The Growth of Family Earnings Inequality in Canada, 1980-2005

Yuqian Lu (Statistics Canada), René Morissette (Statistics Canada and ECSC), Tammy Schirle (Laurier)

March 18, 2009
Internal Seminar Series
Motivation

- Redistribution goals - achieve ‘fair’ distribution of well-being
- Labour market earnings - main source of family income and inequality
- Targeted approach to policy - Canada’s tax and transfer system
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Objectives

- Document recent trends in family earnings inequality
- What factors drive changes in the income distribution?
  - Employment rates of men and women
  - Wage structure
  - Individual’s productive characteristics
  - Family formation

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Overview

- Log equivalent family earnings 1980, 1995, 2005
  - 1980-1995 - large increase in inequality
  - 1995-2005 - some reduction in inequality
- Decomposition methods of Dinardo et al. (1996)
- Increases in inequality result from:
  - ↓ men’s and women’s employment rates
  - ↑ returns to education, immigrant penalties
  - ↑ assortative mating, lone parent families
  - ↓ education, aging

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Sample selection

- Canadian Census 1981-2006
  - Income and work experience 1980-2005
  - Demographic characteristics

- Sample of census families
  - Married/cohabiting opposite sex couples + never married children
  - Lone parents
  - Single individuals

- Exclusions
  - Heads not age 16-64
  - Self-employed
  - Heads have zero earnings
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Equivalent family earnings

\[ Y = \frac{\text{Family earnings}}{\sqrt{\text{Family size}}} \]

- 2002 dollars
- wage and salary earnings of all family members
- Employed
  - positive wages and salary
- Working full-time
  - usual working hours \( \geq 30 \)
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Dinardo, Fortin and Lemieux (1996)


Follows Fortin and Schirle (2006) and Daly and Valetta (2006)

- Family earnings inequality 1980s-mid 1990s
- Canada and U.S.

Determine effect on inequality

- Employment, wage structure \((E_M, \beta_M, E_F, \beta_F)\)
- Assortative mating, Family Composition \((A, C)\)
- Family characteristics \((X_M, X_F)\)
Dinardo, Fortin and Lemieux (1996)


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**Density of log equivalent family earnings** \( t = 1, f_1(y) \)

\[
f_1(y) = \int \int f(y|E_F, X; t_\beta = 1) dF(E_F|X, t_{EF}|X = 1) dF(X|t_X = 1)
\]

**Counterfactual - family earnings if** \( E_F|X \) **had not changed**

\[
f_{c1}(y) = \int \int f(y|E_F, X; t_\beta = 1) \psi_{EF|X} dF(E_F|X, t_{EF}|X = 1) dF(X|t_X = 1)
\]

\[
\psi_{EF|X}(E_F, X) = \frac{dF(E_F|X, t_{EF}|X = 0)}{dF(E_F|X, t_{EF}|X = 1)}
\]

**Probits - obtain conditional probabilities in each year**

**Reweight family observations, estimate counterfactual statistics**

**Eg.** \( E_F = 0 \) more likely in \( t = 0 \), place more weight on families with women not employed and less on employed.
Density of log equivalent family earnings \( t = 1 \), \( f_1(y) \)

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f_1(y) = \int \int f(y|E_F, X; t_\beta = 1)dF(E_F|X, t_{EF|X} = 1)dF(X|t_X = 1)
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The Growth of Family Earnings Inequality in Canada, 1980-2005
Decomposition Methods (simplified example)

- Density of log equivalent family earnings $t = 1$, $f_1(y)$

$$f_1(y) = \int \int f(y|E_F, X; t_\beta = 1)dF(E_F|X, t_{EF|X} = 1)dF(X|t_X = 1)$$

- Counterfactual - family earnings if $E_F|X$ had not changed

$$f_{c1}(y) = \int \int f(y|E_F, X; t_\beta = 1)\psi_{EF|X}dF(E_F|X, t_{EF|X} = 1)dF(X|t_X = 1)$$

$$\psi_{EF|X}(E_F, X) = \frac{dF(E_F|X, t_{EF|X} = 0)}{dF(E_F|X, t_{EF|X} = 1)}$$

- Probits - obtain conditional probabilities in each year
- Reweight family observations, estimate counterfactual statistics
- Eg. $E_F = 0$ more likely in $t = 0$, place more weight on families with women not employed and less on employed.
Changes in the distribution of family earnings

Changes in family earnings inequality

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Men’s employment rates

Yuqian Lu (Statistics Canada), René Morissette (Statistics Canada and ECSC), Tammy Schirle (Laurier)
The Growth of Family Earnings Inequality in Canada, 1980-2005
Decomposition Results

Men's employment

-0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5
Decrease in inequality Increase in inequality

Each factor
Effect of male employment increase: -0.014

1995-2005
Total Change in 90-10: -0.147
Effect of male employment decrease: 0.021

1980-1995
Total Change in 90-10: 0.415

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The Growth of Family Earnings Inequality in Canada, 1980-2005
## Men’s log weekly wages - OLS coefficients

<table>
<thead>
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<th>Education</th>
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<td>HS</td>
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<td>PS</td>
<td>0.19</td>
<td>0.23</td>
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<tr>
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<td>6-10</td>
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<tr>
<td>11-15</td>
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<td>-0.27</td>
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The Growth of Family Earnings Inequality in Canada, 1980-2005
Men’s wage structure

Decomposition Results

- Each factor
  - Effect of male wage structure: -0.003
  - Total Change in 90-10: -0.147
  - Effect of male wage structure: 0.090
  - Total Change in 90-10: 0.415

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Women’s employment rates

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Women's employment

Decomposition Results

-0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5
Decrease in inequality Increase in inequality

Each factor
Effect of increase in female employment:
-0.010

1995-2005
Total Change in 90-10: -0.147

Each factor
Effect of increase in female employment:
-0.037

1980-1995
Total Change in 90-10: 0.415

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## Women's log weekly wages - OLS coefficients

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Women’s wage structure

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<td>Effect of female wages structure: 0.019</td>
</tr>
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The Growth of Family Earnings Inequality in Canada, 1980-2005
### Assortative Mating (no kids) - Male vs. Female earnings decile

<table>
<thead>
<tr>
<th>Year</th>
<th>Decile 1</th>
<th>Decile 2</th>
<th>...</th>
<th>Decile 9</th>
<th>Decile 10</th>
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<tbody>
<tr>
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<td>2.12</td>
<td>1.78</td>
<td>...</td>
<td>0.65</td>
<td>0.60</td>
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<tr>
<td></td>
<td>1.34</td>
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<td>...</td>
<td>0.58</td>
<td>0.53</td>
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<tr>
<td></td>
<td>0.71</td>
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<td>1.69</td>
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<td>...</td>
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<td>1.41</td>
<td>2.77</td>
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Assortative mating

Decomposition Results

Each factor
Effect of decrease in assortative mating: -0.004

1995-2005
Total Change in 90-10: -0.147

Each factor
Effect of increase in assortative mating: 0.042

1980-1995
Total Change in 90-10: 0.415

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Percent of families in each family type

- Couples with kids
- Single (no kids)
- Couples without kids
- Lone parents (includes divorced)

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Decomposition Results

Effect of changes in family composition: 0.048

Total Change in 90-10: -0.147

Effect of changes in family composition: 0.084

Total Change in 90-10: 0.415

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Education and Age of Male Heads

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Education and Age of Female Heads

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Yuqian Lu (Statistics Canada), René Morissette (Statistics Canada and ECSC), Tammy Schirle (Laurier)
The Growth of Family Earnings Inequality in Canada, 1980-2005
What factors will raise family earnings inequality?

- ↓ employment rates
- ↑ returns to university
- ↑ immigrant penalties
- ↑ assortative mating
- ↑ lone-parent families
- ↓ education levels, aging

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 2 Densities of log equivalent family earnings

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The Growth of Family Earnings Inequality in Canada, 1980-2005
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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 3b. 1980-1995 Decomposition
Fig. 3c. 1980-1995 Decomposition

Male wage structure
Female employment

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 3d. 1980-1995 Decomposition

- Female employment
- Female wage structure

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 3e. 1980-1995 Decomposition

- Female wage structure
- Assortative mating
Fig. 3f. 1980-1995 Decomposition
Fig. 3g. 1980-1995 Decomposition

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 3h. 1980-1995 Decomposition
Fig. 4a. 1995-2005 Decomposition

- 2005
- Male employment

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Fig. 4c. 1995-2005 Decomposition

Male wage structure
Female employment

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 4d. 1995-2005 Decomposition

Female employment
Female wage structure

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 4e. 1995-2005 Decomposition

- Female wage structure
- Assortative mating

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The Growth of Family Earnings Inequality in Canada, 1980-2005
Fig. 4f. 1995-2005 Decomposition

Assortative mating

Family composition

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Fig. 4g. 1995-2005 Decomposition

Family composition

Family characteristics
Fig. 4h. 1995-2005 Decomposition

- 1995
- Family characteristics
- 2005

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