

# **Within-firm Gender Segregation: Causes and Consequences**

---

**Inna Maltseva**, Daria Nesterova

National Research University  
Higher School of Economics  
(Moscow, Russia)

SASE 23<sup>rd</sup> Annual Conference  
Madrid, 23/06/2011

# Structure

---

- ☐ Motivation
- ☐ Related papers
- ☐ Data
- ☐ Methodology
- ☐ Results
- ☐ Conclusion

# Motivation

---

Gender segregation is unequal distribution of male and female workers across sectors, industries, occupations, jobs

“Demand-side” explanations of the gender segregation existence:

- Underinvestment in female workers’ human capital (Barron et al., 1993; Becker, Lindsay, 1994)
- ⇒ Women can’t pretend to the same jobs as men do
- Discriminative practice of hiring and career promotion (Lazear, Rosen, 1990; Baldwin et al., 2001; Ransom, Oaxaca, 2005)
- ⇒ Male and female workers are concentrated at different jobs

# Motivation (cont.)

---

Segregation is considered as a main source of gender differences in wages (Groshen, 2001; Bayard et al., 2003; Jurajda, 2005):

at the average women earn less because they are concentrated in the low-paid jobs

Most studies of gender segregation, its sources and consequences, use national-level data. There are some evidences of its existence at the firm level (Baldwin et al., 2001; Blau, DeVaro, 2006; Ransom, Oaxaca, 2005)

We use data from the industrial firm (look inside the internal LM)

---

# Related papers

---

Ransom, Oaxaca (2005): Information about big trade company staff

- ⇒ within-firm gender segregation appeared due to initial assignments, when some job places are occupied either by male or female workers at the moment of hiring

Dohmen, Lehmann, Zaiceva (2008): Information about staff and wages of Russian manufacturing firm (1997-2002)

- ⇒ The most significant gender wage gap is observed among workers and it depends on job segregation;
- ⇒ Gender earnings differences for workers who occupy the same job positions are rather small

# Data and measurement issues

---

Personnel data from one of Russian manufacturing enterprise, operated as a part of “machine building” industry

Sample: 1545 workers (388 – women; 1157 men) who were employed at the enterprise at any time between 2002 and 2006

- *General information*: gender, date of birth, educational level
- *Within-firm career*: dates of hiring and separations; dates of beginning and ending of staying at each job position within the firm; job position
- *Wage information*: types and size of payments (wages, premiums, bonuses and so on)

# Data: Some facts about the firm

---

- ❖ The firm was established in West Siberia in 1941 on the base of the enterprise evacuated from Central
- ❖ Between 1992 and 1994 the firm went through the privatization process. In 2002 the owners of the firms were top-managers, employees, and several branch establishment
- ❖ At the end of 2006 95% of the firm belonged to the new owner
- ❖ Average number of employees – 730 per year (in 2002 – 2006)

# Wage data and earning measuring

---

1. Average monthly earnings – all type of payments received by worker (wages, premiums, bonuses)
2. Financial variable was inflated to 2006 price level using an official CPI for the region where the firm operates
3. Pooled sample of workers employed at the end of each year (2855 observations); every year each person was treated as an independent observation



# Methodology

---

- To analyze the gender employment structure:

Typical approach is based on information at some moment

Problem: one can't take into account cases of hiring and separation that could take place between two moments of observation.

- ❖ Episode – staying of worker at the same job title  
1804 episodes (481 – women; 1323 – men)
- ❖ Duration of each episode

⇒ number of person-days per each title and level as a base for measuring of the gender employment structure

# Methodology (cont.):

## Gender earning differences

---

I. Mincerian equation for logarithm of monthly earnings with controls for:

age, age<sup>2</sup>, tenure, tenure<sup>2</sup>, education levels (dummies), job levels (dummies)

II. Oaxaca-Blinder decomposition of the gender earning gap:

(a) For the whole sample

(b) For each level without and with job titles

$$\ln w_m - \ln w_f = \underbrace{(X_m - X_f)\beta^*}_{\text{Explained part}} + \underbrace{X_m(\beta_m - \beta^*) + X_f(\beta^* - \beta_f)}_{\text{Unexplained part}}$$

$\beta^*$  is a set of the reference coefficients obtained from a pooled model over both gender groups

---

# Firm's hierarchy

Level	Title				
1. Top-management	1. top-management				
2. Heads of departments	2. head of production department		3. head of non-production department		
3. Supervisors	4. supervisor of productive unit		5. head of bureau		
4. High-qualified workers	6. engineer	7. foreman	8. planning engineer	9. economist	
5. Middle-qualified workers			10. technician	11. accountant	12. planning technician
6. Production workers	13. production worker				
7. Apprentices	14. apprentice				

## Gender employment structure (according to duration of episodes)

Level		female	male	% of fem
Top-management		0.07	3.67	0.77
Heads of departments	5.5%	2.88	6.42	12.5% 14.74
Supervisors		2.50	2.32	29.30
High-qualified workers		22.76	15.31	36.44
Middle-qualified workers		19.66	1.40	84.41
Production workers		51.93	70.16	22.21
Apperentice		0.21	0.71	10.03
Total, person-days		1366223	3541387	<b>27.84</b>

- The share of female workers is about 28%
- The most part of employees works as "Production workers"
- A big difference in distribution of male and female workers between and within the levels:
  - "Middle-qualified workers": "mostly female" level
  - Almost all other levels are "mostly male": the share of women at these levels is less than 28%
- The employment structure of this firm is characterized by the vertical segregation

## Gender employment structure (according to duration of episodes)

Title	female	male	% of fem
top management	0.07	3.67	0.77
head of production department	0.38	5.13	2.78
head of non-production department	2.50	1.29	42.70
supervisor	0.03	1.13	0.96
head of bureau	2.47	1.19	44.42
engineer	7.24	7.73	26.53
foreman	4.46	5.40	24.14
planning engineer	1.80	0.64	51.99
economist	9.27	1.54	69.94
technician	9.39	1.09	74.76
accountant	7.40	0.03	99.07
planning technician	2.88	0.28	79.82
worker	51.93	70.16	22.21
apprentice	0.21	0.71	10.03

➤ Dividing of the "spheres of authority":

men are employed at the positions of the production divisions while women mostly work at the non-production departments

➤ "Mostly male" and "mostly female" titles

# Access to levels

Level	Share of hired from outside	Share of women among hired	Share of promoted	Share of women among promoted	Total	Share of women
1	59.26	12.50	40.74	0.00	27	7.41
2	33.33	8.33	66.67	33.33	72	25.00
3	50.00	5.56	50.00	22.22	36	13.89
4	62.44	40.58	37.56	38.55	221	39.82
5	66.36	71.83	33.64	63.89	107	69.16
6	88.79	13.04	11.21	29.51	544	14.89
7	97.01	9.23	2.99	0.00	67	8.96
Total, episodes	815	181	259	93	1074	26.66

- ⇒ Men can be more likely to be hired almost to all levels
- ⇒ Women are dominated among new hired only to the level 5, which is "female" level
- ⇒ Women also have an opportunity to be hired to the level 4, where their presence is noticeable
- ⇒ Access of women to the "male" levels is possible through the promotion (except of levels 1 and 7)

# Access to titles

Title	Share of hired from outside	Share of women among hired	Share of promoted	Share of women among promoted	Total	Share of women
1	59.26	12.50	40.74	0.00	27	7.41
2	36.17	0.00	63.83	10.00	47	6.38
3	28.00	28.57	72.00	72.22	25	60.00
4	52.94	0.00	47.06	12.50	17	5.88
5	47.37	11.11	52.63	30.00	19	21.05
6	66.29	30.51	33.71	23.33	89	28.09
7	39.53	29.41	60.47	30.77	43	30.23
8	65.22	66.67	34.78	87.50	23	73.91
9	71.21	48.94	28.79	52.63	66	50.00
10	59.15	57.14	40.85	55.17	71	56.34
11	100.00	94.74	0.00	n/a	19	94.74
12	58.82	90.00	41.18	100.00	17	94.12
13	88.79	13.04	11.21	29.51	544	14.89
14	97.01	9.23	2.99	0.00	67	8.96
Total, episodes	815	181	259	93	1074	26.66

# Career paths for women and men

---

For those who have moved from one job title to another:  
probabilities to change the job level

- Considerable differences in career paths:
  - women have no excess to the highest hierarchical levels through the within-firm promotions
  - male workers potentially have possibility to make a career from the lowest level to the very top
- Some differences in magnitudes and directions of labor mobility between levels: women have lower probability to move to the “mostly male” levels where men dominate and vice versa
- Within-firm movements are characterized by both promotions and demotions for all employees



# Determinants of monthly earnings, OLS, 2002-2006

	1	2	3
Male	<b>0.357***</b>	<b>0.392***</b>	<b>0.293***</b>
Tenure		0.037***	0.033***
Tenure sq		-0.001***	-0.001***
Age		0.060***	0.049***
Age sq		-0.001***	-0.001***
Education (Higher edu is omitted)			
Primary education		-0.705***	-0.395***
School		-0.263***	0.009
Started professional		-0.417***	-0.102**
College		-0.453***	-0.21***

# Determinants of monthly earnings, 2002-2006 (cont.)

	1	2	3
Level (top-management is omitted)			
2: Heads of departments			-0.487***
3: Supervisors			-0.849***
4: High-qualified workers			-0.982***
5: Middle-qualified workers			-1.100***
6: Production workers			-1.030***
7: Apprentices			-1.580***
N	2855	2855	2855
R-sq	0.044	0.196	0.268

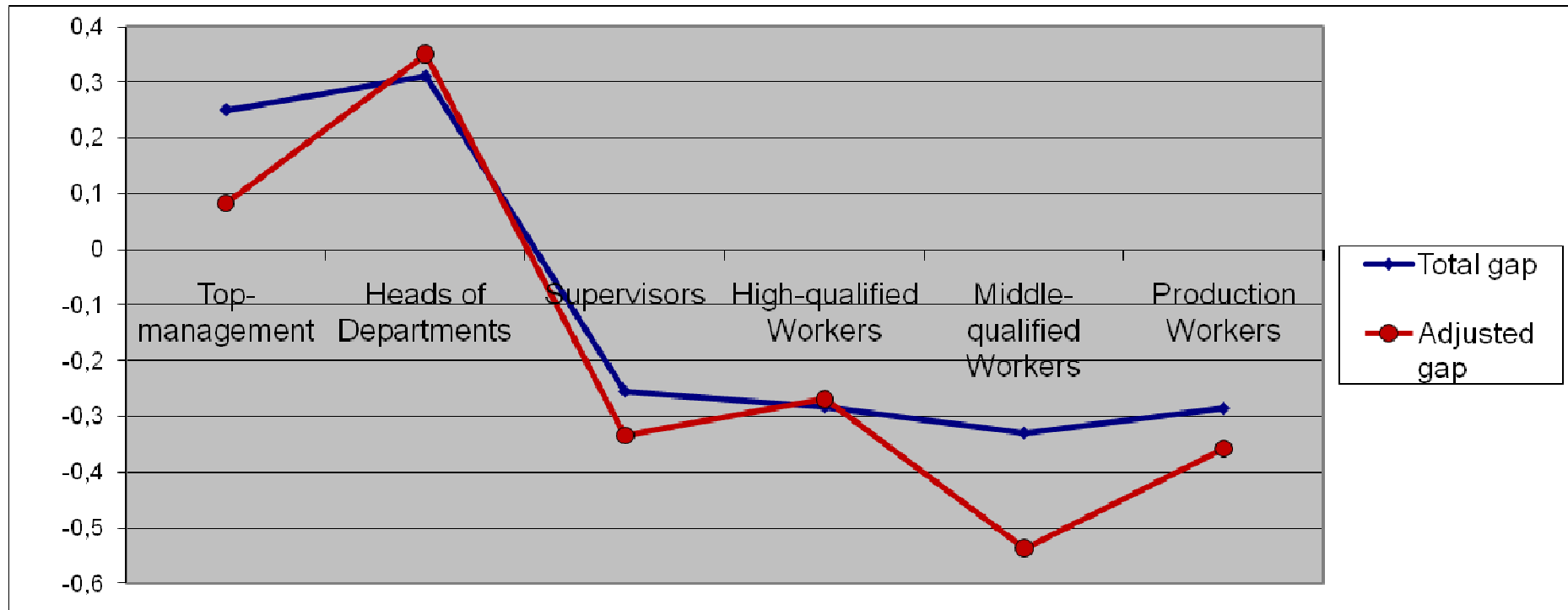
# Decomposition of gender earnings gap (Oaxaca-Blinder)

Total gap	<b>-0.357***</b>
Explained part, total	-.0635* (18%)
Age	0.023***
Tenure	-0.002
Education	-0.010
Job level	-0.075***
N	2855

➤ The results confirm hypothesis that between-level gender segregation has the influence on earnings differences: the negative coefficient for variable “Job level” means that if female and male workers were allocated equally between the job levels, gender earnings gap would decrease.

➤ The greater part of the gender wage gap is not explained by variables we included into estimated equation ⇒ for men and women characteristics of their human capital and their assignments at the particular job levels have different returns in terms of wage size.

# Gender earnings gap across levels



- Total gap - a coefficient on the male dummy in the regression of  $\ln$  earnings on this dummy. Adjusted gap - the same coefficient from the regression with control on age, education and tenure
- In average women employed at the first two levels earn more than men, but only 3% of women are employed at these levels
- The highest gender earnings gap in favor of men is observed at the level "Middle-qualified workers" (54%) that is "mostly female" level

# Decomposition of gender earnings gap across levels (Oaxaca-Blinder)

Level	Total gap	Explained part without titles	Explained part with titles
Middle-qualified workers	-0.330***	0.206**	0.246***
Production workers	-0.286***	0.071***	

Hypothesis: contribution of explained variables to the general gender gap depends on the job level and title when the person works

- Women have advantages in their human capital (endowment) since the explained part leads to decreasing of gender earnings gap
- The share of explained part is different for different levels.
- "Production workers": the controls explain only 25% of the gap. The reason: this level is not homogeneous and it includes workers with very different levels of qualification
- If we control on the job title within the level "Middle-qualified workers" a size of explained gap is increased (74%)  $\Rightarrow$  the size of the gap depends not only on employees' human capital but on the distribution of men and women between the job titles of this level
- The segregation within the level "Middle-qualified workers" gives the gains in earnings for women, but contribution of unexplained part is negative and bigger

# Conclusion

---

- There is a gender segregation at this firm

It has several sources:

- Women almost aren't hired to the most of job titles/levels. At the opposite side, men aren't hired to the level with high concentration of women
- Differences in career paths: in case of mobility women move toward the "mainly female" jobs and titles, while men go into direction of "mainly male" jobs and titles

# Conclusion (cont.)

---

- Gender segregation really effects the size of gender earning gap: women earn less because they concentrated at the low-paid levels
- The total gender earnings gap of 35.7% is almost unexplained by workers' characteristics, but the gender segregation works against women in terms of the size of the gap
- Within the level of "Middle-qualified workers" segregation across job titles have positive effect on gender gap decreasing. But effect of unexplained part (differences in returns to worker's characteristics; unobservable parameters) seems to be stronger