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PERSPECTIVES

ON LABOUR AND INCOME

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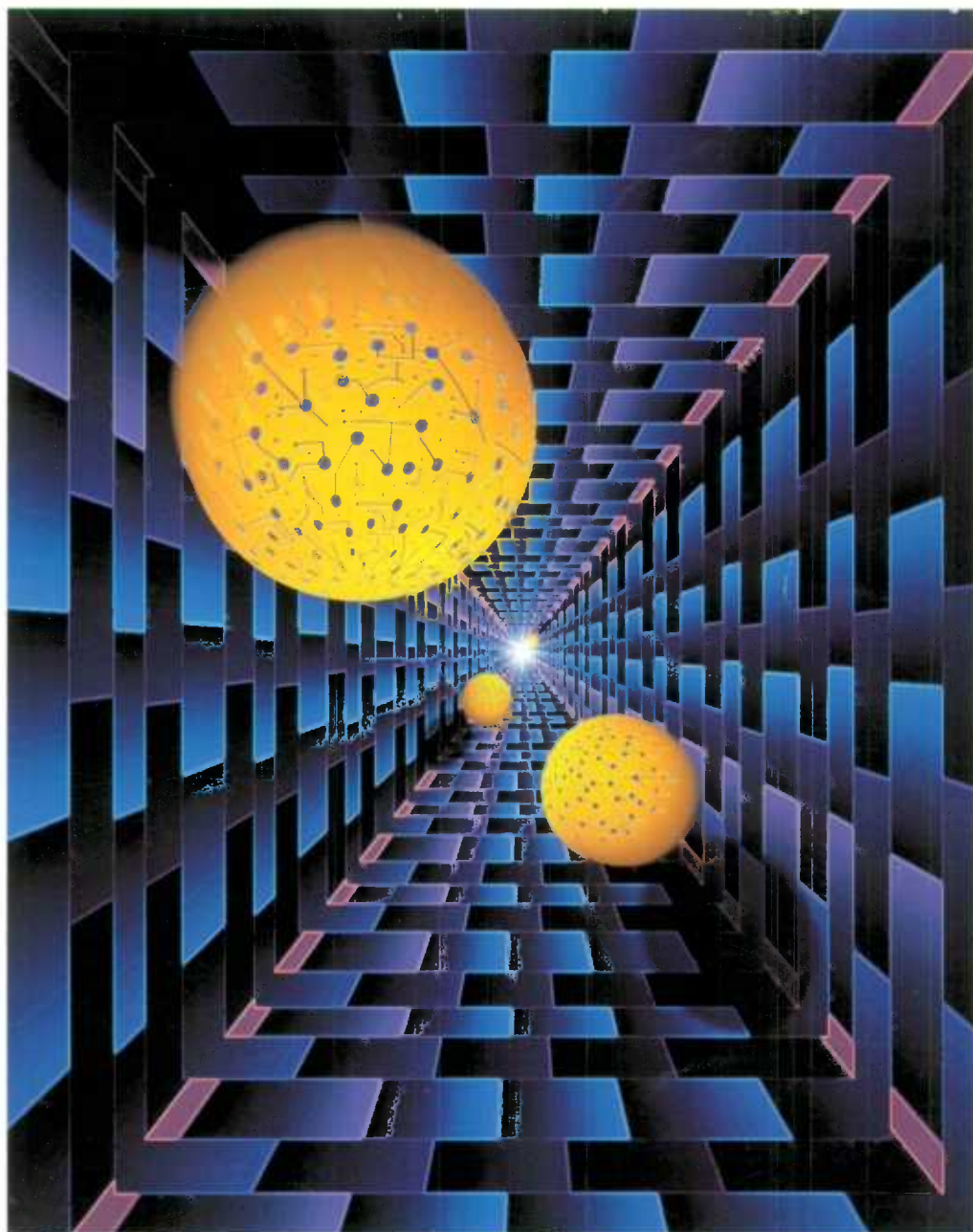
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Zhengxi Lin

Payroll taxes have grown substantially since the early 1980s, and have become an increasingly important source of government revenues. This article, part one of a two-part analysis, details the various payroll taxes collected by the federal and provincial governments. A subsequent article will report on national and provincial trends in the level, growth and role of each component and compare Canadian payroll taxes to those of the other G-7 countries.

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PERSPECTIVES

ON LABOUR AND INCOME

Editor-in-Chief

Ian Macredie
(613) 951-9456
ian.macredie@statcan.ca

Managing Editor

Henry Pold
(613) 951-4608
henry.pold@statcan.ca

Editors

Catherine Hardwick
Bruce Rogers

Data Services

Pierre Bérard
Joanne Bourdeau
Laura Fraser

Production and Composition

Heather Berrea
Cynthia Fortura
Diane Joannis
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28 Income taxes in Canada and the United States

Michael Wolfson and Brian Murphy

Much discussion of comparative tax rates is based on federal statutory income tax rates. But taxes actually paid are often quite different, owing to various tax deductions, credits, surtaxes and payroll taxes. This study uses effective rather than statutory tax rates to compare income taxes paid by individuals and families in Canada and the United States.

32 Knowledge workers on the move

John Zhao, Doug Drew and T. Scott Murray

This article examines available empirical evidence about Canada's "brain drain"—the loss of knowledge workers to the United States. It also looks at Canada's "brain gain"—the acquisition of knowledge workers from the rest of the world. (Adapted from an article in the Spring 2000 issue of *Education Quarterly Review*).

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Perspectives on Labour and Income

The quarterly for labour market and income information

Forum

From the Managing Editor

■ Weather is not the only perennial source of conversation in Canada. Almost anywhere one looks, one finds some sort of comparison with the United States—taxes, salaries, cost of living, unemployment, and the list goes on. However, much of the discussion is based on anecdotal or incomplete information. For example, much recent debate has focused on the issue of lower taxes south of the border and whether it has spurred a mass emigration of Canada's brightest and best. But how large is the exodus? An article in this issue (extracted from the Spring 2000 issue of *Education Quarterly Review*) provides some hard data on the phenomenon and looks at some of the measurement problems involved. And as the study on income taxes in Canada and the United States points out, the tax situation is far from clear-cut—in any given income range (adjusted for purchasing power), one finds a significant overlap in effective tax rates.

To round out the discussion, an article on payroll taxes in Canada sets the stage for an upcoming comparison with the United States and the other members of the G-7. As further background, "Key labour and income facts" provides a set of charts comparing Canada and the United States on a variety of topics: employment and unemployment, education and training, income, and others. Finally, we've included a discussion on sources of difference in provincial earnings and a new look at the Help-wanted Index as an indicator of labour market trends.

Henry Pold
Managing Editor
E-mail: henry.pold@statcan.ca

In the mail...

■ I enjoyed reading your piece on gambling today.

While I haven't finished reading it, I have a few thoughts that I would like to pass on for consideration.

First, the use of the mean to report expenditures may not be appropriate in this case. I suggest that if

you check your raw data you will find measures of expenditure to be highly skewed. For example, in Nova Scotia 0.9% of the total adult population (approximately 16% of players) accounts for 53% of total VLT [video lottery terminal] revenue. These people spend "on average" \$820 per month.

The majority of players (about 32% of all adults) in Nova Scotia (we call them casual players) spend "on average" about \$1.30 per month. My sense is that this information renders the reporting of mean estimates not only weak (at best), but downright dangerous.

Second, (this one is sort of a philosophical piece) not all gambling activities are created equal. In practical terms we need to start thinking about some of these activities differently. For example, from a public health/policy perspective, it makes little sense putting the person who buys a raffle ticket from the local boy scout troop in with someone who plays the VLT three hours a day, seven days a week. Gambling has been, and always will be, pervasive in our society. That has not changed for hundreds of years. The fact is, though, the "business" of gambling has, and it has created social issues that can be tackled only when we start looking at it (and measuring it) a little differently.

Our operational definition of "gambling" needs to change to reflect the rise in the "business" of gambling in Canada.

This is a fascinating subject that I am happy to see Statistics Canada involved in. Your organization has the capability to contribute a good deal to this field, I suspect, particularly by providing "monitoring" kinds of measures.

Ray MacNeil

.....

■ You make a good point in suggesting that average expenditure rates can be misleading, and that the distribution of the rates should be looked at as well. The mean or average can certainly hide skewness in the data. I will definitely keep this in mind when I examine the data again.

Outside of the Survey of Household Spending, which allows for the examination of annual household participation and expenditure rates for broad types of gambling, Statistics Canada does not have specific data on the prevalence of gambling in Canada. So, unfortunately, we have no detailed information on who gambles, what games they choose, how often they gamble and how much they spend.

I agree that gambling has become pervasive in this country, and perhaps that is why there has been such interest in the gambling-related articles published in Perspectives. I thank you again for your interest.

Katherine Marshall

■ I wish to commend you on your work exploring household expenditures on gambling, including the recent "Update on gambling," in the Spring 2000 issue of *Perspectives*.

Your previous work in this area prompted the Nova Scotia Alcohol and Gaming Authority (NSAGA) to further analyze consumer expenditures in order to assess the social and economic consequences of gaming in the province. In the summer of 1999, the NSAGA contracted MPM Gaming Research to examine the relationship between gambling expenditures and other forms of consumer spending, sources and levels of income, and debt. MPM Gaming Research conducted detailed analyses of the 1996 Family Expenditure Survey and the 1997 Survey of Household Spending in order to examine gambling expenditure in Nova Scotia, compared with Saskatchewan and Canada total figures. Their findings closely paralleled yours, although the analyses were more specific to Nova Scotia.

The NSAGA 1998/99 *Annual Gaming Report* presents a compilation of gambling-related research in Nova Scotia during the past fiscal year. Included as Appendix D (volume II), is the aforementioned study conducted by MPM Gaming Research, "Convenience gambling in Nova Scotia: A study of consumer income and expenditure patterns." The paper is discussed in the main body of the report in chapter 4 (volume I).

Here in Nova Scotia we have a legislative mandate to continually study the public interest and reactions to gambling, as well as the social, economic, health and

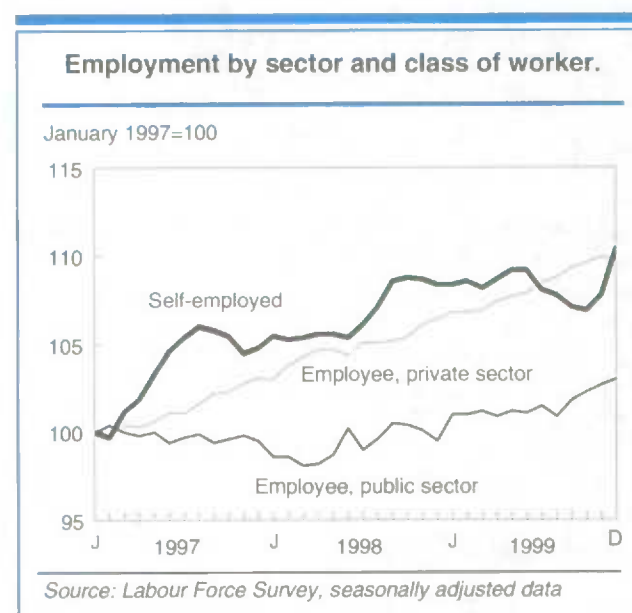
justice impacts from gambling. The intent of such research is to provide objective evidence in order to advance a balanced debate over gaming issues. One hopes our efforts help to address the observation made in your recent article, which states: "Both those in favour of and those opposed to this provincially controlled and regulated industry continue to express the need for further information on the subject."

Joel Baltzer

For the record...

Revised historical labour force survey data

■ As noted in our Spring 2000 issue ("What's new?"), all Labour Force Survey (LFS) historical data have been revised to reflect a new method of estimation and new definitions for the public and private sectors, as well as population counts based on the 1996 Census. In "Key labour and income facts" in the same issue, unrevised LFS data were used in the chart depicting changes in employment by sector and class of worker. The same chart using the revised data is shown below.



To harmonize with other Statistics Canada data sources, the LFS introduced a new definition of the public and private sectors. Instead of basing the definition only on ownership, the new definition is also based on whether the workplace is publicly or privately funded. Those most affected by this conceptual change work in hospitals and universities. To preserve historical consistency as much as possible, workers in these industries were recoded from private to public back to 1976. However, it was not possible to make such revisions for all workers affected by the change in concept. As a result, public employment prior to the full implementation of the new coding concepts is somewhat underestimated.

To better reflect real changes in public and private sector employment, and to avoid a break in the series, the historical seasonally adjusted series have been modified. In addition, the annual averages available on CANSIM have been calculated using the “modified” seasonally adjusted data instead of the unadjusted data.

For further information regarding the changes, contact Jean Marc Lévesque, Labour Statistics Division, at (613) 951-2301; jean_marc.levesque@statcan.ca.

Perspectives

We welcome your views on articles and other items that have appeared in *Perspectives*. Additional insights on the data are also welcome, but to be considered for publication, communications should be factual and analytical. We encourage readers to inform us about their current research projects, new publications, data sources, and upcoming events relating to labour and income.

Statistics Canada reserves the right to select and edit items for publication. Correspondence, in either official language, should be addressed to Bruce Rogers, “What’s new?” *Perspectives on Labour and Income*, 9th floor, Jean Talon Building, Statistics Canada, Ottawa K1A 0T6. Telephone (613) 951-2883; fax (613) 951-4179; e-mail: bruce.rogers@statcan.ca.



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Highlights

In this issue

■ Provincial earnings differences

... p. 9

- Average annual earnings in 1997 varied substantially across provinces, ranging from \$19,200 in Prince Edward Island to \$29,400 in Ontario.
- Average annual earnings are defined as the product of hourly earnings, weekly hours and annual weeks. Lower average annual earnings (relative to those of Ontario) were due primarily to lower average hourly wage rates. In British Columbia, however, lower average annual earnings were the result of fewer weekly hours and fewer annual weeks worked. On an hourly basis, workers in British Columbia on average earned more than their counterparts in Ontario.
- In some cases, average annual earnings would have been lower in Ontario, owing to the effect of one factor (the other two having been made equal—standardized). But the effects of the other two components were so strong that this province's overall average annual earnings remained highest.
- In the case of Ontario–Quebec and Ontario–Manitoba, Ontario's values were consistently higher in all three components. Therefore, no matter how the average annual earnings in Quebec and Manitoba are standardized, they were lower than those in Ontario.

■ Help-wanted Index

... p. 14

- According to data from the 1980s and 1990s, the Help-wanted Index (HWI) (a measure of unmet labour demand) tended to be a predictor of labour market conditions.

- Rises in the index were followed some months later by a hike in the employment rate and a drop in the unemployment rate.

- The index was also positively (but weakly) associated with recent hirings (derived from the monthly Labour Force Survey). A much stronger relationship existed between the HWI and annual hirings (measured by the Longitudinal Worker File).

■ Payroll taxes—structure and statutory parameters

... p. 19

- Payroll taxes have become an increasingly important source of government revenues. Total taxes collected from employers and employees amounted to \$48 billion in 1997, 14% of combined federal and provincial government revenues.
- Nine payroll taxes are administered in Canada: two by the federal government, one by all provincial/territorial governments, and six by five provincial/territorial governments.

■ Income taxes in Canada and the United States

... p. 28

- For the one-third of families in Canada and the United States with incomes of less than C\$25,000 in 1997, average effective tax rates were the same or lower in Canada.
- The largest difference (5.3 percentage points) in effective tax rates between the two countries was for families with incomes of \$50,000 to \$99,999.

- Except for the lowest income group, effective tax rates varied more widely in Canada than in the United States.
- The average effective tax rates in 1997 for families with incomes of \$150,000 or more were 32.8% in Canada and 27.6% in the United States.

■ Knowledge workers on the move ... p. 32

- The number of Canadian taxfilers who moved to the United States in 1997 is estimated to be between 14,000 and 23,000, an increase from the 8,000-to-12,000 range in 1991.
- Canada suffers a net loss of workers to the United States in a variety of key knowledge-based occupations. Only about 0.1% of people with employment income are reflected in this loss, however: less than 1% of the stock of workers in any one of these occupations.
- Of the 1995 university graduates who moved to the United States, a disproportionately high percentage (12%) were doctoral graduates. This may be partly the result of NAFTA provisions, which have made it easier for well-educated Canadians to live and work in that country.
- Some 0.9% of taxfilers with annual incomes of \$150,000 or more left Canada in 1996, a migration rate nine times higher than that of all taxfilers.
- On the other hand, Canada receives more university graduates from elsewhere than it loses to the United States. For every university graduate migrating from Canada to the United States, four degree holders migrate from the rest of the world to Canada.
- Immigrants in the 1990s accounted for about one-third of the increase in employment among computer engineers, systems analysts and computer programmers.

■ What's new?

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■ Just released

Longitudinal Administrative Databank

Historical Labour Force Statistics, 1999

Education Indicators in Canada

"The labour market in the 1990s, Part II: Distributional outcomes—Who is winning and losing?" *Canadian Economic Observer*

Introducing the Dissemination Area for the 2001 Census
Annual Demographic Statistics, 1999

Determinants of Innovative Activity in Canadian Manufacturing Firms: The Role of Intellectual Property Rights

Social Transfers, Earnings and Low-income Intensity among Canadian Children, 1981-96: Highlighting Recent Developments in Low-income Measurement

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Farm statistics

Employment Dynamics

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Income Trends in Canada

Retirement Savings through RPPs and RRSPs, 1991 to 1997

Perspectives

Provincial earnings differences

Kamal K. Sharan

Economic differences among Canadian provinces are well documented and several recent studies have tried to explain why they exist.¹ Possible sources of difference include labour-capital mobility; fiscal, taxation and economic policies; industrial and occupational structures; endowment of natural resources, and labour demand functions (Johnson and Kneebone, 1987; Prichard, 1983; Shaw, 1986; Vanderkamp, 1973).

This article looks at provincial differences in average annual earnings. Earnings are the product of hourly earnings, weekly hours and weeks worked per year. Defined this way, annual earnings comprise one price component (hourly earnings) and two quantity components (weekly hours and annual weeks). A standard statistical technique (see *Standardization and decomposition*) allows the difference in earnings between two provinces to be attributed to one or more components, though the reasons behind such differences are not addressed. Although any province could have been chosen as the reference, this study uses Ontario because it has the highest annual earnings. The data are from the Survey of Labour and Income Dynamics (see *Data source and definitions*).

Average annual earnings in 1997 varied substantially across provinces, ranging from \$19,200 in Prince Edward Island to \$29,400 in Ontario (Table 1). With the exception of British Columbia, lower average annual earnings (relative to those of Ontario) were due primarily to lower average hourly wage rates, and to a lesser degree, fewer average weeks worked. Differences in average weekly hours contributed little to the provincial variation in earnings. The notable exception was British Columbia, where lower average annual earnings were fully explained by fewer weekly hours and fewer annual weeks worked. On an hourly basis, workers in British Columbia on average earned more than their counterparts in Ontario (Table 2).

Kamal K. Sharan is with the Labour Statistics Division. He can be reached at (613) 951-4023 or sharkam@statcan.ca.

Table 1: Average annual earnings and their components

	Annual earnings	Hourly earnings	Weekly hours	Annual weeks
	\$			
Canada	27,100	15.58	36.1	48.3
Ontario	29,400	16.39	36.1	49.8
British Columbia	28,300	16.74	35.2	48.1
Alberta	27,100	15.04	37.6	47.9
Quebec	25,500	15.29	35.4	47.2
Manitoba	24,000	13.98	35.7	48.0
Saskatchewan	23,100	13.37	37.0	46.7
Nova Scotia	22,500	13.06	36.7	47.0
New Brunswick	21,900	12.89	37.8	44.9
Newfoundland	20,200	12.87	37.0	42.5
Prince Edward Island	19,200	11.72	39.0	41.8

Source: Survey of Labour and Income Dynamics, 1997

Provincial earnings differences

All provinces east of Quebec had higher weekly hours values in 1997. Moreover, the Atlantic provinces experienced a greater earnings gap with Ontario than did the other provinces (Chart A).

The difference in total average annual earnings between Ontario and British Columbia was \$1,117 (Table 3). If average annual earnings are standardized for weekly hours and annual weeks, earnings in British Columbia were higher than those in Ontario—by \$611. On the other hand, higher weekly hours in Ontario, and higher annual weeks, accounted for \$705 (63%) and \$1,022 (92%) of the difference, respectively. Thus, the annual weeks and weekly hours effects in Ontario offset the hourly earnings effect in British Columbia (Chart B).

The total difference between Ontario and Alberta was \$2,331. Given the same (standardized) weekly hours and annual weeks, the earnings gap would have

Table 2: Provincial rankings**Highest**

Annual earnings	Ontario
Hourly earnings	British Columbia
Weekly hours	Prince Edward Island
Annual weeks	Ontario

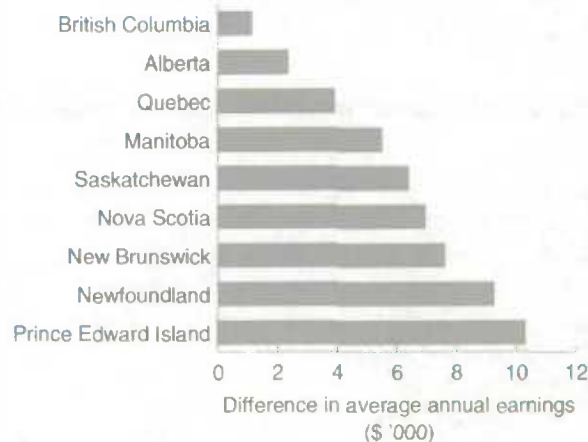
Lowest

Annual earnings	Prince Edward Island
Hourly earnings	Prince Edward Island
Weekly hours	British Columbia
Annual weeks	Prince Edward Island

Source: Survey of Labour and Income Dynamics, 1997

been even wider—\$2,430—the hourly earnings effect. If hourly earnings and annual weeks are standardized, annual earnings were higher in Alberta by \$1,167, because the number of weekly hours was higher. Still, the effects of hourly earnings and annual weeks in Ontario were greater.

The difference in average annual earnings between Ontario and Quebec was \$3,910. Because each of the three components had a lower value in Quebec, no compensatory mechanism was at work. Thus, even

Chart A: Ontario earnings exceeded those in other provinces by up to \$10,000.

Source: Survey of Labour and Income Dynamics, 1997

after comparison on a component-by-component basis, average annual earnings in Ontario were higher. Decomposition shows that almost 50% of the gap was due to lower hourly earnings in Quebec.

Data source and definitions

Data for this study are from the Survey of Labour and Income Dynamics (SLID), a longitudinal household survey that began in January 1993. Every three years some 15,000 households enter the survey and remain for six years. Each year, two detailed questionnaires (one in January covering labour market activity in the previous year, the other in May on income) are completed for household members aged 16 and over. Data used in this cross-sectional analysis are for 1997.

Because the study uses all paid jobs (up to six) held by a person during the year, data are aggregated for people who had more than one job.

Total earnings are obtained directly from the SLID database. Earnings are the sum of wages and salaries from all paid jobs in the year.

Hourly earnings are computed as the ratio of two existing series: total earnings and total hours paid.

Weekly hours are derived from average weekly hours in a given month. Twelve sub-series provide information for

each month of the year. To calculate the average number of hours worked in a week over the year, only those months with more than zero hours are considered. In other words, months with zero hours worked are dropped and the average is calculated over the remaining months.

Annual weeks are derived by dividing total earnings by weekly earnings (which are the product of hourly earnings and weekly hours).

A comparison of average hourly earnings from SLID and other sources, primarily the Labour Force Survey (LFS), shows that SLID-based estimates are about 3% higher. The gap stems from differences in the questions and in the method used to derive hourly earnings. The key difference is that SLID includes overtime pay. Since neither SLID nor the LFS includes overtime hours, SLID rates are higher. Statistics Canada is adjusting the historical SLID data and working with the LFS and the Workplace and Employee Survey to align the concepts, definitions, questions and edits for the future, to maximize consistency across the surveys.

Table 3: Provincial earnings differences

	Average annual earnings	Standardization and decomposition		
		Hourly earnings effect	Weekly hours effect	Annual weeks effect
Ontario (\$)	29,444	28,585	29,239	29,398
British Columbia (\$)	28,327	29,196	28,534	28,376
Difference (\$)	1,117	-611	705	1,022
Contribution (%)	100	-55	63	92
Ontario (\$)	29,444	29,503	27,716	28,818
Alberta (\$)	27,113	27,073	28,883	27,749
Difference (\$)	2,331	2,430	-1,167	1,069
Contribution (%)	100	104	-50	46
Ontario (\$)	29,444	28,403	27,717	28,191
Quebec (\$)	25,534	26,496	27,195	26,709
Difference (\$)	3,910	1,907	522	1,482
Contribution (%)	100	49	13	38
Ontario (\$)	29,444	28,762	26,800	27,140
Manitoba (\$)	23,954	24,533	26,518	26,160
Difference (\$)	5,490	4,229	282	980
Contribution (%)	100	77	5	18
Ontario (\$)	29,444	28,867	25,920	27,050
Saskatchewan (\$)	23,064	23,548	26,559	25,349
Difference (\$)	6,380	5,319	-639	1,701
Contribution (%)	100	83	-10	27
Ontario (\$)	29,444	28,646	25,057	26,899
New Brunswick (\$)	21,865	22,529	26,244	24,249
Difference (\$)	7,579	6,117	-1,187	2,650
Contribution (%)	100	81	-16	35
Ontario (\$)	29,444	28,854	25,726	26,679
Nova Scotia (\$)	22,514	22,992	26,182	25,155
Difference (\$)	6,930	5,862	-456	1,524
Contribution (%)	100	85	-7	22
Ontario (\$)	29,444	27,618	24,425	26,608
Newfoundland (\$)	20,224	21,687	25,054	22,689
Difference (\$)	9,220	5,931	-629	3,919
Contribution (%)	100	64	-7	43
Ontario (\$)	29,444	28,702	23,364	25,821
Prince Edward Island (\$)	19,154	19,736	25,320	22,541
Difference (\$)	10,290	8,966	-1,956	3,280
Contribution (%)	100	87	-19	32

Source: Survey of Labour and Income Dynamics, 1997

Notes: Hourly earnings effect—weekly hours and annual weeks are made identical and only earnings per hour are allowed to differ.
 Weekly hours effect—hourly earnings and annual weeks are made identical and only weekly hours are allowed to differ.
 Annual weeks effect—hourly earnings and weekly hours are made identical and only annual weeks are allowed to differ.

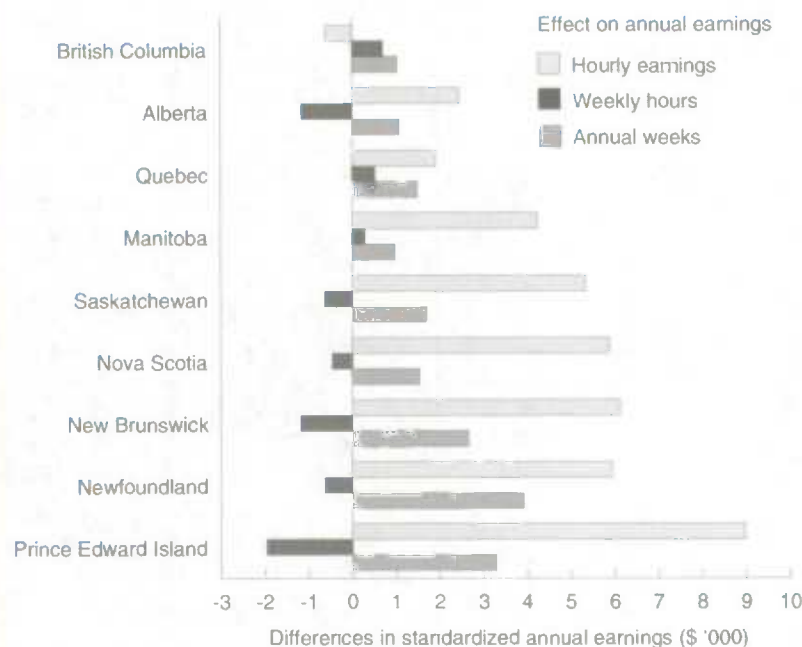
A comparison of Ontario and Manitoba reveals an earnings gap of \$5,490. Once again, each component in Manitoba had a lower value than in Ontario. The decomposition analysis shows that 77% of the earnings difference was due to higher hourly earnings in Ontario. The analysis also suggests that no matter how the average annual earnings in Manitoba are standardized, they were lower than those in Ontario.

The earnings gap between Saskatchewan and Ontario was \$6,380, of which \$5,319 (83%) was due to higher hourly earnings in Ontario and \$1,701 (27%) to that province's annual weeks. However, weekly hours were greater in Saskatchewan, though not enough to counteract the effects of the other two components in Ontario.

A comparison of New Brunswick and Ontario also displays some compensation mechanism. Once again, weekly hours in New Brunswick were higher than those in Ontario. But the effects of higher hourly earnings and annual weeks in Ontario more than compensated for this. The overall average annual earnings difference was \$7,579, of which the major source was higher hourly earnings in Ontario.

An examination of Ontario and Nova Scotia reveals findings similar to those of Ontario and New Brunswick, Saskatchewan and Alberta. The overall earnings difference between the two provinces was \$6,930, of which 85% was due to higher hourly earnings in Ontario. Although weekly hours were higher in Nova Scotia, the effects of hourly earnings and annual weeks in Ontario were greater. As a result, overall average annual earnings were higher in Ontario.

Chart B: Only British Columbia surpassed Ontario in hourly earnings.



Source: Survey of Labour and Income Dynamics, 1997

The Ontario–Newfoundland earnings difference repeats this story. Newfoundland had higher weekly hours, but Ontario's higher hourly earnings and annual weeks led to higher overall average annual earnings. The overall earnings gap between the two provinces was \$9,220, of which the major source was hourly earnings (64%).

Prince Edward Island, too, had higher values for weekly hours. In fact, weekly hours in this province were the highest in Canada. However, average annual earnings were the lowest, owing to hourly earnings. The resulting earnings difference with Ontario (\$10,290) was the highest in the country.

Summary

This study used standardization and decomposition techniques to

analyze average annual earnings in Canada. Earnings were determined as a product of three components: hourly earnings, weekly hours and annual weeks. The analysis shows that average annual earnings vary substantially across the provinces. While Prince Edward Island had the highest average weekly hours among the provinces in 1997, it had the lowest hourly earnings and the lowest average weeks worked. Thus, it was the province with the lowest annual earnings (\$19,200). Ontario had the highest average earnings at \$29,400.

In some cases, average annual earnings would have been lower in Ontario, owing to the effect of one factor (the other two having been made equal—standardized). But the effects of the other two components were so strong that this

province's overall average annual earnings remained highest.

Ontario–Quebec and Ontario–Manitoba were the only cases in which Ontario's values were consistently higher in every component.

These findings are based on comparisons in only one year (1997). Future analyses could consider earnings data for more years to test the robustness of these observations. Furthermore, if the analysis were extended into different dimensions, such as industry or occupation, the components could be broken down—into automotive industry, textile industry, goods manufacturing and service-producing industries, for example, or management, teaching, medicine and health occupations—in order to refine the comparisons between provinces.

Perspectives

Acknowledgements

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Notes

1 See, for example, McInnis (1968), Economic Council of Canada (1977), and Mansell and Copithorne (1986) for discussions, and Day (1989), Coulombe (1997), Coulombe and Lee (1993) and Doiron and Barrett (1992) for analysis.

2 For a description of the decomposition methodology, see Gupta (1993).

Standardization and decomposition²

Are the earnings differences between Ontario and the other provinces related to factors such as hourly wage rates, weekly hours of work, or annual number of weeks worked? This study addresses the question by separating earnings into three components:

Average annual earnings equals average hourly earnings multiplied by average weekly hours multiplied by average number of weeks worked in a year.

Standardization makes it possible to see the effect of each component on provincial differences, by keeping the others constant. Three different sets of standardized differences are generated, the sum of which equals the unstandardized difference.

For example, the hourly wage rate is allowed to vary in two provinces, while weekly hours worked and annual weeks worked are assumed to be identical. The resulting average annual earnings are standardized for weekly hours of work and annual weeks worked.

Decomposition examines the proportional share of each component in the difference between the two populations. For example, for a given \$1,000 difference between two average annual earnings, a certain share is due to a difference in the hourly wage rate, another share to weekly hours of work, and a final share to the number of annual weeks worked.

If

y = average annual earnings for Ontario

Y = average annual earnings for the comparison province

a = average hourly earnings for Ontario

A = average hourly earnings for the comparison province

b = average weekly hours for Ontario

B = average weekly hours for the comparison province

c = average weeks worked for Ontario

C = average weeks worked for the comparison province

then the decomposition equation is

$$\begin{aligned}
 y - Y &= \left[\left(\frac{bc + BC}{3} \right) + \left(\frac{bC + Bc}{6} \right) \right] \cdot (a - A) \\
 &+ \left[\left(\frac{ac + AC}{3} \right) + \left(\frac{aC + Ac}{6} \right) \right] \cdot (b - B) \\
 &+ \left[\left(\frac{ab + AB}{3} \right) + \left(\frac{aB + Ab}{6} \right) \right] \cdot (c - C) \\
 &= \text{hourly earnings effect} + \text{weekly hours effect} \\
 &\quad + \text{annual weeks effect}
 \end{aligned}$$

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Help-wanted Index

Benjamin Amoah

The Labour Force Survey (LFS) has, since its inception in 1945, divided the working-age population into three mutually exclusive classifications: employed, unemployed and not in the labour force, according to international standard definitions. From the survey, two well-known labour market indicators—the employment rate and the unemployment rate—are derived and published monthly. What is not available from the LFS is some measure of unmet labour demand—vacant positions that employers would like to fill. One monthly indicator of this is provided by the Help-wanted Index (HWI) (see *Data sources and limitations*).

Since changes in the unmet demand for labour affect hirings, and because changes in hiring affect employment and unemployment levels and rates, the relationships between the HWI and employment and unemployment rates have remained a subject of interest for labour market researchers.

Despite the interest, relatively little has been written about the relationship between the index and these two labour market indicators. Two studies on the subject reached different conclusions (VanBlarcom, 1985; Hagggar-Guénette, 1989). The former did not find any association between them, while the latter did.

This article re-examines the association between the HWI and employment and unemployment rates over a later period, 1981 to 1999. Since hirings are the connecting link in the associations, the relationship between the HWI and hirings is also studied. The goal is to determine the extent to which changes in the HWI lead changes in those labour market variables that have a clear functional relationship with changes in employers' intention to hire.

This study uses three criteria to assess the performance of the index. First, it looks for consistency in the manner in which the index tracks or relates to hirings,

employment rates and unemployment rates, three variables that are used to analyze trends in the labour market. Second, it determines the strengths of these relationships, if any. Since the conceptual link between the HWI and hirings is direct, the strongest relationship is expected to exist between these variables. The association with the employment rate may not be as strong, owing to the effect of separations, and that with the unemployment rate will probably be weakest, because the connection is less direct. Finally, the study assesses the lead/lag times between the index and the benchmark variables. The index is expected to be a lead indicator of labour market conditions; that is, changes in the index are expected to signal future changes in the other variables.

The HWI and hirings link

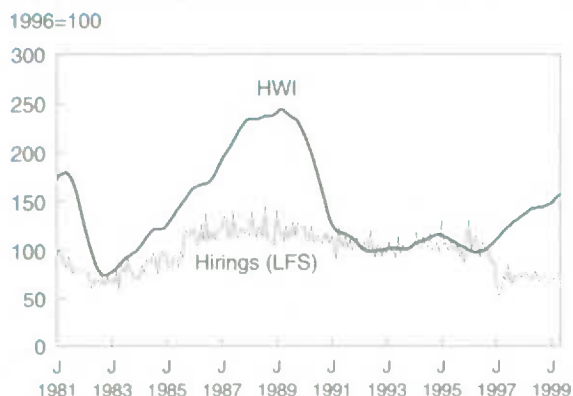
Literature on the empirical relationship between the HWI and hirings is sparse. This study makes use of two sources of hirings data. One source is the monthly job tenure data from the LFS, which can be used as a proxy for hirings. The other source is the annual Longitudinal Worker File (LWF), which measures hirings explicitly.

As mentioned, each hiring fills a vacancy—an unmet labour demand. The more vacancies there are, the more job advertisements are published and the more hirings take place, and vice versa. Thus, one would expect a positive correlation between the HWI and recent hirings.

But is this borne out by the data? For the period 1981 to 1999, a positive relationship existed between the HWI and recent hirings (Chart A).² The cross-correlation coefficients (see *Cross-correlation coefficient*) also indicate a positive relationship, as theory suggests. However, the extent of the association is not as high as expected. This may be explained by data limitations: the use of LFS job tenure as a proxy for monthly hirings and the HWI undercount. Also, as expected, the HWI leads hirings by a couple of months (when

Benjamin Amoah is with the Service Industries Division. He can be reached at (613) 951-0178 or amoabem@statcan.ca.

Chart A: The HWI and LFS recent hirings are very weakly correlated.

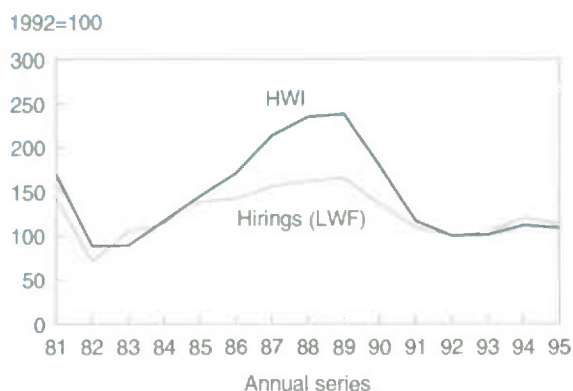


Sources: Help-wanted Index; Labour Force Survey

the cross-correlation coefficient is highest [0.5262]). Not only is the correlation coefficient quite low, but the lead of two months is very weak as well. The correlation coefficients for the other leads are barely distinguishable from that of two months. In fact, the coefficient for a lead of two months and that for a lag of two months are not substantially different.

The relationship between the HWI and annual hirings from the LWF is also positive (Chart B). In fact, the cross-correlation coefficient (0.931) establishes

Chart B: The HWI and LWF hirings are more strongly correlated.



Sources: Help-wanted Index; Longitudinal Worker File

a much stronger relationship than that between the HWI and the LFS recent hirings. No lead/lag periods were identified, primarily because the LWF series is annual and the time between advertisements and hirings is usually less than a year.

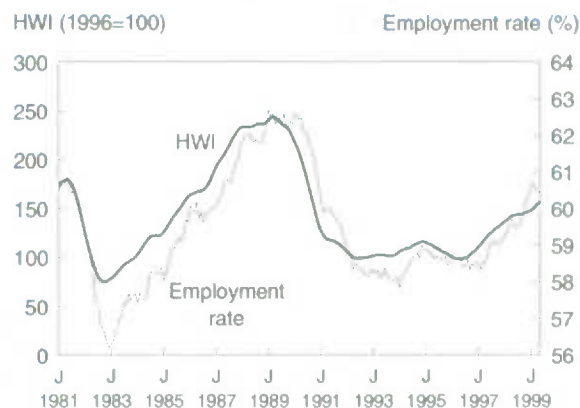
HWI and the employment rate

The employment rate is the percentage of the working-age population (15 years and older) that is employed. Interest in this measure stems from its close relationship with aggregate demand in the economy (Green, 1977). The rationale for this assumption is simple: since the denominator, the working-age population, is relatively stable from month to month, changes in the rate are primarily the result of changes in employment (the numerator). And since the level of, and changes in, employment are generally a function of demand for goods and services, changes in the rate generally reflect changes in aggregate demand in the economy.

Available data suggest a positive relationship in movement between the HWI and the employment rate (Chart C). They also show that the HWI reaches its turning points first. In other words, the HWI roughly leads the employment rate, which is consistent with expectations.

The high cross-correlation coefficients also suggest a close association between the two indicators, as well as a four-month lead by the HWI (the point at which

Chart C: The HWI and the employment rate are closely linked.



Sources: Help-wanted Index; Labour Force Survey

Data sources and limitations

The **Help-wanted Index (HWI)** provides a count of job advertisements published in 22 metropolitan area newspapers. (See Appendix 1 of Statistics Canada [1989] for the list of newspapers used.) Begun in 1973 by the Department of Finance and carried on by Statistics Canada since 1974, the index is patterned after one developed by the Conference Board of the United States in 1964. It is compiled once a month using the Saturday that corresponds to the reference week for the Labour Force Survey, usually the week including the 15th day of the month, and released in the first or second week following the reference month.¹

The HWI tabulates only advertisements placed in the classified sections of selected newspapers, but neglects those in other sections. Furthermore, it does not include government job advertisements or those placed on the Internet (an increasingly popular source) or with private employment agencies. Nor does it capture openings that are filled only through informal contacts (family or friends), which have become an important job search method (Grenon, 1998). It also fails to attach weights to advertisements (in other words, to differentiate between a request for 50 employees and a request for one person). In short, the HWI provides incomplete information on vacancies and hence unmet labour demand. Whatever the degree of undercoverage of the HWI, that is, whatever the error in the estimates of level, what really counts is any bias in the measure of change in the unmet demand for labour. It may well be that the sources of undercoverage in the HWI are fairly constant through time, so the HWI's measures of change are relatively unbiased. And it is this emphasis on timely measurement of change in employers' intention to hire that prompted the production of an index rather than a time series of counts of advertisements.

Job tenure information is from the monthly **Labour Force Survey (LFS)** and has been available since 1976. These estimates measure the length of time between the survey reference week and the start date of the respondent's present job. Because the focus of this analysis is on hires, only employees are considered. For this study, new hires are defined as persons with job tenure of less than one month. The principal problem with this as a proxy for hirings is that it covers only those workers who started with their current employers in the reference month, that is, from the beginning of the reference month to the end of the survey reference week in that month. Because the survey reference week is generally the week including the 15th day of the month, the last day of the reference week can be the 15th of the month or the 21st. This variability in the length of the period over which hirings are measured will introduce a variability in the number of hirings, which will be independent of the volume of hiring taking place.

Job tenure data in the LFS are based only on the main job (no such information exists for the second job). This may lead to an underestimation of the hiring statistics per period. However, since only about 5% of workers are multiple jobholders, the effect on the estimates should not be significant. (For details on concepts, collection methods and data quality, see Statistics Canada [1992].)

The other source of hirings information is the **Longitudinal Worker File (LWF)**. The LWF uses administrative data from Human Resources Development Canada's Record of Employment form and the Canada Customs and Revenue Agency (formerly Revenue Canada) T4 Supplementary file. These hirings represent job vacancies filled during the year. (For details, see Statistics Canada [1998b]).

the coefficient is highest [0.952]). These findings are similar to those for the city of Phoenix in the early 1980s (Friedman, 1982). However, while the correlation with a four-month lead is the highest, those for other leads are almost as high, demonstrating that they are nearly as likely to occur.

HWI and unemployment

The unemployment rate is the ratio of the unemployed (jobless people actively looking for jobs or waiting to start a job in the next four weeks, or those on temporary layoff) to the labour force. Policy makers are interested in this variable mainly because it reflects the interaction between labour supply and demand. An

increasing unemployment rate generally indicates that more people are looking for jobs than jobs are becoming available.

Unlike the employment rate, whose changes are primarily the result of changes in the numerator (employment), changes in the unemployment rate can originate from either the numerator (number unemployed) or the denominator (labour force) or both. Thus, it is possible, in times of improved job prospects, to find increases in employment (due to increases in hires) co-existing with a rising unemployment rate as people return to the labour force. Not surprisingly, volatility in the unemployment rate is higher than that of the employment rate. This tends to affect its relationship with the HWI.

Cross-correlation coefficient

The cross-correlation coefficient (r_{xy}) is a numerical expression of how closely two time series relate to each other. When large values of one series are associated with large values of the other, the series correlate positively. If, on the other hand, large values of one series are associated with small values of the other, the series correlate negatively. When $r_{xy} = 1$ (or -1), it indicates a perfect positive (or negative) fit (correlation) between the two time series. Lead/lag times correspond to the peak (or trough) of the cross-correlation coefficients.

Cross-correlation coefficients: The Help-wanted Index and selected labour market indicators, 1981-1999

Lead/lag (months)	Hires	Employment rate	Unemployment rate	Time span (months)
5	0.5231	0.949	-0.8107	215
4	0.5240	0.952	-0.8155	216
3	0.5258	0.950	-0.8152	217
2	0.5262	0.944	-0.8101	218
1	0.5248	0.933	-0.7997	219
0	0.5224	0.918	-0.7847	220
-1	0.5243	0.898	-0.7659	219
-2	0.5226	0.875	-0.7416	218
-3	0.5204	0.847	-0.7136	217
-4	0.5177	0.817	-0.6818	216
-5	0.5150	0.784	-0.6467	215

Source: Labour Force Survey

At least in theoretical terms, a rise in the HWI will be associated with a future increase in hiring. All things being equal, this results in a drop in the number of unemployed, and consequently, in the unemployment rate. (Conversely, a drop in the HWI would indicate a future drop in hiring and an increase in the unemployment rate.) As such, a negative relationship is expected between the HWI and the unemployment rate. The HWI is also expected to lead the unemployment rate.

Data from the LFS show that increases in the HWI are associated with a fall in the unemployment rate (Chart D). For the period 1981 to 1999, the HWI led the unemployment rate most strongly by four months—the point with the highest cross-correlation coefficient (-0.8155). Other leads also show correlations that are almost as strong. The negative relationship between the two series is clearly evident: as the HWI fell during the 1981-82 and 1990-92 recessions, the unemployment rate increased. Then, as the economy recovered, the HWI rose, employers hired more people, and the unemployment rate fell.

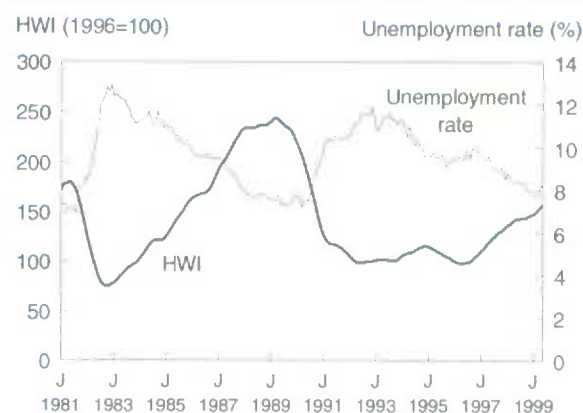
As expected, the relationship between the HWI and the unemployment rate is slightly weaker than that between the HWI and the employment rate. This is shown by the lower cross-correlation coefficients.

Summary

Based on data from the 1980s and 1990s, the HWI appears to be a predictor of labour market conditions. This is consistent with Hagggar-Guénette's findings for the 1980s.

Rises in the index imply that in about four months the employment rate should increase. As well, when the HWI rises it takes a similar interval (four months) for it to be reflected in a fall in the unemployment rate—the expected inverse relationship. The index is positively but very weakly associated with hirings, with the dominance of the two-month lead being barely discernible.

Chart D: The HWI and the unemployment rate are inversely related.



Sources: Help-wanted Index; Labour Force Survey

Owing to the theoretical direct relationship between the index and hiring, a much stronger relationship (than between it and the other variables) was expected. However, this was not the case, perhaps because of limitations in the use of LFS job tenure as a proxy for hirings. The strongest relationship was established between the index and the employment rate, followed by the unemployment rate and hirings.

Perspectives

■ Notes

1 For a detailed description of the HWI, its collection, release and revision to construction methodology, see Statistics Canada (1989 and 1998a).

2 The LFS underwent a comprehensive revision in 1997. Since then, the relationship between the index and LFS tenure-based hiring appears to have been affected—as these indicators seem to be moving in opposite directions (that is, they don't exhibit the same trends).

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Payroll taxes—structure and statutory parameters

Zhengxi Lin

Payroll taxes have grown substantially since the early 1980s, levelling off somewhat in the early to mid-1990s (Lin, forthcoming). They have also become an increasingly important source of government revenues. Total tax revenues collected from employers and employees yielded over \$48 billion in 1997, amounting to 14% of total federal and provincial government revenues, up from 8.2% in 1980. Over the same period, total payroll tax revenues rose from 2.8% of GDP to 5.7%; the effective payroll tax rate more than doubled, from \$5.61 per \$100 of wages and salaries to \$12.23; and average annual payroll taxes increased from \$1,650 per employee to over \$4,200 (in 1997 dollars).

Many important issues surround payroll taxes.¹ To provide some background on the subject, this article reviews the structure and statutory parameters of the Canadian payroll tax system; a subsequent article will report on national and provincial trends in the level, growth and role of each component in recent years, and compare Canadian payroll taxes to those of the other G-7² countries.

Canada's payroll tax system

A government levy is considered a payroll tax if and only if it satisfies three conditions: it is legislated, it is related to employment (that is, it refers to earnings or payrolls) and it varies with earnings.³ Many "head-tax" type charges (for example, Ontario's health care premiums

from 1959 to 1989, and Alberta's and British Columbia's health insurance premiums) are not payroll taxes because, although legislated, they are invariant to earnings or payrolls. Likewise, many fringe benefits (for example, employers' contributions to private employee pension plans, and group life insurance) are not payroll taxes because, although they are related to employment and vary with earnings in some cases, they are not legislated.⁴

At present, a total of nine payroll taxes are administered in Canada (Table 1): two by the federal government, one by all provincial/territorial governments, and six by five provincial/territorial governments. The two federal payroll taxes are Employment

Table 1: Payroll taxes in Canada, 1999

Tax	Authority	Contributors	Effective
Employment Insurance	Federal	Employers Employees	1940
Canada Pension Plan*	Federal	Employers Employees Self-employed	1966
Workers' Compensation	Workers' compensation boards	Employers	1910s
Health Services Fund**	Quebec	Employers	1970
Employer Contributions to Vocational Training	Quebec	Employers	1996
Health and Post Secondary Education Tax Levy	Manitoba	Employers	1982
Employer Health Tax [†]	Ontario	Employers	1990
Health and Post-Secondary Education Tax	Newfoundland	Employers	1990
Payroll Tax	Northwest Territories	Employees	1993

* Workers in Quebec are covered by the parallel Quebec Pension Plan.

** Between 1970 and 1977, the levy was also charged on the net income of employees and the self-employed. These contributions were abolished at the end of 1977. In 1993, another form of individual contributions was introduced.

[†] The EHT was initially charged on employer payrolls only, but was expanded to cover net self-employment income in 1993. In 1999, the self-employed health tax was abolished.

Zhengxi Lin is with the Labour and Household Surveys Analysis Division. He can be reached at (613) 951-0830 or linzhen@statcan.ca.

Insurance (EI) premiums and Canada and Quebec Pension Plan (C/QPP) contributions. While EI premiums are levied on employees and employers, C/QPP contributions are also levied on the self-employed. The other nationwide tax is for workers' compensation; premiums are levied by all provinces and territories on employers only.⁵ The six provincial/territorial payroll taxes are health services fund contributions levied mostly on employers by Quebec; employer contributions to vocational training also charged by Quebec; a health and postsecondary education tax imposed exclusively on employers by Manitoba; an employer health tax in Ontario; a health and postsecondary education tax levied on employers by Newfoundland; and a payroll tax levied on employees by the Northwest Territories.

Employment Insurance premiums

Since 1940, the federal government has levied a payroll tax on both employees and employers to finance the Employment Insurance (Unemployment Insurance until June 1996) program. The system covers employees only; self-employed workers are excluded unless they are fishermen, who can receive income support during the off season under separate regulatory rules.

Financing arrangements for the program have undergone several rounds of changes, the most significant of which took place in 1990. Earlier, the cost of funding the benefits had been shared by employees, employers and the federal government. Each party was responsible for different components of the total cost at different points under different legislation. Under Bill C-21, which took effect

November 18, 1990, the federal government withdrew its share of contributions and the fund became "self-financing"; responsibility for funding benefits fell to employees and employers.⁶

Since 1972, employee premiums have been calculated as the product of the premium rate multiplied by insurable earnings, up to a maximum. Both the premium rate and the maximum insurable earnings are set by the Canada Employment Insurance Commission, with the approval of the Governor in Council on the recommendation of the Minister of Human Resources Development Canada and the Minister of Finance. As specified by the *Employment Insurance Act*,

"The Commission shall . . . set the premium rate for each year at a rate that the Commission considers will, to the extent possible, (a) ensure that there will be enough revenue over a business cycle to pay the amounts authorized to be charged to the Employment Insurance Account; and (b) maintain relatively stable rate levels throughout the business cycle."⁷

Coverage was universal for employees up to 1978. The job-specific minimum requirement was introduced in 1979. It was set at 20 hours a week *or* 20% of the weekly maximum insurable earnings for 1979 and 1980; 15 hours a week *and* 20% of the weekly maximum insurable earnings between 1981 and 1986; and 15 hours a week *or* 20% of the weekly maximum insurable earnings between 1987 and 1996. Effective January 1, 1997, the Act abolished these minimum requirements and every hour of paid employment became insured. To calculate premiums, the Act also replaced the weekly maximum insurable earnings and premiums with an annual ceiling.

For 1999, the employee premium rate was set at \$2.55 per \$100 of insurable earnings to a yearly insurable maximum of \$39,000. The maximum each employee contributed to the system that year was therefore \$994.50; employers were assessed at 1.4 times the employee premium rate, for an annual maximum of \$1,392.30 per employee (Table 2).

Canada and Quebec Pension Plan contributions

The federal and Quebec governments have also levied a payroll tax on employees, employers and the self-employed to finance the Canada and Quebec Pension Plans (C/QPP) since 1966. The plans are financed on a pay-as-you-go basis (that is, contributions by today's workers finance the benefits of today's recipients). All workers from age 18 to retirement (60 to 70 depending on the year) are covered. Major changes (for example, benefit levels, contribution rates, the contributory base, or the investment of the CPP fund) require the approval of the Parliament of Canada and the governments of at least two-thirds of the provinces with two-thirds of Canada's population.

In 1999, maximum pensionable earnings were set at \$37,400, the basic exemption at \$3,500, and maximum contributory earnings at \$33,900 (Table 3). Employees and their employers each contributed \$3.50 per \$100 of contributory earnings up to a maximum \$1,186.50. Self-employed workers paid both the employee and employer shares of contributions at a combined rate of \$7.00 per \$100 of contributory earnings, for a maximum contribution of \$2,373.

Table 2: Employee* contributions to Employment Insurance, 1972 to 1999

	Premium rate	Minimum coverage requirement**		Weekly maximum		Annual maximum	
				Insurable earnings	Premium	Insurable earnings	Premium
	%	hours	\$	\$		\$	
1972	0.90	None		150	1.35	7,800	70.20
1973	1.00	None		160	1.60	8,320	83.20
1974	1.40	None		170	2.38	8,840	123.76
1975	1.40	None		185	2.59	9,620	134.68
1976	1.65	None		200	3.30	10,400	171.60
1977	1.50	None		220	3.30	11,440	171.60
1978	1.50	None		240	3.60	12,480	187.20
1979	1.35	20 or	79.50	265	3.58	13,780	186.03
1980	1.35	20 or	87.00	290	3.92	15,080	203.58
1981	1.80	15 and	83.00	315	5.67	16,380	294.84
1982	1.65	15 and	70.00	350	5.78	18,200	300.30
1983	2.30	15 and	77.00	385	8.86	20,020	460.46
1984	2.30	15 and	85.00	425	9.79	22,100	508.30
1985	2.35	15 and	92.00	460	10.81	23,920	562.12
1986	2.35	15 and	99.00	495	11.63	25,740	604.89
1987	2.35	15 or	106.00	530	12.46	27,560	647.66
1988	2.35	15 or	113.00	565	13.28	29,380	690.43
1989	1.95	15 or	121.00	605	11.80	31,460	613.47
1990	2.25	15 or	128.00	640	14.40	33,280	748.80
1991†	2.25/2.80	15 or	136.00	680	15.30/19.04	35,360	892.84
1992	3.00	15 or	142.00	710	21.30	36,920	1,107.60
1993	3.00	15 or	149.00	745	22.35	38,740	1,162.20
1994	3.07	15 or	156.00	780	23.95	40,560	1,245.19
1995	3.00	15 or	163.00	815	24.45	42,380	1,271.40
1996††	2.95	15 or	150.00	845/750	22.13	39,000	1,150.50
1997	2.90	None		None		39,000	1,131.00
1998	2.70	None		None		39,000	1,053.00
1999	2.55	None		None		39,000	994.50

Source: Human Resources Development Canada

* Employer premiums are equal to 1.4 times employee premiums.

** The weekly coverage requirement applied to each job separately. An employee's collective hours of work/earnings from several jobs could not be used to meet this minimum requirement. Effective January 1, 1997, the minimum was abolished and every hour of work was insured.

† The 2.80% rate took effect July 1.

†† For calculating EI benefits, the maximum weekly insurable earnings were \$845 for the first six months, and then \$750 until the year 2000.

Workers' compensation premiums

All provincial/territorial governments levy workers' compensation (WC) premiums on employers (note that the levy is on employers only, but not all employers are covered) to finance programs run by their respective workers' compensation boards.⁸

Premiums charged to fund WC programs are based on industry groupings and vary according to

the hazard or risk of actual program use. This approach is used in all jurisdictions except Prince Edward Island, Nova Scotia and the Northwest Territories. An employer may have its operation classified into more than one industry with different assessment rates. The system further allows some degree of experience-rating within broad industrial categories, resulting in different assessment rates within the same industry.⁹

Quebec's Health Services Fund

In 1970, Quebec became the first province to levy a tax on employer payrolls as well as on net individual income to help finance its health care system. All employers contributed at the same tax rate until 1998, and the entire payroll of all employers was included in the coverage, with only minor exceptions.¹⁰ The legislated employer tax rate has

seen many increases since its inception. It was initially set at 0.80% of the employer's total payroll, then increased to 4.26% in May 1995 (Table 4).

Between 1970 and 1977, the levy was also charged to both employees and the self-employed. The legislated tax rate was flat (0.8% for

1970 to 1975, 1.2% for 1976 and 1.5% for 1977) and applied to the net income from all sources. The exemption level for married couples was twice that for single persons. And the maximum tax liability for employees differed from that of the self-employed. These non-employer contributions were abolished at the end of 1977.

In 1993, another form of non-employer contributions to the Health Services Fund (HSF) was introduced. This renewed tax differs from the earlier levy in a number of ways. First, the tax base excludes employees' wages and salaries already subject to the employer tax, in addition to a number of items specified in the 1993-94 budget. Second, an exemption of \$5,000 is allowed, but applies to individual taxable income regardless of marital status. Third, although a maximum tax liability still exists, it applies equally to employees and the self-employed. Finally, and more significantly, the tax structure is no longer flat-rated, but now depends upon levels of taxable income: for persons whose taxable income is up to \$40,000, the tax rate is 1.0%, with a maximum contribution of \$150; for those whose taxable income is over \$40,000, the tax liability is equal to \$150 plus 1.0% of the taxable income, up to a maximum contribution of \$1,000.

The 1998 budget introduced a series of graduated contribution rate reductions to small private-sector employers based on their total payrolls. The first round of reductions was introduced in January 1999, the second in January 2000, and the third is set for January 2001 (Table 5). The contribution rate for employers with payrolls \$1 million or less was reduced to 4.00% for 1999, further to 3.22% for 2000 and to 2.70% for 2001—for a total reduction of more than one-third. The extent of HSF contribution relief gradually declines as total payrolls rise; no reduction is granted once total payrolls reach \$5 million.¹¹

Table 3: Employee* contributions to Canada and Quebec Pension Plans, 1966 to 1999**

	Contribution rate	Maximum pensionable earnings	Exemption	Maximum contributory earnings	Maximum contributions
	%			\$	
1966	1.8	5,000	600	4,400	79.20
1967	1.8	5,000	600	4,400	79.20
1968	1.8	5,100	600	4,500	81.00
1969	1.8	5,200	600	4,600	82.80
1970	1.8	5,300	600	4,700	84.60
1971	1.8	5,400	600	4,800	86.40
1972	1.8	5,500	600	4,900	88.20
1973	1.8	5,600	600	5,000	90.00
1974	1.8	6,600	700	5,900	106.20
1975	1.8	7,400	700	6,700	120.60
1976	1.8	8,300	800	7,500	135.00
1977	1.8	9,300	900	8,400	151.20
1978	1.8	10,400	1,000	9,400	169.20
1979	1.8	11,700	1,100	10,600	190.80
1980	1.8	13,100	1,300	11,800	212.40
1981	1.8	14,700	1,400	13,300	239.40
1982	1.8	16,500	1,600	14,900	268.20
1983	1.8	18,500	1,800	16,700	300.60
1984	1.8	20,800	2,000	18,800	338.40
1985	1.8	23,400	2,300	21,100	379.80
1986	1.8	25,800	2,500	23,300	419.40
1987	1.9	25,900	2,500	23,400	444.60
1988	2.0	26,500	2,600	23,900	478.00
1989	2.1	27,700	2,700	25,000	525.00
1990	2.2	28,900	2,800	26,100	574.20
1991	2.3	30,500	3,000	27,500	632.50
1992	2.4	32,200	3,200	29,000	696.00
1993	2.5	33,400	3,300	30,100	752.50
1994	2.6	34,400	3,400	31,000	806.00
1995	2.7	34,900	3,400	31,500	850.50
1996	2.8	35,400	3,500	31,900	893.20
1997	3.0	35,800	3,500	32,300	969.00
1998	3.2	36,900	3,500	33,400	1,068.80
1999	3.5	37,400	3,500	33,900	1,186.50

Source: Human Resources Development Canada

* Employer contributions are equal to employee contributions; self-employed workers pay both the employee and employer contributions.

** Workers in Quebec are covered by the Quebec Pension Plan (QPP). The QPP's contribution parameters are identical to those of the CPP.

Table 4: Quebec's Health Services Fund, 1970 to 1998

Employer contributions		Non-employer contributions			
Effective	Rate	Effective	Rate*	Maximum	
				Employee**	Self-employed
	%		%	\$	
Nov. 1, 1970	0.80	1970 to 1975***	0.8	125	125
June 1, 1976	1.50	1976	1.2	188	300
April 1, 1981	3.00	1977	1.5	235	375
May 2, 1986	3.22				
May 17, 1989	3.36				
April 26, 1990	3.45	Effective	Taxable income †	Tax**	Maximum
Sept. 1, 1991	3.75				
May 10, 1995	4.26 ††		\$		\$
		1993‡	Up to 40,000	1.0%	150
			Over 40,000	\$150+1.0%	1,000

Source: Ministère des Finances, Québec

* This is applied to net income from all sources.

** This is applied to employees whose employment income accounted for at least 75% of net income, and to those over 65.

*** Special rules are applied to workers with low income.

† This excludes wages and salaries and, as of 1994, Old Age Security benefits. It includes income from other sources, as specified in the 1993-94 budget (such as alimony payments and 20% of taxable dividends).

†† The tax liability is calculated by applying the rate to taxable income.

††† Contribution rate reductions to small employers with payrolls under \$5 million were announced in the 1998 budget.

‡ An exemption of \$5,000 is allowed.

Quebec's Employer Contribution to Vocational Training

Effective in 1996, Quebec also levies a payroll tax on employers to help finance its training costs. The flat tax rate of 1% applies to payrolls in excess of the exemption level (\$1 million for 1996, \$500,000 for 1997, and \$200,000 from 1998 onward). Employers' tax liability is reduced by the amount of investment made in government-approved training.

Manitoba's Health and Post Secondary Education Tax Levy

In 1982, Manitoba became the second province to levy a payroll tax to help finance health care and

postsecondary education. The levy is charged to employers only and covers all industrial sectors, with one minor exception.¹²

In the first two years, no relief to small businesses was provided and the full tax rate of 1.5% was applied to the entire payroll. Since 1984, however, a "notch-rated" system has evolved to lighten the tax burden for small and medium-sized employers. The exemption was initially set at \$50,000, and has gradually increased to the present \$1 million (Table 6). At the same time, the "notch maximum" has risen from the initial \$75,000 to the present \$2 million. The "notch rate" (4.5% from 1989 to 1998 and 4.3% in 1999) is applied to the "notch range" (payroll minus exemption) when total payroll is under the "notch maximum." The full tax rate (2.25% between 1987 and 1998, and 2.15% in 1999) is applied to the entire payroll once it exceeds the "notch maximum."

Ontario's health taxes

From 1959 to 1989, Ontario levied health insurance (OHIP) premiums on program participants.¹³ Beginning in 1990, these premiums were abolished and a payroll tax was introduced to help finance health care spending. The Employer Health Tax (EHT) was initially levied on employer payrolls only, but in 1993 coverage was

Table 5: Quebec's Health Services Fund relief to small businesses, 1999 to 2001

Payroll maximum	Tax rate			Reduction
	1999	2000	2001	
\$			%	
1 million or less	4.00	3.22	2.70	36.6
2 million	4.07	3.48	3.09	27.5
3 million	4.13	3.74	3.48	18.3
4 million	4.19	4.00	3.87	9.2
5 million or more	4.26	4.26	4.26	None

Source: Ministère des Finances, Québec

Table 6: Manitoba's Health and Post Secondary Education Tax Levy, 1982 to 1999

Effective	Exemption	Notch maximum	Notch rate	Full rate
		\$	%	
July 1, 1982	None	None	None	1.50
January 1, 1984	50,000	75,000	4.50	1.50
January 1, 1987	100,000	150,000	6.75	1.50
April 1, 1987	100,000	150,000	6.75	2.25
January 1, 1989	300,000	600,000	4.50	2.25
January 1, 1990	600,000	1,200,000	4.50	2.25
January 1, 1994	750,000	1,500,000	4.50	2.25
January 1, 1998	1,000,000	2,000,000	4.50	2.25
January 1, 1999	1,000,000	2,000,000	4.30	2.15

Source: Manitoba Department of Finance

employment have been exempted from EHT payments on the increased portion of the payroll for a full year. In other words, the EHT is calculated on the previous year's payroll.¹⁵

The S-EHT was based on total net self-employment income (TNSEI), with an exemption of \$40,000 and a different rate structure. The bottom rate of 0.98% applied to self-employed workers with TNSEI up to \$200,000; for those whose TNSEI fell between \$200,001 and \$400,000, a marginal rate of 2.726% applied to the portion above \$200,000; and for those whose TNSEI exceeded \$400,000, the top rate of 1.95% applied. The tax liability of all self-employed workers was reduced by 22% of the calculated amount to compensate for the non-deductibility of S-EHT payments for income tax purposes.

A series of changes to the EHT and S-EHT was announced in the 1996 budget. Among them were the introduction of the \$400,000

expanded to include net self-employed income (Self-Employed Health Tax [S-EHT]) (Table 7).

The EHT did not allow exemptions and applied to the entire payroll of all employers, with a few exceptions.¹⁴ Relief to smaller businesses was provided through a series of nine graduated tax rates. The bottom rate of 0.98% (about half of the top rate) applied to

employers with payrolls up to \$200,000; subsequent rates gradually increased as payrolls rose; and the top rate of 1.95% applied to employers with payrolls over \$400,000.

To stimulate job creation in the private sector, the 1994 budget announced an EHT "holiday." Since May 1, 1994, all private-sector employers who expand

Table 7: Ontario's health taxes, 1990 to 1996

Employer Health Tax (EHT)			Self-employed Health Tax (S-EHT)		
Effective	Payroll range	Rate*	Effective	Net self-employment income	Tax**
	\$	%		\$	
1990	Up to 200,000	0.980	1993	Up to 40,000	0
	200,001 to 230,000	1.101		40,001 to 200,000	(income - 40,000) x 0.98%
	230,001 to 260,000	1.223		200,001 to 400,000	1,568 + (income - 200,000) x 2.726%
	260,001 to 290,000	1.344		Over 400,000	(income - 40,000) x 1.95%
	290,001 to 320,000	1.465			
	320,001 to 350,000	1.586			
	350,001 to 380,000	1.708			
	380,001 to 400,000	1.829			
	Over 400,000	1.950			

Source: Ontario Ministry of Finance

* These rates apply to the full payroll for an employer with a payroll within the stated range.

** The tax liability is reduced by 22% of the calculated amount because the S-EHT is not deductible for income tax purposes but EHT payments are.

EHT exemption by 1999, to be available to all private-sector employers and phased in over a three-year period;¹⁶ the setting of an applicable EHT rate according to the pre-exemption payroll level; the abolition of the one-year EHT “holiday,” effective 1997; the increase of the existing S-EHT exemption of \$40,000 to \$200,000 for 1997 and \$300,000 for 1998; the replacement of the old S-EHT rate structure with a flat rate of 1.95% for both 1997 and 1998; the abolition of S-EHT by 1999; and the introduction of the Fair Share Health Care Levy on persons with high income, effective 1996.

The 1998 budget announced two additional changes to the EHT and S-EHT: the advancement of the effective date of the \$400,000 exemption to July 1, 1998, making the exemption for 1998 effectively \$350,000; and the matching of EHT and S-EHT exemptions for 1998.

With 1997 and 1998 as the transition period, the original graduated tax evolved to a completely flat-rated (at 1.95% of total payrolls) system with an exemption of \$400,000, effective January 1, 1999.

Newfoundland's Health and Post-Secondary Education Tax

Newfoundland introduced its payroll tax to help finance health care and postsecondary education in 1990. The tax is levied on employers only. Initially, an exemption of \$300,000 was allowed to all employers,¹⁷ the tax rate was set at 1.5%, and payrolls of all employers except those in the renewable resources sector (fishing, farming and forestry) were covered. Effective July 1992, the exemption level was lowered to \$100,000, the tax rate was raised to 2%, and the previously exempted payrolls of employers in fishing, farming and forestry became taxable at a preferential rate of 1%. The exemption threshold was raised to \$120,000, effective January 1, 1998, and further to \$150,000, effective January 1, 1999.

Northwest Territories' Employee Payroll Tax

The last jurisdiction to enact a payroll tax, the Northwest Territories, did so in 1993. The tax, levied on employees only, is a flat 1% applied to all wages and salaries. Concurrent with the payroll tax, a refundable cost-of-living income tax credit was initiated for year-end residents and paid through personal income tax returns. As a consequence, the payroll tax burden

essentially falls on workers who are not year-end residents of the Territories. The objective is to recover personal income taxes from workers who do not pay the territorial personal income tax.

Conclusion

The payroll tax system in Canada varies considerably among provinces and territories—some jurisdictions levy such taxes while others do not. Also, the number of applicable taxes differs (five in Quebec; four in Manitoba, Ontario, Newfoundland and the Northwest Territories; and three in the rest); and the rates vary from one tax to another and across the country.

The Employment Insurance and Canada and Quebec Pension Plan taxes are based on, but are not proportional to, employees' earnings. The EI tax had a minimum earnings coverage requirement (tax floor) and a tax ceiling prior to 1997; the floor was removed in 1997, but the ceiling is still in force. The C/QPP tax has in place both a floor and a ceiling. For both federal taxes, the statutory rates apply only to the taxable range; earnings below the floor or above the ceiling are not taxed. From the point of view of employers, amounts of EI and C/QPP taxes can be affected not only by individual employees' earnings but also by the overall earnings mix; thus, it is possible for tax liability to vary significantly across different businesses with the same gross payrolls.

The workers' compensation tax is based on total payrolls of the employer, but the applicable rate (for the same level of payroll) can differ from one workers' compensation board to another, and from one industry to another, because of experience rating. The tax liability thus depends upon not only the payroll size of the business, but also its past use of the system, its location, and the industrial mix of its activities.

Quebec's Health Services Fund was a flat-rated levy charged to the entire payroll without exemptions until 1999, when a series of rate reductions was introduced to provide tax relief to small and medium-sized businesses (total payrolls under \$5 million). Its Employer Contributions to Vocational Training levy is also flat-rated, and provides relief to small and medium-sized businesses: employers with total payrolls below the threshold are exempted from the tax. As well, investment in approved training reduces the tax liability.

Manitoba's Health and Post Secondary Education Tax Levy has been "notch-rated" with an exemption to relieve small and medium-sized employers from the tax burden since 1984. Payrolls under the exemption are not taxed; payrolls under the "notch maximum" are assessed for only the "notch range" (the portion of payrolls in excess of the exemption) at the "notch rate"; and only when payrolls exceed the "notch maximum" is the full payroll assessed at the full rate.

Ontario's Employer Health Tax used to cover all payrolls with a series of graduated tax rates—employers with different levels of payrolls were assessed at different contribution rates. Since 1999, the health tax has been fully flat-rated with an exemption.

Newfoundland's Health and Post-Secondary Education Tax not only allows an exemption but also assesses employers in the renewable resource sector (fishing, farming and forestry) at a reduced rate.

Because different bases or different rate structures are used to calculate the amount to be paid across different taxes, analysis of the statutory tax rates is not very meaningful, either across provinces or over time. To overcome the difficulty associated with these differences, a follow-up article in the next issue of *Perspectives* will calculate and compare effective payroll tax rates—total payroll tax revenues collected in each jurisdiction expressed as a proportion of total wages and salaries. In that article, the same base will be used for the calculation of the tax rate across all components, in all provinces/territories and for all years.

Perspectives

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Notes

- 1 See more detailed discussion in Lin (forthcoming).
- 2 The G-7 countries are Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.
- 3 For more detailed discussions on the characteristics of payroll taxes, see Kesselman (1997, chapters 2 and 5).
- 4 Although the public service superannuation plans may be legislated, they are equivalent to private sector pension plans, so their contributions are not considered a payroll tax.
- 5 WC levies by all provincial/territorial governments are counted here as one national payroll tax, primarily because the objective is the same across all jurisdictions—to fund WC programs. However, unlike EI and C/QPP taxes, WC taxes are independently levied by each jurisdiction; premium rates and methods of operation vary considerably. Wide variations also exist among assessment rates and methods of operation within some jurisdictions.
- 6 Details on financing arrangements are documented in Lin (1998), and in Kesselman (1983) for earlier years.
- 7 See Human Resources Development Canada's website at www.hrdc-drhc.gc.ca/ei/legis/ei3.shtml.
- 8 The Ontario body was recently renamed the Workplace Safety & Insurance Board.
- 9 For further details on the financing of the Canadian WC system, see Vaillancourt (1994).
- 10 Aboriginal employers operating on Indian reserves are exempt from the tax coverage, regardless of whether their employees are Native persons. Since 1986, all employers have been exempt from the tax levy on employees working in international financial and trade businesses.
- 11 If T denotes the contribution rate and M the quotient obtained by dividing an employer's total payroll by \$1 million, the contribution rate for 1999 to 2001 applicable to employers with total payrolls under \$5 million is calculated as the following:

$$T^{1999} = (0.063\% \times M^{1999}) + 3.941\%;$$

$$T^{2000} = (0.258\% \times M^{2000}) + 2.966\%; \text{ and}$$

$$T^{2001} = (0.390\% \times M^{2001}) + 2.310\%.$$
- 12 Payrolls of commercial truckers associated with out-of-province activities have been exempted from the tax since 1988. This exemption was extended to all remuneration directly related to interprovincial and international transportation in 1991.

13 An estimated 65% of OHIP premiums were paid by employers on behalf of their employees as fringe benefits (Dahlby, 1993).

14 Exempted are payrolls of foreign embassies and consulates, and Native employers operating on Indian reserves.

15 To ensure that employers do not take advantage of this policy for tax planning, a number of measures have been applied: only new employers do not have to pay EHT in their first year of operation; employers that have purchased, sold or reorganized a business or part of a business must factor in the payroll of the old entity in the comparison of both years' payrolls; and associated employers and employers with more than one account must aggregate their payrolls before doing year-over-year comparisons.

16 Associated employers must agree to share only one exemption among them. The exemption is \$200,000 for 1997; \$300,000 for 1998; and \$400,000 for 1999 onwards. The exemption for part-year employers is prorated by the number of days in which the business is in operation. Public-sector employers currently excluded from the one-year EHT holiday on increases in payroll are not eligible for the exemption.

17 Associated employers were entitled to only one exemption among them.

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Income taxes in Canada and the United States

Michael Wolfson and Brian Murphy

Income taxes¹ in Canada and the United States continue to attract widespread interest. Much popular discussion of comparative tax rates is based on federal statutory income tax rates, those formally enshrined in law. But taxes actually paid are often substantially different from the statutory rates because of various tax deductions, credits, surtaxes, payroll taxes, and differences among state and provincial income taxes (see *Statutory and effective tax rates*). In order to have a more accurate picture of taxes actually paid—effective rather than statutory tax rates—this analysis uses the most recent detailed sample data from the two countries (1997) to compare income taxes paid by individuals and families (see *Data sources and definitions*).

On average, effective income tax rates for Canadian families in 1997 were higher than those of U.S. families.² However, the rates varied considerably within each country for families with similar incomes, reflecting variations in family circumstances other than income, as well as the myriad provisions of tax systems over and above the structure of nominal tax rates.

Average tax rates higher in Canada

Because both countries' income tax systems are generally progressive, with higher income families paying tax at higher average rates, this study divides families on both sides of the border into groups with similar incomes. Meaningful comparisons of incomes require the use of Canada-U.S. purchasing power parities (see *Purchasing power parity*)—\$0.79 in 1997—to adjust the American data.

Michael Wolfson is Director General of the Analysis and Development Branch. He can be reached at (613) 951-8216 or wolfson@statcan.ca. Brian Murphy is with the Social and Economic Studies Division. He can be reached at (613) 951-3769 or murphy@statcan.ca.

Statutory and effective tax rates

Statutory rates for personal income taxes are those prescribed in a jurisdiction's income tax act. For example, the top federal income tax rate in Canada is 29%. However, the rates in various tax brackets are not an accurate indication of the rates actually paid. For example, on top of this basic rate, provinces in Canada also levied income taxes between 44.5% (Alberta) and 69% (Newfoundland) of the basic federal tax rate in 1997. Correspondingly, most American states levy their own income taxes, with 27 states charging a percentage of federal tax or federal taxable income. Eight states levy no personal income tax.

In addition, jurisdictions have a variety of surtaxes and tax credits. More importantly, income tax rates are graduated, so that an initial portion of income is generally not taxed at all, and subsequent levels are taxed at increasing rates, corresponding to the dollar limits for each tax bracket. As a result, the average rate of tax paid is always lower than the combined federal plus provincial or state statutory tax rate on the last dollar of income.

This analysis is concerned with actual taxes paid, rather than statutory tax rates. The basic measure used, therefore, is the effective average tax rate, defined simply as the ratio of total taxes paid to total income per family.

A distribution of Canadian and U.S. families by comparable income groups shows that Canada had proportionally fewer families with either high (\$100,000 or more) or low (less than \$10,000) incomes in 1997 (Table 1). The United States had almost 50% more families in the lowest income group: 10.9%, compared with 7.3%. At the same time, it had about three times as many families in the top income group: \$150,000 or more.

U.S. families in the highest income group paid about 5.2% less of their total income in income taxes than did comparable Canadian families in 1997. On the other hand, for the almost one-third of families with incomes of less than \$25,000, American families paid the same proportion or more of their incomes in taxes.

Data sources and definitions

Taxes include federal, and provincial or state income taxes, plus payroll taxes paid by employees. In Canada, payroll taxes are Employment Insurance premiums and Canada or Quebec Pension Plan contributions; in the United States, Social Security taxes finance old age security, disability and retirement pensions, and Medicaid benefits.

Total income comprises earnings from employment and self-employment, investment income, pension and other income, and government cash transfers. In Canada, this is the definition used by the Survey of Consumer Finances. To the standard American definition of total income (used by the Current Population Survey) this study has added the cash value of food stamps, the Low Income Heat and Energy assistance program credit, and the Earned Income Tax Credit.

Taxpayers in this analysis are family units, or families for short. These include unattached individuals, couples with or without children, lone parents, and generally any group of individuals related by blood, marriage or adoption living in the same dwelling. This definition applies to both the U.S. and Canadian data. (The use of the term family is not the usual Statistics Canada one, since it includes unattached individuals.)

For Canada, the data are from Statistics Canada's Survey of Consumer Finances for 1997, with imputed payroll taxes added. For the United States, the data are from the Census Bureau's March supplement to the Current Population Survey microdata file for 1997.

In the \$25,000-to-\$49,999, the \$50,000-to-\$99,999 and the \$100,000-to-\$149,999 income groups, U.S. families paid on average 4.4%, 5.3% and 3.8% less, respectively, of their income in income and payroll taxes than did comparable Canadian families. For example, Canadian families with \$40,000 paid about \$6,900 in tax, compared with \$5,200 in the United States. Similarly, for families with \$70,000, average amounts of tax paid were \$17,000 and \$13,300, respectively.³

Effective tax rates vary within income groups

Underlying these average effective tax rates in each income group, however, are many provisions in both countries intended to adjust taxes to particular circumstances. In some cases, these provisions are meant to reflect differences in "ability to pay," such as differ-

Table 1: Families by income group, and their average effective tax rates

Income (1997 C\$)	Proportion of families		Average effective tax rate*	
	Canada	U.S.	Canada	U.S.
	%			
All families	100.0	100.0	16.4	13.8
Less than 10,000	7.3	10.9	1.0	2.3
10,000 to 24,999	24.8	21.1	6.2	6.2
25,000 to 49,999	30.4	27.3	17.3	12.9
50,000 to 99,999	29.9	26.5	24.3	19.0
100,000 to 149,999	5.9	8.6	27.9	24.1
150,000 or more	1.8	5.7	32.8	27.6

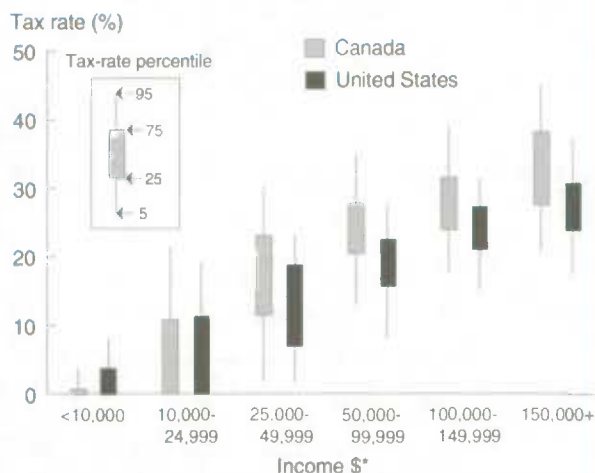
Sources: Survey of Consumer Finances; U.S. Current Population Survey

* The ratio of taxes paid to total income for each family is averaged (using the sample weights) over all the families in the income group. Generally, such an "average of ratios" is lower than the "ratio of averages," which takes total taxes paid by all families in a given income group, and divides it by total income received by these families.

ences in family size. In other cases, the different tax rates arise from basic differences in tax structure (such as joint filing for spouses), different incentive or tax expenditure provisions (for example, RRSPs in Canada, or mortgage interest deductibility in the United States), and variations in the extent of take-up for these tax provisions among families. As a result, the actual amount of income tax paid by any one family depends on a number of factors, including the number of dependants, the way total income is divided among family members, and the kinds of deductions and tax credits members of the family are able to claim.

This dispersion is shown graphically (Chart). The vertical axis is the effective federal plus provincial or state income tax rate, while the horizontal axis shows family income groups.

In order to derive the various tax rates shown, the study sorted families into income groups. Then, within each income group, it sorted families by their effective tax rates. Finally, it extracted families at precisely the 5th, 25th, 75th and 95th percentile positions along this range of effective tax rates. For example, the 75th percentile tax rate partitions families in a given income group into the three-quarters with lower effective tax rates and the one-quarter paying tax at higher rates.

Chart: Effective tax rates in Canada and the United States

Sources: Survey of Consumer Finances; U.S. Current Population Survey

* Purchasing power parity adjusted C\$

In both countries at least one-quarter of all families in the \$10,000-to-\$24,999 group paid no income tax. On the other hand, 95% of families with incomes of \$150,000 or more paid taxes amounting to at least 21% of their income in Canada, and at least 18% in the United States.

In the \$50,000-to-\$99,999 income group, the middle 90% of families (that is, excluding the top

and bottom 5% in terms of effective tax rates) faced rates spanning a range of 21.7 percentage points in Canada, compared with 19.9 points in the United States (Table 2). To illustrate, for families with \$70,000 the range of effective income taxes paid (with the top and bottom 5% of all tax rates trimmed off) would be \$15,200 in Canada, and \$13,900 in the United States.

Purchasing power parity

Purchasing power parity (PPP) is the price in local currencies of the same basket of goods and services. According to Statistics Canada's bilateral Canada-U.S. PPPs (those for personal expenditure rather than GDP overall) (Statistics Canada, 1999; Kemp, 2000), \$79 U.S. dollars spent by an American household in 1997 was equivalent in purchasing power to \$100 Canadian dollars spent here.

This "purchasing power" exchange rate is considerably higher than the market exchange rate, which averaged US \$0.725 in 1997. One reason is that many of the goods and services purchased by Canadians (recreation, food and drugs, for example) do not cross the border, and actually cost less in Canada than they would if they were imported from the United States at the official exchange rate. Another reason is that the official exchange rate is influenced by many factors of little direct relevance to consumers, such as world prices for raw materials.

Summary

Income taxes in both Canada and the United States are generally progressive. Families in both countries pay these taxes at higher effective rates as income increases.

Also, effective income tax rates in the United States tend to be lower than in Canada, income group by income group, for the two-thirds of families with incomes of \$25,000 or more. On the other hand, families in the lowest income group (under \$10,000) south of the border paid over a percentage point more as a proportion of their incomes (2.3% versus 1.0%). Families in the \$10,000-to-\$24,999 income group were taxed similarly in the two countries.

Finally, the range of effective tax rates paid within income groups in each country was generally quite wide. For example, the range for 90% of families in the \$25,000-to-\$49,999 group was roughly 25

Table 2: Ranges of effective income tax rates covering 90% of families within each income group

	Income (1997 C\$)					
	<10,000	10,000-24,999	25,000-49,999	50,000-99,999	100,000-149,999	150,000+
	%					
Canada	3.8	21.7	28.7	21.7	21.3	24.2
United States	8.3	19.2	23.3	19.9	16.2	19.9

Sources: Survey of Consumer Finances; U.S. Current Population Survey

percentage points. At the same time, differences in the *average* rate paid in this income group were about 4.5 percentage points. These relatively wide ranges in effective tax rates within income groups reflect the heterogeneity of family circumstances, as well as the complexities of the tax structures in the two countries.

Perspectives

■ Notes

1 Income tax is used as a shorthand for personal income and employee-paid payroll taxes. Other taxes, such as the employer-paid portion of payroll taxes, corporate income, property and sales taxes, are not considered in this analysis, mainly because they are not included in the available data. Also, it could be argued that the payer of a tax is not necessarily the one who bears the ultimate burden of the tax. The estimation of such tax incidence is beyond the scope of this analysis.

2. This study uses "families" to refer to both unattached individuals and families with two or more members.

3. In other words, these figures are the result of multiplying the illustrative incomes of \$40,000 and \$70,000 by the corresponding average effective tax rates shown in Table 1.

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Knowledge workers on the move

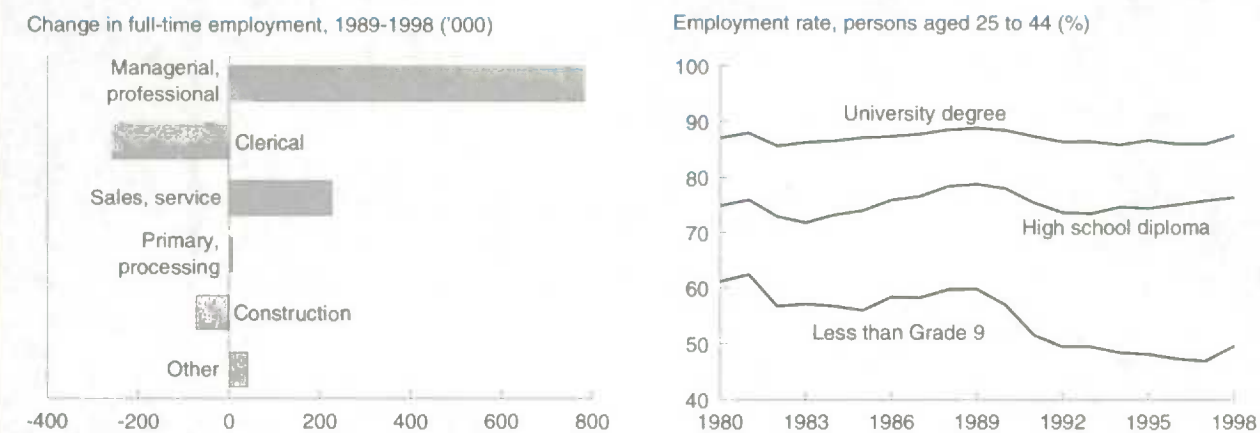
John Zhao, Doug Drew and T. Scott Murray

The Canadian economy experienced a rapid increase in the demand for skills and specialized knowledge in the 1990s (OECD, HRDC and Statistics Canada, 1998). Virtually all job creation occurred in knowledge-based occupations—professional, managerial and technical. The employment rate (that is, the percentage employed) among highly educated persons is much higher than that among people with less education, and this gap is widening. Between 1989 and 1998, knowledge-based occupations gained 780,000 workers, while employment in most other occupations declined. The employment rate of people with Grade 8 education or less fell from 60% in 1989 to less than 50% by 1998. On the other hand, the employment rate of people with a university education held steady at about 87%, even during the recession of the early 1990s (Chart A).

Partly in response to this growing demand for skills and education in the labour force, Canada has made huge additions to its stock of human capital (Chart B). Students who move from the educational systems to the labour market are relatively highly qualified, compared with other countries' or previous Canadian cohorts. Canada does not suffer from any large-scale skill shortages at the aggregate level (Gingras and Roy, 1998). However, this success comes at a cost: in 1995, Canada spent 7.0% of gross domestic product (GDP) on education, well above the mean of 5.6% for OECD countries (OECD, 1998).

Despite this positive picture at the aggregate level, it is clear that imbalances between supply and demand exist in particular industries and occupations. For example, the Software Human Resources Council of

Chart A: The education premium is large and growing.

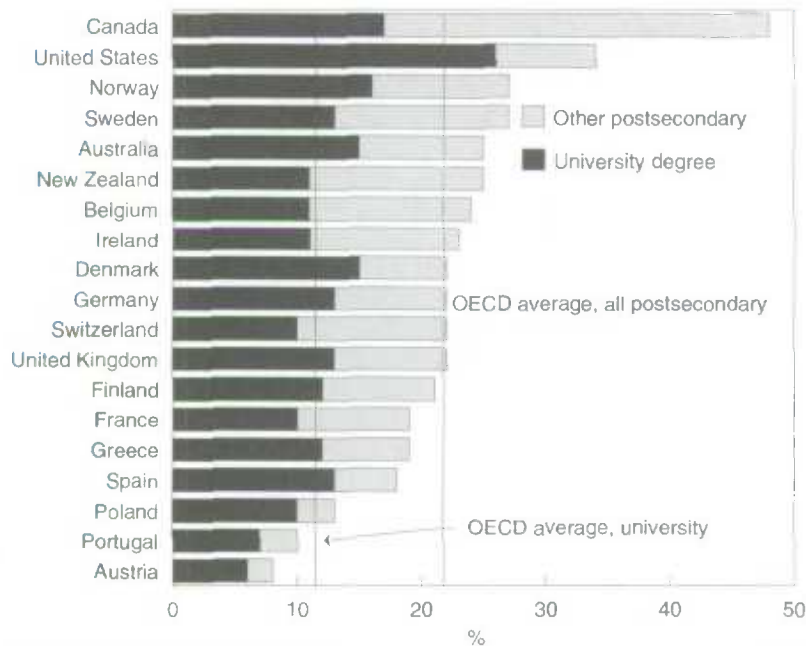


Source: Labour Force Survey

Adapted from an article in Education Quarterly Review (Statistics Canada, Catalogue no. 81-003-XPB) 6, no. 3 (Spring 2000). John Zhao and Doug Drew are with the Centre for Education Statistics. They can be reached at (613) 951-1531 or john.zhao@statcan.ca and (613) 951-9039 or doug.drew@statcan.ca, respectively. T. Scott Murray is Director General of the Institutions and Social Statistics Branch. He can be reached at (613) 951-9035 or scott.murray@statcan.ca.

Chart B: Canadians are highly educated, compared with people in other OECD countries.

Population aged 25 to 64 with university or other postsecondary education



Source: Organisation for Economic Co-operation and Development, 1996

Canada estimated a shortage of 20,000 computer programmers (Parsons, 1996), paralleled by an estimate of 190,000 vacancies in the information technology sector in the United States (Miller, 1997).

Emigration from Canada

Traditionally, most people leaving Canada for the United States applied for permanent immigration. Temporary visas had limitations, such as restrictions on the number of renewals possible.

However, under the North American Free Trade Agreement (NAFTA), Canadian workers in qualifying professional occupations can readily gain entry into the United States, needing only to show proof of their qualifications and a

job offer from an employer in the United States. Furthermore, while a NAFTA visa is valid for one year, the maximum number of renewals is unlimited. Hence, more people may be remaining in the United States for an extended period of time without converting to permanent resident status. One might expect that a large increase in temporary migration (if it were a precursor to staying on in the United States) would eventually lead to a noticeable increase in permanent migration to the United States. The data on permanent emigration suggest that such conversions are not yet taking place on a large scale.

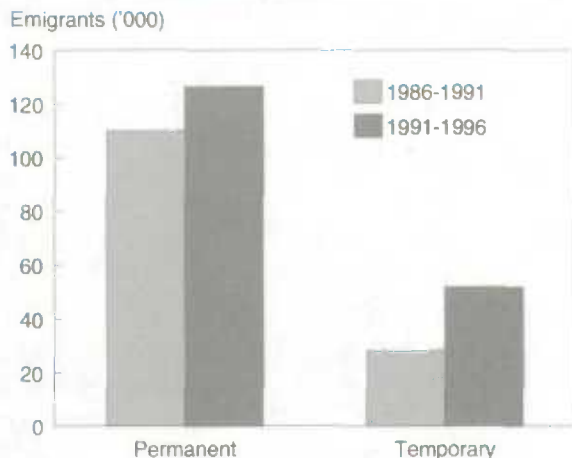
For these reasons, it is important to examine both permanent and temporary migration when estimat-

ing the magnitude and characteristics of outflow from Canada to the United States. The U.S. Immigration and Naturalization Service (INS) provides reliable information on permanent migration from Canada to the United States. However, its data on temporary migration, while meeting the administrative purposes for which they were designed, do not provide a reliable count of people arriving on a temporary basis (see *Data sources and Data limitations*).

According to Statistics Canada's Reverse Record Check (RRC), an estimated 178,000 people left Canada between 1991 and 1996 and were residing in the United States in 1996. Of these, 126,000 people expected to remain permanently in the United States, and an estimated 52,000 expected to return to Canada. The implied annual average emigration of people continuing to reside in the United States from 1991 to 1996 would be around 35,000, of which 70% expected to be permanent. Emigration was about 30% higher than during 1986 to 1991. Permanent emigration increased by an estimated 15%, while temporary emigration doubled (Chart C).

Canadian tax data provide estimates of the number of taxfilers leaving Canada to all destinations during the 1990s.¹ The number of taxfilers who left Canada, whether permanently or temporarily, has increased steadily in recent years, from about 15,400 in 1991 to 28,900 in 1997, with an average of 21,700 per year (Chart D). The only information available on the destination of a mover is the country from which the tax return is filed, including Canada. (Some filers may have used an accountant's or a relative's address in Canada to file

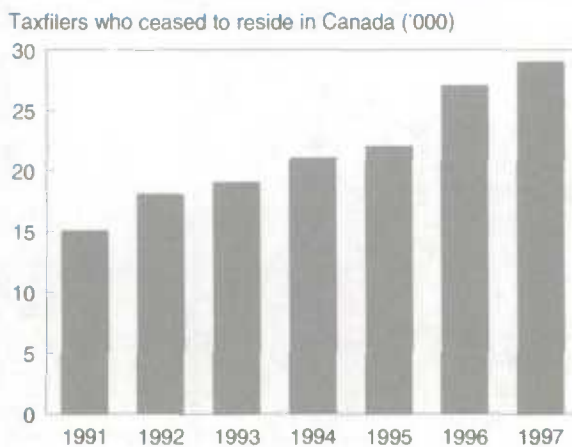
Chart C: Temporary emigration to the United States doubled in the 1990s.



Sources: Reverse Record Check; Census of Canada, 1991 and 1996

their tax returns even though they were no longer residents of the country, or they may have returned to Canada by the time of filing.) Assuming that all taxfilers who filed from either a Canadian or U.S. address had moved to the United States yields an upper bound for this group. The lower bound corresponds to half

Chart D: Taxfiler data indicate increasing emigration in the 1990s.

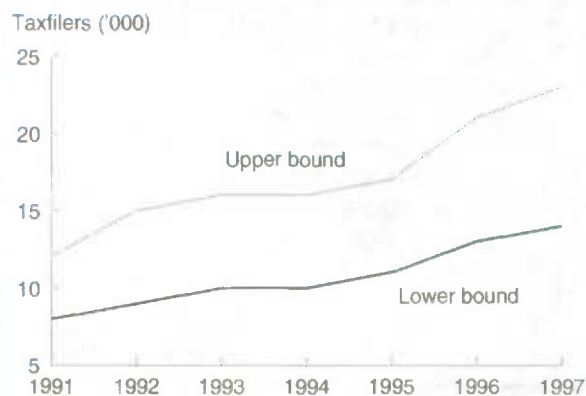


Source: Small Area and Administrative Data Division

of taxfilers going to all destinations; this is based on RRC estimates showing that between 1986 and 1996, half of all permanent emigrants moved to the United States.

Based on the above assumptions, the number of Canadian taxfilers who moved to the United States can be estimated in the 8,000-to-12,000 range in 1991, increasing to the 14,000-to-23,000 range by 1997 (Chart E).

Chart E: Estimated emigration to the United States increased in the 1990s.



Source: Small Area and Administrative Data Division

From the averages of the lower and upper bounds between 1991 and 1997, the average emigration of taxfilers from Canada to the United States is estimated to be between 11,000 and 17,000. Since the taxfiler data on movers show a one-to-one ratio between filers and dependants, the average annual emigration to the United States is probably between 22,000 and 34,000 over this period.

Estimates from all three data sources are consistent, placing annual average emigration to the United States in the 1990s in the 22,000-to-35,000 range. This is about 0.1% of the Canadian population—much smaller than that experienced historically. Nevertheless, taxfiler data do suggest an upward trend in total emigration (both permanent and temporary) in the 1990s.

Data sources

Canadian personal taxation data: Everyone receiving income from Canadian sources is required to file a Canadian tax return, including people leaving Canada during the tax year in question. For those moving from Canada, the date of departure but not the destination is noted on the tax form. In order to capture a full year's income for movers in 1996 (the most recent year for which such data are available), it is necessary to consider those who also filed tax returns in 1995. About 96% of 1996 movers had done so.

Reverse Record Check (RRC): The RRC is used by Statistics Canada to estimate coverage in the Census of Population. The 1996 RRC sample included people residing in Canada at the time of the 1991 Census, as well as people entering Canada since then. Sampled individuals were contacted to establish where they resided at the time of the 1996 Census. Those living in Canada ought to have been included in that census; hence, among this group, those who were missed provide an estimate of undercoverage. A by-product of the RRC is an estimate of people who were living in Canada at the time of the 1991 Census or who entered Canada between 1991 and 1996 and were residing in the United States at the time of the 1996 Census. The survey asks those who had moved south whether they had done so on a permanent or temporary basis.

Permanent movers are people who, at the time of the census, had left Canada with no intention of returning, as well as those who had resided outside Canada for at least two years but whose intentions about returning were unknown. **Temporary** movers are people who, at the time of the census, had resided outside Canada for at least six months with the intention of returning, or had resided

outside Canada for no more than two years if their intentions were unknown.

The **Landed Immigrant Data System**, developed by Citizenship and Immigration Canada, is a principal source of data on immigration to Canada. Its files hold information on the education and work experience of immigrants at the time of arrival in Canada, which in turn suggests their intended occupation.

Canada's 1991 and 1996 **Censuses** are also used in this study. The censuses include variables on immigration status, year of immigration, educational attainment, occupation and income. The Demography Division of Statistics Canada produces historical data on Canadian immigration and emigration.

Current Population Survey (CPS): The CPS is a monthly survey of U.S. labour market conditions, carried out by the Bureau of the Census on behalf of the Bureau of Labor Statistics. Since 1994, a March supplement has profiled the characteristics of foreign-born residents of the United States. This survey provides the number of Canadian-born people who entered the United States during the 1990s and were still living there each year from 1994 to 1999. The CPS includes only people whose usual place of residence for a period of six months or longer is the United States.

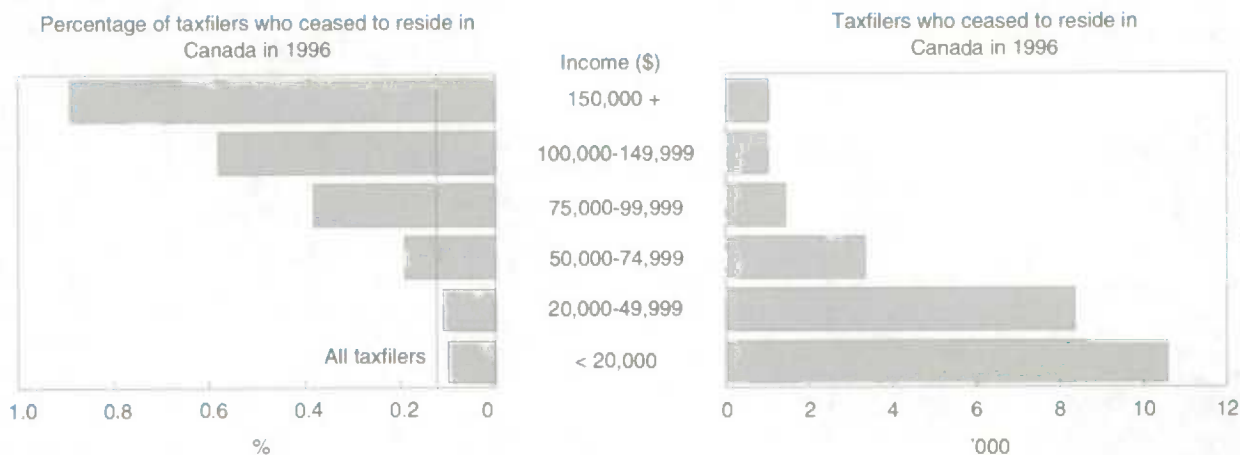
U.S. Immigration and Naturalization Service (INS): The INS publishes numbers of both permanent and temporary visas issued to migrants to the United States, by country of origin. The data on permanent migration provide not only a reliable count of permanent migration from Canada to the United States, but also information on the occupation of the migrants.

Emigrants tend to be young, well-educated and high earners

Close to 10,000 of those who left Canada in 1996 were aged 25 to 34, while another 7,000 were aged 35 to 44; together they accounted for about two-thirds of those who left, compared with only 44% of all taxfilers. Some 4,000 people aged 45 to 54 left, representing the same share of movers (12%) as of all taxfilers.

Recent migrants to the United States possessed high levels of education—higher than those of the native-born population remaining in Canada or of recent Canadian immigrants. Among migrants to the United States aged 16 and over, for the period 1994 to 1999 nearly half (49%) had a university degree. From the 1996 Census, comparable figures were 12% for Canadian-born residents and 21% for 1990s immigrants to Canada.

While movers represented only 0.1% of all taxfilers, they were over-represented among those with higher incomes. For example, taxfilers who left Canada represented 0.9% of those reporting incomes of \$150,000 and over, and close to 0.6% of those with incomes between \$100,000 and \$149,999 (Chart F). In other words, movers were seven times as likely as *all* taxfilers to have incomes \$150,000 and over (4.0% of movers versus 0.6% of all

Chart F: Top income earners leave in higher proportions, but in relatively small numbers.

Source: Small Area and Administrative Data Division

taxfilers). Similarly, they were five times as likely to have incomes between \$100,000 and \$149,999 (4.0% of movers versus 0.9% of all filers).

Of the 26,000 who left, about 19,000 had incomes of less than \$50,000 in 1995, about 5,000 had incomes between \$50,000 and \$99,999, and a further 2,000 had incomes of \$100,000 or more.

Permanent emigration

As a share of population, both permanent immigration (from all countries) and emigration (to all countries) have decreased in the last 100 years (Chart G). Permanent emigration per annum represented more than 1% of the Canadian population early in the century. By the 1930s it had dropped to about 0.35%, holding steady through the 1960s. By the 1990s, permanent emigration had fallen to 0.15% of the population.

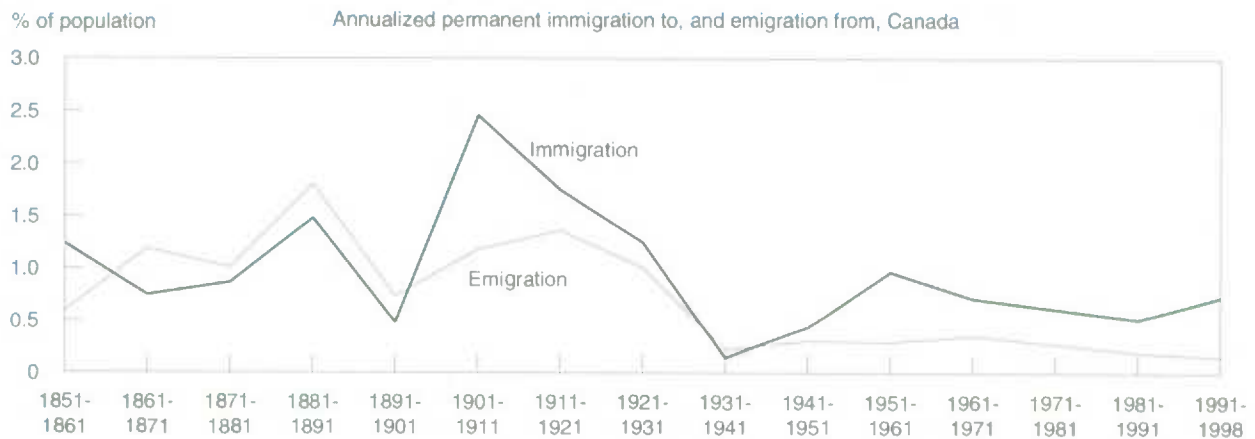
The only information available on total emigration (including both permanent and temporary) from Canada to all countries is that derived from the Reverse Record Check of the 1991 and 1996 Censuses. Annual total emigration from Canada represented 0.22% of the population between 1986 and 1991, increasing to 0.27% between 1991 and 1996. Despite the small increase in the first half of the 1990s, emigration over this period was the lowest in Canadian history.

Who leaves for the United States?

In 1996 and 1997, permanent emigration to the United States was equivalent to only 0.07% of the overall Canadian workforce.² Despite increases in knowledge-based occupations, permanent emigration³ was small relative to the stock of workers in Canada. Physicians, nurses, engineers and scientists had the highest levels of emigration relative to the stock; however, these levels were less than 1% annually (Chart H).

During the 1990s, Canada's largest net losses of knowledge workers to the United States were in the health professions, followed by engineering and managerial occupations (Chart I). Physicians left at a ratio of 19 to 1, nurses, 15 to 1, and engineers and managerial workers, 7 to 1.

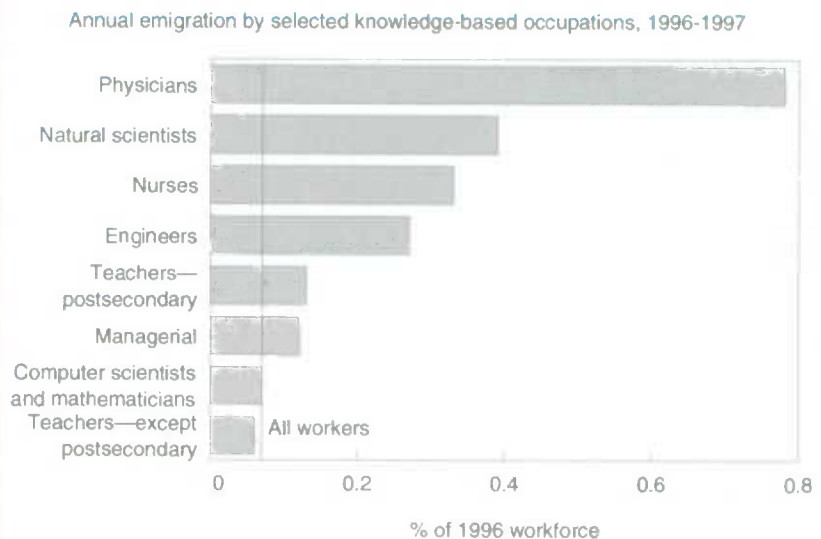
An average of about 150 physicians emigrated to the United States per year during the late 1980s, increasing to 450 per year in 1996 and 1997. Departing nurses increased from 330 per year in the late 1980s to about 750 in the early 1990s, and to 825 in 1996 and 1997. Permanent emigration of those in other knowledge-based occupations increased between the late 1980s and early 1990s, before decreasing somewhat in 1996 and 1997.

Chart G: Immigration and emigration are proportionately smaller today.

Source: Demography Division

Relative to the supply of new graduates, the annual loss of physicians and nurses in recent years has been large. In 1996 and 1997, the annual outflow among physicians was equivalent in magnitude to about one-quarter of the supply of new graduates, with about 450 leaving, compared with a 1995 graduating class of just over 1,700. Among nurses, the outflow was also equivalent to about a quarter of the new graduates, with losses of 800, compared with 3,000 graduates. The annual loss of engineers, computer scientists and natural scientists has been smaller relative to the new supply of university graduates in these fields. The annual average loss of engineers in 1996 and 1997 was equivalent to 4% of 1995 university graduates in this field (12,300). The annual average loss of natural scientists in 1996 and 1997 was equivalent to 1% of 1995 university graduates in these disciplines (18,900).

The bilateral exchange of postsecondary faculty has been more balanced, although during the

Chart H: Emigration to the United States is small relative to the stock of workers in the Canadian labour force.

Sources: Census of Canada; U.S. Immigration and Naturalization Service

1990s faculty emigrating to the United States outnumbered those moving to Canada by a 2-to-1 ratio. Additionally, among faculty who left their positions (other than

for retirement) in 1996 and 1997, senior professors were more likely to leave Canada than to move within Canada (AUCC, 1997). Among faculty leaving their

Data limitations

Both the CPS and RRC estimates are subject to relatively high levels of sampling error. The tax data are based on all filers, but without identification of the destination of movers, whether to the United States or elsewhere. However, it is possible to derive upper and lower bounds for taxfilers who moved to the United States.

To reduce the sampling error of the CPS estimates, an estimate of the average number of Canadian-born people entering the United States each year during the 1990s has been created from CPS results from 1994 to 1999. According to the survey, in March 1994 some 104,000 native-born Canadians had been living in the United States since January 1990—an implied annual outflow of 24,000. Similarly, the implied annual outflows from the 1995-to-1999 surveys are 24,000, 17,000, 16,000, 18,000 and 20,000, respectively. On average then, the number of the Canadian-born who moved to the United States each year during the 1990s (and who continue to live there) was 20,000.

This estimate does not include non Canadian-born people moving from Canada to the United States. Since the 1950s, the U.S. INS data on permanent migration from Canada as the country of last permanent residence have consistently been 40% higher than figures on native-born migrants. In other words, an estimated 28,000 people (both Canadian- and foreign-born) moved from Canada to the United States and continued to reside there during the 1990s.

The CPS data indicate a significant increase in the number of Canadian-born who were living in the United States in 1998 and 1999 and who entered during the 1990s,

but these estimates are based on very small samples and are subject to a high degree of sampling error. However, the implied annual flow based on these two years of CPS data is virtually the same as that based on CPS data for the entire 1994-to-1999 period.

The INS data on temporary visas do not provide reliable statistics. As opposed to counting people, they count visas issued. General I-94 forms, used for all categories of temporary visas, are completed on initial entry to the United States and on visa renewal at border points. However, the data make no distinction between initial entries and renewals.

For example, NAFTA temporary worker visas (TN visas) are valid for a maximum of 12 months and can be renewed within this period: one can either make a request to an INS service centre, or exit and re-enter the United States and renew at the border. The former method may take up to three months, while border renewals can generally be done quickly.

Renewals done at the central sites generate no I-94 forms and produce no counts. Border renewals generate a new I-94 and are included in the INS count of temporary visas.

Temporary visas also include those issued for temporary workers re-entering the United States after an absence of 30 or more consecutive days. Increasingly, Canadians receiving income from U.S. sources obtain a NAFTA visa. For example, a professor making three visits to the United States to give one-hour lectures for fees might generate three INS entries, but not a single stay of significant duration.

positions 58% of senior professors left Canada, compared with 40% of mid-career and 47% of entry-level faculty.

Recent graduates who move are high achievers

Statistics Canada, in collaboration with Human Resources Development Canada, recently carried out a survey of 1995 graduates who had moved to the United States (Frank and Bélair, 1999).⁴ The survey found that the overall percentage of 1995 Canadian postsecondary graduates living in

the United States in 1997 remained small (1.5%). Graduates with more advanced degrees, however, were more likely to leave, with 12% of doctoral graduates living in the United States that year. Movers were also somewhat more likely than non-movers to have received scholarships or other academic awards, and they had significantly higher salaries.⁵

About 18% of movers to the United States had moved back to Canada by 1999. The salaries of this group were similar to those of people remaining in the United States,

evidence that those returning may be bringing valuable work experience back to Canada.

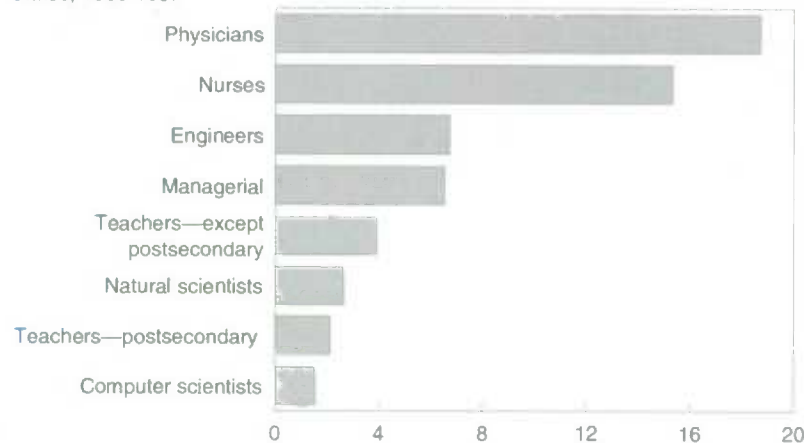
Among those who moved to the United States for work-related reasons, most cited greater availability of jobs and higher pay. A very small percentage of graduates explicitly mentioned lower taxes as one of the reasons for their move.

Immigration to Canada

While Canada does suffer a brain drain to the United States, this is offset by a gain of skilled workers from the rest of the world.

Chart I: Canada has experienced a net loss to the United States in a number of knowledge-based occupations.

Ratio of outflow to inflow from permanent migration between Canada and the United States, 1990-1997



Sources: Citizenship and Immigration Canada; U.S. Immigration and Naturalization Service

Some knowledge-based occupations experienced large increases in permanent immigration from the mid-1980s until 1997, the latest year for which data are available. Over this period, permanent immigration increased fifteen-fold among computer scientists, ten-fold among engineers, eight-fold among natural scientists, and four-fold among managerial workers (Chart J). In 1997, the combined immigration of computer scientists, engineers and natural scientists surpassed 20,000.

On the other hand, permanent immigration has decreased in knowledge-based occupations for which the labour market demand was not as strong during the 1990s—namely physicians, nurses and teachers. Between 1990 and 1997, annual immigration fell 30% among postsecondary teachers, 50% among elementary and secondary teachers, 40% among physicians and 70% among nurses.

The “points system” used in the selection of independent immigrants has been contributing to the recent increase in Canada’s gain of persons in high-demand occupations. High points are awarded to such people. Points are also awarded for factors such as level of education and ability in an official language.

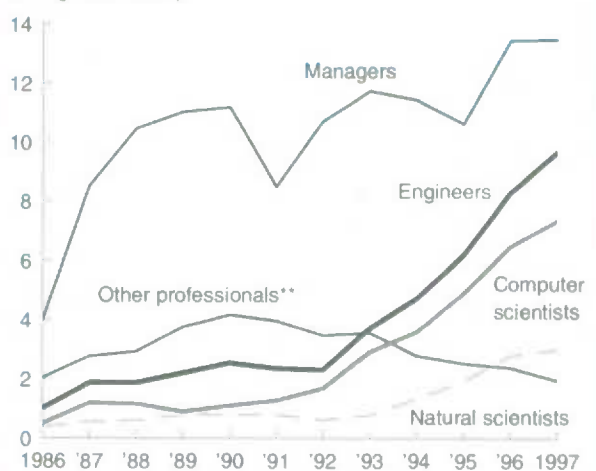
The Canadian Occupational Projections System forecasts that demand for workers in high-technology will remain high, above the level of current domestic supply (Roth, 1998). Canada produces proportionately fewer graduates in mathematics, sciences and engineering than other G-7 countries, with the exception of Italy. In 1995, Canada produced 741 university graduates in science-related fields per 100,000 people aged 25 to 34 in the labour market, compared with 938 in the United States and an average of 831 across OECD countries (OECD, 1997).

What do recent immigrants do?

Among people aged 15 and over at the time of the 1996 Census, 57% of recent immigrants (those who had arrived between 1990 and

Chart J: Canada enjoys a large and increasing brain gain from worldwide sources.

Immigrants* ('000)



Source: Citizenship and Immigration Canada

* Permanent migration into Canada from all countries.

** Teachers (all levels), nurses and physicians.

1994) were in the labour force, compared with 65% of the Canadian-born and 59% of immigrants who had come to Canada before 1990. The lower rate of labour force participation among recent immigrants may reflect initial difficulties faced by newcomers in adapting to the Canadian labour market (see *Intended and actual occupations of immigrants*). The lower rate among earlier immigrants can be attributed mainly to their older age relative to that of the Canadian-born population. When viewed by age group, labour force participation rates of pre-1990 immigrants were comparable to or higher than rates of the Canadian-born. Rates were identical for people aged 25 to 54; at ages 55 to 64, this group of immigrants had a higher labour force participation rate than did the Canadian-born.

If the experience of previous immigrants is any indication, the labour force participation of newcomers can be expected to move toward that of people born in Canada. Recent immigrants were twice as likely as the native-born to be working in computer sciences and engineering and in natural sciences (Table). These are precisely the occupations that have been expanding and experiencing worker shortages.

On the other hand, recent immigrants were under-represented in managerial occupations, nursing, teaching at below-postsecondary levels, and social sciences and related occupations. However, immigrants who came to Canada prior to 1990 were equally represented or over-represented in the same occupations, with the exception of elementary and secondary teachers. The experience of recent immigrants may be a reflection of adjustment issues and/or lower labour market demand in these occupations.

Recent immigrants are young and well-educated

In general, international migrants tend to be younger and more highly educated than non-migrant populations. Why? Because immigration laws tend to favour those who are highly educated—this is true in both Canada and the United States. At the same time, the accompanying knowledge and skill levels of highly educated people will probably be in general demand, reducing much of the uncertainty surrounding a life-altering move. More highly educated people are also more likely to have the contacts and information needed to move to another country. Age is a factor inasmuch as younger people may, on balance, be less likely to have personal and financial commitments.

Table: Employment in knowledge-based occupations as a percentage of the workforce, by immigration status

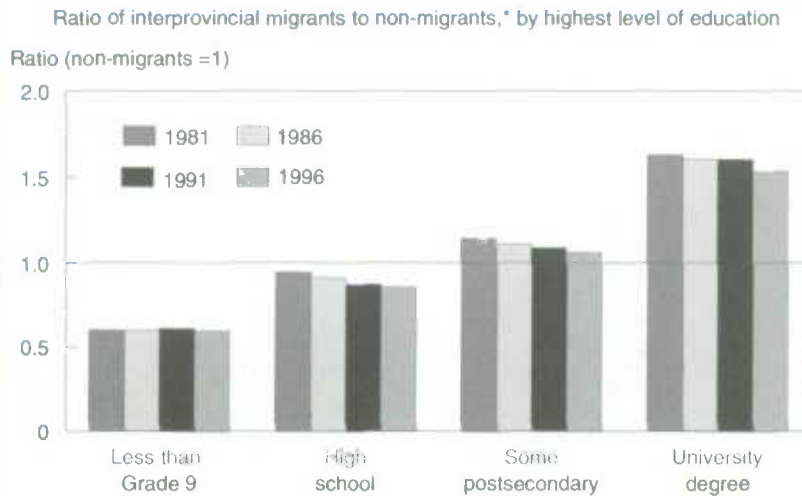
	Canadian-born	Immigrants 1990-1994	Immigrants before 1990
	%		
Entrepreneurs, investors, executives, managers and administrators	13.21	10.13	15.69
Technologists and technicians	3.80	3.00	3.93
Social sciences and related	3.32	1.69	2.63
Teachers—except postsecondary	2.89	0.96	2.23
Nurses	1.78	0.92	1.70
Writers, artists, entertainers and athletes	1.71	1.62	1.88
Computer scientists	1.01	2.06	1.53
Engineers, surveyors, architects and mapping scientists	0.96	1.89	1.93
Teachers—postsecondary	0.92	1.02	1.48
Other health assessment/treating	0.37	0.35	0.48
Physicians	0.33	0.42	0.82
Natural scientists	0.28	0.48	0.40
Other health diagnosing	0.20	0.15	0.26
Mathematicians	0.04	0.04	0.05

Source: Census of Canada, 1996

The propensity to be younger and better educated is also evident among interprovincial migrants, suggesting a common economic incentive in both international and interprovincial migration.

Interprovincial migrants are about one-and-a-half times as likely as the non-migrant population to be aged 15 to 44, and about one-and-a-half times as likely to have a university education (Chart K). In comparison, recent immigrants were about one-and-a-quarter times as likely as the Canadian-born to be 25 to 44. If data are adjusted for age, recent immigrants were close to twice as likely as native-born Canadians to have a university education. Recent immigrants were even more likely to hold advanced university degrees: between two and three times as likely to have a master's degree, and about four times as likely to have a doctorate (Chart L).

Chart K: Interprovincial migrants are over-represented among the well-educated.



Source: Census of Canada

* The comparison is age-adjusted, using the entire Canadian population aged 15 and over as the standard population. To illustrate: the ratio of 1.5 for the category of "university degree" means that interprovincial migrants were one-and-a-half times as likely as non-migrants to be university degree holders, adjusting for age differences in the two populations.

Canadians who move to the United States are even more highly educated than recent Canadian immigrants. However, university graduates migrating to Canada from elsewhere outnumber graduates leaving for the United States (permanent and temporary) by a ratio of approximately 4 to 1 (Chart M). As many immigrants enter Canada with a master's or doctorate as university graduates at all levels leave for the United States.

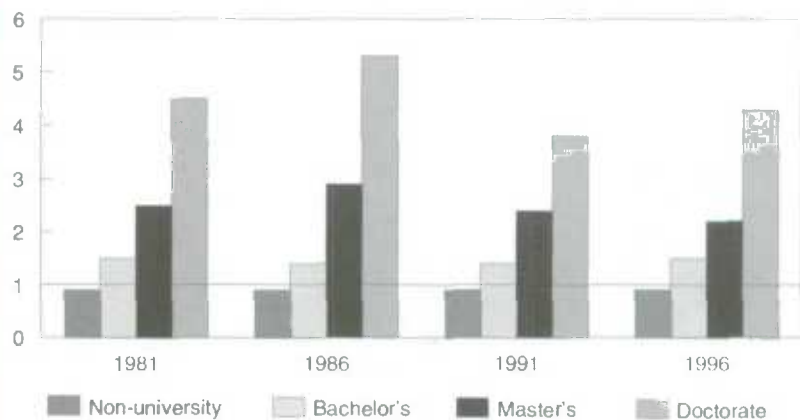
Based on the 1996 Census, about 39,000 degree holders entered Canada each year (both permanently and temporarily) from 1990 to 1996, including 11,000 master's and doctoral degree holders. This compares with an estimated 10,000 per year leaving Canada for the United States in the 1990s, based on the 1994-to-1999 U.S. Current Popu-

lation Surveys. The latter estimate includes both permanent and temporary migrants, and both the Canadian- and foreign-born.⁶

Undoubtedly, a factor influencing the high education of recent immigrants is the "points system" noted earlier. Canada's immigration laws, however, are multifaceted. The goal is not only to promote Canada's economic interest, but also to reunite families and to assist refugees. The two latter objectives are reflected in the other main classes of immigrants: family class and refugees. Immigrants in these two classes are not subject to the same screening as independent immigrants. Yet even when all immigrants are grouped together, they still have significantly higher qualifications than the native-born population, especially at the post-graduate level.

Chart L: Recent immigrants are much more likely to hold university degrees.

Ratio of distribution of recent immigrants* to the Canadian-born, by highest level of education** (Canadian-born = 1)



Source: Census of Canada

* Recent immigrants are those arriving in the five-year period prior to each census.

** The comparison is age-adjusted, using the Canadian-born as the standard population. To illustrate: the 1996 ratio of 4 for "doctorate" means that recent immigrants were four times as likely as the Canadian-born to hold a doctorate degree, after adjusting for age differences in the two populations.

Chart M: Canada gains four times as many university graduates from the rest of the world as it loses to the United States.



Sources: *Census of Canada, 1996*; *U.S. Current Population Survey, 1994-1999*

* This includes both temporary and permanent migration.

Earnings of immigrant computer scientists compare favourably

Much of the debate on brain drain and brain gain has focused on the shortage of skilled workers in the information technology sector. Because of the high demand for these workers, this sector is keenly aware of losses from migration to the United States. It is equally important, however, to consider the contribution of recent immigrants in this sector.

With the expansion of high-technology in recent years, employment of professionals in this sector has grown rapidly, not only among immigrants, but also among the native-born. Between 1991 and 1996, employment of computer engineers, systems analysts and computer programmers grew by 39,000, from 124,000 to 163,000. Recent immigrants (since 1990) accounted for almost a third of this increase (Chart N). It is clear that recent immigrants have become an important component of high-technology employment expansion and that they are helping to meet the high demand for workers in this sector.

According to the 1996 Census, among those aged 15 to 49 the annual income of immigrant computer scientists who had been in Canada for less than 10 years was slightly lower than that of their

Canadian-born counterparts, and among those aged 50 and over, significantly lower. Immigrants for more than 10 years had similar incomes up to the age of 44, and higher incomes from age 45 on. Hence, it appears that those immigrating at relatively young ages integrate well—and actually earn more—than the Canadian-born computer scientists aged 45 or older. On the other hand, those immigrating at older ages seem to experience more difficulties. For the most part, immigrant computer scientists tend to be young (average age in the early thirties) when they immigrate. In 1995, young immigrant computer scientists earned only 1% less than their Canadian-born counterparts (Chart O).

Summary

Is there a “brain drain” to the United States? Yes—Canada suffers a net loss of workers in a variety of key knowledge-based occupations. The magnitude of these losses is relatively small, however: about 0.1% of people with employment income, and less than 1% of the stock of workers in any specific knowledge-based occupation. Emigrants, though, tend to be well-educated, high income earners and people of prime working age. Furthermore, they are drawn from sectors thought to be important to Canada’s economy

Chart N: Recent immigrants account for one-third of the growth in high technology.*



Source: *Census of Canada, 1996*

* Comprises computer engineers, systems analysts and computer programmers.

** Recent immigrants are those arriving in the five-year period prior to each census.

Intended and actual occupations of immigrants

Between 1990 and 1994, some 1.2 million people became landed immigrants in Canada. According to the 1996 Census, close to one million people reported immigrating to Canada over the same period—83% of the Citizenship and Immigration Canada figure. Several factors explain this difference, including deaths, return of immigrants to their country of origin, or emigration to another country. Additional reasons include undercounting of immigrants in the census, and possible reporting errors by immigrant respondents—for example, in reporting the year of landing in Canada.

The intended and actual percentage of recent immigrants (between 1990 and 1994) working in knowledge-based occupations was equal, at 11.6%. Among recent immigrants intending to work in other occupations, the aggregate match between intended and realized occupations was not as close. On becoming landed immigrants, 42% of recent immigrants planned to work in these other occupations, but in 1996 only 36% were doing so. The closer aggregate fit in knowledge-based occupations is not surprising, given the demand. Between 1990 and 1998, full-time employment of professional and managerial workers grew by 780,000, compared with 55,000 for all other workers.

Knowledge workers who arrived between 1990 and 1994, by intended occupation at entry and realized occupation in 1996

	Intended	Realized
	%	
Total knowledge workers	100.0	100.0
Entrepreneurs, investors, executives, managers and administrators	39.1	41.0
Technologists and technicians	11.0	12.1
Computer scientists	7.7	8.3
Engineers, surveyors, architects and mapping scientists	11.4	7.7
Social sciences and related	5.8	6.8
Writers, artists, entertainers and athletes	5.6	6.6
Teachers—postsecondary	2.7	4.1
Teachers—except postsecondary	5.1	3.9
Nurses	3.8	3.7
Natural scientists	3.1	1.9
Physicians	1.7	1.7
Other health assessment/treating	1.9	1.4
Other health diagnosing	0.7	0.6
Mathematicians	0.4	0.1

Sources: Citizenship and Immigration Canada; Census of Canada, 1996

The fit between intended and realized occupations varied for individual knowledge-based occupations (Table). A higher percentage of recent immigrants were working as computer scientists in 1996 (8.3% of those in knowledge-based occupations) than had intended to do so (7.7%). On the other hand, fewer newcomers were working in engineering and natural sciences than had intended. Between the 1991 and 1996 Censuses, employment of computer scientists grew by 30%, while employment of engineers and natural scientists grew more slowly, by 5% and 11%. The high demand for computer scientists may have drawn some of the immigrants with training in engineering, mathematics and natural sciences into computer sciences.

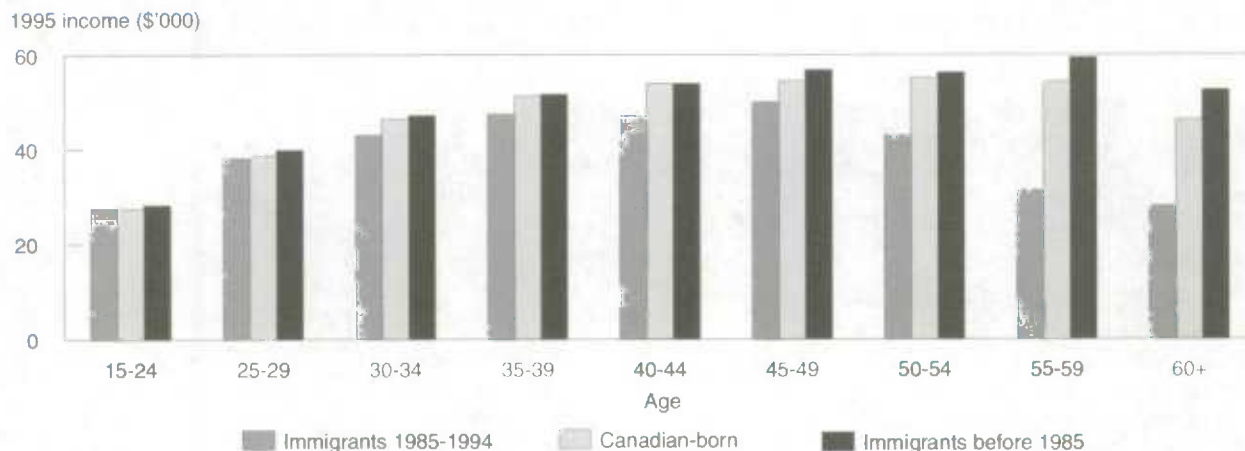
The actual percentage of recent immigrants working in natural and applied science occupations combined (including computer sciences) was lower (18.1% of those in knowledge-based occupations) than the intended percentage at the time of landing (22.7%). One possible factor may be “flow-through” immigration in these high-demand occupations; that is, a proportion of the new immigrants may have emigrated to other countries, particularly the United States. Additionally, among the great number of immigrants Canada admitted each year in the 1990s in these high-technology fields, some may not have successfully integrated into the Canadian labour market in their field of training.

The intended and actual percentages of immigrants working as physicians and nurses matched quite closely. It seems, therefore, that despite licensing requirements for health professionals, immigrant health professionals had successfully integrated and were practising in their field of training in Canada. The health sector may have been better able to absorb immigrant physicians and nurses, perhaps because of the relatively small number admitted each year.

The situation for educators at postsecondary levels was different from that of educators at the elementary and secondary levels. The actual percentage of immigrants working as postsecondary teachers (4.1%) exceeded the intended percentage (2.7%). It may be that some of the recent immigrants were graduate students at the time of landing, but by 1996 were teaching at universities or colleges. The actual percentage of immigrants working as elementary and secondary teachers (3.9%) was below the intended percentage (5.1%). This may reflect more limited opportunities for new hiring of teachers because of declining school-age populations in some jurisdictions, for example, or reductions in public spending on education as governments try to reduce or eliminate deficits.

The realized percentages in managerial, administrative and technical occupations were all close to or slightly higher than the intended percentages in these occupations.

Chart O: In 1995, earnings of immigrant computer scientists were nearly identical to those of their Canadian-born counterparts.*



Source: Census of Canada, 1996

* Employed full year full time.

and society. Of the 1995 graduates who moved to the United States, a disproportionately high percentage (12%) were doctoral graduates. Likewise, 0.9% of taxfilers with annual incomes of \$150,000 or more left Canada in 1996, a migration rate nine times higher than that of all taxfilers. Taxfiler data also indicate an upward trend in the number of people leaving Canada in the 1990s.

On the other hand, Canada receives more university graduates from elsewhere than it loses to the United States. For every university graduate migrating from Canada to the United States, whether on a temporary or permanent basis, four university degree holders migrate from the rest of the world to Canada. Compared with the Canadian-born population (age difference adjusted), recent immigrants are over-represented among university graduates, especially those with advanced degrees.

Recent immigrant high-technology workers are making an important contribution to growth in this sector. Immigrants in the 1990s accounted for about one-third of the increase in employment among computer engineers, systems analysts and computer programmers.

Clearly, this topic is far more complex than first appears. Questions remain about the size of the flow of emigrants and the permanency of their moves, and

the degree to which the best and the brightest may be over-represented. Questions also remain about the extent to which Canadian immigrants compensate for the loss. The situation may also have evolved since these data were compiled and may still be evolving. Statistics Canada will continue to monitor and update existing sources of data, and will work with Human Resources and Development Canada, Industry Canada, and Citizenship and Immigration Canada, as well as with its counterparts in the United States, to extend and improve what is known about the nature, extent and economic effect of the brain drain to the United States and the brain gain from the rest of the world (see *Further initiatives*).

Perspectives

Notes

- 1 As these data are based on all taxfilers and are therefore not subject to sampling errors, they provide a reliable trend of emigration of taxfilers from Canada to all countries. Taxfilers need to identify themselves as movers, however, and some may be prompted not to make this declaration for financial or other reasons.
- 2 Earlier data can be found in Boothby (1993).
- 3 Occupational data are not available for either temporary emigrants to the United States or emigrants to countries other than the United States.

Further initiatives

Taxfiler data

The use of taxfiler data for industrial sector analysis of movers is in its initial stages (see *Industrial sector of movers*). Together with Industry Canada, Statistics Canada will be examining the number and income profiles of movers by industrial sector, in comparison with all taxfilers, as well as trends over time.

National Graduates Surveys (NGS)

The National Graduates Survey (NGS), developed by Human Resources Development Canada and Statistics Canada, is being enhanced to provide estimates of the number of graduates of postsecondary institutions leaving Canada for the United States, by level and field of study, both two and five years after graduation. Previously, it included only those remaining in Canada. The next survey will be conducted later in 2000, a five-year follow-up of the graduating class of 1995. A survey of the class of 1999 is planned for 2001.

Survey of Air and Land Travelers to Canada

The feasibility of conducting surveys on air and land travelers to profile Canadians returning from the United States, and U.S. citizens coming to Canada, is currently being explored. Such surveys have potential to generate information on the intent, experience and duration of

Canadians working in the United States and on the bilateral exchange of high-skilled workers between Canada and the United States.

U.S. 2000 Census

The 2000 Census of the United States will provide in-depth information on the number and characteristics of Canadians who are living in the United States.

Longitudinal Survey of Immigrants

The Longitudinal Survey of Immigrants is being developed by Statistics Canada in collaboration with Citizenship and Immigration Canada to provide information on the early experiences of recent immigrants to Canada. Immigrants will be interviewed six months, two years and four years after arrival.

Longitudinal Immigrants Database (IMDB)

The IMDB links immigration and taxation administrative records to allow analysis of the economic performance of the immigrant population in Canada. The data are updated annually and are currently available for 1980 to 1995. Citizenship and Immigration Canada has performed preliminary analyses, and Statistics Canada has been involved in the development of the database.

4 *Perspectives* published a series of charts from that study in its "Key labour and income facts" department (Winter 1999).

5 A possible contributing factor may be the high proportion (44%) of movers who rated themselves near the top of the class.

6 University graduates emigrating to countries other than the United States are not included because of lack of data.

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Industrial sector of movers

Most of the analysis presented in this study examines migration from the perspective of individuals. However, the issue can also be viewed from a business or industrial sector perspective. Such analysis is in its initial stages, using taxfiler data. Industries with the greatest number of movers in 1996 have been identified. Further analysis is planned to compare the industrial distribution of movers with that of all taxfilers, in order to identify industries in which movers are over-represented, and to examine trends over time.

The data are based on Canada Customs and Revenue Agency (CCRA) T1 and T4 tax files and Statistics Canada's Longitudinal Employment Analysis Program (LEAP) file, constructed by the Business and Labour Market Analysis Division. The T1 file is built from individual tax returns, while the T4 file is created from the T4 forms issued by employers. The LEAP file analyzes employment and income dynamics of employees in Canada; the database includes a classification of employers by industry using the 1980 Standard Industrial Classification (SIC). Linkage of these files has identified the SIC code of each person's primary employer in 1996. Two groups of taxfilers were excluded in this linkage: persons with no earned income, and the self-employed.

The industries with the most movers were hospitals; university education; and elementary and secondary education. Also in the top 10 were a cluster of high-technology industries, including architectural, engineering and other scientific and technical services; computer and related services; and communication and other electronic equipment. The other industries in the top 10 were banks, trust companies and credit unions; other business services; federal government services; and food services.

The sources also provide indirect information on the workers who are leaving. However, the data need to be viewed with caution. For example, not all movers employed by a university were necessarily full-time university professors; some may have been master's or doctoral students whose primary earnings were from teaching and/or research duties. Likewise, it would be wrong to assume that all movers from high-technology industries were high-technology workers.

With these caveats in mind, this early work suggests that movers seem to be concentrated in knowledge-intensive industrial sectors. Most of the top 10 industries fall into high-knowledge industries as classified by Industry Canada (Lee and Has, 1996).

Taxfilers leaving* Canada for all destinations, by industry of employer, 1996

Industry (1980 SIC code)	Number of movers
Hospitals	1,060
University education	910
Elementary and secondary education	690
Architectural, engineering and other scientific and technical services	660
Computer and related services	580
Banks, trust companies and credit unions	520
Food services	440
Federal government service**	420
Communication and other electronic equipment	360
Other business services	290
All remaining industries	10,640

Source: Small Area and Administrative Data Division

* These data exclude movers without earned income, as well as the self-employed. The industry is that of movers' principal employer (in terms of 1996 earnings).

** Except defence services.

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What's new?

Recent reports and studies

■ JUST RELEASED

■ *Longitudinal Administrative Databank*

Data for 1997 have been added to the Longitudinal Administrative Databank (LAD). This databank now spans 16 years, from 1982 to 1997, and contains information about individuals and census families.

The LAD consists of a 10% longitudinal sample of Canadian taxfilers. It is designed to help researchers and analysts study the income changes of Canadians and their families. The LAD includes a wide variety of income and demographic variables, such as employment income, self-employment income, Registered Retirement Savings Plan contributions, alimony, age, sex and census family composition. The large sample (2.2 million persons in 1997) ensures reliable estimates for Canada, the provinces, census metropolitan areas, and some subprovincial regions, based on aggregations of postal codes.

Custom tabulations including 1997 data are now available. For more information, contact Client Services, Small Area and Administrative Data Division, at (613) 951-9720; fax: (613) 951-4745; saadinfo@statcan.ca.

■ *Overview of labour force statistics*

Historical Labour Force Statistics is an annual compilation of the seasonally adjusted employment and unemployment statistics presented each month in the media. It provides data on general labour market characteristics for Canada, the provinces and metropolitan areas going back 10 to 20 years. Each year, the series are updated and revised according to the latest seasonal models and factors.

Historical Labour Force Statistics, 1999 (Catalogue no. 71-201-XPB, \$114) is now available. For more information, contact Jeannine Usalcas, Labour Statistics Division, at (613) 951-4720; fax: (613) 951-2869; usaljea@statcan.ca.

■ *Education indicators*

Education levels in Canada, already high by international standards, improved substantially during the 1990s, according to a new report on the status of education in Canada. More young people graduated from high school, and more high school graduates went on to higher education.

Education Indicators in Canada is a new report of the Pan-Canadian Education Indicators Program, a joint initiative of Statistics Canada and the Council of Ministers of Education Canada, in collaboration with the provincial and territorial ministries responsible for education and training. Its goal is to develop and disseminate a comprehensive set of statistical indicators describing students, teachers and the education systems in Canada. Data were chosen on the basis of two criteria: information needed for policy development and practical availability.

Internationally, among member nations of the Organisation for Economic Co-operation and Development (OECD), Canada had the highest percentage of its population (48%) with postsecondary education in 1995, compared with the OECD average of 23%.

Canada's investment in education is one of the highest in the world, as measured by OECD indicators of education expenditure. Per student spending in Canada, from both public and private sources, amounted to US\$6,400 in 1995, the most recent year for which internationally comparable data are available. This was second only to the

United States at US\$7,900. The OECD average was US\$4,700.

When it comes to labour market success, it pays to stay in school. With each increment in education, employment rates rise and unemployment rates fall. Earnings of recent post-secondary graduates increase progressively with more advanced qualifications.

Education Indicators in Canada (Catalogue no. 81-582-XIE, free) is now available on Statistics Canada's website (www.statcan.ca). It is also available on the Council of Ministers of Education website (www.cmec.ca). A paper copy (Catalogue no. 81-582-XPE, \$20) is also available. For more information, contact Client Services, Centre for Education Statistics, at (613) 951-1503; educationstats@statcan.ca.

■ **Article from Canadian Economic Observer**

The labour market in the 1990s, Part II: Distributional outcomes—Who is winning and losing?

Labour market outcomes improved in the 1990s for women, while outcomes for men generally deteriorated. The feature article in the February 2000 issue of *Canadian Economic Observer* also observes other major trends: declining real wages for young men, rising rates of low income, especially in the mid-1990s, and little or no change in earnings inequality.

The earnings gap between older and younger men, which emerged in the early 1980s, continued to widen in the 1990s. Real annual earnings of men under 35 fell following the recession of the early 1990s and displayed little recovery until 1997.

Earnings also fell for recent immigrants (those who immigrated within five years of the census), particularly among men. In 1995, recent male immigrants who were university graduates aged 35 to 54 earned 55% as much as their Canadian-born counterparts, down from 72% in 1985. For recent immigrant women, declines in relative earnings were recorded between 1990 and 1995.

While women continued to earn less than men, real weekly earnings among women rose 12% between 1989 and 1996. At the same time, they

fell marginally for men. Growth in earnings for women has outstripped that for men in both low and high earnings deciles.

Despite a weak economic recovery, low income rates rose in the mid-1990s, particularly for families with children. While earnings rose for these families between 1993 and 1996, this did not fully offset declines in income received from transfers.

Canadian Economic Observer (Catalogue no. 11-010-XPB, \$23/\$227) is a monthly publication. For more information about this article, or to enquire about concepts, methods or data quality, contact Garnett Picot or Andrew Heisz, Business and Labour Market Analysis Division, at (613) 951-8214 or (613) 951-3748, respectively.

■ **Geography working paper series**

A working paper series from the Geography Division is designed to stimulate discussion on conceptual, methodological or technical issues involved in developing and disseminating geographic data, products and services. Readers of the series are encouraged to contact Statistics Canada with comments, criticisms and suggestions.

Introducing the Dissemination Area for the 2001 Census (Catalogue no. 92F0138MIE, free) is now available on Statistics Canada's website (www.statcan.ca). A paper copy (Catalogue no. 92F0138MPE, \$10) is also available. To order this paper, or for more information about the series, contact GEO-Help, Geography Division, at (613) 951-3889; fax: (613) 951-0569; geohelp@statcan.ca.

■ **Demographic statistics**

The 1999 edition of *Annual Demographic Statistics* provides an updated statistical snapshot of the population of Canada, the provinces and territories and census metropolitan areas as of July 1, 1999.

This publication provides the most recent population estimates and projections up to 2004 by age group and sex, plus data on births, deaths and migrations, and other demographic components. The information is grouped by province

and territory, census metropolitan area and census division. Data on census families and vital statistics are also provided.

The CD-ROM, included with the publication, contains even more data than for 1998. The historical time series includes population data back to 1971 for provinces and territories, and to 1986 for census divisions and census metropolitan areas. The CD-ROM also includes population projections, as well as animated age pyramids illustrating the aging of the population.

Annual Demographic Statistics, 1999 (Catalogue no. 91-213-XPB, \$125 including CD-ROM; Catalogue no. 91-213-XIB, \$56 CD-ROM not included) is now available. For more information, or to enquire about concepts, methods or data quality, contact François Nault, Demography Division, at (613) 951-9582; fax: (613) 951-2307.

■ *Analytical Studies Branch research papers series*

Determinants of Innovative Activity in Canadian Manufacturing Firms: The Role of Intellectual Property Rights

J. Baldwin and D. Sabourin
Research Paper Series no. 122

This study investigates the contribution of various plant and industry characteristics to innovation in Canadian manufacturing. Data come from the 1993 Statistics Canada Survey of Innovation and Advanced Technology. This study investigates the dual probability that a firm will innovate if it uses intellectual property rights, and will claim intellectual property rights if it innovates.

Using logistic regression analysis, the study estimates the probability of being innovative, taking into account plant and industry characteristics, including any research and development; any collaborative research with universities; the firm's size; the degree of competition it faces; the nationality of its ownership; and its internal capabilities in marketing, technology, production and human resources.

University research plays a key role in the innovation process in Canadian manufacturing. Firms in industries relying on science-based university research were more likely to be

innovative. Research and development also played a major role in stimulating innovation. Firms that performed research and development were four times as likely to have introduced a major innovation as firms that did not. Although important, research and development was not the only input into the innovation process; marketing and technological competence were close behind.

Large plants (those with 500 or more employees) were significantly more innovative than were small plants (those with fewer than 100 employees) after other firm characteristics, such as intensity of research and development, competitive environment, nationality of ownership and degree of technological competency were controlled for. The probability of innovating was close to 70% for large firms and 30% for smaller firms.

For more information, or to enquire about concepts, methods or data quality, contact John Baldwin or David Sabourin, Micro Economic Analysis Division, at (613) 951-8588 or (613) 951-3735, respectively.

Social Transfers, Earnings and Low-income Intensity among Canadian Children, 1981-96: Highlighting Recent Developments in Low-income Measurement

G. Picot
Research Paper Series no. 144

Analysts have long used the low income rate—the proportion of people below a given low income cutoff—as the principal means of tracking low income trends and assessing the direct effects of changes in employment earnings and transfer payments on these trends. This research paper analyzes low income trends among Canadian children between 1981 and 1996. It concludes that the low income rate provides valuable information, but when used alone, it can miss some important trends. This is because the low income rate measures only the number (or proportion) of people with low income; it says nothing about changes in their income levels.

Recently, economists have developed a measure called "low income intensity." This paper suggests that this measure be considered since it makes use of both the low income rate and information on the low income gap, which measures how

far below the low income cutoff a family's income is. Information on the gap is published, but is often less prominently featured than the rate. The new measure can detect changes in income levels of low income families. This paper shows that the intensity measure and the commonly used rate may lead to quite different conclusions about low income trends among children and about the direct role of changes in earnings and transfers in determining those trends.

For more information, or to enquire about concepts, methods or data quality, contact Garnett Picot, Business and Labour Market Analysis Division, at (613) 951-8214.

The Maturation of Canada's Retirement Income System: Income Levels, Income Inequality and Low Income among the Elderly

J. Myles

Research Paper Series no. 147

As real incomes of the elderly have advanced, inequality within this group has declined. During the 1980s, average real incomes among the population aged 65 and over increased 10%, a gain that went largely to lower income seniors.

This study categorized seniors into five groups based on their income levels, each representing 20% of the total. Among the one-fifth of seniors with the lowest incomes, disposable income rose 31% between 1980 and 1990, compared with only 1% among the one-fifth of seniors with the highest incomes.

For seniors in the lowest income levels, the changes were a direct result of higher benefits from three sources: Old Age Security, the Guaranteed Income Supplement and the Canada and Quebec Pension Plans (C/QPP). For the majority, the fastest growing sources of income in the 1980s were C/QPP benefits, followed by private pension income.

In 1980, 40% of seniors were in the lowest income group, compared with 20% of all Canadians. By 1995, their proportion in the lowest income group had fallen to 18%, roughly the same as that for other Canadians.

In an international context, these trends represent a significant improvement in the income position of seniors. In the 1970s, the low income rate among Canadian seniors was among the highest for developed nations where data were available. By the early 1990s, Canada had achieved one of the lowest rates.

For more information, or to enquire about concepts, methods or data quality, contact John Myles, Business and Labour Market Analysis Division, at (613) 951-3547.

To obtain copies of these or other studies in the Research Paper Series, contact Hélène Lamadeleine at (613) 951-5231. They are also available free on the Statistics Canada website (www.statcan.ca). The menu path is "Products and services," "Downloadable research papers (free)," then "Analytical studies."

■ *Farm statistics*

Farm families earned an average \$59,200 in 1997, 4.2% more than in 1996, according to the latest data from 1997 personal income tax returns. Average farm family income advanced at a faster pace than in 1996 (0.3%), largely because of higher off-farm employment income. The overall increase in 1997 resulted from a 5.2% gain in off-farm income and a 2.1% increase in net farm operating income (before depreciation).

Farm families specializing in poultry and egg production, who recorded the highest average total income (\$78,200), posted the largest gain (27.1%), owing to substantial growth in both their average net farm operating income (47.8%) and off-farm income (11.8%). Families operating tobacco farms were a close second at \$76,500, followed by those operating grain and oilseed farms (\$66,300). Families running livestock combination farms had the lowest average total income (\$46,700). Only three of the major farm types recorded a drop in average total family income: potato (-10.6%), tobacco (-8.2%), and greenhouse and nursery (-4.6%).

For 1998, average operating revenues per farm increased 3.0% to \$154,000, according to taxation records. During the same period, average operating expenses rose 3.9% to \$130,400.

Operating margins were 15.3 cents per revenue dollar, down from 16.1 cents in 1997. In current dollars, average operating revenues in 1998 were 13.2% above the five-year average for 1993 to 1997, but operating margins were lower by 1.3 cents per dollar of revenue.

Average operating expenses rose mainly because of higher crop production expenses (7.5%), cattle purchases (7.5%) and interest costs (12.7%).

Among farm types, the average operating revenues of poultry and egg farms ranked first at \$539,600, followed by those of potato farms (\$452,800) and greenhouse and nursery farms (\$426,600).

For more information, or to enquire about concepts, methods or data quality, contact Lina Di Pi tro, Agriculture Division, at (613) 951-3171; lina.dipietro@statcan.ca, or the Client Services Unit, Agriculture Division, at (613) 951-5027; fax: (613) 951-3868; agriculture@statcan.ca.

■ *Small business: A statistical overview*

In 1997, there were about 955,800 active employers of all sizes. About 718,000, or 75%, had fewer than five employees; 213,000, or about 22%, had between 5 and 50. Small businesses continued to account for employment creation well out of proportion to their size in 1997. Businesses with fewer than 50 employees accounted for 57% of the gross increase in employment despite representing only 32% of total paid employment. Businesses with fewer than five employees accounted for 26% of the gross increase, while representing just under 9% of total employment.

On a net basis, small firms created 353,000 more jobs than they lost in 1997. This amounted to more than three-quarters of the net employment increase observed among employers of all sizes.

In 1997, some 71% of small businesses with annual revenue between \$30,000 and \$5 million made a profit. This proportion was unchanged from 1995, and was only slightly higher than the 1993 level, 69%. As well, small businesses' net profit margins were \$18,500, or 5.0% of gross revenue. This was unchanged from 1995 but an improvement on 1993, when profits represented 3.9% of gross revenue.

These data are noted in two new electronic products: *Employment Dynamics* and *Small Business Profiles*. The former is based on the Longitudinal Employment Analysis Program (LEAP), a longitudinal file of all businesses with at least one employee, between 1983 and 1997. It includes the number of employer businesses, as well as their payroll and employment, by province and industry. The employment measure used is the average labour unit, obtained by dividing annual payroll by average annual earnings. The data are tabulated by employment size and life status of business. They are available in tables comparing consecutive years.

The LEAP database includes any business remitting taxes on behalf of employees through the payroll deduction accounts of the Canada Customs and Revenue Agency (formerly Revenue Canada). An undetermined number of persons working on their own account (self-employed) are excluded from *Employment Dynamics*, as they do not always pay themselves as employees.

Small Business Profiles reports financial and employment data for an average small business, defined as having annual gross operating revenue between \$30,000 and \$5 million. The 1997 profiles are available for unincorporated and incorporated businesses in about 680 industries, excluding the financial sector, and for each province and territory.

In 1997, manufacturing and business services led net employment growth among small businesses with fewer than 50 employees. The former recorded a net employment increase of 54,800 over 1996, accounting for 15.5% of all net employment gains among businesses with fewer than 50 employees. The latter, covering firms such as employment agencies and management consultants, grew by 50,500, which represented 14.3% of total net employment growth among businesses of this size. The accommodation, food and beverage industry accounted for 11.9% of net employment gains among businesses with fewer than 50 employees, followed by wholesale trade (9.3%) and construction (8.8%).

Employment Dynamics (Catalogue no. 61F0020XCB, \$500) and *Small Business Profiles* (Catalogue no. 61F0015XCB, \$500) are now available on

CD-ROM. To order, contact your nearest Statistics Canada Regional Reference Centre.

For more information, or to enquire about concepts, methods or data quality, contact Jamie Brunet, Small Business and Special Surveys Division, at (613) 951-6684; brunjam@statcan.ca.

■ ***Income—new data source, new product line***

As mentioned previously in "What's new?" (Spring 2000), the Survey of Labour and Income Dynamics (SLID) will replace the Survey of Consumer Finances (SCF) as the official source of income data, starting with the 1998 reference year.

SLID is a longitudinal survey—the same people are interviewed annually for a period of six years—that began with the 1993 reference year. The income content of the two surveys is similar—with SLID adding a large selection of variables that capture transitions in Canadians' jobs, income and family events. SLID is also being used to produce annual cross-sectional income estimates previously based on the SCF.

Estimates from the two surveys tell essentially the same story. Had the major Statistics Canada income releases over the last five years been based on SLID rather than the SCF, the main messages would have been no different.

For more information, see *A Comparison of the Results of the Survey of Labour and Income Dynamics (SLID) and the Survey of Consumer Finances (SCF), 1993-1997: Update* (Catalogue no. 75F0002MIE99007) and *Bridging Two Surveys: An Integrated Series of Income Data From SCF and SLID, 1989-1997* (Catalogue no. 75F0002MIE00002), which are available free on Statistics Canada's website (www.statcan.ca). The menu path is "Products and services," then Downloadable research papers (free)," followed by "Income, expenditures, pensions, assets and debts," and "Income."

The transition from the SCF to SLID has triggered a revision of the income product line, which will now consist of

- an annual report, *Income in Canada*, available in print (Catalogue no. 75-202-XPE, \$45)

and electronic (Catalogue no. 75-202-XIE, \$45) formats. It will provide results and analysis on all major income concepts, in one single report. This publication will include data on market income, government transfers, total income, income tax, income after tax, and low income, as well as other concepts such as income quintiles. The electronic version contains more detailed geographic coverage;

- an annual CD-ROM, *Income Trends in Canada* (Catalogue no. 13F0022XCB, \$195), which will provide nearly two decades of data, starting in 1980, for Canada, the provinces and 15 metropolitan areas. The CD-ROM will present the data in Beyond 20/20™ format, which allows users to view trends, create tables and chart income. An edition of this CD-ROM, featuring data from 1980 to 1997, has previously been released;
- public use microdata files, modeled on the SCF files;
- and longitudinal data, available through remote access, as well as at Statistics Canada regional reference centres and research data centres soon to be opened on selected university campuses across the country.

For further information, contact Client Services, Income Statistics Division, at (613) 951-7355 or 1 888 297-7355; fax: (613) 951-3012; income@statcan.ca.

■ **DID YOU MISS?**

■ ***Retirement savings, 1991 to 1997***

A majority of taxfilers in Canada saved for retirement during the 1990s, either by contributing to a registered retirement savings plan (RRSP) or by having an employer-sponsored registered pension plan (RPP). Seven of every ten taxfilers aged 25 to 64 saved through at least one of these programs between 1991 and 1997.

Of the 30% of taxfilers in this age group who did not use these programs, almost all had incomes of less than \$20,000. Over half of the non-savers were women (60%). The continued non-participation of such people may mean that

public pension programs, such as Old-Age Security, the Guaranteed Income Supplement or the Canada and Quebec Pension Plans, will be their major source of income in retirement.

As income rises, so does the likelihood of saving through RRSPs or RPPs. Eight of ten people with incomes between \$30,000 and \$40,000 saved regularly (in four or more years). Virtually all taxfilers with incomes over \$40,000 did as well. People with incomes of \$50,000 or more (about 15% of taxfilers) were the most likely to be consistent savers; three-quarters of the taxfilers in this income group either contributed to an RRSP or belonged to an RPP in all seven years. Only about 10% of those with incomes of less than \$30,000 saved each year.

The data for this analysis come from administrative files provided by the Canada Customs and Revenue Agency. The pension adjustment factor is used to estimate the value of the pension accrued in a registered pension plan or deferred profit sharing plan in a year.

References to the frequency of savings from 1991 to 1997 were based on people who filed a tax return in each of the seven years and were aged 25 to 64 as of December 31, 1997. Income was averaged over the seven-year period. References to the number of savers or amounts saved in any one year are based on the returns of all taxfilers aged 25 to 64 as of December 31 of that year.

Data on retirement savings through RRSPs and RPPs are available free on Statistics Canada's website (www.statcan.ca) under "Canadian statistics," "Labour, employment, and unemployment," followed by "Employment, insurance and pensions." *Retirement Savings through RPPs and RRSPs, 1991 to 1997* (Catalogue no. 74F0002X1B, \$33) is also available.

For more information about these results and related products and services, or to enquire about concepts, methods or data quality, contact Client Services, Income Statistics Division, at (613) 951-7355 or 1 888 297-7355; fax: (613) 951-3012; income@statcan.ca.

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Key labour and income facts

Selected charts and analysis

This section presents charts and analysis featuring one or more of the following sources. For general inquiries, contact Joanne Bourdeau at (613) 951-4722 or bourjoa@statcan.ca.

Administrative data

Small area and administrative data

Frequency: Annual

Contact: Customer Services
(613) 951-9720

Business surveys

Annual Survey of Manufactures

Frequency: Annual

Contact: Richard Vincent
(613) 951-4070

Business Conditions Survey of Manufacturing Industries

Frequency: Quarterly

Contact: Claude Robillard
(613) 951-3507

Census

Census labour force characteristics

Frequency: Quinquennial

Contact: Michel Côté
(613) 951-6896

Census income statistics

Frequency: Quinquennial

Contact: Abdul Rashid
(613) 951-6897

Employment and income surveys

Labour Force Survey

Frequency: Monthly

Contact: Marc Lévesque
(613) 951-2793

Survey of Employment, Payrolls and Hours

Frequency: Monthly

Contact: Sylvie Picard
(613) 951-4090

Help-wanted Index

Frequency: Monthly

Contact: Sylvie Picard
(613) 951-4090

Employment Insurance Statistics Program

Frequency: Monthly

Contact: Sylvie Picard
(613) 951-4090

Major wage settlements

Bureau of Labour Information

(Human Resources

Development Canada)

Frequency: Quarterly

Contact: (819) 997-3117
1 800 567-6866

Labour income

Frequency: Quarterly

Contact: Anna MacDonald
(613) 951-3784

Survey of Labour and Income Dynamics

Frequency: Annual

Contact: Client Services
(613) 951-7355 or
1 888 297-7355

Survey of Consumer Finances

Frequency: Annual

Contact: Client Services
(613) 951-7355 or
1 888 297-7355

Survey of Household Spending

(replaces *Household Facilities and Equipment Survey* and *Family Expenditure Survey*)

Frequency: Annual

Contact: Client Services
(613) 951-7355 or
1 888 297-7355

General Social Survey

Education, work and retirement

Frequency: Occasional

Contact: Client Services
(613) 951-5979

Social and community support

Frequency: Occasional

Contact: Client Services
(613) 951-5979

Time use

Frequency: Occasional

Contact: Client Services
(613) 951-5979

Pension surveys

Pension Plans in Canada Survey

Frequency: Annual

Contact: Thomas Dufour
(613) 951-2088

Quarterly Survey of Trusteed Pension Funds

Frequency: Quarterly

Contact: Bob Anderson
(613) 951-4034

Special surveys

Survey of Work Arrangements

Frequency: Occasional

Contact: Ernest B. Akyeampong
(613) 951-4624

Adult Education and Training Survey

Frequency: Occasional

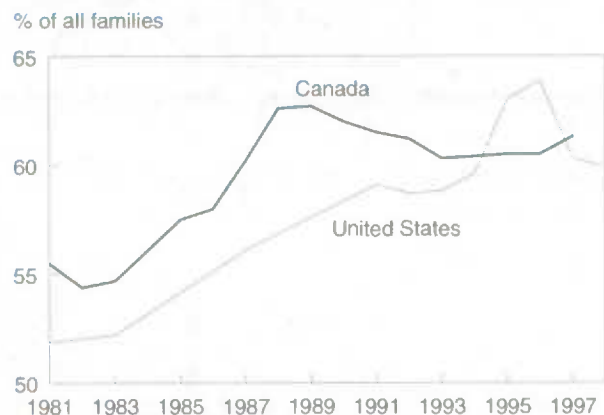
Contact: Client Services
(613) 951-7355 or
1 888 297-7355

Graduate Surveys

(Postsecondary)

Frequency: Occasional
Contact: Bill Magnus
(613) 951-4577

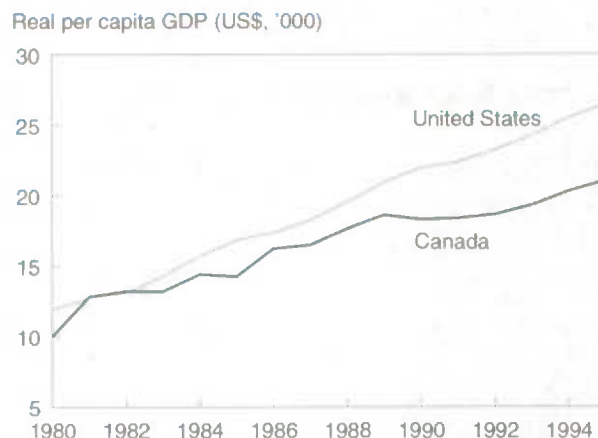
The proportion of dual-earner families is similar in Canada and the United States.



Sources: Survey of Consumer Finances; U.S. Current Population Survey

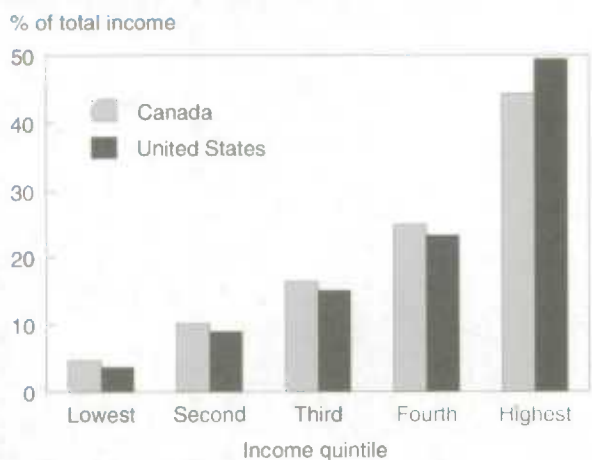
Note: Data for the United States exclude 1982, 1984 to 1986, and 1988 to 1990.

Real per capita GDP is higher in the United States.



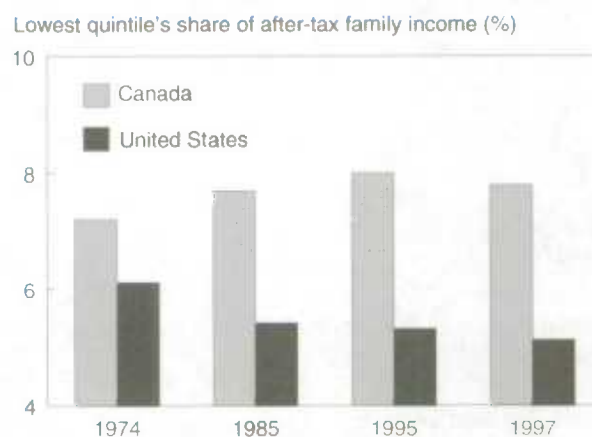
Sources: Census of Canada; Labour Force Survey; Income and Expenditure Accounts; U.S. Survey of Current Business

In 1996, higher income families received a larger share of total income in the United States.



Sources: Survey of Consumer Finances; U.S. Current Population Survey

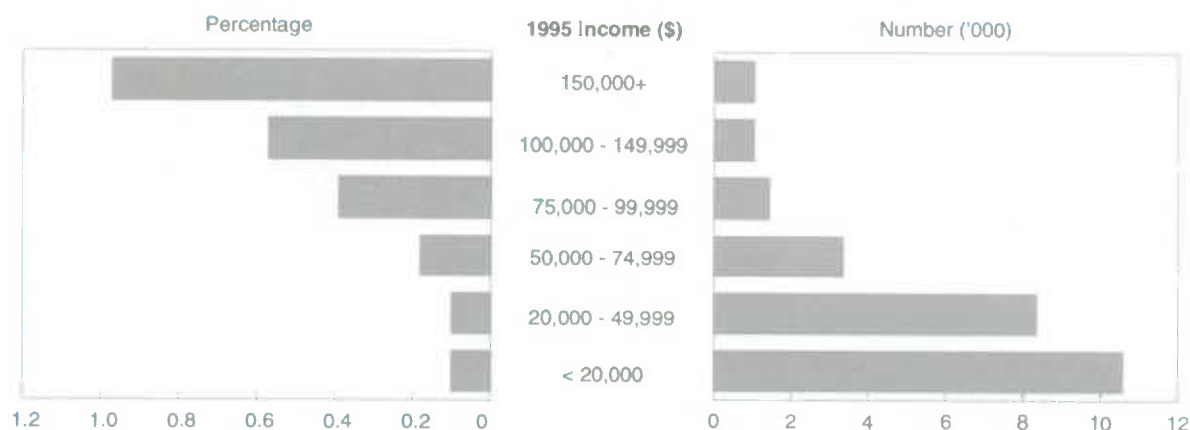
Lower income families have a higher share of after-tax income in Canada.



Sources: Survey of Consumer Finances; U.S. Current Population Survey

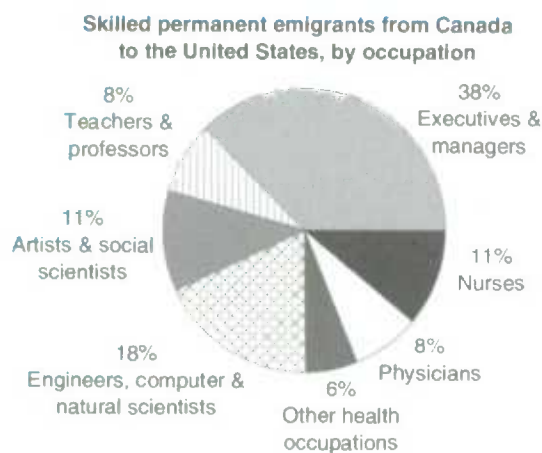
Top income earners have left in higher proportions, but in relatively small numbers.

Taxfilers who ceased to reside in Canada in 1996



Sources: Small Area and Administrative Data Division

Executives and health professionals made up over half the emigrants from Canada to the United States in 1997.



Source: U.S. Immigration and Naturalization Service

Canadian emigration to all destinations is rising.

Taxfilers who ceased to reside in Canada ('000)



Source: Small Area and Administrative Data Division

Canada's labour force participation rate in the 1990s was lower than that of the United States.



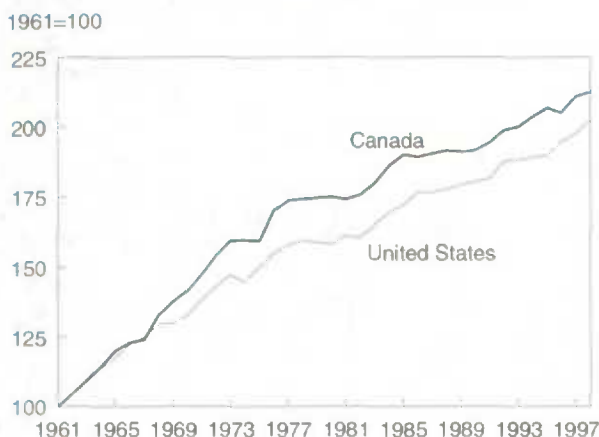
Sources: Labour Force Survey; U.S. Bureau of Labor Statistics

The influx of women into the labour force stabilized in the 1990s.



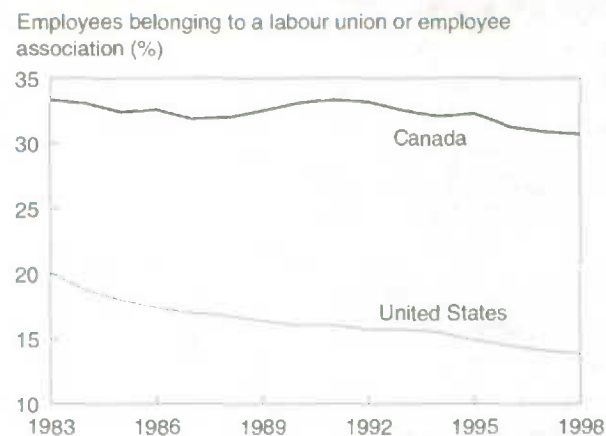
Sources: Labour Force Survey; U.S. Bureau of Labor Statistics

Growth in labour productivity in the business sector has been similar in both countries.



Sources: Micro-economic Studies; U.S. Bureau of Labor Statistics

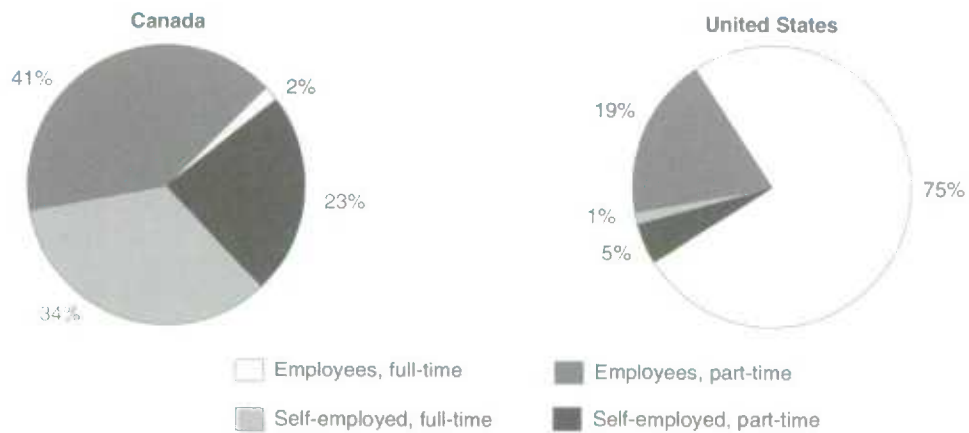
Unionization has been higher in Canada.



Sources: Labour Force Survey; U.S. Current Population Survey

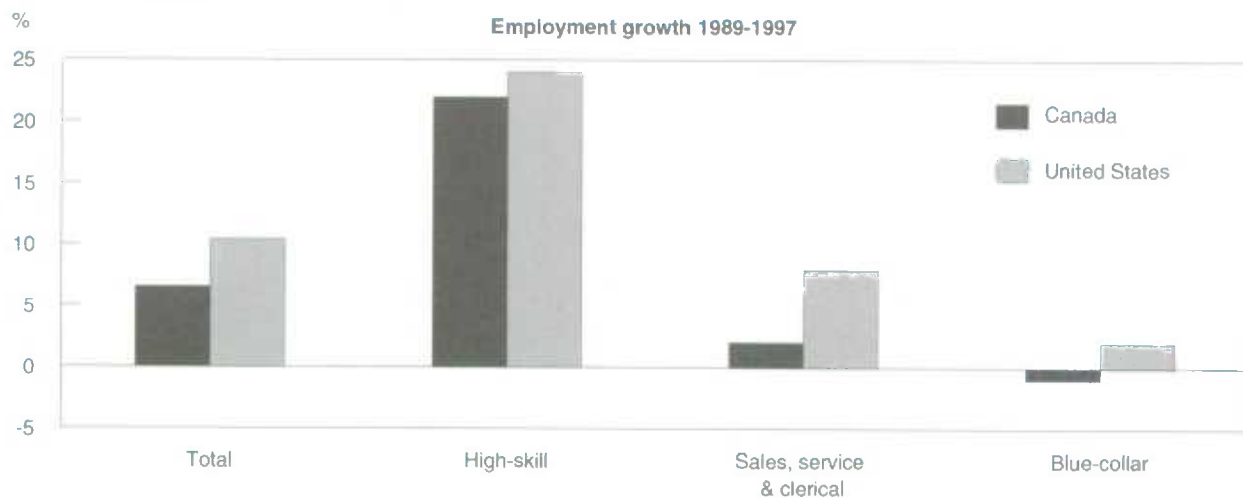
Recent job growth in Canada and the United States has differed.

Share of total employment growth, 1989-1998



Sources: Labour Force Survey; U.S. Bureau of Labor Statistics

High-skill jobs have grown more rapidly than other occupations.



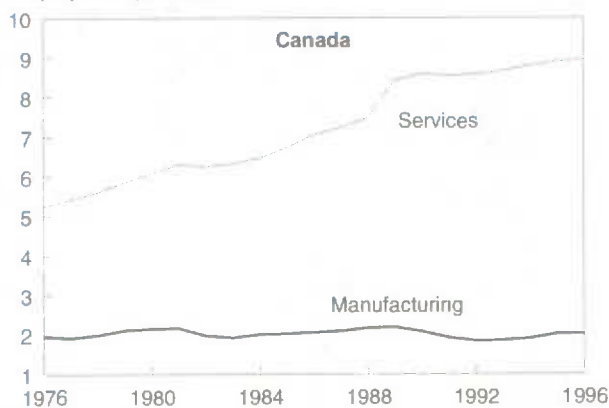
High-skill: managerial, professional and technical

Blue-collar: construction, processing, transportation and materials handling

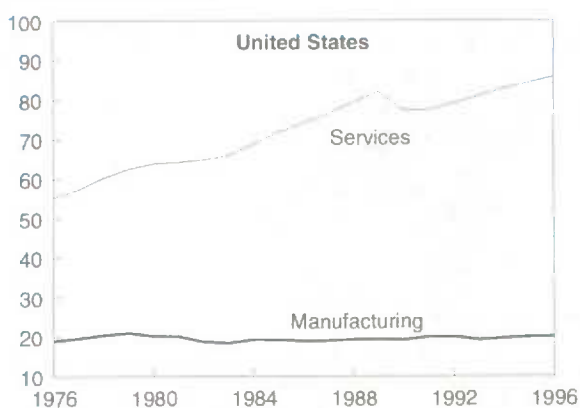
Sources: Labour Force Survey; U.S. National Household Education Survey

Employment growth has been in service industries.

Employment (millions)



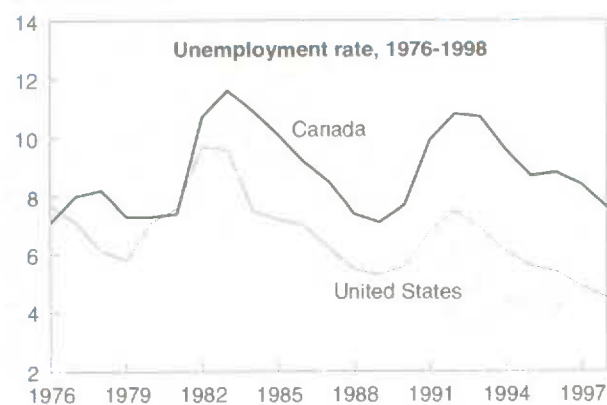
Employment (millions)



Sources: Labour Force Survey; U.S. Survey of Current Business

Gap between Canadian and U.S. unemployment rates widened during the 1990s.

% of labour force



Sources: Labour Force Survey; U.S. Bureau of Labor Statistics

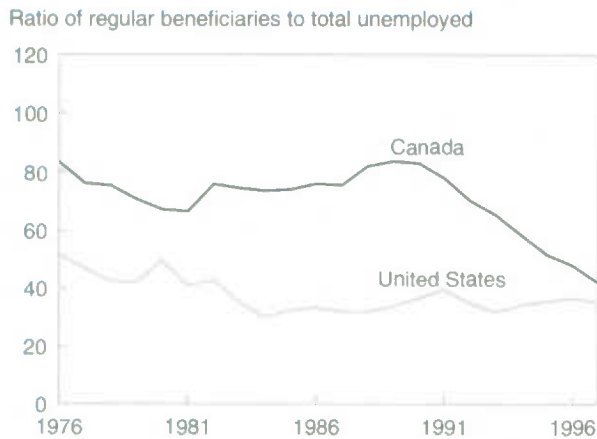
Widening gap in the employment rate favoured the United States.

% of population



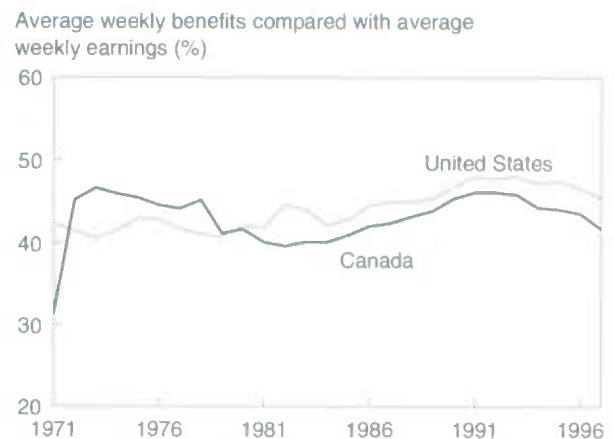
Sources: Labour Force Survey; U.S. Current Population Survey

Employment insurance coverage in both countries has converged.



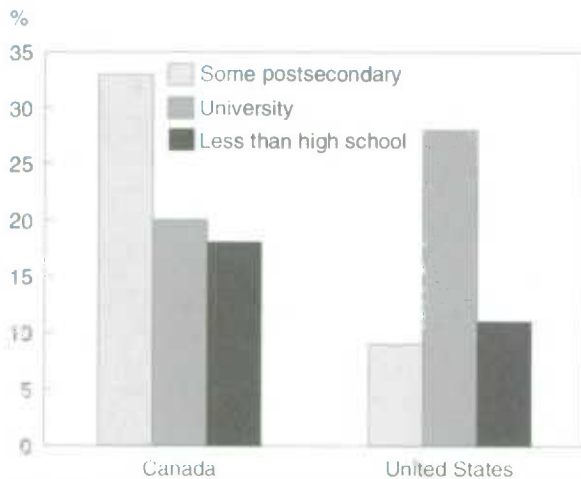
Sources: Employment Insurance statistics; Labour Force Survey; U.S. Social Security Administration

Earnings replacement rates are alike in Canada and the United States.



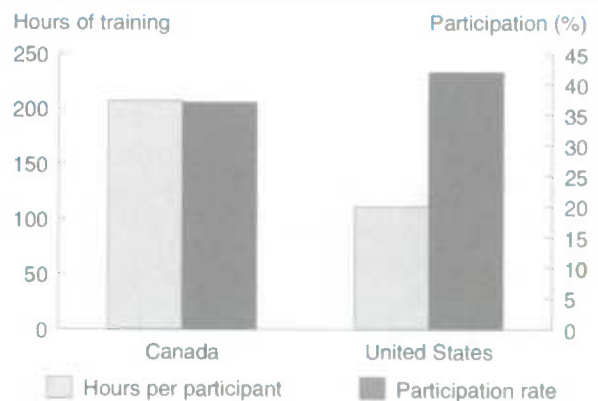
Sources: Employment Insurance statistics; Survey of Employment, Payrolls and Hours; U.S. Social Security Administration

Both higher and lower levels of education are more prevalent in the Canadian labour force.



Sources: Labour Force Survey; U.S. Current Population Survey

Canadian adults spend more time in education and training, but are less likely than Americans to take courses.



Sources: Labour Force Survey; U.S. National Household Education Survey

Charts were adapted from "Canada-U.S. quality of life and policy comparisons," produced by Human Resources Development Canada and Statistics Canada. For more information, contact Rachel Exeter, Special Surveys Division, at (613) 951-4594; fax: (613) 951-4527; rachel.exeter@statcan.ca, or Mark Hopkins, Human Resources Development Canada, at (819) 994-4511; fax: (819) 994-4533; mark.hopkins@spg.org.

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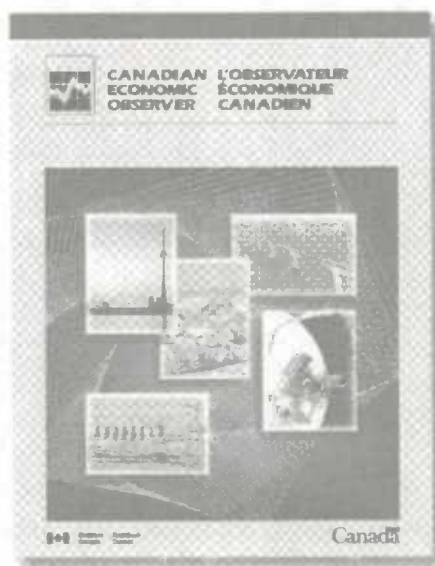
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In the works

Some of the topics in upcoming issues

■ Additional dimensions of unemployment

The official unemployment rate focuses on the individual as a unit of measurement and is based on data from a monthly survey. However, other units of measure or different time horizons may be needed to reflect the complexity of the labour market and to satisfy the many needs of policy makers and labour market analysts. This article looks at some possible candidates.

■ In for the long term

Employer-sponsored pension plans are the major source of retirement income for millions of Canadians. As a pool of investment capital (\$400 billion), they are second in size only to the financial assets of the chartered banks (\$820 billion). This article briefly describes the pension plans offered by employers and places them in the context of other major retirement income programs.

■ Unionization

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