Is there a motherhood penalty?: Decomposing the family wage gap

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This presentation:

- Motivation
- Literature review
- Methodology
- Data
- Results
- Conclusions

What do we do in this paper?

- We estimate and analyze the composition of the existing wage gap between mothers and non-mothers in Colombia.

- We apply the so-called "Ñopo matching procedure", an alternative to Blinder-Oaxaca´s decomposition method. This is a non-parametric approach proposed by Ñopo (2008).

Stata code: nopomatch

Motivation

- Family gap analysis is related to equity of opportunities. Some studies propose that there could be discrimination against mothers coming from the employers (Budin&England (2001)).

- Exiting the labor market after delivery may affect productivity of mothers. Length of the exit period→ Trade off in women's welfare. (Moro-Egido 2012)

Motivation

- Some studies suggest that the gender wage gap has been narrowing down, while the gap between mothers and non-mothers could be increasing (Piras and Ripani (2005)).
- There is international mixed evidence regarding the sign of the wage gap amongst mothers and non-mothers.
- 3 Contributions: i) evidence for a developing country, ii) Besides estimation, decomposition, and iii) Ñopo instead of B-O (correcting selection bias).

Literature review

4 groups of studies:

1. No evidence of motherhood wage penalty
2. Unobserved heterogeneity
3. Self-selection
4. Miscellanea

Literature review

First group: no evidence of motherhood wage penalty

- Korenman and Neumark (1992). USA. OLS shows penalty. First-difference estimator does not.

- Albrecht et al. (1999). Sweden. There is no parental leave penalty. There are penalties for household time and unemployment.

Literature review

Second group: unobserved heterogeneity (abilities, motivation, leisure-consumption preferences)

- Matters
- Anderson et al. (2002). USA. Fixed effects analysis even shows a premium instead of a penalty.

- Does not matter
- Waldfogel (1998). USA and UK. Negligible impact of unobserved heterogeneity.

Literature review

Third group: self-selection, preference of mothers towards certain type of jobs.

- Matters
- Nielsen et al. (2004). Women prefer public sector (family – friendly) to escape from private sector penalty.

- Does not matter
- Molina and Montuenga (2009). Spain. No evidence of women self-selecting into more time-flexible jobs with lower wages.

Literature review

Fourth group: Miscellanea.

- Amuedo-Dorantes and Kimmel (2008): role of non-wage compensation.
- Sigle-Rushton and Waldfogel (2007): role of national welfare systems
- Dupuy and Fernandez-Kranz (2011): role of labor market institutions. Ambiguous effects of parental policy.

Literature review

- Piras and Ripani (2005). Bolivia, Brazil, Ecuador and Peru.

  Divergent evidence:

  - Bolivia: **premium wage** for having children between 13 and 18 years old
  - Brazil: **premium** for having children under 7 years.
  - Peru: **penalty** wage for motherhood.
  - Ecuador: results were not significant.

Literature review

- Peña and Olarte (2010) Colombia. The authors use cross-section analysis correcting by selection bias.

  They found a wage gap between mothers and non-mothers equivalent to 9.4%.

They use B-O to decompose the gap and find that 43% of the gap is due to unobserved factors.

- Why another paper on the same topic, for the same country, with the same database and year of analysis?

Ñopo versus B-O:

- Recall: B-O requires estimation of earnings equations for mothers and non-mothers. With them, it generates the counterfactual, "What would a non-mother earn if, given her characteristics, she were paid as a mother?
- Wage gap is broken into two parts: one attributable to differences in the average characteristics of women, and the other to unobservable differences in characteristics and discrimination in the labor market.

Why Ñopo instead of B-O?

- Problem of B-O: misspecification due to differences in the supports of the distributions of individual characteristics for mothers and non-mothers.
- There are combinations of individual characteristics for which it is possible to find non-mothers in the labor force, but not mothers. And the opposite.
- B-O decomposition fails to recognize these differences in the supports by estimating earnings equations for all working mothers and non-mothers without restricting the comparison only to those women with comparable characteristics.
- Thus, it is implicitly based on an "out-of-support assumption": that the linear estimators of the Mincerean are also valid out of the supports of individual characteristics for which they were estimated.
- Overestimation of the unexplained part of the gap.

Methodology

Steps of the algorithm designed by Ñopo:

Fist step: Select one M from the sample.

Second step: Select all N having the same characteristics of the M selected in the first step.

Third step: Build a synthetic N with all women selected in the second step, with a salary equal to the average wage of the selected N. Match this synthetic N with the original M.

Fourth step: Put the observations of the synthetic N and the original M in their new samples of matched women.

Fifth step: Repeat the fourth steps until the original sample of M is exhausted.

Recall: "nopomatch" stata.

Methodology

- The gap is defined as:

$$\Delta = E[Y|N] - E[Y|M]$$

- Their components are:

$$\Delta = \Delta_x + \Delta_N + \Delta_M + \Delta_O$$

Components of the Wage Gap

$$\Delta = \Delta_x + \Delta_N + \Delta_M + \Delta_O$$

- Δ_x is the portion that can be explained by differences in the distribution of characteristics of N and M on the **common** support.
- Δ_N is the part of the gap explained by the differences in characteristics between N **out** of the common support and the N **in** the common support.
- Δ_M is the part of the gap that can be explained by the differences in characteristics between matched mothers and unmatched mothers.
- Δ_O is the **unexplained** part of the wage gap, this is, the part not due to differences in characteristics of women. If there exist discrimination between M and N, Δ_O would capture this issue.

Components of the Wage Gap

$$\Delta = \Delta_x + \Delta_N + \Delta_M + \Delta_O$$

- Δ_M would be zero either if all mothers can be matched to non-mothers, or if all unmatched mothers have equal average wages than the matched mothers.
- Analogously, Δ_N would be zero either if all non-mothers can be matched to mothers, or if all unmatched non-mothers have equal average wages than the matched non-mothers.

Data and estimations

- Colombian Living Standard Survey, 2008.

Women from Urban areas, 18-65 years old.

	Observations	Population size	%
Mothers	6.008	6.749.086	69,4%
Non Mothers	2.644	2.970.220	30,6%
Total women	8.652	9.719.306	

48,6% of mothers have a job. About the same proportion for non-mothers (48%).

Hourly Wage Average

	Age 18 -45	Age 18 -65
Part-time	7,96	8,03
Full time	7,94	7,96
Self Employed	7,55	7,59
Private employee	7,90	7,91
Public employee	8,68	8,80
Mothers	7,69	7,72
Part-time***	7,91	7,98
Full time ***	7,87	7,90
Self Employed***	7,49	7,51
Private Employee*	7,86	7,88
Public Employee	8,67	8,80
Non-Mothers	7,84	7,86
Part-time***	8,12	8,19
Full time ***	8,09	8,09
Self Employed***	7,84	7,85
Private Employee*	7,97	7,97
Public Employee	8,71	8,80

***p<0.001,**p<0,01,*p<0.05

Labor Participation by Schooling Level

	Total	IP	CP	S	U
Mothers					
Working	52%	39%	45%	58%	82%
Not Working	48%	61%	55%	42%	18%
	100	100	100	100	100
Non-Mothers					
Working	52%	31%	42%	55%	79%
Not Working	48%	69%	58%	45%	21%
	100	100	100	100	100

Source: Own calculations based on ECV 2008

IP: Incomplete primary, CP: Complete Primary

S: Secondary, U: some superior education

Differences in participation are determined by the schooling level, not by the motherhood condition.

Labour characteristics

	18-45 years	
VARIABLE	Mother	Non Mother
Part-time	25,6	19,8
Full time	41,9	50,6
Over time	32,5	29,5
Small firm	62,2	47,6
Employer	1,9	1,0
Self-employed	32,9	18,1
Private employee	48,9	64,4
Public employee	6,9	8,5

Source: Own calculations based on ECV 2008

Education level

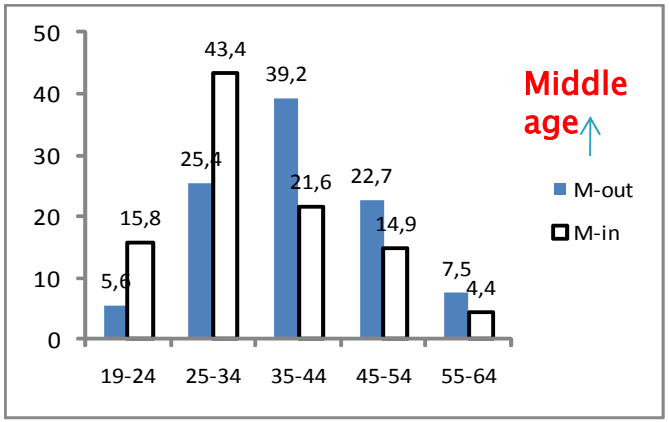
Highest educational degree	18-45 years	
	Mother	Non Mother
None	1,6	2,1
Primary	24,7	11,3
Secondary	52,2	40,5
Some superior*	21,5	46,1

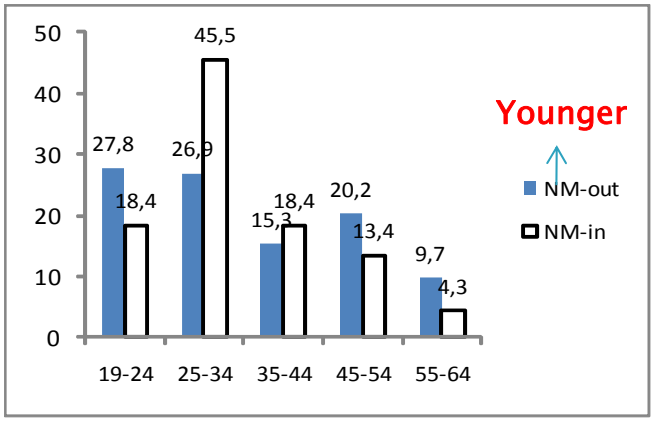
*Technical, technological, university with or without title, graduate.
Source: Own calculations based on ECV 2008

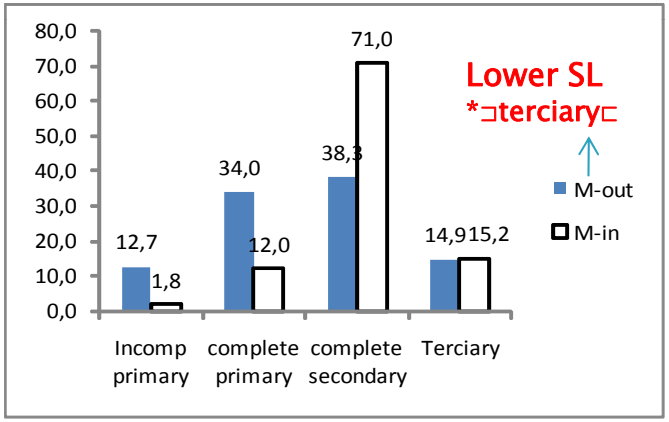
Results, Wage Gap Decomposition

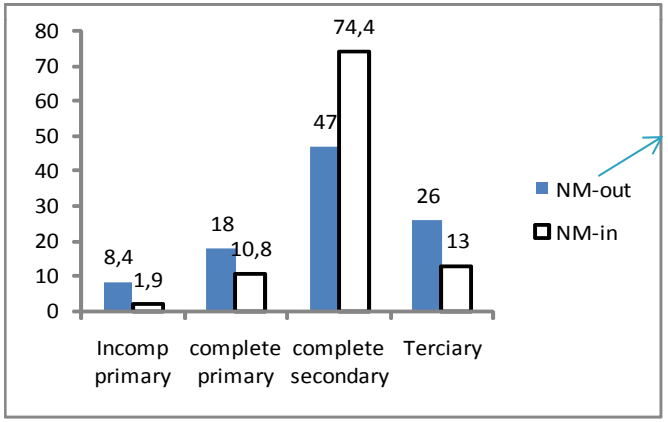
	A& R (1)	+ FT (2)	+SE (3)	+C (4)	+SL (5)	+SF (6)
Gap	1.73	1.73	1.73	1.73	1.73	1.73
ΔO	3.98	1.76	1.82	1.75	0.69	0.67
	(0.17)	(0.40)	(0.45)	(0.71)	(0.75)	(0.75)
ΔN	.	-0.07	-0.07	0.34	1.88	2.08
ΔM	0.02	-0.14	-0.28	-1.09	-1.71	-1.88
ΔX	-2.27	0.18	0.26	0.73	0.85	0.84
%N	100.00	94.28	89.60	79.00	64.25	60.06
%M	96.81	89.97	80.31	66.53	55.74	53.17

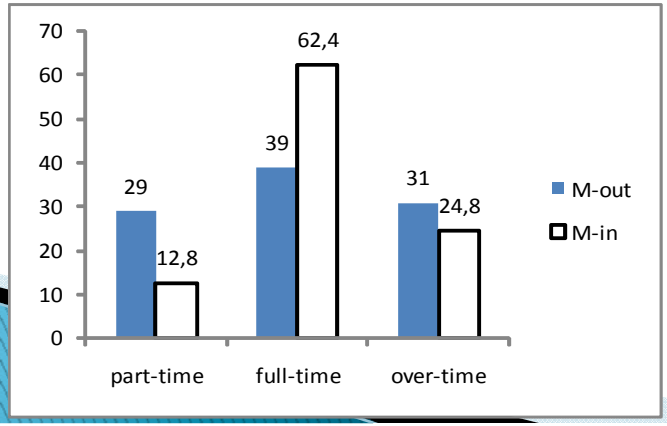
Women in and out of the Common Support

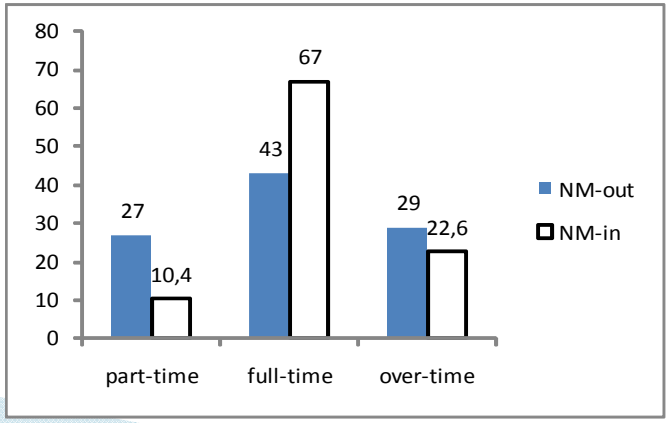












Conclusions

- Schooling is the main variable explaining the existing wage gap between mothers and non-mothers.
- The effect of single mothers.
- There is no evidence of discrimination in the Colombian labor market against mothers.
- Results are (probably) in line with some conclusions from previous literature: self-selectivity, preferences (wages vs. flexibility), lower capacity to aspire to high-paid jobs (giving lower education).

Conclusions

- Labor legislation. Re-arranging women's working day.

  Introducing flexibility would allow mothers to apply to this kind of job positions, not being forced to accept lower salaries than men or non-mothers.

- Relevance of policies directed to female head of households.