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## **Why Are Americans More Productive Than Canadians?**

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# Why Are Americans More Productive Than Canadians?

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## **ABSTRACT**

The objective of this paper is to document the evolution of the Canada-U.S. labour productivity gap and to offer an explanation of why Americans have been and continue to be, on average, more productive than Canadians. This focus on relative productivity levels is in contrast to the typical focus on the gap between productivity growth rates in Canada and the United States. The paper finds that Canada's level of output per person employed was 81.0 per cent of the U.S. level in 2002. This was the lowest relative level since the late 1960s. The general conclusions on the size of the output per hour gap are that output per hour has always been below that in the United States, the productivity gap has increased in the 1990s, particularly since 1994, and the current gap is between 11 and 19 percentage points depending on the source of hours data used. Five main reasons are advanced for this, namely: the lower capital intensity of economic activity in Canada; an innovation gap in Canada relative to the United States; Canada's relatively underdeveloped high-tech sector; less developed human capital in Canada in terms of proportionately fewer university graduates and scientists and engineers in research and development; and more limited economies of scale and scope in Canada.

# Why Are Americans More Productive Than Canadians?

## EXECUTIVE SUMMARY

The objective of this paper is to document the evolution of the Canada-U.S. labour productivity gap and to offer an explanation of why Americans have been and continue to be, on average, more productive than Canadians. Canada's productivity performance has received much attention in Canada in recent years, typically focusing on concerns that Canada's productivity growth rate has lagged that in the United States. Less attention has been given to Canada's long-term lower level of labour productivity relative to that in the United States.

Productivity growth is important because of its contribution to economic growth. In the golden age of postwar capitalism from 1946 to 1973 when productivity growth was particularly strong (3.81 per cent per year), productivity growth accounted for nearly four-fifths of output growth. After 1973, when output per hour growth slowed down (1.34 per cent per year), productivity growth accounted for only 46 per cent of economic growth.

However, productivity growth is even more important from the perspective of growth in living standards. From 1946 to 2002, output per hour growth accounted for 117 per cent of GDP per capita growth, due to negative contributions from the decline in average hours worked and a small increase in the unemployment rate.

The data requirements for comparing productivity levels are extensive. Estimates of output in constant prices are available from both Canadian and U.S. statistical agencies and are considered comparable since Statistics Canada has tended to follow the lead of its U.S. counterparts in the adoption of new methodologies for prices. Since output per hour is the desired measure of labour productivity, both employment and average hours data are required for both countries. Both Canada and the United States collect employment and hours data through household-based surveys and through establishment-based surveys. For employment, household-based estimates are thought to be more comprehensive, but the choice of actual hours worked data is considerably more difficult. For Canada the average hours estimates from the household-based and establishment-based surveys are quite similar, but in the United States the two types of estimates differ dramatically. The choice of hours data hence significantly affects the measurement of the relative level of labour productivity in Canada, but it is not clear which type of estimate is more reliable. The paper therefore presents estimates of the Canada-U.S. labour productivity gap based on both types of hours data.

To calculate total factor productivity it is also necessary to have estimates of capital stock for both Canada and the United States. Statistical agencies in both countries provide capital stock estimates based on the same methodology, although comparability may be limited due to different depreciation rates.

Finally, purchasing power parity (PPP) estimates are needed to translate national currency estimates of GDP into common currency (U.S. dollar) estimates. These PPP estimates are available from Statistics Canada, but there are two basic methodologies for converting national currency-denominated series into a common currency. This paper hence presents estimates of the Canada-U.S. labour productivity gap based on both methodologies.

The paper finds that Canada's level of output per person employed was 81.0 per cent of the U.S. level in 2002. This was the lowest relative level since the late 1960s. The highest relative was 90.5 per cent in 1958. There appears to have been no convergence of Canadian levels of output per worker toward U.S. levels in the postwar period in Canada as even in 1946 the relative was 79.8 per cent.

Depending on the source of hours data for the United States, Canada's level of output per hour was 81.0 per cent or 89.2 per cent of the U.S. level in 2002. Again, these are the lowest levels since the late 1960s. These estimates correspond well with other estimates of the Canada-U.S. labour productivity gap, for example from the OECD, who find that output per hour in Canada was 80.5 per cent of the U.S. level in 2001. The main conclusions on the size of the gap are therefore that output per hour has always been below that in the United States, the productivity gap has increased in the 1990s, particularly since 1994, and the current gap is between 11 and 19 percentage points depending on the source of hours data used.

Canada fares better in terms of capital productivity and total factor productivity (TFP). In 2001 Canada's level of capital productivity was 97.1 per cent of the U.S. level, although Canada's relative capital productivity has shown a strong secular decline since the 1950s. Also in 2001, Canada's level of TFP relative to the United States was 87.2 per cent or 92.5 per cent depending on the hours data used. Both estimates are down considerably from those experienced in the mid-1970s, when the level of TFP in Canada approached that in the United States.

Some preliminary estimates of industry-specific labour productivity gaps are presented for the purpose of determining the importance of sectoral contributions to the overall Canada-U.S. productivity gap. No strong evidence, however, is found to support the claim that industry structure accounts for a significant portion of the gap.

Capital intensity, as measured by the capital-labour ratio, is found to be much lower in Canada compared to the United States. This is estimated to account for around one fifth of the overall productivity gap. The innovation gap, as manifested by lower research and development (R&D) expenditures and patenting as well as lags in the diffusion of best practice techniques in Canada, is also likely to account for a large part of the labour productivity gap.

Three other factors are likely to contribute substantially to the productivity gap, namely:

- Canada's relatively underdeveloped high-tech sector which has had much lower productivity growth rates than its U.S. counterpart;
- Canada's less developed human capital at the top end of the labour market, as manifested by proportionately fewer university graduates and scientists and engineers in R&D; and
- more limited economies of scale and scope in Canada reflecting smaller plant size due to the continuation of border effects.

Taxes, social policies, unionization and regulation, all of which have been suspected in the past of contributing to the Canada-U.S. productivity gap, are not found here to have had any significant effect on the gap. However, further research is needed before definitive conclusions can be drawn on the importance of these factors in explaining the productivity gap.

The future evolution of the Canada-U.S. productivity gap depends on the relative productivity growth of the two countries. The paper finds that, to the degree that Canada can reduce its innovation gap, foster investment to increase capital intensity, develop the high-tech sector, and increase plant size, it can increase its productivity growth rate and reduce the productivity gap.

# Why Are Americans More Productive Than Canadians?<sup>1</sup>

## I Introduction

The issue of Canada's productivity performance has received much attention in Canada in recent years. The focus of the concern has been that Canada's productivity growth rate in the second half of the 1990s has lagged that in the United States. Numerous policies have been advanced to remedy this situation. Less attention has been given the factors behind Canada's long-term lower level of labour productivity relative to that in the United States. The objective of this paper is to remedy this neglect of relative aggregate productivity levels and offer an explanation of why Americans have been and continue to be, on average, more productive than Canadians.

The paper is divided into five major parts. The introduction provides a brief overview of productivity issues and developments to set the context for the paper. The second section provides a detailed examination of the current and historical evidence of the gap on aggregate productivity levels between Canada and the United States, looking at the measurement of labour and capital and providing estimates of labour, capital, and total factor productivity. The third part discusses and evaluates the contribution made by a large number of factors to the explanation of the labour productivity gap between the two countries. Factors discussed include the industry structure, the capital intensity of production, human capital, and technological innovation. The fourth section briefly examines the relationship between productivity levels and economic well-being. The fifth and final section concludes.

Productivity is defined as the ratio of output to input in a production process. Partial productivity measures such as labour productivity or capital productivity relate output to a single input. Total or multi-factor productivity measures relate output to an index of two or more inputs. It is defined as output growth minus the weighted average of the growth of inputs (usually labour and capital) where the weights are the input income shares. Total factor productivity is particularly useful for gauging the efficiency of the use of resources. Labour productivity is crucial for determining the potential growth in living standards as higher levels of per capita income or output require more output to be produced per worker.<sup>2</sup>

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<sup>1</sup> This paper was originally presented at a public lecture at the Centre for International Business, College of Business and Economics, Western Washington University, Bellingham, Washington on January 23, 2003. I would like to thank Steven Globerman for the invitation to present the lecture and James Dean, Steven Globerman and others attending the lecture for useful comments. A revised version was presented at the Conference organized by the Centre for the Study of Living Standards on Relative Canada-U.S. Productivity and Living Standard Trends that took place at the Canadian Consulate General in New York, New York, April 16, 2003. An abridged version of this paper is published in the Spring 2003 issue of the *International Productivity Monitor* posted at [www.csls.ca](http://www.csls.ca). I would like to thank Olivier Guilbaud for excellent research assistance in the preparation of this paper and Someshwar Rao, Jack Triplett, and Ed Wolff for comments on the version of the paper presented in New York.

<sup>2</sup> For a more detailed examination of productivity concepts, see Sharpe (2002b).



In discussion of productivity, it is very important to always specify whether one is referring to productivity levels, that is the amount of output per unit of input at a point in time, or to productivity growth rates, that is the per cent change in productivity levels between two points in time. This is because productivity is both a physical and a value relationship. The physical dimension refers to changes over time in the amount of output produced by a unit of input measured in real terms, that is expressed in constant prices. This is what we have traditionally meant by productivity growth. The value dimension refers to the value, expressed in current dollars, of output produced by a unit of input. This measure is used to compare productivity levels across sectors as only prices can be used to aggregate heterogeneous physical goods.

There is no necessary relationship between physical and value concepts of productivity. For example, the agricultural sector has enjoyed very rapid long-term productivity growth, but the value productivity of the sector (current dollar value of output per worker) is well below the economy-wide average due to the fall in the relative price of agricultural goods. The productivity gains have been passed on to consumers through lower prices. Conversely, certain service industries which have experienced no growth in physical productivity may have a high value productivity level. This may be because of strong demand for the output of the sectors, high costs of factor inputs in the sectors, or monopoly power in the sector allowing firms to raise prices.

Before beginning the discussion of productivity gaps, it is useful to review why productivity is important.<sup>3</sup> Economic growth can be decomposed into productivity growth and employment or labour force growth. Productivity growth has been the most important component of economic growth in Canada in the second half of the 20<sup>th</sup> century, accounting for two-thirds of output growth from 1946 to 2002. In the golden age of postwar capitalism from 1946 to 1973 when productivity growth was particularly strong (3.81 per cent per year), productivity growth accounted for nearly four-fifths of output growth (Table 1 and Chart 1). After 1973, when output per hour growth slowed down (1.34 per cent per year), productivity growth accounted for only 46 per cent of economic growth.

Productivity growth is even more important from the perspective of growth in living standards, which factors in population growth and is defined as GDP per capita. Changes in per capita GDP over time are determined by trends in output per hour, average hours, the proportion of the population of working age (15 and over) in the total population, the labour force participation rate, and the unemployment rate. From 1946 to 2002, output per hour growth (2.53 per cent per year) accounted for 117 per cent of GDP per capita growth (2.16 per cent), due to negative contributions from the decline in average hours worked and a small increase in the unemployment rate (Table 1 and Charts 2 and 3). In the 1946-73 period, the contribution of output per hour growth was 147.7 per cent, declining to 76 per cent in 1973-2002.

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<sup>3</sup> On the two-way relationship between productivity and social progress, see Sharpe, St-Hilaire and Banting (2002).

Equally, differences in the level of GDP per capita across countries can be accounted for by differences in the level of GDP per hour, working time, and the employment share in total population, in turn affected by the unemployment rate, the participation rate, and the demographic structure. Table 2, based on Van Ark (2002), shows that in 2001 Canada's GDP per capita was 77.3 per cent that of the United States. This estimate was slightly less than Canada's aggregate labour productivity relative (82.6 per cent of the U.S. level) because of fewer hours worked in Canada (3.5 percentage points less than in the United States) and a lower share of employment in the total population (1.8 percentage points). These 1.8 percentage points due to the lower employment to population ratio in Canada can be further broken down into a higher unemployment rate in Canada (2.1 percentage points) a smaller labour force participation rate (1.2 points) and a larger share of the working age population in the total population (-1.5 points). The higher ratio of working age population to total population in Canada reflects the lower fertility rate in Canada and hence a relatively smaller proportion of the population in the under 15 age group.

## **II Estimates of the Canada-U.S. Aggregate Productivity Gap**

This section presents estimates of the Canada-U.S. productivity gap for the total economy, including both the business and non-business sectors. Because of productivity measurement problems in the non-business sector, the discussion of productivity growth rates has focused on trends in the business sector. However, the definition of the business sector varies between Canada and the United States. For example, many hospitals are part of the business sector in the United States, but almost all hospitals are included in the non-business sector in Canada. For this reason and also because of easier data availability for the total economy than for the business sector, the total economy or total GDP can be taken as the unit of analysis for aggregate productivity performance in this paper.

Statistics Canada does not produce official estimates of Canada-U.S. productivity gaps as it does for productivity growth rates. This means that there are different estimates of Canada's aggregate productivity level relative to that of the United States produced by different independent researchers based on different data sources. This section first provides a detailed discussion of the variables needed for estimates of relative labour, capital, and total factor productivity levels and the methodological and statistical problems associated with the estimation of these variables. It then presents estimates of Canada's relative aggregate labour, capital, and total factor productivity level from several sources.

### **Data Requirements for Productivity Level Comparisons**

The basic data needed to derive estimates of levels of aggregate or total economy labour, capital and total factor productivity include: output estimates, expressed in current prices or in constant prices (calculated from current price or nominal output data and

output price indexes); employment and average hours estimates; capital stock estimates; and purchasing power parity estimates for GDP.

### Output estimates

Statistics Canada and the U.S. Bureau of Economic Analysis produce estimates of Gross Domestic Product (GDP) at current prices, and at constant prices based on Fisher chain indexes. These estimates are based on national accounts definitions and conventions developed by the United Nations that have been adopted by all OECD countries. In principle, the methodologies used to compile the estimates are more or less comparable. This is particularly so since the Canadian national accounts followed the U.S. lead in adopting chain indexes and in treating software as an investment good.

One minor issue is that the base year for the constant price estimates is generally not the same in Canada and the United States. For example, Statistics Canada currently uses a 1997 base year while the U.S. Bureau of Economic Analysis uses 1996. Either GDP series can be rebased by multiplying the series by the ratio of GDP deflators for old and new base years. The convention in this paper is to use the Canadian base year of 1997, which requires rebasing the U.S. series from 1996 to 1997.

Current price GDP estimates must be deflated by the GDP deflator to obtain constant price GDP estimates. A major issue is the international comparability of the expenditure price series used to derive the GDP deflator because of possible differences in methodologies used to construct price indexes. Methodological differences in the treatment of quality change in existing goods and the treatment of new goods pose the most challenging problems and have been approached differently by national statistical agencies. The Bureau of Labor Statistics (BLS) has been relatively aggressive in the quality adjustments it has introduced into price series, particularly when compared to national statistical agencies in Europe. Some observers argue that this has introduced an upward bias to real growth estimates for the United States compared to European countries such as Germany. This argument is particularly relevant for the output of the high-tech sector, but has less relevance at the total economy level because of the relatively small size of the high-tech sector in the overall economy.

Statistics Canada has tended to follow the lead of the BLS for the development and the adoption of new methodologies for prices. Indeed, Statistics Canada has at times even adopted U.S. deflators, as was the case for the deflator series for computers in the 1980s. Consequently, it is unlikely that differences in price indexes due to different methodologies greatly bias real GDP estimates in Canada relative to those in the United States.

Table 3 provides current price and constant (chained) price (1997 dollars) estimates of GDP for Canada for the 1946 to 2002 period. Table 4 provides similar estimates for the same period for the United States.

## Labour input

Data on labour input comes from both establishment-based and household-based surveys. The establishment-based survey in Canada is called the Survey of Employment, Payroll and Hours (SEPH) and in the United States it is called the Current Employment Survey (CES). The household-based survey in Canada is called the Labour Force Survey (LFS) and in the United States it is the Current Population Survey (CPS).<sup>4</sup>

For employment estimates this paper uses household-based estimates for both countries. This is because household-based employment estimates are more comprehensive than establishment-based employment estimates, and include all industries and all classes of workers. Establishment-based employment surveys exclude agricultural workers and non-salaried workers (self-employed and unpaid family workers). From a labour productivity perspective, it is desirable to include all persons engaged in production in labour input.

Table 3 provides aggregate employment estimates for Canada for the 1946 to 2002 period. Table 4 provides similar estimates for the same period for the United States.

The choice of actual hours worked data is considerably more difficult than the choice of employment data. This paper makes use of both establishment-based and household-based estimates as it focuses on average weekly hours. Total annual hours worked is calculated as the product of annual hours per person employed (average weekly hours multiplied by 52 weeks) and the estimate for household-based employment.

Table 5 provides estimates of average weekly hours from household and establishment surveys for Canada and the United States for the 1976-2002 period. It should be noted that these annual estimates are based on the average of monthly estimates and should, in principle, capture the impact of vacations, holidays, strikes, sickness, maternity and paternity leave, unpaid hours, and off-the-job training on total annual hours worked.

In Canada, household and establishment-based estimates give similar results on the number of hours worked. In 2002, the estimate of average weekly hours per employee from SEPH was 34.3 (Chart 4). This estimate reflects an average 37.9 hours per week for salaried workers and 31.9 hours for hourly paid employees, including overtime. The estimate of average actual weekly hours from the LFS was 34.1, nearly identical to the SEPH estimate.

In the United States, the establishment-based and the household-based hours estimates reveal different stories about working time. In 2002, the estimate of average weekly hours based on the CES was 34.2. This estimate is for production workers only. Estimates for non-production workers do not appear available, and it is not known if average hours worked by non-production workers are greater or less than by production

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<sup>4</sup> One minor difference between the LFS and the CPS is that the working age population is defined as 15 and over in Canada, and as 16 and over in the United States.

workers. In contrast, the estimate of average hours for all workers from the CPS was 37.6, 3.4 hours per week (176 per year) or 9.9 per cent more than the CES estimate.

Labour productivity levels measured on an hours basis are thus significantly lower when CPS hours estimates are used and higher when the CES hours estimates are used. The choice of hours data however makes little difference for productivity growth, and, in particular, for the productivity growth acceleration in the second half of the 1990s, as both measures of average weekly hours have remained stable over this period.

As shown above, both the SEPH and LFS estimates of average hours for Canada are very similar to the CES estimate for the United States at around 34 hours per week. This implies that there is very little difference between output per worker and output per hour estimates of labour productivity relatives between the two countries.

But the CPS hours estimate for the United States is significantly larger than both estimates for Canada. This implies that there is a significant difference between the output per worker and output per hour estimates of labour productivity relatives between the two countries when this data source is used, and that Canada's relative labour productivity level gap, based on hours worked, is much smaller when CPS hours estimates are used.

BLS officials caution that the CPS hours estimate may be too high because it includes unpaid hours of work, which the BLS believes is overreported on the CPS (Eldridge et. al. 2001).<sup>5</sup> On the other hand, it is noted that the CES hours estimate may be too low as it excludes non-production workers and the self-employed, many of whom work long hours both paid and unpaid.<sup>6</sup> Statistics Canada officials appear to have greater confidence in the LFS estimate of hours, even though it too includes unpaid hours worked.

### Capital input

Both Statistics Canada and the Bureau of Economic Analysis (BEA) produce estimates of the capital stock based on the perpetual inventory methodology, which combines investment flows, and assumptions of depreciation patterns and rates. In the past, depreciation assumptions differed significantly between countries, making the capital stock estimates not comparable (Coulombe, 2002). Statistics Canada has recently moved much closer to BEA methodology and assumptions so the capital stock estimates are now much more comparable. Table 6 provides estimates of constant price net capital stock based on the geometric depreciation assumption<sup>7</sup> for the total economy for Canada and the United States for the 1955-2001 period.

<sup>5</sup> Also see Van Ark (1998), OECD (1998) and OECD (2001b) for discussion of the measurement of hours.

<sup>6</sup> Jack Triplett, a former senior BLS official, in his discussion of this paper, has remarked that he considers the U.S. establishment survey "dreadful." He feels it is very out-of-date as it was designed in the 1920s. He also noted that at that time, the concept of production worker, used by the establishment survey, may have had meaning, but it has little relevance in the 21<sup>st</sup> century.

<sup>7</sup> See Diewert (2003) for calculations of Canadian reproducible capital services aggregates under alternative assumptions of depreciation, opportunity cost of capital, and treatment of capital gains.

### Intermediate goods

Data on constant price intermediate goods and raw materials are needed for calculation of multifactor productivity based on gross output. A key problem in this regard is the importance of imported intermediate goods and the manner in which the prices of imported intermediate goods are incorporated into the price indexes used to deflate current price intermediate goods. It has been suggested that in the United States, the prices of intermediate inputs reflect the prices of domestically produced intermediate goods only, biasing this index upward because of the exclusion of cheaper imported intermediate goods. As this paper examines only value added productivity measures, this issue will not be explored, but it is a very important consideration for future work on Canada-U.S. total factor productivity comparisons based on gross output.

### Purchasing power parities

Purchasing power parity (PPP) estimates are needed to translate national currency estimates of GDP and expenditure categories into common currency (U.S. dollar) estimates. Statistics Canada produces official estimates of the bilateral PPP between Canada and the United States for current dollar GDP and expenditure categories for the 1992-2001 period (Kemp, 2002).<sup>8</sup> This paper has extrapolated forward and backward the series on the basis of the differences in trends in the GDP deflator in the two countries (Table 3, column F). In 2002, it is estimated that the GDP PPP was \$0.85 U.S., compared to the actual exchange rate of \$0.637 U.S.

There are two basic methodologies for converting national currency-denominated statistics into a common currency using PPPs (Smith, 2003). The first involves converting a nominal (not adjusted for price changes) series. That is the nominal value in each year is converted using the PPP for that year. The second methodology involves converting a constant price series. That is the real value in each year is converted using the PPP for the base year of the constant price series.

A strength of the first methodology is that current dollar series capture shifts in the shares of expenditure components. A disadvantage is that the converted series is in current price common currency units, making it impossible to calculate growth rates in real terms. There are two solutions to this problem. The first is to not use the current common currency units for growth comparisons, relying instead on constant price national currency series for this purpose. The second is to convert the series in current price common currency series to a real series using the appropriate deflator from the common currency country. For example, PPPs would be used to convert Canadian GDP

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<sup>8</sup> Three multilateral PPP estimates are also available for Canada (Appendix Table 5). Two of the three are quite similar to the bilateral estimates. For example, the OECD GDP PPP historical series gives an estimate of \$0.825 U.S. for 2000, and the Statistics Canada multilateral PPP for OECD countries gives an estimate of \$0.83 U.S. compared to the Statistics Canada bilateral estimate of \$0.84. The Penn World table estimate is a bit of an outlier at \$0.793. Productivity relatives would be slightly different if these PPPs were used.

in current Canadian dollars to current U.S. dollars, and the U.S. GDP deflator would then be applied to convert the series to constant U.S. dollars. It should be noted that growth rates calculated from the converted constant price common currency series will likely not correspond to growth rates of the official constant price national currency series.

The second methodology is conversion of a constant price national currency series to a real common currency series by applying the PPP in the base year of the constant price series to the value in all years. The converted series retains the same growth rates as the series in national currency units, with the added benefit that only one PPP estimate is necessary. A disadvantage of this methodology is that base year expenditure shares are applied to all years in the series, ignoring shifts over time in expenditure patterns. This can be particularly problematic for very long periods. Given the advantages and disadvantages of each method, there is no professional consensus on which should be preferred.<sup>9</sup>

This paper presents both current price and constant price common currency (U.S. dollar) estimates for Canadian GDP based on the two methodologies outlined above.

## **Estimates of Productivity Relatives**

### Labour productivity

The Centre for the Study of Living Standards (CSLS) has compiled estimates of GDP per worker and per hour worked for Canada (Table 3) and the United States (Table 4) for the 1946-2002 period in both nominal and real terms. Table 7 and Charts 5 and 6 present productivity relatives, that is GDP per worker and per hour in Canada as a proportion of the U.S. level. As the current and constant dollar relative estimates are virtually identical, only the current dollar estimates will be discussed. As the focus of this paper is on explaining productivity level differences, not productivity growth rates, it can be argued that current dollar levels are more relevant than constant dollar levels as they capture shifts in expenditure patterns (although the movement to chain GDP indexes may have reduced this advantage of current dollar estimates and may also explain the near identical time paths of the two series, as Chart 6 shows).

Canada's level of output per person employed, \$63,002 in U.S. current dollars in 2002, was 81.0 per cent of the U.S. level of \$77,800.<sup>10</sup> This was the lowest relative level since the late 1960s (Chart 5). The highest relative level was 90.5 per cent in 1958. There appears to have been no convergence of Canadian levels of output per worker toward

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<sup>9</sup> It should also be mentioned that the development of industry PPPs for industry level productivity comparisons is a much more complex issue than the development and use of expenditure PPPs and is not discussed in this paper.

<sup>10</sup> The estimates of the Canada-U.S. aggregate labour productivity gap in this paper are much larger than the 6.1 point gap in the level of output per worker between the two countries reported by Hall and Jones (1996) for 1988. This paper finds that the gap in 1988 was 14 per cent (Table 7).

U.S. levels in the postwar period in Canada as even in 1946 the relative level was 79.8 per cent (Table 7)

As noted in the previous section, Canada's level of GDP per hour worked relative to the U.S. level is sensitive to the choice of hours data for the United States. When establishment-based hours estimates are used, there is little difference in the output per hour relative estimates because average weekly hours worked are almost identical in the two countries. On the other hand, when household-based estimates are used, the Canada-U.S. labour productivity gap is reduced because these estimates show greater hours worked in the United States than in Canada.

In 2002, Canada's level of output per hour worked was \$35.54 in current U.S. dollars. When CES hours estimates are used for the United States, a productivity relative of 81.0 per cent is obtained, the lowest level since the late 1960s (Chart 6). On the other hand, when CPS hours estimates are used for the United States, a much higher productivity relative of 89.2 per cent is obtained. This too is the lowest level in the history of the CPS series, which only goes back to 1976.

The 8.2 percentage point difference in the Canada-U.S. output per hour level gap in 2002 between the productivity relative based on the U.S. CES hours estimates (19.0 points) and the productivity relative based on CPS hours estimates (10.8 points) is, of course, explained by the difference in CES and CPS hours (34.2 hours per week versus 37.6 respectively).

It is useful to compare the CSLS estimates of Canada's relative labour productivity presented above with estimates calculated by other researchers, including Angus Maddison, the Groningen Growth and Development Centre (GGDC) and the OECD.

Angus Maddison (2001) has compiled estimates of Canada's GDP per hour relative to that in the United States back to 1870. In 1870, Maddison calculates that GDP per hour worked in Canada was 76.0 per cent of that in the United States (Appendix Table 3 and Chart 7). By 1913, it had attained 86.9 per cent, the highest relative achieved in the history of the series. It fell to 81.7 per cent by 1950, then rose to 83.2 per cent in 1973. It has declined in the post-1973 period, falling to 78.2 per cent in 1990 and 75.4 per cent in 1998. For the postwar period, Maddison's labour productivity relatives are somewhat below those calculated by the CSLS (Chart 5). The 1998 estimate in particular is around 5 percentage points below the lowest CSLS estimates of 83 per cent.

The Groningen Growth and Development Centre at the University of Groningen in the Netherlands has compiled estimates on GDP per hour worked for Canada and the United States for 1950, 1960, 1973, and the 1979-2002 period inclusive (Appendix Table 5).<sup>11</sup> According to this source, in 2002 Canada's level of GDP per hour was 83.75 per cent of the U.S. level. This is somewhat higher than the CSLS productivity relative (constant dollar) based on CES U.S. hours (80.8 per cent), but below the CSLS relative

<sup>11</sup> These estimates are posted at [www.eco.rug.nl/ggdc](http://www.eco.rug.nl/ggdc) for free download.



based on CPS U.S. hours (89.0 per cent). The GGDC and CSLS series track relatively closely in the 1970s and 1980s, but the GGDC productivity relative is much higher in the 1950s and 1960s.

The GGDC data base also provides total economy productivity relatives for all OECD countries (Table 2). In 2001, four countries had higher levels of output per hour than the United States: Belgium (112.4 per cent of the U.S. level), Norway (109.7 per cent), France (101.8 per cent), and the Netherlands (100.9 per cent). Canada at 82.6 per cent ranked 13<sup>th</sup> out of 27 OECD countries, behind the four countries already mentioned, the United States (100.0 per cent), Ireland (98.4 per cent), Austria (95.9 per cent), Denmark (93.5 per cent), Germany (92.5 per cent), Italy (88.0 per cent), Finland (86.3 per cent), and Switzerland (85.8 per cent).

The OECD also produces a series on Canada's relative GDP per hour for selected years from 1960 to 2001 (Appendix Table 4). In 2001, this series shows that GDP per hour in Canada was 80.5 per cent of U.S. level. This is close to the lower CSLS estimate of 81.9 per cent and is likely explained by use of the multilateral OECD PPP rather than the bilateral Statistics Canada PPP. The OECD estimates for earlier years are also similar to CSLS estimates.

The estimates of Canada's relative productivity level from the sources discussed above are fairly consistent. They all show that output per hour in Canada has always been below that of the United States, that the productivity gap has increased in the 1990s, particularly since 1994, and that the current gap is between 11 and 19 percentage points depending on the source of hours data used.

### Capital productivity

The productivity of the capital stock is defined as the amount of value added produced per unit (\$1,000) of capital stock. Table 8 shows that in 2001 (capital stock for 2002 is not yet available for the United States) Canada's capital productivity level, calculated with constant price data, was 97.1 per cent that of the United States. Canada's capital productivity gap with the United States is thus much less than the labour productivity gap. There has been a strong secular decline in Canada's relative capital productivity since the 1950s (Chart 8).

The composition of the capital stock varies significantly between Canada and the United States. In 2001, machinery and equipment represented only 25.2 per cent of the real (\$1997) capital stock in Canada compared to 34.8 per cent in the United States. Conversely, structures accounted for 74.8 per cent of the capital stock in Canada and 65.2 per cent in the United States. This different structure has implications for the capital productivity of the two components. Because of the smaller share of machinery and equipment in Canada, the relative productivity of this component of the capital stock was 158.5 per cent of that of the United States (Appendix Table 7). Equally, because of the higher share of structures, the relative productivity of this component of the capital stock was only 78.5 per cent of the U.S. level (Appendix Table 6).

### Total factor productivity

Total factor productivity growth is the difference between an index of output and an index of input where the growth rate of the input index is the weighted average of factors of production with the weights the factor income shares. Canada's level of total factor productivity relative to that in the United States can be calculated by combining its relative labour and capital productivity using as weights the income share of labour and capital. The results are of course sensitive to which hours measure is used for the United States.

In 2001, Canada's relative level of total factor productivity for the total economy was 87.2 per cent that of the United States using relative labour productivity based on the U.S. CES hours estimate (Table 9) and 92.5 per cent using relative labour productivity based on the U.S. CPS hours estimate (Table 10).<sup>12</sup> Both estimates were down considerably from those experienced in the mid-1970s, when the level of TFP in Canada approached that in the United States (Chart 9).<sup>13</sup>

### **III Explanations for the Canada-U.S. Labour Productivity Gap**

This section of the paper examines possible explanations for the current gap in total economy labour productivity levels between Canada and the United States. Three types or levels of explanations are included. First, sectoral contributions to productivity growth and the impact of industry structure on aggregate productivity are analyzed. Second, the main drivers of productivity growth, capital intensity, technological innovation, and human capital, are discussed. Finally, the framework environment or infrastructure influencing the productivity drivers, which includes economies of scale and scope, taxes, social policies, unionization, and regulation is examined.<sup>14</sup>

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<sup>12</sup> The Canada-U.S. aggregate total factor productivity gap in this paper differs from the finding of the 1.3 percentage point gap in the TFP level between the two countries reported by Hall and Jones (1996) for 1988. This paper finds that the gap in 1988 was 3.8 points using CPS hours (Table 10).

<sup>13</sup> This result is consistent with a recent study by Dachraoui and Harchaoui (2003) who found that multifactor productivity growth was slower in Canada than in the United States over the 1981-2000 period: 0.60 per cent versus 0.88 per cent per year. Using an experimental frontier approach to productivity measurement, the authors found that the technical change component of multifactor productivity advanced 0.76 per cent per year in Canada, but less efficiency in production relative to that in the United States reduced multifactor productivity growth 0.16 per cent.

<sup>14</sup> Within the context all countries of the world, Hall and Jones (1996) show that differences in governmental, cultural, and natural infrastructure are important sources of productivity variation. They find that a high-productivity country: 1) has institutions that favour production over diversion; 2) is open to international trade; 3) has at least some private ownership; 4) speaks an international language; and 5) is located in a temperate latitude far from the equator. A favourable infrastructure fosters productivity both by stimulating the accumulation of human and physical capital and by raising its total factor productivity. These five factors are not particularly relevant in explaining the Canada-U.S. labour productivity gap because the two countries do not exhibit significant differences in these areas.

## **Sectoral Contributions to the Gap and Industrial Composition**

As a first step in the analysis of the total economy labour productivity gap between Canada and the United States, it is useful to calculate the sectoral contributions to the gap.<sup>15</sup> Unfortunately, this exercise runs up against two serious problems. First, industry-specific purchasing power parities, which are needed to calculate industry relative productivity levels, are not available. Statistics Canada currently calculates PPPs on an expenditure basis, not an industry basis. Second, Statistics Canada now produces industry statistics on the basis of the North American Industrial Classification System (NAICS), while U.S. statistical agencies continue to use the Standard Industrial Classification (SIC). This makes the industry classification systems not directly comparable between the two countries.

Despite these serious problems, Table 11 presents, for exploratory purposes, both current dollar and constant dollar productivity relatives for 10 Canadian industries for 1999 (the most recent year for current dollar industry estimates) on the basis of the GDP PPP and the two different industry classification systems. These data should be regarded as highly provisional and may be subject to major changes when industry PPPs are developed and NAICS is fully adopted by U.S. statistical agencies.

The current and constant dollar estimates of productivity relatives by industry are quite close. Output per worker in mining in Canada appears to be twice as high as in the United States, while output per worker in construction is somewhat higher. Labour productivity in agriculture, forestry, and fisheries appears roughly comparable in the two countries. In manufacturing, transportation and public utilities, finance, insurance and real estate, and services, Canada appears to have between 80 and 90 per cent of the U.S. level. In retail and wholesale trade, Canada appears to have only around two-thirds the U.S. level. The productivity relative for public administration of around 30 per cent likely reflects differences in the definition of the sector and should be ignored.

The industry or sectoral contribution to the overall Canada-U.S. productivity gap (23 percentage points in 1999 for output per worker according to these figures) can be approximated as the product of a particular industry productivity gap and the industry's employment share. Table 11 thus shows that all industries except for mining and construction contributed to the gap, with the contributions of retail trade and services reflecting both the large gaps in these sectors and their large employment shares.

Although labour productivity relatives based on industry PPPs and a common industry classification system are not available, estimates of total factor productivity (TFP) Canada-U.S. relatives for 33 industries are available for 1995 from an Industry Canada study (Lee and Tang, 2002). This study based on a translog production function framework found that in 1995 Canada was less productive in terms of total factor

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<sup>15</sup> For an excellent discussion of factors built from the firm level that can explain productivity level differences across countries at the industry level, see Baily and Solow (2001).

productivity than the United States in 23 of 33 industries, up from 22 in 1988 and 20 in 1973 but down from 25 in 1961 (Table 12).

Canada was found to be much less productive in: agriculture; forestry; crude petroleum and gas; paper; printing; rubber and plastics; stone, clay and glass; fabricated metals; industrial machinery; and transportation and warehousing. On the other hand, Canada was significantly more productive than the United States in: coal mining; construction; tobacco; petroleum refining; electrical utilities; and gas utilities. The authors concluded that the deterioration of Canada's TFP levels relative to those in the United States has become more widespread across industries since 1973.

As the Industry Canada study adjusted for labour and capital quality and used total factor productivity instead of labour productivity, its TFP relatives are not comparable to the labour productivity relatives in Table 11. There appear to be few common patterns, but one such pattern is in construction where both Canada's labour and TFP levels exceed those of the United States.

As Table 11 shows, at the ten industry level there are not major differences in the industry structure of employment in Canada and the United States. At a more disaggregated level, more differences would appear, as a greater share of manufacturing employment is in natural resource-related industries in Canada and a greater share in high-tech industries in the United States. Thus, differences in the industry composition of employment between Canada and the United States accounts for very little of the gap. If Canada had the U.S. employment structure at the ten industry level, with actual Canadian labor productivity levels, aggregate labour productivity in Canada in 1999 would be only 1.0 per cent higher.

## **Main Drivers of Productivity Growth**

### Capital intensity

A possible explanation for a lower aggregate labour productivity level in Canada than in the United States is a lower level of capital intensity, that is capital per worker or per hour worked. This is indeed the case. The Canada-U.S. relative capital-labour ratio at the total economy level in 2001 was 84.7 per cent based on employment (Table 13), 84.3 per cent based on U.S. CES hours, and 92.6 per cent based on U.S. LFS hours (Table 14). The lower level of capital intensity means that Canada's gap in TFP with the United States is less than that for labour productivity, as seen in Tables 9 and 10.<sup>16</sup> Capital intensity has been rising faster in Canada than in the United States, with the relative rising from 60.0 per cent in 1955 to 84.3 per cent in 2001 based on U.S. CES hours (Chart 10).

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<sup>16</sup> This finding of lower capital intensity in Canada differs from that of nearly identical capital intensity between the two countries reported by Hall and Jones (1996) for 1988. This paper finds that the capital/labour ratio in 1988 was 10 per cent lower in Canada than in the United States (Table 14).

The actual contribution of Canada's lower capital-labour ratio to the labour productivity gap can be calculated by multiplying the share of capital income in GDP by the capital-labour gap. The output per hour gap based on U.S. CES hours was 17.9 points in 2001 and the capital-labour ratio gap was 15.7 points, and capital's share of GDP was 0.3. Thus 4.7 points ( $15.7 \times 0.3$ ) of the labour productivity gap or 26.3 per cent of the gap was due to lower capital intensity in Canada. The comparable calculation for the labour productivity gap based on CPS hours (9.2 points) and the capital-labour ratio gap based on CPS hours gap of 7.4 points is 2.2 points or 30.0 per cent. If capital intensity were equal in both countries, then this factor would make no contribution to the productivity gap.

Because of the greater importance of structures in the capital stock in Canada relative to the United States, the capital-labour ratio for this component of the capital stock (Appendix Tables 8 and 10) is actually greater in Canada than in the United States. Conversely, the capital-labour ratio for machinery and equipment (Appendix Tables 9 and 11) is much lower in Canada than in the United States. Indeed, Canada's capital-labour ratio for machinery and equipment in 2001 was only 52-57 per cent of the U.S. level depending on the measure. To the degree that machinery and equipment has a greater impact on productivity than structures, the use of the all components total capital-labour ratio in the calculation of this factor's contribution to the Canada-U.S. labour productivity gap may be understated.

### Technological innovation

In addition to the productivity gap between Canada and the United States, there is also an innovation gap,<sup>17</sup> the latter contributing to the former. The most widely recognized manifestation of the innovation gap is the large discrepancy between the two countries in terms of R&D expenditures.<sup>18</sup> In 2000 (the most recent year for which data are available for the United States), Canada devoted 1.67 per cent of GDP to R&D, a full percentage point below the U.S. effort of 2.69 per cent (Table 15 and Chart 11). This situation reflects both differences in industrial structure between the two countries, with Canada's relatively larger natural resource-related industries less R&D intensive, and the high level of foreign ownership in Canadian industry, with R&D concentrated in the home country.

Canada's low level of R&D spending has negative implications for Canada's patenting record, another key indicator of our ability to innovate.<sup>19</sup> According to Trajtenberg (2002:273-4), Canada stands mid-way vis-à-vis other G-7 countries in terms of patents per capita and patent/R&D ratios and has been overtaken in recent years by a group of countries geared toward the high-tech sector (Finland, Israel, Taiwan, with

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<sup>17</sup> One measure of the innovation gap is provided by the technology achievement index, a measure developed by the United Nations Development Program (2001: Table A2.1). This index is based on indicators of technology creation, diffusion of recent innovations, diffusion of old innovations, and human skills. The index for Canada is 24 per cent less than for the United States.

<sup>18</sup> See Rao et al. (2001) for a discussion of the innovation gap and the impact of the gap on productivity.

<sup>19</sup> The UNDP (2001: Table A2.1) reports that the patent rate in Canada in 1998 was 31 per million persons, compared to 289 in the United States.

South Korea closing in). Trajtenberg also finds that the “rate of success” of Canadian patent applications in the United States has been relatively low and the technological composition of Canadian patents is out of step with the rest of the world, with weaknesses in the crucial computer and electrical and electronic products areas.

Due to Canada’s small size, the country will always account for a very small proportion of the world supply of innovations. From this perspective, what matters for productivity growth is the importation of best-practice technologies from other countries and the wide diffusion and adoption of these technologies by Canadian business. Some argue (e.g Helliwell, 1998:104) that domestic R&D is a key measure (better, for example, than educational attainment) of a nation’s capacity to obtain and make use of foreign technologies. Thus Canada’s low level of R&D may have negative effects on the pace at which best-practice technologies are imported into Canada, diffused throughout the country and hence adopted by industry.

It is very difficult to estimate the contribution of the innovation gap, defined as both the production of new technologies through domestic R&D and the adoption of best-practice technologies from abroad, to the labour productivity gap, but it is likely the key factor.<sup>20</sup> Certainly the widening of the gap in the second half of the 1990s reflects the larger and more dynamic nature of the information technology (IT) industries in the United States. Indeed, Bernstein, Harris and Sharpe (2002) found that the much more rapid growth in high-tech industries in the second half of the 1990s in the United States largely accounted for the faster U.S. manufacturing productivity growth and hence the growing Canada-U.S. manufacturing, and total economy, productivity gap.

### Human capital

The average educational attainment of the population is very similar in Canada and the United States. According to OECD figures, the average Canadian aged 25 to 64 in 1999 had 99.4 per cent of the years of educational attainment of a worker in the United States, 13.21 years versus 13.29 years (Chart 12).

However, the profiles of educational attainment differ somewhat between the two countries. In 1998, 40 per cent of Canadian women and 36 per cent of men aged 25-64 had attained tertiary education (all forms of post-secondary education, including universities and community colleges), compared to 34 per cent and 35 per cent respectively in the United States (OECD, 2001a:55, Chart A10.3). Canada increased its lead over the United States in this crucial area in the 1990s. Between 1989 and 1996, the percentage point change in the proportion of the employed population aged 25 to 64 with tertiary qualifications increased 6.8 points in Canada, nearly double the 3.9 point rise in the United States (OECD, 2002: Table C4.2).

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<sup>20</sup> The federal government has identified the innovation gap as a key, if not the key, factor in Canada’s productivity gap with the United States. See Government of Canada (2002a) for a discussion of proposed government measures to reduce the innovation gap.

However, the proportion of the population that had attained at least upper secondary education was lower in Canada than in the United States, particularly for older Canadians: 67 per cent versus 80 per cent for persons aged 55-64, and 88 per cent versus 90 per cent for those 25-34 (OECD, 2001a:55, Chart A10.2).

The higher incidence of tertiary education in Canada is explained by the high level of development of the community college system (including CEGEPs in Quebec). The proportion of the adult population with a university degree is actually lower in Canada than in the United States.

In addition, the United States outperforms Canada in the graduation rate for advanced research programs. The proportion of the population at typical age of graduation who received a PhD in 1999 was 1.3 per cent in the United States and 0.8 per cent in Canada (OECD, 2002:169, Table C4.1). To the extent that a university education, particularly an advanced university education, is more important than a non-university post-secondary education for productivity, the relative weakness of the Canadian university system may contribute to the labour productivity gap.<sup>21</sup>

The average literacy and numeracy skills of the workforce appear somewhat higher in Canada than in the United States. According to the International Adult Literacy Survey, in 1998 25 per cent of adult Canadians scored in the high level in document literacy, compared to 20 per cent of Americans (Chart 13). At the other end of the literacy spectrum, 48 per cent of Americans scored in the low level, compared to 43 per cent of Canadians.

Canada also fares better than the United States in standardized test results for grade 8 students. The Program for International Student Assessment (PISA) results for science and mathematics show that Canadian students outperformed their U.S. counterparts in both 1995 and 1999 in both areas (OECD, 2002:312, Table F 1.1).

A major strength of the United States is the high quality of its research universities. The United States has proportionately more world-class university researchers than Canada, as evidenced by Nobel prizes and has 35 per cent proportionately more scientists and engineers in R&D.<sup>22</sup> This situation has undoubtedly contributed to the high level of productivity in the United States, as university research institutions create a very favourable environment for the development of applied, productivity-enhancing research outside the university, as seen for example in Silicon Valley. This strength in highly qualified labour, which is closely related to the innovation gap discussed earlier, undoubtedly contributes to the Canada-U.S. labour productivity gap, but its importance is extremely difficult to quantify.<sup>23</sup> One study attempt is by Hall and Jones (1996:Table 1), who estimated that in 1988 lower human capital per worker in

<sup>21</sup> For evidence of this in the context of the manufacturing sector, see Rao, Tang and Wang (2002).

<sup>22</sup> In 1987-97, Canada averaged 2,719 scientists and engineers in R&D per 100,000 persons, compared to 3,676 in the United States (UNDP, 2001:Table A2.2).

<sup>23</sup> The federal government has identified skills as a key determinant of Canada's productivity growth. See Government of Canada (2002b) for a discussion of proposed government measures to strengthen skills and learning in Canada.

Canada accounted for 5 percentage points of the Canada-U.S. aggregate labour productivity gap, that is virtually all of the gap.

## **Environment Influencing Productivity Drivers**

### Economies of scale and scope

Large establishments tend to have higher labour productivity levels than smaller establishments as they enjoy longer production runs and greater economies of scale and scope. Establishment size tends to be lower in Canada than in the United States. There is evidence that the combination of these two factors contributes to the Canada-U.S. labour productivity gap.

Baldwin, Jarmin, and Tang (2002) found that small and medium-sized plants accounted for 67.1 per cent of value added and 76.6 per cent of employment in Canadian manufacturing in 1994 compared to 54.2 per cent and 65.4 per cent respectively in the United States. They also found that relative value-added per employee in Canadian manufacturing for small plants (less than 100 employees) was 67 per cent of the overall average, 104 per cent for medium plants (100-500 employees) and 147 per cent for large plants (over 500 employees). If Canada had had the same employment size distribution as the United States, but the same relative productivity by plant size, the value added per employee in Canadian manufacturing would have been 8 per cent higher. It is likely that the same situation prevails in other sectors, although comparable data on plant size are more difficult to obtain outside manufacturing.

A key issue is why average establishment size continues to be smaller in Canada than in the United States when the Canada-U.S. Free Trade Agreement reduced trade barriers between the countries. In theory, Canadian firms have open access to the U.S. market, but in reality, because of past history or path dependency, there is still much more East-West trade within Canada relative to North-South trade than predicted by gravity models based on population. This inertia in the adjustment of trade flows to potential market opportunities has been labeled border effects (Helliwell, 1998). Anderson and Wincoop (2003) have recently shown that national borders reduce trade flows between industrialized countries by 20-50 per cent, much less than earlier estimates. Over time it is expected that these border effects will continue to fall, with positive implications for Canadian productivity growth and the reduction in the productivity gap. It is unlikely however that border effects will completely disappear.

### Taxes

The government plays a larger role in economic life in Canada than in the United States. In 2002, government revenues, which include both tax and non-tax receipts, represented 41.4 per cent of nominal GDP in Canada, compared to 30.5 per cent in the United States (Appendix Table 12). Tax revenues in Canada were 29.2 per cent of GDP compared to 18.6 per cent in the United States.



Canada's higher tax share has been advanced by some as an explanation of Canada's lower labour productivity level. However, the evidence of this negative impact is weak, if non-existent, for three reasons. First, the main potential linkage between taxes and productivity is largely through investment, with high corporate taxes potentially stifling business investment (Chen and Mintz, 2003). Yet the share of current dollar investment in non-residential fixed assets in GDP has actually been higher over the 1955-2002 period in Canada (16.2 per cent of GDP) than in the United States (14.6 per cent), and comparable in the 1980s and 1990s (Table 16).

Second, high personal taxes can have negative effects on labour supply, both in terms of the decision to participate in the labour force and the decision of how many hours of work to supply. Taxes do affect economic growth through their effects on labour supply, but reduced labour supply or input affects output proportionately and has no negative effect on productivity. It is unlikely that any negative supply effects on labour supply has had a significant effect on personal saving and national investment.

It can also be noted that the OECD reports that the total tax wedge, including employer's social security contributions, are very similar in Canada and the United States, and much lower than in most European countries. In 1999, the tax wedge for a single person was 31.8 per cent in Canada, almost identical to the 31.1 per cent in the United States (OECD, 2001a:61. Table A13.1). For married persons, the rates were 23.0 percent and 24.5 per cent respectively.

Equally Chen and Mintz (2003:8, Table 5) report that the differences between Canada and the United States in the combined effective corporate and personal tax rate on entrepreneurial capital are small. In manufacturing, the combined tax rate for large firms in Canada in 2001 was 72.4 per cent, compared to 69.7 per cent in the United States. The comparable tax rate for small firms was 72.5 per cent and 69.2 per cent respectively. In services, the combined tax rate for large firms in Canada in 2001 was 66.4, compared to 64.6 per cent in the United States. The comparable rate for small firms was 65.4 per cent and 63.5 per cent respectively.

Third, many European countries have much higher tax shares in GDP than experienced in the United States, yet have high labour productivity levels. Indeed, all of the four countries with higher levels of output per hour than the United States in 2001 (Belgium, Norway, France, and the Netherlands in Table 2) had much higher tax shares than the United States.

### Social policies

It has been suggested that social policies may account for the lower level of Canadian labour productivity as they may dampen the pace of reallocation of resources from declining to expanding regions and industries. But the evidence, as in the case of tax policy, is weak. Again social programs largely affect labour supply behaviour, not output per hour. The even more generous social programs in Europe have not prevented many

European countries from achieving high productivity levels, in certain cases even superior to U.S. levels.

Total public social spending is actually only slightly larger in Canada than in the United States (Chart 14). Public social spending (cash benefits and services) was 16.9 per cent of GDP in Canada in 1997 compared to 16.0 per cent in the United States (OECD, 2001a:73, Chart B6.2).<sup>24</sup> However, income support to the working age population was greater in Canada (5.2 per cent versus 2.2 per cent of GDP). For example, the average net replacement rate for four household types (single, married couple, couple with two children and lone parent with two children) in the first month of benefit receipt in Canada in 1999 was 66 per cent compared to 55 per cent for the United States (OECD, 2001a:59, Table A12.1). The difference between Canada and the United States for the average net replacement rate for long-term benefit recipients was even greater: 62 per cent versus 35 per cent.

### Unionization

The unionization rate is significantly higher in Canada than in the United States. Indeed, in 2002, 32.2 per cent of employees were unionized in Canada, compared to 14.6 per cent in the United States (Appendix Table 13). Unions can have negative effects on productivity through restrictive work practices, so the higher unionization rate in Canada has been advanced as an explanation of the labour productivity gap.

But unions can also have positive effects on productivity through their voice function which reduces costly labour turnover and through their wage effects, which spur employers to substitute capital for labour thereby increasing labour productivity. It is unclear which effect dominates. Consequently, it is likely that unions have little net effect on labour productivity levels and that the difference in unionization rates does not account for lower productivity levels in Canada.

### Regulation

It is often asserted that the degree of labour market and product market regulation is greater in Canada than the United States. Since regulations can have a negative effect on productivity, it is sometimes argued that this situation contributes to the Canada-U.S. labour productivity gap.

But it is very difficult to quantify the wide range of regulations that affect economic activity in the two countries and to conclude that Canada is more regulated than the United States. Indeed, environmental regulation is considered by many to be more stringent in the United States. In addition, certain regulations can have a positive effect on labour productivity (though possibly a negative effect on total factor

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<sup>24</sup> Private spending on social spending was larger in the United States than in Canada (8.6 per cent of GDP compared to 4.5 per cent) in 1995 because of much higher private spending on health in the United States (OECD, 2001a:75, Table B 7.1). This meant that total social spending was actually less in Canada than in the United States in 1997 (21.4 per cent versus 24.6 per cent).

productivity) by forcing firms to invest in capital-intensive machinery and equipment that is both pollution-reducing and labour-saving. Consequently, it is unlikely that differences in the regulatory environment can account for much of the gap between U.S. and Canadian aggregate labour productivity levels.

### Other factors

In addition to the factors discussed above, there are many other factors which influence productivity growth rates and levels, including capacity utilization, minimum wages and payroll taxes, and competition.

Capacity utilization tends to be positively correlated with productivity growth. Much weaker capacity utilization in Canada than in the United States could account for part of the labour productivity gap. But in 2002, the Bank of Canada estimated that the economy-wide output gap was higher in Canada than in the United States. This suggests that no part of the current Canada-U.S. labour productivity gap can be accounted for by cyclical factors. Indeed, the strong cyclical position of the Canadian economy may even be dampening the gap.

One explanation that has been advanced for relatively high output per hour productivity levels in Europe is that low wage jobs have largely been eliminated through high minimum wages and payroll taxes borne by employers. The lack of low productivity jobs increases average labour productivity through a composition effect. Canada's relative minimum wage is somewhat higher than that in the United States as is the incidence of low-wage employment, defined as the proportion of full-time workers earning less than two-thirds median earnings.

In mid-2000, the ratio of adult minimum wages to median full-time earnings was 0.42 in Canada (OECD, 2001a:71, Chart 5B5.1). This ratio was lower than in many European countries such as France (0.61), but higher than in the United States (0.37). In the mid to late 1990s, the incidence of low pay in Canada was 21 per cent, compared to less than 15 per cent in most European countries and 25 per cent in the United States (OECD, 2001a:67, Chart B3.1). In principle, this situation would not account for the labour productivity gap, but rather would tend to reduce the gap.

On the other hand, payroll taxes are actually lower in Canada than in the United States due to lower social security contribution rates, reducing labour costs. This gives less incentive for employers to increase labour productivity by substituting capital for labour. Given the offsetting influences of Canada's high relative minimum wage and low payroll costs, and the relatively small differences with the United States, it is unlikely that the net effect of these two factors on the Canada-U.S. labour productivity gap is significant.

Competition is the driving force behind productivity advance. A possible explanation for lower productivity levels in Canada than in United States may be that Canadian firms are under less intense competitive pressures than U.S. firms. Such a

situation could reflect either regulatory barriers in Canada (e.g. restrictions on foreign ownership in certain sectors such as banking, transportation, and cultural industries), the smaller size of the Canadian market, or behavioural differences between Canadian and U.S. entrepreneurs and managers. Unfortunately, little evidence is available on differences in competitive pressures between the two countries.

#### **IV Productivity Levels and Economic Well-being**

This paper has addressed in detail the important issue of why aggregate productivity levels are higher in the United States than in Canada. This section briefly addresses the much broader, and even more crucial question of how important Canada-U.S. productivity relatives are for the well-being of Canadians. One's definition of what constitutes economic well-being is key to answering this question. Productivity is the key determinant of living standards, defined as income per capita, and income is certainly an important component of any definition of economic well-being. But economic well-being also consists of equality and economic security. While higher productivity can indirectly provide the basis for improvements in these components of well-being, public policy plays a key role though policies and programs such as social assistance and Old Age Security which reduce income inequality, and policies and programs such as Employment Insurance and universal health coverage which provide economic security.

The Centre for the Study of Living Standards has developed an Index of Economic Well-being based on four components: consumption flows, stocks of wealth, income equality, and economic security and has produced estimates of the Index for Canada and the United States (Osberg and Sharpe (2002a) and OECD countries (Osberg and Sharpe, 2002b). The weighting scheme applied to these four components to calculate the overall index is crucial for the outcome.

In 1999, consumption flows per capita in Canada were 69.2 per cent of the U.S. level and per capita stocks of wealth were 92.1 per cent (Table 17 and Chart 15). But both equality and security were much higher in Canada than in the United States, 143.8 per cent and 150.2 per cent respectively of the U.S. level.

Consumption is the component of the Index most closely linked to productivity.<sup>25</sup> When a high weight is given to consumption, the United States emerges as having a higher level of economic well-being than Canada, as seen in the alternative weighting scheme (0.7 to consumption) in Chart 16. But when the four components of well-being are equally weighted, Canada obtains a higher level of economic well-being (113.8 per cent of the U.S. level) because of the greater income equality and economic security its citizens enjoy. While productivity can certainly have positive effects on equality and security, public policy can play an even greater role. For Canadians who give high

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<sup>25</sup> See Sharpe (2002a) for discussion of the relationship between productivity and the four components of the Index of Economic Well-being.

weights to equality and security in their definition of economic well-being, public policy may trump productivity as a potential means to increase well-being.

## V Conclusion

This paper has documented a labour productivity gap currently in the 10 to 20 per cent range in the total economy between Canada and the United States in 2002. Unfortunately, the uncertainty surrounding the reliability of the two estimates of average weekly hours produced by the U.S. Bureau of Labor Statistics does not allow one to narrow the range of the estimates of the gap.

The paper reviews possible explanations for this gap and concludes that it reflects four factors:

- The lower capital intensity of economic activity in Canada, estimated to account for around one fifth of the gap;
- Canada's innovation gap as manifested by lower R&D expenditures and patenting as well as lags in the diffusion of best practice techniques in Canada;
- Canada's relatively underdeveloped high-tech sector which has had much lower productivity growth rates than its U.S. counterpart;
- Canada's less developed human capital at the top end of the labour market, as manifested by proportionately fewer university graduates and scientists and engineers in R&D; and
- More limited economies of scale and scope in Canada reflecting smaller plant size due to the continuation of border effects.

The paper found no conclusive evidence that the other factors examined, including industry structure, human capital, taxes, social policies, unionization, and regulation accounted for a significant portion of the gap. However, further research is needed before a definitive conclusion can be drawn on the importance of these factors in explaining the productivity gap.

The future evolution of the Canada-U.S. productivity gap depends on the relative productivity growth rate in the two countries. To the degree that Canada can reduce its innovation gap, foster investment to increase capital intensity, develop the high-tech sector, and increase plant size, it can increase its productivity growth rate and reduce the productivity gap (assuming that the United States experiences a slower rate).

The key data recommendation of the paper is that further research be undertaken on the hours issues, in particular to ascertain the comparability of the household survey

hours estimates between the two countries in order to narrow the range of estimates of the size of the gap.

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# Why are Americans More Productive than Canadians?

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	GDP per Hour (1997 chained US	Average Weekly Hours	Average Annual Hours	Working Age Population to Total Population, %	Labour Force Partici- pation Rate, %	1-Unemp- loyment Rate, %	GDP per Capita (1997 chained US dollars)
	A	B	C=B*52	D	E	F	$G=A*C*(D/100)*$ $(E/100)*(F/100)$
1946	8.08	53.18	2,765	71.80	55.38	96.67	8,591
1947	8.24	52.39	2,724	72.14	55.24	97.80	8,753
1948	8.39	52.78	2,745	71.66	54.93	97.74	8,866
1949	8.69	52.71	2,741	69.29	54.91	97.25	8,815
1950	9.55	50.87	2,645	70.49	54.06	96.45	9,283
1951	9.84	50.56	2,629	69.84	54.03	97.62	9,535
1952	10.55	50.02	2,601	69.22	53.83	97.13	9,942
1953	10.98	49.55	2,576	68.83	53.46	97.04	10,109
1954	11.03	48.92	2,544	68.33	53.22	95.51	9,751
1955	12.02	48.05	2,498	67.86	53.30	95.69	10,396
1956	12.52	47.78	2,485	67.56	53.86	96.64	10,943
1957	12.81	46.79	2,433	67.32	54.38	95.43	10,893
1958	13.56	45.24	2,352	67.03	54.25	93.05	10,795
1959	13.83	44.61	2,320	66.73	54.15	94.12	10,915
1960	14.39	43.41	2,258	66.55	54.55	93.14	10,983
1961	14.95	42.43	2,206	66.44	54.47	92.95	11,092
1962	15.57	42.40	2,205	66.43	54.23	94.18	11,648
1963	16.16	41.99	2,184	66.57	54.19	94.53	12,040
1964	16.71	41.70	2,169	66.79	54.46	95.39	12,580
1965	17.23	41.44	2,155	67.18	54.76	96.13	13,141
1966	17.56	41.11	2,137	65.71	57.66	96.69	13,755
1967	17.84	40.46	2,104	66.32	58.01	96.23	13,903
1968	18.87	39.37	2,047	67.04	57.98	95.56	14,354
1969	19.52	38.75	2,015	67.79	58.25	95.64	14,861
1970	20.36	37.85	1,968	68.58	58.17	94.41	15,099
1971	20.94	37.45	1,948	69.32	58.48	93.89	15,523
1972	21.72	36.97	1,923	69.96	58.98	93.87	16,179
1973	22.19	36.88	1,918	70.65	60.15	94.52	17,095
1974	22.26	36.59	1,903	71.47	60.94	94.74	17,481
1975	22.75	35.83	1,863	72.20	61.51	93.17	17,543
1976	23.79	35.32	1,837	72.90	61.50	92.98	18,213
1977	24.27	35.31	1,836	73.49	61.80	92.02	18,623
1978	24.26	35.65	1,854	74.19	62.65	91.68	19,168
1979	24.12	35.67	1,855	74.87	63.58	92.51	19,701
1980	24.32	35.11	1,826	75.39	64.17	92.50	19,869

**Table 1: Real Per Capita GDP and its Determinants in Canada, 1946-2002 (cont.)**

	GDP per Hour (1997 chained US	Average Weekly Hours	Average Annual Hours	Working Age Population to Total Population, %	Labour Force Partici- pation Rate, %	1-Unemp- loyment Rate, %	GDP per Capita (1997 chained US dollars) $G=A*C*(D/100)*$ $(E/100)*(F/100)$
	A	B	C=B*52	D	E	F	
1981	24.82	34.58	1,798	75.80	64.96	92.43	20,314
1982	24.99	34.43	1,791	76.06	64.37	89.03	19,500
1983	25.45	34.48	1,793	76.30	64.70	88.06	19,833
1984	26.24	34.53	1,796	76.53	65.00	88.70	20,789
1985	26.57	34.75	1,807	76.78	65.53	89.35	21,585
1986	26.41	34.73	1,806	76.98	65.98	90.36	21,889
1987	26.86	34.62	1,800	76.93	66.40	91.19	22,518
1988	26.88	35.20	1,830	76.93	66.84	92.25	23,331
1989	26.64	35.66	1,855	76.60	67.20	92.45	23,515
1990	26.87	35.16	1,828	76.59	67.12	91.88	23,207
1991	27.32	34.47	1,793	76.85	66.53	89.68	22,454
1992	28.20	33.93	1,764	77.06	65.68	88.84	22,375
1993	28.26	34.39	1,789	77.27	65.40	88.64	22,637
1994	28.68	34.83	1,811	77.28	65.18	89.64	23,453
1995	29.15	34.58	1,798	77.42	64.90	90.56	23,850
1996	29.19	34.82	1,810	77.62	64.69	90.36	23,977
1997	29.70	34.85	1,812	77.90	64.87	90.90	24,727
1998	30.40	34.53	1,796	78.26	65.13	91.72	25,518
1999	30.92	34.82	1,811	78.56	65.59	92.43	26,664
2000	31.27	35.07	1,824	78.87	65.88	93.19	27,617
2001	32.02	34.39	1,788	79.13	65.99	92.80	27,744
2002	32.66	34.09	1,773	79.41	66.90	92.34	28,401
Average Annual Growth Rates							
1946-2002	2.53	-0.79	-0.79	0.18	0.34	-0.08	2.16
1946-1973	3.81	-1.35	-1.35	-0.06	0.31	-0.08	2.58
1973-2002	1.34	-0.27	-0.27	0.40	0.37	-0.08	1.77
1973-1981	1.41	-0.80	-0.80	0.88	0.97	-0.28	2.18
1981-1989	0.89	0.39	0.39	0.13	0.42	0.00	1.85
1989-2002	1.58	-0.35	-0.35	0.28	-0.03	-0.01	1.46
1989-1995	1.51	-0.51	-0.51	0.18	-0.58	-0.34	0.24
1995-2002	1.64	-0.20	-0.20	0.36	0.43	0.28	2.53

Sources:

Population: CANSIM II series v466668 as of April 6, 2003, linked to a series from the Historical Statistics of Canada in 1971.

Source: Nominal GDP: CANSIM II series v646937 for 1961-2002, April 10, 2003, linked to series F71 (Gross domestic product at factor cost) from Statistics Canada. Historical Statistics of Canada, Second Edition. Ottawa, 1983. Real GDP: CANSIM II series V3860085 for 1961-2002, April 10, 2003, Real GDP = Nominal GDP / Deflator, using series K172 (Gross national expenditure at market prices implicit price index) from Statistics Canada. Historical Statistics of Canada, Second Edition. Ottawa, 1983.

Hours: from the Labour Force Historical Review 2001(R) CD-ROM, linked to a series from Aggregate Productivity Measures in 1976.

Data for 2002: CANSIM II series v2634366

Employment, Labour Force, Working Age Population, Unemployment: Labour Force Historical Review 2001(R) linked to series from Historical Labour Force Statistics in 1976.

Working age is defined as 15+ from 1966 onwards and 14+ before 1966.

Data for 2002: CANSIM II series v2461119

**Table 2: Reconciliation of GDP per Capita and Labour Productivity, 2001 (preliminary estimates)**

	GDP per Hour Worked		Effect of Working Hours (a) in % points	Effect of Employment Share in Total Population (in % points)			Total (c)	GDP per Head of Population	
	(a)			Unemploy- ment (b)	Labour Force to Population (15-64 yrs)	Population to Total Population		in 1996	
	in 1996 US\$	as % of US						US\$	as % of US
United States	37.0	100.0	0.0	0.0	0.0	0.0	0.0	33,538	100.0
Norway	40.6	109.7	-28.9	1.0	3.1	-1.6	2.5	27,940	83.3
Ireland	36.4	98.4	-8.8	0.6	-9.7	1.0	-8.1	27,318	81.5
Switzerland	31.7	85.8	-12.8	2.1	5.5	0.6	8.2	27,236	81.2
Denmark	34.6	93.5	-16.4	0.1	2.4	0.4	2.9	26,857	80.1
<b>Canada</b>	<b>30.5</b>	<b>82.6</b>	<b>-3.5</b>	<b>-2.1</b>	<b>-1.2</b>	<b>1.5</b>	<b>-1.8</b>	<b>25,923</b>	<b>77.3</b>
Australia	30.3	82.0	-3.1	-1.7	-1.7	1.5	-1.9	25,818	77.0
Belgium	41.5	112.4	-18.9	-2.1	-15.4	-0.7	-18.2	25,252	75.3
Netherlands	37.3	100.9	-28.1	1.5	-1.1	1.3	1.7	24,989	74.5
Austria	35.5	95.9	-17.9	0.8	-6.3	1.5	-4.0	24,828	74.0
Japan	26.6	72.1	-2.7	-0.1	1.4	1.7	3.0	24,267	72.4
Finland	31.9	86.3	-10.7	-3.4	-2.2	0.9	-4.7	23,795	71.0
Sweden	30.2	81.7	-10.7	-0.3	1.7	-2.0	-0.5	23,636	70.5
Germany	34.2	92.5	-16.6	-2.5	-5.1	1.0	-6.6	23,247	69.3
France	37.6	101.8	-17.8	-3.6	-9.6	-1.6	-14.8	23,176	69.1
Italy	32.5	88.0	-11.0	-4.1	-5.2	0.9	-8.4	22,991	68.6
United Kingdom	29.4	79.5	-9.2	-0.2	-1.8	-0.6	-2.7	22,696	67.7
Spain	27.9	75.6	-1.8	-6.6	-12.2	0.9	-18.0	18,723	55.8
New Zealand	22.5	60.8	-3.6	-0.3	-0.7	-0.8	-1.9	18,560	55.3
Korea	15.2	41.1	13.6	0.4	-8.4	3.3	-4.7	16,747	49.9
Portugal	19.3	52.1	-3.1	0.3	-1.1	1.2	0.4	16,548	49.3
Greece	21.6	58.5	2.4	-3.9	-10.9	0.7	-14.1	15,696	46.8
Czech Rep.	14.4	39.0	3.2	-1.5	-3.0	2.0	-2.5	13,346	39.8
Hungary	17.4	47.2	-1.8	-0.5	-10.8	1.0	-10.4	11,730	35.0
Poland	11.9	32.2	2.7	-4.8	-4.2	1.1	-7.9	9,021	26.9
Mexico	12.1	32.8	3.0	0.9	-9.6	-2.7	-11.5	8,156	24.3
Turkey	10.2	27.5	1.1	-0.9	-10.2	0.2	-10.9	5,933	17.7
European Union	32.3	87.4	-12.1	-2.4	-6.0	0.2	-8.2	22,511	67.1
OECD excl. US	24.9	67.3	-2.8	-1.5	-7.0	0.1	-8.4	18,818	56.1

(a) Calculated on basis of actual hours worked per person per year; (b) calculated on basis of standardized unemployment rates from OECD; (c) sum of previous columns plus rounding differences; (d) European Union is weighted average for 14 EU member countries, excluding Luxembourg.

Source: Groningen Growth & Development Center & The Conference Board. See Van Ark (2002). Based on *OECD National Accounts, Economic Outlook, Employment Outlook* and *Labour Force Statistics*, with GDP converted to US\$ at 1996 EKS PPPs.

**Table 3: Aggregate Labour Productivity Levels and Growth Rates in Canada, 1946-2002**

	Canada					Canada in US Dollars						
	Real GDP	GDP	Employment	Average	Total Annual	Real GDP		Real GDP per Worker (in 1997 US dollars) I=G/C	GDP per Worker (in current US dollars) K=H/C	per Hour Worked (in 1997 US dollars) J=G/E	Hour Worked (in current US dollars) L=H/E	
	(millions of chained 1997 dollars)	(millions of current dollars)	(thousands )	Weekly	Hours	(in millions of 1997 dollars)	GDP					
	A	B	C	Jobs	Worked (in millions)	E=C*D*52	(millions of current US dollars)					F
			D	E	F	G=A*0.84	H=B*F					
1946	\$128,009	\$12,468	4,813	53.18	13,311	1.239	\$107,527	\$15,449	\$22,340	\$3,210	\$8.08	\$1.16
1947	133,179	14,114	4,985	52.39	13,579	1.261	111,871	17,793	22,443	3,570	8.24	1.31
1948	137,810	16,395	5,029	52.78	13,802	1.187	115,760	19,466	23,019	3,871	8.39	1.41
1949	143,687	17,827	5,068	52.71	13,891	1.137	120,697	20,271	23,815	4,000	8.69	1.46
1950	154,304	19,609	5,133	50.87	13,579	1.122	129,616	22,006	25,251	4,287	9.55	1.62
1951	161,930	22,906	5,258	50.56	13,824	1.081	136,021	24,755	25,870	4,708	9.84	1.79
1952	174,261	25,742	5,332	50.02	13,869	1.051	146,379	27,062	27,452	5,075	10.55	1.95
1953	181,911	26,830	5,400	49.55	13,914	1.067	152,805	28,615	28,296	5,299	10.98	2.06
1954	180,702	27,071	5,409	48.92	13,757	1.061	151,790	28,710	28,065	5,308	11.03	2.09
1955	197,830	29,820	5,533	48.05	13,824	1.072	166,177	31,976	30,032	5,779	12.02	2.31
1956	213,325	33,343	5,761	47.78	14,316	1.070	179,193	35,667	31,103	6,191	12.52	2.49
1957	219,339	34,995	5,912	46.79	14,383	1.083	184,245	37,883	31,165	6,408	12.81	2.63
1958	223,514	36,179	5,886	45.24	13,847	1.092	187,752	39,522	31,897	6,714	13.56	2.85
1959	231,317	38,193	6,055	44.61	14,048	1.083	194,306	41,367	32,088	6,831	13.83	2.94
1960	237,928	39,781	6,153	43.41	13,891	1.085	199,859	43,152	32,480	7,013	14.39	3.11
1961	245,230	41,173	6,246	42.43	13,780	1.092	205,993	44,974	32,979	7,200	14.95	3.26
1962	262,382	44,665	6,422	42.40	14,159	1.092	220,401	48,771	34,322	7,595	15.57	3.44
1963	276,306	47,961	6,576	41.99	14,360	1.083	232,097	51,933	35,293	7,897	16.16	3.62
1964	294,196	52,549	6,818	41.70	14,785	1.068	247,125	56,124	36,248	8,232	16.71	3.80
1965	312,930	57,930	7,079	41.44	15,254	1.050	262,861	60,814	37,134	8,591	17.23	3.99
1966	333,724	64,818	7,471	41.11	15,968	1.029	280,328	66,705	37,524	8,929	17.56	4.18
1967	343,454	69,698	7,686	40.46	16,169	1.015	288,501	70,774	37,535	9,208	17.84	4.38
1968	360,214	76,131	7,833	39.37	16,035	1.017	302,580	77,423	38,630	9,885	18.87	4.83
1969	378,344	83,825	8,079	38.75	16,281	1.018	317,809	85,312	39,336	10,559	19.52	5.24
1970	389,809	90,179	8,169	37.85	16,080	1.027	327,440	92,579	40,083	11,333	20.36	5.76
1971	405,860	98,429	8,360	37.45	16,281	1.029	340,922	101,246	40,781	12,111	20.94	6.22
1972	427,962	109,913	8,607	36.97	16,549	1.013	359,488	111,295	41,765	12,930	21.72	6.73
1973	457,766	128,956	9,038	36.88	17,331	0.975	384,523	125,715	42,547	13,910	22.19	7.25
1974	474,663	154,038	9,413	36.59	17,911	0.922	398,717	142,063	42,358	15,092	22.26	7.93
1975	483,316	173,621	9,577	35.83	17,844	0.911	405,985	158,149	42,391	16,513	22.75	8.86
1976	508,445	199,994	9,776	35.32	17,956	0.879	427,094	175,788	43,687	17,981	23.79	9.79
1977	526,028	220,973	9,915	35.31	18,204	0.876	441,864	193,574	44,567	19,524	24.27	10.63
1978	546,825	244,877	10,212	35.65	18,933	0.880	459,333	215,542	44,979	21,106	24.26	11.38
1979	567,631	279,577	10,658	35.67	19,766	0.867	476,810	242,391	44,739	22,743	24.12	12.26
1980	579,907	314,390	10,970	35.11	20,028	0.860	487,122	270,365	44,005	24,646	24.32	13.50
1981	600,253	360,471	11,297	34.58	20,312	0.849	504,213	305,958	44,633	27,084	24.82	15.06
1982	583,089	379,859	10,947	34.43	19,602	0.831	489,795	315,745	44,742	28,843	24.99	16.11
1983	598,941	411,386	11,027	34.48	19,769	0.820	503,110	337,165	45,625	30,576	25.45	17.06
1984	633,756	449,582	11,300	34.53	20,291	0.823	532,355	370,027	47,111	32,746	26.24	18.24
1985	664,059	485,714	11,617	34.75	20,992	0.823	557,810	399,959	48,015	34,428	26.57	19.05
1986	680,144	512,541	11,979	34.73	21,633	0.817	571,321	418,671	47,694	34,950	26.41	19.35
1987	709,058	558,949	12,321	34.62	22,178	0.804	595,609	449,580	48,342	36,490	26.86	20.27
1988	744,333	613,094	12,710	35.20	23,264	0.796	625,240	487,985	49,192	38,393	26.88	20.98
1989	763,837	657,728	12,986	35.66	24,084	0.790	641,623	519,866	49,407	40,032	26.64	21.59
1990	765,311	679,921	13,084	35.16	23,923	0.796	642,861	541,143	49,133	41,359	26.87	22.62
1991	749,294	685,367	12,851	34.47	23,037	0.801	629,407	549,104	48,978	42,729	27.32	23.84
1992	755,848	700,480	12,760	33.93	22,514	0.81	634,912	567,389	49,758	44,466	28.20	25.20
1993	773,528	727,184	12,858	34.39	22,996	0.82	649,764	596,291	50,536	46,377	28.26	25.93
1994	810,695	770,873	13,112	34.83	23,747	0.83	680,984	639,825	51,937	48,798	28.68	26.94
1995	833,456	810,426	13,357	34.58	24,020	0.83	700,103	672,654	52,415	50,360	29.15	28.00
1996	846,952	836,864	13,463	34.82	24,374	0.84	711,440	702,966	52,846	52,216	29.19	28.84
1997	882,733	882,733	13,774	34.85	24,964	0.84	741,496	741,496	53,831	53,831	29.70	29.70
1998	918,910	914,973	14,140	34.53	25,390	0.86	771,884	786,877	54,587	55,647	30.40	30.99
1999	968,451	980,524	14,531	34.82	26,312	0.85	813,499	833,445	55,983	57,356	30.92	31.68
2000	1,012,334	1,064,995	14,910	35.07	27,193	0.84	850,361	894,596	57,034	60,001	31.27	32.90
2001	1,027,522	1,092,246	15,077	34.39	26,958	0.85	863,118	928,409	57,248	61,579	32.02	34.44
2002	1,062,143	1,142,123	15,412	34.09	27,321	0.850	892,200	970,969	57,891	63,002	32.66	35.54
46-02	3.85	8.40	2.10	-0.79	1.29		3.85	7.67	1.71	5.46	2.53	6.30
46-73	4.83	9.04	2.36	-1.35	0.98		4.83	8.07	2.41	5.58	3.81	7.02
73-02	2.94	7.81	1.86	-0.27	1.58		2.94	7.30	1.07	5.35	1.34	5.63
73-81	3.45	13.71	2.83	-0.80	-2.00		3.45	11.76	0.60	8.69	1.41	9.56
81-89	3.06	7.81	1.76	0.39	2.15		3.06	6.85	1.28	5.01	0.89	4.60
89-02	2.57	4.34	1.33	-0.35	0.97		2.57	4.92	1.23	3.55	1.58	3.91
89-95	1.46	3.54	0.47	-0.51	-0.04		1.46	4.39	0.99	3.90	1.51	4.43
95-02	3.52	5.02	2.07	-0.20	1.86		3.52	5.38	1.43	3.25	1.64	3.46

Sources: Population: CANSIM II series v466668 as of April 6 2003, linked to a series from the Historical Statistics of Canada in 1971

Source: Nominal GDP: CANSIM II series v646937 for 1961-2002, April 10, 2003, linked to series F71 (Gross domestic product at factor cost) from Statistics Canada.

Historical Statistics of Canada, Second Edition, Ottawa, 1983. Real GDP: CANSIM II series V3860085 for 1961-2002, April 10, 2003, Real GDP = Nominal GDP / Deflator, using series expenditure at market prices implicit price index) from Statistics Canada. Historical Statistics of Canada, Second Edition, Ottawa, 1983. Hours: from the Labour Force Historical Review linked to a series from Aggregate Productivity Measures in 1976. Employment, Labour Force, Working Age Population, Unemployment: Labour Force Historical Review 2001(R) linked Labour Force Statistics in 1976. Employment and Hours data for 2002: CANSIM II series v2461119 and v2634366, April 6, 2003. Working age is defined as 15+ from 1966 onwards and The GDP PPPs for 1946-1991 were calculated by multiplying the 1992 PPP estimate by the index value (1992=1.00) of the US GDP deflator as a percentage of the Canadian GDP deflator The GDP PPP for 2002 was calculated by multiplying the 2001 PPP estimate by the index value (2001=1.00) of the US GDP deflator as a percentage of the Canadian GDP deflator PPPs for 1992-2001 are from Purchasing Power Parities and Real Expenditures, United States and Canada, 1992-2001, Statistics Canada publication 13-604-MIB no. 39, June 2002



**Table 5: Average weekly Hours per Worker in Canada and the United States**

	Establishment Surveys			United States (Current Employment Survey)	Household Surveys			
	Canada (Survey of Employment, Payrolls and Hours) Average Weekly Hours Worked by Salaried Workers	Weekly Hours Worked by Hourly Paid Employees, Including Overtime	Average Weekly Hours per Employee	Average Weekly Hours per Production Worker	Canada (Labour Force Survey) Average Actual Hours (all jobs)	Average Actual Hours (worked in reference week)	United States (Current Population Survey) Average Hours for All Workers	Average Hours at Work During Reference Week*
1976	n/a	n/a	n/a	36.1	35.3	38.0	36.4	38.7
1977	n/a	n/a	n/a	36.0	35.3	37.9	36.5	38.8
1978	n/a	n/a	n/a	35.8	35.7	38.3	36.7	39.0
1979	n/a	n/a	n/a	35.7	35.7	38.5	36.6	38.9
1980	n/a	n/a	n/a	35.3	35.1	37.9	36.2	38.5
1981	n/a	n/a	n/a	35.2	34.6	37.4	35.9	38.1
1982	n/a	n/a	n/a	34.8	34.4	37.1	35.8	38.0
1983	n/a	n/a	n/a	35.0	34.5	37.2	36.2	38.3
1984	n/a	n/a	n/a	35.2	34.5	37.4	36.7	38.8
1985	n/a	n/a	n/a	34.9	34.7	37.5	36.9	39.0
1986	n/a	n/a	n/a	34.8	34.7	37.5	37.1	39.1
1987	n/a	n/a	n/a	34.8	34.6	37.4	37.0	39.0
1988	n/a	n/a	n/a	34.7	35.2	38.0	37.4	39.4
1989	n/a	n/a	n/a	34.6	35.7	38.4	37.5	39.6
1990	n/a	n/a	n/a	34.5	35.2	38.2	37.4	39.4
1991	36.8	31.0	33.8	34.3	34.5	37.4	37.2	39.2
1992	36.7	30.8	33.7	34.4	33.9	36.9	36.9	38.9
1993	36.7	30.9	33.7	34.5	34.4	37.2	37.4	39.4
1994	36.7	31.2	33.8	34.7	34.8	37.6	37.4	39.2
1995	36.5	30.9	33.4	34.5	34.6	37.3	37.5	39.3
1996	36.7	30.9	33.5	34.4	34.8	37.6	37.5	39.3
1997	36.8	31.5	33.8	34.6	34.9	37.8	37.8	39.5
1998	36.8	31.4	33.7	34.6	34.5	37.5	37.6	39.3
1999	36.7	31.6	33.7	34.5	34.8	37.7	38.0	39.6
2000	37.3	31.6	33.9	34.5	35.1	37.9	38.1	39.7
2001	37.8	31.6	34.1	34.2	34.4	37.3	37.6	39.2
2002	37.9	31.9	34.3	34.2	34.1	37.1	37.6	39.1

Source: Canada: SEPH estimates: CANSIM II Tables 281-0024, 281-0033 and 281-0038, on January 14, 2003.

LFS estimates: Statistics Canada, CANSIM II series v2634367 and v2634368

United States: CES estimates: series EEU00500005(n) from Bureau of Labour Statistics website: www.bls.gov, on January 14, 2003.

CPS estimates: series LFU123000000 from Bureau of Labour Statistics website: www.bls.gov, on January 14, 2003.

Note: The SEPH series for total employees is an average of average weekly hours for salaried employees and employees paid by the hour, weighted according to the respective employment shares.

The SEPH series are for an Industrial aggregate excluding unclassified.

\*Data on persons 'at work' exclude employed persons who were absent from their jobs during the entire reference week for reasons such as vacation, illness, or industrial dispute.

Average Hours for all workers in the United States is equal to total hours, which is the product of average hours for persons at work times number of persons at work, divided by total employment.



**Table 6: End-Year Net Stocks of Non-Residential Fixed Assets for Total Economy, in millions of 1997 \$US, Canada and the United States, 1955-2002**

	All Components		Machinery and Equipment		Structures	
	Canada, \$US 1997	United States, 1997 \$	Canada, \$US 1997	United States, 1997 \$	Canada, \$US 1997	United States, 1997 \$
1955	263,423	4,062,976	38,571	853,448	238,769	3,299,670
1956	281,204	4,201,836	41,326	883,943	254,680	3,409,939
1957	301,459	4,338,025	43,757	912,832	273,768	3,520,209
1958	317,809	4,447,510	44,633	925,271	290,655	3,625,805
1959	333,060	4,582,364	45,632	954,161	306,160	3,735,140
1960	348,045	4,719,889	46,635	980,643	321,365	3,850,082
1961	362,511	4,861,418	46,803	1,007,526	337,134	3,970,631
1962	377,479	5,022,976	47,452	1,045,645	352,802	4,094,917
1963	393,196	5,188,539	48,604	1,083,362	368,614	4,224,811
1964	412,300	5,379,471	50,983	1,129,104	386,501	4,370,591
1965	434,935	5,611,794	54,533	1,189,692	406,697	4,539,733
1966	461,872	5,878,831	59,343	1,269,941	429,932	4,719,154
1967	486,571	6,131,182	63,261	1,342,967	451,908	4,894,837
1968	508,691	6,379,527	65,545	1,411,179	473,259	5,071,455
1969	530,374	6,627,872	67,913	1,482,199	494,012	5,244,335
1970	552,920	6,842,837	70,247	1,537,972	515,766	5,403,198
1971	575,975	7,028,428	72,609	1,576,893	538,044	5,553,650
1972	598,415	7,243,393	75,332	1,642,697	559,151	5,699,430
1973	623,427	7,490,403	79,973	1,729,366	580,488	5,855,489
1974	650,191	7,725,396	85,705	1,815,634	602,277	6,000,334
1975	678,925	7,902,976	91,311	1,869,802	626,416	6,122,752
1976	705,263	8,083,226	96,403	1,928,384	648,607	6,242,366
1977	731,252	8,292,851	100,433	2,013,448	671,856	6,359,177
1978	756,781	8,559,888	104,245	2,126,599	694,895	6,503,088
1979	787,042	8,860,306	109,876	2,253,793	720,690	6,667,557
1980	822,758	9,135,354	117,165	2,351,296	750,258	6,841,372
1981	866,009	9,411,738	129,052	2,443,582	781,893	7,021,727
1982	897,928	9,629,374	135,011	2,500,960	809,074	7,184,328
1983	921,793	9,829,652	138,143	2,569,975	831,201	7,312,352
1984	945,063	10,124,728	141,131	2,689,546	852,863	7,482,429
1985	971,105	10,454,520	144,484	2,815,135	877,094	7,680,540
1986	994,804	10,742,920	149,237	2,929,089	896,828	7,851,551
1987	1,021,087	11,008,623	155,247	3,022,579	917,706	8,020,693
1988	1,054,685	11,273,137	165,081	3,121,051	941,465	8,183,946
1989	1,089,904	11,544,727	175,336	3,228,151	966,442	8,344,862
1990	1,121,428	11,817,385	182,405	3,321,607	991,674	8,522,319
1991	1,147,859	12,031,026	186,603	3,389,782	1,015,184	8,667,164
1992	1,168,176	12,230,913	190,731	3,463,537	1,032,029	8,791,168
1993	1,186,050	12,458,841	193,492	3,560,965	1,048,034	8,917,695
1994	1,209,845	12,706,663	198,346	3,686,082	1,067,735	9,034,972
1995	1,234,225	13,003,890	204,503	3,836,117	1,086,309	9,177,013
1996	1,259,414	13,352,525	212,235	4,012,717	1,103,632	9,344,751
1997	1,296,959	13,745,890	226,709	4,216,281	1,125,433	9,532,581
1998	1,334,730	14,192,933	242,232	4,465,512	1,146,056	9,732,558
1999	1,377,144	14,660,194	260,943	4,725,380	1,167,472	9,946,048
2000	1,425,418	15,160,673	283,061	5,012,132	1,190,726	10,171,373
2001	1,469,135	15,533,103	300,573	5,184,036	1,215,214	10,378,381
2002	1,506,285	n/a	316,472	n/a	1,234,639	n/a

Sources: Canada: Stocks of Fixed assets, total economy: CANSIM II series v1078498, v1078499, v1078500, v1078501.

PPPs for gross fixed capital formation: CANSIM II series v13930594, v13930595, v13930596. United States: BEA FAT Tables 1.2 and 9.1. All on April 08, 2003.

Notes: All Components fixed assets for Canada have been converted to 1997 \$US by multiplying them by 0.85, the 1997 PPP exchange rate.

Machinery and Equipment fixed assets for Canada have been converted to 1997 \$US by multiplying them by 0.69, the 1997 PPP exchange rate.

Structures fixed assets for Canada have been converted to 1997 \$US by multiplying them by 0.94, the 1997 PPP exchange rate.

Data for the United States prior to 1987 were derived using chained type quantity indexes of end-year net stock in constant prices.

**Table 7: Relative Labour Productivity Levels Using Different Average Hours Sources, Canada-United States, 194**

	Canada/United States, % (Hours based on CES)				Canada/United States, % (Hours based on CPS)	
	GDP per Worker (in thousands of 1997 dollars)	GDP per Worker (in current dollars)	GDP per Hour Worked (in 1997 dollars)	GDP per Hour Worked (in current)	GDP per Hour Worked (in 1997 dollars)	GDP per Hour Worked (in current)
1946	80.42	79.77	60.94	60.45	n/a	n/a
1947	83.98	83.31	64.61	64.09	n/a	n/a
1948	84.44	83.77	64.00	63.48	n/a	n/a
1949	86.83	86.14	64.91	64.39	n/a	n/a
1950	86.52	85.83	67.69	67.15	n/a	n/a
1951	83.83	83.15	66.15	65.62	n/a	n/a
1952	85.96	85.27	68.57	68.02	n/a	n/a
1953	86.02	85.33	68.75	68.20	n/a	n/a
1954	84.40	83.72	67.46	66.92	n/a	n/a
1955	87.23	86.53	71.90	71.32	n/a	n/a
1956	90.91	90.18	74.76	74.16	n/a	n/a
1957	89.68	88.96	74.38	73.78	n/a	n/a
1958	91.19	90.46	77.60	76.98	n/a	n/a
1959	87.72	87.02	76.68	76.07	n/a	n/a
1960	88.17	87.47	78.40	77.77	n/a	n/a
1961	87.45	86.75	79.56	78.93	n/a	n/a
1962	87.07	86.38	79.47	78.83	n/a	n/a
1963	87.19	86.49	80.56	79.91	n/a	n/a
1964	86.57	85.87	80.33	79.69	n/a	n/a
1965	85.50	84.81	80.05	79.41	n/a	n/a
1966	83.13	82.46	78.06	77.44	n/a	n/a
1967	82.77	82.10	77.74	77.12	n/a	n/a
1968	83.00	82.33	79.69	79.05	n/a	n/a
1969	84.16	83.49	81.87	81.22	n/a	n/a
1970	86.45	85.76	84.73	84.05	n/a	n/a
1971	85.86	85.17	84.59	83.91	n/a	n/a
1972	86.33	85.64	86.39	85.70	n/a	n/a
1973	86.09	85.40	86.15	85.46	n/a	n/a
1974	87.97	87.27	87.75	87.05	n/a	n/a
1975	87.39	86.69	88.05	87.34	n/a	n/a
1976	88.21	87.50	90.15	89.43	90.80	90.07
1977	89.15	88.44	90.90	90.17	92.09	91.35
1978	89.01	88.30	89.38	88.66	91.72	90.98
1979	88.29	87.58	88.37	87.66	90.69	89.96
1980	88.25	87.54	88.73	88.02	91.04	90.31
1981	87.54	86.84	89.11	88.40	90.89	90.16
1982	88.79	88.08	89.73	89.01	92.36	91.62
1983	87.93	87.22	89.26	88.55	92.29	91.55
1984	88.14	87.43	89.84	89.12	93.78	93.02
1985	88.27	87.56	88.65	87.94	93.71	92.96
1986	86.72	86.02	86.89	86.20	92.52	91.78
1987	87.21	86.51	87.67	86.97	93.09	92.34
1988	87.11	86.41	85.87	85.18	92.56	91.81
1989	86.27	85.58	83.70	83.02	90.75	90.02
1990	85.35	84.66	83.74	83.07	90.68	89.95
1991	84.71	84.03	84.28	83.60	91.48	90.75
1992	84.06	83.38	85.22	84.54	91.42	90.68
1993	84.40	83.97	84.66	84.22	91.83	91.35
1994	85.32	85.13	85.01	84.81	91.64	91.44
1995	85.12	84.99	84.92	84.79	92.41	92.27
1996	84.06	84.68	83.05	83.67	90.57	91.23
1997	83.84	83.84	83.23	83.23	90.95	90.95
1998	82.72	83.31	82.89	83.48	90.15	90.79
1999	82.74	82.55	81.98	81.79	90.29	90.08
2000	82.29	82.57	80.95	81.22	89.28	89.58
2001	82.31	82.50	81.87	82.05	89.98	90.18
2002	80.80	80.98	80.82	81.00	89.00	89.20
46-02	0.01	0.03	0.51	0.52	n/a	n/a
46-73	0.25	0.25	1.29	1.29	n/a	n/a
73-02	-0.22	-0.18	-0.22	-0.18	n/a	n/a
73-81	0.21	0.21	0.42	0.42	n/a	n/a
81-89	-0.18	-0.18	-0.78	-0.78	-0.02	-0.02
89-02	-0.50	-0.42	-0.27	-0.19	-0.15	-0.07
89-95	-0.22	-0.11	0.24	0.35	0.30	0.41
95-02	-0.74	-0.69	-0.70	-0.65	-0.54	-0.48

**Table 8: Relative Capital Productivity for All Components in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), All Components		Real GDP, billions of 1997 \$US		Real GDP per 1,000\$ of Capital Stock Canada/ US,		
	Canada	United States	Canada	United States	Canada	United States	%
	1955	263,423	4,062,976	166	2,140	630.8	526.8
1956	281,204	4,201,836	179	2,183	637.2	519.5	122.66
1957	301,459	4,338,025	184	2,226	611.2	513.2	119.08
1958	317,809	4,447,510	188	2,205	590.8	495.8	119.16
1959	333,060	4,582,364	194	2,364	583.4	515.9	113.07
1960	348,045	4,719,889	200	2,423	574.2	513.4	111.86
1961	362,511	4,861,418	206	2,479	568.2	510.0	111.42
1962	377,479	5,022,976	220	2,629	583.9	523.4	111.55
1963	393,196	5,188,539	232	2,743	590.3	528.6	111.66
1964	412,300	5,379,471	247	2,902	599.4	539.5	111.11
1965	434,935	5,611,794	263	3,088	604.4	550.2	109.85
1966	461,872	5,878,831	280	3,290	606.9	559.7	108.44
1967	486,571	6,131,182	289	3,373	592.9	550.1	107.78
1968	508,691	6,379,527	303	3,534	594.8	553.9	107.39
1969	530,374	6,627,872	318	3,641	599.2	549.4	109.08
1970	552,920	6,842,837	327	3,648	592.2	533.1	111.09
1971	575,975	7,028,428	341	3,770	591.9	536.4	110.35
1972	598,415	7,243,393	359	3,974	600.7	548.7	109.48
1973	623,427	7,490,403	385	4,204	616.8	561.2	109.90
1974	650,191	7,725,396	399	4,179	613.2	540.9	113.37
1975	678,925	7,902,976	406	4,164	598.0	526.9	113.49
1976	705,263	8,083,226	427	4,396	605.6	543.8	111.36
1977	731,252	8,292,851	442	4,600	604.3	554.7	108.94
1978	756,781	8,559,888	459	4,853	607.0	567.0	107.05
1979	787,042	8,860,306	477	5,008	605.8	565.2	107.19
1980	822,758	9,135,354	487	4,996	592.1	546.9	108.25
1981	866,009	9,411,738	504	5,119	582.2	543.9	107.05
1982	897,928	9,629,374	490	5,015	545.5	520.8	104.73
1983	921,793	9,829,652	503	5,232	545.8	532.3	102.53
1984	945,063	10,124,728	532	5,613	563.3	554.3	101.62
1985	971,105	10,454,520	558	5,829	574.4	557.5	103.03
1986	994,804	10,742,920	571	6,028	574.3	561.1	102.36
1987	1,021,087	11,008,623	596	6,233	583.3	566.1	103.03
1988	1,054,685	11,273,137	625	6,493	592.8	575.9	102.93
1989	1,089,904	11,544,727	642	6,720	588.7	582.1	101.13
1990	1,121,428	11,817,385	643	6,839	573.3	578.7	99.06
1991	1,147,859	12,031,026	629	6,807	548.3	565.8	96.92
1992	1,168,176	12,230,913	635	7,014	543.5	573.5	94.77
1993	1,186,050	12,458,841	650	7,200	547.8	577.9	94.79
1994	1,209,845	12,706,663	681	7,491	562.9	589.5	95.48
1995	1,234,225	13,003,890	700	7,691	567.2	591.4	95.91
1996	1,259,414	13,352,525	711	7,966	564.9	596.6	94.69
1997	1,296,959	13,745,890	741	8,319	571.7	605.2	94.47
1998	1,334,730	14,192,933	772	8,675	578.3	611.2	94.62
1999	1,377,144	14,660,194	813	9,032	590.7	616.1	95.88
2000	1,425,418	15,160,673	850	9,371	596.6	618.1	96.52
2001	1,469,135	15,533,103	863	9,394	587.5	604.8	97.14
Average annual growth rates							
55-01	3.81	2.96	3.65	3.27	-0.15	0.30	-0.45
55-73	4.90	3.46	4.77	3.82	-0.13	0.35	-0.48
73-81	4.19	2.90	3.45	2.49	-0.72	-0.39	-0.33
81-89	2.92	2.59	3.06	3.46	0.14	0.85	-0.71
89-01	2.52	2.50	2.50	2.83	-0.02	0.32	-0.33
89-95	2.09	2.00	1.46	2.27	-0.62	0.27	-0.88
95-01	2.95	3.01	3.55	3.39	0.59	0.37	0.21

**Table 9: Canada TFP Level Relative to the United States  
(using CES hours)**

Canada as % of the United States (US=100)

	Relative Value Added per		Relative Value Added per		TFP AB+CD
	Hour A	Labour Share B	Capital Stock C	Capital Share D	
1955	71.9	0.652	119.7	0.348	88.5
1956	74.8	0.652	122.7	0.348	91.4
1957	74.4	0.652	119.1	0.348	89.9
1958	77.6	0.652	119.2	0.348	92.1
1959	76.7	0.652	113.1	0.348	89.3
1960	78.4	0.652	111.9	0.348	90.0
1961	79.6	0.652	111.4	0.348	90.6
1962	79.5	0.652	111.5	0.348	90.6
1963	80.6	0.652	111.7	0.348	91.4
1964	80.3	0.652	111.1	0.348	91.0
1965	80.1	0.652	109.8	0.348	90.4
1966	78.1	0.652	108.4	0.348	88.6
1967	77.7	0.652	107.8	0.348	88.2
1968	79.7	0.652	107.4	0.348	89.3
1969	81.9	0.652	109.1	0.348	91.3
1970	84.7	0.652	111.1	0.348	93.9
1971	84.6	0.652	110.4	0.348	93.6
1972	86.4	0.652	109.5	0.348	94.4
1973	86.1	0.652	109.9	0.348	94.4
1974	87.8	0.652	113.4	0.348	96.7
1975	88.0	0.652	113.5	0.348	96.9
1976	90.1	0.652	111.4	0.348	97.5
1977	90.9	0.652	108.9	0.348	97.2
1978	89.4	0.652	107.0	0.348	95.5
1979	88.4	0.652	107.2	0.348	94.9
1980	88.7	0.652	108.2	0.348	95.5
1981	89.1	0.652	107.0	0.348	95.4
1982	89.7	0.652	104.7	0.348	95.0
1983	89.3	0.652	102.5	0.348	93.9
1984	89.8	0.652	101.6	0.348	93.9
1985	88.7	0.652	103.0	0.348	93.7
1986	86.9	0.652	102.4	0.348	92.3
1987	87.7	0.652	103.0	0.348	93.0
1988	85.9	0.652	102.9	0.348	91.8
1989	83.7	0.652	101.1	0.348	89.8
1990	83.7	0.652	99.1	0.348	89.1
1991	84.3	0.652	96.9	0.348	88.7
1992	85.2	0.652	94.8	0.348	88.5
1993	84.7	0.652	94.8	0.348	88.2
1994	85.0	0.652	95.5	0.348	88.6
1995	84.9	0.652	95.9	0.348	88.7
1996	83.1	0.652	94.7	0.348	87.1
1997	83.2	0.652	94.5	0.348	87.1
1998	82.9	0.652	94.6	0.348	87.0
1999	82.0	0.652	95.9	0.348	86.8
2000	80.9	0.652	96.5	0.348	86.4
2001	81.9	0.652	97.1	0.348	87.2

Average annual growth rates

55-01	0.28	-0.45	-0.03
55-73	1.01	-0.48	0.36
73-81	0.42	-0.33	0.12
81-89	-0.78	-0.71	-0.75
89-01	-0.18	-0.33	-0.24
89-95	0.24	-0.88	-0.19
95-01	-0.61	0.21	-0.29

Source: Tables 3, 4, 6. The labour share is an average of total compensation divided by nominal GDP over the 1976-1997 period, both series taken from CANSIM II Table 383-0003, August 22, 2002.

The capital share is 1-labour share.

**Table 10: Canada TFP Level Relative to the United States  
(using CPS hours)**

Canada as % of the United States (US=100)

	Relative	Labour	Relative		TFP
	Value		Value		
	Added per	Share	Added per	Capital	
	Hour		Capital	Share	
	A	B	Stock	D	AB+CD
1976	90.8	0.652	111.4	0.348	98.0
1977	92.1	0.652	108.9	0.348	98.0
1978	91.7	0.652	107.0	0.348	97.1
1979	90.7	0.652	107.2	0.348	96.4
1980	91.0	0.652	108.2	0.348	97.0
1981	90.9	0.652	107.0	0.348	96.5
1982	92.4	0.652	104.7	0.348	96.7
1983	92.3	0.652	102.5	0.348	95.9
1984	93.8	0.652	101.6	0.348	96.5
1985	93.7	0.652	103.0	0.348	97.0
1986	92.5	0.652	102.4	0.348	95.9
1987	93.1	0.652	103.0	0.348	96.5
1988	92.6	0.652	102.9	0.348	96.2
1989	90.8	0.652	101.1	0.348	94.4
1990	90.7	0.652	99.1	0.348	93.6
1991	91.5	0.652	96.9	0.348	93.4
1992	91.4	0.652	94.8	0.348	92.6
1993	91.8	0.652	94.8	0.348	92.9
1994	91.6	0.652	95.5	0.348	93.0
1995	92.4	0.652	95.9	0.348	93.6
1996	90.6	0.652	94.7	0.348	92.0
1997	90.9	0.652	94.5	0.348	92.2
1998	90.2	0.652	94.6	0.348	91.7
1999	90.3	0.652	95.9	0.348	92.2
2000	89.3	0.652	96.5	0.348	91.8
2001	90.0	0.652	97.1	0.348	92.5
Average annual growth rates					
76-01	-0.04		-0.54		-0.23
76-81	0.02		-0.79		-0.30
81-89	-0.02		-0.71		-0.28
89-01	-0.07		-0.33		-0.17
89-95	0.30		-0.88		-0.13
95-01	-0.44		0.21		-0.21

Source: Tables 3, 4, 6. The labour share is an average of total compensation divided by nominal GDP over the 1976-1997 period, both series taken from CANSIM II Table 383-0003, August 22, 2002.

The capital share is 1-labour share.

**Table 11: Contribution by Industry to the Canada-United States Labour Productivity Gap (GDP per Worker), 1999**

**Current Dollar Estimates**

	Canada					United States				Canada/United States, %				
	GDP (millions of dollars)	1999 PPP	GDP \$US (millions of dollars)	Employment (thousands of workers)	GDP per Worker	GDP (millions of US dollars)	Employment (thousands of workers)	Industry Employment Shares	GDP per Worker	Relative Labour Productivity	GDP per Worker Gap	Industry Employment Shares	Absolute Contribution to the Gap	Relative Contribution to the Gap
Agriculture, Forestry and Fisheries	22,473	0.85	19,102	522	36,621	127,719	3,457	0.026	36,945	99.1	0.9	0.036	0.03	0.1
Mining	34,181	0.85	29,054	156	185,883	104,147	1,263	0.009	82,460	225.4	-125.4	0.011	-1.35	-5.9
Construction	47,084	0.85	40,021	775	51,654	425,414	9,433	0.070	45,098	114.5	-14.5	0.053	-0.78	-3.4
Manufacturing	169,313	0.85	143,916	2,217	64,903	1,481,341	19,940	0.147	74,290	87.4	12.6	0.153	1.93	8.4
Transportation & Public Utilities	70,217	0.85	59,685	860	69,377	770,124	9,740	0.072	79,068	87.7	12.3	0.059	0.73	3.2
Wholesale Trade	48,547	0.85	41,265	536	76,973	645,341	5,421	0.040	119,045	64.7	35.3	0.037	1.30	5.7
Retail Trade	48,117	0.85	40,900	1,712	23,889	831,674	22,411	0.166	37,110	64.4	35.6	0.118	4.20	18.3
FIRE*	174,043	0.85	147,937	863	171,441	1,798,768	8,727	0.065	206,115	83.2	16.8	0.059	1.00	4.4
Services	242,069	0.85	205,759	6,111	33,669	1,977,224	48,801	0.361	40,516	83.1	16.9	0.421	7.11	31.0
Public Administration	51,536	0.85	43,805	774	56,581	1,151,330	6,015	0.044	191,410	29.6	70.4	0.053	3.75	16.4
All Industries	907,580	0.85	771,443	14,527	53,104	9,313,082	135,208	1.000	68,880	77.1	22.9	1.000	22.90	100

**Constant Dollar Estimates (1997 dollars)**

	Canada					United States				Canada/United States, %				
	Real GDP (millions of 1997 dollars)	1997 PPP	Real GDP \$US (millions of 1997 dollars)	Employment (thousands of workers)	Real GDP per Worker (1997 dollars)	Real GDP (millions of 1997 dollars)	Employment (thousands of workers)	Industry Employment Shares	Real GDP per Worker (1997 dollars)	Relative Labour Productivity	Real GDP per Worker Gap	Industry Employment Shares	Absolute Contribution to the Gap	Relative Contribution to the Gap
Agriculture, Forestry and Fisheries	23,112	0.84	19,414	522	37,221	139,893	3,457	0.026	40,467	92.0	8.0	0.036	0.29	1.2
Mining	34,316	0.84	28,826	156	184,424	116,593	1,263	0.009	92,314	199.8	-99.8	0.011	-1.07	-4.6
Construction	46,527	0.84	39,083	775	50,443	383,150	9,433	0.070	40,618	124.2	-24.2	0.053	-1.29	-5.6
Manufacturing	160,158	0.84	134,533	2,217	60,671	1,505,534	19,940	0.147	75,503	80.4	19.6	0.153	3.00	13.0
Transportation & Public Utilities	70,012	0.84	58,810	860	68,360	753,737	9,740	0.072	77,386	88.3	11.7	0.059	0.69	3.0
Wholesale Trade	50,696	0.84	42,584	536	79,434	687,598	5,421	0.040	126,840	62.6	37.4	0.037	1.38	6.0
Retail Trade	47,813	0.84	40,163	1,712	23,458	840,705	22,411	0.166	37,513	62.5	37.5	0.118	4.42	19.1
FIRE*	174,225	0.84	146,349	863	169,602	1,742,732	8,727	0.065	199,694	84.9	15.1	0.059	0.90	3.9
Services	236,039	0.84	198,273	6,111	32,444	1,832,638	48,801	0.361	37,553	86.4	13.6	0.421	5.72	24.7
Public Administration	51,083	0.84	42,910	774	55,425	1,091,067	6,015	0.044	181,391	30.6	69.4	0.053	3.70	16.0
All Industries	893,982	0.84	750,945	14,527	51,693	9,093,645	135,208	1.000	67,257	76.9	23.1	1.000	23.14	100

Sources: Canada: Unpublished Employment data provided by Statistics Canada Division of Labour Statistics and unpublished Real GDP data provided by Statistics Canada Division of Industry Measure and Analysis. United States: CPS employment data from BLS website, www.bls.gov, January 31, 2003 and GDP data from BEA website, www.bea.gov, January 17, 2003. Note: Industries are classified under SIC in the United States and under NAICS in Canada. We assume that the US Transportation and Utilities industry under SIC is equivalent to an aggregate of the following Canadian NAICS industries: Utilities; Transportation and Warehousing. We also assume that the US Service industry is equivalent to an aggregate of the following Canadian industries: Information and Cultural Industries; Professional and Scientific Services; Administrative and support, waste management; Educational Services; Health care and social assistance; Arts, Entertainment and recreation; Accommodation and Food Services; Other Services (except Public Administration). \*FIRE=Finance, Insurance and Real Estate

**Table 12: TFP Levels in Canada Relative to the United States (US=100)**

Industry	1961	1973	1988	1995
1. Agric., for. & fisheries	0.84	0.93	0.85	0.83
2. Metal mining	1.32	1.6	1.32	0.9
3. Coal mining	0.61	0.91	1.35	1.16
4. Crude pet. & gas	0.83	1.03	0.63	0.71
5. Non-met. mining	0.85	0.9	0.97	0.96
6. Construction	0.9	0.94	1.1	1.18
7. Food	1.1	1.1	0.98	0.96
8. Tobacco	1.61	1.48	2.03	2.06
9. Textile	0.98	1.08	1.01	0.98
10. Apparel	0.98	1.01	0.96	0.99
11. Lumber & wood	0.79	0.88	0.9	1.01
12. Furniture	0.92	1.07	0.92	0.96
13. Paper	0.87	0.79	0.8	0.83
14. Printing	0.75	0.74	0.91	0.88
15. Chemicals	0.78	0.76	0.89	0.93
16. Petroleum refining	1.37	1.28	1.07	1.15
17. Rubber & plastics	0.77	0.81	0.86	0.85
18. Leather	0.75	0.85	0.9	0.83
19. Stone, clay & glass	0.82	0.94	0.96	0.87
20. Primary metals	0.86	0.89	0.97	0.96
21. Fabricated metals	0.81	0.84	0.85	0.84
22. Non-elec. machinery	1.02	1.15	0.94	0.88
23. Electrical machinery	1.27	1.35	1.14	0.98
24. Motor vehicles	0.73	0.93	1.04	1.07
25. Other trans. equip.	0.88	0.88	0.83	0.98
26. Misc. manufacturing	0.91	0.89	0.87	0.92
27. Trans. & warehouse	0.82	0.9	0.92	0.87
28. Communications	0.42	0.65	0.93	0.99
29. Electric utilities	1.43	1.46	1.59	1.24
30. Gas utilities	0.8	1.24	1.38	1.15
31. Trade	0.84	0.94	1.07	1.02
32. Finance, ins., real estate	1.28	1.15	0.96	1.09
33. Other services	0.94	0.91	0.92	0.93

Source: Lee, Frank C. and Jianmin Tang. "Productivity Levels and International Competitiveness Between Canada and the United States" in Someshwar Rao and Andrew Sharpe ed. *Productivity Issues in Canada*. Calgary, University of Calgary Press, 2002, pp 102.

**Table 13: Relative Capital Labour Ratio for All Components based on Employment in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), All Components		Employment (thousands)		Capital Labour Ratio		
	Canada	United States	Canada	United States	Canada	United States	Canada/ US,
							%
1955	263,423	4,062,976	5,533	62,170	47,606	65,353	72.85
1956	281,204	4,201,836	5,761	63,799	48,809	65,861	74.11
1957	301,459	4,338,025	5,912	64,071	50,992	67,707	75.31
1958	317,809	4,447,510	5,886	63,036	53,993	70,555	76.53
1959	333,060	4,582,364	6,055	64,630	55,003	70,902	77.58
1960	348,045	4,719,889	6,153	65,778	56,562	71,755	78.83
1961	362,511	4,861,418	6,246	65,746	58,037	73,942	78.49
1962	377,479	5,022,976	6,422	66,702	58,783	75,305	78.06
1963	393,196	5,188,539	6,576	67,762	59,790	76,570	78.09
1964	412,300	5,379,471	6,818	69,305	60,475	77,620	77.91
1965	434,935	5,611,794	7,079	71,088	61,443	78,942	77.83
1966	461,872	5,878,831	7,471	72,895	61,825	80,648	76.66
1967	486,571	6,131,182	7,686	74,372	63,304	82,439	76.79
1968	508,691	6,379,527	7,833	75,920	64,944	84,030	77.29
1969	530,374	6,627,872	8,079	77,902	65,646	85,080	77.16
1970	552,920	6,842,837	8,169	78,678	67,685	86,973	77.82
1971	575,975	7,028,428	8,360	79,367	68,898	88,556	77.80
1972	598,415	7,243,393	8,607	82,153	69,523	88,170	78.85
1973	623,427	7,490,403	9,038	85,064	68,981	88,056	78.34
1974	650,191	7,725,396	9,413	86,794	69,073	89,008	77.60
1975	678,925	7,902,976	9,577	85,846	70,890	92,060	77.00
1976	705,263	8,083,226	9,776	88,752	72,141	91,077	79.21
1977	731,252	8,292,851	9,915	92,017	73,754	90,123	81.84
1978	756,781	8,559,888	10,212	96,048	74,106	89,121	83.15
1979	787,042	8,860,306	10,658	98,824	73,847	89,657	82.37
1980	822,758	9,135,354	10,970	99,303	75,000	91,995	81.53
1981	866,009	9,411,738	11,297	100,397	76,660	93,745	81.77
1982	897,928	9,629,374	10,947	99,526	82,025	96,752	84.78
1983	921,793	9,829,652	11,027	100,834	83,594	97,484	85.75
1984	945,063	10,124,728	11,300	105,005	83,634	96,421	86.74
1985	971,105	10,454,520	11,617	107,150	83,591	97,569	85.67
1986	994,804	10,742,920	11,979	109,597	83,046	98,022	84.72
1987	1,021,087	11,008,623	12,321	112,440	82,876	97,907	84.65
1988	1,054,685	11,273,137	12,710	114,968	82,979	98,055	84.63
1989	1,089,904	11,544,727	12,986	117,342	83,927	98,385	85.30
1990	1,121,428	11,817,385	13,084	118,793	85,710	99,479	86.16
1991	1,147,859	12,031,026	12,851	117,718	89,323	102,202	87.40
1992	1,168,176	12,230,913	12,760	118,492	91,550	103,221	88.69
1993	1,186,050	12,458,841	12,858	120,259	92,246	103,600	89.04
1994	1,209,845	12,706,663	13,112	123,060	92,272	103,256	89.36
1995	1,234,225	13,003,890	13,357	124,900	92,404	104,114	88.75
1996	1,259,414	13,352,525	13,463	126,708	93,549	105,380	88.77
1997	1,296,959	13,745,890	13,774	129,558	94,157	106,098	88.75
1998	1,334,730	14,192,933	14,140	131,463	94,391	107,961	87.43
1999	1,377,144	14,660,194	14,531	133,488	94,772	109,824	86.29
2000	1,425,418	15,160,673	14,910	135,208	95,603	112,129	85.26
2001	1,469,135	15,533,103	15,077	135,073	97,443	114,998	84.73
Average annual growth rates							
55-01	3.81	2.96	2.20	1.70	1.57	1.24	0.33
55-73	4.90	3.46	2.76	1.76	2.08	1.67	0.40
73-81	4.19	2.90	2.83	2.09	1.33	0.79	0.54
81-89	2.92	2.59	1.76	1.97	1.14	0.61	0.53
89-01	2.52	2.50	1.25	1.18	1.25	1.31	-0.06
89-95	2.09	2.00	0.47	1.05	1.62	0.95	0.66
95-01	2.95	3.01	2.04	1.31	0.89	1.67	-0.77

Sources: Tables 3, 4, 6



**Table 14: Relative Capital Labour Ratio for All Components based on Hours in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), All Components		Hours (millions) United States			Capital Labour Ratio (using hours)				
	Canada	United States	Canada	United	United	Canada	United States	United States	Canada/ US	Canada/ US
				States			States (CES)	(CES)	(CPS)	(CES), %
1955	263,423	4,062,976	13,824	128,020	n/a	19.05	31.74	n/a	60.04	n/a
1956	281,204	4,201,836	14,316	130,380	n/a	19.64	32.23	n/a	60.95	n/a
1957	301,459	4,338,025	14,383	129,270	n/a	20.96	33.56	n/a	62.46	n/a
1958	317,809	4,447,510	13,847	126,198	n/a	22.95	35.24	n/a	65.13	n/a
1959	333,060	4,582,364	14,048	131,070	n/a	23.71	34.96	n/a	67.82	n/a
1960	348,045	4,719,889	13,891	132,030	n/a	25.05	35.75	n/a	70.09	n/a
1961	362,511	4,861,418	13,780	131,965	n/a	26.31	36.84	n/a	71.41	n/a
1962	377,479	5,022,976	14,159	134,231	n/a	26.66	37.42	n/a	71.24	n/a
1963	393,196	5,188,539	14,360	136,717	n/a	27.38	37.95	n/a	72.15	n/a
1964	412,300	5,379,471	14,785	139,469	n/a	27.89	38.57	n/a	72.30	n/a
1965	434,935	5,611,794	15,254	143,427	n/a	28.51	39.13	n/a	72.87	n/a
1966	461,872	5,878,831	15,968	146,315	n/a	28.92	40.18	n/a	71.99	n/a
1967	486,571	6,131,182	16,169	146,959	n/a	30.09	41.72	n/a	72.13	n/a
1968	508,691	6,379,527	16,035	149,228	n/a	31.72	42.75	n/a	74.21	n/a
1969	530,374	6,627,872	16,281	152,719	n/a	32.58	43.40	n/a	75.06	n/a
1970	552,920	6,842,837	16,080	151,786	n/a	34.39	45.08	n/a	76.27	n/a
1971	575,975	7,028,428	16,281	152,289	n/a	35.38	46.15	n/a	76.65	n/a
1972	598,415	7,243,393	16,549	158,062	n/a	36.16	45.83	n/a	78.91	n/a
1973	623,427	7,490,403	17,331	163,221	n/a	35.97	45.89	n/a	78.39	n/a
1974	650,191	7,725,396	17,911	164,735	n/a	36.30	46.90	n/a	77.41	n/a
1975	678,925	7,902,976	17,844	161,150	n/a	38.05	49.04	n/a	77.58	n/a
1976	705,263	8,083,226	17,956	166,605	167,804	39.28	48.52	48.17	80.95	81.54
1977	731,252	8,292,851	18,204	172,256	174,516	40.17	48.14	47.52	83.44	84.53
1978	756,781	8,559,888	18,933	178,803	183,485	39.97	47.87	46.65	83.49	85.68
1979	787,042	8,860,306	19,766	183,457	188,276	39.82	48.30	47.06	82.44	84.61
1980	822,758	9,135,354	20,028	182,281	187,031	41.08	50.12	48.84	81.97	84.10
1981	866,009	9,411,738	20,312	183,767	187,437	42.63	51.22	50.21	83.24	84.91
1982	897,928	9,629,374	19,602	180,102	185,378	45.81	53.47	51.94	85.68	88.19
1983	921,793	9,829,652	19,769	183,518	189,740	46.63	53.56	51.81	87.06	90.01
1984	945,063	10,124,728	20,291	192,201	200,612	46.58	52.68	50.47	88.42	92.28
1985	971,105	10,454,520	20,992	194,456	205,560	46.26	53.76	50.86	86.04	90.96
1986	994,804	10,742,920	21,633	198,327	211,162	45.99	54.17	50.88	84.89	90.39
1987	1,021,087	11,008,623	22,178	203,471	216,043	46.04	54.10	50.96	85.09	90.35
1988	1,054,685	11,273,137	23,264	207,448	223,600	45.33	54.34	50.42	83.43	89.92
1989	1,089,904	11,544,727	24,084	211,122	228,925	45.26	54.68	50.43	82.76	89.74
1990	1,121,428	11,817,385	23,923	213,115	230,762	46.88	55.45	51.21	84.54	91.54
1991	1,147,859	12,031,026	23,037	209,962	227,899	49.83	57.30	52.79	86.96	94.39
1992	1,168,176	12,230,913	22,514	211,958	227,373	51.89	57.70	53.79	89.92	96.46
1993	1,186,050	12,458,841	22,996	215,745	234,010	51.58	57.75	53.24	89.31	96.88
1994	1,209,845	12,706,663	23,747	222,049	239,392	50.95	57.22	53.08	89.03	95.99
1995	1,234,225	13,003,890	24,020	224,071	243,838	51.38	58.03	53.33	88.54	96.35
1996	1,259,414	13,352,525	24,374	226,655	247,153	51.67	58.91	54.03	87.71	95.64
1997	1,296,959	13,745,890	24,964	233,101	254,702	51.95	58.97	53.97	88.10	96.27
1998	1,334,730	14,192,933	25,390	236,528	257,242	52.57	60.01	55.17	87.61	95.28
1999	1,377,144	14,660,194	26,312	239,477	263,744	52.34	61.22	55.58	85.50	94.16
2000	1,425,418	15,160,673	27,193	242,563	267,530	52.42	62.50	56.67	83.87	92.50
2001	1,469,135	15,533,103	26,958	240,214	264,007	54.50	64.66	58.84	84.28	92.63
Average annual growth rates										
55-01	3.81	2.96	1.46	1.38	n/a	2.31	1.56	n/a	0.74	n/a
55-73	4.90	3.46	1.26	1.36	n/a	3.59	2.07	n/a	1.49	n/a
73-81	4.19	2.90	2.00	1.49	n/a	2.15	1.38	n/a	0.75	n/a
81-89	2.92	2.59	2.15	1.75	2.53	0.75	0.82	0.05	-0.07	0.69
89-01	2.52	2.50	0.94	1.08	1.20	1.56	1.41	1.29	0.15	0.26
89-95	2.09	2.00	-0.04	1.00	1.06	2.14	1.00	0.94	1.13	1.19
95-01	2.95	3.01	1.94	1.17	1.33	0.99	1.82	1.65	-0.82	-0.65

Sources: Tables 3, 4, 6

**Table 15: Research and Development Expenditure as a Share of GDP in Canada and the United States**

	United States			Canada		
	R&D Expenditure (in millions of current dollars)	Nominal GDP (in millions of current dollars)	R&D Expenditure as a Share of GDP	R&D Expenditure (in millions of current dollars)	Nominal GDP (in millions of current dollars)	R&D Expenditure as a Share of GDP
1953	\$5,160	\$379,900	1.36	n/a	\$26,830	n/a
1954	5,621	381,100	1.47	n/a	27,071	n/a
1955	6,281	415,200	1.51	n/a	29,820	n/a
1956	8,500	438,000	1.94	n/a	33,343	n/a
1957	9,908	461,500	2.15	n/a	34,995	n/a
1958	10,915	467,900	2.33	n/a	36,179	n/a
1959	12,490	507,400	2.46	n/a	38,193	n/a
1960	13,711	527,400	2.60	n/a	39,781	n/a
1961	14,564	545,700	2.67	n/a	41,173	n/a
1962	15,636	586,500	2.67	n/a	44,665	n/a
1963	17,519	618,700	2.83	458	47,961	0.95
1964	19,103	664,400	2.88	555	52,549	1.06
1965	20,252	720,100	2.81	662	57,930	1.14
1966	22,072	789,300	2.80	750	64,818	1.16
1967	23,346	834,100	2.80	853	69,698	1.22
1968	24,666	911,500	2.71	910	76,131	1.20
1969	25,996	985,300	2.64	986	83,825	1.18
1970	26,271	1,039,700	2.53	1,069	90,179	1.19
1971	26,952	1,128,600	2.39	1,124	98,429	1.14
1972	28,740	1,240,400	2.32	1,210	109,913	1.10
1973	30,952	1,385,500	2.23	1,304	128,956	1.01
1974	33,359	1,501,000	2.22	1,497	154,038	0.97
1975	35,671	1,635,200	2.18	1,676	173,621	0.97
1976	39,435	1,823,900	2.16	1,822	199,994	0.91
1977	43,421	2,031,400	2.14	2,040	220,973	0.92
1978	48,774	2,295,900	2.12	2,319	244,877	0.95
1979	55,457	2,566,400	2.16	2,728	279,577	0.98
1980	63,273	2,795,600	2.26	3,216	314,390	1.02
1981	72,267	3,131,300	2.31	4,020	360,471	1.12
1982	80,848	3,259,200	2.48	4,728	379,859	1.24
1983	90,075	3,534,900	2.55	5,023	411,386	1.22
1984	102,344	3,932,700	2.60	5,756	449,582	1.28
1985	114,778	4,213,000	2.72	6,433	485,714	1.32
1986	120,337	4,452,900	2.70	6,964	512,541	1.36
1987	126,299	4,742,500	2.66	7,338	558,949	1.31
1988	133,930	5,108,300	2.62	8,359	613,094	1.36
1989	141,914	5,489,100	2.59	8,802	657,728	1.34
1990	152,051	5,803,200	2.62	9,514	679,921	1.40
1991	160,914	5,986,200	2.69	9,977	685,367	1.46
1992	165,358	6,318,900	2.62	10,585	700,480	1.51
1993	165,714	6,642,300	2.49	11,391	727,184	1.57
1994	169,214	7,054,300	2.40	12,560	770,873	1.63
1995	183,611	7,400,500	2.48	13,021	810,426	1.61
1996	197,330	7,813,200	2.53	13,126	836,864	1.57
1997	212,379	8,318,400	2.55	13,996	882,733	1.59
1998	226,872	8,781,500	2.58	15,131	914,973	1.65
1999	244,143	9,274,300	2.63	16,080	980,524	1.64
2000	264,622	9,824,600	2.69	17,804	1,064,995	1.67
2001	n/a	10,082,200	n/a	19,363	1,092,246	1.77

Source: United States: R&D data: National Science Foundation. *National Patterns of Research and Development Resources, 2000 Data update (NSF 01-309)*, Table D. Available online at [www.nsf.gov/sbc/srs/nprdr/start.htm](http://www.nsf.gov/sbc/srs/nprdr/start.htm), January 23, 2002.

Nominal GDP data: NIPA Tables, [www.bea.gov](http://www.bea.gov), January 17, 2003.

Canada: CANSIM II Table 358-0001 for R&D data and 379-0024 for Nominal GDP, January 21, 2003.

**Table 16: Investment in Non-Residential Fixed Assets for Total Economy as a Share of Nominal GDP, Canada and the United States, 1955-2002**

	All Components		Machinery and Equipment		Structures	
	Canada	United States	Canada	United States	Canada	United States
1955	16.34	13.95	6.56	7.45	9.78	6.50
1956	19.44	14.86	7.83	7.74	11.62	7.12
1957	20.78	15.06	7.93	7.89	12.85	7.18
1958	18.18	14.10	6.63	7.05	11.55	7.04
1959	17.46	14.33	6.71	7.65	10.76	6.68
1960	17.09	14.15	6.65	7.48	10.45	6.67
1961	16.46	14.08	6.11	7.38	10.34	6.70
1962	16.07	14.12	6.20	7.63	9.86	6.49
1963	16.04	13.93	6.40	7.44	9.64	6.49
1964	16.95	14.21	7.10	7.63	9.85	6.58
1965	18.32	14.82	7.76	7.89	10.56	6.93
1966	19.71	15.30	8.47	8.38	11.23	6.92
1967	18.55	15.02	7.99	8.29	10.56	6.73
1968	16.64	14.69	6.92	8.09	9.72	6.59
1969	16.18	14.63	6.90	8.11	9.28	6.53
1970	16.29	14.22	6.79	7.81	9.50	6.41
1971	16.43	13.45	6.66	7.18	9.77	6.27
1972	15.80	13.69	6.69	7.57	9.11	6.12
1973	15.93	14.25	7.10	8.03	8.83	6.22
1974	16.79	14.78	7.53	8.29	9.26	6.48
1975	17.89	14.22	7.81	7.99	10.08	6.23
1976	16.34	13.79	7.38	8.01	8.96	5.78
1977	16.04	14.18	7.07	8.62	8.97	5.56
1978	15.93	15.08	7.17	9.17	8.76	5.90
1979	16.75	15.97	7.68	9.58	9.07	6.38
1980	17.64	16.04	7.86	9.26	9.78	6.77
1981	18.95	16.32	8.83	9.29	10.12	7.03
1982	17.43	15.96	7.74	8.94	9.69	7.02
1983	15.27	14.78	6.99	8.92	8.28	5.86
1984	14.71	15.53	6.91	9.44	7.79	6.09
1985	15.09	15.92	7.10	9.53	7.99	6.39
1986	14.79	15.24	7.54	9.46	7.25	5.79
1987	14.80	14.63	7.70	9.06	7.11	5.58
1988	15.49	14.36	8.14	9.01	7.35	5.36
1989	15.68	14.33	8.22	9.10	7.46	5.23
1990	15.32	14.22	7.71	8.87	7.61	5.35
1991	14.41	13.63	7.17	8.76	7.24	4.86
1992	13.16	13.10	6.95	8.70	6.21	4.40
1993	12.71	13.29	6.71	8.91	6.00	4.38
1994	13.45	13.46	7.07	9.20	6.38	4.26
1995	13.34	14.09	7.20	9.59	6.14	4.50
1996	13.35	14.53	7.29	9.81	6.06	4.72
1997	15.01	14.87	8.48	9.97	6.53	4.89
1998	15.35	15.30	8.94	10.32	6.40	4.97
1999	15.35	15.65	9.08	10.66	6.27	4.99
2000	15.34	15.87	9.13	10.77	6.21	5.10
2001	15.25	14.93	8.87	9.81	6.39	5.12
2002	14.33	n/a	8.53	n/a	5.80	n/a
Period averages						
1955-02	16.18	14.62	7.44	8.63	8.74	5.98
1955-73	17.30	14.36	7.02	7.72	10.28	6.64
1974-81	17.04	15.05	7.67	8.78	9.38	6.27
1982-89	15.41	15.09	7.54	9.18	7.86	5.91
1990-01	14.34	14.41	7.88	9.62	6.45	4.80

Sources: Canada: Current prices investment :CANSIM II series v1070246, v1070247, v1070248, v1070249. April 09, 2003. Nominal GDP: Table 3.

United States: Current price investment: BEA website, www.bea.gov, FAT Table 1.5, April 09, 2003.

Nominal GDP: Table 4.

Note: Structure in Canada is the sum of Building construction and Engineering Construction Investment.

**Table 17: Levels of Economic Well-Being in Canada and the United States, 1999**

	Canada	US
Total Consumption Flows per capita (1996 US\$)	16,525	23,896
US=100 (A)	69.15	100.00
Total Real per capita Wealth (1996 US\$)	113,157	122,911
US=100 (B)	92.06	100.00
<b>Equality</b>		
Gini Coefficient	0.4030	0.4570
US=100 (C)	88.18	100.00
Poverty Intensity*	0.0397	0.0873
US=100 (D)	45.50	100.00
(E) = (C)*0.25 + (D)*0.75	56.17	100.00
(F) = 200 - (E)	143.83	100.00
<b>Economic Security</b>		
<b>Risk Imposed by Unemployment</b>		
Employment Rate	60.60	64.30
US=100 (G)	94.25	100.00
% of Unemployed Receiving Benefits	43.10	37.79
US=100 (H)	114.06	100.00
Weekly Benefits as % of Weekly Earnings	42.77	46.36
US=100 (I)	92.27	100.00
(J) = (G)*(H)*(I)/10000	99.18	100.00
<b>Risk Imposed by Illness</b>		
Priv. Med. Care as % of Per. Dis. Income	4.42	13.93
US=100 (K)	31.73	100.00
(L) = 200 - (K)	168.27	100.00
<b>Risk Imposed by Single Parent Poverty</b>		
Poverty Intensity for single women with children*	0.13	0.18
US=100 (M)	74.68	100.00
Divorce Rate	0.95	2.05
US=100 (N)	46.37	100.00
(O) = (M)*(N)/100	34.63	100.00
(P) = 200 - (O)	165.37	100.00
<b>Risk of Poverty Imposed by Old Age</b>		
Elderly Poverty Intensity*	0.0086	0.0670
US=100 (Q)	12.80	100.00
(R) = 200 - (Q)	187.20	100.00
<b>Components</b>		
(1): Consumption Flows = (A)	69.15	100.00
(2): Wealth Stocks = (B)	92.06	100.00
(3): Equality Component = (F)	143.83	100.00
(4): Security Component**	150.19	100.00
<b>Overall Well-Being Index</b>		
Equal Weighting	113.81	100.00
Original Weighting	110.37	100.00
= (1)*0.4 + (2)*0.1 + (3)*0.25 + (4)*0.25		
Alternative Weighting	87.02	100.00
= (1)*0.7 + (2)*0.1 + (3)*0.1 + (4)*0.1		

\* Poverty intensity measures are for 1997

\*\* weighted average of (J), (L), (P), and (R), according to the weights in 1999 for each country, as discussed in the respective indexes.

Note: In order to facilitate comparison with the United States, the Gini coefficient for Canada is based on total money income, and is for 1997, the most recent year for which an estimate is available. Canadian Dollars for consumption and wealth data have been converted to US Dollars using the Statistics Canada GDP PPP exchange rate for 1996 of 0.83 Canadian Dollars per US Dollar.

Source: Centre for the Study of Living Standards

**Appendix Table 1: Real Per Capita GDP and its Determinants in United States, 1946-2002**

	GDP per Hour (1997 chained dollars)	Average Weekly Hours	Average Annual Hours	Working age Population to Total Population, %	Labour Force Participation Rate, %	1-Unemployment Rate, %	GDP per Capita (1997 chained dollars) $G=A*C*(D/100)*(E/100)*(F/100)$
	A	B	C=B*52	D	E	F	
1946	13.26	40.3	2,096	72.91	57.58	93.09	10,856
1947	12.75	40.3	2,096	71.52	57.58	96.10	10,576
1948	13.11	40.0	2,080	70.30	58.84	96.20	10,846
1949	13.39	39.4	2,049	69.75	58.87	94.10	10,598
1950	14.10	39.8	2,070	69.24	59.24	94.70	11,336
1951	14.87	39.9	2,075	67.82	59.26	96.70	11,994
1952	15.39	39.9	2,075	66.99	59.07	97.00	12,259
1953	15.97	39.6	2,059	67.15	58.81	97.10	12,612
1954	16.35	39.1	2,033	66.69	58.73	94.50	12,308
1955	16.72	39.6	2,059	66.34	59.31	95.60	12,951
1956	16.74	39.3	2,044	65.96	59.96	95.90	12,976
1957	17.22	38.8	2,018	65.51	59.67	95.70	13,000
1958	17.47	38.5	2,002	65.34	59.44	93.20	12,662
1959	18.04	39.0	2,028	65.16	59.26	94.50	13,347
1960	18.35	38.6	2,007	64.87	59.37	94.50	13,405
1961	18.79	38.6	2,007	64.59	59.38	93.30	13,494
1962	19.59	38.7	2,012	64.41	58.73	94.50	14,091
1963	20.06	38.8	2,018	64.61	58.75	94.30	14,490
1964	20.81	38.7	2,012	64.83	58.76	94.80	15,120
1965	21.53	38.8	2,018	65.09	58.85	95.50	15,887
1966	22.49	38.6	2,007	65.16	59.15	96.20	16,737
1967	22.95	38.0	1,976	65.30	59.56	96.20	16,970
1968	23.68	37.8	1,966	65.77	59.65	96.40	17,603
1969	23.84	37.7	1,960	66.25	60.10	96.50	17,960
1970	24.03	37.1	1,929	66.83	60.36	95.10	17,786
1971	24.75	36.9	1,919	67.52	60.15	94.10	18,151
1972	25.14	37.0	1,924	68.66	60.38	94.40	18,933
1973	25.76	36.9	1,919	69.44	60.78	95.10	19,835
1974	25.37	36.5	1,898	70.20	61.23	94.40	19,537
1975	25.84	36.1	1,877	70.85	61.31	91.50	19,280
1976	26.38	36.1	1,877	71.65	61.54	92.30	20,156
1977	26.70	36.0	1,872	72.14	62.33	92.90	20,881
1978	27.14	35.8	1,862	72.75	63.15	93.90	21,801
1979	27.30	35.7	1,856	73.29	63.59	94.20	22,247
1980	27.41	35.3	1,836	73.66	63.72	92.90	21,941

**Appendix Table 1: Real Per Capita GDP and its Determinants in United States, 1946-2002 (cont.)**

	GDP per Hour (1997 chained dollars)	Average Weekly Hours	Average Annual Hours	Working age Population to Total Population, %	Labour Force Partici- pation Rate, %	1-Unemp- loyment Rate, %	GDP per Capita (1997 chained dollars)  G=A*C*(D/100)* (E/100)*(F/100)
	A	B	C=B*52	D	E	F	
1981	27.86	35.2	1,830	73.98	63.85	92.40	22,255
1982	27.85	34.8	1,810	74.15	64.01	90.30	21,597
1983	28.51	35.0	1,820	74.32	64.05	90.40	22,329
1984	29.20	35.2	1,830	74.65	64.32	92.50	23,742
1985	29.97	34.9	1,815	74.75	64.76	92.80	24,438
1986	30.39	34.8	1,810	75.02	65.27	93.00	25,044
1987	30.63	34.8	1,810	75.29	65.57	93.80	25,665
1988	31.30	34.7	1,804	75.30	65.93	94.50	26,494
1989	31.83	34.6	1,799	75.29	66.53	94.70	27,165
1990	32.09	34.5	1,794	75.67	66.53	94.40	27,357
1991	32.42	34.3	1,784	75.34	66.20	93.20	26,877
1992	33.09	34.4	1,789	75.08	66.49	92.50	27,331
1993	33.37	34.5	1,794	74.96	66.27	93.10	27,692
1994	33.74	34.7	1,804	74.81	66.56	93.90	28,462
1995	34.32	34.5	1,794	74.56	66.63	94.40	28,878
1996	35.14	34.4	1,789	74.41	66.81	94.60	29,563
1997	35.69	34.6	1,799	74.47	67.09	95.10	30,506
1998	36.68	34.6	1,799	74.34	67.12	95.50	31,443
1999	37.71	34.5	1,794	74.39	67.12	95.80	32,365
2000	38.63	34.5	1,794	74.30	67.19	96.00	33,214
2001	39.11	34.2	1,778	74.33	67.02	95.20	32,983
2002	40.41	34.1	1,773	74.50	66.56	94.20	33,466
Average Annual Growth Rates							
1946-2002	2.01	-0.30	-0.30	0.04	0.26	0.02	2.03
1946-1973	2.49	-0.33	-0.33	-0.18	0.20	0.08	2.26
1973-2002	1.57	-0.27	-0.27	0.24	0.31	-0.03	1.82
1973-1981	0.98	-0.59	-0.59	0.80	0.62	-0.36	1.45
1981-1989	1.68	-0.21	-0.21	0.22	0.51	0.31	2.52
1989-2002	1.85	-0.11	-0.11	-0.08	0.00	-0.04	1.62
1989-1995	1.26	-0.05	-0.05	-0.16	0.03	-0.05	1.02
1995-2002	2.36	-0.17	-0.17	-0.01	-0.02	-0.03	2.13

Sources:

Employment, Labour Force, Working Age Population, Unemployment: Economic Report of the President 2002-2003, Table B-35.

Real GDP: BEA NIPA tables, April 6, 2003

Nominal GDP from the BEA NIPA tables, April 6, 2003. GDP deflator is real/nominal GDP \* 100.

Population: BEA NIPA Table 8.7, www.bea.gov, April 6, 2003.

Hours: Economic Report of the President 2002, 2003, Table B-42 and 1988. 1946 value assumed equal to 1947 value.

**Appendix Table 2: Relative Real Per Capita GDP and its Determinants, Canada/United States,1946-2002**

	GDP per Hour (1997 chained dollars)	Average Weekly Hours	Average Annual Hours	Working age Population to Total Population, %	Labour Force Partici- pation Rate, %	1-Unemp- loyment Rate, %	GDP per Capita (1997 chained dollars)
	A	B	C=B*52	D	E	F	$G=A*C*(D/100)*$ $(E/100)*(F/100)$
1946	60.94	131.96	131.96	98.48	96.17	103.85	79.14
1947	64.61	129.99	129.99	100.87	95.93	101.77	82.77
1948	64.00	131.95	131.95	101.94	93.37	101.61	81.74
1949	64.91	133.78	133.78	99.33	93.27	103.35	83.17
1950	67.69	127.82	127.82	101.81	91.25	101.84	81.89
1951	66.15	126.72	126.72	102.97	91.18	100.95	79.50
1952	68.57	125.36	125.36	103.32	91.13	100.13	81.10
1953	68.75	125.12	125.12	102.50	90.90	99.94	80.15
1954	67.46	125.11	125.11	102.46	90.62	101.07	79.23
1955	71.90	121.33	121.33	102.29	89.86	100.10	80.27
1956	74.76	121.59	121.59	102.43	89.83	100.77	84.33
1957	74.38	120.58	120.58	102.75	91.14	99.72	83.80
1958	77.60	117.50	117.50	102.58	91.27	99.84	85.26
1959	76.68	114.39	114.39	102.41	91.38	99.60	81.77
1960	78.40	112.47	112.47	102.60	91.89	98.56	81.94
1961	79.56	109.91	109.91	102.86	91.73	99.62	82.20
1962	79.47	109.57	109.57	103.14	92.34	99.66	82.66
1963	80.56	108.23	108.23	103.03	92.24	100.25	83.10
1964	80.33	107.76	107.76	103.02	92.68	100.62	83.20
1965	80.05	106.80	106.80	103.22	93.05	100.66	82.72
1966	78.06	106.49	106.49	100.84	97.48	100.51	82.18
1967	77.74	106.46	106.46	101.56	97.39	100.03	81.93
1968	79.69	104.15	104.15	101.93	97.21	99.13	81.55
1969	81.87	102.79	102.79	102.32	96.91	99.11	82.75
1970	84.73	102.03	102.03	102.61	96.38	99.27	84.89
1971	84.59	101.50	101.50	102.67	97.22	99.78	85.52
1972	86.39	99.93	99.93	101.90	97.68	99.44	85.46
1973	86.15	99.94	99.94	101.75	98.96	99.39	86.18
1974	87.75	100.25	100.25	101.80	99.53	100.36	89.48
1975	88.05	99.26	99.26	101.91	100.33	101.83	90.99
1976	90.15	97.84	97.84	101.75	99.94	100.74	90.36
1977	90.90	98.08	98.08	101.86	99.15	99.05	89.19
1978	89.38	99.59	99.59	101.98	99.20	97.64	87.92
1979	88.37	99.90	99.90	102.15	99.99	98.20	88.56
1980	88.73	99.46	99.46	102.35	100.69	99.56	90.56

**Appendix Table 2: Relative Real Per Capita GDP and its Determinants, Canada/United States, 1946-2002 (cont.)**

	GDP per Hour (1997 chained dollars)	Average Weekly Hours	Average Annual Hours	Working age Population to Total Population, %	Labour Force Partici- pation Rate, %	1-Unemp- loyment Rate, %	GDP per Capita (1997 chained dollars)
	A	B	C=B*52	D	E	F	$G=A*C*(D/100)*$ $(E/100)*(F/100)$
1981	89.11	98.23	98.23	102.46	101.74	100.03	91.28
1982	89.73	98.95	98.95	102.57	100.56	98.59	90.29
1983	89.26	98.50	98.50	102.67	101.02	97.41	88.82
1984	89.84	98.10	98.10	102.51	101.06	95.89	87.56
1985	88.65	99.57	99.57	102.72	101.18	96.28	88.33
1986	86.89	99.80	99.80	102.62	101.09	97.16	87.40
1987	87.67	99.48	99.48	102.19	101.27	97.21	87.74
1988	85.87	101.44	101.44	102.15	101.38	97.62	88.06
1989	83.70	103.07	103.07	101.74	101.02	97.63	86.56
1990	83.74	101.92	101.92	101.22	100.89	97.33	84.83
1991	84.28	100.51	100.51	102.00	100.49	96.22	83.54
1992	85.22	98.64	98.64	102.64	98.79	96.05	81.86
1993	84.66	99.69	99.69	103.08	98.68	95.21	81.75
1994	85.01	100.37	100.37	103.31	97.93	95.47	82.40
1995	84.92	100.24	100.24	103.84	97.41	95.93	82.59
1996	83.05	101.21	101.21	104.32	96.84	95.51	81.11
1997	83.23	100.73	100.73	104.60	96.69	95.59	81.06
1998	82.89	99.80	99.80	105.27	97.04	96.04	81.16
1999	81.98	100.93	100.93	105.61	97.72	96.48	82.39
2000	80.95	101.66	101.66	106.15	98.06	97.07	83.15
2001	81.87	100.54	100.54	106.46	98.47	97.48	84.12
2002	80.82	99.97	99.97	106.59	100.52	98.03	84.87
<b>Average Annual Growth Rates</b>							
1946-2002	0.51	-0.49	-0.49	0.14	0.08	-0.10	0.12
1946-1973	1.29	-1.02	-1.02	0.12	0.11	-0.16	0.32
1973-2002	-0.22	0.00	0.00	0.16	0.05	-0.05	-0.05
1973-1981	0.42	-0.21	-0.21	0.09	0.35	0.08	0.72
1981-1989	-0.78	0.60	0.60	-0.09	-0.09	-0.30	-0.66
1989-2002	-0.27	-0.23	-0.23	0.36	-0.04	0.03	-0.15
1989-1995	0.24	-0.46	-0.46	0.34	-0.60	-0.29	-0.78
1995-2002	-0.70	-0.04	-0.04	0.37	0.45	0.31	0.39

Sources: Table 1 and Appendix Table 1.



**Appendix Table 3: Labour Productivity Levels (in 1990 international dollars) and Growth Rates in Canada and the United States, 1870-1998**

	GDP per Person Employed			GDP per Hour Worked		
	United States	Canada	Canada/United States, %	United States	Canada	Canada/United States, %
1870	\$6,683	\$5,061	75.7	\$2.25	\$1.71	76.0
1913	13,327	11,585	86.9	5.12	4.45	86.9
1950	23,615	20,311	86.0	12.65	10.33	81.7
1973	40,727	35,302	86.7	23.72	19.74	83.2
1990	47,976	39,601	82.5	30.1	23.53	78.2
1998	55,618	43,298	77.8	34.55	26.04	75.4

Average annual growth rates

1870-1913	1.92	2.25
1913-1950	2.48	2.30
1950-1973	2.77	2.86
1973-1998	1.52	1.11
1973-1990	1.41	1.04
1990-1998	1.74	1.27

Source: Madison, Angus. *The World Economy: a Millennial Perspective*. OECD, 2001: Tables E-5, E-7, E-8.

**Appendix Table 4: Groningen and OECD Estimates of Relative Real GDP per Hour Worked, Canada as a Percentage of the United States, 1950-2002**

	Real GDP, Millions of 1999 \$US		Average Annual Hours		Average Weekly Hours		Employment (thousands of workers)		Real GDP per hour, 1999 \$US Canada/ United			OECD Estimates of Real GDP per Hour
	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	United States, %	Canada/ United States, %
	1950	\$124,875	\$1,748,238	2,111	2,166	40.6	41.7	4,983	61,651	\$11.87	\$13.09	90.70
1960	195,421	2,457,673	2,014	1,967	38.7	37.8	6,042	67,150	16.06	18.61	86.31	83.10
1973	381,573	4,246,713	1,919	1,882	36.9	36.2	8,761	86,838	22.70	25.99	87.34	n/a
1979	479,828	5,077,684	1,856	1,845	35.7	35.5	10,550	98,824	24.50	27.85	87.98	n/a
1980	486,248	5,079,979	1,825	1,831	35.1	35.2	10,857	99,303	24.54	27.93	87.85	87.60
1981	501,344	5,206,761	1,799	1,815	34.6	34.9	11,184	100,397	24.91	28.57	87.21	n/a
1982	486,073	5,109,172	1,789	1,800	34.4	34.6	10,850	99,526	25.04	28.52	87.81	n/a
1983	500,222	5,323,223	1,794	1,808	34.5	34.8	10,940	100,834	25.49	29.20	87.27	n/a
1984	528,903	5,710,870	1,794	1,822	34.5	35.0	11,209	105,005	26.30	29.85	88.12	n/a
1985	557,500	5,932,324	1,804	1,825	34.7	35.1	11,516	107,150	26.83	30.34	88.43	88.40
1986	572,104	6,136,574	1,804	1,803	34.7	34.7	11,866	109,597	26.72	31.05	86.05	n/a
1987	595,429	6,352,293	1,799	1,805	34.6	34.7	12,209	112,440	27.11	31.30	86.61	n/a
1988	624,369	6,619,726	1,830	1,825	35.2	35.1	12,591	114,968	27.09	31.55	85.88	n/a
1989	639,480	6,848,687	1,856	1,829	35.7	35.2	12,866	117,342	26.77	31.90	83.92	n/a
1990	641,066	6,968,379	1,830	1,819	35.2	35.0	12,961	118,793	27.02	32.25	83.79	86.50
1991	627,398	6,933,754	1,794	1,808	34.5	34.8	12,747	117,718	27.44	32.59	84.19	n/a
1992	632,881	7,146,209	1,763	1,799	33.9	34.6	12,672	118,492	28.33	33.53	84.50	n/a
1993	647,722	7,337,184	1,789	1,815	34.4	34.9	12,770	120,259	28.36	33.62	84.33	n/a
1994	678,879	7,636,309	1,810	1,825	34.8	35.1	13,027	123,060	28.80	33.99	84.71	n/a
1995	697,773	7,842,459	1,799	1,840	34.6	35.4	13,271	124,900	29.22	34.13	85.63	87.30
1996	709,007	8,125,234	1,810	1,838	34.8	35.4	13,380	126,708	29.28	34.88	83.95	n/a
1997	739,103	8,485,364	1,815	1,848	34.9	35.5	13,705	129,558	29.72	35.43	83.87	n/a
1998	769,266	8,848,718	1,794	1,864	34.5	35.8	14,068	131,463	30.48	36.11	84.40	84.60
1999	811,294	9,212,800	1,810	1,872	34.8	36.0	14,456	133,488	31.01	36.87	84.12	n/a
2000	848,277	9,558,475	1,825	1,879	35.1	36.1	14,827	135,208	31.35	37.63	83.31	n/a
2001	860,585	9,582,498	1,789	1,878	34.4	36.1	14,997	135,073	32.08	37.77	84.94	80.50
2002	888,984	9,802,895	1,789	1,878	34.4	36.1	15,282	134,398	32.52	38.83	83.75	n/a
Average annual growth rates												
1950-2002	3.85	3.37	-0.32	-0.27	-0.32	-0.27	2.18	1.51	1.96	2.11	-0.15	
1950-1973	4.98	3.93	-0.41	-0.61	-0.41	-0.61	2.48	1.50	2.86	3.03	-0.16	
1973-1981	3.47	2.58	-0.80	-0.45	-0.80	-0.45	3.10	1.83	1.17	1.19	-0.02	
1981-1989	3.09	3.49	0.39	0.10	0.39	0.10	1.77	1.97	0.90	1.39	-0.48	
1989-2000	2.60	3.08	-0.15	0.24	-0.15	0.24	1.30	1.30	1.44	1.51	-0.07	
2000-2002	2.37	1.27	-1.00	-0.01	-1.00	-0.01	1.52	-0.30	1.86	1.59	0.26	

Source: University of Groningen and the Conference Board, GGDC Total Economy Database, 2003, <http://www.eco.rug.nl/ggdc>, April 08, 2003.

OECD estimates: CATTE, Pietro, Peter Jarrett and David Rae. *Looking Forward Hopefully: What Canada can Learn from some Other OECD Countries' Growth Experiences*.

OECD Economics Department, July 24, 2002. Available online at <http://www.td.com/economics/standard/full/OECD.pdf>.

Note: The following description of the Groningen database sources for average hours is taken directly from their website:

Canada: "1950, 60 and 73 from Maddison (1995). And linked to 1979. 1976-2001 from the LFS, 2002 is kept constant."

United States: "1950 and 60 from Maddison (1995) For intermediate years (51-59 and 61-66), interpolated with trend from BLS. 1967-2001 calculated

from BLS by dividing total hours worked from BLS productivity database by all persons employment from CPS. 2002 is kept constant."

**Appendix Table 5: PPPs Canada/United States, Gross Domestic Product, US dollars per Canadian Dol**

	OECD GDP PPPs Historical Series	Penn World Table Version 6.1	Statistics Canada PPP for GDP, OECD Countries	Statistics Canada, PPP, System of National Accounts	Market Exchange Rates
1950	n/a	0.820	n/a	n/a	n/a
1951	n/a	0.876	n/a	n/a	0.950
1952	n/a	0.948	n/a	n/a	1.021
1953	n/a	0.940	n/a	n/a	1.017
1954	n/a	0.959	n/a	n/a	1.027
1955	n/a	0.940	n/a	n/a	1.014
1956	n/a	0.949	n/a	n/a	1.016
1957	n/a	0.972	n/a	n/a	1.043
1958	n/a	0.951	n/a	n/a	1.030
1959	n/a	0.963	n/a	n/a	1.043
1960	n/a	0.955	n/a	n/a	1.031
1961	n/a	0.919	n/a	n/a	0.987
1962	n/a	0.874	n/a	n/a	0.936
1963	n/a	0.875	n/a	n/a	0.927
1964	n/a	0.882	n/a	n/a	0.927
1965	n/a	0.895	n/a	n/a	0.928
1966	n/a	0.913	n/a	n/a	0.928
1967	n/a	0.933	n/a	n/a	0.927
1968	n/a	0.937	n/a	n/a	0.928
1969	n/a	0.937	n/a	n/a	0.929
1970	0.891	0.968	n/a	n/a	0.958
1971	0.911	0.997	n/a	n/a	0.990
1972	0.898	1.036	n/a	n/a	1.009
1973	0.873	1.050	n/a	n/a	1.000
1974	0.826	1.105	n/a	n/a	1.022
1975	0.818	1.078	n/a	n/a	0.983
1976	0.798	1.148	n/a	n/a	1.014
1977	0.797	1.091	n/a	n/a	0.940
1978	0.806	1.021	n/a	n/a	0.877
1979	0.799	0.985	n/a	n/a	0.854
1980	0.789	0.983	n/a	n/a	0.855
1981	0.784	0.965	0.790	n/a	0.834
1982	0.766	0.971	0.760	n/a	0.811
1983	0.762	0.981	0.760	n/a	0.811
1984	0.770	0.933	0.770	n/a	0.772
1985	0.779	0.883	0.780	n/a	0.732
1986	0.777	0.879	0.780	n/a	0.720
1987	0.766	0.924	0.760	n/a	0.754
1988	0.761	0.994	0.760	n/a	0.813
1989	0.758	1.035	0.760	n/a	0.845
1990	0.767	1.057	0.770	n/a	0.857
1991	0.777	1.080	0.780	n/a	0.873
1992	0.780	1.025	0.780	0.810	0.827
1993	0.792	0.959	0.790	0.820	0.775
1994	0.799	0.899	0.800	0.830	0.732
1995	0.845	0.885	0.840	0.830	0.729
1996	0.844	0.884	0.840	0.840	0.733
1997	0.851	0.860	0.850	0.840	0.722
1998	0.837	0.805	0.840	0.860	0.674
1999	0.840	0.800	0.840	0.850	0.673
2000	0.825	0.793	0.830	0.840	0.673
2001	0.836	n/a	0.830	0.850	0.646
2002	0.837	n/a	n/a	n/a	0.637

Sources: OECD PPPs: OECD website, [www.oecd.org/oece/pages/home/displaygeneral/0,3380,EN-statistics-513-15-no-no-no-513,00.html](http://www.oecd.org/oece/pages/home/displaygeneral/0,3380,EN-statistics-513-15-no-no-no-513,00.html)

Penn World PPPs: Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002. Statistics Canada PPPs: OECD countries: CANSIM II Table 380-0037, series v647898.

System of National Accounts PPPs: CANSIM II Table 380-0057, series v13930600. Market Exchange rates: CANSIM II series v37426. All series as of April 09, 2

Note: The market exchange rates are annual averages of monthly data published by Statistics Canada.

**Appendix Table 6: Relative Capital Productivity for Structures in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Structures		Real GDP, billions of 1997 \$US		Real GDP per 1,000\$ of Capital Stock Canada/ US,		
	Canada	United States	Canada	United States	Canada	United States	%
1955	238,769	3,299,670	166	2,140	696.0	648.7	107.29
1956	254,680	3,409,939	179	2,183	703.6	640.1	109.91
1957	273,768	3,520,209	184	2,226	673.0	632.5	106.40
1958	290,655	3,625,805	188	2,205	646.0	608.1	106.22
1959	306,160	3,735,140	194	2,364	634.7	633.0	100.27
1960	321,365	3,850,082	200	2,423	621.9	629.3	98.82
1961	337,134	3,970,631	206	2,479	611.0	624.4	97.85
1962	352,802	4,094,917	220	2,629	624.7	642.1	97.30
1963	368,614	4,224,811	232	2,743	629.6	649.2	96.98
1964	386,501	4,370,591	247	2,902	639.4	664.0	96.30
1965	406,697	4,539,733	263	3,088	646.3	680.1	95.03
1966	429,932	4,719,154	280	3,290	652.0	697.3	93.51
1967	451,908	4,894,837	289	3,373	638.4	689.1	92.65
1968	473,259	5,071,455	303	3,534	639.4	696.8	91.76
1969	494,012	5,244,335	318	3,641	643.3	694.3	92.66
1970	515,766	5,403,198	327	3,648	634.9	675.1	94.04
1971	538,044	5,553,650	341	3,770	633.6	678.8	93.35
1972	559,151	5,699,430	359	3,974	642.9	697.3	92.20
1973	580,488	5,855,489	385	4,204	662.4	717.9	92.27
1974	602,277	6,000,334	399	4,179	662.0	696.4	95.06
1975	626,416	6,122,752	406	4,164	648.1	680.1	95.30
1976	648,607	6,242,366	427	4,396	658.5	704.2	93.51
1977	671,856	6,359,177	442	4,600	657.7	723.3	90.92
1978	694,895	6,503,088	459	4,853	661.0	746.3	88.57
1979	720,690	6,667,557	477	5,008	661.6	751.1	88.09
1980	750,258	6,841,372	487	4,996	649.3	730.3	88.90
1981	781,893	7,021,727	504	5,119	644.9	729.0	88.46
1982	809,074	7,184,328	490	5,015	605.4	698.1	86.72
1983	831,201	7,312,352	503	5,232	605.3	715.6	84.59
1984	852,863	7,482,429	532	5,613	624.2	750.1	83.22
1985	877,094	7,680,540	558	5,829	636.0	758.9	83.80
1986	896,828	7,851,551	571	6,028	637.0	767.7	82.98
1987	917,706	8,020,693	596	6,233	649.0	777.1	83.52
1988	941,465	8,183,946	625	6,493	664.1	793.3	83.71
1989	966,442	8,344,862	642	6,720	663.9	805.3	82.44
1990	991,674	8,522,319	643	6,839	648.3	802.4	80.79
1991	1,015,184	8,667,164	629	6,807	620.0	785.3	78.95
1992	1,032,029	8,791,168	635	7,014	615.2	797.9	77.11
1993	1,048,034	8,917,695	650	7,200	620.0	807.4	76.79
1994	1,067,735	9,034,972	681	7,491	637.8	829.1	76.92
1995	1,086,309	9,177,013	700	7,691	644.5	838.1	76.90
1996	1,103,632	9,344,751	711	7,966	644.6	852.4	75.63
1997	1,125,433	9,532,581	741	8,319	658.9	872.7	75.50
1998	1,146,056	9,732,558	772	8,675	673.5	891.3	75.56
1999	1,167,472	9,946,048	813	9,032	696.8	908.1	76.73
2000	1,190,726	10,171,373	850	9,371	714.2	921.3	77.52
2001	1,215,214	10,378,381	863	9,394	710.3	905.2	78.47
Average annual growth rates							
55-01	3.60	2.52	3.65	3.27	0.04	0.73	-0.68
55-73	5.06	3.24	4.77	3.82	-0.27	0.57	-0.83
73-81	3.79	2.30	3.45	2.49	-0.34	0.19	-0.53
81-89	2.68	2.18	3.06	3.46	0.36	1.25	-0.88
89-01	1.93	1.83	2.50	2.83	0.56	0.98	-0.41
89-95	1.97	1.60	1.46	2.27	-0.49	0.67	-1.15
95-01	1.89	2.07	3.55	3.39	1.63	1.29	0.34

**Appendix Table 7: Relative Capital Productivity for Machinery and Equipment in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Machinery and Equipment		Real GDP, billions of 1997 \$US		Real GDP per 1,000\$ of Capital Stock Canada/ US,		
	Canada	United States	Canada	United States	Canada	United States	%
1955	38,571	853,448	166	2,140	4,308	2,508	171.78
1956	41,326	883,943	179	2,183	4,336	2,469	175.59
1957	43,757	912,832	184	2,226	4,211	2,439	172.63
1958	44,633	925,271	188	2,205	4,207	2,383	176.52
1959	45,632	954,161	194	2,364	4,258	2,478	171.85
1960	46,635	980,643	200	2,423	4,286	2,471	173.45
1961	46,803	1,007,526	206	2,479	4,401	2,461	178.85
1962	47,452	1,045,645	220	2,629	4,645	2,514	184.72
1963	48,604	1,083,362	232	2,743	4,775	2,532	188.61
1964	50,983	1,129,104	247	2,902	4,847	2,570	188.59
1965	54,533	1,189,692	263	3,088	4,820	2,595	185.73
1966	59,343	1,269,941	280	3,290	4,724	2,591	182.32
1967	63,261	1,342,967	289	3,373	4,561	2,511	181.59
1968	65,545	1,411,179	303	3,534	4,616	2,504	184.35
1969	67,913	1,482,199	318	3,641	4,680	2,457	190.50
1970	70,247	1,537,972	327	3,648	4,661	2,372	196.53
1971	72,609	1,576,893	341	3,770	4,695	2,391	196.40
1972	75,332	1,642,697	359	3,974	4,772	2,419	197.24
1973	79,973	1,729,366	385	4,204	4,808	2,431	197.80
1974	85,705	1,815,634	399	4,179	4,652	2,302	202.13
1975	91,311	1,869,802	406	4,164	4,446	2,227	199.65
1976	96,403	1,928,384	427	4,396	4,430	2,280	194.35
1977	100,433	2,013,448	442	4,600	4,400	2,285	192.58
1978	104,245	2,126,599	459	4,853	4,406	2,282	193.07
1979	109,876	2,253,793	477	5,008	4,340	2,222	195.30
1980	117,165	2,351,296	487	4,996	4,158	2,125	195.65
1981	129,052	2,443,582	504	5,119	3,907	2,095	186.51
1982	135,011	2,500,960	490	5,015	3,628	2,005	180.91
1983	138,143	2,569,975	503	5,232	3,642	2,036	178.88
1984	141,131	2,689,546	532	5,613	3,772	2,087	180.76
1985	144,484	2,815,135	558	5,829	3,861	2,070	186.47
1986	149,237	2,929,089	571	6,028	3,828	2,058	186.03
1987	155,247	3,022,579	596	6,233	3,837	2,062	186.06
1988	165,081	3,121,051	625	6,493	3,787	2,080	182.07
1989	175,336	3,228,151	642	6,720	3,659	2,082	175.78
1990	182,405	3,321,607	643	6,839	3,524	2,059	171.18
1991	186,603	3,389,782	629	6,807	3,373	2,008	167.98
1992	190,731	3,463,537	635	7,014	3,329	2,025	164.38
1993	193,492	3,560,965	650	7,200	3,358	2,022	166.08
1994	198,346	3,686,082	681	7,491	3,433	2,032	168.94
1995	204,503	3,836,117	700	7,691	3,423	2,005	170.76
1996	212,235	4,012,717	711	7,966	3,352	1,985	168.87
1997	226,709	4,216,281	741	8,319	3,271	1,973	165.77
1998	242,232	4,465,512	772	8,675	3,187	1,943	164.03
1999	260,943	4,725,380	813	9,032	3,118	1,911	163.11
2000	283,061	5,012,132	850	9,371	3,004	1,870	160.69
2001	300,573	5,184,036	863	9,394	2,872	1,812	158.46
Average annual growth rates							
55-01	4.56	4.00	3.65	3.27	-0.88	-0.70	-0.18
55-73	4.13	4.00	4.77	3.82	0.61	-0.17	0.79
73-81	6.16	4.42	3.45	2.49	-2.56	-1.84	-0.73
81-89	3.91	3.54	3.06	3.46	-0.82	-0.08	-0.74
89-01	4.59	4.03	2.50	2.83	-2.00	-1.15	-0.86
89-95	2.60	2.92	1.46	2.27	-1.10	-0.63	-0.48
95-01	6.63	5.15	3.55	3.39	-2.89	-1.67	-1.24

**Appendix Table 8: Relative Capital Labour Ratio for Structures based on Employment in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Structures		Employment (thousands)		Capital Labour Ratio		
	Canada	United States	Canada	United States	Canada	United States	Canada/ US, %
1955	238,769	3,299,670	5,533	62,170	43,151	53,075	81.30
1956	254,680	3,409,939	5,761	63,799	44,205	53,448	82.71
1957	273,768	3,520,209	5,912	64,071	46,308	54,942	84.28
1958	290,655	3,625,805	5,886	63,036	49,380	57,520	85.85
1959	306,160	3,735,140	6,055	64,630	50,560	57,793	87.49
1960	321,365	3,850,082	6,153	65,778	52,226	58,531	89.23
1961	337,134	3,970,631	6,246	65,746	53,975	60,393	89.37
1962	352,802	4,094,917	6,422	66,702	54,941	61,391	89.49
1963	368,614	4,224,811	6,576	67,762	56,052	62,348	89.90
1964	386,501	4,370,591	6,818	69,305	56,691	63,063	89.90
1965	406,697	4,539,733	7,079	71,088	57,454	63,861	89.97
1966	429,932	4,719,154	7,471	72,895	57,550	64,739	88.89
1967	451,908	4,894,837	7,686	74,372	58,794	65,816	89.33
1968	473,259	5,071,455	7,833	75,920	60,421	66,800	90.45
1969	494,012	5,244,335	8,079	77,902	61,146	67,320	90.83
1970	515,766	5,403,198	8,169	78,678	63,137	68,675	91.94
1971	538,044	5,553,650	8,360	79,367	64,360	69,974	91.98
1972	559,151	5,699,430	8,607	82,153	64,961	69,376	93.64
1973	580,488	5,855,489	9,038	85,064	64,230	68,836	93.31
1974	602,277	6,000,334	9,413	86,794	63,983	69,133	92.55
1975	626,416	6,122,752	9,577	85,846	65,408	71,323	91.71
1976	648,607	6,242,366	9,776	88,752	66,345	70,335	94.33
1977	671,856	6,359,177	9,915	92,017	67,764	69,109	98.05
1978	694,895	6,503,088	10,212	96,048	68,046	67,707	100.50
1979	720,690	6,667,557	10,658	98,824	67,621	67,469	100.23
1980	750,258	6,841,372	10,970	99,303	68,391	68,894	99.27
1981	781,893	7,021,727	11,297	100,397	69,214	69,940	98.96
1982	809,074	7,184,328	10,947	99,526	73,908	72,185	102.39
1983	831,201	7,312,352	11,027	100,834	75,379	72,519	103.94
1984	852,863	7,482,429	11,300	105,005	75,475	71,258	105.92
1985	877,094	7,680,540	11,617	107,150	75,499	71,680	105.33
1986	896,828	7,851,551	11,979	109,597	74,867	71,640	104.50
1987	917,706	8,020,693	12,321	112,440	74,485	71,333	104.42
1988	941,465	8,183,946	12,710	114,968	74,071	71,185	104.05
1989	966,442	8,344,862	12,986	117,342	74,420	71,116	104.65
1990	991,674	8,522,319	13,084	118,793	75,793	71,741	105.65
1991	1,015,184	8,667,164	12,851	117,718	78,998	73,626	107.30
1992	1,032,029	8,791,168	12,760	118,492	80,880	74,192	109.01
1993	1,048,034	8,917,695	12,858	120,259	81,511	74,154	109.92
1994	1,067,735	9,034,972	13,112	123,060	81,434	73,419	110.92
1995	1,086,309	9,177,013	13,357	124,900	81,329	73,475	110.69
1996	1,103,632	9,344,751	13,463	126,708	81,978	73,750	111.16
1997	1,125,433	9,532,581	13,774	129,558	81,705	73,578	111.05
1998	1,146,056	9,732,558	14,140	131,463	81,048	74,033	109.48
1999	1,167,472	9,946,048	14,531	133,488	80,342	74,509	107.83
2000	1,190,726	10,171,373	14,910	135,208	79,863	75,228	106.16
2001	1,215,214	10,378,381	15,077	135,073	80,602	76,835	104.90
Average annual growth rates							
55-01	3.60	2.52	2.20	1.70	1.37	0.81	0.56
55-73	5.06	3.24	2.76	1.76	2.23	1.46	0.77
73-81	3.79	2.30	2.83	2.09	0.94	0.20	0.74
81-89	2.68	2.18	1.76	1.97	0.91	0.21	0.70
89-01	1.93	1.83	1.25	1.18	0.67	0.65	0.02
89-95	1.97	1.60	0.47	1.05	1.49	0.55	0.94
95-01	1.89	2.07	2.04	1.31	-0.15	0.75	-0.89

**Appendix Table 9: Relative Capital Labour Ratio for Machinery and Equipment based on Employment in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Machinery and Equipment		Employment (thousands)		Capital Labour Ratio		
	Canada	United States	Canada	United States	Canada	United States	Canada/ US, %
1955	38,571	853,448	5,533	62,170	6,971	13,728	50.78
1956	41,326	883,943	5,761	63,799	7,173	13,855	51.77
1957	43,757	912,832	5,912	64,071	7,401	14,247	51.95
1958	44,633	925,271	5,886	63,036	7,583	14,678	51.66
1959	45,632	954,161	6,055	64,630	7,536	14,763	51.04
1960	46,635	980,643	6,153	65,778	7,579	14,908	50.84
1961	46,803	1,007,526	6,246	65,746	7,493	15,325	48.90
1962	47,452	1,045,645	6,422	66,702	7,390	15,676	47.14
1963	48,604	1,083,362	6,576	67,762	7,391	15,988	46.23
1964	50,983	1,129,104	6,818	69,305	7,478	16,292	45.90
1965	54,533	1,189,692	7,079	71,088	7,704	16,735	46.03
1966	59,343	1,269,941	7,471	72,895	7,944	17,422	45.60
1967	63,261	1,342,967	7,686	74,372	8,230	18,057	45.58
1968	65,545	1,411,179	7,833	75,920	8,368	18,588	45.02
1969	67,913	1,482,199	8,079	77,902	8,406	19,026	44.18
1970	70,247	1,537,972	8,169	78,678	8,599	19,548	43.99
1971	72,609	1,576,893	8,360	79,367	8,685	19,868	43.71
1972	75,332	1,642,697	8,607	82,153	8,752	19,996	43.77
1973	79,973	1,729,366	9,038	85,064	8,849	20,330	43.53
1974	85,705	1,815,634	9,413	86,794	9,105	20,919	43.52
1975	91,311	1,869,802	9,577	85,846	9,534	21,781	43.77
1976	96,403	1,928,384	9,776	88,752	9,861	21,728	45.38
1977	100,433	2,013,448	9,915	92,017	10,130	21,881	46.29
1978	104,245	2,126,599	10,212	96,048	10,208	22,141	46.10
1979	109,876	2,253,793	10,658	98,824	10,310	22,806	45.21
1980	117,165	2,351,296	10,970	99,303	10,680	23,678	45.11
1981	129,052	2,443,582	11,297	100,397	11,424	24,339	46.94
1982	135,011	2,500,960	10,947	99,526	12,333	25,129	49.08
1983	138,143	2,569,975	11,027	100,834	12,528	25,487	49.15
1984	141,131	2,689,546	11,300	105,005	12,489	25,613	48.76
1985	144,484	2,815,135	11,617	107,150	12,437	26,273	47.34
1986	149,237	2,929,089	11,979	109,597	12,458	26,726	46.61
1987	155,247	3,022,579	12,321	112,440	12,600	26,882	46.87
1988	165,081	3,121,051	12,710	114,968	12,988	27,147	47.84
1989	175,336	3,228,151	12,986	117,342	13,501	27,511	49.08
1990	182,405	3,321,607	13,084	118,793	13,941	27,961	49.86
1991	186,603	3,389,782	12,851	117,718	14,521	28,796	50.43
1992	190,731	3,463,537	12,760	118,492	14,948	29,230	51.14
1993	193,492	3,560,965	12,858	120,259	15,049	29,611	50.82
1994	198,346	3,686,082	13,112	123,060	15,127	29,954	50.50
1995	204,503	3,836,117	13,357	124,900	15,311	30,714	49.85
1996	212,235	4,012,717	13,463	126,708	15,765	31,669	49.78
1997	226,709	4,216,281	13,774	129,558	16,459	32,544	50.57
1998	242,232	4,465,512	14,140	131,463	17,131	33,968	50.43
1999	260,943	4,725,380	14,531	133,488	17,957	35,399	50.73
2000	283,061	5,012,132	14,910	135,208	18,985	37,070	51.21
2001	300,573	5,184,036	15,077	135,073	19,936	38,380	51.94
Average annual growth rates							
55-01	4.56	4.00	2.20	1.70	2.31	2.26	0.05
55-73	4.13	4.00	2.76	1.76	1.33	2.21	-0.85
73-81	6.16	4.42	2.83	2.09	3.24	2.28	0.95
81-89	3.91	3.54	1.76	1.97	2.11	1.54	0.56
89-01	4.59	4.03	1.25	1.18	3.30	2.81	0.47
89-95	2.60	2.92	0.47	1.05	2.12	1.85	0.26
95-01	6.63	5.15	2.04	1.31	4.50	3.78	0.69

**Appendix Table 10: Relative Capital Labour Ratio for Structures based on Hours in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Structures		Hours (millions)		Capital Labour Ratio					
	Canada	United States	Canada	United States		Canada	United States		Canada/ US (CES), %	Canada/ US (CPS), %
				(CES)	States (CPS)		(CES)	(CPS)		
1955	238,769	3,299,670	13,824	128,020	n/a	17.27	25.77	n/a	67.01	n/a
1956	254,680	3,409,939	14,316	130,380	n/a	17.79	26.15	n/a	68.02	n/a
1957	273,768	3,520,209	14,383	129,270	n/a	19.03	27.23	n/a	69.90	n/a
1958	290,655	3,625,805	13,847	126,198	n/a	20.99	28.73	n/a	73.06	n/a
1959	306,160	3,735,140	14,048	131,070	n/a	21.79	28.50	n/a	76.48	n/a
1960	321,365	3,850,082	13,891	132,030	n/a	23.13	29.16	n/a	79.33	n/a
1961	337,134	3,970,631	13,780	131,965	n/a	24.47	30.09	n/a	81.31	n/a
1962	352,802	4,094,917	14,159	134,231	n/a	24.92	30.51	n/a	81.68	n/a
1963	368,614	4,224,811	14,360	136,717	n/a	25.67	30.90	n/a	83.07	n/a
1964	386,501	4,370,591	14,785	139,469	n/a	26.14	31.34	n/a	83.42	n/a
1965	406,697	4,539,733	15,254	143,427	n/a	26.66	31.65	n/a	84.24	n/a
1966	429,932	4,719,154	15,968	146,315	n/a	26.92	32.25	n/a	83.48	n/a
1967	451,908	4,894,837	16,169	146,959	n/a	27.95	33.31	n/a	83.91	n/a
1968	473,259	5,071,455	16,035	149,228	n/a	29.51	33.98	n/a	86.84	n/a
1969	494,012	5,244,335	16,281	152,719	n/a	30.34	34.34	n/a	88.36	n/a
1970	515,766	5,403,198	16,080	151,786	n/a	32.07	35.60	n/a	90.10	n/a
1971	538,044	5,553,650	16,281	152,289	n/a	33.05	36.47	n/a	90.62	n/a
1972	559,151	5,699,430	16,549	158,062	n/a	33.79	36.06	n/a	93.70	n/a
1973	580,488	5,855,489	17,331	163,221	n/a	33.49	35.87	n/a	93.37	n/a
1974	602,277	6,000,334	17,911	164,735	n/a	33.63	36.42	n/a	92.32	n/a
1975	626,416	6,122,752	17,844	161,150	n/a	35.10	37.99	n/a	92.39	n/a
1976	648,607	6,242,366	17,956	166,605	167,804	36.12	37.47	37.20	96.41	97.10
1977	671,856	6,359,177	18,204	172,256	174,516	36.91	36.92	36.44	99.97	101.28
1978	694,895	6,503,088	18,933	178,803	183,485	36.70	36.37	35.44	100.91	103.56
1979	720,690	6,667,557	19,766	183,457	188,276	36.46	36.34	35.41	100.32	102.96
1980	750,258	6,841,372	20,028	182,281	187,031	37.46	37.53	36.58	99.81	102.41
1981	781,893	7,021,727	20,312	183,767	187,437	38.49	38.21	37.46	100.74	102.75
1982	809,074	7,184,328	19,602	180,102	185,378	41.28	39.89	38.75	103.47	106.51
1983	831,201	7,312,352	19,769	183,518	189,740	42.05	39.85	38.54	105.52	109.10
1984	852,863	7,482,429	20,291	192,201	200,612	42.03	38.93	37.30	107.97	112.69
1985	877,094	7,680,540	20,992	194,456	205,560	41.78	39.50	37.36	105.78	111.82
1986	896,828	7,851,551	21,633	198,327	211,162	41.46	39.59	37.18	104.72	111.49
1987	917,706	8,020,693	22,178	203,471	216,043	41.38	39.42	37.13	104.97	111.45
1988	941,465	8,183,946	23,264	207,448	223,600	40.47	39.45	36.60	102.58	110.57
1989	966,442	8,344,862	24,084	211,122	228,925	40.13	39.53	36.45	101.52	110.09
1990	991,674	8,522,319	23,923	213,115	230,762	41.45	39.99	36.93	103.66	112.24
1991	1,015,184	8,667,164	23,037	209,962	227,899	44.07	41.28	38.03	106.75	115.88
1992	1,032,029	8,791,168	22,514	211,958	227,373	45.84	41.48	38.66	110.52	118.56
1993	1,048,034	8,917,695	22,996	215,745	234,010	45.58	41.33	38.11	110.26	119.59
1994	1,067,735	9,034,972	23,747	222,049	239,392	44.96	40.69	37.74	110.51	119.14
1995	1,086,309	9,177,013	24,020	224,071	243,838	45.23	40.96	37.64	110.42	120.17
1996	1,103,632	9,344,751	24,374	226,655	247,153	45.28	41.23	37.81	109.82	119.76
1997	1,125,433	9,532,581	24,964	233,101	254,702	45.08	40.89	37.43	110.24	120.46
1998	1,146,056	9,732,558	25,390	236,528	257,242	45.14	41.15	37.83	109.70	119.31
1999	1,167,472	9,946,048	26,312	239,477	263,744	44.37	41.53	37.71	106.83	117.66
2000	1,190,726	10,171,373	27,193	242,563	267,530	43.79	41.93	38.02	104.42	115.17
2001	1,215,214	10,378,381	26,958	240,214	264,007	45.08	43.20	39.31	104.34	114.67
Average annual growth rates										
55-01	3.60	2.52	1.46	1.38	n/a	2.11	1.13	n/a	0.97	n/a
55-73	5.06	3.24	1.26	1.36	n/a	3.75	1.85	n/a	1.86	n/a
73-81	3.79	2.30	2.00	1.49	n/a	1.75	0.79	n/a	0.95	n/a
81-89	2.68	2.18	2.15	1.75	2.53	0.52	0.42	-0.34	0.10	0.87
89-01	1.93	1.83	0.94	1.08	1.20	0.97	0.74	0.63	0.23	0.34
89-95	1.97	1.60	-0.04	1.00	1.06	2.01	0.59	0.53	1.41	1.47
95-01	1.89	2.07	1.94	1.17	1.33	-0.05	0.89	0.73	-0.94	-0.78

Sources: Tables 3, 4, 6



**Appendix Table 11: Relative Capital Labour Ratio for Machinery and Equipment based on Hours in Canada and the United States (US=100) 1955-2000**

	Capital Stock (In millions of 1997 US \$), Machinery and Equipment		Hours (millions) United States		Capital Labour Ratio					
	Canada	United States	Canada	United States (CES)	United States (CPS)	United States		Canada/ US (CES), %	Canada/ US (CPS), %	
						Canada	United States (CES)			
1955	38,571	853,448	13,824	128,020	n/a	2.79	6.67	n/a	41.85	n/a
1956	41,326	883,943	14,316	130,380	n/a	2.89	6.78	n/a	42.58	n/a
1957	43,757	912,832	14,383	129,270	n/a	3.04	7.06	n/a	43.08	n/a
1958	44,633	925,271	13,847	126,198	n/a	3.22	7.33	n/a	43.96	n/a
1959	45,632	954,161	14,048	131,070	n/a	3.25	7.28	n/a	44.62	n/a
1960	46,635	980,643	13,891	132,030	n/a	3.36	7.43	n/a	45.20	n/a
1961	46,803	1,007,526	13,780	131,965	n/a	3.40	7.63	n/a	44.49	n/a
1962	47,452	1,045,645	14,159	134,231	n/a	3.35	7.79	n/a	43.02	n/a
1963	48,604	1,083,362	14,360	136,717	n/a	3.38	7.92	n/a	42.71	n/a
1964	50,983	1,129,104	14,785	139,469	n/a	3.45	8.10	n/a	42.59	n/a
1965	54,533	1,189,692	15,254	143,427	n/a	3.58	8.29	n/a	43.10	n/a
1966	59,343	1,269,941	15,968	146,315	n/a	3.72	8.68	n/a	42.82	n/a
1967	63,261	1,342,967	16,169	146,959	n/a	3.91	9.14	n/a	42.81	n/a
1968	65,545	1,411,179	16,035	149,228	n/a	4.09	9.46	n/a	43.22	n/a
1969	67,913	1,482,199	16,281	152,719	n/a	4.17	9.71	n/a	42.98	n/a
1970	70,247	1,537,972	16,080	151,786	n/a	4.37	10.13	n/a	43.11	n/a
1971	72,609	1,576,893	16,281	152,289	n/a	4.46	10.35	n/a	43.07	n/a
1972	75,332	1,642,697	16,549	158,062	n/a	4.55	10.39	n/a	43.80	n/a
1973	79,973	1,729,366	17,331	163,221	n/a	4.61	10.60	n/a	43.55	n/a
1974	85,705	1,815,634	17,911	164,735	n/a	4.78	11.02	n/a	43.41	n/a
1975	91,311	1,869,802	17,844	161,150	n/a	5.12	11.60	n/a	44.10	n/a
1976	96,403	1,928,384	17,956	166,605	167,804	5.37	11.57	11.49	46.38	46.72
1977	100,433	2,013,448	18,204	172,256	174,516	5.52	11.69	11.54	47.20	47.82
1978	104,245	2,126,599	18,933	178,803	183,485	5.51	11.89	11.59	46.29	47.51
1979	109,876	2,253,793	19,766	183,457	188,276	5.56	12.29	11.97	45.25	46.44
1980	117,165	2,351,296	20,028	182,281	187,031	5.85	12.90	12.57	45.35	46.53
1981	129,052	2,443,582	20,312	183,767	187,437	6.35	13.30	13.04	47.78	48.73
1982	135,011	2,500,960	19,602	180,102	185,378	6.89	13.89	13.49	49.60	51.05
1983	138,143	2,569,975	19,769	183,518	189,740	6.99	14.00	13.54	49.90	51.59
1984	141,131	2,689,546	20,291	192,201	200,612	6.96	13.99	13.41	49.70	51.88
1985	144,484	2,815,135	20,992	194,456	205,560	6.88	14.48	13.69	47.54	50.26
1986	149,237	2,929,089	21,633	198,327	211,162	6.90	14.77	13.87	46.71	49.73
1987	155,247	3,022,579	22,178	203,471	216,043	7.00	14.86	13.99	47.12	50.03
1988	165,081	3,121,051	23,264	207,448	223,600	7.10	15.04	13.96	47.16	50.84
1989	175,336	3,228,151	24,084	211,122	228,925	7.28	15.29	14.10	47.61	51.63
1990	182,405	3,321,607	23,923	213,115	230,762	7.62	15.59	14.39	48.92	52.97
1991	186,603	3,389,782	23,037	209,962	227,899	8.10	16.14	14.87	50.17	54.46
1992	190,731	3,463,537	22,514	211,958	227,373	8.47	16.34	15.23	51.84	55.62
1993	193,492	3,560,965	22,996	215,745	234,010	8.41	16.51	15.22	50.98	55.29
1994	198,346	3,686,082	23,747	222,049	239,392	8.35	16.60	15.40	50.32	54.25
1995	204,503	3,836,117	24,020	224,071	243,838	8.51	17.12	15.73	49.73	54.12
1996	212,235	4,012,717	24,374	226,655	247,153	8.71	17.70	16.24	49.18	53.63
1997	226,709	4,216,281	24,964	233,101	254,702	9.08	18.09	16.55	50.21	54.86
1998	242,232	4,465,512	25,390	236,528	257,242	9.54	18.88	17.36	50.53	54.96
1999	260,943	4,725,380	26,312	239,477	263,744	9.92	19.73	17.92	50.26	55.35
2000	283,061	5,012,132	27,193	242,563	267,530	10.41	20.66	18.73	50.38	55.56
2001	300,573	5,184,036	26,958	240,214	264,007	11.15	21.58	19.64	51.66	56.78
Average annual growth rates										
55-01	4.56	4.00	1.46	1.38	n/a	3.06	2.59	n/a	0.46	n/a
55-73	4.13	4.00	1.26	1.36	n/a	2.83	2.61	n/a	0.22	n/a
73-81	6.16	4.42	2.00	1.49	n/a	4.08	2.88	n/a	1.16	n/a
81-89	3.91	3.54	2.15	1.75	2.53	1.72	1.76	0.99	-0.04	0.72
89-01	4.59	4.03	0.94	1.08	1.20	3.62	2.91	2.80	0.68	0.80
89-95	2.60	2.92	-0.04	1.00	1.06	2.64	1.90	1.84	0.73	0.79
95-01	6.63	5.15	1.94	1.17	1.33	4.60	3.93	3.76	0.64	0.80

Sources: Tables 3, 4, 6

**Appendix Table 12: Tax Revenue as a Share of Nominal GDP in Canada and the United States, all Levels of Government, 1961-2002**

	Tax Revenue, billions of current dollars		Nominal GDP, billions of current dollars		Tax Revenue as a Share of Nominal GDP, %		Government Revenue as a Share of Nominal GDP, %	
	Canada	United States	Canada	United States	Canada	United States	Canada	United States
	1961	\$9.1	\$112.1	\$41.2	\$545.7	22.22	20.54	27.83
1962	10.1	120.9	\$44.7	586.5	22.62	20.61	27.98	25.92
1963	10.7	128.7	\$48.0	618.7	22.39	20.80	27.91	26.44
1964	12.2	131.6	\$52.5	664.4	23.27	19.81	28.93	25.38
1965	13.6	143.3	\$57.9	720.1	23.54	19.90	29.51	25.36
1966	15.3	156.6	\$64.8	789.3	23.61	19.84	30.63	26.33
1967	17.2	166.7	\$69.7	834.1	24.62	19.99	31.98	26.83
1968	19.5	195.6	\$76.1	911.5	25.56	21.46	33.28	28.30
1969	22.5	220.5	\$83.8	985.3	26.81	22.38	35.06	29.51
1970	24.4	220.6	\$90.2	1,039.7	27.10	21.22	35.59	28.75
1971	27.2	230.9	\$98.4	1,128.6	27.60	20.46	36.21	28.27
1972	30.6	263.5	\$109.9	1,240.4	27.84	21.24	36.49	29.81
1973	35.8	288.3	\$129.0	1,385.5	27.79	20.81	36.53	29.96
1974	45.1	316.1	\$154.0	1,501.0	29.30	21.06	38.62	30.37
1975	48.2	321.5	\$173.6	1,635.2	27.78	19.66	37.51	29.09
1976	54.4	369.3	\$200.0	1,823.9	27.20	20.25	37.36	29.79
1977	59.4	415.7	\$221.0	2,031.4	26.90	20.46	37.27	30.00
1978	63.1	467.7	\$244.9	2,295.9	25.75	20.37	36.75	30.12
1979	70.9	518.5	\$279.6	2,566.4	25.36	20.20	36.53	29.97
1980	81.8	563.2	\$314.4	2,795.6	26.00	20.15	37.39	30.03
1981	100.3	637.7	\$360.5	3,131.3	27.84	20.37	39.64	30.34
1982	106.4	633	\$379.9	3,259.2	28.00	19.42	40.23	29.45
1983	111.8	666.3	\$411.4	3,534.9	27.18	18.85	39.72	28.74
1984	122.1	731.1	\$449.6	3,932.7	27.15	18.59	39.76	28.59
1985	131.1	789.1	\$485.7	4,213.0	27.00	18.73	39.45	28.88
1986	145.4	834.5	\$512.5	4,452.9	28.36	18.74	40.36	29.07
1987	162.1	928.1	\$558.9	4,742.5	29.00	19.57	40.64	29.66
1988	179.4	977	\$613.1	5,108.3	29.26	19.13	41.02	29.41
1989	194.3	1067.7	\$657.7	5,489.1	29.54	19.45	41.24	29.68
1990	209.4	1114	\$679.9	5,803.2	30.80	19.20	42.91	29.62
1991	214.4	1131.9	\$685.4	5,986.2	31.28	18.91	43.72	29.87
1992	218.1	1186.6	\$700.5	6,318.9	31.13	18.78	44.03	29.97
1993	221.9	1270.1	\$727.2	6,642.3	30.51	19.12	43.32	30.42
1994	232.0	1367.7	\$770.9	7,054.3	30.10	19.39	42.88	30.73
1995	244.2	1463.8	\$810.4	7,400.5	30.14	19.78	42.94	31.10
1996	259.6	1581.3	\$836.9	7,813.2	31.02	20.24	43.51	31.48
1997	279.2	1715.7	\$882.7	8,318.4	31.63	20.63	43.97	31.70
1998	289.8	1843.3	\$915.0	8,781.5	31.67	20.99	44.02	32.16
1999	309.7	1964.7	\$980.5	9,274.3	31.59	21.18	43.60	32.47
2000	331.3	2127.3	\$1,065.0	9,824.6	31.11	21.65	43.73	33.06
2001	331.2	2083.8	\$1,092.2	10,082.2	30.32	20.67	42.94	32.43
2002	333.5	1942.8	\$1,142.1	10,446.0	29.20	18.60	41.39	30.45

Source: Canada: Tax Revenue: CANSIM II series v647168, v647173, v647167 (direct taxes, indirect taxes, government income) April 09, 2003. Nominal GDP: 7

United States: Tax Revenue and government current receipts: BEA website, www.bea.gov, NIPA Table 3.3. April 09, 2003. Nominal GDP: Table 4.

Note: In Canada, tax revenue is the sum of direct and indirect taxes for all levels of government. In the United States,

Tax revenue is the sum of income taxes, corporate profits tax accruals, sales taxes, and property taxes for state and local government, and of income taxes, corporate profits tax accruals, excise taxes and customs duties for federal government.

**Appendix Table 13: Union Coverage as a Percentage of all Employees, Canada and the United States, 1976-2002**

	Canada		United States		Union Density	
	Total	Union	Total	Union	Canada	United States
1976	8,547	2,738	n/a	n/a	32.04	n/a
1977	8,635	2,878	n/a	n/a	33.33	n/a
1978	8,976	2,875	n/a	n/a	32.03	n/a
1979	9,331	2,993	n/a	n/a	32.08	n/a
1980	9,553	3,055	n/a	n/a	31.98	n/a
1981	9,618	3,115	n/a	n/a	32.39	n/a
1982	9,121	3,003	n/a	n/a	32.92	n/a
1983	9,475	3,331	88,290	20,532	35.16	23.26
1984	9,679	3,380	92,194	19,932	34.92	21.62
1985	10,009	3,434	94,521	19,358	34.30	20.48
1986	10,283	3,551	96,903	19,278	34.54	19.89
1987	10,710	3,617	99,303	19,051	33.77	19.18
1988	10,940	3,720	101,407	19,241	34.01	18.97
1989	11,137	3,826	103,480	19,198	34.35	18.55
1990	10,950	3,841	104,876	19,105	35.07	18.22
1991	10,778	3,829	103,723	18,790	35.53	18.12
1992	10,718	3,803	104,668	18,578	35.48	17.75
1993	10,757	3,757	106,101	18,682	34.93	17.61
1994	11,150	3,814	107,989	18,850	34.20	17.46
1995	11,149	3,858	110,038	18,346	34.60	16.67
1996	n/a	n/a	111,960	18,158	n/a	16.22
1997	11,421	3,844	114,533	17,923	33.66	15.65
1998	11,715	3,848	116,730	17,918	32.84	15.35
1999	12,068	3,882	118,963	18,182	32.17	15.28
2000	12,488	4,025	120,786	17,944	32.23	14.86
2001	12,768	4,109	122,482	18,114	32.18	14.79
2002	13,066	4,201	122,007	17,771	32.15	14.57
Averages						
1983-2002					34.01	17.72
1976-1982					32.39	n/a
1983-1989					34.44	20.28
1990-2002					33.75	16.35

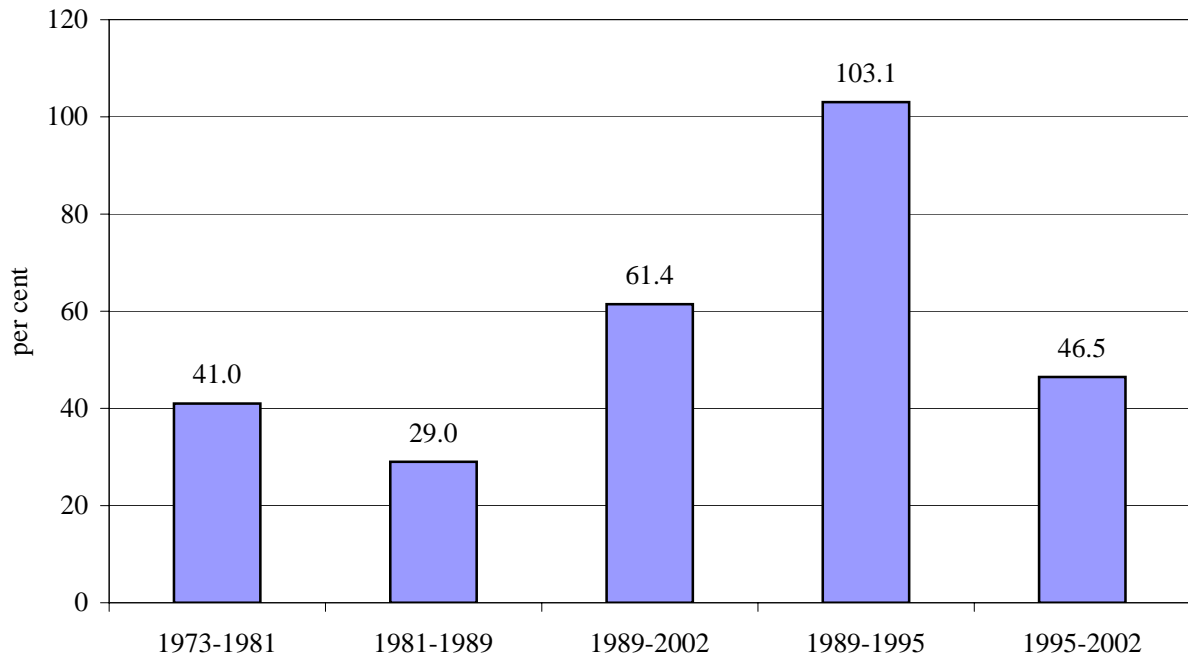
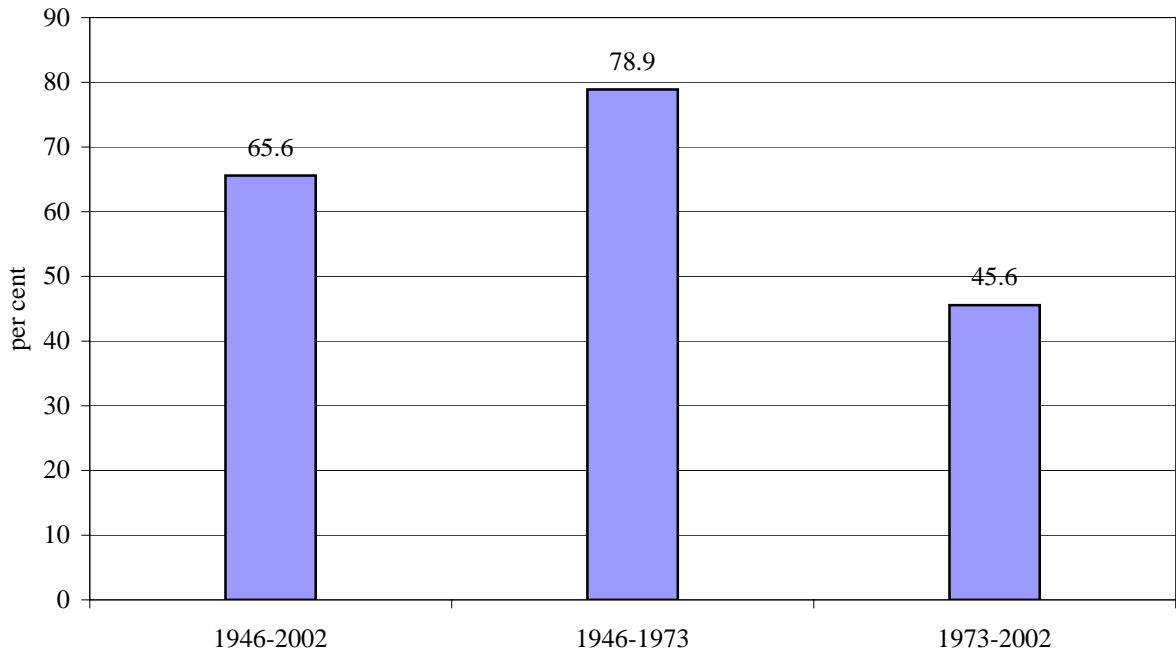
Source: Canada: Employees: CANSIM II series v2113867 for 1997-2002 and v812257 for 1976-1995.

Union coverage: CANSIM II series v2113868 for 1997-2002 and v811960 for 1976-1995.

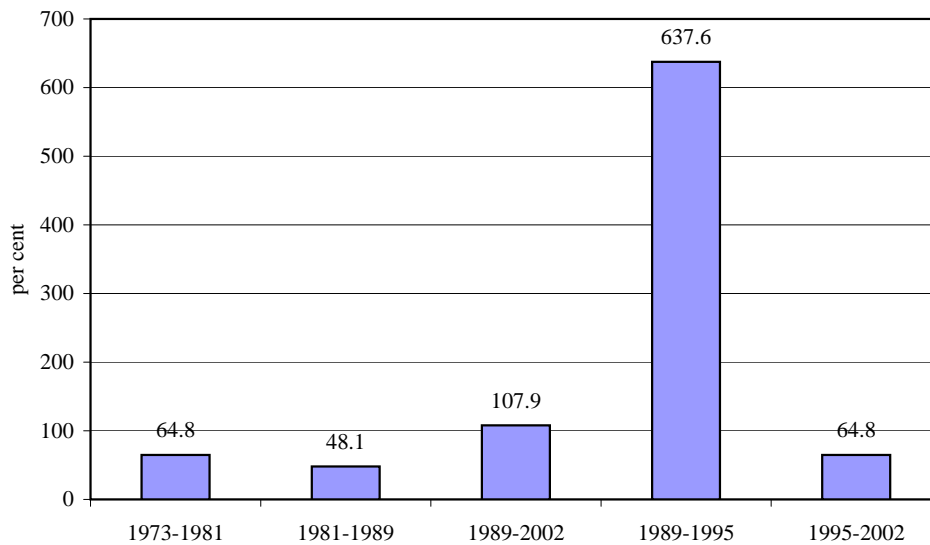
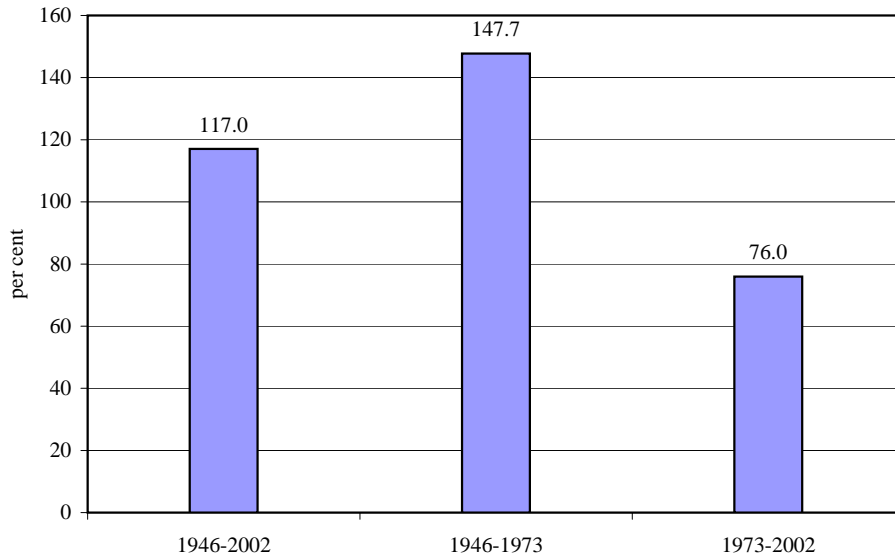
United States: Unpublished CPS union affiliation data provided by the BLS.

Notes: Data in the US refers to union coverage. Data in Canada for 1976-1995 refers to unionized workers, for 1997-2002, it refers to union coverage. Canadian data is based on CALURA for 1976-2002, and on LFS for 1997-2002.

**Chart 1: Contribution of GDP per Hour Worked Growth to Economic Growth in Canada, 1946-2002, Selected Periods  
(productivity growth as a proportion of GDP growth)**

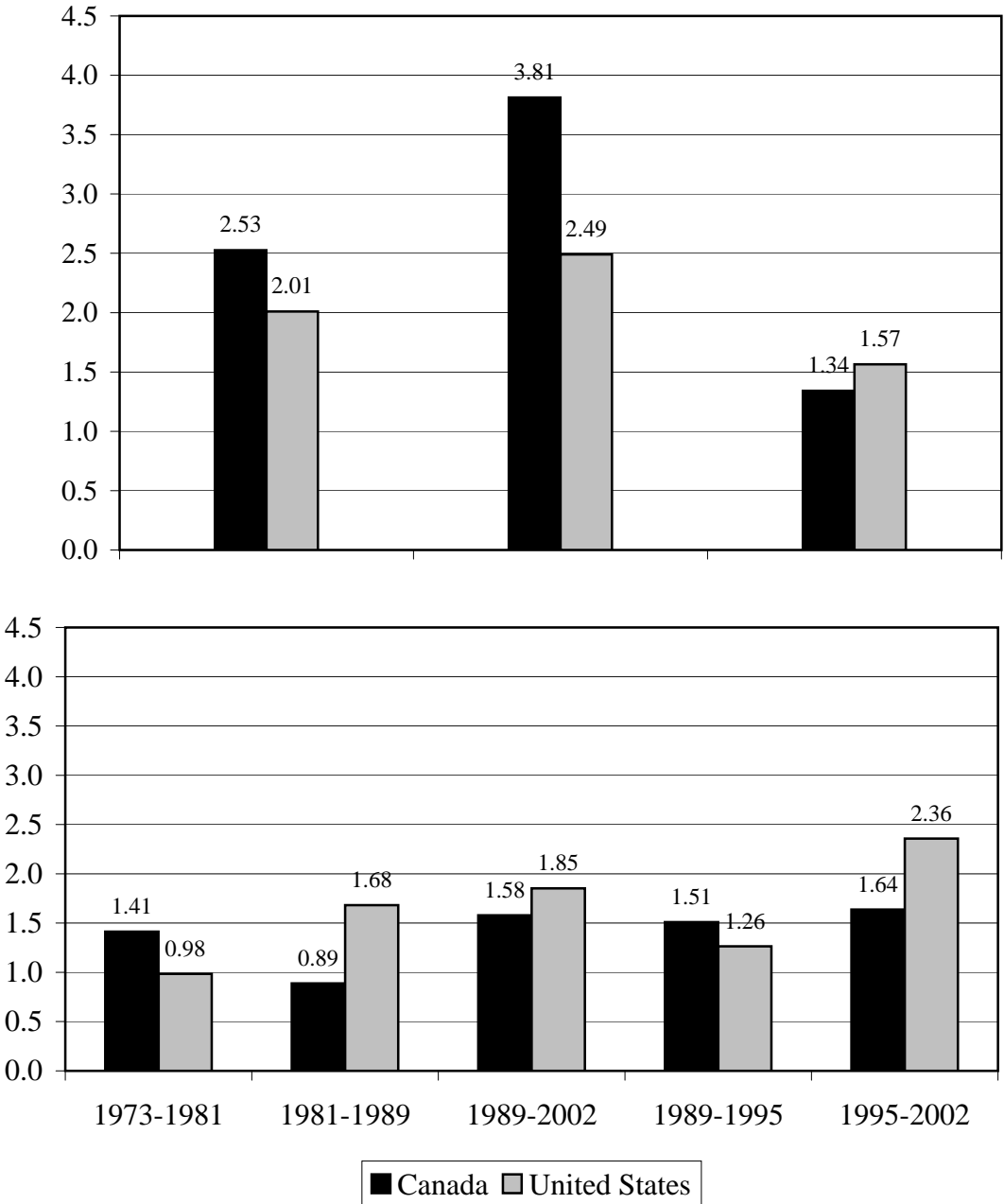


**Chart 2: Contribution of GDP per Hour Growth to Growth in GDP per Capita in Canada, 1946-2002, Selected Periods**  
 (productivity growth as a proportion of GDP per capita growth)



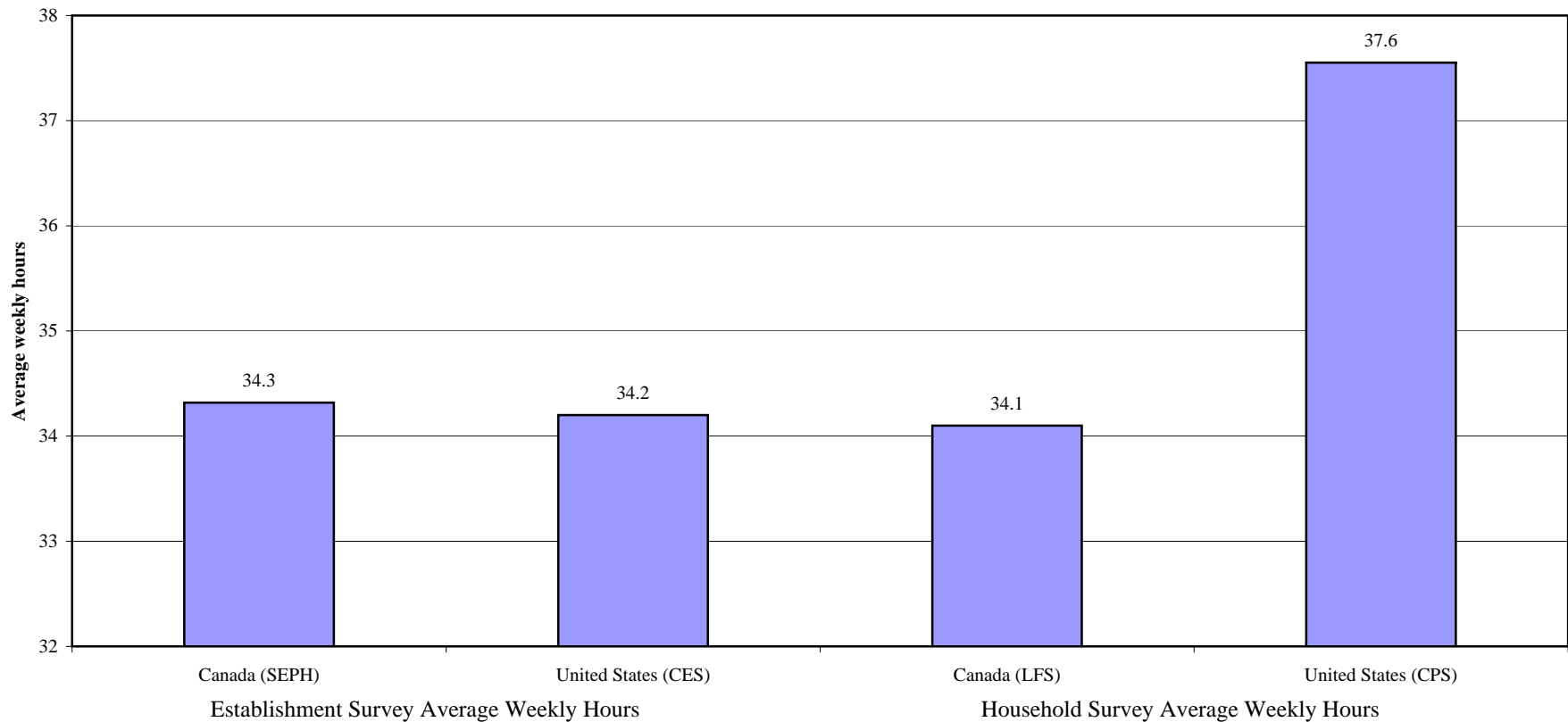
Source: Tables 1

**Chart 3: Real GDP per Hour Worked in Canada and the United States  
(Average annual rate of change)**



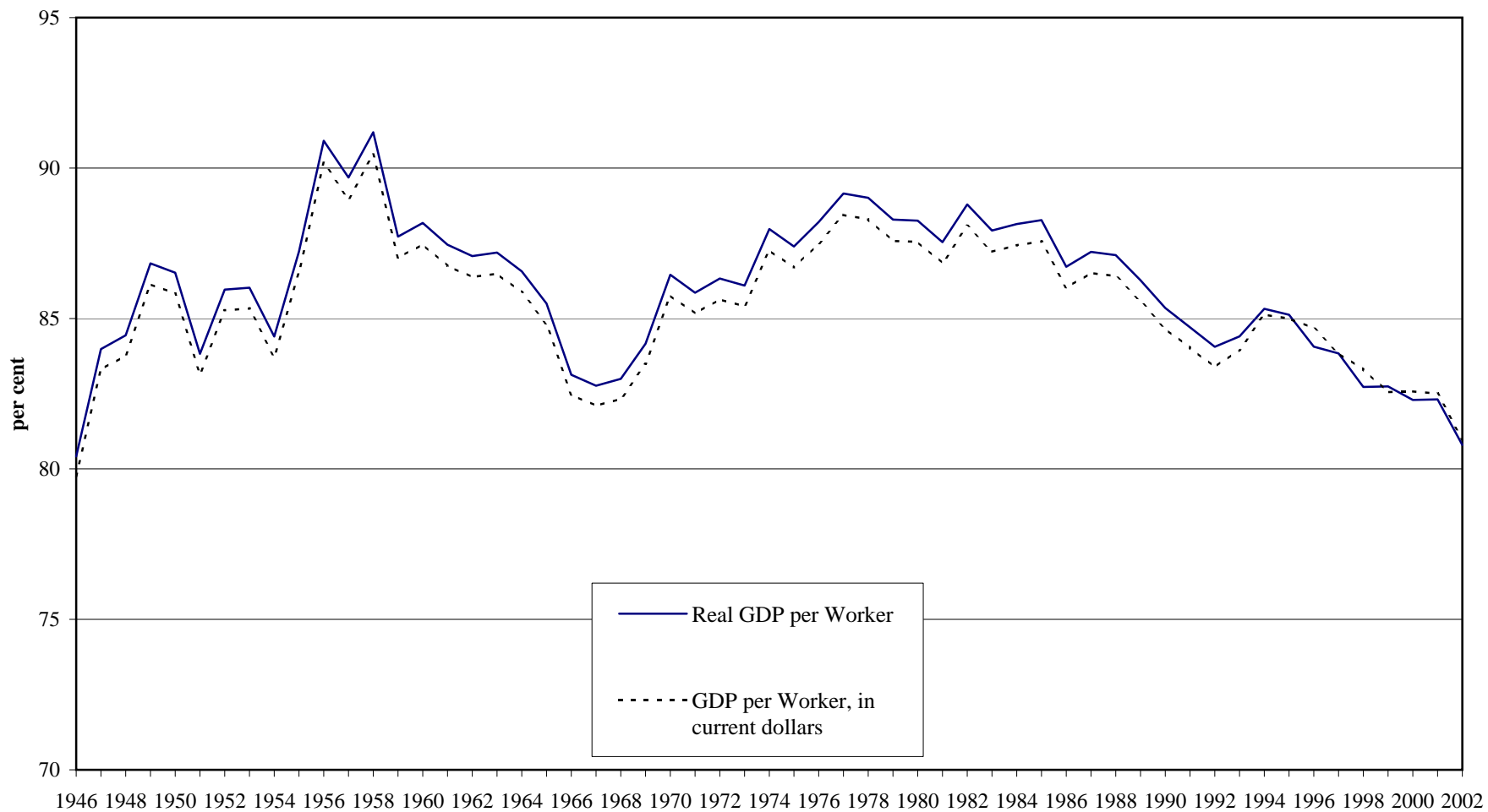
Source: Tables 3 and 4

**Chart 4: Average Weekly Hours in Canada and the United States,  
Establishment and Household Surveys, 2002**



Source: Canada: SEPH estimates: CANSIM II Tables 281-0024, 281-0033 and 281-0038, on January 14, 2003. LFS estimates: Statistics Canada, CANSIM II series v2634367. United States: CES estimates: series EEU00500005(n) from Bureau of Labour Statistics website: [www.bls.gov](http://www.bls.gov), on January 14, 2003. CPS estimates: series LFU123000000 from Bureau of Labour Statistics website: [www.bls.gov](http://www.bls.gov), on January 14, 2003. Notes: The SEPH series is an average of average weekly hours for salaried employees and employees paid by the hour, weighted according to the respective employment shares. Household Average Hours in the United States is equal to total hours, which is the product of average hours for persons at work times number of persons at work, divided by total employment.

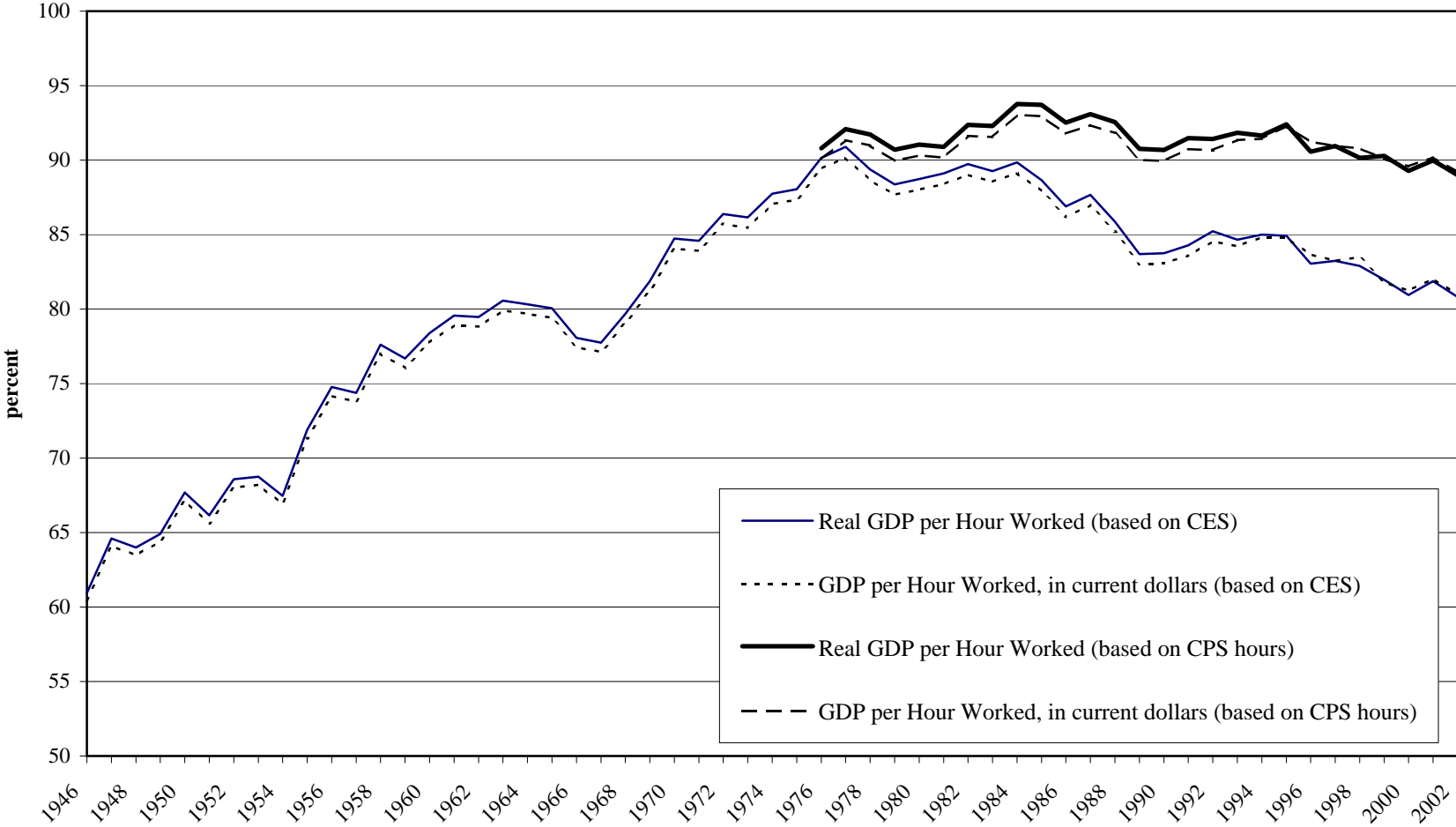
**Chart 5: GDP per Worker Levels, Canada as a Percent of the United States, 1946-2002**



Source: Table 7

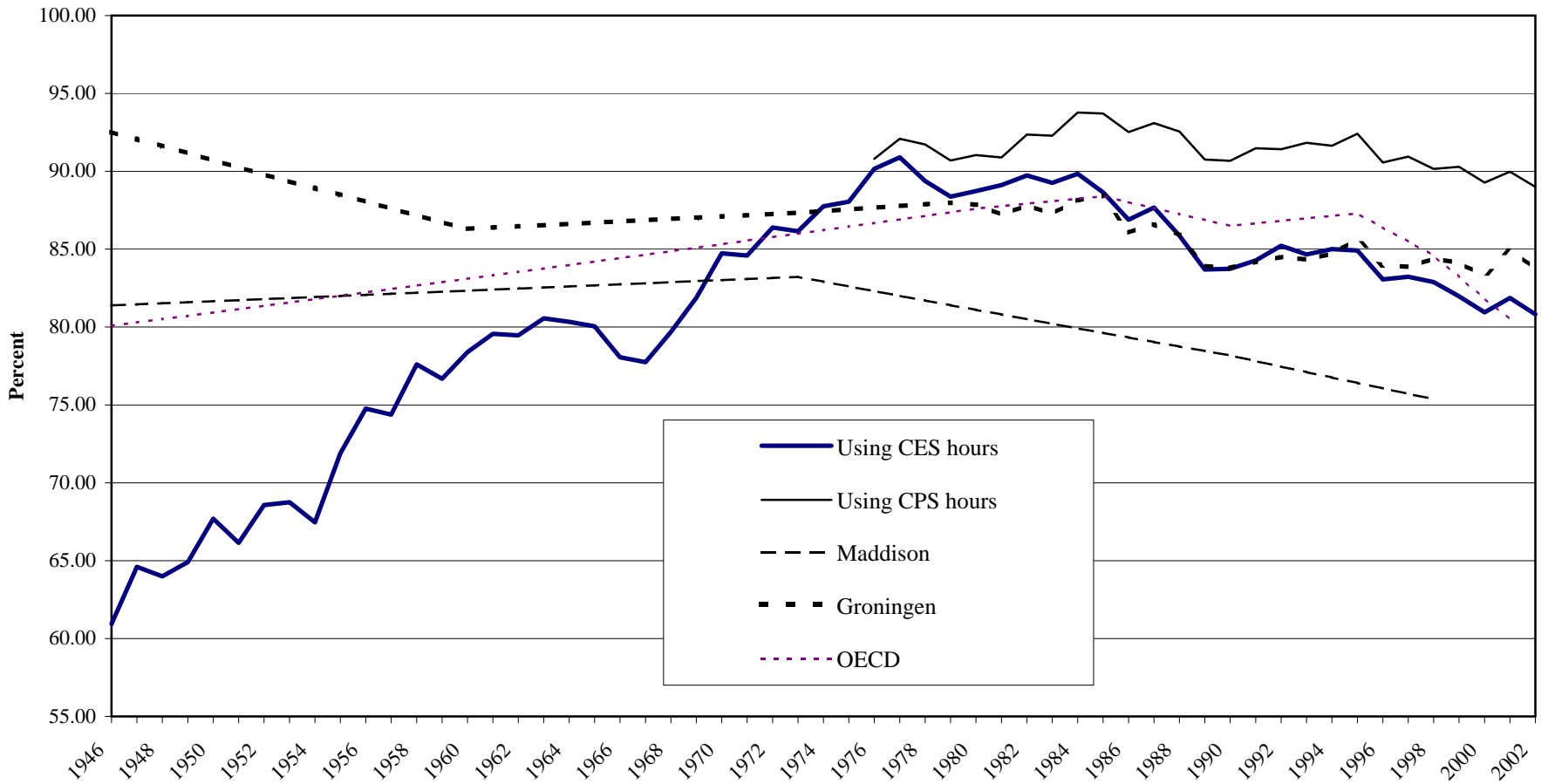


**Chart 6: GDP per Hour Worked Levels, Canada as a Percent of the United States, 1946-2002**



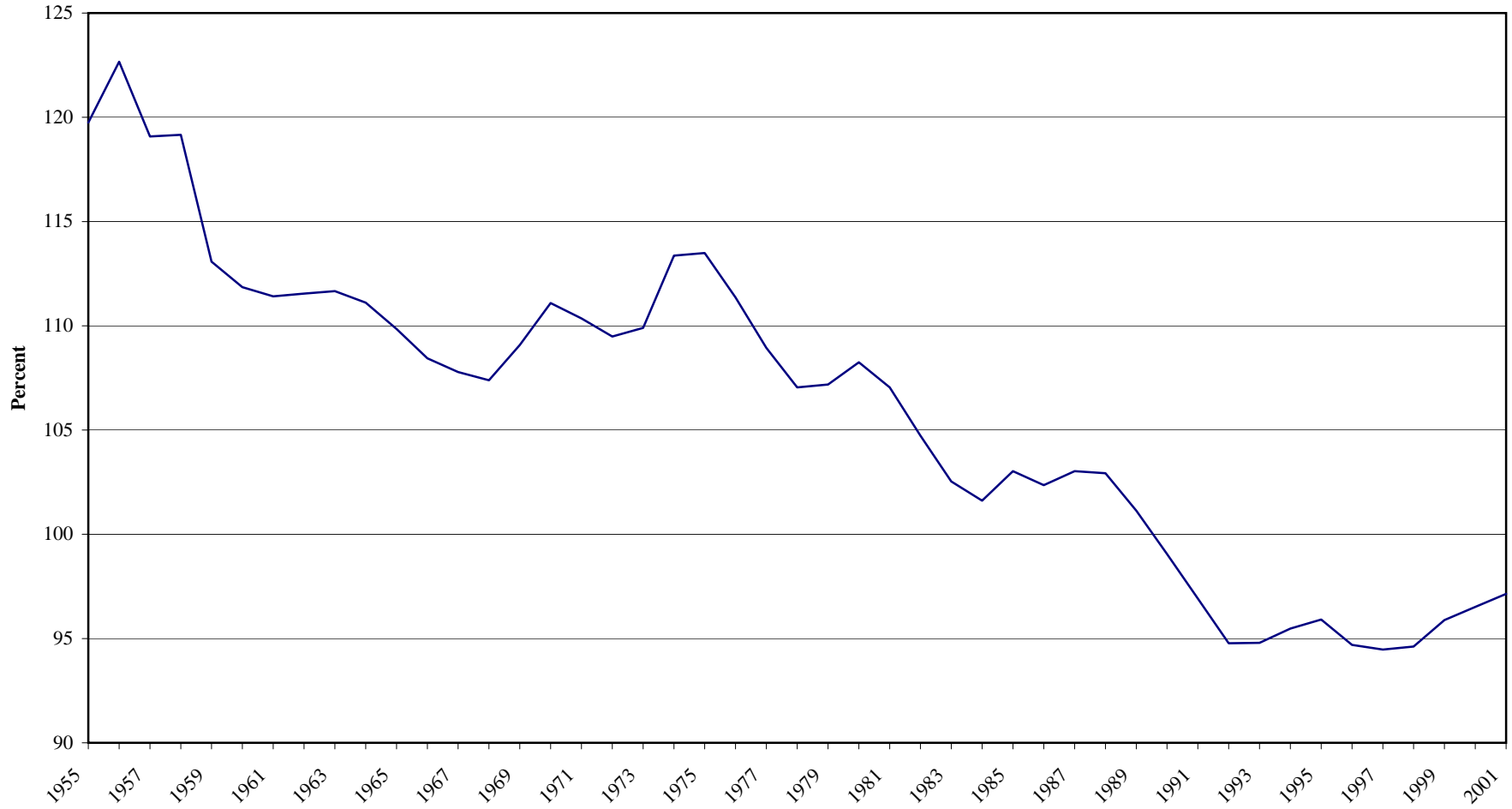
Source: Table 7

**Chart 7: Trends in Real GDP per Hour, Canada as a Percentage of the United States, Various Sources, 1946-2002**



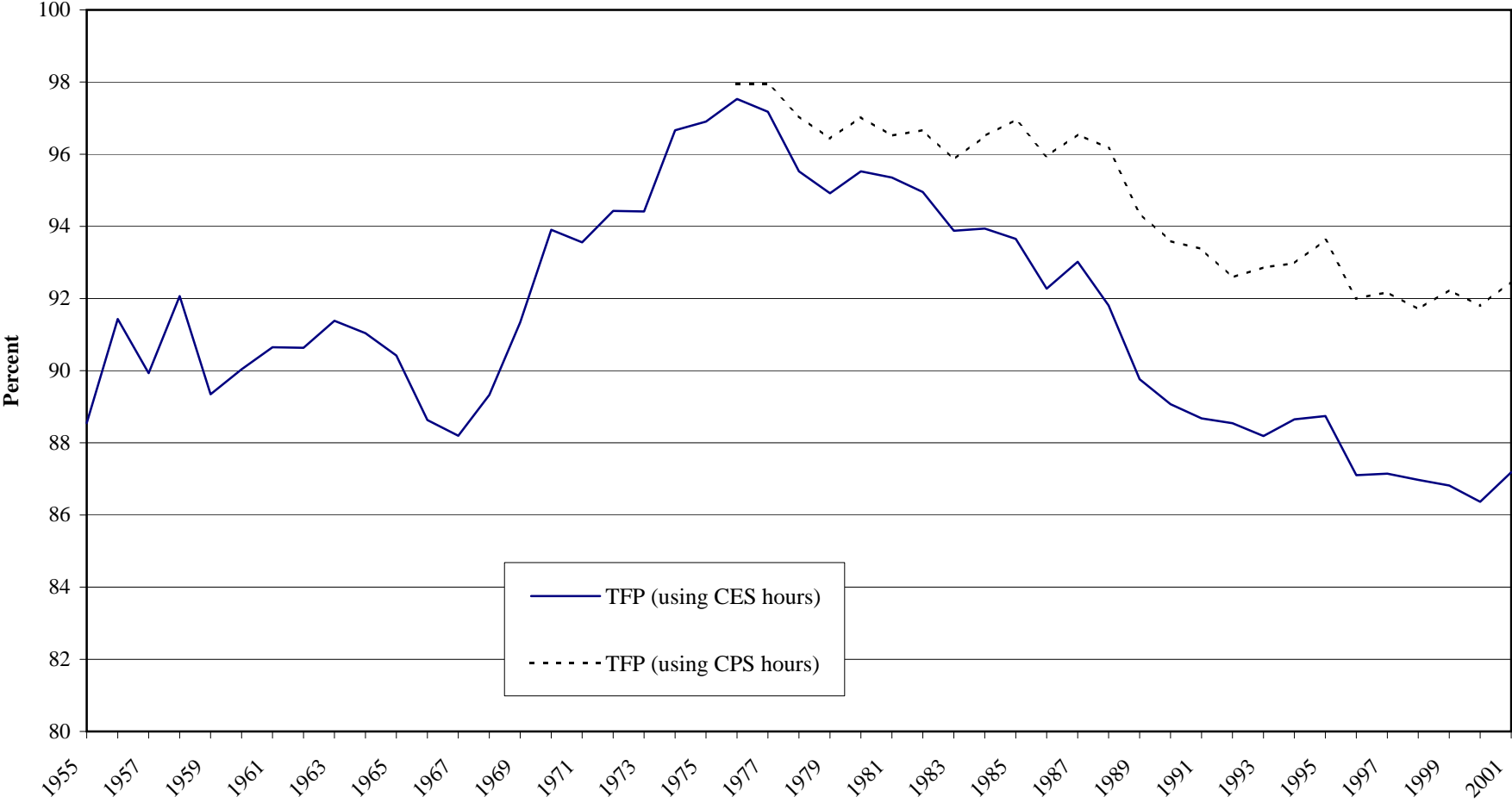
Sources: Table 7, Appendix Tables 3 and 4. Note: Trends for the Maddison, Groningen and OECD series were obtained by linear interpolation.

**Chart 8: Relative Capital Productivity Levels, Canada as a Percentage of the United States, 1955-2001**



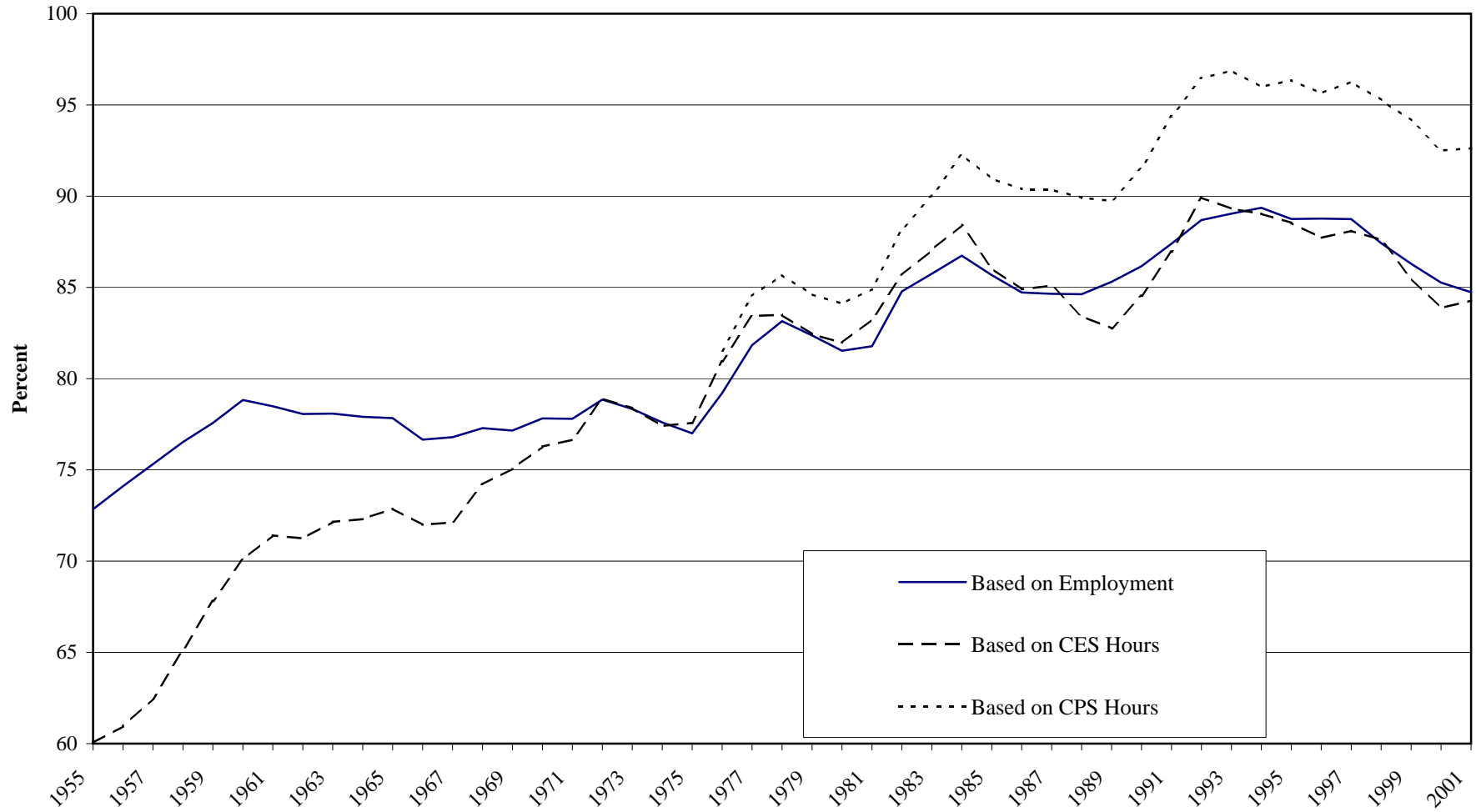
Source: Table 8

**Chart 9: Relative Total Factor Productivity Levels, Canada as a Percentage of the United States, 1955-2001**



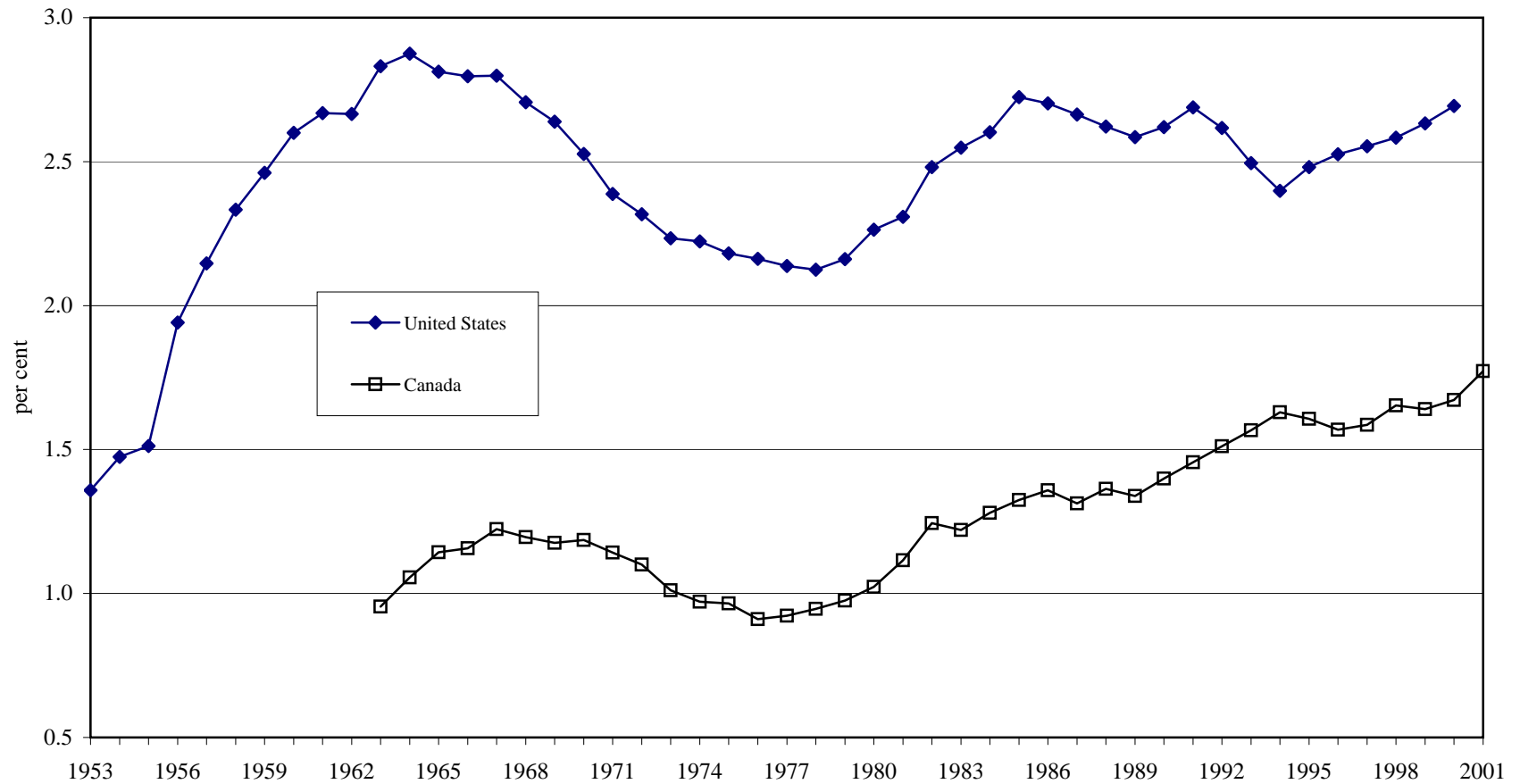
Source: Table 9 and 10

**Chart 10: Relative Capital Labour Ratio Levels, Canada as a Percentage of the United States, 1955-2001**



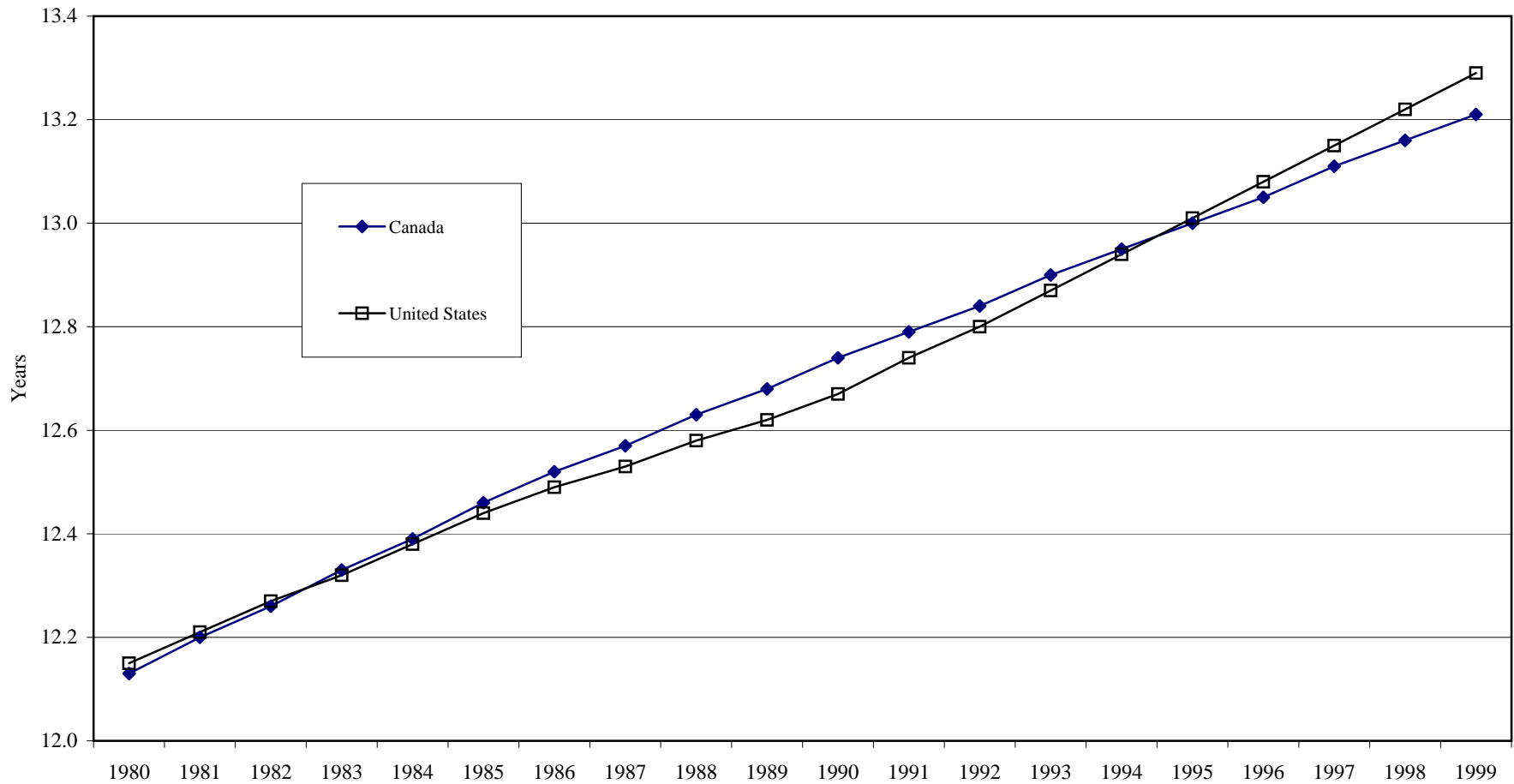
Source: Table 13 and 14

**Chart 11: Research and Development Expenditure as a Share of GDP in Canada and the United States, 1993-2000**



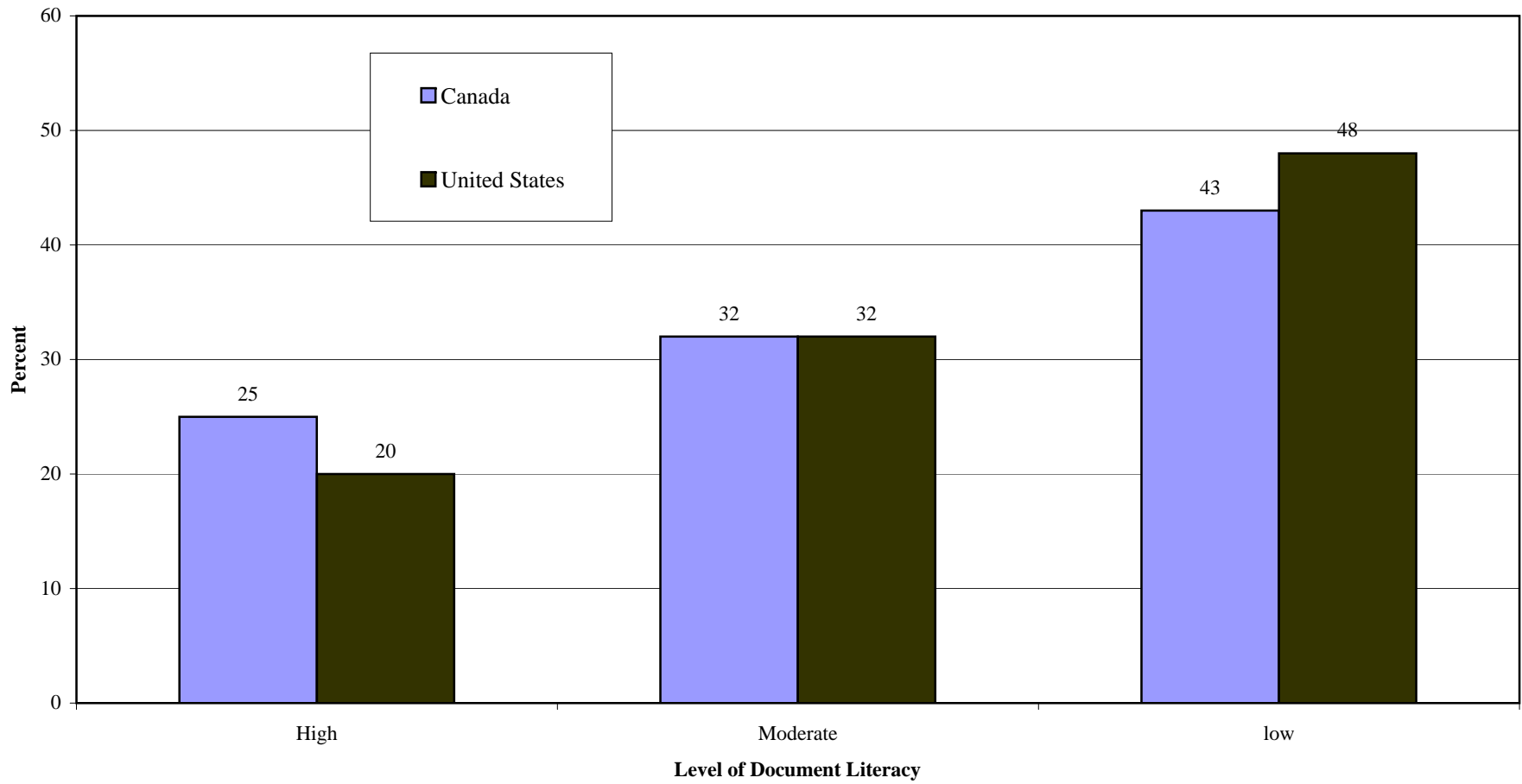
Source: United States: R&D data: National Science Foundation. *National Patterns of Research and Development Resources, 2000 Data update (NSF 01-309)*, Table D. Available online at [www.nsf.gov/sbe/srs/nprdr/start.htm](http://www.nsf.gov/sbe/srs/nprdr/start.htm), January 23, 2002. Nominal GDP data: NIPA Tables, Canada: CANSIM II Table 358-0001 for R&D data and 379-0024 for Nominal GDP, January 21, 2003. [www.bea.gov](http://www.bea.gov), January 17, 2003.

**Chart 12: Human Capital in Canada and the United States, Average Years of Schooling in the Population, 1980-1999**



Source: Average years of schooling for 1980, 1985, 1990 and 1995 from De la Fuente, A. and R. Domenech, "Attainment Levels in OECD Countries" v. 2.0, January 2001. Available at <http://iei.uv.es/~rdomenech/human.html>. Data for years between based on linear interpolation.

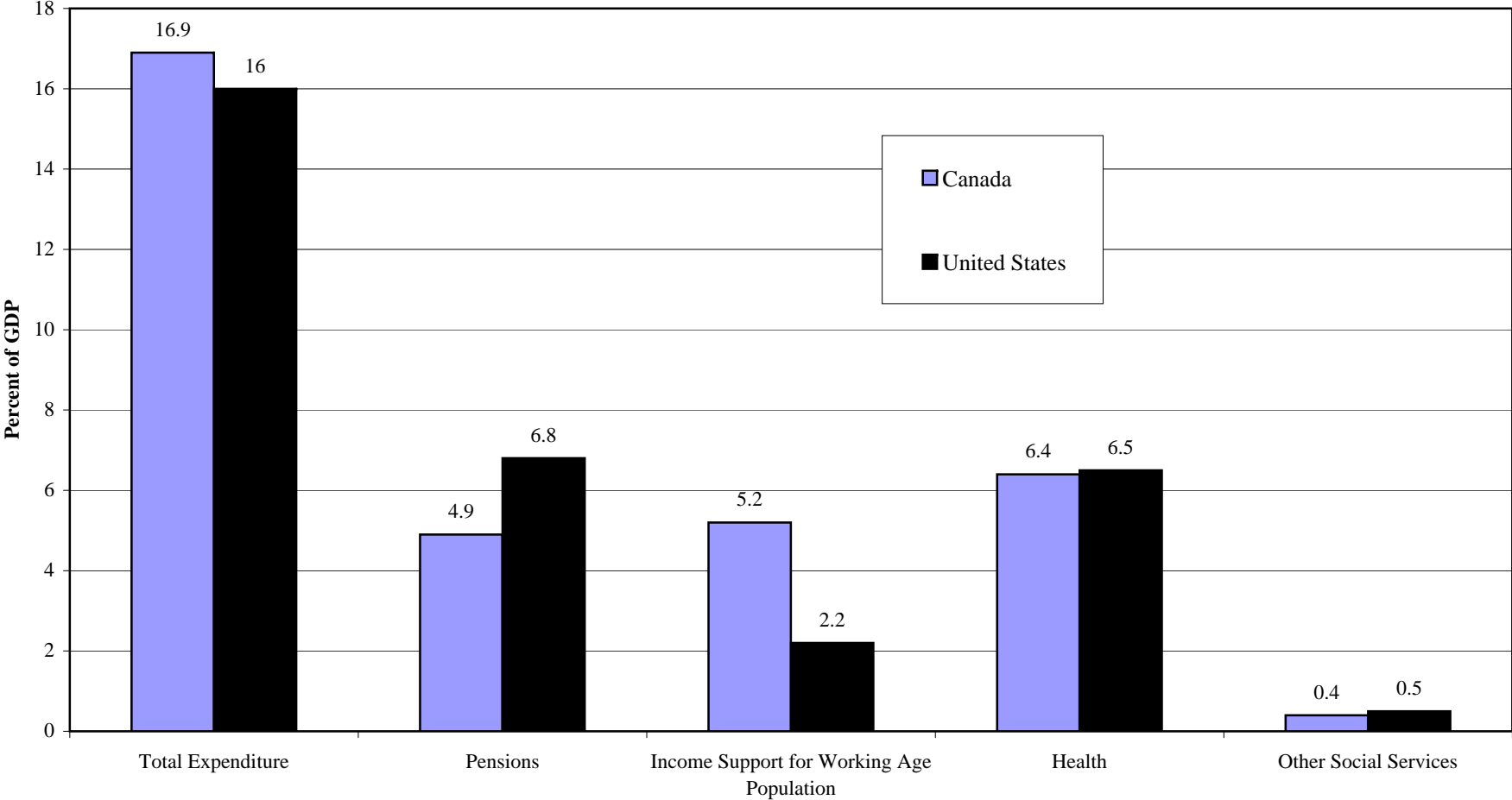
**Chart 13: Adult Population by Level of Document Literacy, Canada and United States, 1998**



Source: OECD. *Society at a Glance, OECD Social Indicators 2001*. OECD, 2001, pp 57. Data is based on Industrial Adult Literacy Survey.

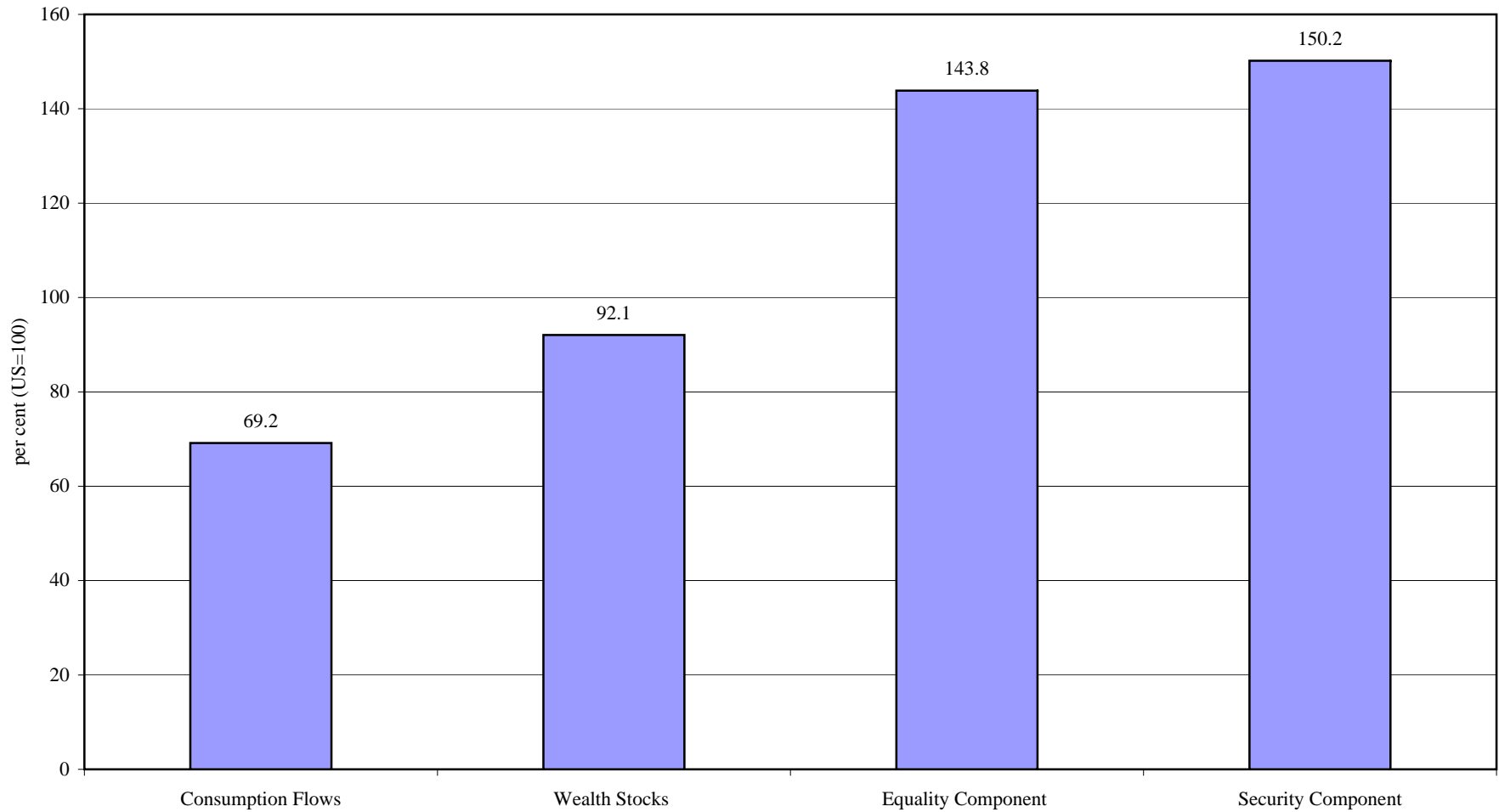


**Chart 14: Public Social Expenditure by Broad Social Policy Area, Canada and United States, 1997**



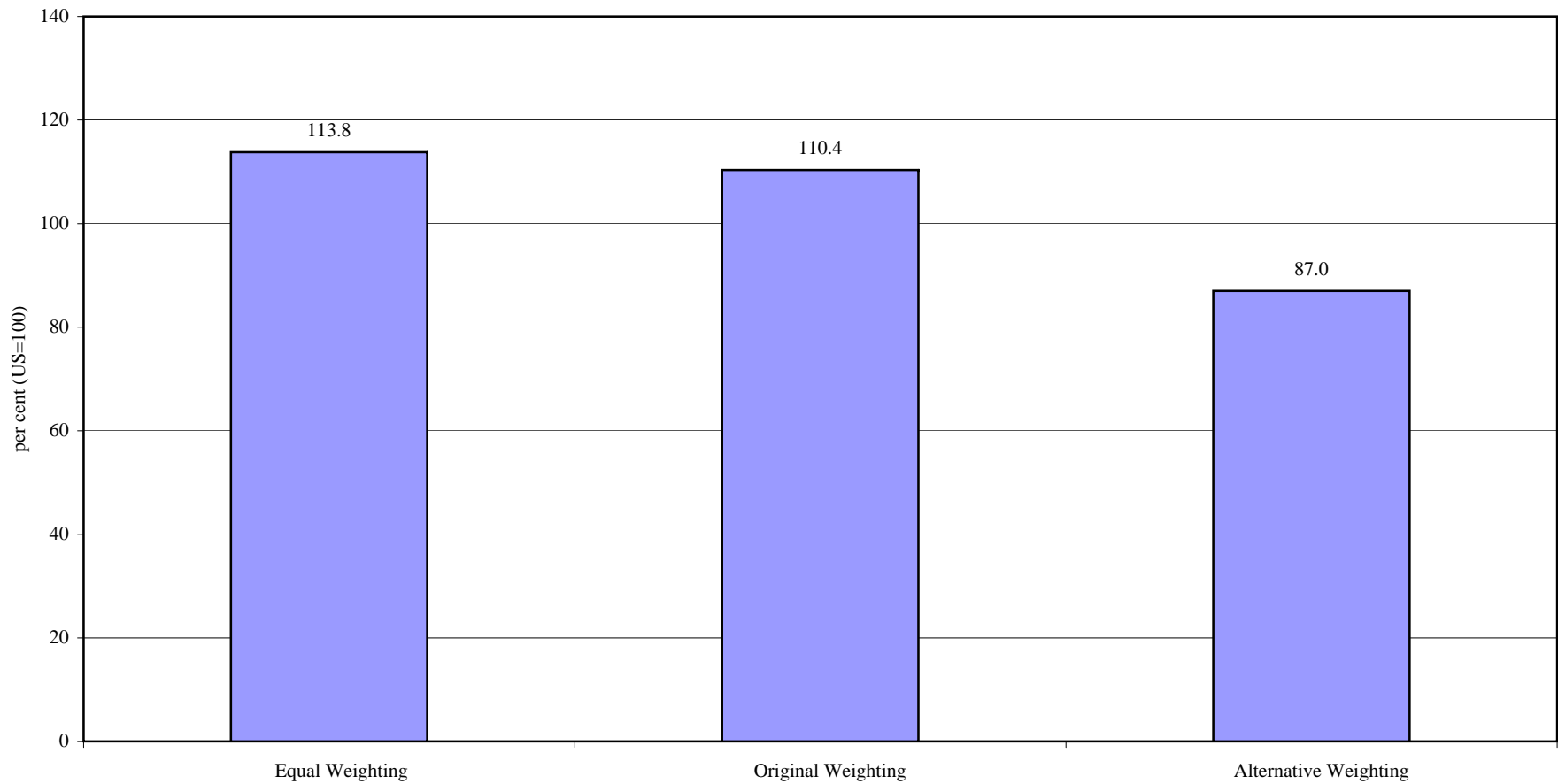
Source: OECD. Society at a Glance, OECD Social Indicators 2001. OECD, 2001, pp 73

**Chart 15: Levels of Economic Well-Being in Canada as a Percentage of the United States  
(US=100), 1999**



Source: Osberg, Lars and Andrew Sharpe. The Index of Economic Well being. *Indicators, The Journal of Social Health*, Spring 2002, vol.1, no. 2, pp. 24-62

**Chart 16: Overall Well-Being Indexes, Canada as a Percentage of the United States (US=100), 1999**



Source: Osberg, Lars and Andrew Sharpe. The Index of Economic Well being. *Indicators, The Journal of Social Health*, Spring 2002, vol.1, no. 2, pp. 24-62.

Note; Equal weighting means that each component of the index has a 0.25 weight. Original weighting means that the Consumption Flows component has a 0.4 weight, the Wealth Stocks component has a 0.1 weight, the Equality component has a 0.25 weight, and the Security component has a 0.25 weight. Alternative weighting means that the Consumption flows component has a 0.7 weight, the Wealth Stocks component has a 0.1 weight, the Equality component has a 0.1 weight, and the Security component has a 0.1 weight.