The Growth Story: Canada's Long-run Economic Performance and Prospects

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Canada's economy turned a corner in the 1990s. What happened?

Most Canadians would give a lot of credit to the dramatic about face on the deficit in mid-decade. We finally began to live within our means; made room for taxes to be cut; and came to rely less on bureaucrats and more on entrepreneurs.

Those who follow these issues more closely would also point to the Bank of Canada's successful war on inflation, culminating with the "cleansing" recession that ushered in the 1990s. Credit would also be due to the substantial liberalization of trade following implementation of the Canada-U.S. Free Trade Agreement (FTA) in 1989, and subsequently the North American Free Trade Agreement (NAFTA).

Those less disposed to accord much credit to policy would simply point out that a rising tide lifts all boats. That rising tide included exceptionally favourable global macroeconomic circumstances; the investment boom triggered (irrationally or not) by the promise of information and communications technologies; and the extraordinary dynamism of the United States, from which Canada benefits more than any other country. All combined to make strong Canadian growth inevitable.

True enough. But many of Canada's peers in the club of advanced economies — essentially the member countries of the Organization of Economic Cooperation and Development (OECD) — have not fared nearly as well. And taking a closer look at several factors that are believed to be key drivers of *long-term* economic growth — e.g. investment in physical and human capital; innovation; the state of domestic competition; performance of financial markets; flexibility of labour markets; strength of entrepreneurial behaviour — one sees that Canada has become, in most respects, well-positioned to sustain the momentum established in the mid-1990s.

The objective of this essay is to outline the case for this conclusion. No original research is reported. The perspective is policy-oriented, rather than academic. While we draw on many sources — a number of which have appeared in the pages of the *International Productivity Monitor* — the foundation reference is the work of the OECD's Growth Project launched at the request of member governments in 1999. Specifically, we draw heavily on a recently published compendium of the work to date — *The Sources of Economic Growth in OECD Countries* (OECD, 2003a). That report is reviewed by Martin N. Baily

(2003) elsewhere in this issue. What follows also owes a considerable debt to research incorporated in recent OECD surveys of Canada including, in particular, work by Catte, Jarrett and Rae (OECD, 2002).

We present Canada's economic performance over the past 20 to 30 years as seen through the lens of the OECD's comprehensive investigation of the key drivers of long-run growth. This international analysis is complemented in what follows with a wide range of Canada-specific data, subjectively chosen as indicative of what Canada has been doing right (or wrong). The overall message derives from the *pattern* of evidence and not from any specific indicators.

The bottom line is this. Canada has performed remarkably well within its peer group of OECD countries since the mid-90s, finally reversing the country's 15-year economic swoon that began at the end of the 1970s. This recovery reflects much more than just the fiscal turnaround. In fact, judged by the standards of the pro-growth policy prescription developed by OECD analysts, Canada is now doing most things right.

Of course, the theory and empirical evidence underlying today's conventional wisdom as to what are effective growth-promoting policies is still far from settled. The potentially relevant factors are so numerous and interlinked that policy prescriptions will forever require an overlay of intuitive judgment and tailoring to local circumstances. The economy is certainly not a clockwork.

More significantly, there can be no resting on laurels. While Canada has made a good start, the economic performance gap relative to the United States — the only benchmark that matters to most Canadians — is still large and, until the late 1990s, was growing. The scope and intensity of global competition is not diminishing — think of China. Then there is the quasi-inevitable demographic arithmetic. Statistics Canada projects that within a little more than a decade, the population aged 15 to 65 will begin to shrink as a proportion of the total population, and at an accelerating rate as the baby boom bulge retires. Fewer hands feeding more mouths, while expectations of affluent retirement and life-extending medical miracles increase the age-dependency burden.

Finding ways to increase Canada's rate of productivity growth will therefore be of increasing social and political necessity. In view of the considerable lead time needed to bring about significant change in the nation's stock of human and physical capital and industrial structure, the challenge of impending demographic maturity is already upon us.

Canada's Growth in Historical Perspective

Throughout the post-war period until the end of the 1970s, Canada enjoyed a sustained period of robust growth in per capita output, stronger on average than that of the United States. It was a period when productivity growth in Canada, Western Europe, and particularly Japan, converged toward that of the economic leader (the United States) and unemployment rates were generally low. This happy conjuncture came to an end around the time of the "oil crisis" in the mid-70s giving way to weak growth and rising inflation — a global "stagflation". The deep recession of 1980-81 reflected a determined effort by the U.S. Federal Reserve and other central banks to finally come to grips with the inflationary dynamic that had become embedded in many advanced economies.

Meanwhile, the strong productivity growth that had propelled burgeoning living standards in OECD countries, and the development of the welfare state, throughout the period from 1950 to 1975 abruptly lost momentum for reasons that are still not fully understood. Signs of a sustained

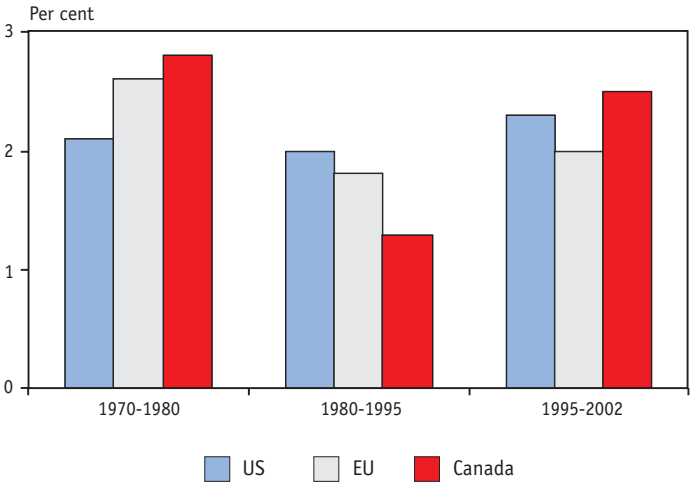
recovery of productivity growth — particularly in the United States, but also in other countries such as Canada, Australia, Finland and Sweden — did not become evident until the second half of the 1990s, and are still not visible in much of Europe. It is too soon to say whether this "new economy" rebound — led initially by the production of information and communications technologies (ICT), particularly in Finland, Sweden and the United States, but now increasingly dependent on effective *uses* of ICT-based services in the economy at large — will produce continuing productivity growth of the magnitude recently seen.

Canada's growth performance has been broadly consistent with the general context just outlined — i.e. exceptionally strong average growth of per capita output in the 1970s, followed by a particularly lackluster performance for the next decade and a half, and finally an impressive rebound after the mid-1990s, with average growth in this latter period outstripping both the United States and the European Union (Chart 1). Canada's lagging economic performance from 1980 through the mid-1990s — and the associated fiscal deterioration and growing gap relative to U.S. output and productivity — has saddled the country with a reputation for second-rate economic performance that has proven hard to shake. But seven or eight years after having turned the corner, a more impressive image for the Canadian economy is deserved and overdue.

Canada's material standard of living, proxied by GDP per capita, ranks second in the G-7 behind the United States and roughly on a par with a group of smaller wealthy OECD countries including Switzerland, Denmark and the Netherlands (Chart 2). But a gap of at least 15 per cent relative to the United States persists. For Canadians, this is the relevant benchmark. Indeed, for those travelling or buying assets in the United States, the gap seems even larger in light of the chronically weak Canadian dollar, the exchange value of which has been considerably less — by as much as 20 per cent — than its purchasing power parity level on which the data in Chart 2 are based. [1]

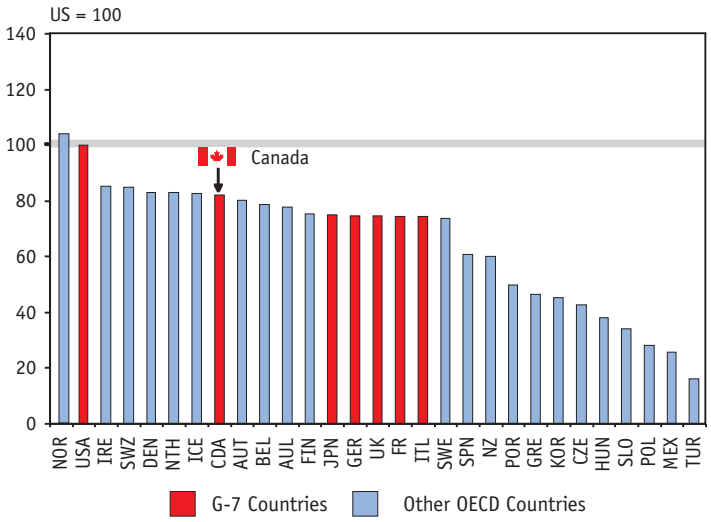
Of course, very few people apart from economists would think to equate their standard of living with their country's GDP per capita. It is a pure abstraction. And while per capita output does correlate with most social and economic indicators of well-being and development, the

Chart 1
Canada's Growth has Recovered Strongly
(Average annual growth of GDP per capita)



Source: OECD, 2003a, Table 1.1

Chart 2
Global Perspective on 'Living Standards'
(Relative GDP per capita* in 2001)

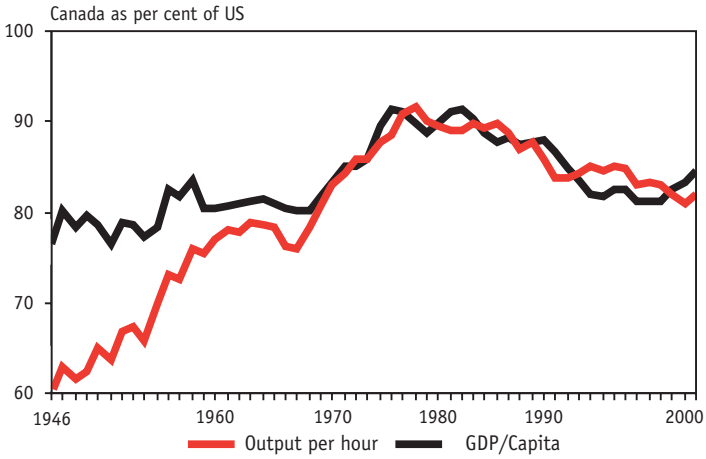


Source: OECD, 2003a, Table 1.1

Chart 3

Has Canada's Catch-up Stalled Permanently?

(Output per capita and productivity)



Source: Centre for the Study of Living Standards.

relationship is not strictly one-to-one within the group of advanced countries. For example, life expectancy in the United States is actually slightly below the OECD average and about 2.5 years behind that in Canada.[2] The incidence of child poverty and infant mortality in the United States are well above the OECD average. Violent crime in the United States is far more prevalent and the rate of incarceration is among the highest in the world. In fact, the United States lags both Canada and the OECD average on many social indicators, probably reflecting the more unequal distribution of income in the United States than in Western Europe and Canada.

When it comes to national *quality of life*, it is not only average income that matters, but also its distribution. The question as to whether there is, in advanced market economies, some unavoidable trade-off between the rate of growth of output per capita and its more even distribution involves exceptionally complex issues. The empirical evidence assembled with respect to OECD countries is really not conclusive either way (OECD 2001c). The virtue of a focus on GDP per capita — which is adopted in what follows — is that GDP growth expands the scope of society's *choices*. And these choices are likely to be exercised quite effectively in democratic societies since citizens have a rather direct say in how the growing pie should be divided.

The issues addressed in this essay require a long-run perspective. In the nearly six decades since the end of World War II, the growth rate of Canada's GDP per capita has, on average, slightly exceeded that of the United States, thanks largely to a remarkable catch-up in labour productivity (real GDP per hour worked) between the mid-1940s and the late 70s (Chart 3). This is consistent with a "convergence hypothesis" according to which countries, or regions, with relatively low levels of productivity tend over time to close the gap with the productivity leader — i.e. the United States for most of the 20th century — as technology and best practices diffuse from countries at the performance frontier to the laggards (Abramovitz, 1986; Wolff, 2000).[3]

The convergence process has been evident in the post-war catch-up of western Europe and particularly of Japan through the end of the 1980s. Within Canada, a similar catch-up is observed *regionally*. Since at least 1960, per capita output in the Atlantic Provinces has, on average, grown faster than that of Canada as a whole. Meanwhile, Ontario has grown more slowly in *per capita* terms than the national average — and, perhaps surprisingly, more slowly than the Atlantic region — over the past four decades taken as a whole. (This does not necessarily hold true, of course, from year to year, or for selected sub-periods.)

The essential question raised by the trend in Chart 3 is whether Canada has "hit a wall" and is no longer able to keep closing the productivity and output gaps relative to the United States. A similar question is preoccupying many European governments and particularly the G-7 members of "old Europe" where ageing populations and structural rigidities in labour markets have created a pernicious combination.

It might be questioned as to whether Canada needs to actually "catch-up" to the United States. After all, output per capita continues to grow, and a growth rate of even 2 per cent per year implies a doubling of real output per person in only 35 years, or more than four-fold real growth in a lifetime. Looked at another way — if Canada's per capita output grows at 2.5 per cent per year (the average rate between 1995 and 2002), it would take less than seven years for Canada to reach the level of per capita output in the United States today.[4]

Notwithstanding this rational arithmetic, the existence of a persistent "standard of living" gap relative to the United States, in the here and now, is psychologically uncomfortable. And it may have substantive negative implications for growth to the extent that investment and talented people are preferentially attracted to the United States in view of its reputation as economic leader and land of opportunity. While much of this reputation is inherent in the sheer size of the United States, there can be no doubt that Canada's economic attractiveness would improve were it to equal the U.S. economic performance in terms of productivity and living standards.

Although views may therefore differ as to the importance of *eliminating* the per capita output gap with the United States, most Canadians would agree that we should not fall steadily farther behind. This unfortunately was the case from the early 1980s until the mid-1990s. And crucially, the widening labour productivity gap has only very recently appeared to have stabilized (Chart 3).

In fact, weak productivity growth, both absolutely and relative to the United States, has been the Achilles' heel of the Canadian economy for the past 25 years. During the 1980s and early 1990s, this was compounded by sub-par labour utilization — i.e. high unemployment and, for a time, a declining labour force participation rate. But by 2001, Canadian labour input per capita had come close to the U.S. level and considerably exceeded that of most European countries (Table 1). Data for 2002 indicate further relative gains by Canada. Canada's employment rate — i.e. employed persons as a per cent of the OECD's conventionally-defined working age population (aged 15 through 64) — is now almost identical to that of the United States.[5] Although employed Canadians work fewer hours on average than Americans, the proportion of the population that is of working age is about five per cent higher in Canada than in the United States. The combined result is that annual hours worked *per capita* in Canada are only slightly less than in the United States. Pierre Fortin (2003) estimates about a six per cent difference, whereas the OECD data imply virtually no difference.

Table 1
Labour Utilization, 2001

	Canada	US	EU	OECD Ave
Employment Rate[1,3]	71.9%	72.3%	65.3%	66.3%
Unemployment Rate[3] (Standardized)	7.2%	4.7%	7.4%	6.5%
Hours per Employee[2] (US = 100)	91	100	-	-

Notes

1. Total employed as percent of population aged 15-64.

2. Data from Fortin (2003), Table 1. OECD, 2003a cites hours worked per employee in 2000 as follows: United States, 1835 and Canada, 1795, implying an index for Canada of almost 98.

3. Source: OECD (2003b).

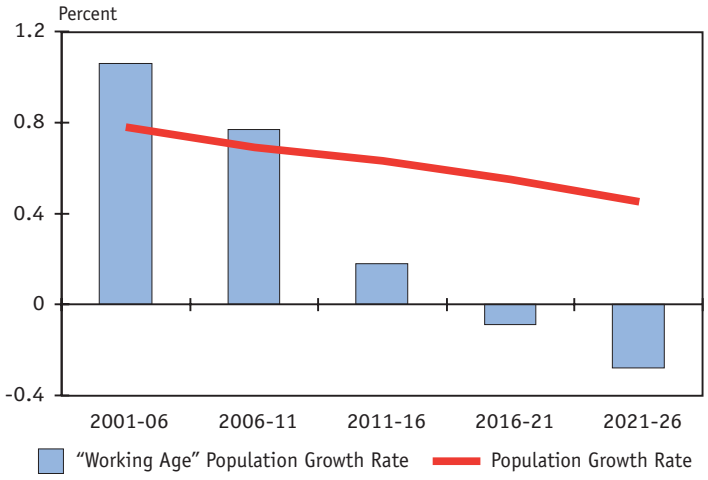
The bottom line is as follows. Since (i) GDP per capita is equal, by definition, to "GDP per hour worked" times "Hours worked per capita"; and (ii) hours per capita are nearly the same between Canada and the United States; then (iii) essentially the entire gap in GDP per capita between Canada and the US is due to the productivity gap. This is also evident from Chart 3.[6]

Having acknowledged Canada's productivity weakness today, the mid-to-long-term outlook is even more challenging (Chart 4). Panel (a) in

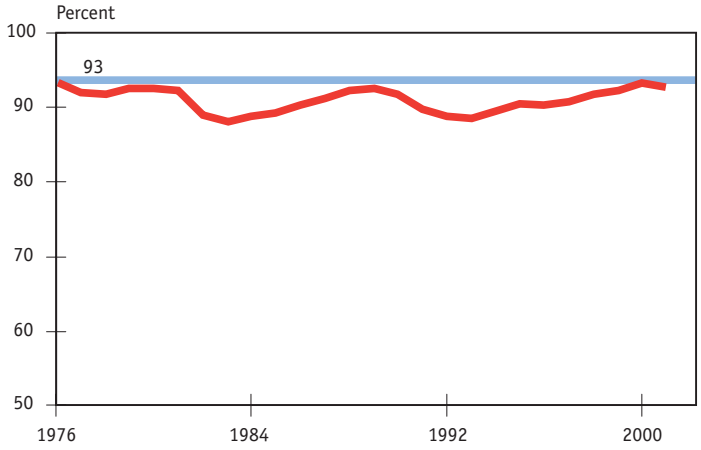
Chart 4

Canada's Growth Expectations

(a) Demographic Projections 2001-26

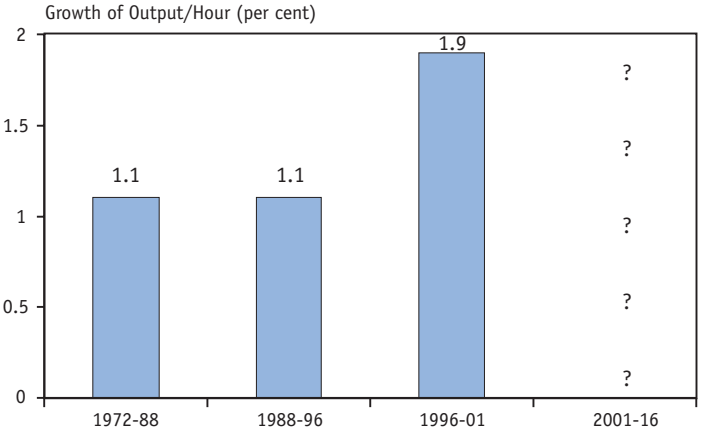


(b) Employment as per cent of Labour Force



(Note: The unemployment rate is 100% minus the plotted trend.)

(c) Trend Labour Productivity Growth



Source: Statistics Canada.

Chart 4 shows that this country's "demographic dividend" — i.e. the situation where the population of working age grows faster than the population as a whole — is soon coming to an end. It is estimated that around 2018, Canada's working age population will actually begin to shrink, and at an increasing rate as the bulge of the baby boom moves into retirement. Based on current trends, the effect of demographics on Canada's growth rate will soon switch from tailwind to headwind (Table 2).

In response, working beyond age 65 will make sense for an increasing number of Canadians in view of better health and jobs that are less physically demanding than they once were, to say nothing of the need to augment pension income. Increased immigration could also mitigate the drag, though Canada's high current levels of immigration (relative to most OECD countries) are already incorporated in the projections in panel (a).

There is some further potential for adjustment through an even higher employment rate — i.e. greater labour force participation and/or lower unemployment combined perhaps with increased annual hours — but the potential for significant increase via this channel appears to be limited based on long-term trends (panel (b) in Chart 4). More to the point: while everyone would welcome lower unemployment, few would consider it progress to draw people reluctantly into the labour force or to lengthen the work week.[7]

The implication of this straightforward line of reasoning is that Canada's long-term growth path will depend almost entirely on the rate of productivity growth. And in view of labour force demographics, *declining* growth of GDP per capita can only be avoided by an *increasing* rate of productivity growth.[8]

Panel (c) in Chart 4, based on data from Robidoux and Wong (2003), indicates that the rate of labour productivity growth has indeed increased in Canada from about 1.1 per cent per

year on average between 1988 and 1996 to 1.9 per cent in the subsequent five years. In light of the impending trend of workforce demographics summarized in Table 2, the challenge is not only to maintain the recent encouraging productivity trend, but actually to intensify it. Meanwhile, the United States appears to be better positioned demographically than Canada in view of its somewhat younger age structure — due to a higher fertility rate — implying a longer period of demographic tailwind in the US. Other things being equal, this will tend to widen the gap in output per capita.[9]

Before addressing the policy factors relevant to promoting output and productivity growth, one further element of the recent context is particularly germane. Chart 5 isolates the primary sources of labour productivity growth in Canada and the United States over the period 1990 to 2000. Although precise estimates of the contributions differ depending on the source, there is broad consensus that the strong productivity revival in the United States has emanated from information and communications technology (ICT), in respect of both its production and use [(Oliner and Sichel, 2002), though for a more skeptical view, see Gordon (2002) and Wolff (2002)]. The story has been similar in Canada, but more muted, reflecting Canada's relatively smaller ICT producing sector and this country's characteristically slower uptake of the technology by businesses. The impact of ICT on European productivity growth has been, with a few exceptions such as Finland, more muted still (van Ark, Inklaar, and McGuckin, 2003). A comprehensive analysis of the contribution of ICT to economic growth has recently been published by the OECD (OECD, 2003d).

Two important messages are conveyed in Chart 5. First, Canada's productivity growth rate during the 1990s matched the United States on average for the business sector as a whole, excluding the ICT-producing sector and the intensive-use ICT sectors. (Intensive users include, for example, financial institutions, large wholesalers and retailers, and professional services firms). Second, the potential for continuing ICT-based productivity growth appears to be very large as this general-purpose technology diffuses throughout the economy. The raw tech-

Table 2
Projected Work Force Demographics For Canada

	Ratio of Working Age Population to Total Population[1]	Contribution to Growth Rate of GDP per Capita[2] (per cent)	
2001	.6854	0.3	Demographic
2006	.6950	0.0	"Tailwind"
2011	.6975	-0.5	
2016	.6820	-0.6	Demographic
2021	.6607	-0.7	"Headwind"
2026	.6371		

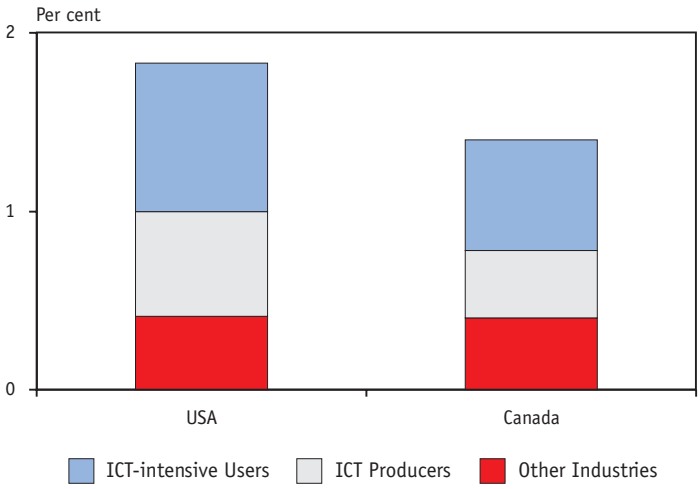
Notes

1 Population aged 15-64 divided by total population.

2 Annual rate of change (per cent per year) of the working age population ratio, averaged over the 5-year intervals. For interpretation see footnote 7 in text.

Source: Based on Statistics Canada medium growth projection of population by age.

Chart 5
Sources of Business Sector Productivity Growth
(Average annual increase of output per employed person, 1990-2000[1])



Note

1 Sector contributions are individual sector productivity growth rates weighted by workforce shares

Source: OECD.

nological possibilities themselves are still developing rapidly and much more efficient usage patterns will emerge as young cohorts of "super ICT-literate" workers come to dominate the labour force. It is almost certain that this emerging generation will create applications for ICT that cannot be conceived today, but which will become dominant in the future economy.

Canada is well-positioned to take advantage of the ICT potential in light of an excellent communications infrastructure, high levels of internet usage and a diverse, talented software production sector. Close integration with the U.S. economy also gives Canada an important advantage as a fast follower of the ICT technology leader. This underlines the importance of developing maximally efficient channels of technology diffusion/adoption, particularly by Canadian small and medium-size businesses.

Determinants of Long-run Economic Growth

Having outlined the broad dimensions of the growth challenge facing Canada — essentially, the productivity challenge — the question becomes what is to be done in policy terms? And this begs the antecedent question: in seeking to promote output and productivity growth, what matters most?

Stated this way, the question really has no honest answer. This is because the factors that determine economic growth are in constant dynamic interaction, feeding back and feeding forward on one another in a complex web of mutual interdependence. The situation is analogous to a living organism where one is hard put to say which is more important — the heart, lungs, liver, or kidneys. Take away any one of these and you're dead.

A *system* perspective is therefore required. Chart 6 schematically represents some of the more important "organs" of the economic system and indicates several of the prominent causal pathways interconnecting them. The point of the diagram is not to define a "system dynamics" model of the economy, but rather to convey some idea of the number and complexity of factors that a comprehensive economic growth policy should address.

We start from essentially a definitional proposition. An economy grows (i) when more people are put to work (growing labour supply); and/or (ii) when workers collectively produce more value of goods and services in successive intervals of time (growing productivity). To enhance productivity, one can invest to augment raw labour with (a) increasing amounts of "human capital" (e.g. formal education; on-the-job training; or simply acquired experience) and (b) increasing amounts of physical capital. Thus *investment*, and the savings needed to finance it, lies at the heart of the growth process.[10]

The other key determinant is *innovation*, interpreted broadly to encompass not only activity associated with lab coats, but also incremental improvements emanating from the shop floor; more effective managerial techniques (working smarter); entrepreneurial creativity; and acts of sheer imagination that end up creating new sources of value (e.g. in arts and entertainment).

Investment and innovation are thus the foundation of economic growth. They are, moreover, interdependent since innovation usually produces new investment opportunities with higher prospective returns while investment in new equipment, in R&D, and in human capital are critical precursors to innovation.

This much is quite obvious. What is more subtle and important is to correctly identify the high-leverage factors and incentives that promote investment and innovation in the first place. These should be the focus of economic growth policy.

Chart 6

Growth Processes & Policy: A Complex Web

The principal factors by which growth is directly generated (the circles) are affected by policies (the rectangles) both directly and through intermediate "agencies" such as the investment climate; state of competition; diffusion of technology and best practices; etc. The diagram is only illustrative and does not attempt to capture all relevant factors and interactions.

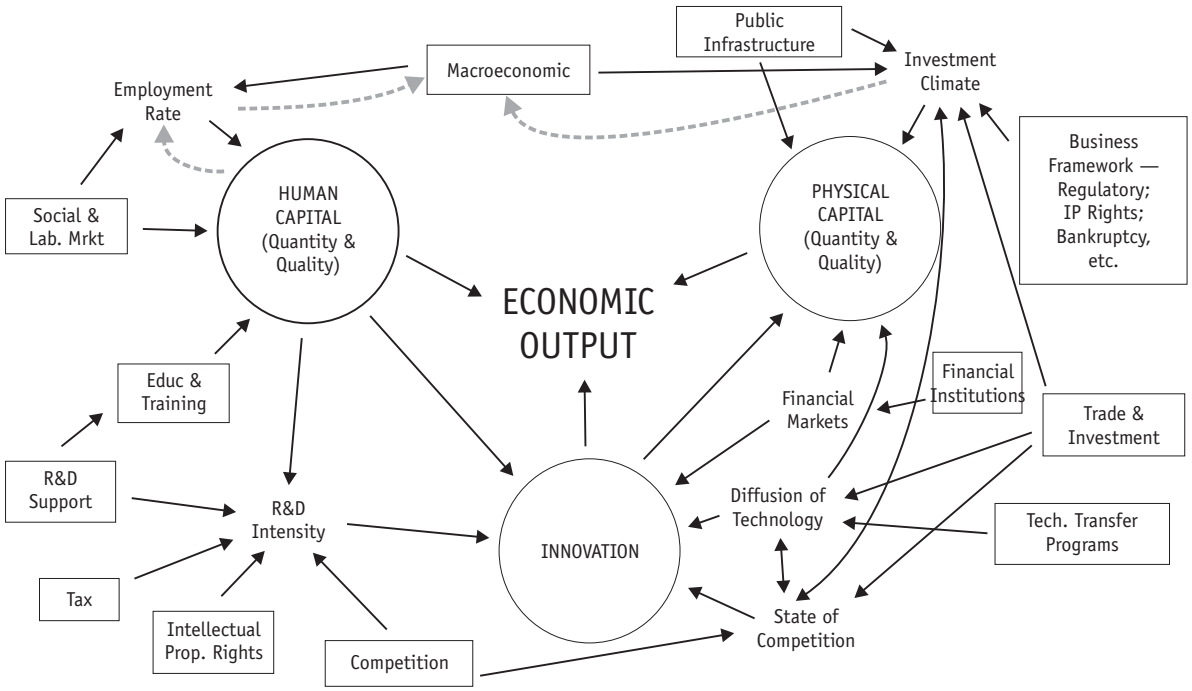


Table 3

Quantifying Some Key Growth Drivers*

Impact on level of GDP per capita in steady state

Driving Factor	Definition	Change	Impact	Typical Change over 80s and 90s in OECD
Human Capital	Average years of education	+ 1 Year	4% - 7%	+ 1.5 years in G-7
Physical Capital	Private non-res. Invest. as % GDP	+ 1 pct. pt.	1.3%	Variable
R&D	Business R&D % GDP	+ 0.1 pct. pt.	> 1.2%	About 0.1 pct. pt.
Trade Exposure	Ave of Exp/Imp % GDP	+ 10 pct. pt.	4%	About 10 pct. pts
Tax Burden	Govt. Revenue % GDP	+ 1 pct. pt. (0.6%)	– (0.7%)	About 1.5 pct. pts
Inflation Level	Final Consumption Deflator	- 1 pct. pt.	0.4% - 0.5%	About 4 pct. pts.
Inflation Variability	Standard Deviation	- 1 pct. pt.	2%	About 2/3 pct. pts

* Based on regression analysis of 21 OECD countries over 1971-98.

To this end, the OECD has carried out an ambitious research project to identify, and to quantify approximately, the primary sources of economic growth in advanced countries. The study applied state-of-the-art econometric techniques to data from 21 countries over almost three decades (1971-98). The findings are summarized in a recently published 250-page report (OECD, 2003a).[11] The period covered encompasses three global recessions; the productivity slowdown after the mid-1970s and the first stages of the post-1995 "new economy" rebound; the successful struggle to tame inflation and runaway deficits; and the evolution of a more open global economy. The statistical analysis therefore has considerable power to identify factors most relevant to growth in advanced democratic, market-oriented societies.

Key quantitative results are summarized in Table 3. The "impact" column in the table gives the estimated sensitivity of GDP per capita to small changes in what were identified as the principal growth drivers.[12]

The interpretation of the table can be illustrated by the first row, *Human Capital*. The OECD analysis adopted as a rough proxy for human capital the average number of years of education in the population aged 25-64. (This indicator was calculated for each country in each year.)[13] The estimated effect of increasing the average education level by one year is to increase the *level* of GDP per capita by 4 per cent to 7 per cent relative to what it otherwise would have been, holding all else constant. (The range in sensitivity corresponds to different estimation models.) The response of GDP to a one-time increase in the education level would of course not be instantaneous. The rate of convergence to a new "steady state" growth path (at a higher level of GDP) was also estimated — the data suggest that covering half the "distance" to the new steady state seems to take about four to five years.

Note that all of the impacts reported in Table 3 refer to the effect of the driver in question on the *level* of GDP per capita, not on the long-term *growth rate* of GDP per capita. The difference is somewhat subtle. During the time the economy is responding to the change in a driver that has a positive impact, the measured growth rate will increase as GDP adjusts to a new higher level. But eventually the response to the one-time jolt peters out and growth reverts to its original *speed*, other things being equal. Of course, in the real world, the growth drivers are changing continuously so the economy is always adjusting, thus confounding the interpretation of whether observed changes in the trend growth rate are quasi-permanent or transitory.[14]

It must be emphasized that the estimates in Table 3 are based on multi-country observations and reflect many simplifying assumptions in the choice of econometric models. Only very general inferences can therefore be drawn as to policy directions for a specific country since other factors in the local context will always be important. Moreover, there would eventually be diminishing returns to continued increases in the drivers. For example, Canada already has among the highest levels of human capital in the world, at least as measured by years of education per worker and the proportion of workers with post-secondary education. It is likely that adding a further year of formal schooling would therefore have less impact on Canada's growth rate than on that of a country with much lower average education. It is also not the case that more of a good thing is necessarily better, since channelling investment into one particular area implies foregone opportunities in others that may provide even higher returns.

The following observations further elaborate the picture summarized in Table 3.

Human Capital: There is obviously more to human capital formation than years of schooling. Workplace training and lifelong learning under-

taken by people on their own behalf clearly increase and update human capital. But the most potent influence could be the early childhood and pre-natal environment where lifelong potentialities can be enhanced or crushed. There is strong evidence that early intervention to mitigate disadvantage has vastly greater payoff than later attempts at remediation (Heckman and Caneiro, 2003).

Physical Capital: The amount and quality of investment in productive capital is the most familiar and well-established driver of productivity growth. Its effect is via two primary channels: (i) "capital deepening" whereby output per worker is boosted simply by more capital per worker — a tractor is usually better than a hoe; and (ii) the embodiment of technological innovation in new generations of capital — microchip technology being the most spectacular contemporary example. Of course, capital does not come free and over-investment can leave it "stranded", out of productive use at least for a time (e.g. today's thousands of kilometers of unlit optical fibre).

The policy challenge is to create an optimal *climate* for investment (see Chart 6) so that private sector actors are motivated to make investment for which both private and, ideally, social returns exceed cost. Sound macroeconomic policy, including taxation, is evidently a key contributor to an hospitable investment climate. But so are business framework policies related, for example, to intellectual property rights, competition, labour market regulations, and foreign investment, as well as complementary supply-side investments by government in public infrastructure, research and education. Trade policy can also have an important influence via the complementarity frequently observed between trade liberalization and increased investment, either to take advantage of expanded opportunities or to meet new competition. Public policy in support of safe and efficient financial institutions is also needed to ensure that capital is efficiently channelled from savers to investors across the entire spectrum of risk. Overlaying all of these specific attractions is the need to minimize uncertainty by making policy transparent and as stable and predictable as possible in view of the fact that capital investments always entail longer-term commitments.

Research and Development: R&D might be taken as a broad proxy for innovation, though it is only one input and directly affects primarily the production of new goods and services rather than more efficient ways of doing things. Of course, new goods and services resulting from R&D can greatly enhance efficiency when incorporated in production processes — the use of ICT innovations being a prime example. The "downstream" effects of R&D are therefore pervasive. This probably explains the empirical fact that there is a strong correlation across OECD countries between R&D intensity (business spending on R&D expressed as a per cent of GDP) and productivity growth. Canada's chronically low level of R&D intensity (see Chart 11 in the next section) implies that there is unexploited opportunity to increase productivity, and possibly its long-run *rate* of growth.

Trade Exposure: Increased trade exposure appears to be a potentially potent source of productivity growth, reflecting not only gains from comparative advantage, but also the opportunity to exploit scale economies (i.e. specialization to serve a global market), and the spur to innovation arising from exposure to stiffer competition and more rapid diffusion of best practices to domestic producers. While Canada can continue to gain from even greater trade liberalization, there are limits in view of the prevailing extent of openness and Canada's already exceptionally high level of trade activity (see Chart 9 in the next section).

Tax Burden: Table 3 shows that an increased tax burden has the expected directional impact on GDP — i.e. a larger tax take depresses output,

other things being equal. But the impact is complex and depends in part on the nature of the tax and, particularly, on the use to which funds are put. Tax increases to fund programs that blunt incentives or to prop up inefficient enterprises clearly dampen growth. This is in addition to any adverse impact of higher taxes on work incentives or entrepreneurial risk taking. On the other hand, taxes to fund productive public infrastructure, and to enhance human capital can obviously be growth-promoting. The bottom line message of the OECD impact analysis is that skepticism is warranted in respect of proposals to increase the size of government relative to the economy. In practice, and on balance, there is likely to be a cost in terms of lower output. This may be justified in light of other public objectives but the potential cost should be weighed in the decision.

Inflation: Perhaps the most surprising implication of the OECD analysis is the estimated strength of the impact of inflation reduction, both in respect of level and variability. Reducing the level of inflation appears to affect growth largely by improving the capital investment climate. Reducing the uncertainty caused by volatility of inflation has little impact on the propensity to invest, but increases growth through a more efficient allocation of resources made possible by more reliable price signals.

Unfortunately, the potential of inflation control to spur extra growth in Canada (and in most OECD countries) has been exhausted. Indeed, *deflation* has actually become a concern in some quarters. The key message of the OECD analysis is that there would be a heavy price to pay if inflation beyond two to three per cent were again to take root given: (i) its inherent tendency to accelerate, and (ii) the recession-inducing response this would elicit from central banks.

The analysis summarized in Table 3, notwithstanding its multidimensionality and rigour, still omits important elements of the growth story, namely those that defy explicit quantification. Two of the most powerful growth drivers are *competition* and the *diffusion* of technology and best practices broadly in the economy. (Of course, both of these interact in various ways with elements that are included in Table 3, such as trade exposure, capital investment, R&D.)

Competition is important not only because it makes businesses more responsive to the wishes of customers but also because it creates a powerful incentive to innovate and continually to increase efficiency so as to expand, or defend, market position. Competition thus creates a climate conducive to entrepreneurship. For all these reasons, competition is, in most cases, an extremely potent driver of productivity growth.

But even this conclusion must be qualified. Competition can, under some circumstances, become excessive and degenerate into a downward spiral of price cutting that actually stifles investment and generates cycles of business failure. The airline industry appears to be prone to this type of market failure. Competition can also diminish the incentive to invest in innovation if competitors are able to appropriate some of the returns without adequate compensation to the original investor. This is why patent protection is essential in, for example, the pharmaceutical industry, but again only up to a point. Creating an optimal state of competition, sector by sector, is therefore an exceptionally subtle policy challenge, but the potential payoff in terms of productivity growth is correspondingly large.

Rapid diffusion throughout the economy of leading-edge technology and best practices is a particularly powerful productivity driver. Japanese manufacturers have accomplished this to great effect, systematically scouring the world for the best ideas, then adapting them at home to achieve remarkably rapid productivity growth and world leadership in several industries. Another significant example has been the so-called "Ag Rep" system which spearheaded the

dissemination of scientifically-based agricultural practices to farms throughout North America, triggering revolutionary productivity gains in that sector during the 20th century.

More broadly, a generalized diffusion process, as previously noted, underlies the productivity convergence among OECD countries, and across Canadian regions. Efficient techniques and channels of technology diffusion to Canada from abroad are particularly important. This is because even in the best of circumstances, this country, given its relative size, would not originate more than about five to ten per cent of potentially relevant innovation.

Foreign direct investment, and the embodiment of leading-edge technology in new capital investment by domestic firms, are primary channels of diffusion. Geographical clusters of related activity — e.g. California's Silicon Valley, agricultural biotech in Saskatoon, ICT in Ottawa — are also important agents of diffusion, obviously for the firms in the cluster itself, but also because successful clusters become high-profile centres of influence over much broader areas. Silicon Valley has inspired countless would-be imitators. Clusters are exceptionally fertile breeding grounds for talent, a proportion of which ends up somewhere else, thereby spreading the experience and extending networks of personal contacts.

A major objective of a diffusion strategy must be to improve the rate at which best practices/technologies are adopted by smaller businesses. (Canadian small and medium-sized enterprises (SMEs) appear chronically to lag their U.S. counterparts in this regard.) The Ag Rep system was very effective for small farmers and the Industrial Research Assistance Program (IRAP) of the National Research Council of Canada has been successful in promoting productivity, primarily in smaller manufacturers. Today's challenge, with potential for extremely high payoff, is to develop policies and programs to stimulate more rapid diffusion of ICT-enabled practices in virtually all sectors of the economy.

Canada's Growth Scorecard

We turn now to several illustrations that indicate how Canada has performed, and is currently positioned, in respect of many of the principal productivity drivers identified in the OECD growth study, and summarized in Table 3. The following indicators — covering macroeconomic policy, capital investment, trade exposure, human capital and R&D — include some of those employed in the OECD's quantitative analysis, as well as others not included in that work but which nevertheless illustrate the themes.

The message of these indicators, taken collectively, is that Canada now stands among the leaders in its peer group of OECD countries in most of the key measures believed to underlie superior long-run economic performance.

Macroeconomic Policy: Canada's fiscal turnaround is reflected in Chart 7 which traces the evolution since 1981 of net government debt — federal and provincial/state combined for Canada and the United States. The figures, with liabilities offset by assets, represent the National Accounts basis of presentation which permits cross-country comparison based on similar definitions.[15] The budget dynamics underlying Chart 7 are shown in Table 4 which confirms that Canada's fiscal turnaround has not been duplicated, either in magnitude or duration, by the United States or the European Union group of countries. And while total government spending in Canada — 40.6 per cent relative to GDP in 2002 — is still five percentage points above the comparable U.S. level, the reduction in Canada since 1994 has been nine percentage points of GDP versus less than one percentage point in the United States (Table 5).

Table 4
Total Government Budget Surplus/(Deficit)

	1997	1998	1999	2000	2001	2002	2003	2004
Canada	0.8	0.5	1.4	2.4	1.8	1.3	1.1	0.9
US	-1.2	-0.2	0.1	0.9	-0.2	-2.4	-4.0	-3.9
EU	-1.8	-1.4	-0.7	-1.0	-1.2	-1.6	-1.4	-1.5

Source: OECD (2003b:223).

Table 5
Total Government Outlays
(Consumption and transfers relative to GDP, per cent)

	1985	1994	2002	Decrease 1994-2002
Canada	48.3	49.7	40.6	9.1 pct pts
US	36.5	36.5	35.6	0.9 pct pts
EU	49.6	51.5	47.7	3.8 pct pts

Source: OECD (2003b:220).

Canada's fiscal turnaround, combined with credible control of inflation, has largely erased the risk premium in Canadian interest rates relative to those in the United States, contributing to an improved investment climate. Expenditure restraint has finally created room for selective tax cuts — e.g. bringing the average corporate income tax rate down progressively from 46.6 per cent in 2000 to a scheduled 33.4 per cent in 2007 and below the current comparable U.S. rate of 40 per cent (Finance Canada, 2003). Budget surpluses are now a net source of national savings — compared with a draw on savings equal to 9.1 per cent of GDP in 1992.

The policy challenge is to stay the course and continue to pay down debt so as not to further burden the next generation of taxpayers who will have to cope with an ageing population. It is therefore important to resist the temptation to treat fiscal discipline as "yesterday's" issue. We should have learned how quickly things can accelerate out of control and how difficult it is to muster the political consensus to set them right again.

Capital Investment: A tight correlation exists between the level of business investment in machinery and equipment and productivity growth. The boom in business capital formation in the 1990s in North America (Chart 8), though to some degree excessive, has laid a foundation for future growth. Particularly important will be the extent to which businesses are able to take increasing advantage of installed ICT infrastructure (i) through new business processes, and (ii) by more fully employing the assets now in place.

Chart 8 shows that the investment boom began earlier in the United States and carried to a higher peak than in Canada. Still, the average compound rate of growth of business fixed capital formation in the United States over the period 1994-2000, at 9.9 per cent, was only slightly higher than the average in Canada at 8.9 per cent. The EU average was 5.7 per cent (OECD, 2003b:200). And while Canada lags the United States in ICT-related investment, it still ranks with the United States, Finland and Australia as the OECD leaders in ICT capital employment, and is thus well-placed to exploit the potential of this general-purpose enabling technology (OECD, 2003a:45, 46).[16]

Trade Exposure: Foreign trade stimulates productivity growth via several channels — compet-

itive pressure; economies of scale as a result of market expansion; gains from specialization in areas of comparative advantage; and trade-related capital investment. Accordingly, Canada's increased trade exposure has been a plus and stands out among G-7 countries (Chart 9).[17]

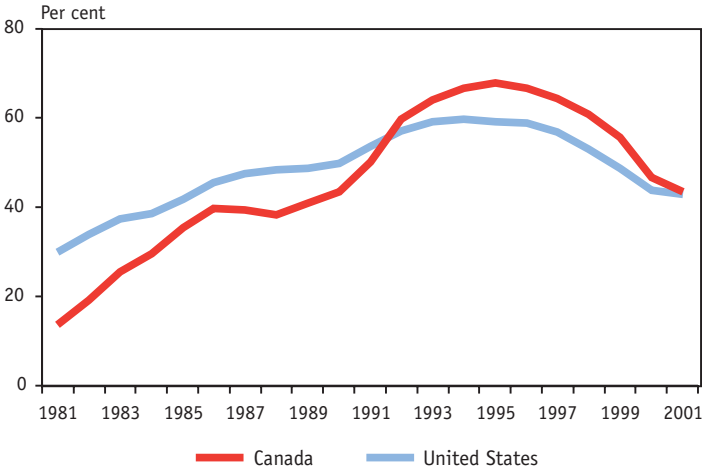
The impact of increased trade on Canada's productivity growth has been less than perhaps was anticipated and certainly has not been sufficient to close the gap with the United States. But there is evidence that productivity has indeed increased in the sectors most liberalized under the FTA/NAFTA. On the other hand, those agreements had relatively little impact on the machinery and ICT sectors, the areas in which productivity growth potential has recently been greatest and which led to the growing gap vis-à-vis the United States.

Looking forward, even if Canada does not substantially increase its overall trade exposure there is much scope to shift the *composition* of exports toward greater technological content, including ICT-based services. That is the main opportunity and challenge. Canadian trade will continue to be concentrated overwhelmingly with the United States given the irreversible extent of integration of the North American economy. Although some have been understandably concerned about Canada's dependence on the U.S. market, it is ultimately of great benefit in terms of long-run productivity growth to be so closely linked to the global leader.

Human Capital: Modern economies depend increasingly on "knowledge" as raw material and the analysis and manipulation of "information" as the principal source of growing added value. Success in the knowledge economy depends on growing investments in human capital, primarily through universal and more advanced education; sophisticated training; and lifelong learning.

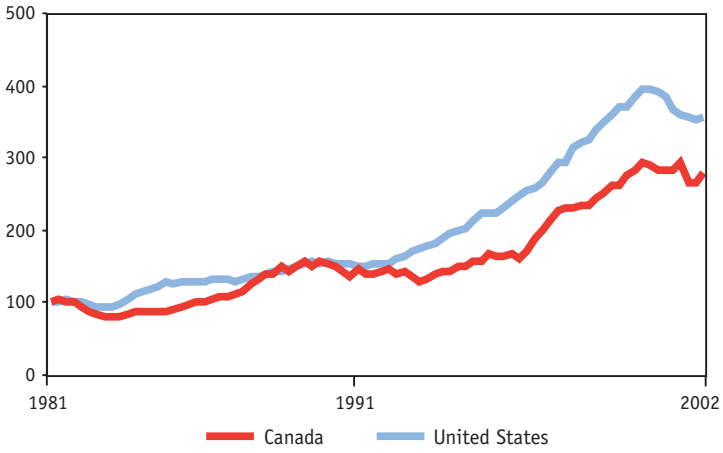
In terms of formal education, Canada's population is among the world's most well-endowed, ranking second in the OECD behind Germany

Chart 7
Net Debt as per cent of GDP
(National Accounts Basis)



Source: OECD (2003b:228).

Chart 8
Machinery and Equipment Investment
(Volume terms, 1981 = 100)



Source: OECD.

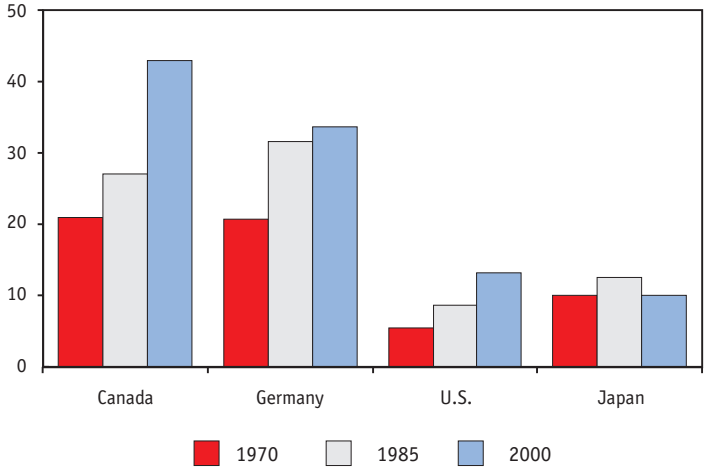
in average years of schooling in the labour force (Table 6), and first in the proportion of younger persons with post-secondary education (OECD 2003a). But what about the *quality*, not just the quantity, of Canadian education?

One significant indicator has been provided by results of the recently-initiated Program of International Student Assessment (PISA) under auspices of the OECD (OECD, 2001b). This involved very large and rigorously-controlled cross-country testing of 15-year olds in respect of practical capabilities in reading, science and

Chart 9

Growing Foreign Trade Exposure

(Average of exports and imports, per cent of GDP)



Source: OECD Economic Survey of Canada, Sept 2001:117.

Table 6

Average Years of Education of Working Age Population

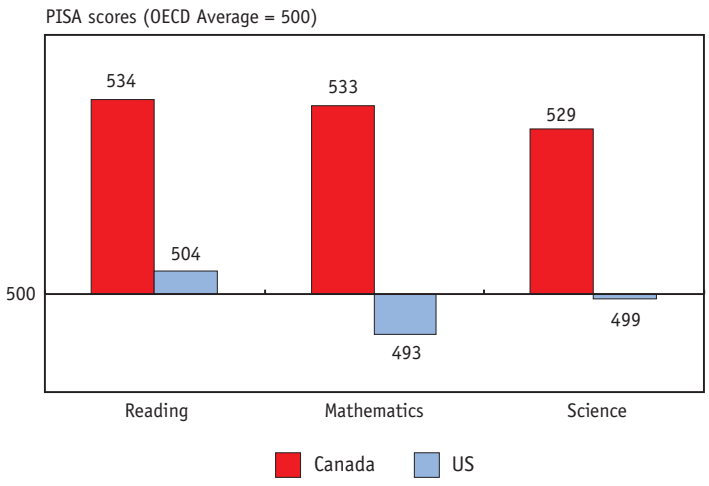
	1970	1980	1990	1998	Increase (Years)
Canada	11.37	12.10	12.47	12.94	1.57
US	11.57	12.23	12.59	12.71	1.14
Germany	9.47	11.41	12.89	13.55*	4.08

Source: OECD (2003b:220).

Chart 10

Human Capital Potential

(Mean country performance in PISA*)



* Program for International Student Assessment (OECD).

mathematics (Chart 10). Canadian students scored exceptionally well in the first PISA survey in 2000, ranking near the top of the OECD in all three categories.[18] Canada also had a relatively shallow gradient in its results as a function of students' socio-economic status. This stood in marked contrast, for example, to Germany and the United States where social disadvantage was reflected in much poorer scores. Canada's results exceeded those of the United States even at elite levels — i.e. considering only the top 10 per cent of performers in each country, Canada's average was greater than that of the United States.

While this first PISA survey (which will be repeated at regular intervals) is only one indicator of future human capital potential — albeit a significant one in view of the unprecedented scope and rigour of its methodology — it does show, perhaps surprisingly to many parents, that Canada's grade school system, *on average*, is doing a good job by international standards.[19]

Research and Development: Canada has been a perennial laggard in the league tables of R&D spending relative to GDP. While its R&D ratio has been gradually inching upward, including particularly the proportion performed by business, Canada's ranking within the OECD has actually dropped a couple of notches, from 12th in the 1980s to 14th in the 90s (Chart 11).

R&D is obviously not the whole story in an assessment of innovation performance, but high R&D intensity, and particularly the proportion performed by business, does correlate with productivity growth and with other measures of commercialization of innovation — e.g. patents, technology licenses.

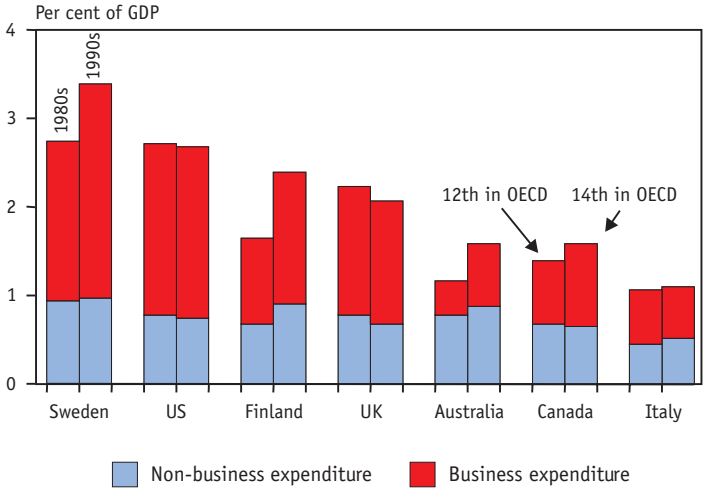
It is important therefore to understand, more deeply than we now do, why Canada continues to lag in the bottom half of its OECD peer group? Part of the answer is industrial structure. The Canadian economy, notwithstanding its growing technological orientation, is still relatively dominated by industries that exhibit low R&D inten-

sity regardless of where they are located — e.g. resource-based manufacturing.

But even on a matched industry basis, Canadian R&D spending (as a share of value-added) is in most sectors far below that of the United States (OECD, 2000). This is probably because many of Canada's large, technically-advanced firms are affiliates of foreign (usually U.S.) multinationals. Most R&D is performed in the home country. The auto industry is a striking example. Very little R&D is performed in Canada despite substantial production value-added in this country. Of course, Canada benefits greatly from the R&D embodied in capital equipment installed in auto plants and in other facilities where foreign investment carries with it technology and leading-edge production practices. On the other hand, Canadian R&D intensity in the communications equipment and semiconductors sector is estimated to exceed that of the United States, reflecting the activity of Nortel and the large number of other Canadian-based firms in this segment.

How might Canada's R&D effort be increased? First off, it is difficult to force-feed business R&D spending. Firms are already motivated to perform R&D to the extent it is profitable to do so relative to alternative investments.[20] The policy objective therefore is to create in Canada an R&D *environment* that is attractive to multinational firms, including those headquartered in Canada, which increasingly scan the world for the best places to locate activity. Canada already offers one of the most attractive R&D tax credit regimes, and in recent years has done much to increase the supply potential of research universities — e.g. through the Canada Foundation for Innovation; Millennium Research Chairs; and commercially-oriented "centres of excellence" at both the provincial and federal levels. These initiatives take time to pay off, but there is no doubt that solid groundwork is being laid in respect of research infrastructure and the supply of highly qualified people.

Chart 11
R&D — Why Isn't Canada Catching Up ?



Source: OECD (2003a:63).

Many other factors are of course relevant to the innovation process — particularly competition; diffusion of best practices; supply of risk-oriented venture capital; and a hospitable environment for entrepreneurs. Here the picture is more encouraging than in the case of R&D. Surveys by the OECD suggest (a) that Canada's venture capital sector is second only to the United States in terms of support for early stage, high-tech firms; and (b) that barriers to entrepreneurship in Canada are, on the whole, near the lowest in the OECD.[21]

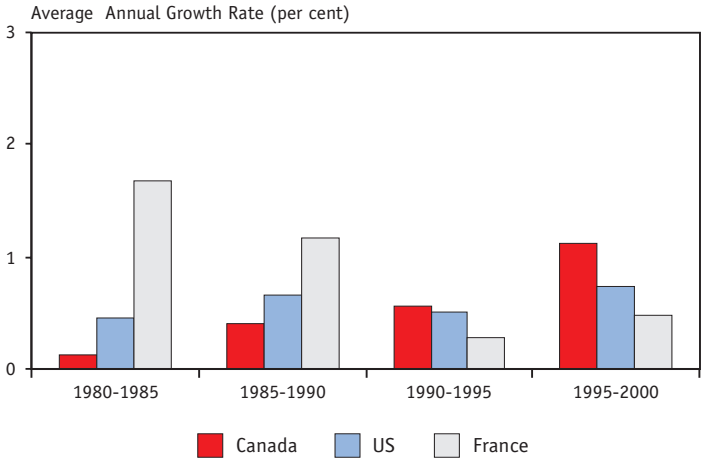
Taken as a whole, therefore, the evidence is very mixed in respect of Canada's innovation performance and potential. The good news is that there is plenty of room for improvement and policy has become strongly oriented in this direction. Perseverance will be required because the structural impediments, particularly to the increase of R&D intensity, are pervasive and of very long standing.

Economic Efficiency: There is strong evidence that the *efficiency* of the Canadian economy is growing at an increasing rate. Chart 12 compares the growth rate of multifactor productivity (MFP) of Canada, the United States and France (the latter as a proxy for G-7 Europe) averaged over five-year intervals from 1980 to 2000. Multifactor pro-

Chart 12

Canada's Efficiency is Accelerating

(Growth of business sector Multi-Factor Productivity*)



* Adjusted for improvement in "quality" of both human and physical capital to capture the "efficiency" residual (disembodied technical change).

Source: OECD (2003a:50).

Chart 13

Canada's Growth Score Card

Growth Drivers	Three-Star Rating
• Sound Macro Policies	***
• Human Capital	***
• Exposure to Trade	***
• Productive Investment	**
• Innovation	*?

ductivity growth measures the rate of increase in GDP that cannot be accounted for simply by growth in the inputs of labour (hours worked) and capital (volume of capital stock). The data in Chart 12 have been adjusted for "quality" improvements in both labour and capital. The growth of MFP thus reflects an increase in the pure efficiency with which the economy combines labour and capital to generate output. While there are significant measurement challenges in the estimation of MFP growth, it is reasonably certain that it has been accelerating in Canada from extremely anemic levels in the 1980s. The recovery of MFP growth is arguably the single most encouraging trend in recent Canadian economic performance.

Conclusion — The Growth Scorecard

The story sketched in this essay defies adequate summary. No proposition stands without qualification. This reflects in part huge gaps in our understanding of the growth process itself, and in part historical and cultural contingencies which cause measures that may be strongly growth-enhancing at one place and time to have possibly quite a different impact at another.

With that caveat, it may nevertheless be helpful to summarize the message — i.e. the writer's *opinion* — as to where Canada stands in respect of what are generally believed to be the principal drivers of long-run growth of output and productivity. With apologies to the Michelin restaurant guide, Chart 13 assigns a subjective "one, two, or three star rating" to Canada's recent performance and current position in respect of five major growth drivers. The judgmental ratings are relative to the performance of Canada's peer group of highly developed countries.

It is difficult to fault Canada's achievement and positioning in respect of the macroeconomic policy environment, human capital development, and trade exposure. But even three stars still leaves room for improvement. And staying on top may be the toughest challenge. For example, in the domain of human capital (here interpreted broadly to also encompass labour market performance) Canada's labour market policies have become more growth-friendly, but there has recently been regrettable back-sliding in respect of Employment Insurance rules, the reform of which had been hard won. Secondly, Canada's generally strong advocacy of freer trade is undercut to some extent by continued protection of supply-managed agricultural commodities. And finally, while fiscal policy is in good shape overall — particularly when compared with the apparent loss of discipline in the United States — pressures to increase spending, *ad hoc*, are building.[22]

Canada's performance in respect of business investment has been strong, but not outstanding relative to a number of OECD peers, hence a two-star rating. It remains to be seen whether the investment by Canadian firms in ICT during the past five to seven years, while less than that which occurred in the United States, may nevertheless have been more efficiently allocated. Concern has also been expressed regarding the marked decline of Canada's share of global foreign direct investment (FDI) between the mid-1980s and late 1990s, while the already dominant share attracted by the United States has risen.[23]

Finally, Canada's rating in respect of innovation is equivocal. Is it one star or perhaps a little better? The jury's still out. Indicators have been improving in absolute terms, but less so in relative terms. On the other hand, the efficiency of Canadian business overall, as measured by MFP growth, has picked up substantially. If sustained, and augmented with growing capital per worker, this augurs well for stronger labour productivity growth in future.

The bottom line message of this essay is that Canada's economy is on the right track for the longer run. The payoff from a decade of improved practices in both the public and private sectors is finally becoming visible, notwithstanding the recent cyclical weakness. The biggest risk is that an impression of success may breed complacency as policy-makers turn their attention to squeakier wheels. Complacency is not justified. Canada has only turned the corner, positioned finally to make up the ground lost since 1980 and, much more significantly, to achieve the sustained productivity growth that will be needed as the population ages. This will not be easily accomplished. It will demand policy innovation and sustained commitment. It must be understood that productivity growth is not an end in itself, but rather the economic means by which the welfare of the entire society can be expanded.

Notes

* Peter Nicholson was special advisor to the Secretary-General of the OECD and is currently a policy advisor to the Honourable Paul Martin. The author wishes to thank Peter Jarrett and Dirk Pilat at the OECD, Paul Henri Lapointe and colleagues at Finance Canada, and Andrew Sharpe at the Centre for the Study of Living Standards. All opinions expressed are solely those of the author, who also assumes responsibility for any remaining errors. Email: pnicholson @paulmartin.ca.

1 Little significance should be attached to small differences in country rankings in Chart 2. These change from year to year and are subject to many measurement issues at both the national and cross-national level that cloud strict comparability. The most recent OECD comparisons (OECD, 2003c) indicate that in 2002 Canada's GDP per capita was fourth highest in the OECD after Norway, United States and Ireland and was 16 per cent below that of the United States based on multilateral PPPs (or 15 per cent, if based on Statistics Canada's bilateral PPPs.) Some estimates have placed the gap currently at as little as 13.5 per cent (Finance Canada, private communication). It is hard to find any two sources that produce precisely the same numbers for even such standard statistics as GDP per capita, particularly in the context of international comparisons where different estimates of purchasing power parity are encountered. Of course, there is no doubt as to the existence of a significant gap between the United States and other OECD countries. But whether the gap between the United States and Canada is about 15 per cent or closer to 20 per cent depends on whom, and when, you ask.

2 In 1999, U.S. life expectancy was 76.7 years; the OECD 30-country average was 76.9, and Canada's average was 79 years.

3 Convergence is not inevitable. Indeed, many poor developing countries have slipped even farther behind during the past 25 years, while others like Korea, Thailand, Taiwan and now China, continue to close the gap with the West. Also, countries like Argentina that were positioned comparably to Canada in the pre-war period, somehow failed to stay on the growth escalator. The convergence hypothesis must therefore be qualified. Catch-up depends on developing institutions — and in particular governance systems — that are conducive to investment and development, as has been the case for the most part in the OECD group.

4 Assuming Canada's output per capita is currently about 85 per cent of the U.S. level, it would reach 100 per cent after six and a half years of 2.5 per cent average compound growth.

5 The employment rate is thought to be a superior metric to the unemployment rate since it includes the combined effect of the labour force participation rate and unemployment rate, neither of which is wholly independent of the other. The most recent data (2003) indicate essentially no difference between the employment-to-population ratios in Canada and the United States.

6 Significantly, labour productivity in several OECD countries *exceeds* that of the United States — e.g. Netherlands, Belgium, Norway and Italy (OECD 2003a). On the other hand, these countries, Norway excepted, have lower employment rates and far fewer hours worked per employee. For example, the average Dutch worker puts in about 25 per cent fewer hours annually than his American counterpart, reflecting a larger proportion of part-timers and a very large number of people on disability pensions. High productivity allows more scope for the work-leisure trade-off (while holding total output constant), though it must be acknowledged that the low labour input in Europe is not entirely voluntary and reflects some policy short-comings. Moreover, the high European productivity numbers are due in part to shedding the least productive workers and to high ratios of capital per worker.

7 The growth impact of even a very significant permanent reduction in the unemployment rate would be relatively modest. Suppose unemployment were permanently cut from 7 per cent to 4.5 per cent. This represents an increase in the employment ratio (relative to labour force) from .930 to .955 or 2.7 per cent. If reaching the new higher level took, say, five years, it would add about a half percentage point to GDP growth per year on average during that period, all else being equal. After year five, there would be no further impact on growth other than via changes in the size of the labour force; hours worked; or productivity. Of course the *level* of GDP at year five would be about 2.5 per cent higher than otherwise would have been the case and this higher level would represent the new permanent base on which the (steady-state) growth rate would then operate. The impact on the level of GDP would thus be large and persistent.

8 GDP per capita can be decomposed, by definition, into the product of: GDP per hour, hours per worker, workers per working age population, and working age population per total population. The rate of growth of GDP per capita (per cent change per year) is closely approximated by the sum of the growth rates of the factors in the product. Assuming that: (i) growth in annual hours worked per employed person, and (ii) growth of the ratio of employed to the working age population, are both small numbers, it follows that growth in GDP per capita is governed essentially by *growth* in labour productivity plus growth in the fraction of the total population that is of working age. As the latter "growth" rate turns *increasingly* negative — i.e. the demographic headwind picks up strength — then productivity growth must *increase* at a corresponding rate to keep the growth rate of GDP per capita from declining.

9 Jorgenson, Ho and Stiroh (2003) have projected U.S. labour productivity growth over 2001-11, estimating a range from 1.1 per cent per year (pessimistic) to 2.4 per cent (optimistic) with a base case of 1.8 per cent. A very rough implication is that Canada must at least sustain its recent trend rate of productivity growth to avoid a widening gap in output per capita.

10 There is a fundamental trade-off between current consumption and investment. The latter represents postponed consumption so as to generate a higher rate of growth and thus greater consumption possibilities in the future, to be enjoyed either in later life or by subsequent generations. The "choice" of a society's investment/consumption ratio is of course implicit, being the result of millions of daily choices by consumers and businesses. These choices can, in a blunt way, be influenced by policy — e.g. a tax on consumption, like the GST, creates some bias in favour of investment, all else being equal.

11 The countries included in the data base are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

12 Many other factors were tested in the regression analyses — e.g. the impact of different compositions of government spending among investment, consumption and transfer payments; the effect of financial institutions; the impact of "distortionary" taxes (ratio of direct to indirect tax receipts). Some of these were found to have statistically significant effect, but the detailed interpretation of the results is beyond the scope of this essay — refer to Chapter 2 of OECD (2003a).

13 This and other metrics used in the analysis are admittedly rough, reflecting limitations of available and comparable cross-country data over a lengthy time period. The quantitative results must therefore be regarded only as indicative though greater confidence might be attached to the indicated *relative* importance of the various drivers, rather than to the absolute magnitude of their impact.

14 There are deeper theoretical issues involved here. Some theories — so-called *endogenous* growth theories — assume there are significant spillover effects from investments in, for example, human capital or R&D, in the sense that these activities increase the rate at which innovation is generated and incorporated into the economy thus "permanently" affecting the growth *rate* of GDP and not just its one-time level. If this theoretical view is correct (empirical evidence so far is mixed), then some of the impacts in Table 3 would be significantly greater than reported.

15 Debt includes the funded portion of pension liabilities to government employees, but not the unfunded portion. The latter is, for example, included in the Public Accounts definition of gross debt in Canada which results in a higher ratio relative to GDP on that basis.

16 The level of investment in machinery and equipment in the overall economy in Canada (M&E investment as per cent of GDP) is actually among the lowest in the OECD and has declined from about 10 per cent in the 1970s to roughly 8 per cent in the 1990s. (Korea and Japan rank highest.) This reflects the growing services orientation of the Canadian economy. And while the United States also has a relatively low M&E investment ratio (just over 9 per cent in the 1990s), it exceeds Canada's ratio and by an amount that increased over the last decade (Finance Canada, private communication).

17 Note that larger countries like the United States and Japan are expected to exhibit less "trade intensity" relative to GDP than smaller countries simply because their large domestic markets are relatively more self-sufficient. Thus Chart 9, in a sense, overstates Canada's "scale-adjusted" trade orientation relative to the other three countries. Note

also that the dollar value of exports is considerably greater than the domestic value-added to those exports since the exported products will often include considerable import content. Nonetheless, the very large *increment* in Canada's trade exposure since 1985 is impressive.

18 Canadian 15-year olds ranked 2nd in reading literacy; 5th in science; and 6th in mathematics. Leaders in the latter two categories were Korea and Japan. Finland was 1st in reading and had the best results overall.

19 The results across Canadian schools were of course not uniform with some significant differences among and within provinces. By exposing such differences, the PISA program can be expected to inspire extra effort by the laggards, especially if the differences in results become widely known by parents.

20 One might question the federal government's goal of getting Canada, by 2010, into the top five in the world in terms of R&D as a percentage of GDP. While in principle a laudable objective, it is primarily determined by private sector behaviour. In this regard, market signals are a more reliable guide than government exhortation. On the other hand, public sector support for more basic research and R&D related to government mandates should be increased since there is strong evidence that the returns for society as a whole from R&D of this type are very large.

21 OECD (2001a:77 and 82). Canada is ranked next to best in the OECD, just behind the UK, on an index of barriers to entrepreneurship, combining measures of barriers to competition, regulatory opacity and administrative burdens on start-ups. According to this analysis, Canada still has room for improvement in respect of administrative burden.

22 A roster of recommendations for policy improvements in a number of domains is included in the OECD's various Economic Surveys of Canada.

23 The OECD cites Canada for relatively tight restrictions on FDI and although these restrictions have declined substantially over the past 20 years, the liberalization in other countries has been even greater, at least on paper. (See OECD, 2003b:169-173, where several caveats are noted with respect to cross-country comparison of FDI restrictions.)

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