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Communiqué

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***Monetary, tax, and innovation policy
key to raising Canadian living standards,
says C.D. Howe study***

Canadians are underemployed, overtaxed, and underproductive, says Pierre Fortin, one of Canada's foremost economists, in the C.D. Howe Institute's annual Benefactors Lecture, delivered in Montreal today. Fortin urges a three-pronged strategy to close the gap between Canadian and US living standards and ensure Canadian prosperity in the future.

Fortin — who is Professor of Economics, Université du Québec à Montréal, and Webster Research Associate, Canadian Institute for Advanced Research — notes that the gap between Canadian and US living standards, which narrowed until the 1970s, ceased closing in the 1980s and began widening in the 1990s. He documents trends in four factors that determined changes in private disposable income per person, a common measure of living standards:

- the effects of changing terms of trade;
- changes in the amount of income generated that stays in the hands of households and businesses after net payments to foreigners and governments;
- changes in output per employed person (labor productivity); and
- changes in the share of the population that is employed.

Through the three decades, the United States experienced relatively little variance in its growth experience. Canada, by contrast, suffered from a decline in relative productivity growth in the 1980s, a relatively poor employment record in the 1990s, and declining prices for key exports.

Looking for causes behind these developments, Fortin emphasizes poor macroeconomic management in Canada in the 1980s and 1990s, when overly lax fiscal policy and overly tight monetary policy combined to produce an explosion of public debt and interest costs, followed by a rise in taxes. To undo the damage, he argues, reforms in both monetary and budgetary policy are needed.

On the monetary side, Fortin urges the Bank of Canada to increase its target range for inflation from its current 1–3 percent to 2–4 percent. He also suggests more aggressive probing of the economy's ability to run at a higher level of capacity use without triggering accelerating inflation — in fact, Fortin argues, structural changes in the economy may now make an unemployment rate as low as 6 percent consistent with stable inflation.

On the budgetary side, Fortin notes that Canadian governments can reduce the ratio of public debt to gross domestic product by half or more over the next 15 years, which would reduce interest costs and allow tax cuts in the \$30 billion range. Using this tax room to lower personal tax rates and move more toward a consumption tax base would, Fortin argues, improve incentives to work and save in Canada.

The causes of Canada's disappointing productivity performance are harder to find, says Fortin, but potentially more important, since macroeconomic changes may produce a one-time increase in Canadian incomes, but faster productivity growth can produce ongoing increases indefinitely. Canada's record in human capital investment is, on the whole, reasonably good. Likely suspects in the poor overall performance are, in Fortin's view, Canada's relatively low spending on research and development (R&D) and low business investment in machinery and equipment. Fortin notes that Canada's relatively generous tax treatment of some forms of R&D, combined with high overall corporate taxes and a rate structure that discriminates against newer services-oriented industries, appears to encourage companies to conduct research in Canada but to exploit the results of their research elsewhere.

To remedy these problems, Fortin recommends lowering Canada's corporate tax rates to below the median of the industrialized countries, reforms to Canada's protection of intellectual property rights, and government investments to encourage the development of technology management and commercialization skills and networking.

A crucial lesson from recent experience, Fortin argues, is how Canada's employment performance, tax burden, and productivity record interact with each other. Just as weak employment can add to the fiscal problem and, through higher taxes, reinforce weak employment, a stronger economy can provide the basis for lower taxes and further strength. He notes that positive action on all these fronts is not only possible but desirable. The strong interaction between full employment, low taxes and fast productivity growth makes a strategy aiming to improve Canada's performance on all three fronts more likely to succeed, he concludes.

The Benefactors Lecture, which is presented annually in the fall, was sponsored this year by North Limited. Past lecturers include economists Paul Boothe, Thomas J. Courchene, Richard Harris, Richard G. Lipsey, John McCallum, and D.G. McFetridge, and political scientist Richard Simeon.

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Communiqué

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Selon une étude de l'Institut C.D. Howe, les politiques monétaires, fiscales et de l'innovation sont essentielles à la clé d'une hausse du niveau de vie des Canadiens

Les Canadiens sont sous-employés, surimposés et sous-productifs, a affirmé M. Pierre Fortin, l'un des plus éminents économistes au pays, dans le cadre de la conférence annuelle des bien-faiteurs de l'Institut C.D. Howe, donnée aujourd'hui à Montréal. M. Fortin propose une stratégie à trois volets pour combler l'écart entre le niveau de vie des Canadiens et celui des Américains, et garantir la prospérité future de la population canadienne.

M. Fortin, qui est professeur d'économie à l'Université du Québec à Montréal et adjoint de recherche Webster à l'Institut canadien des recherches avancées, souligne que l'écart entre le niveau de vie des Canadiens et celui des Américains s'est resserré jusqu'aux années 70, puis est resté stationnaire pendant les années 80 pour commencer à s'élargir dans les années 90. Il cite quatre facteurs dont les tendances ont déterminé les modifications du revenu disponible des particuliers, une mesure du niveau de vie communément employée, soit :

- les effets de l'évolution des termes des échanges internationaux;
- les changements dans la proportion du revenu produit qui reste entre les mains des ménages et des entreprises, compte tenu des paiements nets versés à l'étranger et aux gouvernements;
- l'évolution de la production par travailleur (la productivité du travail);
- les variations dans la proportion de la population qui est employée.

Au cours de cette trentaine d'années, les États-Unis ont connu une croissance assez régulière, tandis que le Canada faisait face à un ralentissement de la croissance de sa productivité dans les années 80, à un taux d'emploi plutôt médiocre dans les années 90 et à des prix à la baisse pour ses principales exportations.

Pour expliquer cette évolution, M. Fortin a fait valoir la piètre gestion macroéconomique du pays dans les années 80 et 90, lorsqu'une politique financière trop permissive a été associée à une politique monétaire trop rigoureuse, entraînant une forte expansion de l'endettement et

des frais d'intérêts publics, suivie d'une hausse des impôts. Pour réparer les dommages, soutient-il, des réformes des politiques monétaires et budgétaires s'imposent.

Sur le plan monétaire, M. Fortin conseille à la Banque du Canada d'augmenter sa fourchette d'inflation-cible, qui est de 1 à 3 %, à 2 à 4 %. Il propose également un examen plus poussé de la mesure dans laquelle la capacité de l'économie pourrait être stimulée sans entraîner une accélération de l'inflation; en fait, indique-t-il, les changements dans la structure de l'économie pourraient maintenant justifier la combinaison d'un taux de chômage pouvant atteindre 6 % et d'un taux d'inflation stable.

Sur le plan budgétaire, M. Fortin observe que les gouvernements canadiens pourraient réduire d'au moins de moitié le coefficient de dette publique par rapport au produit intérieur brut dans les 15 prochaines années, ce qui réduirait les frais d'intérêts et permettrait des réductions d'impôt de l'ordre de 30 milliards de dollars. En profitant de cette marge fiscale pour réduire le taux d'impôt sur le revenu des particuliers et adopter une assiette fiscale axée sur la consommation, l'économiste estime que l'on améliorerait les mesures incitatives à travailler et à épargner au pays.

La cause du rendement décevant de la productivité est plus difficile à cerner, explique M. Fortin, mais cette question pourrait être plus importante, puisque des changements macroéconomiques pourraient entraîner une hausse unique des revenus des Canadiens, tandis qu'une croissance plus rapide de la productivité pourrait entraîner des hausses soutenues. La performance canadienne en matière d'investissement dans le capital humain est, dans l'ensemble, assez bonne. Les raisons probables du rendement généralement médiocre sont, d'après M. Fortin, les suivantes : des dépenses relativement faibles en matière de recherche et de développement (R.-D.), et le trop faible taux d'investissement des entreprises dans le matériel et l'outillage. L'économiste constate que le traitement fiscal plutôt généreux de certaines formes de R.-D., conjugué à des impôts sur les entreprises généralement élevés et à une structure des taux qui nuit aux secteurs plus neufs axés sur les services, semblent encourager les entreprises à mener leurs recherches au Canada, mais à en exploiter les résultats ailleurs.

Pour remédier à ces problèmes, M. Fortin recommande une baisse du taux d'imposition des entreprises au pays pour qu'il soit inférieur à la médiane des pays industrialisés, une réforme de la protection des droits de propriété intellectuelle au Canada, et des investissements gouvernementaux qui favoriseront le développement de la gestion de la technologie, les capacités de commercialisation et le réseautage.

On tire une leçon essentielle des expériences récentes, soutient M. Fortin, et il s'agit de la dynamique entre le taux d'emploi, le fardeau fiscal et la productivité. La faiblesse de l'emploi aggrave le problème fiscal, qui donne lieu à des impôts plus élevés, lesquels entraînent à leur tour un nouvel affaiblissement de l'emploi; de même, une économie plus forte pose les assises d'une réduction d'impôt, qui renforcera d'autant plus l'économie. Il constate que des mesures positives sur tous ces fronts sont non seulement possibles, mais souhaitables. La combinaison du plein emploi, d'un faible taux d'imposition et d'une forte croissance de la productivité augmentera les chances de succès d'une stratégie visant à améliorer le rendement du pays sur ces trois fronts à la fois, de conclure M. Fortin.

La conférence des bienfaiteurs, donnée chaque année à l'automne, est parrainée cette année par North Limited. Au nombre des conférenciers passés, figuraient Paul Boothe, Thomas J. Courchene, Richard Harris, Richard G. Lipsey, John McCallum et D.G. McFetridge, ainsi que le politologue Richard Simeon.

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**C.D. Howe Institute
Benefactors Lecture, 1999**

**The Canadian Standard of Living:
Is There a Way Up?**

by

Pierre Fortin

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and
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Canadian Institute for Advanced Research*

Montreal, October 19, 1999

Sponsored by
North Limited

Foreword

Canada has made significant progress in the past decade toward eliminating fiscal deficits and reducing unemployment. Yet per capita income in this country, after adjusting for taxes, has grown very little compared with that in the United States. Economic growth is a central problem for the economy today, and Canadians are searching for ways to increase opportunities to raise their standard of living.

How can this be achieved? Should taxes be cut? If so, which ones? Have Canadian governments adopted the policies that will best enhance the effectiveness of education and of research and development programs? What roles do monetary and fiscal policy play in determining Canada's economic growth rate?

The 1999 C.D. Howe Institute Benefactors Lecture is well timed to provide an overview of the critical issues related to economic growth today. This year's lecturer is one of Canada's foremost authorities on the subject: Pierre Fortin, Professor of Economics, Université du Québec à Montréal, and Webster Research Associate, Canadian Institute for Advanced Research.

The Institute's aim in presenting the Benefactors Lecture series is to raise the level of public debate on issues of national interest by presenting diverse points of view. In doing so, the Institute hopes to give Canadians much to think about, including information they need to exercise their responsibilities as citizens.

I wish to thank our benefactor for this year's lecture, North Limited, and in particular John LeBoutillier, President and Chief Executive Officer, Iron Ore Company of Canada, whose support also enabled us to make copies of the lecture available free of charge.

The text of the lecture was copy edited by Barry A. Norris and prepared for publication by him and by Wendy Longsworth and Shannon Spencer. As with all C.D. Howe Institute publications, the opinions expressed here are those of the author, and do not necessarily represent the views of the Institute's members or Board of Directors.

Jack M. Mintz
President and Chief Executive Officer
C.D. Howe Institute

During the past year, several important individuals and organizations have expressed concern about the Canadian economy's disappointing recent performance and about its future. In October 1998, the prime minister linked economic prosperity and Canadians' standard of living to long-term productivity growth, and renewed his commitment to organizing policy priorities around what he called the "productivity agenda." Among the requirements for growth, he emphasized fiscal discipline, investment in health, education, training, and public infrastructure, and basic support for science, technology, and research and development (Chrétien 1998).

In December 1998, the Organisation for Economic Co-operation and Development (OECD) congratulated Canadian authorities for their demonstrated commitment to structural reforms (OECD 1998). Crown corporations had been privatized; deregulation was under way in transport, communications, energy, and financial services; freer trade had been achieved among the provinces and with the United States and Mexico; employment insurance (EI) regulations had been rolled back to pre-1970 generosity levels; inflation had been curbed; and structural fiscal deficits had been eliminated. But the OECD noted that, despite these reforms, Canada's economic showing was still poor. The OECD's prescription was to implement more structural reforms: reduce taxes, complete financial services deregulation, further tighten EI, eliminate remaining interprovincial trade barriers, and firm up work incentives.

In April 1999, the Business Council on National Issues (BCNI) echoed the same concern:

Despite the progress of the past decade, Canada is underperforming in a number of key areas. Gains in productivity and innovation are not keeping up with those of our major competitors. Our standard of living is in relative decline. The unemployment rate remains too high. Our currency continues to trend downward. Our global share of foreign direct investment keeps falling. Public debt is too high. Personal taxes are too heavy. The real after-tax incomes of Canadians have stagnated. And Canada's ability to retain and build knowledge-

In the preparation of this lecture, I have greatly benefited from many discussions with past and present colleagues of the Economic Growth and Policy Program of the Canadian Institute for Advanced Research, and from the very detailed and helpful suggestions of the C.D. Howe Institute's research personnel.

intensive activities such as head office operations and research and development is being seriously challenged. (BCNI 1999a, 1.)

To investigate those problems and find solutions, the BCNI launched what it called a “major initiative to overcome barriers to innovation and growth” (BCNI 1999b, 1).

In June 1999, the governor of the Bank of Canada also recognized that Canada’s economic performance over the past quarter-century had been the source of disappointment and concern. In sorting out explanations, he highlighted four trends: “high inflation in the 1970s and 1980s; large and rising fiscal deficits from the mid-1970s to the mid-1990s; a slowdown in productivity growth; and a decline in the prices of primary commodities” (Thiessen 1999, 55). But the recent elimination of inflation and fiscal deficits, the major restructuring of Canadian businesses, and the declining share of primary products in Canadian exports gave the governor reason to be positive about the country’s capacity to meet tomorrow’s challenges.

The prime minister, the OECD, the BCNI, and the governor all acknowledge that Canada’s economic growth performance has been less than startling in recent years, and all agree that slow productivity growth has been part of the problem. While the prime minister and the governor are characteristically optimistic about the future, the tone of the OECD and BCNI interventions is more in the mode of “serious concern about what will happen next.”

The BCNI’s *cri du cœur* is particularly significant. It does not come from a distant international organization or from politicians and civil servants with a vested interest in having everyone believe that prosperity is just about to return — under their farsighted leadership. The BCNI’s members, as its press releases emphasize, administer close to \$1.9 trillion in assets and employ one in ten working Canadians. If those companies are worried, then so we should all.

As the BCNI states, the core problem is that, in recent years, real disposable incomes of Canadians have stagnated while those of Americans have continued to grow. Canada’s economy does not seem to be going anywhere in absolute terms, and the income gap with the United States is widening. Canadians are underemployed, underproductive, and overtaxed, and, given their low prices, exports of primary commodities no longer get us off the hook.

There is no contradiction, however, between those observations and the top marks Canada receives every year from the United Nations' Human Development Index (HDI). Although the HDI gives some weight to real income per capita, it is designed primarily to rank countries according to levels of achievement in health and education. Canada gets the highest score because it does better than any other country in those areas. Arguably, Canada would increase its edge at the top if the HDI included income inequality and physical safety, since not only are Americans, on average, less healthy and less educated than Canadians at this point; they also live in a society that is less egalitarian and less physically safe.

Nevertheless, it is Canada's stagnating real income per capita — its standard of living — that is the primary focus of this lecture since such stagnation, if it persists, could eventually feed back negatively on health and education. Canada would then risk falling to a lower HDI rank.

The connection with health and education underlines a key reason Canadians should care about real economic growth. A rising standard of living provides not only more resources for materialistic individual consumption, but also for improved health, intellectual and social welfare, and cultural undertakings, increased leisure, a cleaner environment, and better social relations. As economist and social critic Robert Frank argues,

these resources could be used to support more time with family and friends, more freedom from congestion and pollution, greater autonomy and flexibility in the workplace, and increases in a variety of other forms of inconspicuous consumption that would enhance the quality of our lives. (1999, 194.)

Real economic growth also facilitates the fight against inequality and poverty, because people are always more ready to share part of an increasing income than to absorb an absolute reduction in a stagnant income. Growth is clearly not *sufficient* for all these things to happen, but it is certainly a *necessary* precondition.

I present my argument in four parts. In the first part, I describe the problem by offering the basic facts about changes in real private disposable income (PDI) per adult in Canada over the past three decades and about trends in income inequality and poverty, both in absolute terms and relative to trends in the United States. With this analysis in mind,

I argue, in the second, third, and fourth parts, respectively, that the Canadian economy has become underemployed, overtaxed, and underproductive. In each case, I assess competing explanations, evaluate future prospects, and make policy prescriptions.

What Happened?

Private disposable income, the focus of the analysis in the section, is all current income that is ready to be spent or saved and that ends up in personal and corporate hands after households and businesses have paid their taxes, received their transfers from governments, and paid their bills to foreigners.¹ The resulting aggregate is in current dollars so that, to reflect comparable purchasing power units over time, it must be corrected for the effect of inflation. This is done by deflating each year's current dollar PDI by the private spending price index (PSPI) for that year, which is the average price Canadians pay for the private consumption and investment goods they buy.² The result of this operation is *real* PDI, calculated in constant purchasing power dollars. Finally, real PDI *per adult* is obtained by dividing real PDI by the working-age (or adult) population.³

Two aspects of this definition require caution. First, real PDI per adult is a measure of the *average* private income of a population. Average income is always a key characteristic of any income distribution, but by itself it provides no information on how equally national income is shared among individuals and classes of society. The way national income is distributed is clearly relevant to economic welfare, and I examine this issue later.

1 This notion of income adds up all income originating from gross domestic product (GDP) that can be disposed of by the private sector. It is wider than the usual concept of personal disposable income in that it includes undistributed corporate profits and personal and corporate depreciation charges.

2 In national accounts terminology, the PSPI is the implicit price index for C + I — that is, the deflator for the sum of personal consumption spending and business capital formation.

3 For Canada, the adult population refers to those ages 15 and over; in the case of the United States, it is those who are 16 and over — reflecting the different ways the two countries' labor force surveys define the working-age population.

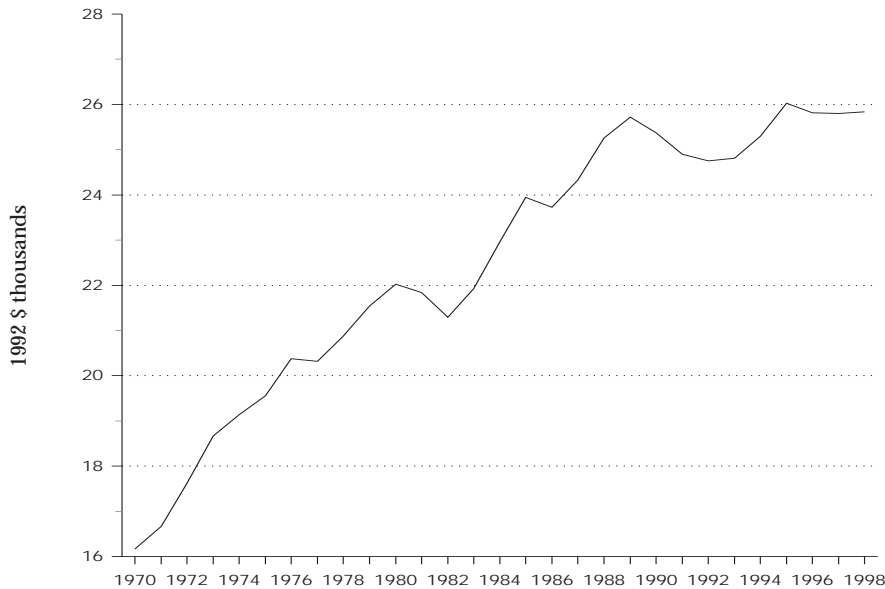
Second, the decision to focus on *private* after-tax-and-transfer income is not insignificant. It means that researchers abstract from the contribution of *public* disposable income — defined as taxes net of government transfers — to national welfare through the provision of government services such as national defense, health care, and education. My rationale for examining private disposable income separately is purely practical: quite simply, most current discussion about Canadians' standard of living is conducted in terms of the privately disposable portion of national income, since the national tax burden has become a central issue in discussions of economic performance. But I do not neglect the impact of publicly disposable income and spending on economic growth and welfare in the analysis to follow.

Trends in Real PDI per Adult since 1970

The popular view is that Canadians' average real PDI has decelerated, then stagnated, over the past quarter-century, an impression that is supported by the data presented in Figure 1. There was strong growth in real PDI per adult between 1970 and 1979, particularly between 1970 and 1973. Income per head in 1979 was 33 percent above its 1970 level — an average growth rate per adult of 3.2 percent per year. Between 1979 and 1989, growth slowed down to a cumulative increase of 19 percent, or 1.8 percent per year. In the 1990s, the growth engine has come to a near-complete stop. In 1998, seven years after the recession trough of 1991, real PDI per adult was a mere 0.5 percent above its 1989 peak level.

To a large extent, the widespread feeling that Canadians are being left behind economically comes from the comparison of Canada's economic performance with that of the United States. Figure 2 shows how the *ratio* of Canadian to US real PDI per adult has changed since 1970. The most remarkable feature is the sharp reversal in the trend between the late 1970s and the 1990s, again confirming popular intuition. Between 1970 and 1979 (a peak year for the North American business cycle), Canadian real PDI per adult increased cumulatively by 16 percent *more* than US real PDI per adult, bringing average private purchasing power in Canada to 75 percent of average US purchasing power in 1979, from 64 percent in 1970. Since 1979, the combination of steady income

Figure 1: *Real Private Disposable Income per Adult, Canada, 1970–98*



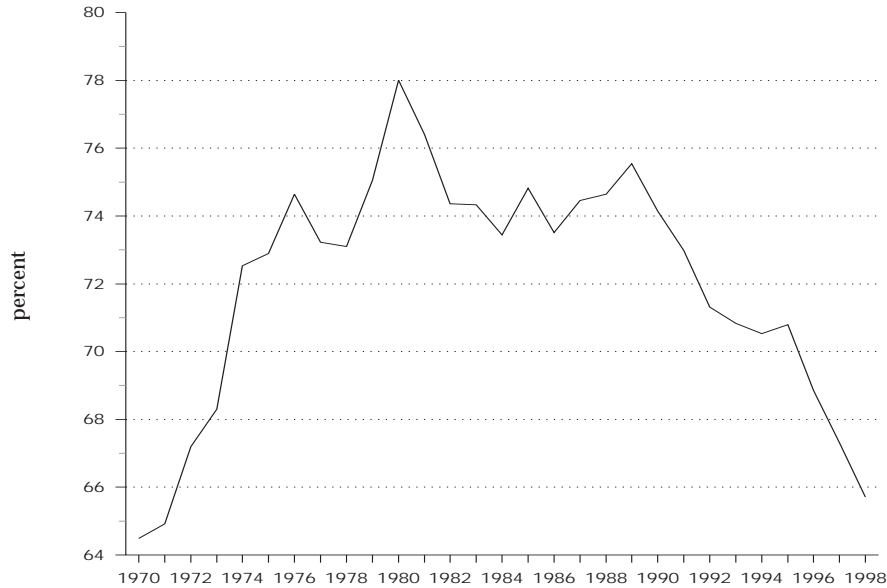
Source: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.

growth in the United States and income slowdown and stagnation in Canada has obliterated all the relative gains Canada made during the 1970s. By 1998, real PDI per adult in Canada had fallen to 66 percent of its US counterpart — almost back to the 1970 level.

It is crucial to observe here that Canada's poor relative income performance over the past two decades does not reflect some abnormally strong performance of US real income per head. Two decisive pieces of evidence refute such an assertion. First, in absolute terms, US real PDI per adult actually grew by 1.5 percent in the 1970s, by 1.7 percent in the 1980s, and by 1.6 percent in the 1990s; there has been no acceleration of US income per head. Second, in relative terms, international data for the 1988–98 period carry the same message as Table 1 shows:⁴ Canada has indeed done poorly over the past ten years by international standards, while the United States' performance has been good, but not startling. In

⁴ Real GDP per capita in the OECD data is closely related, but not equal, to real PDI per adult. It is a before-tax-and-transfer concept, it is deflated by an output price index instead of a spending price index, and it is divided by the total population instead of the adult population.

Figure 2: *Purchasing Power of Real Private Disposable Income per Adult, Canada as a Percentage of the United States, 1970–98*



Note: The ratio between Canadian and US real PDI per adult incorporates an estimate of relative purchasing power in the two countries. Statistics Canada estimates that in 1992 it cost C\$126 in Canada to purchase a representative basket of private consumption and investment goods worth US\$100 in the United States.

Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

other words, using the United States as the reference economy among all industrial countries amounts to comparing the Canadian performance with an *average* performance, not with an impossible standard. Using Ireland, Portugal, Norway, the Netherlands, or Spain as benchmarks instead of the United States would have made Canada's outcome look comparatively much worse.

As mentioned earlier, considering only *private* disposable incomes exaggerates the extent to which Canada lags behind the United States. Over the past 30 years, due largely to higher government tax revenue, public disposable income (tax revenue less government transfers) in Canada has exceeded that in the United States by an amount representing about 3.5 percent of GDP on average. With these additional resources, Canadian governments have supplied more public goods and services than have US governments. Adding up public and private disposable incomes and comparing Canada and the United States on the

Table 1: *Cumulative Increase in Real GDP per Capita, 25 OECD Countries, 1988–98*

Rank	Country	Increase <i>(percent)</i>
1	Ireland	92.2
2	South Korea	60.9
3	Luxembourg	41.2
4	Portugal	32.6
5	Norway	30.3
6	Netherlands	26.2
7	Spain	25.7
8	Denmark	21.8
9	Austria	21.7
10	Australia	20.4
11	Belgium	19.3
12	United States	18.5
13	Japan	16.8
14	Mexico	16.3
15	Greece	14.9
16	France	14.5
17	Germany	14.3
18	United Kingdom	14.0
19	Italy	13.5
20	Finland	13.4
21	Iceland	10.7
22	Sweden	7.3
23	New Zealand	5.7
24	Canada	5.0
25	Switzerland	4.9

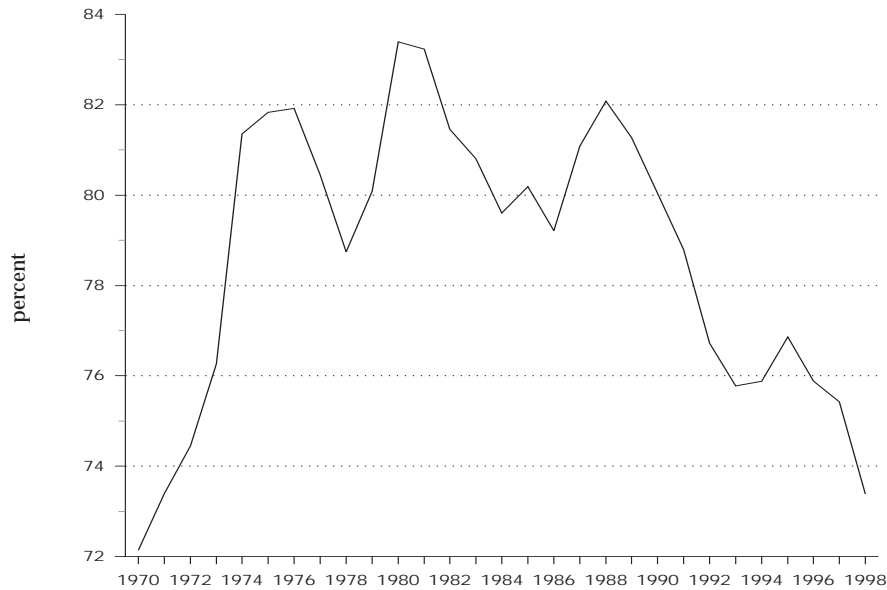
Note: The four poorest OECD countries — the Czech Republic, Hungary, Poland, and Turkey — are omitted.

Source: Organisation for Economic Co-operation and Development, *National Accounts, Main Aggregates 1960–1997, Volume 1*, 1999 ed. (Paris: OECD, 1999); updated with data from *Main Economic Indicators*, May 1999.

basis of the resulting *total* national income should give a more accurate and less unfavorable picture of Canada's relative standard of living.⁵

⁵ I consciously avoid here the controversy about the comparative value of a dollar of private consumption or investment versus a dollar of public services or infrastructure. Both the private market system and the political system have their strengths and shortcomings. Conservative economists such as Milton Friedman assert that a dollar of private spending is more valuable than a dollar of public spending; liberal economists such as John Kenneth Galbraith argue that the opposite is true.

Figure 3: *Purchasing Power of Total Real National Income per Adult, Canada as a Percentage of the United States, 1970–98*



Note: GNP is the sum of incomes that are disposable for spending or saving by the private and public sectors after net payments to foreigners have been made — which is why it is called gross *national* product instead of gross *domestic* (territorial) product. It is deflated by the total domestic spending price index (TSPI), which is the average price Canadians pay for all the private and public consumption and investment goods and services they buy.

In national accounts terminology, the TSPI is the implicit price index for C + I + G, sometimes called the absorption price index. As in Figure 2, based on Statistics Canada's bilateral comparisons of purchasing power, the ratio between Canadian and US real GNP per adult assumes that in 1992 it cost C\$123 in Canada to purchase a representative basket of private and public consumption and investment goods worth US\$100 in the United States.

Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

The comparison is made in Figure 3, which traces the purchasing power of gross national product (GNP) per adult in Canada relative to the United States back to 1970. Comparing this figure with Figure 2 confirms that Canada's relative income position looks better when total national income, rather than just the privately disposable portion, is taken into account. For example, one can see that for 1980 the comparison puts average Canadian income at 78 percent of average US income if private income alone is considered, but at 83 percent if both private and public incomes are added up. Similarly, for 1998 the Canada-US private income ratio is 66 percent, but the total income ratio is 73 percent.

The comparison of Figures 2 and 3 is no more than a sophisticated way of reporting the presence of a larger public sector in Canada than in the United States. It does not allow inferences about whether the overall welfare of Canadians would improve or deteriorate if the public sector were smaller and less redistributive and the private sector were accordingly larger. One can immediately note, however, that the time pattern of the national income ratio in Figure 3 looks very similar to that of the private income ratio in Figure 2. In both pictures, the Canada-US ratio rises strongly between 1970 and 1980 and then goes through an accelerating decline between 1980 and 1998. This indicates that much more than an increase in the tax burden is needed to explain the relative drop in Canadian after-tax incomes since 1980. I further clarify matters in the following section by breaking down changes in real PDI per adult into their source components.

Four Components of Real PDI per Adult

A natural way to break down real PDI per adult is to think of it as the product of four elements: labor productivity, the employment rate, the private-income retention rate, and the terms-of-trade effect. This decomposition is an identity that is always true by construction, but it is a meaningful one that focuses attention on important sources of economic welfare; I rely on it to offer a preliminary interpretation of the economic events of the past three decades. Given their crucial importance for what follows, the four elements require some attention, and can be understood in three steps.

The first step is to recognize that the most important source of private disposable income is the total value of things produced within Canada's borders each year — namely, GDP itself. Real GDP per adult is total real wealth created annually per adult. But a country can create more real wealth per adult in only two ways: either by increasing real output per worker (with better ideas, better education and training, more advanced technologies, better work organization, more and higher-quality machinery and equipment), or by putting a larger fraction of the adult population to work. The first way is an indication of exactly what economists mean by *labor productivity*. The second way is an increase in the employment-to-population ratio, which I refer to for con-

venience as the *employment rate*. Real GDP per adult is just the product of labor productivity and the employment rate.

The second step is to observe that PDI is not total income generated by GDP, but only the fraction of GDP that ends up in private hands after accounting for taxes, government transfers, and net foreign payments. I call this fraction the *private-income retention rate*. For analytical purposes, it is useful to identify separately the three sources of the net income leakage between GDP and PDI: the overall tax rate, the overall transfer rate, and the net foreign payment rate, which are equal, respectively, to the fractions of GDP that are taxed, transferred by governments to domestic households and businesses, and paid out to foreigners. For example, an overall tax rate of 35 percent of GDP, an overall transfer rate of 15 percent of GDP, and a net foreign payment rate of 3 percent of GDP give a private-income retention rate of $100 - 35 + 15 - 3 = 77$ percent of GDP.

The third step in breaking down real PDI per adult into its basic elements is to note a fine, but crucial point: the average price Canadians get for the total GDP they produce and sell (the output price index, OPI) need not be the same as the average price Canadians pay for the consumption and investment goods they buy with their PDI (the private spending price index, PSPI).⁶ There is an overlap between the two, because Canadians do buy much of what they produce. But the presence of imports and exports, in particular, may create a wedge between them, because the OPI incorporates the prices of the exports Canadians produce but do not buy, while the PSPI includes the prices of the imports Canadians buy but do not produce. So, to get real PDI from real GDP requires multiplying the latter by the OPI-PSPI ratio. Changes in that price ratio mostly reflect changes in the average price of exports relative to the average price of imports. I accordingly slip into a slight abuse of language and call the OPI-PSPI ratio the *terms-of-trade effect*. The practical importance of the terms-of-trade effect for the evolution of real disposable income cannot be underestimated in a country that is a large exporter of primary products. When world prices of such commodities as cereals, energy, lumber, pulp and paper, and metals rise, Canadians become richer by the mere fact that the rest of the world puts a greater value on our exports of primary products.

⁶ In national accounts terminology, the OPI is the implicit price index for $C + I + G + X - M$ — that is, the GDP price deflator, as we have seen.

To summarize, there are only four ways private households and corporations can get richer: by putting more people to work, by producing more output per worker, by retaining a larger fraction of domestic income after tax, transfer, and net foreign payments, and by cashing in on higher relative export prices. The arithmetical way of stating this, as shown in Box 1, is to express real PDI per adult as the *product* of the employment rate, labor productivity, the private-income retention rate, and the terms-of-trade effect. Equivalently, the annual percentage change in real PDI per adult must be approximately equal to the *sum* of the annual percentage changes in those four elements.

Trends in Components of Real PDI per Adult since 1970

The decomposition of real PDI per adult into the four standard components I have just presented will be helpful in structuring facts and interpreting the absolute stagnation and relative decline that Canadian real incomes have suffered in the recent past. It will also later prove useful in guiding policy prescriptions and projections into the future. Needless to say, tracking and interpreting the time paths of the four components over 30 years for both Canada and the United States can be burdensome. Fortunately, the broad trends are clear and simple to describe.

Table 2 presents the average annual growth rates of real PDI per adult in the two countries as sums of the average rates of change in the four components for each of the three decades 1970–79, 1979–89, and 1989–98. The table also shows the differences between the Canadian and US numbers. It captures the contributions the four components made in each period to the *intercountry difference* in average growth rates of real PDI per adult, which is the same as the average growth rate of the *ratio* between the Canadian and US real PDI per adult during that period. The intercountry differences form the basis for assessing Canada's income performance relative to that of the United States.

Table 3 indicates how the numbers reported in Table 2 change from 1970–79 to 1979–89 and from 1979–89 to 1989–98. Thus, it calculates the contributions the four components made to the changes from one decade to the next in each country's average growth rates of real PDI per adult as well as in the intercountry differences in average growth rates.

**Box 1: The Four Source Components of
Real Private Disposable Income per Adult**

Real private disposable income per adult can be identically expressed as the *product* of four source components:

$$\text{real PDI per adult} = \text{employment rate} \times \text{labor productivity} \times \text{private-income retention rate} \times \text{terms-of-trade effect.}$$

Equivalently, the growth rate of real PDI per adult is approximately the *sum* of the individual growth rates of those four components.

Definitions

Real PDI per adult is equal to private disposable income divided by the private spending price index and by the total working-age population (ages 15 and over in Canada; 16 and over in the United States). In turn, PDI is equal to gross domestic product *less* all tax payments to governments, *plus* all transfers received from governments (transfers to persons, business subsidies, and net payments of interest on the public debt), *less* all net payments of interest, dividends, and transfers to foreigners.

The *employment rate* is the percentage of the total working-age population that has jobs (according to Statistics Canada's *Labour Force Survey*).

Labor productivity is equal to real GDP per worker. In turn, real GDP is equal to current dollar GDP divided by the GDP price deflator or output price index.

The *private-income retention rate* is the ratio between PDI and GDP.

The *terms-of-trade effect* is the ratio between the output price index and the private spending price index.

Finally, note that the traditional measure of domestic wealth creation, real GDP per adult, is the product of the first two components — that is,

$$\text{real GDP per adult} = \text{employment rate} \times \text{labor productivity.}$$

The growth rate of real GDP per adult is therefore the sum of the growth rates of the employment rate and labor productivity.

Table 2 confirms the three main observations made earlier concerning the growth of income per adult in the two countries over the three decades. First, Canadian real PDI per adult decelerated from 3.2 percent per year in the 1970s to 1.8 percent per year in the 1980s to basically zero in the 1990s. Second, the growth rate of US real PDI per adult was stable at around 1.6 percent per year across the three decades; it was not faster

Table 2: Components of the Growth Rate of Real Private Disposable Income per Adult, Canada and the United States, 1970-98

	Component														
	Terms-of-Trade Effect		Private-Income Retention Rate		Labor Productivity		Employment Rate		Total						
	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	
1970-79	0.48	-0.10	0.58	0.41	0.21	0.20	1.45	0.91	0.54	0.85	0.48	0.37	3.19	1.50	1.69
1979-89	0.27	0.06	0.21	0.05	0.18	-0.13	0.92	0.98	-0.06	0.53	0.49	0.04	1.77	1.71	0.06
1989-98	-0.08	0.21	-0.29	-0.22	0.02	-0.24	0.84	1.17	-0.33	-0.49	0.20	-0.69	0.05	1.60	-1.55

(average annual percentage change)

Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; idem, *The Labour Force*, cat. 71-001, various issues; United States, Department of Commerce, *Survey of Current Business*, various issues; idem, Bureau of Labor Statistics, *Employment and Earnings*, various issues.

Table 3: Changes in the Growth Rate of Real Private Disposable Income per Adult, by Component, Canada and the United States, 1970-79 to 1979-89 and 1979-89 to 1989-98

	Component														
	Terms-of-Trade Effect		Private-Income Retention Rate		Labor Productivity		Employment Rate		Total						
	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	Canada	US	
1979-89	-0.21	0.16	-0.37	-0.36	-0.03	-0.33	-0.53	0.07	-0.60	-0.32	0.01	-0.33	-1.42	0.21	-1.63
less 1970-79															
1989-98	-0.35	0.15	-0.50	-0.27	-0.16	-0.11	-0.08	0.19	-0.27	-1.02	-0.29	-0.73	-1.72	-0.11	-1.61
less 1979-89															

(average annual percentage change)

Sources: See Table 2.

in the 1990s than in the previous two decades. Third, as a result, Canadian income per head increased 1.7 percent per year faster than US income per head in the 1970s but 1.6 percent per year more slowly in the 1990s.

Inspection of the US data in Tables 2 and 3 reveals a fourth important fact. Not only was the overall growth of US real PDI per adult very stable across the three decades but, quite remarkably, the respective contributions of its four source components were also individually stable over time. The terms-of-trade effect and labor productivity improved slightly (but only slightly) and the private income retention rate and the employment rate deteriorated a bit (but only a bit). This means that the factors behind the deterioration in Canada's relative income performance were to a large extent Canadian events and only to a small extent US events. The data in Table 3 for decennial changes in intercountry growth rate differentials are, therefore, not too different from the data for changes in Canadian absolute growth rates.

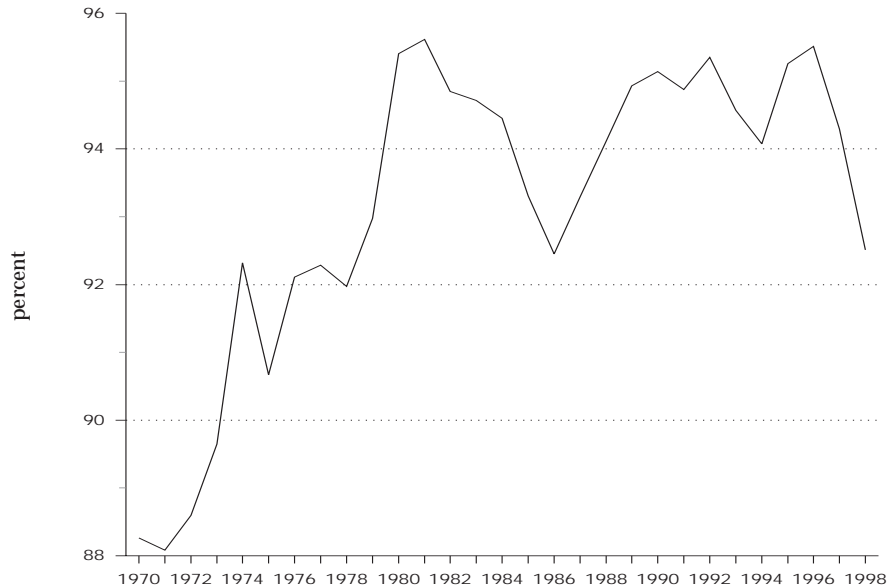
What have been the sources of the absolute and relative trends in Canadian incomes since 1970? Table 3 shows that, from decade to decade, all four components of real PDI per adult contributed to Canada's absolute income slowdown and decline relative to the United States. But the main factor causing the slowdown has not been the same over time. In the 1980s, it was, by a modest margin, the decline in Canadian labor productivity. In the 1990s, the dominant factor, by a wide margin, has been the large drop in the employment rate. Productivity had little to do with the additional difficulties of the 1990s.

The next few paragraphs provide a more detailed review of the specific contributions of the four components of income growth.

The Terms-of-Trade Effect

I begin with the terms-of-trade effect, which captures the possibly divergent trends in the average price Canadians get for the output they produce (the OPI) and the average price Canadians pay for what they spend privately (the PSPI). The data in Tables 2 and 3 are completed here by Figure 4, which shows the trajectory of the ratio between the Canadian and US terms of trade. The striking fact in both the tables and the figure is that, since the early 1980s, the terms-of-trade effect has become less favorable to Canadian income growth and more favorable to US income

Figure 4: *Terms-of-Trade Effect: Ratio between Output and Spending Price Indices in Comparable Purchasing Power Units, Canada as a Percentage of the United States, 1970–98*



Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

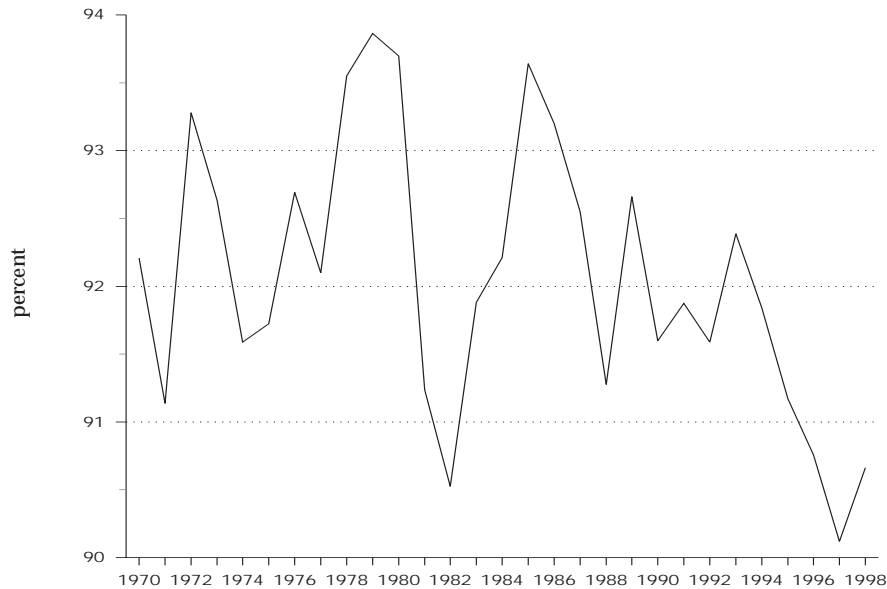
growth. The absolute and relative deterioration of Canada's terms of trade was not a dominant factor in the country's underperformance of either the 1980s or the 1990s, but it was a moderate and steady contributor.

This phenomenon is a result not of domestic factors but of the long-term downward trend in relative prices of the primary products of which Canada is a net exporter and the United States is a net importer in world markets. There is not much one can do about this trend except to facilitate the reallocation of private and public resources in the required direction with appropriate macro and micro policies.

The Private-Income Retention Rate

The private-income retention rate is the fraction of GDP that ends up in private hands after accounting for the net income-withdrawal effects of three factors: net foreign payments, taxation, and government transfers. The first two reduce private disposable income, while the third increases it. Tables 2 and 3 show that the private-income retention rate in

Figure 5: *Private-Income Retention Rate: Fraction of GDP Retained as Private Disposable Income, Canada as a Percentage of the United States, 1970–98*

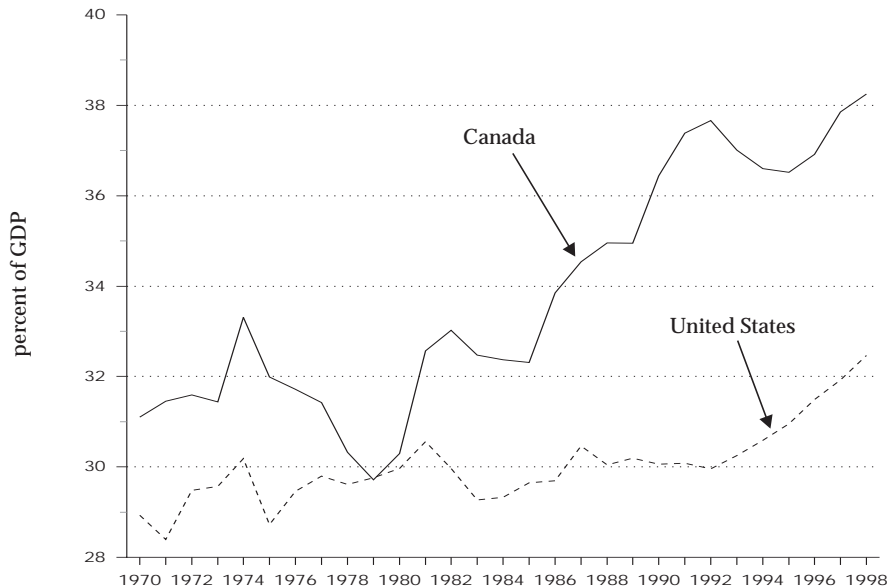


Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

Canada turned from very supportive of private income growth in the 1970s to somewhat unfavorable in the 1990s. In the United States, it changed from mildly supportive in the 1970s to neutral in the 1990s. Figure 5 shows that there has been some movement, but not a persistent trend, in the *ratio* between the Canadian and US retention rates. The Canadian private-income retention rate has always been below the US rate, increasing slightly from 90 percent to 93 percent of the US rate in the first half of the 30-year period, and returning toward 90 percent in the second half.

That absolute and relative trends in private-income retention have not been an important influence on absolute and relative PDI growth over the past three decades may come as a surprise to those who believe that the rising tax burden in Canada has been a major cause — if not *the* major cause — of the absolute stagnation and relative decline of Canadian private incomes in recent years. The explanation for this gap between perceptions and reality is that, while higher taxes have reduced PDI relative to GDP, larger government transfers (including increased

Figure 6: *Total Taxes as a Percentage of GDP, Canada and the United States, 1970–98*



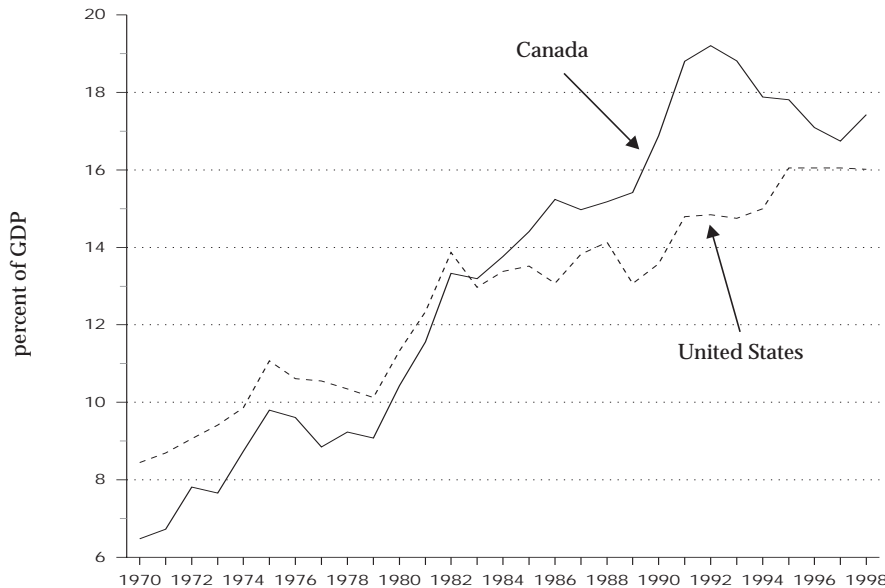
Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

interest payments on the public debt) have had the opposite effect of increasing PDI relative to GDP. The resulting net effect on average PDI — counting transfer recipients as well as taxpayers — has been small.

Figures 6 and 7 clarify the picture. It is apparent from Figure 6 that Canada's overall tax rate was reduced to 30 percent of GDP in 1980 — the same as the US tax rate for that year. It then rose dramatically in the 1980s, finally exceeding 38 percent of GDP in 1998, 5.5 percentage points above the US level. Meanwhile, however, as Figure 7 shows, the overall transfer rate in Canada rose to 17 percent of GDP in 1998 (above the US level) from 9 percent in the late 1970s (below the US level). The combined effect of these trends in taxes and transfers is that the amount of income withdrawn from private hands by the Canadian public sector hardly moved between 1980 and 1998: it was $30 - 9 = 21$ percent of GDP in 1980, and $38 - 17 = 21$ percent in 1998. As a result, the differential with the United States in net income withdrawal by governments increased from 1980 to 1998, but only moderately.

The fact that the net accounting impact of simultaneous increases in tax and transfer rates on aggregate Canadian PDI was negligible be-

Figure 7: *Total Government Transfers as a Percentage of GDP, Canada and the United States, 1970–98*

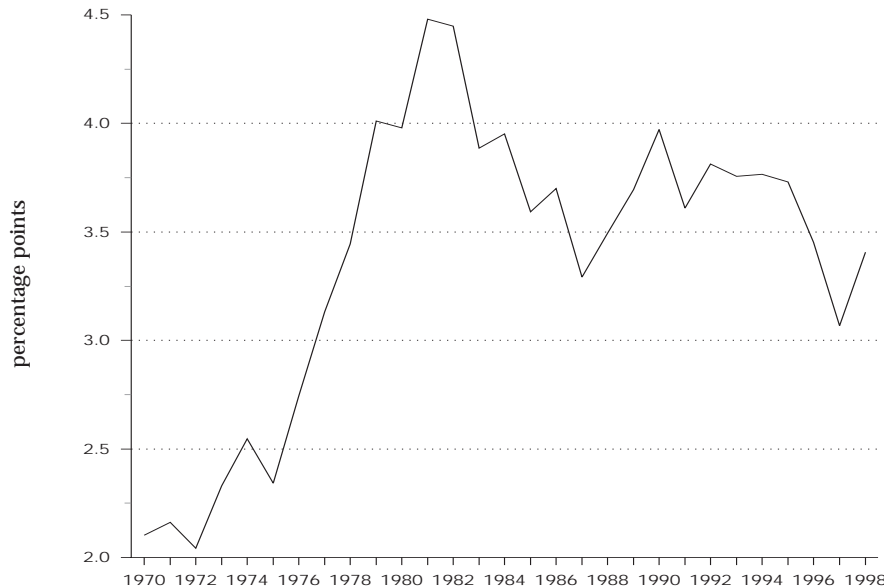


Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

tween 1980 and 1998 by no means implies that there is no “Canadian tax problem.” Increases in tax-and-transfer rates affect incomes not only through the direct accounting channel just described, but also through indirect effects — on economic efficiency and on income distribution. First, economic efficiency and, hence, total GDP were likely reduced. There is a strong presumption in the public finance literature that inefficiencies caused by rising taxes and transfers — ranging from standard distortions in resource allocation to tax evasion and migration — increase more than proportionately with the tax-and-transfer rates. This includes cases in which the overall tax rate has increased to finance rising interest payments on an exploding public debt. (Recall that those interest payments are part of the national accounts concept of “transfers.”)

Second, income distribution was modified. Various income groups neither pay the same amounts in taxes nor receive the same amounts in transfers. One naturally expects groups that pay large sums in taxes and receive little in government transfers to complain loudly. While the average PDI of all Canadians was not changed by increases in tax and transfer rates over the 1980–98 period, the PDI of taxpayers must have

Figure 8: *Net Foreign Payments as a Percentage of GDP, Canada less the United States, 1970–98*



Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; United States, Department of Commerce, *Survey of Current Business*, various issues.

been negatively affected. Considerations of efficiency and equity raise issues of the optimal tax-and-transfer burden and the redistributive function of governments, to which I return later in the paper.

The final element affecting private-income retention rates is net payments of interests, dividends, and transfers to foreigners. To simplify, Figure 8 shows the time path of the *difference* between the net fractions of GDP that Canada and the United States paid out to foreigners between 1970 and 1998.⁷ Most of the variations reflect changes in the Canadian fraction: in the second half of the 1970s, the relative importance of payments to foreigners as a fraction of GDP jumped by about two percentage points. This had the effect of slowing down a bit the otherwise rapid increase in the ratio of Canadian to US PDI during that period. Since 1982, the Canada-US differential in net foreign payments has declined, thus providing some support for relative Canadian incomes. Thus, for most of the 1980s and 1990s, the burden of net foreign pay-

⁷ Note that the United States was a net *recipient* of factor income from the rest of the world until 1997.

ments was not a contributor to the widening private income gap between Canada and the United States.

Labor Productivity

The third source of changes in real PDI per adult is the growth rate of labor productivity — real GDP per worker. Look again at Table 2, which underlines two broad facts concerning productivity trends in Canada and the United States. First, after averaging 1.5 percent per year in the 1970s, Canadian productivity growth declined to 0.9 percent per year in the 1980s and has stayed in that neighborhood in the 1990s. Second, US productivity growth was remarkably stable through the entire period, averaging 1 percent per year from 1970 to 1998 — a little less in the 1970s, a little more in the 1990s. The “Canadian productivity problem” is, therefore, that Canada had an edge over the United States in productivity growth before 1980 (actually, before 1974) that it lost thereafter. The problem is not so much that Canada’s productivity is growing more slowly than that of the United States, but that it has stopped growing more quickly. In the past quarter-century, it has not been possible — as it was in the previous quarter-century — to count on faster productivity growth to help Canadian incomes catch up with US incomes.⁸

Table 2 also shows that, in Canada, productivity growth was very favorable to real income growth in the 1970s, but much less so in the 1980s and 1990s. In the United States, productivity growth was modestly supportive of real income growth in all three decades.

Table 3 emphasizes the point I made earlier that the decline in Canadian productivity growth was the most important factor in the absolute

⁸ The productivity data on which the summary statistics of Table 2 are based are not the only aggregate productivity numbers that are publicly available. Statistics Canada and the US Bureau of Labor Statistics calculate labor productivity series defined as output per hour of work (instead of per worker) for the business sector (excluding government). The two organizations also publish multifactor productivity series defined as output per unit of a composite of inputs (including labor, machinery and equipment, and other primary inputs) for the business sector. But while they differ in the details from the coarser data in Table 2, the productivity growth rates based on these alternative measures carry the same basic message about intertemporal changes and intercountry differences in productivity growth: before the mid-1970s, Canadian productivity was growing faster than US productivity; since then, productivity advances in the two countries have been similarly slow and without any clear tendency to increase or decrease.

and relative slowdown of Canadian income growth in the late 1970s and the 1980s, but has played only a minor role in the further deterioration of Canada's income performance in the 1990s.

Figure 9 shows that Canadian labor productivity increased from 81 percent of US labor productivity in 1970 to a stable plateau at around 84.5 percent between 1975 and 1995. The sudden drop in the ratio to 82 percent by 1998 is an eye-catching development, but to an undetermined extent it is due to an important revision of US measurement procedures (Gordon 1999) that Canada has not entirely followed.

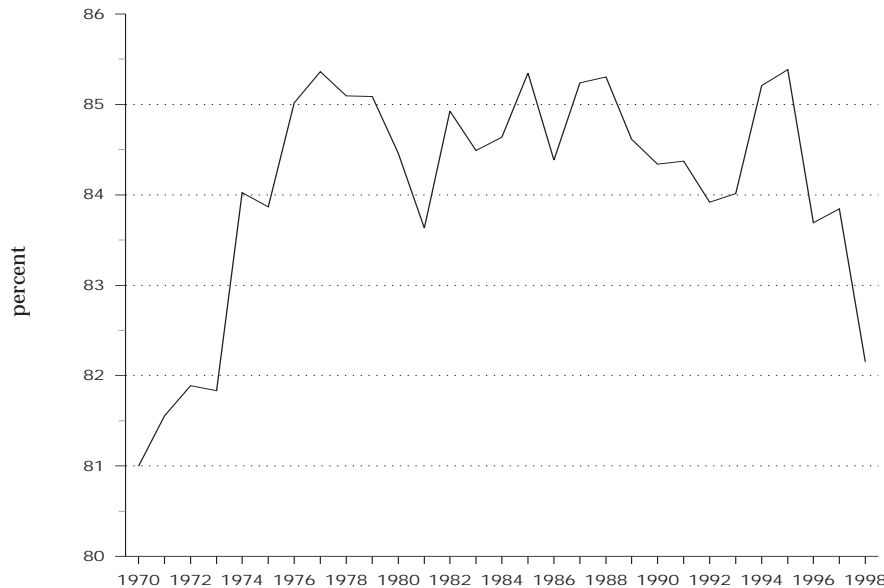
The Employment Rate

The final contributor to trends in real PDI per adult is changes in the employment rate — the percentage of the adult population who have jobs. Referring again to Table 2, one can see the startling turnaround of the growth of Canada's employment rate from an average *increase* of 0.8 percent per year in the 1970s to an average *decrease* of 0.5 percent per year in the 1990s. Meanwhile, the US employment rate increased in all three decades, although the rate of growth slowed down from 0.5 percent per year in the 1970s and 1980s to 0.2 percent per year in the 1990s.

Table 3 calculates that the reversal of the increase in the employment rate in the 1990s explains almost 60 percent of the drop in the annual growth rate of real PDI per adult in Canada from 1.8 percent in the 1980s to zero in the 1990s. In fact, considering real wealth creation alone (the growth of real GDP per adult), 90 percent of the deterioration in Canada's economic performance in the 1990s relative to the 1980s reflects the setback in the growth of the employment rate and only 10 percent the small slowdown in productivity. The employment rate turnaround also explains 45 percent of the drop in the Canadian-US PDI-per-adult ratio from the 1980s to the 1990s, and 75 percent of the fall in the GDP-per-adult ratio. Figure 10 provides visual evidence that the Canadian employment rate caught up with the US rate in the 1970s, increased as rapidly as the US rate in the 1980s, but fell sharply in absolute and relative terms over the 1990–96 period, and began to recover only after 1996. In 1998, Canada's employment rate was still 4.5 percent below its 1989 peak and 6 percent below the US rate.

A drop in the employment rate says nothing, however, about the implications of this development for the welfare of Canadians. At one

Figure 9: *Labor Productivity: Real GDP per Worker in Comparable Purchasing Power Units, Canada as a Percentage of the United States, 1970–98*



Note: This figure is constructed according to the purchasing power parity assumption that it cost C\$123 in Canada in 1992 to purchase a representative basket of private and public consumption and investment goods worth US\$100 in the United States

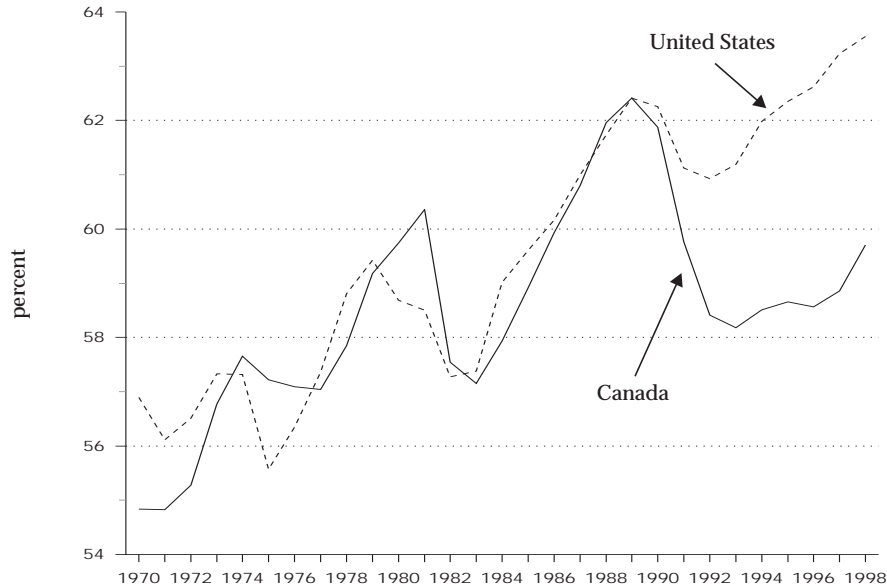
Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.; idem, *The Labour Force*, cat. 71-001, various issues; United States, Department of Commerce, *Survey of Current Business*, various issues; idem, Bureau of Labor Statistics, *Employment and Earnings*, various issues.

extreme, the drop might reflect a voluntary decline in the general propensity to seek employment: perhaps Canadians want to spend more time with friends, go to school, or play golf. At the other extreme, the drop could reflect a decrease in the number of jobs available, which would keep many Canadians involuntarily unemployed. I look at the evidence on these alternative possibilities later in the lecture.

Trends in Income Inequality

So far, I have analyzed trends in Canadian incomes since 1970 in terms of *average* private disposable income. But whether average income increases or decreases says nothing about the degree of income inequality — that is, what happens to the *distribution* of income around that average. In particular, it is mute on the poverty rate — that is, the fraction of

Figure 10: *Employment Rate: Total Employment as a Percentage of the Working-Age Population, Canada and the United States, 1970–98*



Note: The figure incorporates a small downward correction of official US data on the employment rate. The US definition is made consistent with the Canadian definition of the adult population, which includes the 15-year-old group.

Sources: Statistics Canada, *The Labour Force*, cat. 71-001, various issues; United States, Bureau of Labor Statistics, *Employment and Earnings*, various issues.

the population living below some agreed-on low-income cutoff. Income inequality and poverty are key aspects of national economic welfare. Learning about them will complete this review of Canada's recent income performance. Fortunately, two Statistics Canada researchers, Michael Wolfson and Brian Murphy (1998) provide a fairly comprehensive survey of income inequality and poverty in Canada and the United States.

Wolfson and Murphy capture the degree of income inequality by looking at the percentages of total income going to the five 20 percent slices (quintiles) of the population ordered by rising income levels. The higher-income quintiles receive more than 20 percent of total income, and the lower-income quintiles receive less than 20 percent. The question is how much more and how much less in each case. As for poverty, Wolfson and Murphy measure it as the percentage of families whose disposable income is less than 50 percent of median family income (adjusted for size and composition). This is the most widely used measure

Table 4: Trends in Income Inequality and Poverty, Canada and the United States, 1974 and 1995

Income Definition and Group	Canada		United States	
	1974	1995	1974	1995
	<i>(percentage of total income)</i>			
Pre-tax earnings from jobs and self-employment				
Men, ages 18–64				
Bottom quintile	4.8	3.5	4.2	3.4
Top quintile	40.2	43.2	41.9	49.2
Women, ages 18–64				
Bottom quintile	3.2	3.1	2.8	3.1
Top quintile	43.2	44.6	44.4	47.0
Family disposable income ^a				
Bottom quintile	6.1	7.5	5.6	4.7
Top quintile	38.5	38.1	40.2	44.2
	<i>(percentage with disposable income < 50% of median family income)^a</i>			
Low-income families	17.5	12.1	18.2	19.8

^a Adjusted for family size and composition.

Source: Wolfson and Murphy 1998.

of relative poverty internationally, and differs somewhat from Statistics Canada's measure based on low-income cutoff points.

Table 4, drawn from the Wolfson and Murphy study, summarizes the income inequality and poverty picture. The phenomenon of income inequality is complex and must be looked at in several dimensions; the table presents the facts in five of them: country (Canada or United States), year (1974 or 1995), type of income (before and after taxes and transfers), gender, and quintile (top or bottom).

Four results stand out. First, for the two years, the two genders, and whether before tax or after tax, income is always more unequally distributed in the United States than in Canada. Second, from 1974 to 1995, the distribution of pre-tax earnings becomes more unequal in both countries, but less so in Canada and among women. Third, for the two years and the two countries, after-tax-and-transfer disposable family income is always less unequal than before-tax earnings. Fourth, again

from 1974 to 1995, the distribution of after-tax family income becomes less unequal in Canada and more unequal in the United States.

Three additional developments in income inequality since the mid-1970s have been identified in the literature, but are not reported in Table 4. First, in both Canada and the United States, the population with less than a high school education has been experiencing increasing difficulty in the mainstream labor market. Twenty years ago, in 1979, 82 percent of men ages 25 to 54 with less than nine years of schooling were employed; in 1998, no more than 62 percent held jobs (Statistics Canada 1999). Among this group, unemployment and inactivity have made major strides. Second, since 1975 the wage premium earned by someone with a university degree over someone with only a high school education has increased by about 15 percent in the United States, but not at all in Canada (Murphy, Riddell, and Romer 1998). This has been an important emerging difference between the labor markets of the two countries. Third, the earnings gap between younger and older workers has widened, particularly in Canada. Since 1975, average earnings of Canadian male workers in the 18–34 age group have, in fact, declined by 25 percent relative to the earnings of those in the 45–64 age group (Picot 1998).

Concerning poverty, the picture Wolfson and Murphy present is unambiguous: the relative poverty rate was lower in Canada than in the United States through the entire 1974–95 period. Further, between those two years it declined significantly (to 12 percent) in Canada, and increased (to 20 percent) in the United States.⁹ The authors make the additional observation that, despite higher average family disposable income in the United States in 1995, the first 35 percent of families in the Canadian disposable income distribution were absolutely better off than families in the corresponding portion of the US income spectrum.¹⁰

⁹ In recent years, the US poverty rate has begun to decline as the US economy has been delivering near full employment.

¹⁰ This result is based on Canada-US bilateral comparisons of purchasing power produced by Statistics Canada. In these comparisons, Canadian dollar incomes are translated into US dollars through division by the purchasing power parity (PPP) exchange rate. This rate indicates how much it costs in Canadian dollars to purchase a representative consumption basket worth one US dollar in the United States. For example, in 1995 the PPP exchange rate for consumption was C\$1.25 (Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, 1997, table 62). Note that the PPP exchange rate is a different concept from the usual Canada-US exchange rate. In 1995, the latter averaged C\$1.37. Using it to transform Canadian...

If average family disposable income is substantially higher in the United States but low-income families are still absolutely better off in Canada, then two conclusions follow immediately. First, poverty in the United States must be an acute problem. Second, middle- and upper-income families must be far richer in the United States than in Canada.

Summary

After decelerating to 1.8 percent per year in the 1980s from 3.2 percent per year in the 1970s, average real private disposable income per adult in Canada did not increase at all between 1989 and 1998. Meanwhile, by contrast, average private income growth in the United States was globally and structurally very stable. US real PDI per adult grew by about 1.6 percent per year in each of the past three decades. To begin to understand what happened, I presented a decomposition of the absolute and relative private standard of living in Canada into four source components: the terms-of-trade effect, the private-income retention rate, labor productivity, and the employment rate.

Which of these four factors was responsible for the major slowdown of private income growth Canadians experienced over the past quarter-century? Table 5 indicates that, in various degrees, all four factors contributed to Canada's income deceleration in both the 1980s and the 1990s. The dominant factor in the 1980s was the slowdown in productivity; in the 1990s, it has been the poor employment performance. Overall, from the 1970s to the 1990s, the contraction of the employment rate was responsible for about 40 percent of the income slowdown and stagnation, with the deteriorating terms of trade, the falling private-income retention rate, and the productivity slowdown each contributing about 20 percent. It is crucial to understand why, over the past two decades, the Canadian tax-and-transfer system has withdrawn more income from private hands, why Canada's productivity has decelerated, and why a smaller fraction of the adult population has been holding jobs.

On income inequality and poverty, three conclusions stand out. First, the two countries' tax-and-transfer systems redistribute income

Note 10 - cont'd.

...dollar incomes into US dollars would lead to an underestimation of the true purchasing power of Canadian families relative to US families.

Table 5: *The Contribution of Four Components to the Decline in the Growth Rate of Real Personal Disposable Income per Adult, Canada, 1970–98*

Component	1970–79 to 1979–89	1979–89 to 1989–98	1970–79 to 1989–98
	<i>(percentage contribution)</i>		
Terms-of-trade effect	15	20	18
Private-income retention rate	25	16	20
Labor productivity	37	5	19
Employment rate	23	59	43
Total	100	100	100

Source: Table 3.

across social classes, but the Canadian system seems to do so more effectively than the US system. Second, between the mid-1970s and the mid-1990s — and perhaps for similar trade- and technology-related reasons — before-tax earnings became more unequal in the two countries, but both before-tax earnings and after-tax-and-transfer incomes resisted the trend toward more inequality better in Canada than in the United States. Male, young, and low-skilled workers suffered most. Third, in the past quarter-century, the relative poverty rate has been lower in Canada than in the United States; moreover, it has declined in Canada and increased in the United States.

In the next three parts of the lecture, I focus on why Canadians are underemployed, why they are overtaxed, and why they are underproductive. I pay attention to a few aspects of employment, taxation, and productivity that have important implications for Canada's performance in the areas of inequality and poverty. Following my attempt at interpreting past events, each of the three parts ends with a substantive section on future prospects and policy prescriptions.

Why Are Canadians Underemployed?

In the 1970s and 1980s, as we have seen (Figure 10, Table 2), Canada's employment rate increased at least as fast as that in the United States. The 1990s have, however, witnessed both a large employment rate drop in Canada and a continued increase in the United States; it is this decade that is the focus of this section.

The decline in Canada's employment rate actually occurred early in this decade, going from 62.4 percent of the total adult population in 1989 to 58.4 percent in 1992. It then took seven years — until mid-1999 — to basically recover only half of the lost ground. This is the largest and most persistent drop in employment Canada has seen since the Great Depression. Meanwhile, starting from the same level as in Canada, the US employment rate suffered a much smaller, 1.5 point decline from 1989 to 1992 and has since recovered to 1.5 points *above* the 1989 level. The gap between the two countries' employment rates has increased from zero in 1989 to 3.5 points in 1999.

A similar widening intercountry gap is apparent if one compares unemployment rates. In 1989, the peak year in the business cycle, the unemployment rate differential between Canada and the United States was 2.2 percentage points: 7.5 percent of the willing-to-work adult population was unemployed in Canada, and 5.3 percent in the United States. By the first half of 1999, the intercountry differential had risen to 3.6 points: 7.9 percent in Canada versus 4.3 percent in the United States.

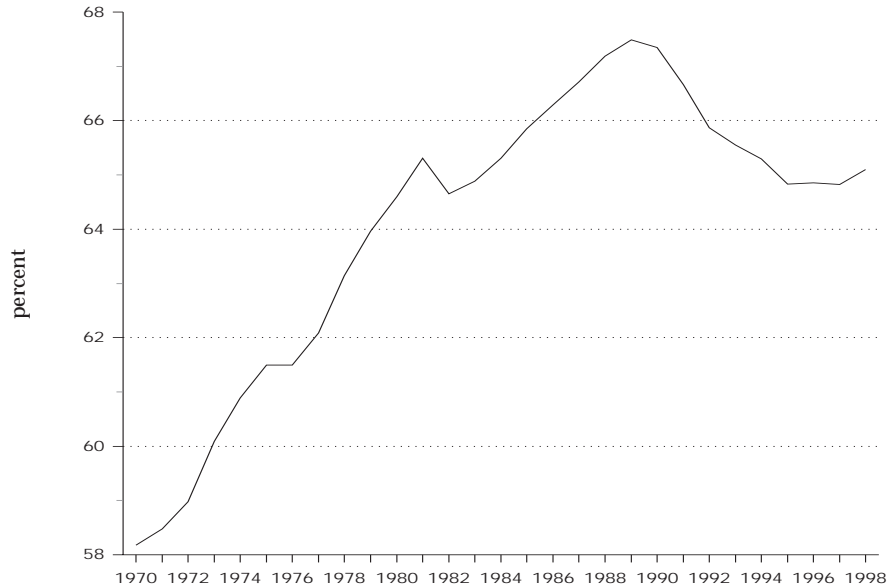
There are two possible explanations for Canada's disappointing employment performance of the 1990s. First, it could be that Canadians have decided voluntarily to *supply* less work. Second, it could be that business and government *demand* for labor services has declined. I argue that both supply and demand factors are involved, but that demand factors are dominant.

Declining Labor Force Participation

On the supply side, the most conspicuous development in the 1990s has been the surprising decline in the official measure of Canadians' willingness to work. Figure 11 shows that the aggregate labor force participation rate — the percentage of Canadian adults who declare they want employment — increased continuously from 1970 to 1989, though at a slowly declining rate, basically in line with underlying structural and demographic factors. But the large absolute 2.7 percentage point drop in the labor force participation rate in the 1990s, from 67.5 percent of the adult population in 1989 to 64.8 percent in 1995–97, came as a surprise.

Part of that drop was the result of the 1990–92 recession and the following slump in economic activity. Reduced employment opportuni-

Figure 11: *Labor Force Participation Rate: Percentage of the Working-Age Population Willing to Work, Canada, 1970–98*



Source: Statistics Canada, *The Labour Force*, cat. 71-001, various issues.

ties affected the perceptions of many of the nonemployed about their chances of finding work, weakening their willingness to search actively for a job. But a combination of structural factors also contributed to the reduced willingness to work independently of the worsening state of the job market.

First, the participation of women in the labor force, which had been pulling the aggregate participation rate up for 30 years, began to plateau. The participation rates of successive generations of women are now slowly approaching some new stable equilibrium.

Second, the school enrollment rate of young Canadians in the 15–24 age group has continued to rise briskly in the 1990s, as it had done in the previous decade more or less independently of the business cycle. Although this bodes well for the future labor force participation of the young, rising school attendance has an immediate depressing effect on their current labor force participation.

Third, in the 1990s, a string of major amendments has restricted employment insurance eligibility and benefits. Cutting EI is like discouraging a loose attachment to the labor market, and has led many workers either to leave or not to enter the labor force (Fortin and Fortin 1999).

Fourth, better pension provisions have reduced labor force participation among those ages 55 and over. Fifth, the trend deterioration in employment opportunities and working conditions has continued to encourage those with low skills to withdraw from the labor force. Sixth, rising effective marginal tax rates may have reduced labor supply among various groups.

How much of the 4 percentage point decline in the employment rate from 1989 to 1996 was due to these supply-side structural developments? The answer is: not very much. This is because a significant proportion of those who have stopped looking for work in the 1990s are in groups with a very high incidence of unemployment: young people who have decided to persevere in school; workers who have turned away from the labor market because of EI restrictions; and the low skilled, who face dimmer long-term job prospects. Since those groups have much lower employment rates and higher unemployment rates than other labor force participants, their withdrawal from the labor force has reduced the aggregate unemployment rate much more than it has reduced the aggregate employment rate, thus reversing the decade-old shift many researchers (for example, Card and Riddell 1996) had previously noted. A cautious guess is that, within the next couple of years, it may not be possible to return the national employment rate to its 1989 level of 62.4 percent without restarting inflation, but some number between 61.5 and 62.0 percent may be within reach (Fortin and Fortin 1999).

One important implication of this argument is that, just as the United States has done, Canada could achieve a significantly lower unemployment rate over the next few years than was possible in 1989 without generating ever-rising inflation. How much lower remains uncertain — most probably less than 7 percent, possibly 6 percent — but if the current recovery keeps going, the Canadian labor market may be allowed to test unemployment rates in the 6 percent range, just as the US labor market was recently able to explore unemployment rates in the 4.5 percent range.¹¹ What happens next to the employment rate will de-

¹¹ The US Bureau of Labor Statistics uses a more restrictive definition of unemployment than does Statistics Canada. Unlike Statistics Canada, the Bureau does not count “reading ads” as a valid reason to be classified as unemployed. Further, the incarcerated population, which is excluded from the labor force survey and cannot be counted as unemployed, is larger in the United States than in Canada. Also, the seasonal decline in economic activity in winter is larger in Canada. This makes it...

pend on Canada's ability to manage the unemployment rate and on future structural trends in labor force participation.

Declining Job Availability

If the sharp decline in the Canadian employment rate in the 1990s has been due only to a small extent to a fall in the propensity of Canadians to supply work, then by elimination it must largely reflect a fall in the *demand* for labor services. Basically, firms have laid off employees and stopped hiring because there has been insufficient aggregate spending to make use of all available productive capacity. The same has happened to governments: tax revenues have been falling with the decline in private incomes. This is supported by direct independent evidence from the time path of the aggregate volume of job offers employers have made through newspaper ads.

A useful device with which to look at this evidence is the Beveridge curve, which traces the simultaneous movements in the unemployment rate and the job offer rate through time to provide a simple way to interpret broad labor market trends.¹² Canada's Beveridge curve for the 1981–98 period is pictured in Figure 12, which shows that from 1989 to 1992 the economy trod a path from northwest to southeast that was similar to the path it followed from 1981 to 1983. This kind of orientation of the Beveridge curve typically occurs during recessions generated by declines in aggregate demand for goods and services relative to available productive capacity. In both cases, the job offer rate fell because employers made fewer jobs available, and the unemployment rate increased because more workers were laid off and jobs were harder to find.

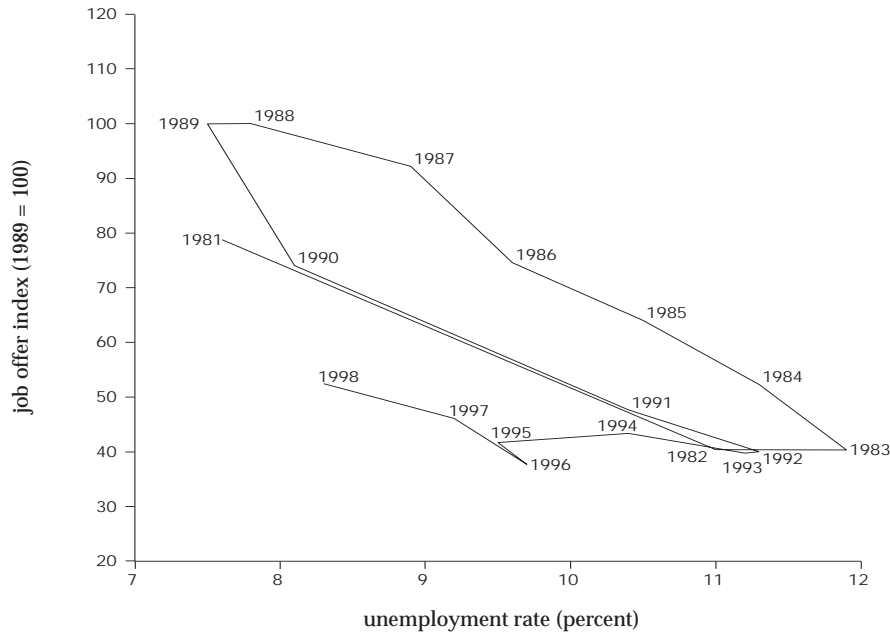
Three features of the 1990–92 recession made that episode different from the 1982–83 recession, however. First, the magnitude of the decline in job offers was larger: 60 percent in 1990–92 compared with 40 percent in 1982–83. Second, the recovery from the later recession was long de-

Note 11 - cont'd.

...unlikely that the minimum unemployment rate consistent with stable inflation could be as low in Canada as in the United States, even if the labor markets of the two countries were otherwise similar. (See Riddell and Sharpe 1998.)

¹² Blanchard and Diamond (1989) give detailed explanations on how to interpret the co-movements of unemployment and job offers in a Beveridge curve.

Figure 12: *The Beveridge Curve: Job Offers versus Unemployment, Canada, 1981–98*



Note: The job offer rate is equal to the ratio between Statistics Canada’s help-wanted index and the total working-age population, normalized to 100 in 1989.

Sources: Statistics Canada, *The Labour Force*, cat. 71-001, various issues; and idem, *The Daily*, cat. 11-001, various issues.

layed: after the trough of 1992, the job offer rate and the employment rate remained flat for four more years, and did not begin to recover until 1997. By contrast, after 1983 the job offer rate began an immediate recovery that was sustained until the end of the decade. Third, despite the continuing stagnation in the job offer rate and the employment rate between 1992 and 1996, the unemployment rate declined by 1.6 percentage points, from 11.3 percent to 9.7 percent. The Beveridge curve went straight west during those years, confirming the evidence, based on the analysis of labor force participation just presented, that the unemployment decline in those years was for the most part structural, not due to a cyclical recovery in aggregate demand. Many unemployed Canadians who participated in the labor force withdrew and were reclassified as “out of the labor force.”

So, why did the Canadian economy fall so deep into recession in 1990–92, and why did it take until 1997 for a sustained recovery to begin? Initially, firms laid off employees and stopped hiring because they

could no longer sell as much as before. Several factors were at work. First, the US recession reduced foreign demand for Canadian exports. Second, the terms of trade (the ratio of export to import prices) deteriorated by 5 percent in Canada, but remained basically unchanged in the United States. Third, anti-inflationary monetary policy in Canada allowed *real* (net of inflation) short-term interest rates to rise to 9 percent (they were only 5 percent in the United States) and let the exchange rate of the Canadian dollar appreciate by 25 percent against the US dollar. Those developments easily explain why, from 1989 to 1992, aggregate spending, output, and employment fell so sharply in Canada, not only in absolute terms, but also relative to aggregate spending, output, and employment in the United States.

But understanding why the Canadian slump continued from 1992 until 1996 while a sustained recovery was taking place in the United States is a bit more difficult. The 1992–96 period saw Canadian real exports increase by an unprecedented 45 percent. That export boom was fueled by the US recovery, the reversal of the previous real appreciation of the Canadian dollar, some improvement in Canada's terms of trade, and the wider and safer access to US markets secured by the Canada-US Free Trade Agreement (FTA). At the same time, however, Canadian real domestic consumption and investment *fell* by 1 percent in absolute value. This schizophrenic combination of surging exports and stagnating domestic demand over the period allowed just enough growth in real GDP to prevent the employment rate from declining further, but delayed the recovery.

Structural Interpretations of the 1992–96 Slump

Several attempts have been made to find micro-structural explanations for the slump, but without much empirical success. Complaints about globalization and free trade fly in the face of the incredible export boom of 1992–96. Appeals to labor market rigidities (such as union power, employment regulations, minimum wages, employment insurance, and social assistance) to account for the slump in employment miss two points: first, all of them already existed in the previous two decades, and had not prevented employment growth from proceeding as rapidly in

Canada as in the United States; second, many of those rigidities have been lessened or removed during the 1990s.

Another argument is that large-scale reforms (including deregulation, privatization, and downsizing) and the necessary adjustments to the new trade and technology environment generated intense and disruptive restructuring and raised structural unemployment by exacerbating the mismatch between the supply of and demand for skills. But this view is contradicted by the fact that structural unemployment actually declined in Canada between 1992 and 1996, as shown in Figure 12.

The stagnation in employment is sometimes attributed to the increases in payroll taxes that took place over the 1990–93 period. Forgotten here, however, is the large economic literature showing that the lasting effect of payroll taxation is mostly to reduce wages, not employment (see Dahlby 1994). This literature admits a one-time effect on inflation and temporary cash-flow effects on unemployment as possibilities, but empirical research has not found systematic evidence of this sort of occurrence (see Gordon 1998). It is also an exaggeration to blame the slump on constitutional politics: interest rate spikes appeared only momentarily during the Charlottetown and Quebec referendums. Further, the employment rate fared no worse in Quebec from 1990 to 1998 than in other provinces, staying around 93.5 percent of the national average.

These observations by no means imply that adjustment to reforms, globalization, and new technologies proceeds without pain; that labor market rigidities, the rising skills mismatch in high-tech sectors, and high payroll taxes do not hurt economic efficiency; or that unsolved constitutional problems will have no effect on long-run economic performance. My point is simply that evidence suggests the contribution of such factors to the specific problem of lack of output and employment recovery until 1997 was small or negligible. The slump requires a different explanation.

The Shared Responsibility of Fiscal and Monetary Policy

In fact, the key to understanding the magnitude and persistence of the 1990–96 Canadian recession and slump lies in the damaging interaction between high accumulated public debt and high real interest rates.

The Role of Fiscal Policy

With a low public debt such as Canada had before 1980, an economy can sustain fairly high real interest rates without courting macroeconomic disaster. But a large public debt complicates matters because it magnifies the effect of any given increase in interest rates on the size of interest payments on the debt and, hence, on fiscal deficits: an across-the-board increase of 1 percentage point in interest rates applied to a \$500 billion debt generates an additional \$5 billion in annual interest charges and a corresponding increase in the fiscal deficit.

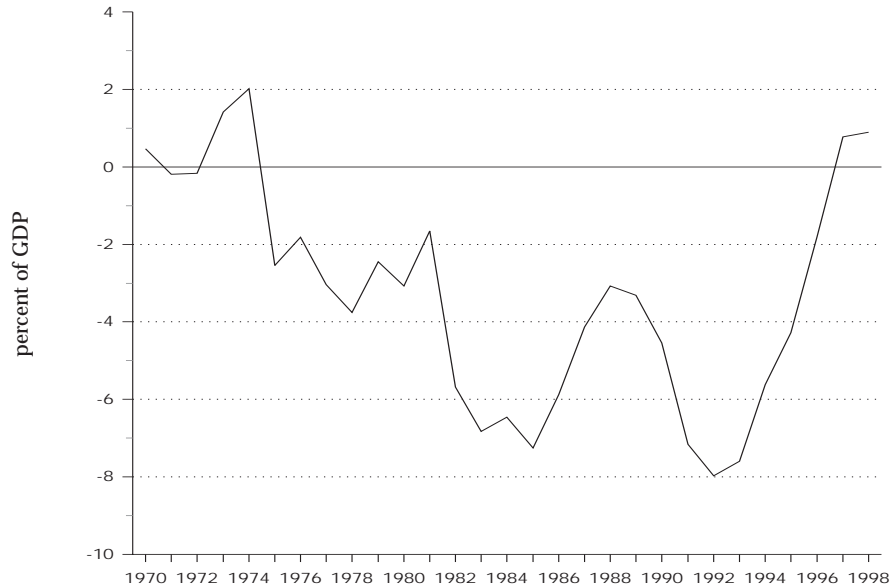
This effect has two important macroeconomic consequences. First, higher fiscal deficits mean that the public debt rises at an increasing speed. Domestic borrowers are crowded out and led to incur more debt abroad, which raises external deficits. The likely result is increased risk premiums for Canadian debt in domestic and foreign financial markets (Fillion 1996; Clinton 1998). This may then lead the monetary authorities to keep interest rates high to maintain order in markets and avoid a currency run. Fiscal and monetary policy are thus caught in the circular process of rising interest rates' causing rising deficits, and rising deficits' causing even higher interest rates. This keeps domestic aggregate demand, output, and employment depressed.

Second, once the fiscal authorities are trapped in this financial nexus, the only way out is through a fiscal correction involving higher taxes, lower program expenditures, or both. In the short run, however, these measures can only prolong the depression of aggregate demand, output, and employment.

Let us see how it happened in practice. Figures 13 and 14 recount how, between 1975 and 1990, Canadian fiscal authorities forgot the prudent Keynesian principle of balancing the budget across business cycles.¹³ Figure 13 shows that moderate deficits averaging 2.5 percent of

¹³ The public sector net debt and deficit statistics reported in this paragraph and below are drawn from Statistics Canada and OECD databanks. They are based on United Nations standard national accounts concepts. One advantage of these numbers is that they subject data from all levels of government and all countries to the same standardized definitional treatment. One drawback is that, contrary to (sound) public accounts practice, they consolidate government employee pension funds with the rest of the public sector. Since these funds are in surplus, the result is lower public sector debt and deficit *levels*. Fortunately, the analysis of *changes* in fiscal position, with which we are mostly concerned here, is little affected.

Figure 13: *Public Sector Budget Balance as a Percentage of GDP, Canada, 1970–98*

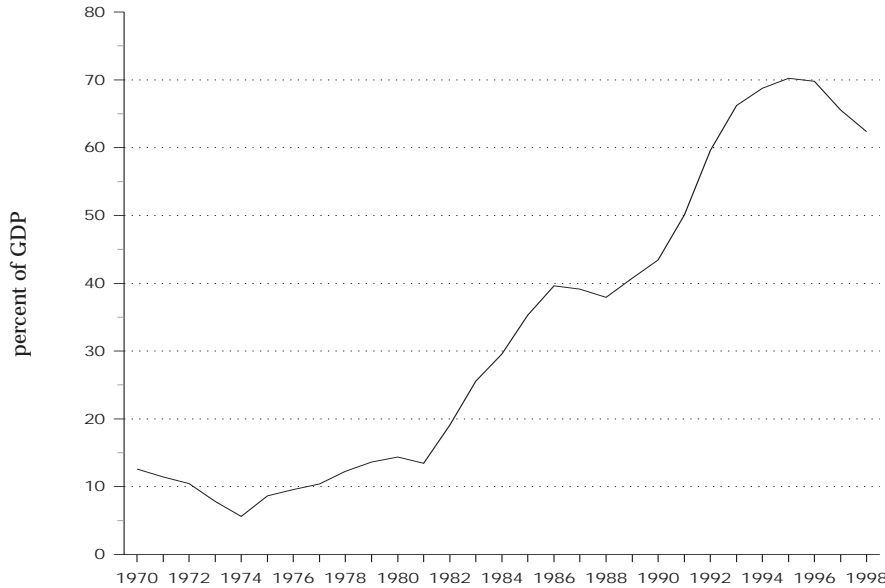


Source: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.

GDP first appeared between 1975 and 1981. The 1980–82 recession and its aftermath then amplified the dive into deficit to 7 percent of GDP by 1985. In the second half of the 1980s, public deficits were reduced somewhat by the recovery. Some first attempts at redressing the fiscal situation were made, mostly through tax increases (look back at Figure 6). Depending on the jurisdiction, government program spending remained unchanged or increased as a percentage of GDP. As a result, at the turn of the decade, the consolidated public sector deficit remained above 3 percent of GDP.

Figure 14 shows the cumulative effect of these annual deficits on the net public debt. Starting from 6 percent of annual GDP in 1974, the debt increased mildly to 14 percent of annual GDP in 1981. It then rose sharply to 40 percent in 1986. From 1985 on, combined *discretionary* changes in tax laws and expenditure programs did not contribute to increases in the consolidated public sector deficit as a percentage of GDP. They were successful in preventing the debt-to-GDP ratio from rising further until 1989, but did not reduce it below 40 percent of annual GDP. At this level of debt, the rising high interest rates from 1989 on had a ma-

Figure 14: *Public Sector Net Debt as a Percentage of GDP, Canada, 1970–98*

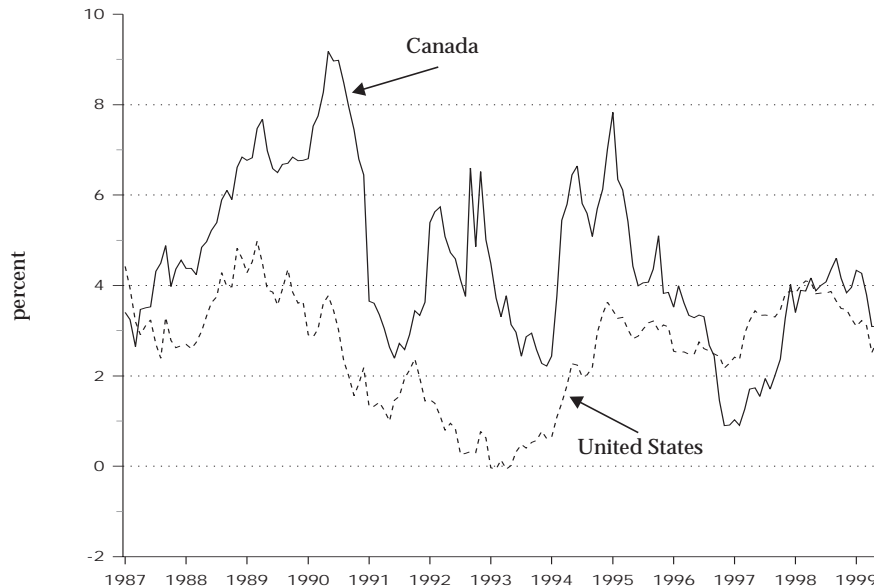


Source: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues; and idem, *National Balance Sheet Accounts*, cat. 13-214, various issues.

major impact on government interest payments. The swollen debt service and the effects of the recession on tax revenues and automatic social expenditures brought the fiscal deficit up to 8 percent of GDP in 1992 and 1993, and the debt-to-GDP ratio reached a maximum of 70 percent in 1995.

As envisaged above, there were important macroeconomic consequences from two channels. First, there were recurring market concerns about the deteriorating fiscal situation, which from time to time led the Bank of Canada to tighten monetary policy (Freedman and Macklem 1998). These episodes account for some of the local spikes in Canadian real short-term interest rates that can be observed in Figure 15, and retarded the recovery of domestic demand. Second, a series of drastic fiscal consolidation measures, culminating in the February 1995 federal budget, were eventually legislated. These measures succeeded in returning the overall fiscal balance to a surplus position by 1997 (see Figure 13). In the meantime, however, through standard multiplier effects on aggregate demand and output, the sharp fiscal restraint had a further delaying impact on the recovery of domestic demand.

Figure 15: *Real Short-Term Interest Rates, Canada and the United States, January 1987–June 1999*



Note: Interest rates are those on three-month prime corporate paper less the consumer price inflation rate for the past year.

Sources: *Bank of Canada Review*, various issues; Statistics Canada, *The Consumer Price Index*, cat. 62-010, various issues; United States, Bureau of Labor Statistics, *The CPI Detailed Report*, various issues.

The large debt already accumulated by the Canadian public sector at the end of the 1980s exposed the country to a serious fiscal crisis. But if domestic interest rates had not initially risen to sufficiently high levels, causing debt-servicing costs to rise sharply and a deep recession to occur, there would have been no fiscal crisis. This point is made clear by a simple comparison between Canadian and US economic and fiscal developments in the 1990s. The two countries closed the 1980s with very similar public sector debt-to-GDP ratios — 38 percent in the United States and 40 percent in Canada (OECD 1999b). While net debt interest payments were somewhat higher in Canada, the United States was also very exposed to a fiscal crisis. However, that country's fiscal difficulties did not reach the crisis stage. From 1990 to 1996, US net public debt increased by only 10 percentage points, to 48 percent of GDP; in Canada, it rose by 30 percentage points to 70 percent of GDP. Since, by any account, discretionary fiscal policy did not tighten more in the United States than in Canada over the period, the only possible sources of the widening

gap between the two countries' debt burdens were the very significant differences in real interest rates and economic performance between them. The suggested story is that relatively high real interest rates generated a severe and sustained economic and fiscal crisis in Canada, whereas relatively low real interest rates allowed the United States to escape both.

The Role of Monetary Policy

High real interest rates thus must share responsibility with the large initial public debt for Canada's fiscal crisis and for the extended weakness of Canadian output and employment in the 1990s.

It is apparent from Table 6 that, in 1989–91, the Canadian real short-term rate, as well as its 3 percentage point differential with the US rate, was high by historical standards. Given the powerful negative impact of high interest rates on private and public domestic demand, a major contribution from this source to the deeper Canadian recession is not in doubt. What is more intriguing is what happened next. Although on average during the 1992–95 period the lower Canadian real interest rate helped stop the economic freefall, the US real interest rate declined by about the same amount, so that the Canada-US interest rate differential remained as large as in 1989–91. The Canadian interest rate also displayed more volatility than the US rate. Thus, contrary to the US economy, the Canadian economy got no systematic, steady support from low real interest rates after 1992. The United States recovered, but Canada did not. In fact, all *external* sources of macroeconomic fluctuations in Canada turned for the better: rising export demand, improved terms of trade, the exchange rate depreciation, and the FTA all boosted foreign demand for Canadian goods. But with high and volatile domestic interest rates and neutral or restrictive fiscal policy, domestic demand for Canadian goods remained understandably depressed. Canadians had to wait until after the fiscal consolidation and the interest rate decline of 1995–96 before a sustained recovery could really begin.

How did Canada fall into this high-interest-rate, high-unemployment trap? One must recognize that, during the 1992–95 period, market expectations were often unsettled. This made it more difficult than usual for the Bank of Canada to achieve its desired mix of short-term interest and exchange rates (Freedman and Macklem 1998). The domestic

**Table 6: Changes in Real Short-Term Interest Rates,^a
Canada and the United States, 1979–99**

	Canada	United States	Canada less United States
		(percent)	
1979–88	4.31	3.56	0.75
1989–91	5.96	2.80	3.16
1992–95	4.67	1.58	3.09
1996–99 ^b	3.01	3.14	-0.13

Note: Given the approximate one-year lag between changes in real short-term interest rates and their full impact on domestic demand, the choice of subperiods is consistent with demand responses in 1990–92, 1993–96, and 1997–99.

^a Interest rate on three-month prime corporate paper less the consumer price index inflation rate for the previous year, averaged over various periods.

^b To mid-year 1999.

Sources: *Bank of Canada Review*, various issues; Statistics Canada, *The Consumer Price Index*, cat. 62-010, various issues; United States, Bureau of Labor Statistics, *The CPI Detailed Report*, various issues.

usual for the Bank of Canada to achieve its desired mix of short-term interest and exchange rates (Freedman and Macklem 1998). The domestic fiscal situation was the most frequent source of market nervousness; there were also episodic concerns about the international monetary situation (the European crisis in 1992, the Mexican crisis in 1994–95) and about domestic political problems (the Charlottetown referendum in 1992, the Quebec referendum in 1995). But by the Bank of Canada's sticking to an overly ambitious inflation target, underestimating the extent of slack in the economy, and following an excessively conservative recovery strategy, the high interest rates and the deep and persistent slump were, to a large extent, of its own making.

An Overly Ambitious Inflation Target

In a February 1988 speech, Bank of Canada Governor Crow announced that the Bank would seek to achieve and maintain “price stability” (Crow 1998), which he later defined operationally as “a rate of increase in the [consumer price index, CPI] that is clearly below 2 per cent” (Bank of Canada 1991, 10). A formal inflation-reduction agreement was signed with the minister of finance in February 1991, according to which CPI in-

cent inflation-control target range were later renewed for the 1995–98 and 1998–2001 periods. The 2 percent target initially set for the end of 1995 was attained by the end of 1991. Over the 1992–96 period, CPI inflation mostly remained in the bottom half of the inflation-control target range of 1–3 percent, averaging 1.4 percent per year. By contrast, in the United States the Federal Reserve neither adopted an explicit inflation target nor tried actively to reduce that country’s CPI inflation below 3 percent. Over the same 1992–96 period, US CPI inflation averaged 2.8 percent per year.¹⁴

Adopting a target range to control inflation is probably a good idea. At best, having markets understand that the central bank will normally keep the inflation rate within the specified range can help stabilize inflationary expectations. At worst, it can do no harm. But whatever the selected width and midpoint of the range, the crucial question for the performance of the real economy is what level of inflation will be achieved on average. The fact that, over the 1992–96 period, CPI inflation averaged 1.4 percent in Canada and 2.8 percent in the United States may not seem worth noticing, but this small difference may have been of macroeconomic significance for three reasons.¹⁵

First, according to the terms of the standard short-run tradeoff between inflation and unemployment, to reduce inflation to 1.4 percent instead of being content with 2.8 percent must have required some 2 to 3 percentage points of additional excess unemployment in Canada during the first half of the 1990s. It indicates that the Canadian recession was deeper than the US recession to start with.

Second, recent research has raised the possibility that holding inflation at 1.4 percent instead of 2.8 percent may require a *permanently* higher unemployment rate. For example, if a social norm promotes strong resistance to absolute wage cuts on the part of employees, firms in financial difficulty will find it very hard, if not impossible, to reduce

¹⁴ In 1998–99, US CPI inflation fell into the 1.5–2.0 percent range. This was due not to Federal Reserve action, but to special factors such as an appreciation of the US dollar, a decline in prices of imported commodities, and changes in the official measure of inflation. Only the second factor affected Canadian CPI inflation in a similar way.

¹⁵ Part of the intercountry inflation rate differential may reflect differences in CPI measurement methodologies. This is a difficult and controversial issue. Bank of Canada researchers have calculated that true inflation is overestimated by about 0.5 of a percentage point more in the United States than in Canada (Crawford, Fillion, and Lafliche 1998).

their wage-to-price ratios by more than the rate of inflation. They will adjust through layoffs instead of wage cuts, hence contributing to higher unemployment. This binding-wage-floor phenomenon and the associated upward pressure on unemployment would naturally be more important in a world of 1.4 percent inflation than in one of 2.8 percent inflation.¹⁶ How much more important is not yet known with certainty, but the results of one influential US study imply that the unemployment rate could increase permanently by more than 1 percentage point (Akerlof, Dickens, and Perry 1996). The empirical status of the binding-wage-floor hypothesis is still undecided in the macroeconomic literature, but if it eventually survives statistical tests, it could explain why the increase in the Canadian-US unemployment rate gap was not only large during the 1990–92 recession but persisted through the rest of the decade.

Third, there is another channel through which Canada's adopting a more ambitious low-inflation target than the United States could possibly lead to permanently higher structural unemployment: it may have become systematically more difficult for the Bank of Canada to manage short-term interest and exchange rates as it wishes. If inflation is 1.4 percent in Canada and 2.8 percent in the United States, then setting the same *real* short-term interest rate, say 2 percent, in the two countries will require a lower *nominal* (market) interest rate in Canada than in the United States: 3.4 percent in Canada, 4.8 percent in the United States. But this may be asking too much of financial markets, for which US nominal interest rates provide the basic North American psychological anchor. Unless they have strong reasons to believe the Canadian dollar exchange rate will appreciate enough to compensate them for the interest rate differential — which will occur occasionally, as it did during the 1996–98 period — financial markets will dump their Canadian dollar assets, provoke a currency depreciation, and perhaps even start a more serious speculative attack.

¹⁶ Naturally, where labor markets are concerned, the focus should more appropriately be on nominal wage growth, not on CPI inflation. In Canada, the fixed-weight index of average hourly earnings increased annually by 2.3 percent over the 1992–96 period and by 1.1 percent over the 1997–99 period. In the United States, the employment cost index for total compensation grew by 3.2 percent per year over each of the two periods. An intercountry differential has emerged for wage growth, just as it has for CPI inflation, and cannot easily be dismissed as reflecting differences in measurement methodologies.

True, many financial market participants believe in purchasing power parity theory, according to which a steady 1.4 percent inflation differential in favor of Canada eventually leads to a proportionate appreciation of the Canadian dollar exchange rate, other things being equal. But PPP theory is a *very long run* proposition, whereas convincing participants to hold lower-yield, money market Canadian dollar assets requires them to expect a *very short-run* appreciation of the Canadian dollar.

Market participants here face several layers of cumulative uncertainty. First, there is theoretical and empirical uncertainty about the validity of PPP theory (Krugman and Obstfeld 1994). Second, no one knows for sure what the “true” Canadian-US long-run inflation differential is — is it equal to the 1992–96 average of 1.4 percentage points, or to the 1996–99 average of 0.6 of a point? Third, there is measurement uncertainty, given intercountry differences in price measurement methodologies. Fourth, assuming PPP theory is true and the inflation differential is correctly estimated, there is further uncertainty about the time it would take for that differential to be reflected in exchange rate changes. The empirical literature indicates it could take decades.

Given the widespread uncertainty, it is possible that a risk-aversion strategy on the part of financial market participants would lead them to consider the small Canadian-US inflation differential as too uncertain to form a basis for their exchange rate expectations. The desire to keep order in financial and currency markets would then impart an upward bias and more volatility in the setting of nominal and real short-term interest rates by the Bank of Canada, and hence a downward bias in output and employment outcomes. Episodes of negative intercountry short-term nominal interest rate differentials, such as occurred during the 1996–98 period of high hopes for a Canadian dollar appreciation, would continue to occur from time to time, but for reasons that have little to do with the negative inflation differential.

Is it optimal for the Bank of Canada to target a lower inflation rate than the United States achieves on average? As long as US inflation remains low, the answer would seem to be negative. On the benefit side, there is no evidence from the empirical economic literature that targeting an inflation rate of 1.5 percent instead of, say, 2 to 4 percent brings any improvement to aggregate economic performance (Barro 1997;

Sala-i-Martin 1997). On the cost side, Canada's lower inflation rate increases the risk of permanently higher unemployment whether the binding-wage-floor hypothesis is true or financial markets fail to align their expectations of exchange rate variations on the average intercountry inflation differential.

Underestimation of Slack in the Economy

The second reason Canadian real interest rates remained so high after 1991 is that, for an extended period, the Bank of Canada overestimated the future course of actual output (real GDP) and underestimated potential output — the maximum level of output that can be achieved without ever-rising inflation. As a result, the Bank kept underestimating the *output gap* — the percentage by which actual output falls short of potential output.

The larger the output gap, the stronger market pressure against inflation will tend to be. Therefore, underestimating the output gap gave the Bank of Canada stronger reasons than the true situation justified to fear an imminent return of inflation, and must have led it to target higher levels of short-term interest rates than was really necessary to keep inflation in the middle of the 1–3 percent inflation control target range. This, in turn, must have contributed to putting off the recovery and to keeping inflation close to 1 percent most of the time. The Bank did acknowledge in various issues of its *Monetary Policy Report* that its estimate of the output gap was very uncertain, but it did not admit the estimate was too low. Only recently has the Bank raised clearly “the possibility that potential output may be larger than had been estimated... [so that] the economy appears to be better able to sustain higher levels of employment without increased inflation or rising inflation expectations” (Bank of Canada 1999, 26).

Why did the Bank of Canada overestimate the future course of actual output during the slump of 1992–96?

It seems to have misjudged the reaction of the economy to the mix of short-term real interest and exchange rates — that is, the *monetary conditions* — it was achieving. The Bank's monetary conditions index (MCI), which gives short-term real interest rate changes three times as much weight as real exchange rate changes, showed monetary

conditions becoming easier over the 1992–93 period and remaining easy thereafter (see, for example, Bank of Canada 1997, 16). The message one got from this published trend in the MCI was that the negative aggregate demand effect from the high real short-term interest rate was being more than offset by the favorable effect of the real exchange rate depreciation, so that, on the whole, monetary policy was seen as encouraging the recovery.

In fact, in a recent paper on the Canadian slump of the 1990s (Freedman and Macklem 1998), the Bank admits that a key equation it previously used (Duguay 1994) to measure the reaction of real GDP to both the interest rate and the exchange rate, and on which the MCI was constructed, had overestimated real GDP by a significant margin during the 1992–96 period. A recent Bank of Canada *Monetary Policy Report* also speculates that, in both timing and magnitude, changes in the Canadian dollar exchange rate may have a much more uncertain effect on real net exports than had previously been thought (Bank of Canada 1999, 24). In short, those admissions clearly raise the possibility that the Bank underestimated the negative effect of high real interest rates on aggregate demand, while overestimating the positive effect of the low Canadian dollar. Around mid-decade, careful observers of the Canadian business cycle did express doubt about the Bank's interpretation of a lower Canadian dollar as stimulative and, hence, about the overoptimistic message of the MCI (Boessenkool, Laidler, and Robson 1996). Although the Bank eventually must have realized its systematic prediction failure, the support monetary conditions meanwhile gave the recovery was insufficient, and the economy kept turning in bad output and employment outcomes.

Next, why has the Bank of Canada underestimated potential output during the 1990s?

To estimate the maximum level of output consistent with stable inflation, the Bank applies smoothing techniques to the past history of actual output and weighs the result judgmentally with certain estimated statistical relationships (Butler 1996). Unfortunately, this methodology usually has the technical property of automatically building any sustained slump into the estimated trend of potential output (Krugman 1998). During a long slump, potential output will likely be underestimated. Over the 1990–96 period, the Bank's estimate of potential real GDP growth was 2.0 percent per year. Given that the adult population

had increased by 1.6 percent per year, the straight implication is that, according to the Bank, the non-inflationary potential growth rate of real GDP *per adult* was only 0.4 percent per year during that period. But, as we have already seen, the potential growth rate of real GDP per adult is the sum of the potential growth rates of labor productivity and the employment rate. Assuming that this sum averaged only 0.4 percent per year over a seven-year period does not make sense under any reasonable economic assumption.

A Conservative Monetary Strategy

The third reason real interest rates stayed relatively high and the recovery was long delayed in Canada after 1991 is that the Bank of Canada was more concerned than the US Federal Reserve about the cost of inadvertently allowing the unemployment rate to fall below its estimated minimum non-inflationary level — or, equivalently, of allowing actual output to exceed potential — which would start a new round of inflationary excesses. Since 1994, the Federal Reserve has not hesitated to keep real interest rates low enough to actively “test and probe” levels of unemployment below 6 percent — the non-inflationary level generally accepted in the United States until that time. The Fed has put much emphasis on minimizing the risk of erroneously keeping unemployment higher than the lowest sustainable level, viewing the cost of falling under the non-inflationary unemployment rate as symmetrical with the cost of exceeding it (see, for example, Blinder 1998).

By contrast, only in 1997 did the Bank of Canada begin to ponder seriously the possibility — suggested above by the analysis of labor force participation and the Beveridge curve — that the non-inflationary unemployment rate might have declined in Canada during the 1990s, as it had already done in the United States (Thiessen 1997). The Bank had previously put more emphasis on minimizing the risk of erroneously allowing unemployment to fall below the lowest sustainable level, which it implicitly estimated to hang around 8.5 percent.¹⁷ This conservative

¹⁷ In its November 1997 *Monetary Policy Report*, the Bank estimated that the gap between actual and potential output had been 1.75 percent of potential in the previous spring quarter. In the same quarter, the national unemployment rate had been 9.4 percent. Under the rule of thumb called Okun’s law, each 1 percent increase in...

attitude toward risk management is consistent with an established tradition at the Bank of worrying about the possibility that prices accelerate more if unemployment is allowed to fall below the non-inflationary level than they decelerate when unemployment exceeds that critical level (see, for example, Macklem 1997).¹⁸ Clearly, under the circumstances of generally declining structural unemployment in North America, the US Federal Reserve's more aggressive strategy has paid out handsomely compared to the Bank of Canada's more conservative strategy.

Summary

In the early 1990s, Canada's employment rate suffered a drop that was the largest and most persistent since the Great Depression — from 62.4 percent of the working-age population in 1989 to 58.4 percent in 1992. Stagnation followed until 1996, and then a partial recovery to 60.4 percent by mid-1999. By contrast, the US employment rate has increased during the decade.

Part of the employment rate drop has been voluntary. For structural and demographic reasons, there has been a significant withdrawal from the labor force among groups with previously high rates of unemployment: young men and women who decided to persevere in school in larger numbers, workers who found it too hard to qualify for the newly restricted EI benefits, and low-skilled workers who faced dimmer long-term job prospects. As a result, at the end of the 1990s, the highest employment rate and the lowest unemployment rate consistent with stable inflation have both declined, with the non-inflationary unemployment rate now possibly being as low as 6 percent, compared with 7.5 or 8 percent ten years ago.

For the most part, one can attribute the employment rate drop of 1990–92 to a large and protracted decline in job availability initially due

Note 17 - cont'd.

... output is associated with a reduction of roughly 0.5 of a percentage point in unemployment; accordingly, the implicit Bank estimate for the non-inflationary unemployment rate (corresponding to an output gap of zero) must have been about 8.5 percent at the time.

¹⁸ In technical terms, the Bank tradition is that the Phillips curve would be vertical (at the level of the non-accelerating inflation rate of unemployment, or NAIRU) in the long run, but could be convex in the short run.

to a standard recession. The conspicuous causes of the recession were the concomitant (but shallower) US recession, some decline in the average prices of Canadian exports of primary products, and the high interest rates and the exchange rate appreciation induced by the anti-inflationary monetary policy the Bank of Canada pursued over the 1989–91 period. Developments between 1992 and 1996 were more surprising. There was a “schizophrenic” split in the aggregate demand for Canadian goods between foreign demand and domestic demand. Real exports increased briskly, but real domestic consumption and investment spending on Canadian goods declined in absolute value. This allowed just enough growth in real GDP to prevent the job offer rate and the employment rate from declining further, thus delaying the recovery. A key implication is that the decline in the unemployment rate over the 1992–96 period has all the appearances of a structural decline, confirming the previous analysis of labor force behavior.

Many structural interpretations of the Canadian slump of the 1990s have been attempted: globalization, free trade, labor market rigidities, downsizing and restructuring, payroll tax increases, and constitutional politics. While raising genuine problems about the efficient functioning of the Canadian economy, those explanations are either unsupported by evidence or too limited in scope to account for the large and persistent drop in the employment rate.

The most likely explanation of the magnitude and persistence of the 1990–96 recession and slump is the damaging interaction between high accumulated public debt and high real interest rates. High debt and high interest rates caught the economy in the circular process of rising interest rates causing rising deficits, and rising deficits causing even higher interest rates. This process kept output and employment depressed. In addition, once the fiscal authorities found themselves trapped in this financial nexus, their only way out was through a fiscal retrenchment whose negative short-run impact on aggregate demand prolonged the depression of output and employment.

High interest rates in Canada are the consequence not only of the large public debt already accumulated at the end of the 1980s and of episodic international and constitutional concerns. They have also arisen from the behavior of the central bank. First, the Bank of Canada parted course with the US Federal Reserve in pursuing a more ambitious low-

inflation target. Second, technical errors led the Bank to overestimate future actual output and to underestimate potential output. As a result, at least until 1997, it underestimated the remaining gap between actual and potential output and overestimated the lowest unemployment rate achievable without increasing inflation. Third, the Bank's deep concern about the cost of inadvertently reducing unemployment below the non-inflationary level led it to follow a more conservative strategy than the successful "testing and probing" strategy adopted by the Federal Reserve.

Achieving and Maintaining Full Employment

The Canadian employment picture has improved significantly in the past three years. Real economic growth has picked up speed, and between the end of 1996 and summer 1999, the employment rate increased by 2 percentage points to 60.4 percent while the unemployment rate declined, also by 2 points, to 7.8 percent. The buoyant US economy has continued to support the growth of real exports through the recent period of commodity price decline and the Asian crisis. Emboldened externally by the US Federal Reserve's impressive performance in reducing unemployment and internally by the end of the fiscal crisis, the steady low inflation rate, and more stable market expectations, the Bank of Canada has tried to keep interest rates low and test the waters of lower unemployment rates. To protect the momentum of the recovery, it allowed the Canadian dollar exchange rate to fall below 64 US cents during the period of economic and financial uncertainty in 1998, and it was quick to bring short-term interest rates back down after the worst was over in early 1999.

In summer 1999, however, Canada's employment rate was still 2 percentage points below its 1989 level. The unemployment rate was slightly above the 7.5 percent rate achieved in 1989, but probably still about 1.5 points above its sustainable non-inflationary level. As I indicated above, the evidence on recent labor force behavior and the comovements of job offer and unemployment rates strongly suggests that the non-inflationary level of unemployment is significantly below what it was ten years ago. To these can be added the presumption, based on two decades of domestic structural reforms and internationalization of the Canadian economy (see OECD 1998), that tougher domestic and in-

ternational competition is now better able to hold up wage and price acceleration at lower unemployment rates than before.

Thus, further progress is necessary before Canada can achieve a state of full employment comparable to that currently observable in the United States. The economic and social benefits of such a state cannot be minimized. Each percentage point reduction in the national unemployment rate means about \$20 billion more in annual national income and 225,000 more jobs. Further, as the labor market becomes progressively tighter, the additional jobs go disproportionately to workers at the bottom of the income scale. To that extent, income inequality and poverty decline — as they have begun to do in the past few years of near full employment in the United States.

There is also an added benefit in terms of productivity growth. Although recessions and slumps initially may have some useful “cleansing” effect on organizations, an economy that remains underutilized over an extended period will generate fewer profits, less investment in new technologies, and eventually smaller productivity gains. Between 1989 and 1998, the level of real investment in machinery and equipment doubled in the United States, but increased by only 60 percent in Canada. As I emphasize further below, it is hard not to see Canada’s poor equipment investment outcome as a significant cause of the country’s disappointing productivity performance over the decade. Uncertain employment prospects further encourage workers’ resistance to organizational and technological change. There is no evidence from any time or place that depression, rather than full employment, is better for productivity growth: real GDP per worker in Canada was lower in 1939 than in 1929.

What are the prospects for completing the current ongoing recovery of output and employment in Canada? A number of external factors, such as economic and financial developments in the United States and the rest of the world, over which Canadians have no control, will continue to exert a strong influence on the Canadian economy. While there is reason to be particularly optimistic that the Federal Reserve will continue to manage the US economy in an enlightened way, nobody knows the future. Canada is, however, in full control of the two domestic levers of aggregate demand and inflation management: monetary and fiscal policy. So, the appropriate question to ask is: What are the conditions

under which monetary and fiscal policy will maximize Canada's chances of fully recovering from the slump of the 1990s and staying at full employment once it reaches this state?

Assuming the current monetary regime continues to aim for low inflation with flexible exchange rates, three policy prescriptions follow from the analysis I have presented. First, to the extent that the United States continues to achieve a reasonably low average level of inflation — say, between 2 and 4 percent — the Bank of Canada should not continue to keep the CPI inflation rate below 2 percent as it has done since 1992. It should try to do as well as the US Federal Reserve, but not reach for a more ambitious inflation target. This would naturally require that the inflation-targeting agreement between the Bank and the Finance Department be revised accordingly when the current version expires in 2001.

The case I have presented for this view is based on a simple cost-benefit argument. On the benefit side, there is no evidence from the empirical economic literature that targeting an inflation rate of 1.5 percent instead of, say, 2 to 4 percent brings any improvement to aggregate economic performance. On the cost side, Canada's lower inflation rate increases the risk of permanently higher unemployment if resistance of workers and firms to absolute wage cuts remains strong or if financial markets do not align their expectations of exchange rate variations on the average intercountry inflation differential. In practice, the existence of such a persistent tradeoff between inflation and unemployment at very low levels of inflation would mean that Canada could achieve and maintain, say, a 6 percent unemployment rate if it allowed the inflation rate to stabilize at 3 percent, but might have to settle for a 7 percent unemployment rate if it insisted on keeping inflation at 1.5 percent.

My second policy prescription is to accord a high priority in the policy agenda to reducing the net debt of the public sector as a percentage of GDP. I indicated above that the increase in Canada's debt-to-GDP ratio to 40 percent in 1990 made public finances particularly vulnerable to high interest rates and a deep and protracted slump. A circular reinforcement process between high deficits and very high interest rates was inevitable, with serious consequences for the persistence of the slump. Although no one rationally wants to see this process recur, it would be foolhardy to dismiss its possibility entirely, forget the lesson, and keep walking along the precipice.

Ottawa and the provinces successfully reduced the debt-to-GDP ratio from 70 percent in 1995 to 62 percent in 1998. The Keynesian principle of balancing the budget on average has made a comeback in the form of deficit elimination legislation in several provinces and, at the federal level, of planning for a zero deficit after setting aside an annual contingency reserve devoted to reducing the debt if it is not needed during the fiscal year. But this is done as memories of the recent fiscal crisis are still fresh. The current 62 percent debt-to-GDP ratio is still much higher than the 40 percent of ten years ago. Fiscal authorities need to have long memories of what happened in the past decade, and to hold the line firmly on debt stabilization or reduction plans until the public sector net debt falls to at least 30 percent of annual GDP.

My third prescription amounts to a call for better empirical analysis by Canadian research economists concerning the level of potential output (or the non-inflationary rate of unemployment) in Canada and the sensitivity of aggregate demand and actual output to changes in monetary conditions — that is, changes in real interest and exchange rates. Throughout the 1990s, the Bank of Canada's systematic underestimation of potential output and overestimation of actual output led to systematic underestimation of the output gap and overestimation of inflationary pressure. This created a bias in favor of higher real short-term interest rates than was warranted and delayed the recovery process. There should be no controversy about this call for better research, since the Bank itself has acknowledged its prediction failure. Another matter in great need of empirical clarification is the belief within the Bank that the cost of the unemployment rate's falling below its minimum non-inflationary threshold is significantly greater than the cost of exceeding it. There has been no parallel belief at the Federal Reserve concerning the behavior of the US unemployment rate, which is why the Fed has moved more aggressively than the Bank of Canada against unemployment. On all these technical questions, the Bank clearly needs outside help from the research community.

Why Are Canadians Overtaxed?

The net income that governments withdraw from the economy is the difference between the taxes they collect from and the transfers they

make to persons and businesses. Taxes are the main basis for this withdrawal. Transfers include both unrequited transfers to the private sector *and* interest payments to domestic owners of government debt. In the first part of this paper, I established that, from the 1970s to the 1990s, government withdrawals did reduce, on net, the total fraction of national income that ultimately wound up in private hands, but not very significantly. This was because both taxes and transfers increased by about the same percentage of GDP (look back at Figures 6 and 7). From 1980 to 1998, the overall tax rate rose from 30 to 38 percent of GDP, and the overall transfer rate rose from 9 to 17 percent of GDP, leaving the net of the two unchanged at 21 percent of GDP. As I emphasized earlier, this is not to deny that Canada has a tax problem: a 25 percent increase in the overall tax burden (from 30 to 38 percent of GDP) is bound to exacerbate problems with economic efficiency and productivity and affect income distribution among social classes.¹⁹

The Fiscal Crisis: Bad Luck and Slow Reaction

From 1975 to 1995, Canada got trapped in a fiscal conundrum by a combination of bad luck and slow reaction time. In the mid-1970s, the economic environment was very favorable: the economy was running at full capacity and growing at real annual rates of 5 percent with zero or negative real interest rates. Governments began to index the income tax to the cost of living and introduced large tax cuts. This brought the global tax rate from 32 percent of GDP in 1975 to 30 percent in 1978–80 (see Figure 6). These reductions were quickly offset by tax increases in 1981. Then, bad luck set in with the deep 1982–83 recession and the first deficit crisis. Excess capacity and unemployment increased significantly. The growth rate of real GDP dropped sharply and never recovered to the pace of the 1960s and 1970s, and real interest rates went from negative to high positive levels. Unaware of the long-term nature of these changes in growth and interest rate trends, the fiscal authorities

¹⁹ At this level of generality, one need not distinguish finely between average tax rates and marginal tax rates. Both matter for migration and tax evasion. Work, saving, and investment incentives depend mainly on marginal tax rates. Usually, countries with higher marginal tax rates also tend to have higher average tax rates.

did not hesitate to actively expand program expenditures in order to prop up the sagging economy. All this brought the public sector budget deficit to 7 percent of GDP in 1983–85.

Reaction to the fiscal disequilibrium was slow and weak. The fiscal authorities made a first attempt at fiscal consolidation in 1985–87, largely based on an increase of the overall tax rate from 32 to 35 percent of GDP. Despite the concomitant recovery, however, the fiscal deficit was never reduced much below 4 percent of GDP. This allowed the circular process from high deficits to rising debt to increased interest payments to higher deficits to take a firm grip on public budgets. The net public sector debt-to-GDP ratio was stabilized in 1987–89, but not before it had soared to 40 percent of annual GDP, compared with 6 percent 15 years earlier.²⁰

It is in this very fragile fiscal environment that the second stroke of bad luck occurred. The deep 1990–92 recession and the following slump sent the fiscal deficit back up to 8 percent of GDP and the debt to 70 percent of annual GDP. Between 1990 and 1993, to sooth the impact of the recession, program expenditures were again increased, from 35 to 37 percent of GDP on a cyclically adjusted basis (see Figure 16).²¹ At the same

²⁰ As already indicated, these debt *levels* are on a national accounts basis. They are lower than the corresponding public accounts numbers by about 20 percentage points of GDP, mainly because they subtract the accumulated surpluses of government pension funds. However, it is enough for our purposes that annual *changes* in the two series are very similar.

²¹ Business fluctuations considerably affect the actual ratio of program expenditures to GDP. In a recession, for example, GDP is depressed relative to trend, and program expenditures increase automatically as EI and social assistance payments rise with higher unemployment. These two effects combine to give a cyclical lift to the program expenditure-to-GDP ratio. To get at a true measure of the *discretionary* changes in the ratio (such as shown in Figure 16), the cyclical fluctuations in GDP and program expenditures are removed as follows. In the denominator, the actual value of the GDP price index is retained, but actual real GDP is replaced by trend real GDP. The latter is obtained by interpolating actual real GDP log-linearly between the peak years 1966, 1973, 1979, and 1989, and then assuming a trend growth rate of 2.5 percent between 1989 and 1998. There is no pretention here that trend real GDP calculated in this way gives a precise measure of non-inflationary real GDP or that it cuts through the middle of cyclical fluctuations (it just removes them). In 1998, the value of trend real GDP calculated by this method would have corresponded to an aggregate unemployment rate of about 6 percent. In the numerator, actual program expenditures are replaced by trend program expenditures, which are obtained by calculating roughly how different EI and social assistance payments would have been if real GDP had been at its trend value. The cyclically adjusted ratio shown in Figure 16 is the resulting ratio of trend program expenditures to trend GDP.

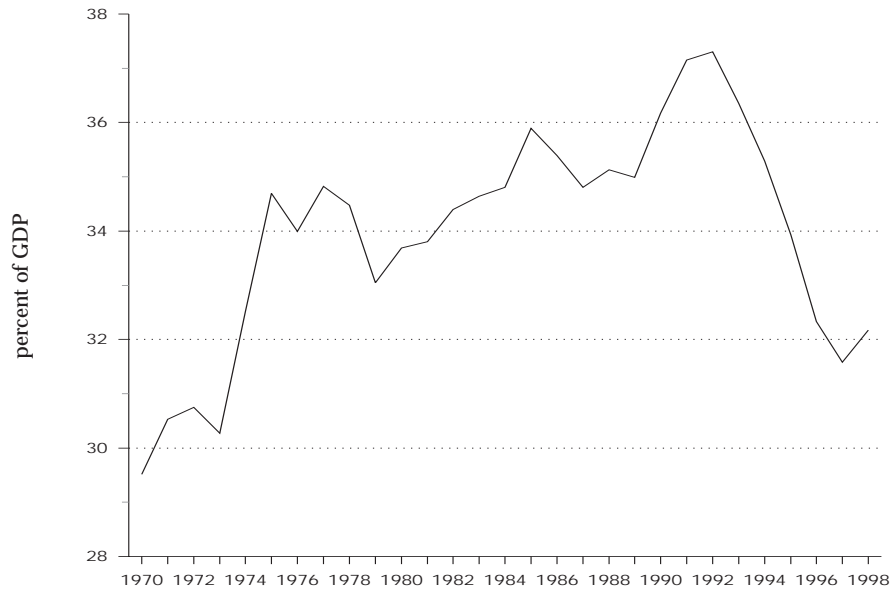
time, however, to prevent the fiscal balance from deteriorating even more, the global tax burden was simultaneously raised from 35 to 38 percent of GDP.

In 1994, almost 20 years after the beginning of the fiscal problems, the fiscal authorities finally decided to bring the primary balance into substantial surplus to provide fiscal room for the mammoth debt service and to wind down the deficit. Moreover, since the tax burden had already jumped from 32 percent to 38 percent of GDP over the previous decade, the return to fiscal equilibrium was thought to require a vigorous *coup de barre* on the spending side. Eventually, from the bottom of the recession in 1992 to 1998, public sector program fell from 42 percent to 34 percent of GDP on an actual basis and from 37 percent to 32 percent on a cyclically adjusted basis. The gross debt service declined by 1 percentage point to 8 percent of GDP. The public sector budget balance was turned around by 9 percentage points, from a deficit of 8 percent of GDP to a surplus of 1 percent.

From this summary of fiscal developments over the 1975–98 period, it is even easier to understand why Canadians are overtaxed than why they are underemployed. A fruitful way to summarize what happened to Canada's tax burden is to make a distinction between long-term and short-term aspects. Over a long period of time — that is, abstracting from the business cycle and assuming a stable debt-to-GDP ratio — Canadians pay taxes to finance two permanent types of allocations: program expenditures on health, education, income security, infrastructure, and so on; and interest charges on the existing public debt. Over shorter periods, depending on current and recent economic and fiscal performance, governments may have to increase taxes for two transitory purposes: to offset revenue losses and larger automatic expenditures for EI and social assistance in a recession, and to reduce or eliminate the annual fiscal deficit to bring the debt and interest charges on it under control.

What does the just-told fiscal story of the past quarter-century say about the change in the long-term pressure on Canada's tax burden? Figures 16 and 17 clarify the picture. Figure 16 shows that, on a cyclically adjusted basis, public sector program expenditures increased by 3 percentage points from about 34 percent of GDP in the mid-1970s to 37 percent in the early 1990s. Figure 17 indicates that (gross) interest payments

Figure 16: *Public Sector Program Expenditures as a Percentage of GDP, Canada, 1970–98*



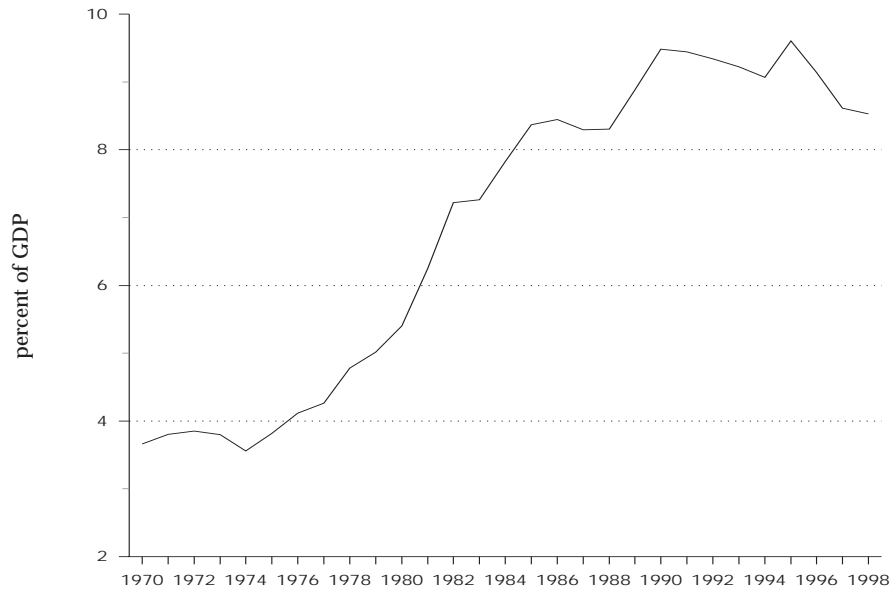
Note: Both expenditures and GDP are cyclically adjusted.

Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues; and author's calculations.

on the public debt rose by 5 percentage points from 4 percent to 9 percent of GDP over the same period. Adding these two changes reveals that a large, 8 percentage point, long-term pressure accumulated on the overall tax rate over the period. The only reason the tax rate actually increased by “only” 6 percentage points, from 32 percent of GDP to 38 percent, during that time is that the public sector deficit was eventually allowed to rise to 8 percent of GDP (see Mintz and Poschmann 1999).

Since 1992, the picture has evolved considerably. Although interest payments on the debt were still 4 percentage points above their mid-1970s level in 1998, the severe spending cuts of the previous years had reduced cyclically adjusted program expenditures to 32 percent of GDP — that is, 2 points *below* their mid-1970s' level. So, while the net accumulated upward pressure on the overall tax rate from these two long-term factors was 8 points (5 plus 3) from 1975 to 1992, by 1998 it had receded to only 2 points (4 minus 2). Nevertheless, the overall tax rate in 1998 was still 38 percent of GDP, 6 points above its mid-1970s' level. This time, much of the higher tax rate was devoted to the short-term task of

Figure 17: *Gross Interest Payments on Public Sector Debt as a Percentage of GDP, Canada, 1970–98*



Source: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues.

absorbing the slump-related revenue loss and social spending, and of realizing a small budget surplus leading to some debt reduction.

By How Much Are Canadians Overtaxed?

In what sense does this leave Canadians overtaxed? A simple answer is that they are overtaxed relative to the current level of public services they receive, for two reasons: Canadians are deeply in debt, and they are underemployed. In 1998, the global tax rate exceeded 38 percent of GDP, and Canadians were getting public services from program expenditures (for health, education, income protection, defense, infrastructure, and so on) worth 34 percent of GDP. Of this 4 percentage point gap between taxes and public services, 3.5 points were required to make fiscal room for net interest payments on the public debt (gross interest payments on the debt less the investment income of governments); the rest was allocated to generate a small debt-reducing fiscal surplus. The underem-

ployment situation entered the picture by exaggerating the weight of program expenditures as a percentage of below-potential GDP. A quick calculation of what GDP would have been in 1998 if the national unemployment rate had been at the non-inflationary level of 6 percent I estimated earlier indicates that the same expenditure programs would have cost 32 percent of full-potential GDP instead of 34 percent of actual GDP. Adding the effects of indebtedness and underemployment therefore leads to an estimate of about 6 percent of GDP for the total size of the “excess” tax burden that Canadian taxpayers support, representing a huge amount of more than \$54 billion of Canada’s \$900 billion GDP in 1998.

This calculation is straightforward, but based on special assumptions. It compares the tax rate in 1998 (38 percent of GDP) with what the rate would have been if net debt had been brought down to zero, full employment had prevailed, and program expenditures had been 32 percent of GDP. Some groups of people will regard the 1998 level of public services as lower than their values and preferences would deem desirable. To satisfy them, perhaps the full-employment program-expenditure-to-GDP ratio should be 34 percent in the long run instead of 32 percent. Assuming these groups want the economy to recover to full employment and agree that the net debt should be eliminated, they will estimate that the excess tax burden in 1998 was 4 percentage points of GDP instead of 6 points — \$36 billion instead of \$54 billion. Other groups, however, will not want to get rid of the net public debt completely, but will be ready to support a long-term debt service and annual deficit each amounting to, say, 1 percent of GDP. These groups too will estimate that the overall tax rate in 1998 was too high by 4 percentage points of GDP instead of 6 points.

But across these various expressions of preferences two implications remain. First, under most reasonable sets of preferences, Canadians *are* overtaxed. Second, assuming Canadians make the effort to achieve and maintain non-inflationary full employment, they still have to decide about the relative size to which net public debt ought to converge in the future and at what speed; and the relative size to which program expenditures ought to converge in the future and at what speed. So, while there is little question that Canadians’ tax burden should decline, the degree and pace of the reduction depends on the time paths the fiscal authorities set for program expenditures and the net debt.

Reducing the Public Debt

There are numerous reasons the current level of the net public debt (as a percentage of GDP) is unacceptable:

- When the accumulated debt is large, the slightest change in interest rates can quickly destabilize government budgets. This was one key reason that the 1990–92 recession degenerated into a seven-year-long slump.
- A large debt entails higher average and marginal tax rates, and hence more of the adverse incentives in economic behavior created by taxation.
- A large debt signals a problem of intergenerational equity, with the supply of public services and transfers to current generations exceeding the rate that is sustainable over the long term at current levels of taxation (see, in particular, Oreopoulos and Vaillancourt 1998).
- By displacing private debt in private portfolios, the public debt raises the cost of financing private and public investment and sends many Canadians to borrow abroad. Whether through lower domestic investment and productivity or increased interest payments on the larger external debt, national income is reduced.
- By raising interest payments and thus increasing the wedge between taxes paid and public services received, a rising public debt deepens the frustration of taxpayers and creates a serious problem of legitimacy of government. Taxpayers in the 1960s were quite ready to accept a larger tax burden in part because their pre-tax real incomes were rising rapidly, but also in part because they could see schools and hospitals being built with their taxes. In recent years, Canadians have had serious problems accepting the increase in their tax burden in part because pre-tax real incomes have declined in absolute levels, but also in part because taxpayers have received fewer public services in return for higher taxes, which have mostly served to pay interest on the accumulated public debt.

Ottawa and the provinces have already taken practical steps to reduce the relative weight of the public debt in the economy by legislating deficit elimination rules or by setting aside contingency reserves. Zero deficits have the enormous advantage of simplicity. They freeze the debt at a fixed amount and allow reductions in the debt-to-GDP ratio through

the eroding action of the growing GDP in the denominator. For example, if current dollar GDP increases by 5 percent in 1999, the net public sector debt on a national accounts basis will have declined by 3 percentage points from 62.3 percent of annual GDP in 1998 to 59.3 percent by the end of 1999. In this way, under normal growth rates, Canada can return its net public debt to 40 percent of GDP in 10 years and to 30 percent in 15 years.

In fact, the Canadian public sector will likely do better than that if the current deficit elimination rules and policies continue to apply on a public accounts basis, for two reasons. First, a zero deficit on public accounts technically means a surplus on national accounts. Second, for long-term planning purposes, the Canada and Quebec Pension Plans are expected to move into annual surplus. As a result, the public sector budget balance on national accounts will probably rise to about 2 percent of GDP by 2009.²²

The practical question is whether governments should do even more and reduce the absolute level of the debt even faster. Given all the reasons that a large debt is unacceptable, it is not hard to mount a good theoretical case in favor of front-loading fiscal surpluses (see, for example, Robson and Scarth 1998). At the level of practical politics, however, large fiscal surpluses also cannot fly. The money would be there for the taking, and the lure would be politically irresistible. The current annual pace of reduction of the debt-to-GDP ratio is already an impressive achievement of the past five years of budget politics; rather than trying unsuccessfully to improve the zero-deficit norm on public accounts, I think we should concentrate on making sure it sticks permanently.

Stabilizing Program Expenditures

The current size and composition of government program expenditures in this country is the result of Canadians' preferences for a certain level of public services, of their willingness to pay the required taxes, and of economic and political history. In 1998, these factors left Canada with an aggregate level of program spending worth 34 percent of actual GDP. The most significant international comparison is with the United States, where program spending was 31 percent of GDP in 1998. With full em-

²² I am indebted to Bill Robson for clarifying these points for me.

ployment in the two countries, the comparison would, in fact, be a lower 32 percent for Canada and the same 31 percent for the United States, giving 1 percentage point of GDP as the full-employment differential between the two countries.

Is this too small or too high? This is clearly a matter of taste, about which each citizen is entitled to her opinion, with governments' having to choose among the many options. It should be noted, however, that a key difference between Canadian and US government spending is the level of defense expenditures, which in 1998 was 1 percent of GDP in Canada and 4 percent in the United States. This means that, at full employment, nondefense program spending would have been 31 percent of GDP in Canada and 27 percent in the United States.

This 4 percentage point differential between the two countries is not inconsequential. My view is that the Canadian public sector is not making entirely bad use of it. As I mentioned in the introduction, the main reason Canada gets the highest marks in the United Nations' Human Development Index is because of its top score on the combined subindex of health and education. The average Canadian lives longer than the average citizen of any other countries except Japan and Iceland. Compared with that in the United States, life expectancy at birth in Canada is nearly three years longer and premature mortality 25 percent lower, while in per capita terms Canada's mainly public health expenditures amount to only 55 percent of the United States' mainly private health spending. Moreover, the aggregate school enrollment rate in Canada's largely publicly financed educational sector is the highest in the world. The income security system managed by the Canadian public sector, while far from being the most egalitarian in the world, is significantly more so than the US system (see Wolfson and Murphy 1998).

In fact, after the particularly difficult fiscal retrenchment period Canada has just gone through, some might even be tempted to argue that the country should allow its public sector to begin absorbing a rising fraction of national income in coming years. This would be a mistake: although severe, the spending cuts of the past few years have, in my view, put a welcome end to the long-term upward drift in the share of public program expenditures in GDP.

Although painful, this exercise has been salutary in two respects. First, Canadians have signaled that the relative size of the public sector

has exceeded a level they consider acceptable. Second, the spending restraint has generated an intense and welcome search in the public sector for ways to do things differently and better. Ideas of unit cost minimization, product and process innovation, incentives reform, and public-private partnerships are making progress in the public sector thanks to the recent financial pressure. Canadians are rethinking and reforming government. Allowing the share of public services to go up again inordinately risks losing the benefits of the ongoing renewal process. Health care is a case in point. Even if Canada spends much less and performs better than the United States in this area, other countries spend even less than Canada and perform almost as well. Britain's health expenditures are only two-thirds as high as Canada's, yet Britons live almost as long as Canadians.

In the light of these observations, public sector program expenditure in Canada should be allowed to rise no faster than inflation plus the *trend* growth rate of real GDP. Taking recent inflation and trend real growth performance as being 1.5 percent and 2.5 percent, respectively, this means public sector program spending should grow no faster than 4 percent per year. Since the actual growth rate of real GDP is above trend in expansions and below trend in recessions, the ratio of program spending to GDP would decrease below trend in expansions and increase above trend in recessions. A long-term equilibrium between the shares of the private and public sectors would thus be established.

The Size and Form of Tax Reductions

How would stabilizing program expenditures and eliminating deficits on average affect the amount of tax Canadians pay? If the Canadian economy was always at full employment, the program expenditure-to-GDP ratio would be something close to 32 percent. But economic fluctuations will always occur, so on average the expenditure-to-GDP ratio would more likely be 33 percent (say, with unemployment at 6 percent in good years and 8.5 percent in bad years). Further, with no deficit and no disruptive increase in real interest rates in the long run, net interest payments on the debt would slowly decline from their level of 3.5 percent of GDP in 1998 to something as low as Canadians want.

Under these stipulated conditions, the ratio of net public sector debt service to GDP would fall to about 1.5 percent of GDP in ten years' time. In addition, as I explained earlier, a zero public accounts deficit would mean a 2 percent national accounts surplus-to-GDP ratio by then. As a result of financing program spending worth 33 percent of GDP, net interest payments worth 1.5 percent of GDP, and a public sector surplus worth 2 percent of GDP, an overall tax rate of 36.5 percent of GDP would be required. Since the actual overall tax rate for 1998 was 38.5 percent, a global tax reduction equivalent to 2 percent of GDP would be feasible — representing an across-the-board tax cut of 5 percent. In terms of 2009 GDP, with national income growth (including inflation) averaging 4 percent annually until then, taxes would be reduced cumulatively by about \$30 billion. (Keep in mind that these figures are meant to be orders of magnitude, rather than precise.)

This global tax reduction includes measures that all three levels of government would take with respect to all forms of taxation. Still to be decided would be which level of government would reduce which taxes and by what amount. The arithmetic of the budget constraint immediately indicates that governments that are deeper in debt — the federal government and Quebec, for example — would face larger tax-reduction jobs than less-indebted governments. Much would also depend on the federal-provincial relations games.

As to which taxes to reduce, the right question is: How can Canadians' living standards be put back on the growth track? The broad answer provided by the large research literature on taxation is to adapt the level and structure of taxation so as to protect work incentives, encourage saving and investment, support technological innovation, and reinforce Canada's competitive position as a place to work and to do business. This answer is neither new nor easy to implement, but it has the great advantage of being the correct one. Note also the mention of both level *and* structure. It is much easier to improve the tax structure when taxes can be lowered, because this is the ideal political context in which the number of winners from tax reform can massively dominate the number of losers.

Work incentives are protected, and personal incentives to move across borders are reduced, when marginal tax rates on labor income are low. Canadian marginal tax rates currently become very high at rela-

tively modest levels of income. A “smart” reduction in marginal tax rates would lower the marginal rates for all taxpayers, but more for those at middle- and higher-income levels. The progressivity could be preserved by significant increases in basic demographic exemptions, by restrictions on tax shelters unrelated to saving, and by a re-examination of the clawback provisions of several social programs. A revamped, two-rate personal income tax for Canada, with a combined federal and provincial low rate below 30 percent and a high rate below 40 percent, is perfectly feasible, and it would go a long way toward addressing concerns about the competitiveness of Canada’s personal income tax *vis-à-vis* that of the United States.

To encourage saving and investment and, hence, capital formation, productivity, and economic growth, the key is to have lower taxes on saving and investment and higher taxes on consumption.²³ This militates against reductions in consumption taxes such as the goods and services tax (GST) and the various provincial sales taxes, and in favor of completing the transformation of the personal income tax into a personal consumption tax by further increasing amounts of deductible savings (see Seidman 1997). A more radical alternative would be to bring the entire income tax system closer to a flat tax scheme, under which the corporate income tax would be fully integrated with the personal income tax and transformed into a flat tax on business cash flow, where all investment expenditures would be deductible (Hall and Rabushka 1985).

Canada’s overall tax burden will have to stay larger than that in the United States because government program spending will remain more important here. Within this global size constraint, however, there are measures that can lessen Canada’s competitive tax disadvantage and keep the country an attractive place to work and do business. A reduction in the marginal tax rates for those at middle- and higher-income levels is one important ingredient; a general decrease in the corporate income tax rate is also crucial.

Mintz (1999) has observed that Canada’s 43 percent statutory rate of corporate income tax is 8 percentage points above the OECD median, that it discriminates unduly in favor of the resource and manufacturing industries, and that it encourages erosion of the tax base through the

²³ The connection between investment and productivity is examined in more detail below.

shifting of activity and profits to lower-tax jurisdictions. He further observes that corporate tax burdens (including taxes on profit income, capital, and property transfers) have been falling rapidly over the past five years in most industrial countries, but not in Canada. The likely result is that in 2000, "Canada would become the highest-taxed country for services and the second-highest for manufacturing among G-7 countries" (*ibid.*, 9).

It seems clear that the extraordinary economic success of Ireland, for example, over the past decade, while the product of a combination of factors, owes much to its favorable business tax environment, which has attracted mountains of foreign direct investment (OECD 1999a). The tax environment does indeed matter for economic growth, and particularly for the location of economic activity.

Mintz's remarks also point to an interesting paradox. Canada's generous tax treatment of research and development (R&D) is very supportive of technological innovation, but its general corporate tax system strongly discriminates against the services industries that employ much of the high-skilled manpower and generate much of the R&D. This does not make sense: it invites Canadians and foreigners to set up R&D operations in Canada, but to make use of the results of this activity in manufacturing or services firms established in countries with more favorable overall corporate tax systems.

One area that should not be targeted for tax cuts is employment insurance. The current large surplus of EI premiums over EI benefits has actually transformed this tax into a general payroll tax unrelated to benefits (Kesselman 1998). Federal legislation should recognize this fact by making a clear distinction between the general payroll tax and EI premiums. At the same time, two shortcomings of EI as a general payroll tax should be corrected. First, the upper ceiling on taxable annual earnings, currently about \$40,000, should be removed to eliminate the incentive it creates to employ relatively less taxed high-wage workers. Second, coverage should be expanded to include self-employed workers. The additional revenue from these two sources would permit larger reductions in the personal and corporate income taxes. While EI premiums should be lowered, the general payroll tax should not, both because it is a particularly efficient form of taxation and because the area

of payroll taxation is one in which, contrary to personal and corporate income taxation, Canada is already competitive internationally.

Summary

Canada now has an opportunity to reduce taxes by up to \$30 billion over the next ten years. This opportunity should be used perceptively to protect work incentives, promote investment — not consumption — and strengthen the country's technological base and international fiscal competitiveness.

To achieve these goals, consumption taxes such as the GST and payroll taxes such as the EI tax should *not* be reduced. EI taxation should become a general payroll tax with no ceiling on taxable earnings and expanded to cover self-employment earnings. Instead, the focus should be on broad personal and corporate tax reductions. Basically, the marginal rates of personal taxation should be significantly lowered, basic exemptions increased, and tax shelters unrelated to savings restricted. Amounts of deductible savings should be increased. Corporate income taxation should be equalized across industrial sectors and its standard rate reduced from 43 percent to below the OECD median of 35 percent. The effective rate of corporate taxation should be lowered so as to restore Canada's international competitiveness as a business location.

The link of these proposals with the general theme of this lecture is obvious: they will contribute to the growth of private disposable incomes in Canada by directly raising the private-income retention rate and by indirectly supporting the growth of employment and productivity.

Why Are Canadians Underproductive?

The reasons Canadians are overtaxed are easy enough to understand. The reasons they are underemployed are more complex, but a step-by-step decomposition of the problem also leads to a reasonable understanding. In both cases, we know approximately what to do.

The reasons Canadians are underproductive are even more important over the long run. There is a limit on how much one can raise the standard of living by reducing taxation and carrying employment to the maximum non-inflationary level. But there is no limit to the productivity level — the amount of goods and services Canadians can produce in

an hour of work. The problem is that policies that raise productivity are less well understood than those that bring full employment or reduced taxation.

One way to visualize this is to recall (see Figure 3) that the Canadian standard of living in 1998 is estimated to have been 73 percent of the US level; the intercountry real income gap was thus 27 percent. By how much would Canada's real national income per adult have increased if the Canadian unemployment rate for 1998 had been equal to the moderately optimistic minimum non-inflationary level of 6 percent I estimated earlier, instead of the actual 8.3 percent? The standard answer is: by not more than 5 percent.²⁴ This would have raised the Canadian-US income ratio to 77 percent from 73 percent and, hence, would have reduced the intercountry real income gap to 23 percent from 27 percent. Only 15 percent of the gap — four percentage points out of 27 — would have been eliminated.

The lesson from this simple exercise is not that bringing the Canadian economy back to full employment is less important than closing the productivity gap between Canada and the United States. The reasons that achieving full employment should be a top priority were reviewed in detail earlier, but in a sense this is the easy part of the solution — there is a free lunch to grab. The hard part is to get rid of the remaining 85 percent of the intercountry real income gap, and there is only one way to achieve this: through raising Canada's productivity relative to that of the United States.

Basic Facts about Canadian Productivity

Productivity growth has been the dominant source of the exponential rise in the standard of living in Canada and other industrial countries for the past two centuries. If Canadians cannot get their productivity moving, they can forget about the growth of real income per capita over horizons longer than five to ten years. Productivity growth has been the subject of intensive and deep research over the past four decades. While

²⁴ According to Okun's Law, each 0.5 of a percentage point reduction in unemployment is associated roughly with a 1 percent increase in output. According to this rule, a 2.3 point reduction in unemployment from 8.3 to 6 percent would raise real GDP by 4.6 percent — a little less than 5 percent.

much progress has been made in understanding this complex process, much also remains mysterious about it.

In this part of the paper, I lay down the basic facts about Canadian productivity performance in recent history, suggest explanations of why Canada has not done well enough in this area, and make a few tentative prescriptions.

In 1970, Canadian labor productivity (real GDP per worker) was 81 percent of the US level; by 1976, it had risen to 85 percent. This increase reflected the fact that, in the first half of the 1970s, as over the previous decades, Canadian productivity grew faster than US productivity. After the mid-1970s, however, the picture changed in two striking ways. First, between 1976 and 1995, labor productivity stopped growing faster in Canada than in the United States, and the Canada-US productivity ratio remained stuck at 85 percent. Second, between 1995 and 1998, Canadian labor productivity dropped back to 82 percent of the US level. (Look back at Figure 9 for the evolution of Canadian versus US labor productivity.)

The source of the turnaround after 1995 was an apparent major acceleration of productivity in the United States by 1 percent per year for those three years compared with the 1972–95 period. Gordon (1999) attributes this acceleration to a combination of three factors: a technical downward revision in way the United States calculates its GDP price index, implying a concomitant upward revision in output; a normal cyclical rebound in US productivity; and an explosion of US productivity growth to more than 40 percent per year in the manufacturing of computers, reflecting large estimated computer price declines.²⁵ The GDP price index revision and its implication for productivity means that US

²⁵ The connection between assumptions concerning price changes and the resulting productivity growth figures can be explained with the following example. Consider a current dollar increase in sales of computers from \$100 billion in 1998 to \$120 billion in 1999. If the average price of computers is assumed to be unchanged at \$1,000 per unit from 1998 to 1999, then the sales figures mean 100 million computers were made and sold in 1998, and 120 million in 1999; real sales and output have increased by 20 percent. However, suppose the average price of computers goes down by 40 percent, so that what cost \$1,000 in 1998 cost only \$600 in 1999. It then follows that 100 million computers were made and sold in 1998 and 200 million in 1999. In this case, real output has increased by 100 percent. Depending on the increase in hours of work in the computer-making industry from 1998 to 1999, a similarly important difference in productivity growth (the growth of real output per hour) will be found as a result of the two price assumptions.

Table 7: Measures of Productivity Growth, Canada and the United States, 1970–98

	Canada	United States
	<i>(annual percentage change)</i>	
Labor Productivity Measures		
Real output per worker, total economy		
1970–79	1.5	0.9
1979–89	0.9	1.0
1989–98	0.8	1.2
Real output per hour of work, business sector		
1970–79	2.4	2.0
1979–89	0.9	1.2
1989–98	1.2	1.3
Real output per hour of work, manufacturing sector		
1970–79	3.2	2.9
1979–89	1.7	2.6
1989–98	2.1	3.6
Multifactor Productivity Measures		
Real output per unit of composite input, business sector		
1970–79	1.4	1.3
1979–89	0.4	0.3
1989–97	0.8	0.4
Real output per unit of composite input, manufacturing sector		
1970–79	1.2	0.6
1979–89	0.6	1.2
1989–96	0.7	1.4

Sources: Statistics Canada, *Aggregate Measures of Productivity*, cat. 15-204, various issues; United States, Bureau of Labor Statistics, *Monthly Labor Review*, various issues.

productivity growth had been previously underestimated. The productivity explosion in computer manufacturing, however, although probably overestimated to some extent and concentrated in a very small segment of the US economy (accounting for less than 1 percent), is a real phenomenon that must legitimately be folded into the productivity growth numbers.

Essentially, Canada stopped closing its 15 percent productivity gap with the United States 20 years ago. At best, we may not have lost ground; at worst, we may have begun to slip. By way of comparison, in 1994, with labor productivity set at 100 in the United States, France was at 101, Germany and the Netherlands were at 98, Belgium was at 96, and

Canada was at 86. In 1973, Canada was second to the United States in labor productivity, and all these countries lagged behind (VanArk 1996).

In addition to the growth rate of real output (GDP) per worker, there are other official measures of productivity growth. Four of these measures, presented in Table 7, are constantly referred to in debates about Canadian productivity. Two of them also calculate productivity relative to the labor input, but use the more precise notion of hours of work, instead of number of workers, to capture units of labor services. One measure concerns the entire business sector (75 percent of the economy), the other the manufacturing sector (20 percent of the business sector). The business sector measure shows that Canadian productivity growth has been tracking US productivity quite well in the past two decades, but again implies that the existing intercountry productivity gap is not closing. The manufacturing productivity measure, however, indicates that Canada has been falling behind in this sector.

A comparison of these two per-hour measures implies that, in non-manufacturing sectors at least, Canadian productivity has grown faster than US productivity and has continued to close the intercountry gap. These sectors include other goods-producing industries (agriculture, forestry, mining, utilities, construction) and the large private services sector, which accounts for 70 percent of the business sector and includes everything from large banks to corner convenience stores.²⁶

The last two measures in Table 7 are less well known than the first three, but more fundamentally related to the analysis of the process of productivity growth. Why does each hour of work produce more and more output over time? Basically, labor productivity increases for two kinds of reasons: those we know, and those we do not know. Those we know are contained in the word and reality of measurable investment. The notion of investment here widely encompasses buildings and structures, machinery and equipment, public infrastructure, R&D, educa-

²⁶ Since services sector productivity is notoriously hard to measure (see Diewert, Nakamura, and Sharpe 1999), it is fair to ask whether anyone can be confident that it has grown faster in Canada than in the United States. What can be said, at least, is that statements about comparisons between two countries using very similar estimation methodologies can be trusted more than statements about any one country taken individually. Comparisons have the arithmetical advantage of being based on differences — when subtracting, errors of a similar nature in the two countries tend to cancel each other out.

tion, and training. Labor becomes more productive because it can work with more and more tangible capital, knowledge capital, and human capital. The reason we do not know is the fraction of real output growth that remains unexplained once one has accounted for the growth of labor input *and* all forms of investment in capital inputs. As an early student of the process of economic growth called it, this is “a measure of our ignorance” (Denison 1962). A useful way to view this dichotomy between the measurable contributions of identifiable inputs and the mysterious residual contribution is to think of investment in tangible capital, knowledge, and human resources as having two types of benefits: one that is private and appropriated by the individual firms that do the investing, and one that (willy-nilly) spills over to other firms through the diffusion of ideas concerning ways of doing things.

The notion of labor productivity growth measured by the first three concepts in Table 7 results from the subtraction of the growth of labor input alone from the growth of output. The notion of *multifactor* productivity growth measured by the last two concepts in the table results from the subtraction of contributions to the growth of output from labor and some forms of capital inputs — tangible capital and a rough industry-based measure of human capital.²⁷ The growth rates of these individual inputs are weighted to form the growth rate of a “composite input” and then subtracted from the growth of output. The table shows that multifactor productivity growth in the total business sector — the growth of real output per unit of this labor-capital composite input — is estimated to have declined in both Canada and the United States since the 1970s, but to have been higher in Canada than in the United States in the 1980s and 1990s — by about 0.25 percent per year on average. In the smaller manufacturing sector, however, Canadian multifactor productivity growth has trailed that in the United States. Just as in the case of labor productivity growth, multifactor productivity in the nonmanufacturing sectors seems to have grown faster in Canada than in the United States and the intercountry gap in those sectors must have shrunk during the period.

²⁷ So far, neither Statistics Canada nor the US Bureau of Labor Statistics subtracts contributions from detailed measures of human capital or from R&D stocks. One difference between the two organizations is that the US body accounts for the contribution of land capital.

One can draw three broad conclusions from these measures. First, labor productivity in both the total economy and the business sector has grown somewhat less in Canada than in the United States over the past two decades, so that the intercountry productivity gap has stopped shrinking and has even increased a bit. In other words, Canada has become an exception to the so-called convergence rule, according to which industrial countries that lag behind catch up by growing faster than the world productivity leader — at least, that has been the pattern since 1950 (see Barro 1997; Sala-i-Martin 1997). Second, since 1980 and particularly during the 1990s, labor productivity has grown faster in Canada than in the United States in the nonmanufacturing sectors, but much less in the manufacturing sector. Third, in both decades and sectors, the productivity growth picture looks more favorable for Canada on a multifactor basis than on a labor basis alone. The first conclusion essentially confirms what we already know from Figure 9. The second and third conclusions require more detailed scrutiny.

Is Canadian Manufacturing Backward?

Despite the many questions one may have about errors in productivity measurement, it is generally taken as a fact that Canada has fallen behind the United States in manufacturing productivity growth in the 1980s, and even more in the 1990s. But what does it mean, what are its root causes, and what should we do about it?

Table 8 compares the labor productivity performance of 17 Canadian and US manufacturing industries over the 1989–97 period (Sharpe 1999, table 3). Even if the data are subject to “measurement fragility” and should be handled cautiously, one robust fact comes out clearly: the overall Canadian disadvantage in manufacturing productivity growth is highly concentrated in electrical and electronic machinery (including the making of computers) and in commercial and industrial machinery. In these two industries during the period, US real output increased by 182 percent and 92 percent, respectively, and declined absolutely by 1 percent in the rest of manufacturing.

This extraordinary disparity comes from the same phenomenon as Gordon (1999) emphasized above in explaining the recent acceleration of labor productivity in the United States since 1995. As he pointed out,

Table 8: Average Labor Productivity Growth by Manufacturing Industry, Canada and the United States, 1989–97

	Canada	United States	Canada less United States
	<i>(annual percentage change)</i>		
Electrical and electronic machinery	4.28	13.91	-9.63
Commercial and industrial machinery	1.63	7.88	-6.25
Fabricated metal products	0.93	2.01	-1.08
Primary metals	4.50	2.99	1.51
Transportation equipment	2.29	-0.70	2.99
Food and beverages	2.23	-0.09	2.32
Chemical products	3.44	3.23	0.21
Nonmetallic mineral products	-1.37	1.84	-3.21
Petroleum refining	7.44	1.60	5.84
Pulp and paper	4.27	1.44	2.83
Printing and publishing	-2.61	-1.80	-0.81
Rubber and plastic products	4.45	4.03	0.42
Furniture and fixtures	4.89	2.03	2.86
Textiles	4.62	3.95	0.67
Clothing	3.33	3.83	-0.50
Leather products	-0.26	4.11	-4.37
Wood and lumber	-1.46	-2.88	1.42
Total manufacturing	2.35	2.90	-0.55
Total less electronics and machinery	2.21	0.20	2.01

Source: Centre for the Study of Living Standards, Productivity Data Base (www.csls.ca).

in recent years new quality adjustment procedures to price data have determined, for example, that the quality of new computers is improving so quickly that their mildly increasing prices actually constitute huge price decreases per unit of standardized computer power. The US Bureau of Labor Statistics, in effect, has been splitting the progress of current dollar sales of computers into large price decreases and large increases in estimated constant dollar real output and, hence, real output per hour of work.

Productivity in the rest of the US manufacturing sector does not, however, seem to be growing especially quickly. Canada has performed relatively well in most traditional manufacturing and also in some “high-end” industries such as transportation equipment. If the two ma-

chinery industries are removed from the manufacturing sectors of the two countries, Canada's overall productivity growth deficit of 0.6 of a percentage point per year (2.3 percent versus 2.9 percent for the United States) becomes a surplus of 2 points in nonmachinery manufacturing (2.2 versus 0.2). This 2.6 percentage point turnaround largely exceeds Canada's productivity growth deficit of 1.5 points per year (2.1 versus 3.6) in manufacturing labor productivity growth rates for the 1989–98 period. In fact, Canada matched, and even exceeded, US standards in the nonmachinery manufacturing sector during that period, but trailed miserably in the two machinery industries. Simple arithmetic shows that removing the two machinery industries from the total business sector would turn Canada's 0.1 point disadvantage in labor productivity growth there into a 0.4 point advantage in the nonmachinery business sector. According to this calculation, Canada would, except for machinery, close the productivity gap with the United States in two decades.

Should one, then, dismiss the case of lagging manufacturing productivity growth in Canada? Definitely not. The much slower growth of productivity in the machinery sector, with its mere 2 percent of Canadian GDP, is not just a statistical artifact; it represents true opportunities for real output and income growth that Americans are seizing and Canadians are forsaking. In fact, countries such as Sweden and South Korea have experienced sharp increases in their share of manufacturing output going to the machinery industries. The machinery anomaly in Canada could hold an important clue to understanding the country's productivity lag.

Daniel Treffer, at the Canadian Institute of Advanced Research (CIAR), is one who believes so. He ventures (Treffer 1999) to explain both the machinery anomaly and the simultaneous good performance of many of Canada's traditional manufacturing industries by pointing out that at the root of technological progress are two types of innovations: product innovation and process innovation. Product innovation, as its name implies, involves the introduction of new products (*ibid.*, 67). Industries that manufacture electrical and electronic products (particularly computers or industrial and commercial machinery where the link is between innovative activity and commercialized final products) are of that type. In those industries, Canada is not competitive with the United States. (Transportation equipment is a notable exception.)

“By contrast,” Trefler goes on, “ process innovation involves reductions in the cost of producing existing products” (ibid.). Traditional industries, such as pulp and paper, rubber or plastic products, and furniture, are of that type, and, as Trefler notes, “in most of them, Canada has been able to cut costs more effectively than the United States” (ibid.). Trefler’s bottom-line message is that “Canada’s productivity gap is a product innovation gap” (ibid.).

Trefler sees the source of this product innovation gap in a combination of three factors — Canada’s low expenditures on R&D, its failure to tap into the US knowledge base, and its slow rate of new technology adoption — and relies on work by his CIAR colleagues to make his point. Bayoumi, Coe, and Helpman (1999) investigate the question of international spillovers of R&D and find that a 0.5 percent increase in US R&D would raise US productivity by 6.7 percent and, via piggy-backing, raise the productivity of trade partner Canada by 2.4 percent. While piggy-backing in product-innovative sectors has benefits, without an indigenous R&D base these remain limited.

Jaffe and Trajtenberg (1996) assembled a data set on 2.5 million US patents originating from a large number of countries and find that when Canadian firms take out patents in the United States, they tend to cite related older US patents only 65 percent as often as US patents cite previous US patents. In theory, such a purely aggregative statistic could mean that Canadians simply bother less with lower-value patents, but this is unlikely in practice. Further, not only are Canadian firms failing to fully exploit the outside knowledge made public by the patent system, but the number of Canadian applications for North American patents is just about 55 percent of corresponding US patent activity in per capita terms (Whewell and Rafiquzzaman 1998).

Baldwin and Sabourin (1996) demonstrate that, among small- and medium-sized enterprises (SMEs), adoption rates of the most common new technologies by Canadian firms in the five advanced industries at the top of Table 8 seriously lagged behind their US counterparts in 1989.²⁸ And Baldwin, Rafiquzzaman, and Chandler (1994) report that

²⁸ To be fair, Canadian managers prominently mentioned the size of the market (and of the individual plant) and worker resistance as barriers to the adoption of new technology, relative to what US managers perceived these barriers to be. It should also be mentioned that the 1993 follow-up study found the Canada-US gap to be half as large as in the 1989 study.

interviewed business executives cited the capacity for innovation, and particularly for developing a new technology, as the most important factor for the success of the SME they were managing.

Finally, Trefler (1999) gathers direct evidence on the capacity of traditional manufacturing industries in Canada to face up to the competitive challenge posed by process innovation. In an investigation of the effects of FTA tariff cuts in some 200 manufacturing industries, he shows, after controlling for a host of concomitant factors, that industries experiencing small tariff cuts experienced small productivity increases, while industries having to absorb large tariff cuts received large productivity boosts. A key part of the story is that large tariff cuts were concentrated in traditional manufacturing industries, which revealed their keen ability to cut costs. This is why, Trefler concludes, the FTA must be judged a productivity success, as well as a revelator of previously unsuspected dynamism in Canada's "low-end" manufacturing.

Some may be tempted, on a cursory glance at the disappointing aggregate manufacturing productivity numbers, characterize Canadian manufacturers as hiding behind an undervalued dollar to avoid facing the challenges of globalization and technology. In fact, the disaggregated evidence suggests that, with a couple of exceptions, productivity in Canadian manufacturing industries has been growing faster than US productivity over the past decade. This includes industries traditionally regarded as our *secteurs mous*, whose response to the FTA was often painful, but overall successful. Canada may be behind, but it is catching up.

Nevertheless, the two machinery exceptions are major and cannot be dismissed as anomalies. Trefler and his CIAR colleagues may be right that the problem with the Canadian innovation system is product innovation. In any event, their conjecture clearly deserves serious investigation. What is Canada lacking in this area? How has the US advantage in product innovation developed over the years? Is it through better university-private sector linkages? better organization of material-science-based research? a better knowledge generation and diffusion system? Is it just a temporary advantage from having invested earlier and more heavily in R&D than other countries? Or does the product innovation gap reflect unsurmountable economic characteristics such as consumer market size, scope for interactive behavior, or scale economies in networking? Without subsidizing R&D more, how can we subsidize it

better to address the gap? How do we make sure innovators get a competitive return on their R&D investment, and yet allow the rest of society eventually to get access to the new knowledge? Does it matter that as much R&D as possible takes place in Canada instead of elsewhere? These questions need urgent clarification.

Does Canada Underinvest?

Beyond the manufacturing productivity puzzle, Canada's relative productivity performance always looks better when the contributions of the growth of both labor and capital inputs are subtracted from the growth of output than when only the growth of the labor factor is subtracted. Put differently, the picture is more favorable to Canada on a multifactor productivity basis than on a labor productivity basis (look again at Table 7). Concentrating on the 1989–98 period, labor productivity growth in the business sector was slower by 0.1 of a percentage point per year in Canada relative to the United States (1.2 versus 1.3), but multifactor productivity growth in the same sector was 0.4 of a point faster (0.8 versus 0.4). In the manufacturing sector, Canadian labor productivity growth fell short of US growth by 1.5 percentage points (2.1 versus 3.6), but on a multifactor basis Canada trailed by only 0.7 of a point (0.7 versus 1.4).

Thus, part of the gap that obtains when subtracting only labor input growth from output growth disappears when capital input growth is also subtracted. The logical implication is that capital input must have grown more slowly in Canada than in the United States and that it is responsible for part of the intercountry productivity growth gap. Since a simpler word for capital input growth is investment, the question naturally arises as to whether Canada invests enough (per worker) in tangible, knowledge, or human capital to support capacity expansion and productivity growth.

The answer is not one-sided. It depends on whether one considers education and training, R&D, public infrastructure, buildings and structures, or machinery and equipment. Relative to the United States, Canada seems to have done better in education and in buildings and structures, about as well in public infrastructure, and less well in R&D and machinery and equipment. Let us consider them in turn.

Investment in Education

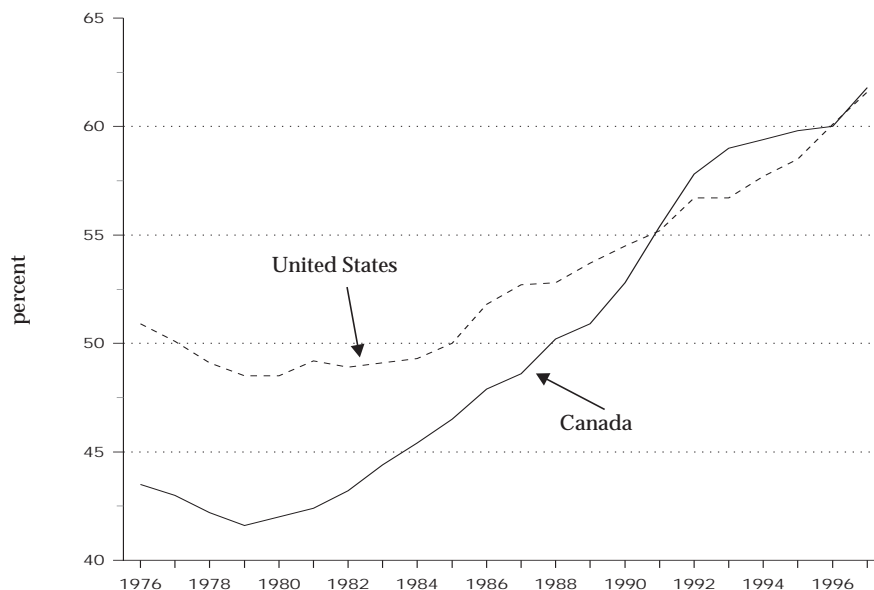
Traditionally, Canada lagged behind the United States in school enrollment rates at every level of education. During the 1970s, for example, about 25 percent of the adult labor force in the United States had a college education but only about 15 percent in Canada. The picture has, however, changed significantly in the past quarter-century. The change has come from much faster increases in school enrollment rates among young Canadians than among young Americans during the 1980s and 1990s. Figure 18 shows that the school enrollment gap between the two countries reached a maximum in 1979, with 48 percent of the young population attending school in the United States and only 42 percent in Canada. Then, throughout the 1980s, the aggregate enrollment rate rose sharply in Canada, but stagnated or increased slowly in the United States. Canadian enrollments briefly overcame US enrollments in the first half of the 1990s, and in 1997 the rate stood at 62 percent in both countries.

For Canada to have closed its large education gap with the United States in the relatively short period between 1979 and 1991 was a major social and economic achievement. It indicates that Canada invested more in education, that it was more successful in attracting students and controlling the dropout rate for a given amount of investment, or both.

The implications of this achievement are twofold for the Canadian economy. First, a higher level of education has a significant impact on labor quality and the standard of living, as the literature on economic growth well documents. Education plays an important role in innovation systems, which tend to use highly skilled workers. It plays an even greater role in the implementation of new technologies, which require adaptability and capacity to learn abstract concepts and new skills. Education makes all Canadians richer through higher productivity and wages, and probably also through interactive effects that make the global social return to this investment higher than the purely private return appropriated by separate individuals.

The second reason that education is so important is that it is Canada's best hope for reducing income inequality. Faster-rising education levels in Canada may hold the key to understanding the reason that, although wage inequality has risen in both Canada and the United States over the past quarter-century, it has increased less in Canada. Murphy, Riddell, and Romer (1998) have concentrated on the following puzzle. A

Figure 18: *School Enrollment Rate, Canada and the United States, 1976–97*



Note: The enrollment rate is defined as the percentage of the population ages 15–24 attending school.

Sources: Statistics Canada, *Survey of Consumer Finances*, various issues; United States, Bureau of Labor Statistics, *Current Population Survey*, various issues.

major assumption of much recent discussion of rising wage inequality is that modern technological progress is knowledge intensive and, therefore, biased in favor of skilled workers and against unskilled workers. If this is true, a rising wage premium for education should have developed in recent decades. The puzzle is that the wage premium for a university degree relative to a high school certificate has indeed risen a lot in the United States, but not at all in Canada.

Murphy, Riddell, and Romer propose a simple demand-supply explanation for this puzzle. They provide evidence that technology-driven forces do raise the relative demand and wage premiums for the labor services of university graduates to the same extent in the two countries. But they point out that the relative *supply* of university graduates has increased much faster in Canada than in the United States since the late 1970s, as Figure 18 illustrates. They conclude that in Canada the relative supply effect has been large enough to offset the relative demand effect, which translates into a relatively lower wage premium for university graduates in Canada. In other words, in the race between

education and technology, education has kept up in Canada, but not quite in the United States.

Two additional points are worth making about Canada's respectable education performance of the past 25 years. First, the benefits from rising levels of education are slow to materialize. Each year, the new generation of graduates joining the labor force represents only 2 percent of the active population, but these graduates will have a 45-year or longer working life. They bring renewal, but this is a slow process. In particular, while young Canadians in their twenties are at least as highly educated as young Americans, their parents in their fifties are much less educated than the US generation of the same age. If it continues, the progress of education in Canada will encourage convergence of Canada's standard of living toward the US standard, but this will take decades, not years.

The second point is that it is one thing to educate Canadian children, but another to provide them with good employment opportunities that will keep them in Canada. By good employment opportunities, I mean high wages, no excessive taxation, technological progress, and full employment, all of which need to operate simultaneously. That is why it is so crucial that Canada's economic growth strategy be coordinated among federal and provincial education, finance, and industry ministries and the central bank. While the evidence so far on the resurgence of a "brain drain" from Canada to the United States is not overwhelming, it is a cause for concern (Helliwell 1999). The data may not show sharp deterioration in the situation yet, but by the time the problem becomes evident, much precious time may have been lost. (The problem is already serious in the health professions, and among scientific and technical personnel.) Canada's role as a resource provider to the United States could then be confirmed under a new guise: from exporter of natural resources to exporter of human resources.

Investment in R&D

In contrast to education, Canada has not kept pace with international standards in R&D. In 1996, for example, Canada invested only 1.6 percent of its GDP in R&D, compared with an average of 2.2 percent for OECD countries and 2.6 percent for the United States.

Is it a bad thing for Canada to lag behind other industrial countries in R&D? Unquestionably, yes, and three arguments strongly support this affirmative answer. First, despite difficult measurement problems (see Griliches 1994), economists agree that the average private return on R&D investment is not only high, but perhaps twice as high as the return on investment in traditional capital equipment (see, for example, Mohnen 1992). The estimated sensitivity of productivity growth to R&D stocks is particularly significant among industrial countries after taking account of intercountry differences in education and openness to trade and investment (Coe and Helpman 1995). This finding exactly parallels the opinions reported by successful SME managers in the study by Baldwin, Rafiquzzaman, and Chandler (1994).

Second, left to itself, the private economy is not likely to invest enough in R&D. Much of the knowledge developed by R&D cannot (and often should not) be prevented from spilling over at home and abroad to firms and individuals other than the innovator. Hence, the latter is likely to reap personally only a fraction of his initial investment. The rate of return to the national and foreign economies — often in excess of 50 percent — far exceeds the private return to the innovator (Helpman 1997). On account of these beneficial spillovers, a much higher level of investment in R&D is desirable than is justified by the private return alone. Aghion and Howitt (1998) point out that not only are there spillover benefits from R&D, but also spillover *costs* of investing in R&D: if Pierre's R&D is successful in improving product quality or in creating a new product variety, Jack's product may become outdated and worthless. Despite this negative "business-stealing" effect, however, the positive spillover benefits largely dominate. A recent influential study (Jones and Williams 1998) finds that, even in the United States, where R&D is already more widespread than in the average OECD country, the optimal rate of investment in R&D is probably at least twice as high as the current level. Given the external spillover effects of R&D, some form of government support, through targeted or untargeted subsidies and through regulation of property rights on innovations by patent legislation, seems justified.

Third, researchers have discovered that, even if the benefits of R&D eventually spread across countries, on average the transfer process takes a long time — 15 years for half of the benefits of R&D to be trans-

mitted internationally, according to one study (Bayoumi, Coe, and Helpman 1999). Another study (Jaffe and Trajtenberg 1999) confirms that spillover effects are initially very concentrated geographically and spread only gradually. This confers an important advantage on local innovators. Further, R&D activity is often very interactive and prospers in areas and networks with large concentrations of highly skilled workers. So, it does matter that R&D takes place in Canada, and not only in the United States or elsewhere.

Canada's past underinvestment in R&D has retarded productivity advances through two channels: a direct internal loss of benefits to Canadian firms that have invested less in R & D than have US firms, and an indirect external loss to the entire economy because less investment in R&D has meant less beneficial spillover effects for all.

This being said, however, the question of innovative activity does not hang on the OECD measure of R&D expenditures or on various measures of patent activity. What really matters for productivity growth is the country's whole *innovation system*, not any particular part of it.

Two important implications follow from taking a broader view of productivity-enhancing innovative activity. First, there are good reasons to believe that Canada's low ranking according to the OECD measure exaggerates the extent to which this country is lagging internationally in the innovation field. These reasons include the existence of close links between Canadian industries and their US counterparts, a very large stock of accumulated US direct investment in Canada and a rising stock of Canadian investment in the United States, the easy flow of communications between the two countries, close academic interchanges, and a shared language. Thus, OECD-reported R&D expenditures and measures of patent activity could significantly underestimate the actual stock and flow of useful knowledge that is available to Canadian firms. To that extent, cross-country studies of international spillover effects (such as that by Bayoumi, Coe, and Helpman 1999) must underestimate the importance of such spillovers in the case of Canada-US exchanges.

The second implication from taking a broad view of innovation is that we should be looking at aspects other than R&D and patent activity, such as interconnections between basic research and private industry, the role of intra- and inter-industry networking, and the development and retention of managerial talent and entrepreneurship. The latter di-

mention may be particularly critical. Innovation is about new ideas on what things to do and how to do them. Most new ideas come from a small pool of extremely able individuals who are influenced by their economic and social environment. It is especially crucial that Canada understand and support the kind of economic and social incentives that will attract and retain a rich pool of first-rate managers and entrepreneurs. In this sense, for example, the current debate over the brain drain should be more about *who* leaves or does not come to Canada than about *how many* leave or do not come. The analysis of the incidence of the tax system on this phenomenon should be oriented accordingly.

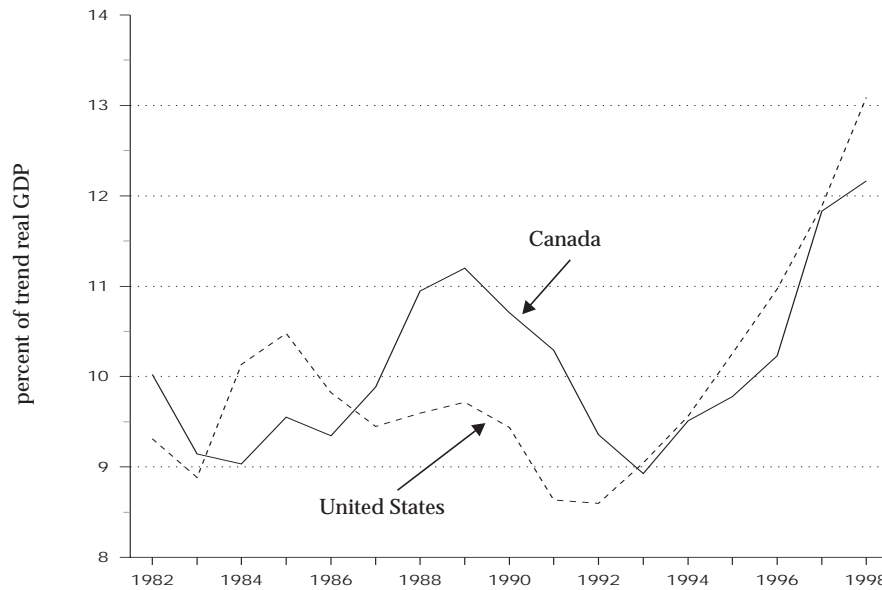
Investment in Tangible Capital

Investment in tangible capital regroups the three traditional forms of nonresidential investment: public investment in infrastructure, business investment in buildings and structures, and business investment in machinery and equipment. There is little to differentiate Canada and the United States concerning investment in nondefense infrastructure: over the past 20 years, both countries have invested about 2.3 percent of their domestic resources in this area.

There is a more interesting story to tell about nonresidential business investment. Figure 19 compares the evolution of this type of investment in Canada and the United States between 1982 and 1998. It shows that the business investment-to-GDP ratio was higher in the United States from 1984 to 1986 and from 1995 to 1998, and higher in Canada from 1987 to 1992. Although cyclical behavior is present in the investment data, there was no overall domination of US business investment over Canadian investment, and therefore no apparent weaker contribution to productivity growth in Canada than in the United States through this channel.

A different picture emerges, however, after distinguishing between what happened to business investment in buildings and structures, on the one hand, and business investment in machinery and equipment, on the other. Figure 19, which shows that the *aggregate* of the two types of investment was about the same on average in the two countries, hides the fact that Canadian investment exceeded US investment in buildings and structures, but fell short in machinery and equipment. Figure 20 de-

Figure 19: *Nonresidential Real Business Investment as a Percentage of Trend Real GDP, in Comparable Purchasing Power Units, Canada and the United States, 1982–98*



Note: To eliminate distortions due to different country sizes, currencies, and aggregate economic fluctuations, real business investment for each economy is calculated as a proportion of trend real GDP, and Canadian dollar values are transformed into US dollar values with comparable purchasing power.

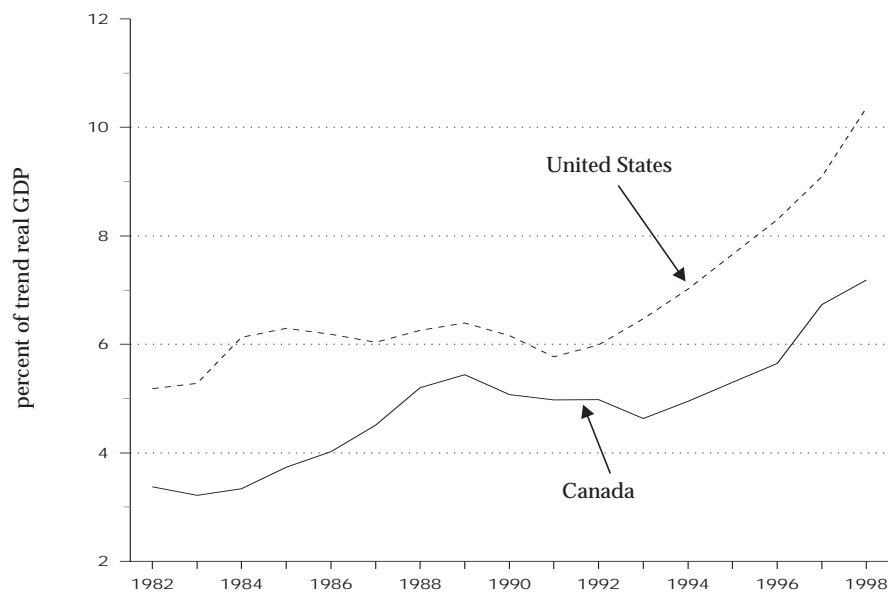
Trend real GDP replaces actual real GDP in the denominator of the real investment-to-GDP ratio. It is meant to remove the influence of the business cycle on real GDP. For Canada, trend real GDP is obtained by interpolating actual real GDP log-linearly between the two peak years 1979 and 1989, and then assuming a trend growth rate of 2.5 percent between 1989 and 1998. For the United States, the log-linear interpolation procedure is applied both between 1979 and 1989 and between 1989 and 1998.

Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues; United States, Department of Commerce, *Survey of Current Business*, various issues; and author's calculations.

picts the systematically lower propensity of Canadian businesses to invest in machinery and investment.

The net impact of this phenomenon on productivity growth may not have been neutral. The literature on investment and productivity has indeed established that productivity growth responds much more to changes in investment in machinery and equipment than to changes in investment in buildings and structures. The lower level of domestic resources invested in machinery and equipment by Canadian businesses over the 1980s and 1990s could, therefore, explain a significant part of the slower growth of productivity in Canada. By exactly how

Figure 20: *Real Business Investment in Machinery and Equipment as a Percentage of Trend Real GDP, in Comparable Purchasing Power Units, Canada and the United States, 1982–98*



Sources: Statistics Canada, *National Income and Expenditure Accounts*, cat. 13-201, various issues; United States, Department of Commerce, *Survey of Current Business*, various issues; and author's calculations.

much is uncertain, but one available estimate implies that the 1.6 percentage point average difference in the equipment investment-to-GDP ratio could have given rise to a 0.4 of a percentage point lower labor productivity growth rate in Canada.²⁹

Two possible explanations offer themselves for the lower relative level of business investment in machinery and equipment in Canada. First, this type of investment could be complementary with investment in R&D and, therefore, be a key channel through which less such invest-

²⁹ For example, DeLong and Summers (1992) report that, in a sample of 61 non-oil-exporting countries for the 1960–85 period, each increase in equipment investment of 1 percentage point of GDP was associated with a 0.25 of a percentage point increase in labor productivity growth. In a more exhaustive recent investigation, Sala-i-Martin (1997) obtains a near-identical estimate, implying that a 1.6 point reduction in equipment investment would lower labor productivity growth by $0.25 \times 1.6 = 0.4$ of a percentage point. It should be noted that the Canadian-US gap in equipment investment did not emerge in the 1980s, but already existed in the 1960s and 1970s. It must have been offset by other factors at the time.

ment might affect productivity growth negatively (Wolff 1991). The higher level of investment in machinery and equipment in the United States would, according to this view, partly reflect the fact that business investment in R&D is 50 percent higher in that country than in Canada. Second, there could be a cost-of-capital connection. McKenzie and Thompson (1997) find that, in the 1980s and 1990s, the cost of capital was higher in Canada than in the United States, primarily due to Canada's higher real interest rates, but also because of Canada's more demanding tax system (and despite its more generous R&D tax provisions). They estimate that this intercountry difference in the cost of capital had a modest but significant effect on the intercountry difference in investment levels for machinery and equipment (but not for buildings and structures).

Summary

Over the past 20 years, the level of Canadian labor productivity (real GDP per worker) has lagged behind the US level by about 15 percent. In the past three years, the gap may even have widened. In terms of rates of change, Canada's labor productivity has stopped growing faster than US labor productivity and since 1995 has actually grown more slowly. This, in essence, is Canada's economy-wide productivity problem. The country has become an exception to the productivity convergence rule.

The aggregate numbers hide the fact that labor productivity has been advancing faster in Canada than in the United States in the non-manufacturing sector and significantly more slowly in the manufacturing sector. Further, the lag in Canadian manufacturing productivity growth is not broad based, but largely concentrated in two sectors. In most manufacturing industries, Canada has done better than the United States on productivity growth, but the two major exceptions are electrical and electronic machinery, and commercial and industrial machinery. In these two, productivity growth is far ahead in the United States. Finally, differences in productivity growth between Canada and the United States are generally larger when productivity growth is calculated as the difference between the growth of output and that of labor input alone than when the growth of a composite of labor and capital inputs is subtracted. This means that part of the problem of the lagging

growth rate in Canadian labor productivity can be attributed to the slower growth of capital inputs.

Two types of arguments help to explain this set of facts. The first relies on Daniel Treffer's (1999) conjecture that, in general, Canada's productivity gap is a product innovation gap, not a process innovation gap. As evidenced by their positive reaction to the FTA, Canadian companies seem very good at implementing cost-cutting process innovations. But, as suggested by their lagging behind US companies in adopting and developing new technologies, they do not seem as good at product innovation. This is indicative of insufficient involvement in R&D activities.

The second argument documents the fact that Canada underinvests in some key areas. While investment in human capital is doing relatively well, with the Canadian school enrollment rate now having caught up with the US rate, Canada continues to invest less than the United States in R&D and in machinery and equipment, both of which have been found to be closely associated with productivity growth. Whatever the historical reasons for this underinvestment in R&D, it is hurting Canada's productivity performance. Coupled with high real interest rates and a heavier corporate tax burden, it must also have retarded Canadian investment in machinery and equipment.

How Can Productivity Be Accelerated?

In addition to the two arguments above, I have argued that Canadians are underemployed, overtaxed, and overindebted, all of which are basically detrimental to productivity growth. High real interest rates and underemployment are associated with lower profits and, therefore, lower investment and productivity growth. Overtaxation of labor and capital income discourages employment and investment. Too much public debt leads to lower rates of private investment through leaving less private saving available at higher cost to finance private and public investment. So, bringing Canada to full employment, lower taxation, and lower public debt must be the first prescription on any list of policy recommendations to spur productivity and real income growth.

The second prescription is that Canada continue to encourage innovative activity, paying special attention to product innovation. Although Canadian firms still underinvest in R&D by international

standards, some solid progress is clearly under way. In Quebec, for example, business R&D expenditures increased very rapidly from 1.4 percent of GDP in 1988 to 2 percent in 1996, and the province is now about to catch up with the OECD average. The combination of fast-rising levels of education, rapid expansion of international trade, dynamic networking in high-tech sectors, greater and better interaction between universities and industries, generous federal and provincial R&D tax provisions, and federal patent legislation go a long way toward explaining this unexpected turnaround.

Given the extent of R&D subsidization already in place in Canada, however, we do not necessarily need more R&D subsidies of this type. Instead, we need to pause and review the outcomes of this policy for several reasons. First, the good results already obtained in some sectors and regions may indicate it is just a matter of time before R&D activity in Canada is able to match and exceed the OECD average and approach that of world leaders Germany, Japan, and the United States. A little patience is in order. Second, program evaluation is always a good idea and might lead to efficiency improvements within the same financial envelope. As we gain experience, a tighter program could release funds to improve the still-loose connection of Canadian SMEs with R&D. Third, we should question seriously the inconsistency between having both the most generous R&D tax and grant provisions and the highest corporate tax burden of all G-7 countries. Such a situation may be inviting Canadians and foreigners to set up R&D operations in Canada but then to make use of the results of this activity in manufacturing or services firms established in countries with more favorable corporate tax systems.

In this suggested review of Canada's policies to support innovative activity, we might want to explore more targeted approaches to R&D subsidies, make sure property rights are granted in exchange for honest disclosure of knowledge, confirm government support for basic research, and pay careful attention to the economic incentives surrounding innovative managers and entrepreneurs.

A more targeted approach to R&D subsidies might be interesting to explore in the case of *general purpose technologies* (GPT). This concept, developed by Manuel Trajtenberg, refers to a new technology that represents a drastic innovation in processes or products and that triggers a chain of secondary innovations (Bresnahan and Trajtenberg 1995; Lipsey,

Bekar, and Carlaw 1998). The steam engine, electricity, and the computer are classic examples. Once a GPT is recognized by the research and business communities, the large scope and potentialities of the innovation might justify targeted government intervention, if just in the form of accelerating bureaucratic approbation mechanisms or helping to remove financial constraints. Trying to pick winners may be bad policy, but inadvertently turning winners into losers is no better. As a particular form of targeted subsidization, Paul Romer's (1993) idea of setting up industry boards to direct R&D subsidies might be suited to the kind of research activity with widely diffused benefits a GPT entails. However, as Aghion and Howitt (1998, 505) warn, these boards would be acceptable only if they did not become vehicles for constructing barriers to entry or for facilitating collusion.

Beside giving out subsidies, governments can encourage R&D activity by granting property rights on innovations that allow firms to earn monopoly rents for making them available to others. This is the role the patent system plays. The aim is to set incentives to innovate by giving protection of a certain length and breadth against free-rider imitators, but also to make sure the new ideas become publicly available to foster their further development and to spread their benefits widely. It is crucial that the patent system be set and understood as an exchange: you have access to patents only if your own submissions disclose your knowledge base fairly. In addition, since patent culture is clearly not as widespread in Canada as in, say, Germany, Japan, and the United States, it would be a good idea to set a strategy to diffuse information on the system widely across industries and learning institutions.

R&D activities feed on fundamental research whose benefits are not appropriable, whereas business incentives are mostly set to promote more immediately appropriable commercial applications. It follows that fundamental research must be funded mainly by government. There is some danger that basic research will pay the price for the currently popular (and otherwise highly desirable) drive to strengthen linkages between universities and the private sector. We should not let this happen. The last thing we want is to allow the wellspring of leading-edge research to dry up (see Nicholson 1997). Fundamental research is a worldwide undertaking in which Canada must participate locally in its own areas of excellence.

The third and final prescription is to make sure Canada does not lose its top worldwide ranking in education. Canada produces annually a large number of graduates who receive a very high-quality education. The wealth of nations is created by ideas, people, and machines — but ultimately by the people who develop the ideas, take the risks, make the machines, manage firms, and provide the labor services. This wealth is then shared among members of society according to rules that are based to a large extent on individual capacities to contribute to production — that is, on productivity. We ought not to forget that the ultimate basis for wealth creation and sharing is human capital in its every aspect. Canada has been able to earn the United Nations' top ranking because past generations of Canadian teachers and educational managers have succeeded in keeping a balance between access and quality.

The popular tendency nowadays is to argue that the educational system should begin to focus more on quality than on access, better serve the needs of labor markets, and become more private and less public. Three points are in order. First, even if Canada still has high-quality education, some areas and sectors clearly are in urgent need of improvement. The public secondary school system has well-publicized weaknesses, and scientific and technical education is not particularly strong in Canada either, as reflected by the mitigated success of young Canadians in comparative international tests. Second, the passage from school to work and the adequacy of links between university training and market needs are not as smooth as they once were, because the world outside has changed faster than Canadian universities have been able to respond. Third, private incentives, rather than public intervention, usually provide the most efficient signals to individuals and institutions to determine how much and what education to get and to deliver.

Still, we ought not to forget that broad access to a college education is the guarantor of society-wide increases in the standard of living, as opposed to a system largely based on ability to pay. Further, human beings do not define themselves only as workers, managers, and entrepreneurs. The educational system is also one of the main vectors of the wider culture. If the immediate cost of university education to students is very high and front loaded — with average tuition fees of, say, \$12,000 instead of \$3,000 in public institutions — a lot of young people will be discouraged from persevering to the postsecondary level.

Education is like R&D: left alone, the purely private pursuit of the good would leave society with much less than the optimal level. In the broadest sense, it would be a less productive, more materialistic, and more unequal society. We should focus instead on practical questions such as how much, as a society, we should invest in education annually, how to split the cost of education between students and governments across disciplines and programs, and how to split governmental assistance among subsidies to establishments, direct aid to students, and tax expenditures.

Conclusion

For Canadians' personal disposable incomes, the 1990s have been the worst decade of the century save for the horrendous 1930s. Average real after-tax income per adult has not grown at all. Canada's growth performance between 1988 and 1998 was the worst (together with Switzerland) among all industrial countries. These assertions may be politically incorrect to make, but they have the merit of being the truth. Fortunately, as my colleague Rick Harris, pointing to the low degree of persistence of growth performances over decades among countries, recently quipped with some relief: "The good news is that a poor growth performance in the past is not a sentence for life" (1999). My advice, however, is that our fortune not be left in the hands of good luck alone. Canada needs a better vision and better policies than in the past.

By definition, there can be only four sources for the worsening performance of Canada's real personal disposable income per adult over the past decade: less favorable terms of international trade, a heavier net-of-transfer tax burden, a slower growth rate of output per worker (productivity), and a falling employment rate. I have shown that 60 percent of Canada's slowing income growth problem was due to a large drop in the employment rate. Standardized for population, Canadian employment fell by 7 percent between 1989 and 1992; since then, it has recovered only half the lost ground. Less favorable terms of international trade and the heavier net-of-transfer tax burden contributed another 15 to 20 percent each to the problem, while the deceleration of productivity accounted for the remaining 5 percent.

There is no question that Canada's poor employment performance has been the major event of the decade. However, the small contribu-

tions of the country's heavier net-of-transfer tax burden and slower rate of productivity growth underestimate the true seriousness of these problems for its long-term growth performance and prospects, for two reasons.

First, although the balance of taxes and transfers has had little net effect on the wedge between national income and privately disposable income over the past two decades, this really hides a major increase of 25 percent in the overall tax rate (from 30 percent of GDP in 1980 to 38 percent in 1998) that has been offset by an increase in the overall transfer rate of a similar order of magnitude, much of it in the form of larger interest payments on the rising public debt. This important reshuffle of private incomes by governments must have had significant consequences for economic efficiency and income redistribution.

Second, the problem with the growth rate of Canadian productivity in the 1990s is not so much that it declined from the 1980s — it changed very little — but rather that it remained at best equal to the growth rate of US productivity, so that Canada's productivity *level* stopped catching up with the higher US level as it had done in the 1960s and 1970s, and as most other industrial countries have been doing since 1945.

Given these observations, and given that Canada has no choice but to absorb international fluctuations in its relative export-to-import prices, I conclude that the main economic problems about which something can be done are the country's high degrees of underemployment, overtaxation, and underproductivity. Canada is still suffering from serious underutilization of its human and material resources, having recovered only half of the huge employment drop that struck with the recession of 1990–92 and that persisted through the 1993–96 slump of domestic economic activity. For the most part, the recession and slump were due to the deadly interaction between the large public debt inherited from the 1970s and 1980s and the high interest rates of the 1989–95 period. Without the large accumulation of fiscal deficits from 1979 to 1989, the high interest rates and the recession they induced would not have degenerated into a fiscal crisis that contributed to keep interest rates high and prolong the slump until 1996. But at the same time, as the US experience with the same initial public debt demonstrates, if Canadian real interest rates had not been so much higher than US real interest rates, the recession in Canada would not have been so deep, the recov-

ery would not have taken so long to emerge, and we would have avoided a full-fledged fiscal crisis. So, Canada's underemployment problem of the 1990s is a shared responsibility of fiscal and monetary policy — a policy blunder of the first order of magnitude.

Clearly, the top economic priority in the first few years of the next decade will be for the Bank of Canada to lead the economy to a full recovery from the recession and slump of the 1990s. The Bank can achieve this goal by managing short-term interest rates so that national unemployment continues to decline below the current level of 7.8 percent. I believe, on the basis of recent labor force and job offer behavior, that Canada may be able to achieve a 6 percent unemployment rate without starting ever-rising inflation.

Naturally, if Canada is to be successful in this endeavor within a short period, the international economic environment must continue to be favorable. But a precondition is some change in thinking at the Bank of Canada. In my view, the Bank should first recognize as clearly as does the US Federal Reserve that it is responsible not only for keeping inflation low, but also for making sure unemployment remains as close as possible to the minimum non-inflationary level. Second, the Bank should — again as the Fed has done — become more aggressive in exploring higher growth rates and lower unemployment rates. In this respect, it is a welcome development that the Bank recently recognized that, through much of the 1990s, it had systematically underestimated the extent of economy-wide market slack, which had biased its actions toward monetary tightness and retarded the recovery. Third, due to the particular behavior of labor and financial markets at very low inflation rates, it may be impossible to achieve a 6 percent unemployment rate and keep inflation below 2 percent simultaneously. It would therefore be prudent to raise the inflation control target range to a 2 to 4 percent band from the current 1 to 3 percent band.

Because public debt was such a magnifying factor of the 1990–96 recession and slump, it should be progressively reduced as a percentage of GDP. This would be a defensive move against future fiscal crises. Another reason to wind down the currently high debt-to-GDP ratio is that it was the major cause of the sharp increase in Canada's tax burden between 1975 and 1995. Initial misperceptions about the persistence of slower real economic growth and high real interest rates, as well as two

major anti-inflationary recessions accompanied by discretionary spending increases, led to an explosion of deficits, debt, and interest charges that could be stopped only through large tax increases and, eventually, spending cuts. Now that deficits have been eliminated, the public debt is frozen in current dollar terms and declining as a percentage of the rising GDP. This provides fiscal room for reducing taxes every year.

If the Canadian public sector as a whole follows a zero-deficit policy on public accounts and indexes program expenditures to the trend growth rate of nominal GDP from 1999 on, taxes could be reduced cumulatively by 2 percent of GDP, or \$30 billion, in ten years. There is now a great opportunity to modify the tax structure to make it more growth-friendly, in the sense that it protects work incentives, promotes business investment, and strengthens the country's technological base and international fiscal competitiveness. Indeed, it is much easier politically to bring about important changes in the tax structure when they can be combined with a general tax reduction, since this is the ideal context in which the number of taxpayers who gain from the operation can be maximized.

If the growth objective is kept in mind, the tax changes should avoid reducing consumption taxes. Neither the GST nor provincial sales tax rates should be reduced. That part of EI premiums that has become a general payroll tax should be declared as such and dissociated from EI. The ceiling on taxable earnings should be removed and coverage expanded to self-employment income; the additional tax revenue should then be used to finance larger reductions in personal income taxes and corporate taxes. Personal taxation should be simplified, its marginal rates significantly lowered, and the amounts of deductible savings increased. Corporate taxation should stop discriminating against the services sector. Canada's effective rate of corporate taxation, now the highest among the G-7 countries, should be reduced to below the median so as to restore its international competitiveness as a business location.

Taken together, these measures will raise disposable incomes and support the growth of employment and productivity. That Canada's productivity level seems stuck at 85 percent (or below) that of the United States is due entirely to much better US performance in two manufacturing subsectors, electronic and electrical machinery (including computer fabrication) and commercial and industrial machinery. Outside of these

two machinery subsectors, however, Canadian productivity has performed significantly better than US productivity over the past quarter-century. Nevertheless, the importance of Canada's falling behind the machinery subsectors should not be dismissed. As Trebler (1999) argues, it may be indicative of a serious disadvantage for Canadian industry in the area of *product* innovation, as opposed to *process* innovation where Canada has, in fact, done well. Canadians fail to tap as much as they can into the existing technological knowledge base, and they are slower than others in adopting new technologies.

Canada's drive toward higher productivity has been solid in the educational area. A big success of the past quarter-century has been its ability to close the gap with the United States in school enrollment rates. This is likely to contribute to faster-rising productivity as older, less-educated generations are replaced by younger, better-educated generations. But this process will take time. Meanwhile, there is an urgent need to improve the quality of Canadian secondary public schools and, most crucially, to provide better employment opportunities *in Canada* for our school graduates.

Having done relatively well in the area of human capital investment, Canada has nevertheless done poorly in two other crucial dimensions of investment: knowledge capital (R&D) and tangible capital (machinery and equipment). R&D expenditures amount to only 1.6 percent of GDP in Canada, compared with 2.2 percent for the OECD average and 2.6 percent for the United States. Confirming Trebler's hypothesis on Canada's product innovation gap, Trajtenberg (1999) shows that the technological composition of Canadian innovations has not evolved in step with the rest of the world. With a few exceptions, such as communications and drugs, Canadian patents have remained concentrated in traditional fields. Further, they are not widely cited. Canada's quantitative and qualitative lag in R&D activity cannot be offset entirely by close links with US firms and institutions and by the country's increased openness to international trade and foreign direct investment. Successful Canadian firms indicate that investment in R&D and capacity for technological adaptation and innovation are the most important reasons for their good performance, and economic research finds extremely high private rates of return on R&D and significant knowledge spillover effects. Despite the diffusion of knowledge across borders, being the first in any area gives a crucial ad-

vantage to local firms. Lagging behind others in R&D puts Canada at a serious economic disadvantage.

When Canada's relatively slow increase in R&D activity over the past decade (from 1.4 percent to 1.6 percent of GDP) is contrasted with the country's R&D tax provisions having become among the most generous in the world, a puzzle clearly emerges. Perhaps, with a little patience, Canadians will see their overall involvement in R&D soon accelerate, as it has done in Quebec over the past ten years. Nevertheless, there may be cause for concern.

Canada's R&D activities should be reviewed from two perspectives. First, we should look not only at narrowly defined R&D expenditures, but at the broader innovation system, including upstream activity in basic research, the property rights and patent system, the development of technology management and commercialization skills, and incentives for networking. We should also investigate the usefulness of more targeted approaches to diffusion and innovation in the area of general-purpose computer technology, and consider the feasibility of R&D subsidization through industry-managed boards. Second, one should examine the possible inconsistency between having generous R&D tax provisions on the one hand and a heavy corporate tax burden on the other. My worry is that Canada may have become an attractive location for *producing* R&D, but an unattractive place for *using* R&D. The consequence of the high corporate tax burden would be either that Canada attracts R&D activity purely for re-export or that Canada does not attract it at all (despite the advantageous tax provisions) because it is more profitable to use it elsewhere.

Since 1992, Canadian business investment in machinery and equipment has been about 3 percentage points of GDP below the corresponding US level. This gap is cause for concern because this type of investment is one of the most consistent and important correlates of productivity growth. Part of Canada's disappointing performance here may be explained by the recession and slump of the 1990s, since the intercountry gap was only 1 percentage point of trend GDP toward the end of the 1980s. This should serve as a reminder of how important it is to keep the Canadian economy as close to full employment as is the US economy. Part of the intercountry gap can also be related to Canada's deficiency in R&D spending, since investment in machinery and equip-

ment is the channel through which the results from R&D activity are implemented in production processes. Canada's lag in machinery and equipment investment provides indirect confirmation that the lag in R&D expenditures also hurts the country's productivity performance. At the same time, McKenzie and Thompson (1997) find that the Canada-US gap in machinery and equipment investment is significantly influenced by country differences in corporate tax burdens.

In summary, the overall productivity level of the Canadian economy is currently about 15 to 18 percent below that of the US economy. Between 1975 and 1995, this gap remained about unchanged, and since 1995 it may have worsened a bit. The long-term clouds over Canada's productivity performance have been its relatively poor showing in product innovation, R&D activity, the quantity and quality of patent applications, and investment in machinery and equipment. The silver lining has been Canada's relative success in raising the average education level of its young population and in opening its frontiers to international trade and investment. In addition, the 1990–92 recession, the following 1993–96 slump, and Canada's deteriorating international fiscal competitiveness have certainly operated as drags on the growth of real private incomes and productivity in this country.

A crucial lesson to be learned from this *tour d'horizon* of Canada's economic performance is that employment, the tax burden, and productivity are strongly interactive. If a country is far away from full employment, tax rates have to increase to maintain public services, and productivity growth is held up by low profits, low R&D spending, and low investment. If taxes are too high, then work incentives and employment are hurt, and investment, innovation, and productivity growth are discouraged. If productivity growth is sluggish, the slow growth in government revenue induces increases in tax rates to compensate, and the slow or negative growth in real wages encourages labor force withdrawal and welfare dependency. Because of the strong interaction among the goals of full employment, low taxes, and fast productivity growth, it will be easier to achieve all three simultaneously than to aim for only one of them in disregard of the other two.

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