Provincial earnings differences

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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).

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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).

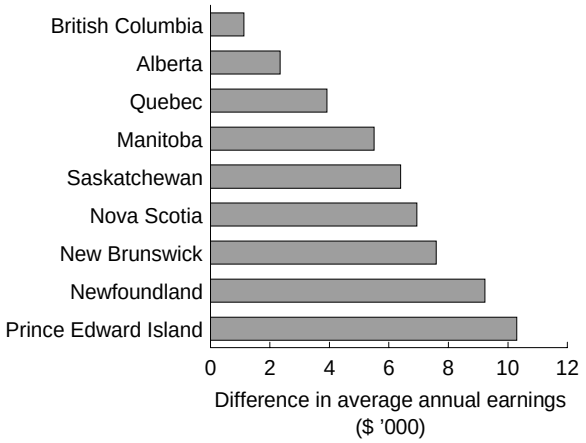
The total difference between Ontario and Alberta was $2,331. Given the same (standardized) weekly hours and annual weeks, the earnings gap would have

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

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



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 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.

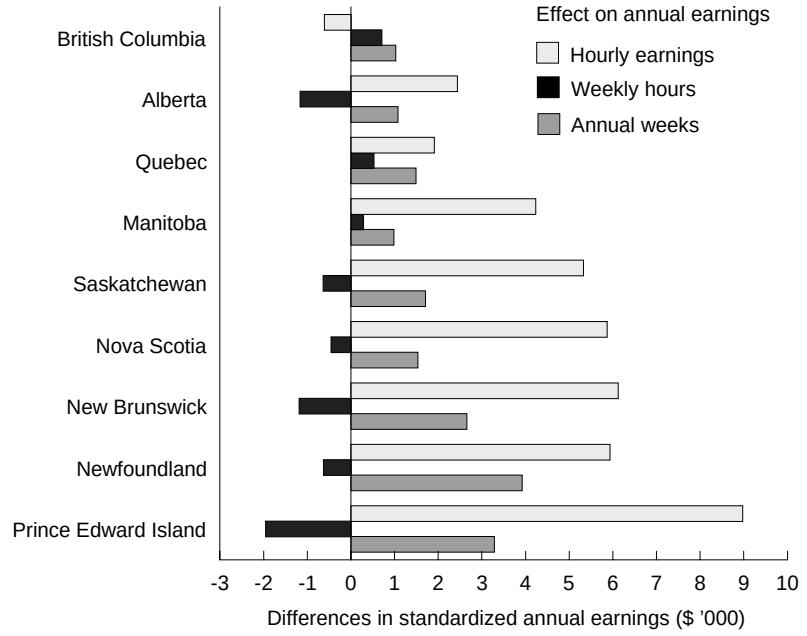
A comparison of Ontario and Manitoba reveals an earnings gap of $5,490. Once again, each component in Manitoba had a lower value than in Ontario. The decomposition analysis shows that 77% of the earnings difference was due to higher hourly earnings in Ontario. The analysis also suggests that no matter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

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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 decomposition[2]

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

$$
\begin{aligned}
y - Y &= \left[\left(\frac{bc+BC}{3}\right)+\left(\frac{bC+Bc}{6}\right)\right]\bullet(a-A) \\
&+ \left[\left(\frac{ac+AC}{3}\right)+\left(\frac{aC+Ac}{6}\right)\right]\bullet(b-B) \\
&+ \left[\left(\frac{ab+AB}{3}\right)+\left(\frac{aB+Ab}{6}\right)\right]\bullet(c-C)
\end{aligned}
$$

= hourly earnings effect + weekly hours effect + annual weeks effect

References

Coulombe, S. *Regional Disparities in Canada: Characterization, Trends and Lessons for Economic Policy*. Working Paper no. 18. Ottawa: Industry Canada, 1997.

Coulombe, S. and F.C. Lee. *Regional Economic Disparities in Canada*. Working Paper no. 9317E. Ottawa: University of Ottawa, 1993.

Day, K. *Regional Disparities in Wage and Unemployment Rates in Canada: A Review of Some Issues*. Technical Report no. 51. Ottawa: Bank of Canada, 1989.

Doiron, D. and G. F. Barrett. *Inequality in Male and Female Earnings: The Role of Hours and Wages*. Discussion Paper no. 92-36. Vancouver: University of British Columbia, 1992.

Economic Council of Canada. *Living Together: A Study of Regional Disparities*. Ottawa: The Council, 1977.

Gupta, P.D. *Standardization and Decomposition of Rates: A User's Manual*. Washington: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, 1993.

Johnson, J. A., and R.D. Kneebone. *A Quarterly Econometric Model of Provincial Labour Demand*. Research Paper no. 87110. Waterloo: Wilfrid Laurier University, 1987.

Mansell, R.L. and L. Copithorne. "Canadian regional economic disparities: A survey." In *Disparities and Inter-regional Adjustment,* edited by K. Norrie, 1-51. Collected Research Studies of the Royal Commission on the Economic Union and Development Prospects for Canada, vol. 64. Toronto: University of Toronto Press, 1986.

McInnis, M. "The trend of regional income differentials in Canada." *Canadian Journal of Economics* 1, no. 2 (May 1968): 440-470.

Prichard, J. R. S. (with J. Benedickson) "Securing the Canadian economic union: Federalism and internal barriers to trade." In *Federalism and the Canadian Economic Union*, edited by M.J. Trebilcock, J. R. S. Prichard, T.J Courchene and J. Whalley, 3-50. Papers presented at a conference held at the University of Western Ontario Law School, December 1981. Toronto: University of Toronto Press for the Ontario Economic Council, 1983.

Shaw, R. P. "Fiscal versus traditional market variables in Canadian migration." *Journal of Political Economy* 94, no. 3 part 1 (June 1986): 648-666.

Vanderkamp, J. *Mobility Behaviour in the Canadian Labour Force*. Special study no. 16. Ottawa: Economic Council of Canada, 1973.