Top Earnings Inequality and the Gender Pay Gap: Canada, Sweden, and the United Kingdom

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and with the collaboration of
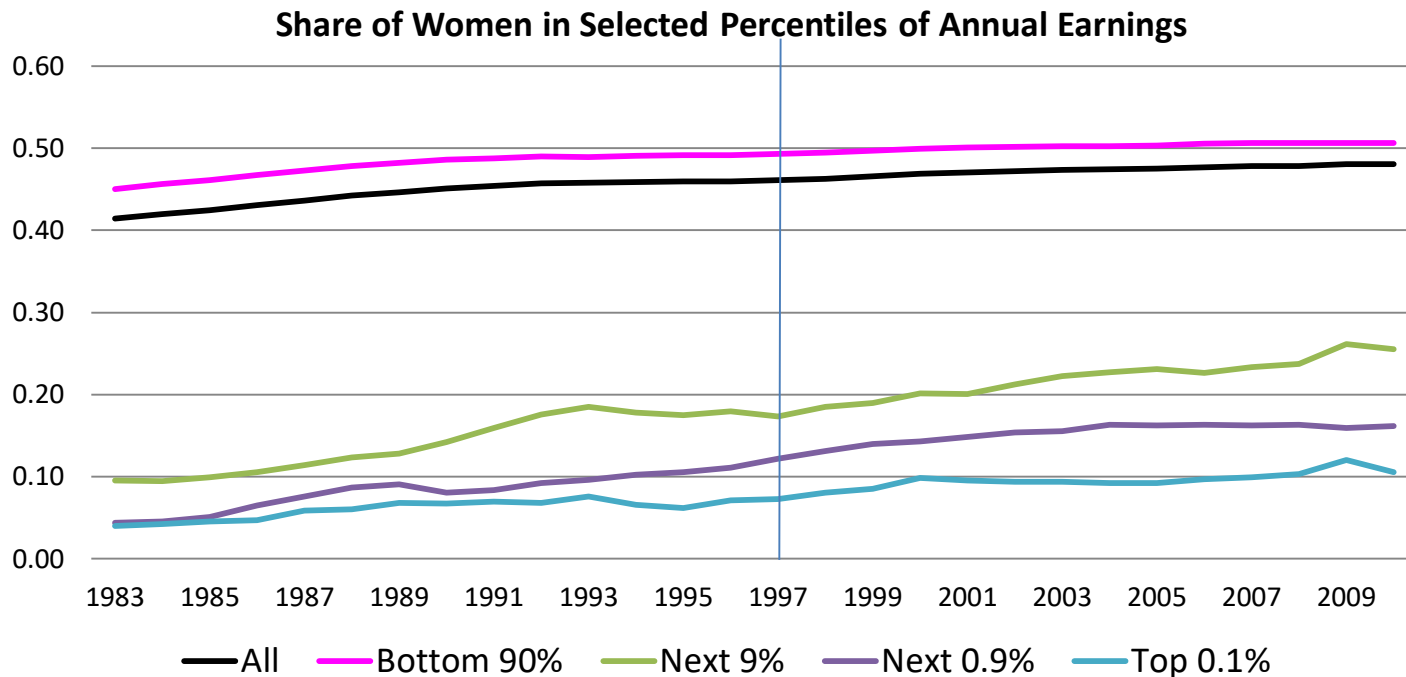Aneta Bonikowska and Marie Drolet

Statistics Canada   Statistique Canada

with Brian Bell, Kings' College London and
Michael Boehm, University of Bonn

Data

- Appeal to administrative/income tax data to capture the highest incomes

- Use all earnings data from income tax data available in the Canadian Longitudinal Worker Files (LWF, 1983-2010)

- Utilize similar annual earnings from administrative data from Sweden (LISA, 1990-2013) and for the United Kingdom (ASHE, 1999-2015)

- To include additional covariates, the analysis is supplementedby hourly wage data from public use Canadian (CAN-LFS, 1997-2015) and UK Labour Force Survey (UK-LFS, 1993-2015)

- Focus on workers 25 to 64 years old, exclude self-employment income and too low earners.
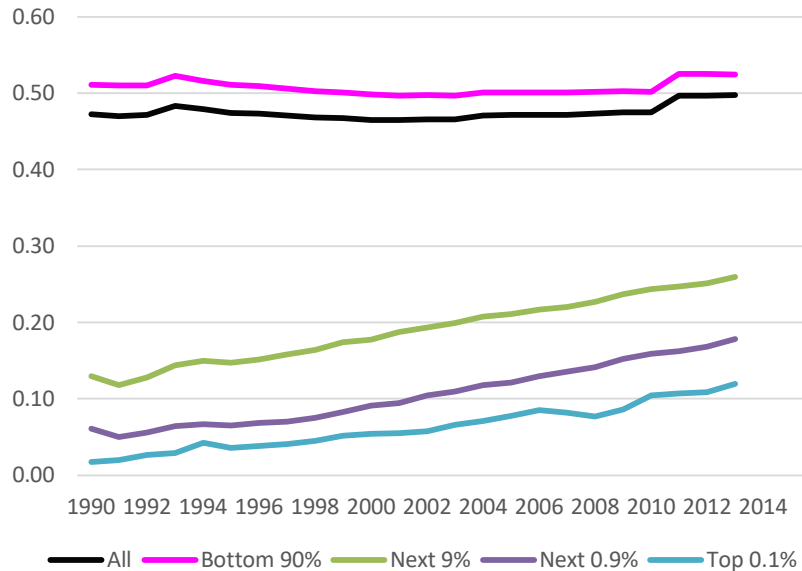
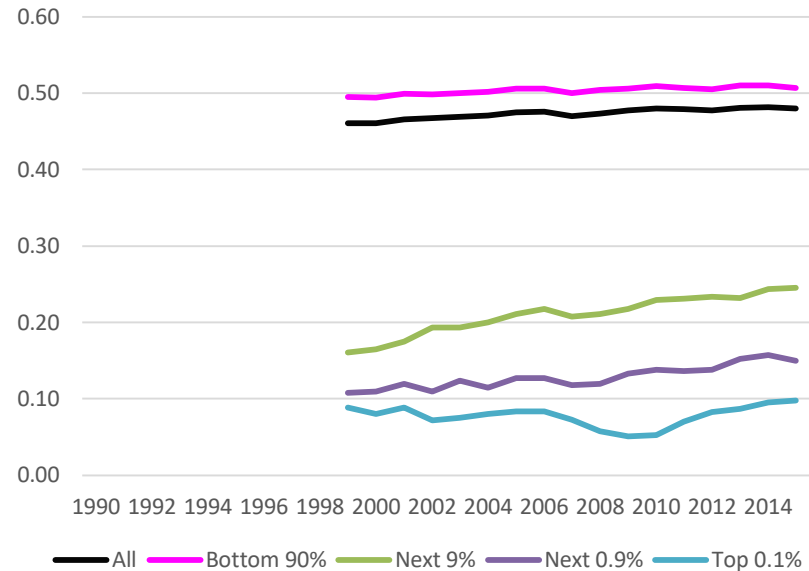# Slower Convergence in Share of Women among Top Earners in Canada

Share of Women in Selected Percentiles of Annual Earnings

Legend: All — Bottom 90% — Next 9% — Next 0.9% — Top 0.1%

Source: Fortin, Drolet and Bonikowska (2017), LWF 1983-2010, 25-64 years old, Annual earnings from all jobs

Similar Trends in Female Shares in Sweden and the UK

Share of Women in Selected Percentiles of Annual Earnings - Sweden

Share of Women in Selected Percentiles of Annual Earnings – United Kingdom
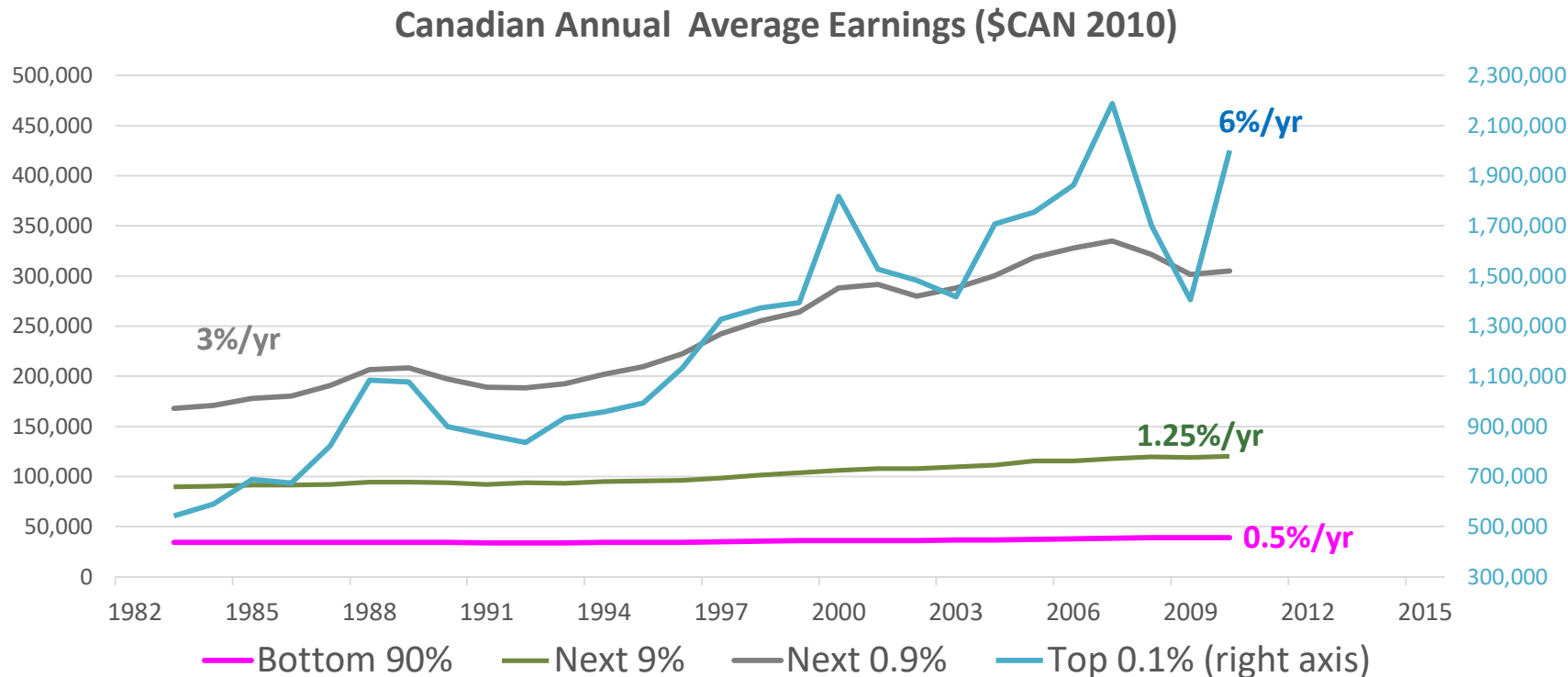
Questions of interest:

1) What are the consequences of the under-representation of women in top jobs (top decile) for the overall average gender pay gap?

2) Given recent starkling increases in top incomes, is this under-representation contributing to the slowdown in the convergence of female/male pay?

3) Are the popular "Women on Board" policies and disclosures are effective to improve this under-representation?

Increasing Earnings Inequality in Top Incomes and the Gender Pay Gap

- Several papers (Blau and Kahn, 1992, 1994; Fortin and Lemieux, 2000) have explored the consequences of rising wage dispersion *(increased variance)* for the gender pay gap

- When residual inequality experienced stupendous increases in the 1980s, Blau and Kahn (1997) coined the term "swimming upstream" to characterize women's pursuit of pay equality in the face of countervailing currents.

- Have recent increases in top incomes *(increased skewness)* lead to similar effects, therefore accounting for the slower progress in the gender pay and growing unexplained (by traditional factors) share?
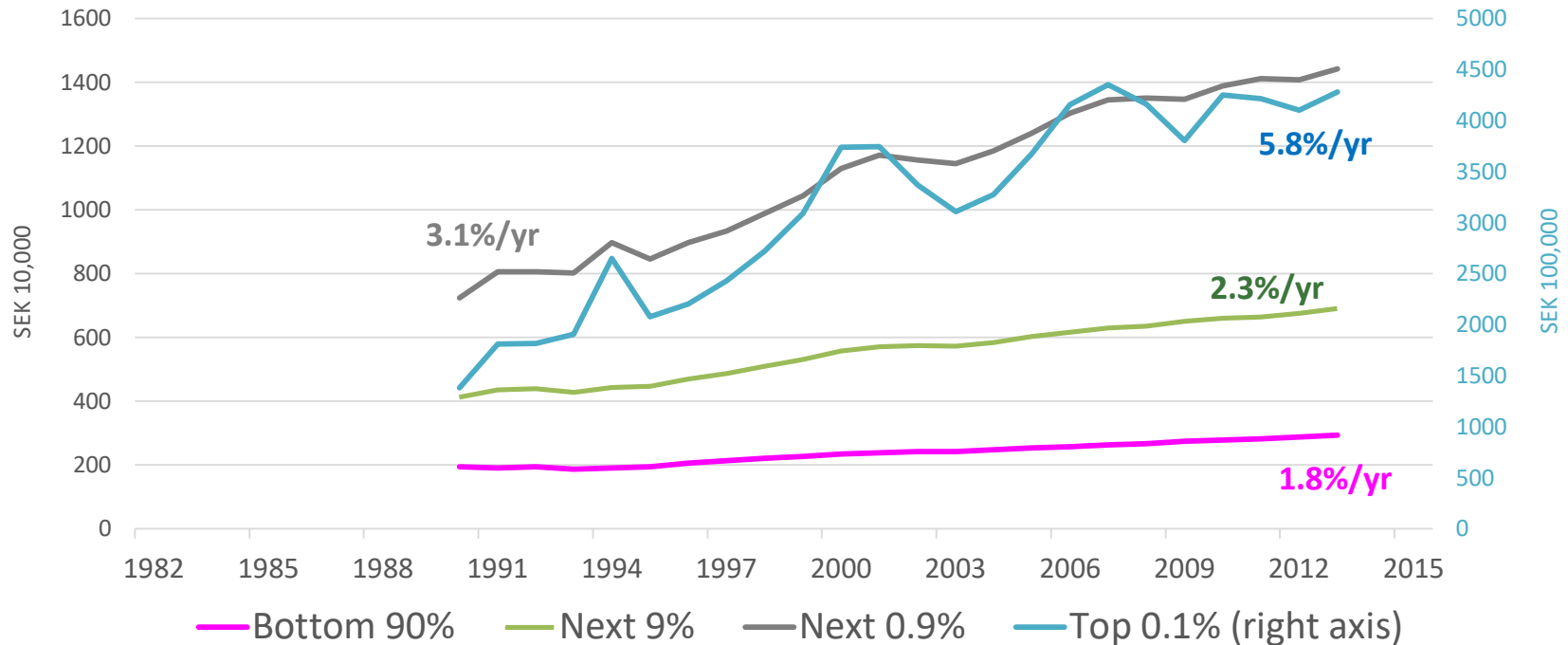
Larger Increases for Top Earners in Canada

Canadian Annual Average Earnings ($CAN 2010)

3%/yr

6%/yr

1.25%/yr

0.5%/yr

Legend: Bottom 90% — Next 9% — Next 0.9% — Top 0.1% (right axis)

Source: Fortin, Drolet and Bonikowska (2017), LWF 1983-2010, 25-64 years old, Annual earnings from all jobs

Some Increases in Lower Groupings in Sweden

Swedish Annual Average Earnings (SEK 2010)

Legend: Bottom 90% — Next 9% — Next 0.9% — Top 0.1% (right axis)

Annotations: 3.1%/yr, 2.3%/yr, 5.8%/yr, 1.8%/yr

Top Income Groups Hit by the Financial Crisis in the UK

United Kingdom − Average Annual Earnings (£2010)

Legend: Bottom 90% — Next 9% — Next 0.9% — Top 0.1% (right axis)

Annotations: 0.5%/yr, 0.11%/yr, 1.1%/yr, 0.65%/yr

Increasing Earnings Inequality in Top Incomes and the Gender Pay Gap

- Apply the approach used in the analysis of earnings inequality in top incomes (developed by Thomas Piketty, Emmanuel Saez, and co-authors) to characterize top earners

- Use positional ranks to construct a proxy of vertical segregation at the top of the earnings distribution (Fortin and Lemieux, 1998; Bayer and Charles, 2016)

- Apply reweighing techniques *à la* DiNardo, Fortin and Lemieux (1996) [DFL] to construct counterfactual gender pay gaps

- **Caveat**: Analysis remains an **accounting "what if" exercise** to quantify the relative importance of the potential swimming upstream effects
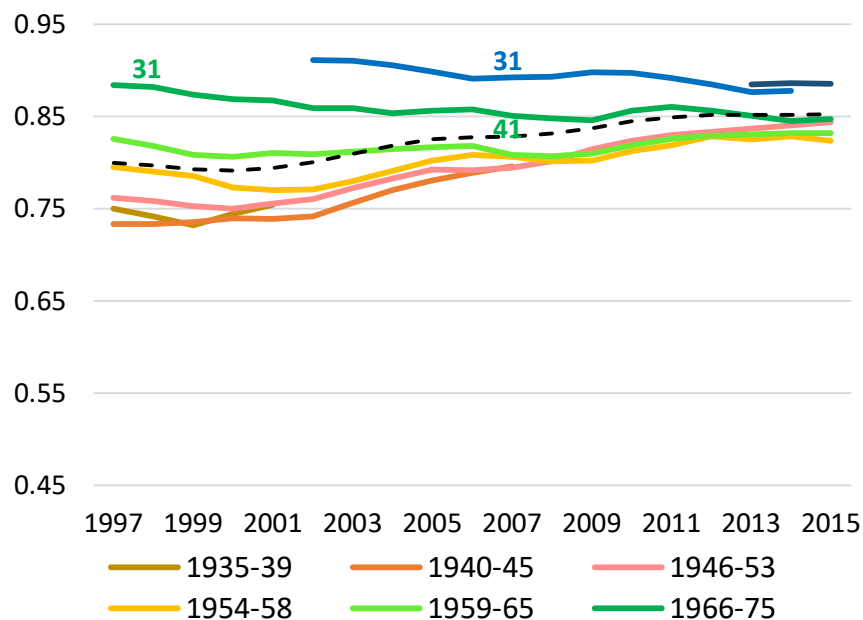
Measure of the gender pay gap

- "Hourly Wage" ratio is the preferred measure to consider whether employers treat women fairly and should be used in statements

  "women earn 85 cents out (86 öre/82p) of every $1 (1kr/£1) men earn"

- "Annual (Weekly) Earnings of Full-Time Workers" ratio

  ≈ 70% in Canada and ≈ 64%* in the UK

- Because many women working full-time full-year work less hours a week than men mixes the number of hours worked with hourly pay

- But for the very top income groups, the "All Annual Earnings" measure is the only one available (from tax data)

- "Annual Earnings" ratio ≈ 65% in Canada, ≈ 74% in Sweden, and 62%* in the UK

- It gives a better idea of costs of women's lower labour supply or impact of bonuses
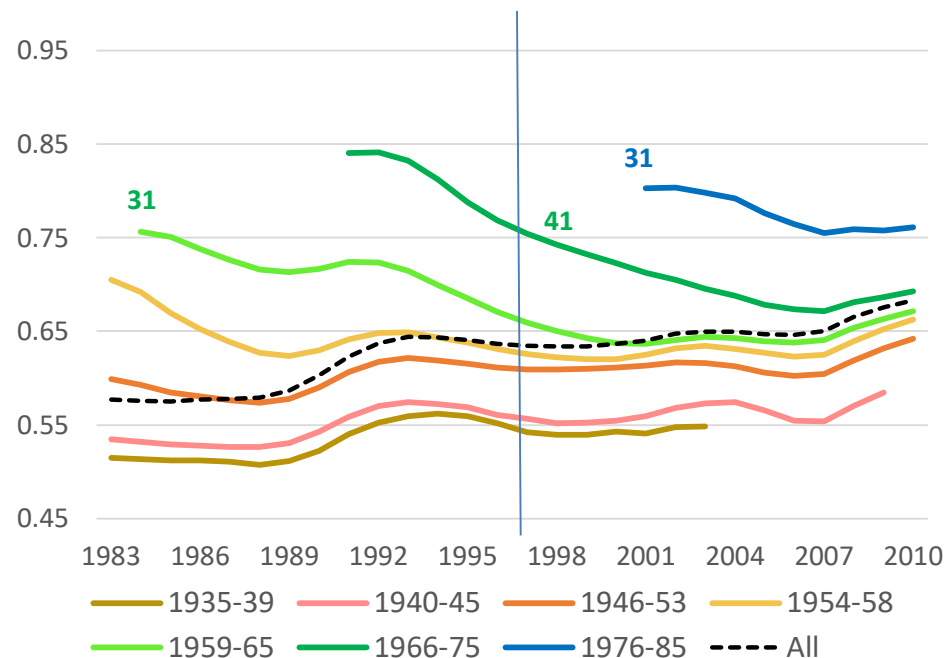
Source: Sweden: Eurostat (2015); *UK: Dias, Elming and Joyce (2016)

Generational Effects in the Gender Pay Gap

Source: Fortin (2017), LFS public use data, ages 25 to 64 year, 3-year moving average annual earnings from all jobs
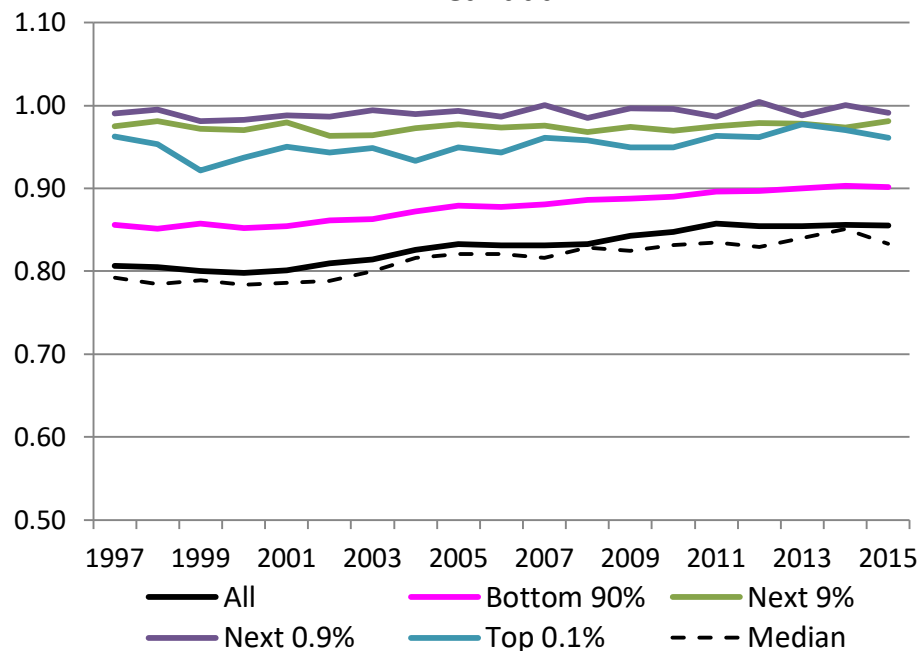
Gender Gap in Top Incomes

- Follow Guvenen, Kaplan, and Song (2014) in using the thresholds of the wage and earnings distribution for men and women combined

- Depart from the traditional literature on the glass ceiling which compares the pay gap at percentiles of the gender-specific distributions

- Depart from most of the literature which uses the logarithm of wages or earnings in order to emphasize the top end

- Allow for the construction of counterfactuals to study the under-representation of women in top income groups: what if women were distributed in the top decile in the same way men are?
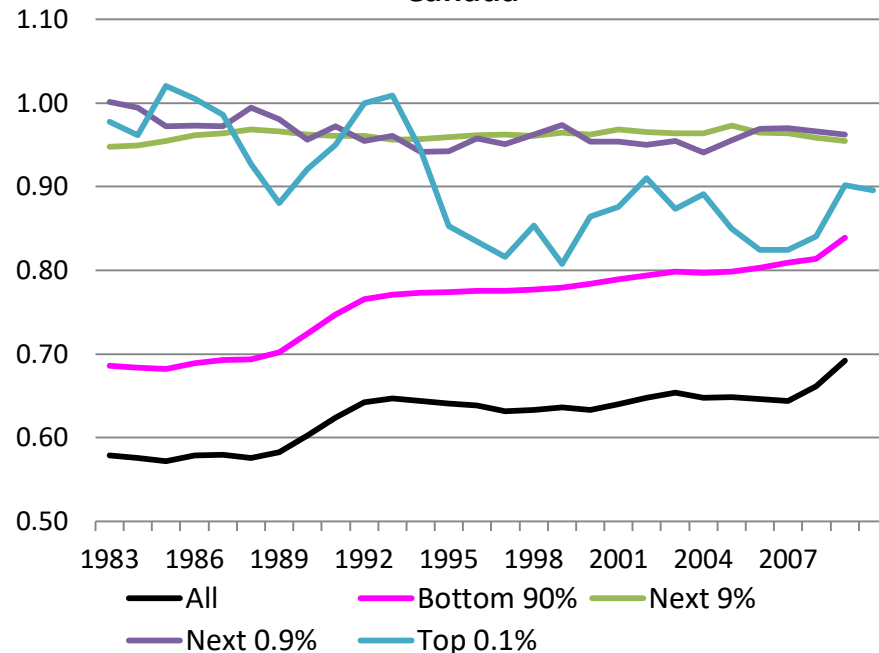
Under-representation of women in top jobs makes for a less favorable overall gender pay ratio

Female-Male Average Hourly Wages Ratios - Canada

Source: LFS 1997-2015, 25-64 years old, Hourly wages from the main job

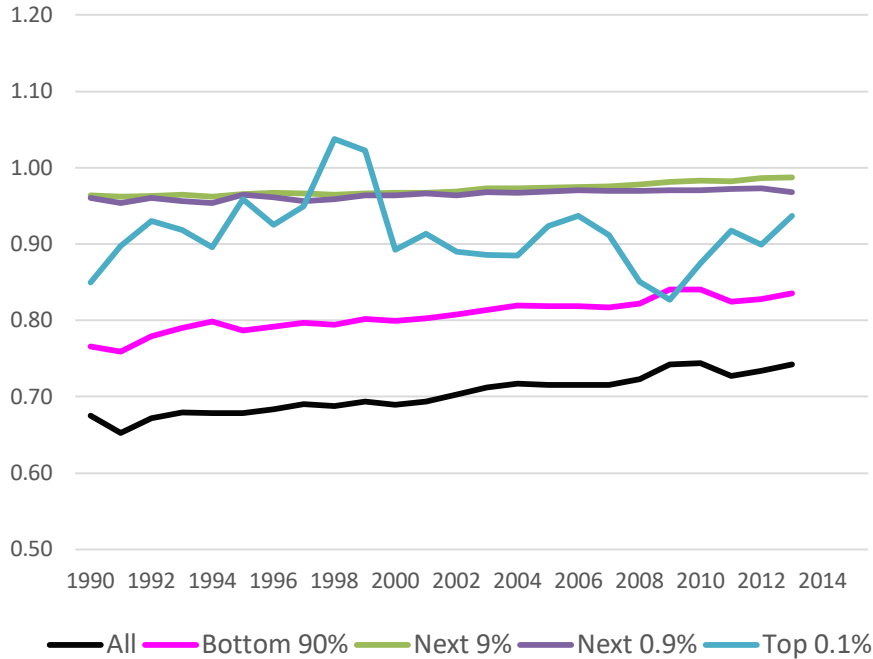**Female-Male Average Annual Earnings Ratios - Canada**

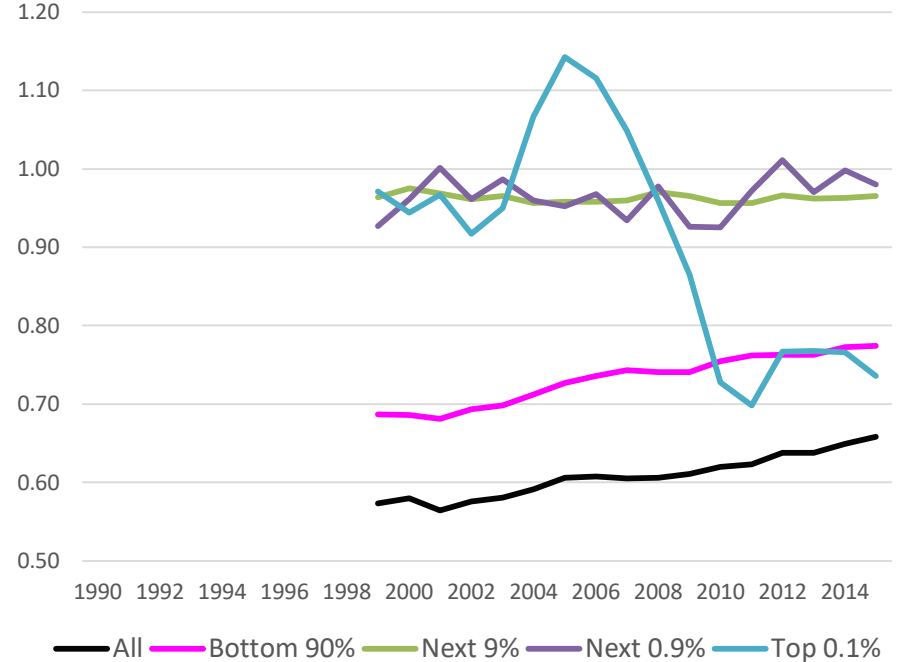Source: LWF 1983-2010, 25-64 years old, Annual earnings from all jobs

Similar Differences in Ratios in Sweden and the UK
No Upward Trend in Gender Earnings Ratio in Top 0.1%

Female-Male Earnings Ratios - Sweden

Female-Male Earnings Ratios - United Kingdom

Legend: All — Bottom 90% — Next 9% — Next 0.9% — Top 0.1%

Source: Fortin, Bell, and Boehm (2017), workers ages 25 to 64, LISA data for Sweden, ASHE data for the UK.

Gender	Rank	Numbers	% of All	% of women	Average Salary	Female/ Male Ratio	Gender Gap
Men	All	968	100		134955	0.89	14332
Women	All	419	100	30.2	120623		
Men	Full	501	51.8		152494	0.96	6446
Women	Full	130	31	20.6	146048		
Men	Associate	297	30.7		121483	0.94	6888
Women	Associate	184	43.9	38.3	114595		
Men	Assistant	170	17.6		106806	0.93	7097
Women	Assistant	105	25.1	38.2	99709		

Table 1. Average Professorial Salaries at UBC in 2010

If the proportion of women across professorial ranks was identical to men, the overall counterfactual average female salary would be:

51.8/100×146048 + 30.7/100×114595 +   17.6/100×99709 =128259.3, and the overall ratio would be 128382/134955(*100)=95%

➢ The salary gap explained by rank is 128259.3−120623.1 =7636.2
➢ More that 53% of the gap is accounted for by the gender differences in the proportion of faculty members across rank.

Table 2. Oaxaca-Blinder Decomposition of Average Professorial Salaries at UBC in 2010

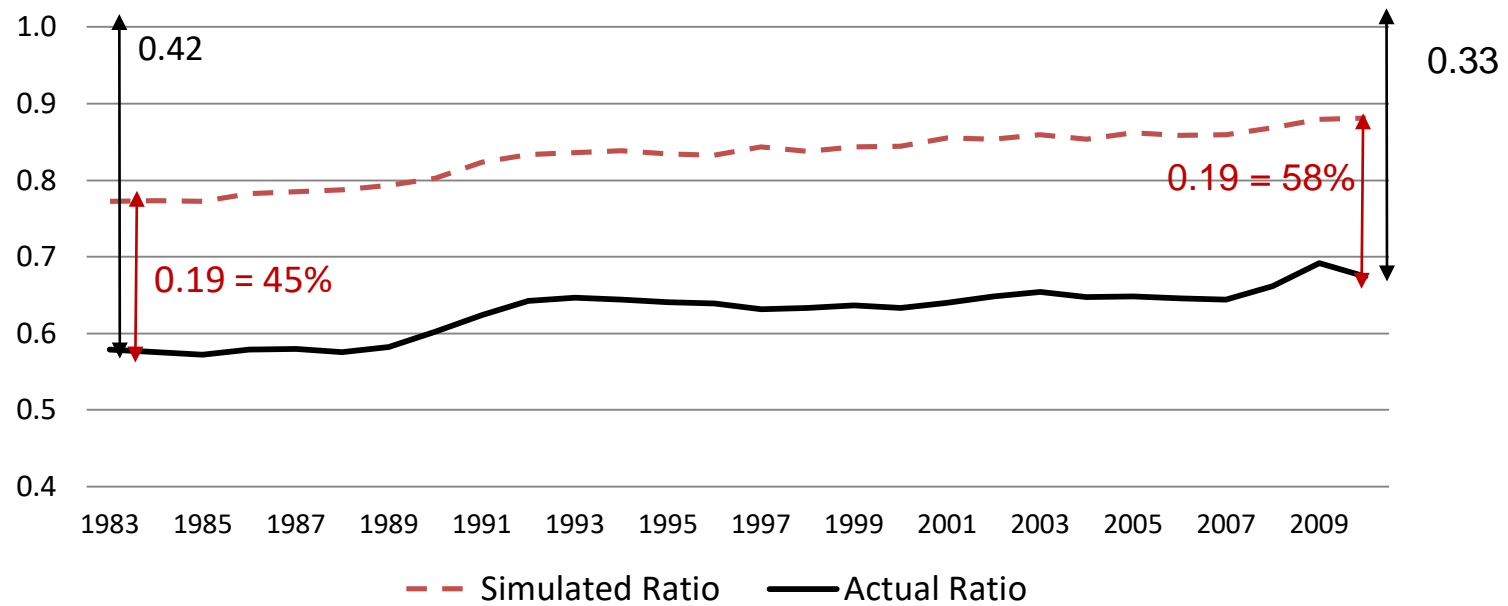| Variables:	Model 1		% of gap	Model 2		% of gap
Raw Gender Salary Differentials	14332.24	***		14332.24	***	
Accounted for by differences in characteristics						
Professorial Rank	7636.226	***	53.28%	6647.376	***	46.38%
CRC, DUP				546.2663	*	3.81%
Years in Rank				1180.126	**	8.23%
Departmental Dummies				3093.223	**	21.58%
Total Explained	7636.226	***	53.28%	11466.99	***	80.01%
Total Unexplained	6696.018	***	46.72%	2865.253	***	19.99%

Note: Using female coefficients. *** p<0.01, ** p<0.05, * p<0.1 See UBC (2011) for alternative specifications.

- ➤ The more complete specification accounts for 80% of the gap, 46% of which from vertical segregation and 22% from horizontal segregation.
- ➤ This leaves an unexplained gender gap of 2.2% of average professorial salary

If the shares of women in percentiles grouping* were the same as men's, the gap in annual earnings would be 20 point lower

Female-Male Annual Earnings Ratios - Canada
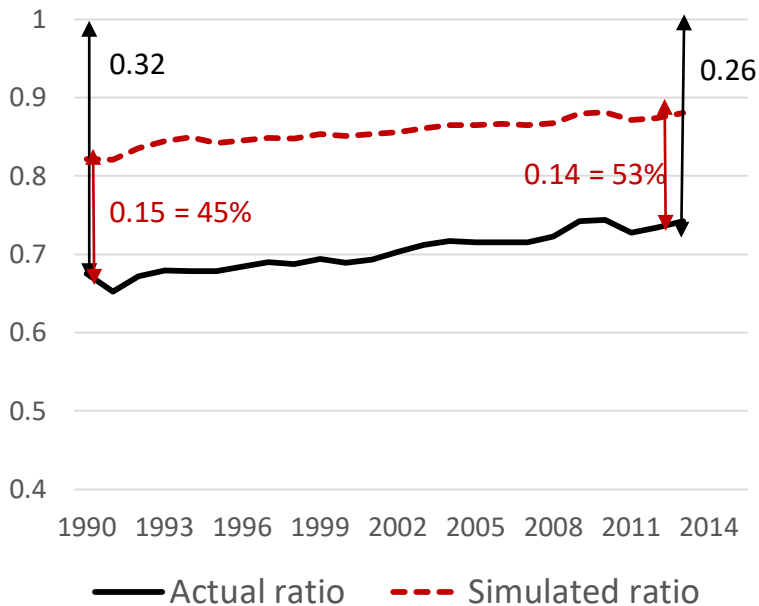

- - - Simulated Ratio   —— Actual Ratio

Source: Fortin, Drolet and Bonikowska (2017), LWF 1983-2010, 25-64 years old, Annual earnings from all jobs

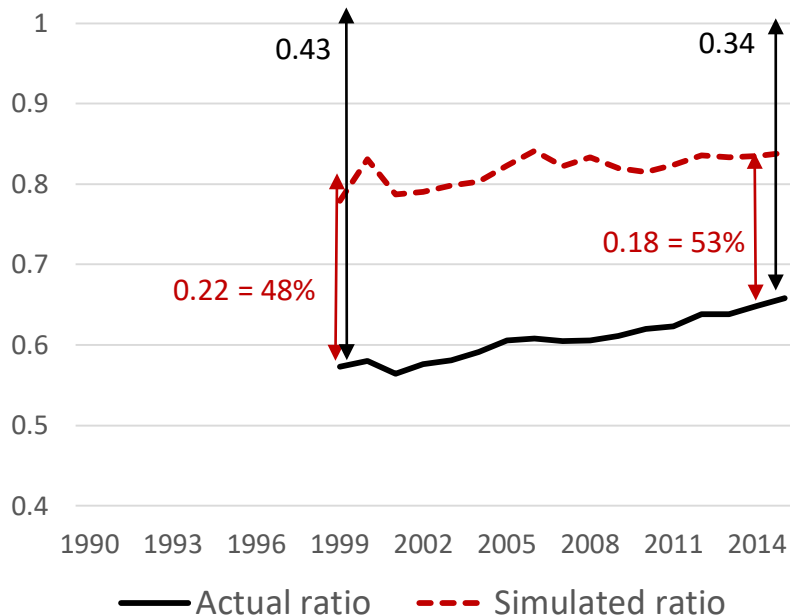*percentiles grouping: bottom 90%, next 9%, next 0.9%, top 0.1%

If the shares of women in percentiles grouping* were the same as men's, the gap would be 50% lower

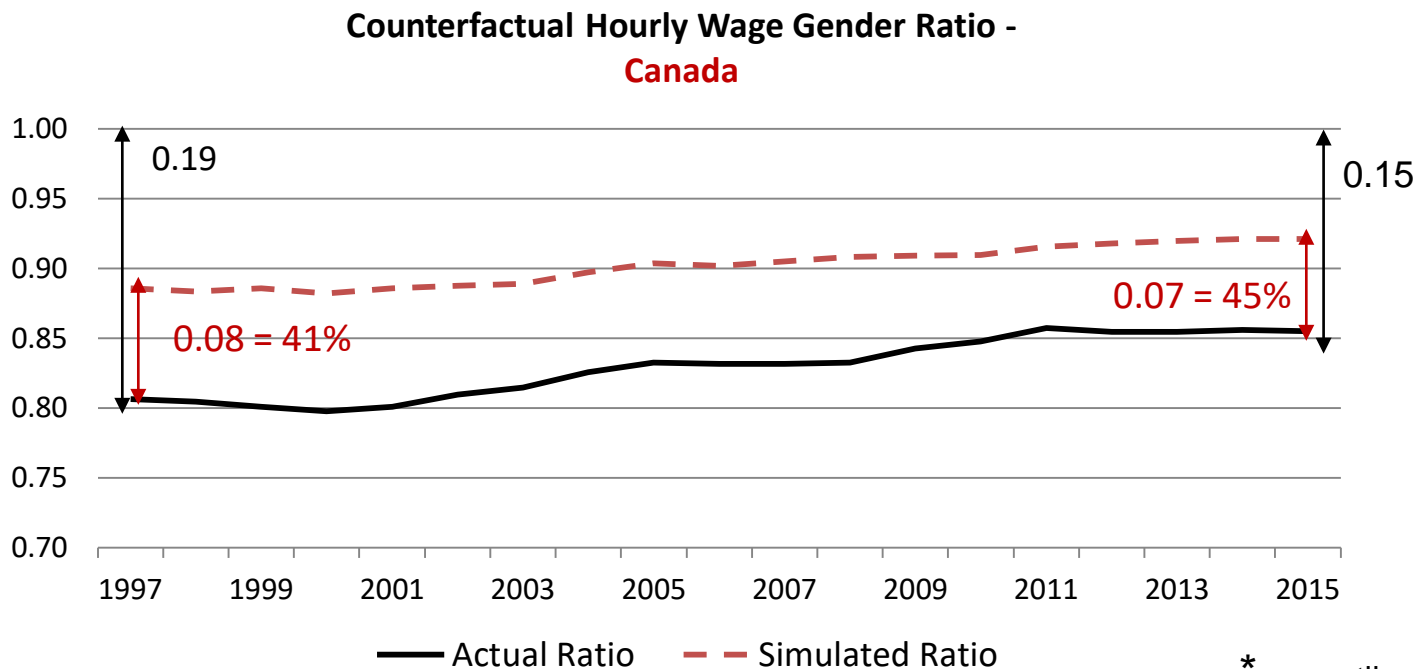**Female-Male Annual Earnings Ratios - Sweden**

0.32

0.26

0.15 = 45%

0.14 = 53%

1990 1993 1996 1999 2002 2005 2008 2011 2014

—— Actual ratio   - - - Simulated ratio

Female-Male Annual Earnings Ratios – United Kingdom

0.43

0.34

0.22 = 48%

0.18 = 53%

1990 1993 1996 1999 2002 2005 2008 2011 2014

—— Actual ratio   - - - Simulated ratio

Source: Fortin, Bell, and Boehm (2017), workers ages 25 to 64, LISA data for Sweden, ASHE data for the UK.

If the shares of women in percentiles grouping* were the same as men's, the gap would be 6-9 points lower

Counterfactual Hourly Wage Gender Ratio - Canada

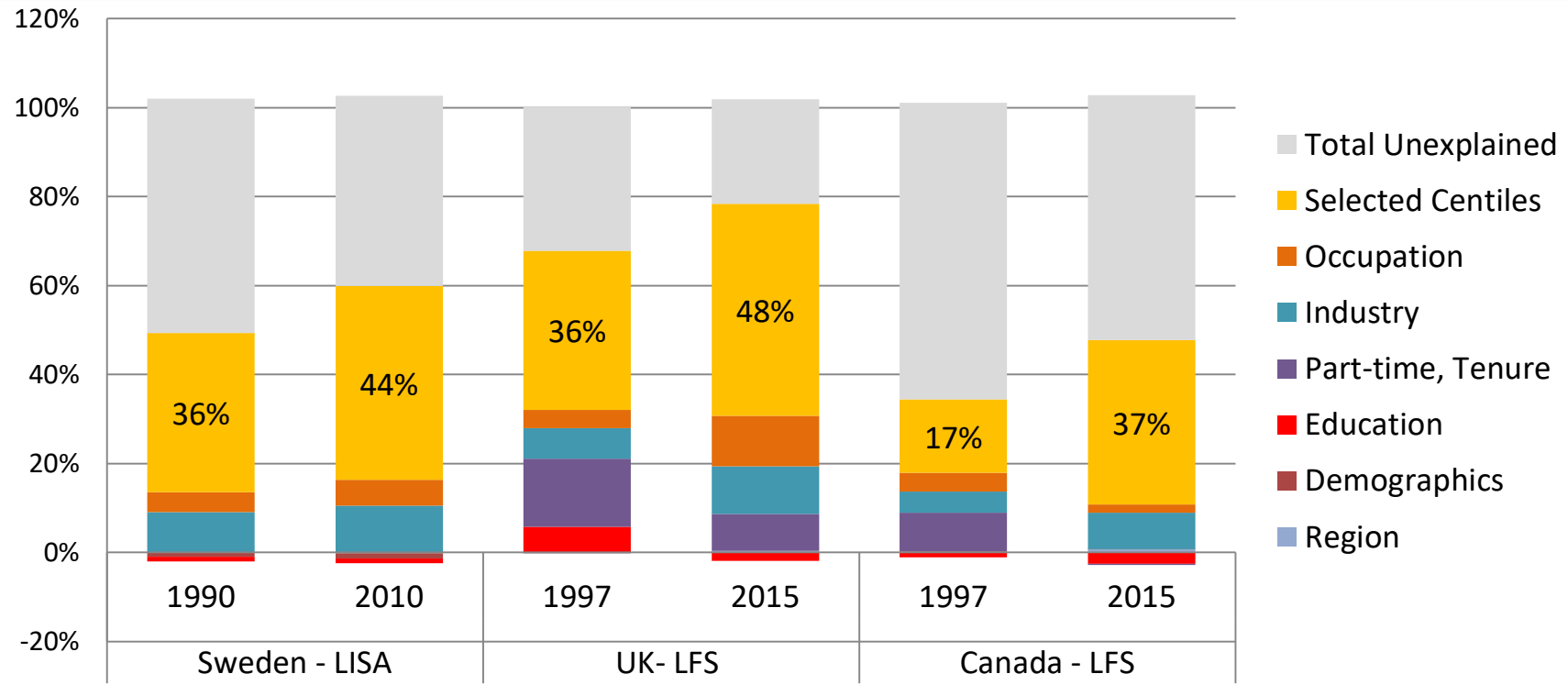Legend: Actual Ratio (solid black line), Simulated Ratio (dashed red line)

Source: Fortin (2017), LFS 1997-2015, 25-64 years old, Hourly wages on the main job

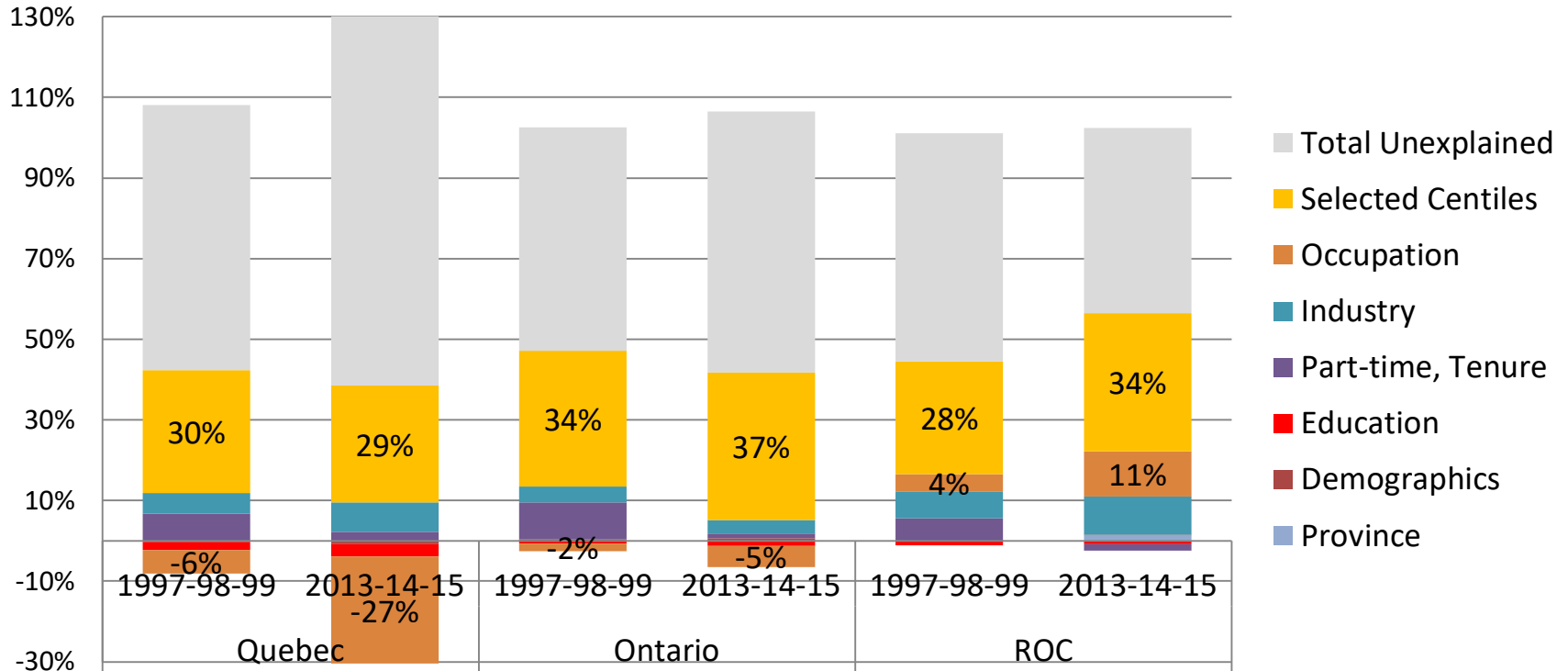*percentiles grouping: bottom 90%, next 9%, next 0.9%, top 0.1%

Against traditional factors in O-B decomposition, centile groupings remain dominant and growing over time

Note: Entries are male/female differences in the explanatory variables multiplied by the corresponding female coefficients as a share of the gender pay gap.

In provinces with Pay Equity, the explanatory power of occupations, like education, has gone negative

Note: Entries are male/female differences in the explanatory variables multiplied by the corresponding female coefficients as a share of the gender pay gap.

Findings

- In Canada (except for Quebec), Sweden, and the United Kingdom, the under-representation of women in partitions of the top decile accounts for a predominant and growing share of the gender pay gap.

  - By itself, this under-representation accounts for 45% (circa 1990) to 58% (circa 2010) of the gender earnings gap in the three countries

  - Pitted against traditional explanatory factors, it stills account for 36% (circa 2000) to 48% (circa 2015) of gap (Sweden and UK), from 17% (circa 1985) to 37% (circa 2010) in Canada

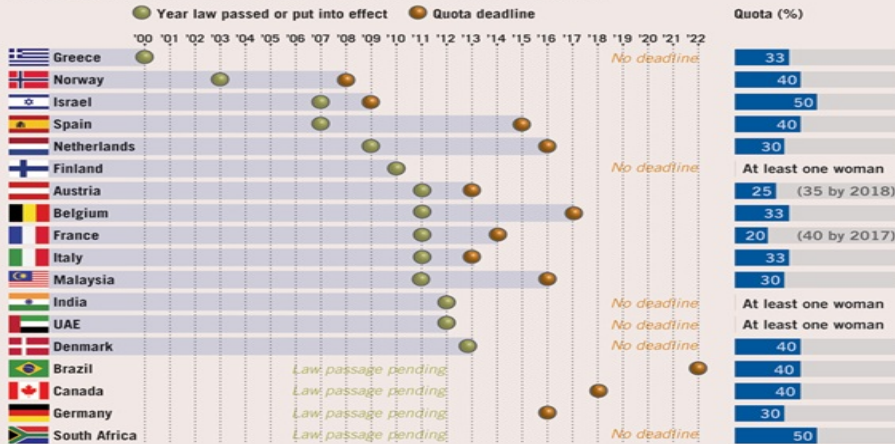# Increasing Women's Representation in Top Jobs

- With increasing earnings inequality in top incomes, further improvements in vertical segregation, "relatively more women in top jobs" will be likely be even more important for further decline in the gender pay gap in the 21st century

- How do we get there?

- Country fixed effects DD models of the impact of quotas for "Women on Boards" show direct effects of 50%, but no significant trickle down

- Leaving open how to improve women's representation in top jobs?

Women's Quotas for Corporate Boards?

Source: Dizik, 2015

Source: Fortin, Bell, and Boehm (2017)

- Yes, for Women on Boards
- but no evidence of trickle down in country-fixed effects models

Dependent Variable:	Women on Boards		Women in Senior Management	
Mean	11.14	12.12	29.73	29.86
Explanatory Variables				
Quotas	5.22	5.48	0.15	0.83
	(1.17)	(1.25)	(1.05)	(0.94)
Disclosure Rules	2.15	2.31	(1.12)	(1.05)
	(0.95)	(1.09)	(0.69)	(0.69)
Relative Female Employment Rate	50.66	53.77	(6.87)	(12.41)
	(20.38)	(21.2)	(37.81)	(37.79)
Log GDP per capita (PPP)	2.57	5.64	(0.62)	(0.25)
	(4.26)	(6.69)	(3.61)	(3.20)
R-square	0.27	0.36	0.13	0.29
No. of observations	224	173	213	195
OECD only	No	Yes	No	Yes
No.of countries	40	29	27	23

Note: Dependent variables are the share of women on corporate boards from BoardEx data (European PWN, 2008) from 2006 to 2009, from GMI data (Gladman and Lamb, 2013) from 2009 to 2014, and the share of women in senior management from ILO (2014). The data on the relative female employment rate, computed as the ratio of female employment rate to the total employment rate, is from the World Bank. Estimates from country fixed-effects models with robust standard errors clustered at the country level.   * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Fortin, Bell, and Boehm (2017)

Thank you!

Steep Growth in Women's Labour Force Participation* Followed by a Leveling-Off

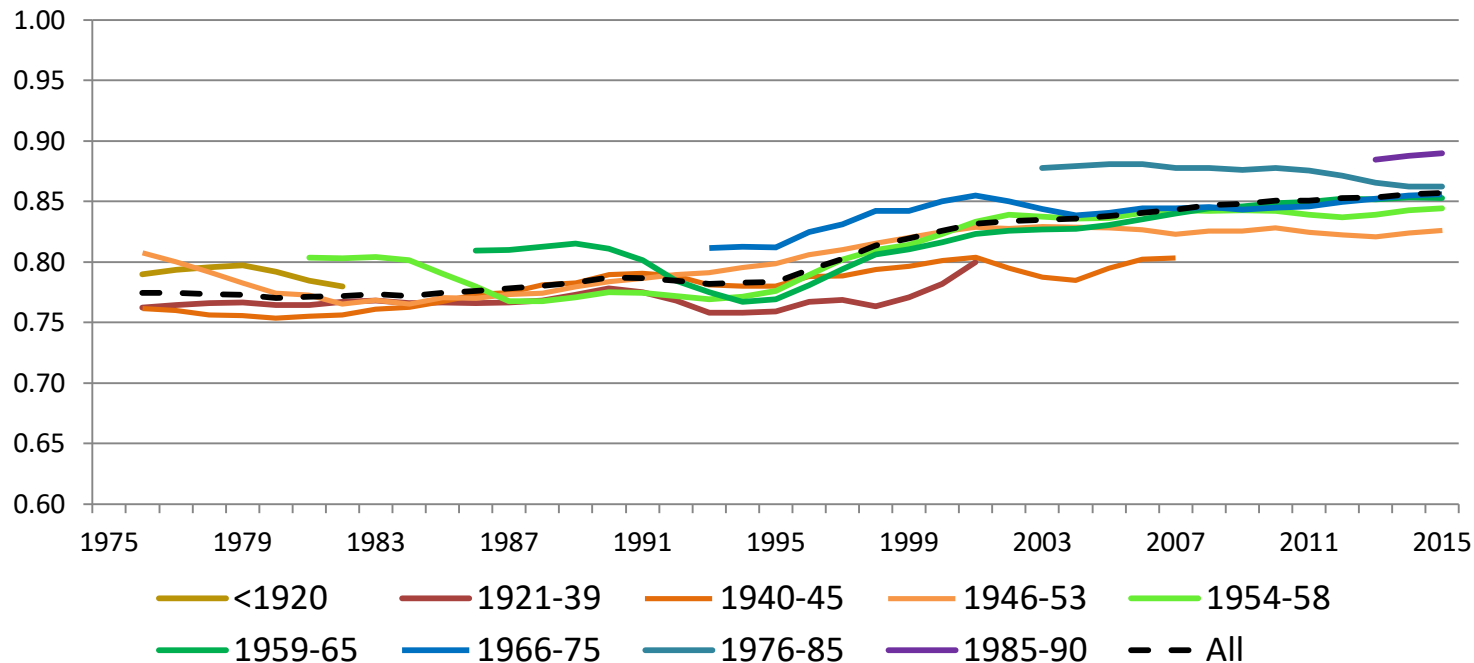**Canadian Labour Force Participation Rate - Ages 25 to 64**

Source: Fortin, Drolet and Bonikowska (2016), LFS Public use files, 1976-2015
*Labour force participants include employed (at work or on-leave) and unemployed individuals

Less Convergence in Gender Gap in Hours

Canada - Gender Ratio in Average Total Weekly Hours

Source: Fortin (2017), LFS data, ages 25 to 64 year, employed with positive hours of work, usual hours from all jobs

Canadian Data

Longitudinal Worker File (LWF)

- LWF is a 10% random sample of all Canadian workers
- Years: 1983-2010
- integrates data from the T1 and T4 files of Canada (CRA) and the LEAP (Statistics Canada)
- Annual earnings from all jobs, include bonuses, honorariums, etc.
- Selected if > half of minimum wage earnings equivalent
- Select workers age 25 to 64

Labour Force Survey (LFS) Public Use

- Monthly survey on approximately 100,000 individuals rotating 6-months panel sample design
- Years: 1997-2015
- Hourly wage of employees from main job
- Selected if > half the minimum wage
- Select workers age 25 to 64

Canadian Data

Longitudinal Worker File (LWF)

- No self-employment income
- No labour supply information
- Top coded at P99.99 ≈ $2,000,000 in 1983 to ≈$10,000,000 in 2000
- Available covariates: union coverage, age, industry
- CPI adjusted to 2010$CAN

Labour Force Survey (LFS) Public Use

- No self-employment income
- Number of weeks worked unavailable
- Imputed > P99.9 from ≈$95/hour in 1997 ≈ $125/hour in 2015
- At 2080 (=52wk*40hrs) hrs/year, from $200,000 to $260,000
- Available covariates: age, union, education, occupation, industry, firm size, etc.

Swedish Data

British Data

Longitudinell Integrationsdatabas för Sjukförs äkrings-och Arbetsmarknadsstudier
(LISA)

- Integrates data from Statistics Sweden, the Social Insurance Agency and the Swedish Agency for Innovative Systems

- annual earnings data are from the largest source of income, include performance pay and bonuses, exclude self-employment income

- Years: 1990-2013

- Select workers age 25 to 64
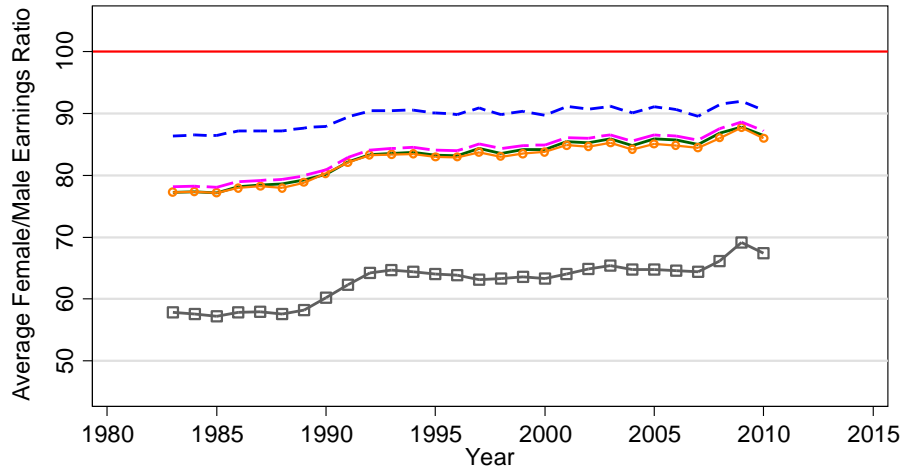
- 2.5-3 million observations per year

Annual Survey of Hours and Earnings (ASHE)

- 1% panel of workers based on social security number

- Statutory filing required by employers

- Years: 1999-2015

- Annual earnings includes all cash compensation, including bonuses etc.

- Selected if > half of minimum wage annual earnings equivalent
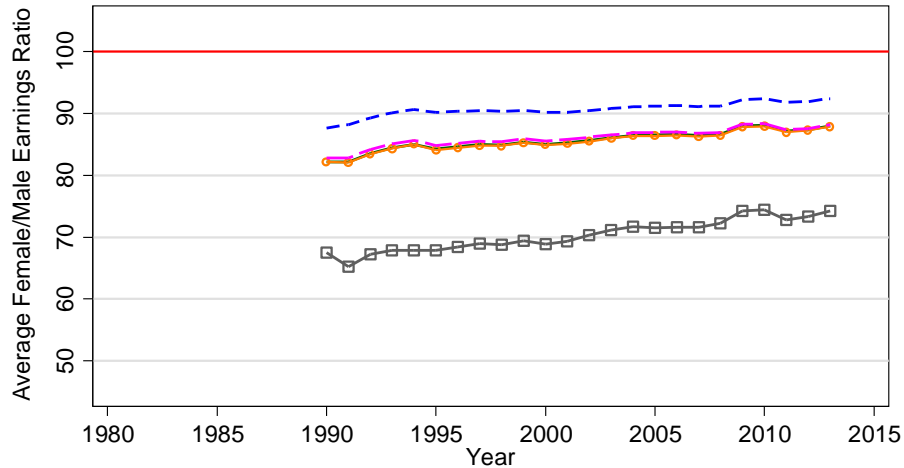
- Select workers aged 25 to 64

Alternative Partitions

A.Canada

B.Sweden

Alternative Partitions

C. United Kingdom