

**The evolution of labor relations inside a
Russian firm during transition:
evidence from personnel data**

Hartmut Lehmann

(University of Bologna, DARRT and
IZA)

Beijing 18 – 19 September 2009

General Motivation (the overall project)

- Personnel data opens “black box” of firms in transition
- Episodes of large restructuring during transition
- Analyze the evolution of employment (turnover), wages, inequality and gender policies **inside a firm**:
 - Detailed look at the “internal labor market”
 - First studies for a transition economy
 - One firm in Russia
- Which employment and wage policies are idiosyncratic and which are common to different economic regimes?
- Personnel data for two Russian and one Ukrainian firm (all in manufacturing)

Our studies

1. Dohmen, Lehmann and Schaffer, “Wage Policies of a Russian Firm and the Financial Crisis of 1998: Evidence from Personnel Data – 1997 to 2002”
IZA DP No. 3350 and CEPR DP 6845.
2. Dohmen, Lehmann and Schaffer, “Wage determination and wage inequality inside a Russian Firm in late Transition: evidence from personnel data, 1997 to 2002”
In R. Kanbur and Jan Sveinar, Labor Markets and Economic Development, Routledge 2009, 62 - 89.
3. Dohmen, Lehmann and Zaiceva, “The Gender Earnings Gap inside a Russian Firm: First Evidence from Personnel Data – 1997 to 2002”
Journal for Labour Market Research, 2008, 41 (2/3), 157-180.

Here, we focus on studies 1 and 3.

Motivation (Paper 1)

- How do external labor market conditions affect personnel policies of firms?
 - Do firm's personnel policies change in response to macroeconomic shocks?
 - We know little about effects of crises on workers (one major study: Fallon and Lucas 2002: on workers and households in aftermath of Asian and Turkish crises in the 1990's)
 - However, we know nothing about what happens to workers inside firms in times of macroeconomic upheaval
 - Who bears the burden of an adverse shock within firms?

Motivation (Paper 3)

- How are females affected during transition inside a firm?
- What are gender-specific outcomes in a certain firm?
 - Gender wage gap
 - Segregation
 - Discrimination
- Few empirical studies – data unavailability (wages are often missing).
No study for transition economies

Personnel Data in both studies

- Personnel data of a Russian firm 1997-2002:
 - Span period of large macro shock: the financial crisis of 1998
 - Can establish link between adjustment and shock (in Western context hard to do)
 - Contribution to the literature on real wage rigidity/ flexibility (How prevalent are nominal wage cuts? Are real wages downward rigid?)
 - Document the evolution of the gender earnings gap and potential reasons behind
- Advantages:
 - First for transition economies
 - Detailed look at the internal labor market
- Disadvantages:
 - Not representative

The Firm (1)

- Operates in one of the Central Russian *oblast* , in “machine building and metal works” sector
- Produces equipment for gas and oil production and smith-press equipment
- Out of 17 Central Russian *oblasts*, *oblast*, where firm, is 8th in terms of wage levels (2006 data)
- The firm operates in a product market characterized as follows:
 - 6.2% export share (CIS): the vast majority -for Russian market
 - no regional competitor
 - more than 5 competitors in the Russian market, among them firms from the EU
- In 2007 about 3400 employees

The Firm (2)

- It was founded in the 1950s and privatized in 1992
 - Ownership structure (in 2002): workers/employees/managers (53.1%), former employees (21.5%), Russian entities (25.4%)
 - Caveat: top management seems to have decisive majority (interview with CEO), workers have no voting rights
 - Formally there is collective wage bargaining at the firm but trade union officials are “in the pocket of the CEO”
 - Dividend payments to workforce are miniscule relative to annual compensation
- ⇒ corporate governance structures neither give employees influence over wage setting nor do they confound wages
- Two hostile takeover attempts tell us that firm has been performing well (see also profitability on the slides below).

How representative is our firm ?

- In terms of profitability
 - in sector: declining from 1999 onwards
 - in firm: stable and predominantly rising
 - In terms of employment
 - in sector: declining
 - in firm: stable (even slightly increasing)
 - CEO in list of Russia's top managers (had success with conversion)
- ⇒ Firm is a part of a small but important part of Russian industry that has managed transition well



Profitability



Employment

Data

- We created electronic files based on records from the personnel archive of the firm. All employees, except for top managers
- For all employees employed at any point in time during the period from January 1997 – end of 2002 (**panel**), we have information on:
 - Previous career (previous employer, career inside firm only partially available)
 - Education
 - Demographics (age, gender, family status, children, etc)
 - Hiring and separation date
 - Position in the firm
 - Wages (monthly wages averaged over the year)
 - Bonus payments:
 - (1)monthly bonus (fixed percentage of the wage), not paid to production workers
 - (2)extra annual bonus (form of profit sharing)
 - (3)annual bonus (paid to production workers only)
 - Wage arrears (of little importance in this firm)
- Financial variables are deflated to 1997 using corresponding CPIs
- Sample size is around 3,000 observations per year

CERT Regional Data Set

- Sample of industrial firms in same region for years 1997 to 2002, with important information on
 - Employment
 - Separations and hirings
 - Wages by employee category
 - Dynamics of wage arrears

Wage Policies of a Russian Firm and the Financial Crisis of 1998: Evidence from Personnel Data – 1997 to 2002

The financial crisis of 1998

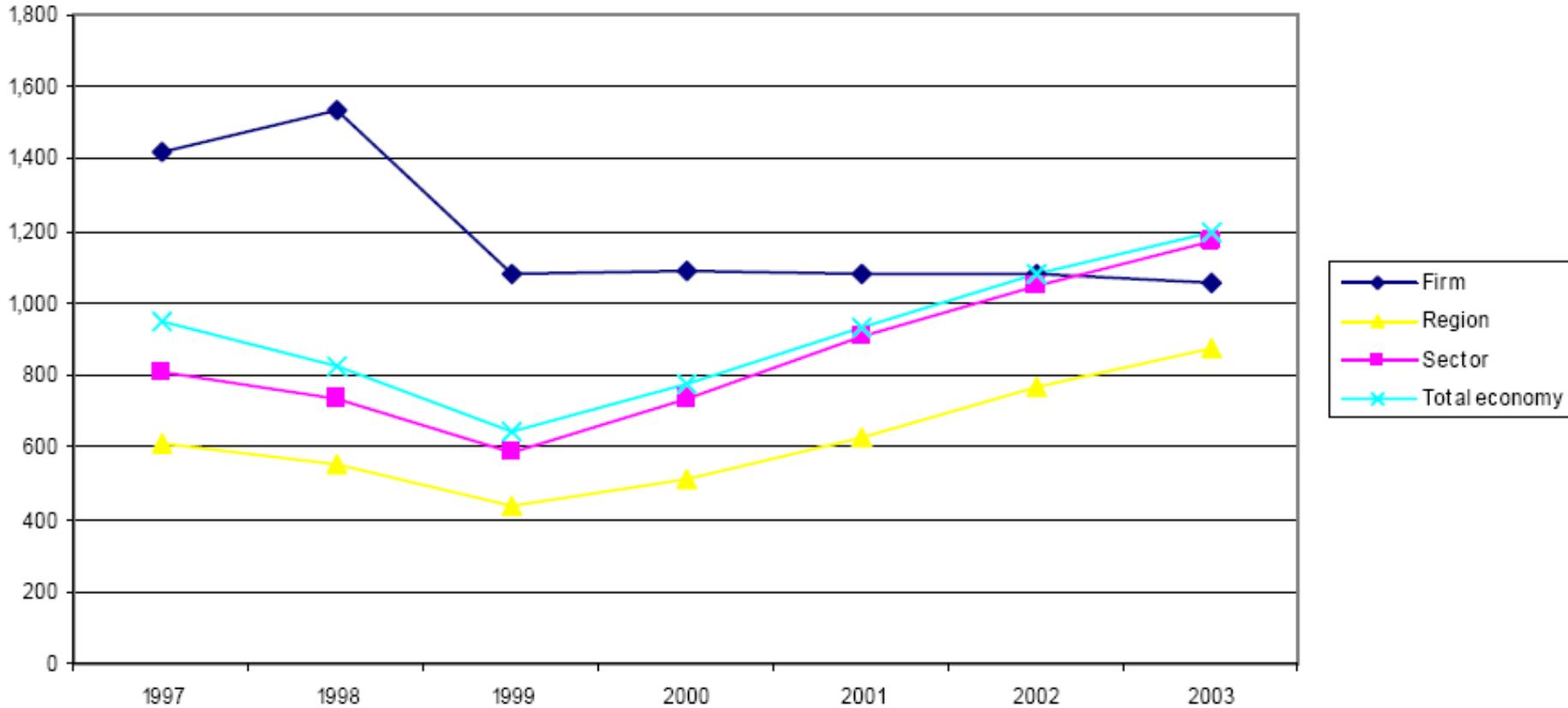
- Since 1995 CBR – stabilization policy (ex. rate as an anchor):
 - Low inflation, but: appreciation of real ex. rate
- 1998: floating rouble – politically unpopular. CB defends it until foreign reserves were exhausted
- Consequences (short-term):
 - Devaluation of rouble, default on domestic debt, collapse of a banking system, liquidity problems, huge inflation
- In the longer term:
 - Rising oil prices + real depreciation + fall in real wages → growth

The firm and the crisis

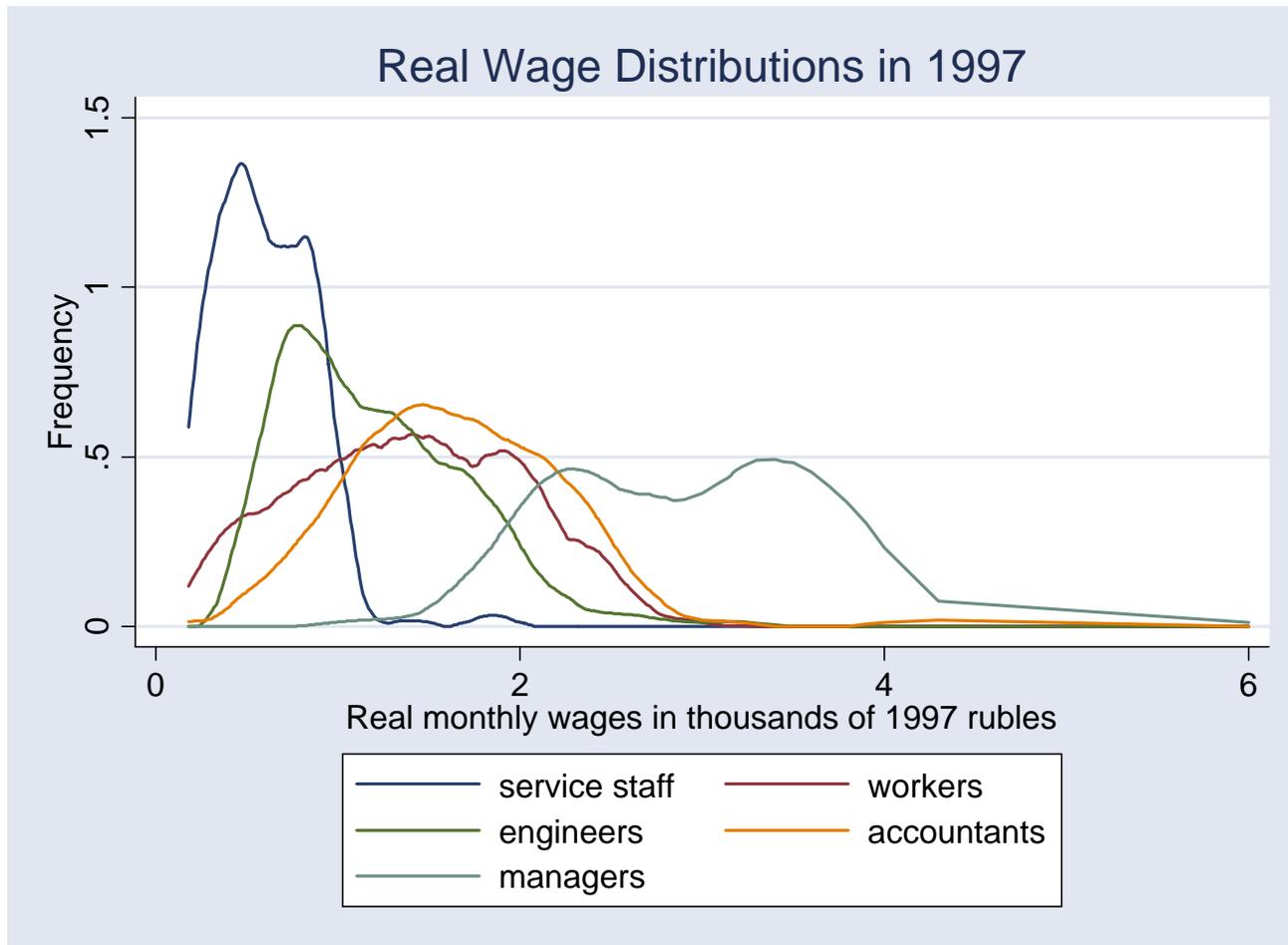
- BEFORE CRISIS
 - Sharp drop in oil prices before the crisis caused problems
 - Real appreciation of ruble made it difficult for firm to compete with importers
- IMMEDIATE AFTERMATH and AFTER CRISIS
 - Shortage of lending capital was of little importance (like for many Russian firms)
 - Devaluation of ruble increased competitiveness temporarily.
 - Ongoing oil boom has improved profit situation of firm considerably throughout reported period

Results: Wages and Compensation

Real Monthly Wage in Thousand 1997 Rubles



Wage structure (in 1997)



Determinants of wages (in 1997)

- Employees with more education receive higher wages
- Gender wage gap (substantially larger in the lower half of distribution)
(TO BE DISCUSSED BELOW)
- Higher wages for employees with long tenure (holds throughout the distribution)
- The markup of wages over production workers for accountants and managers falls as we go from lower to higher quantiles



WageRegressions



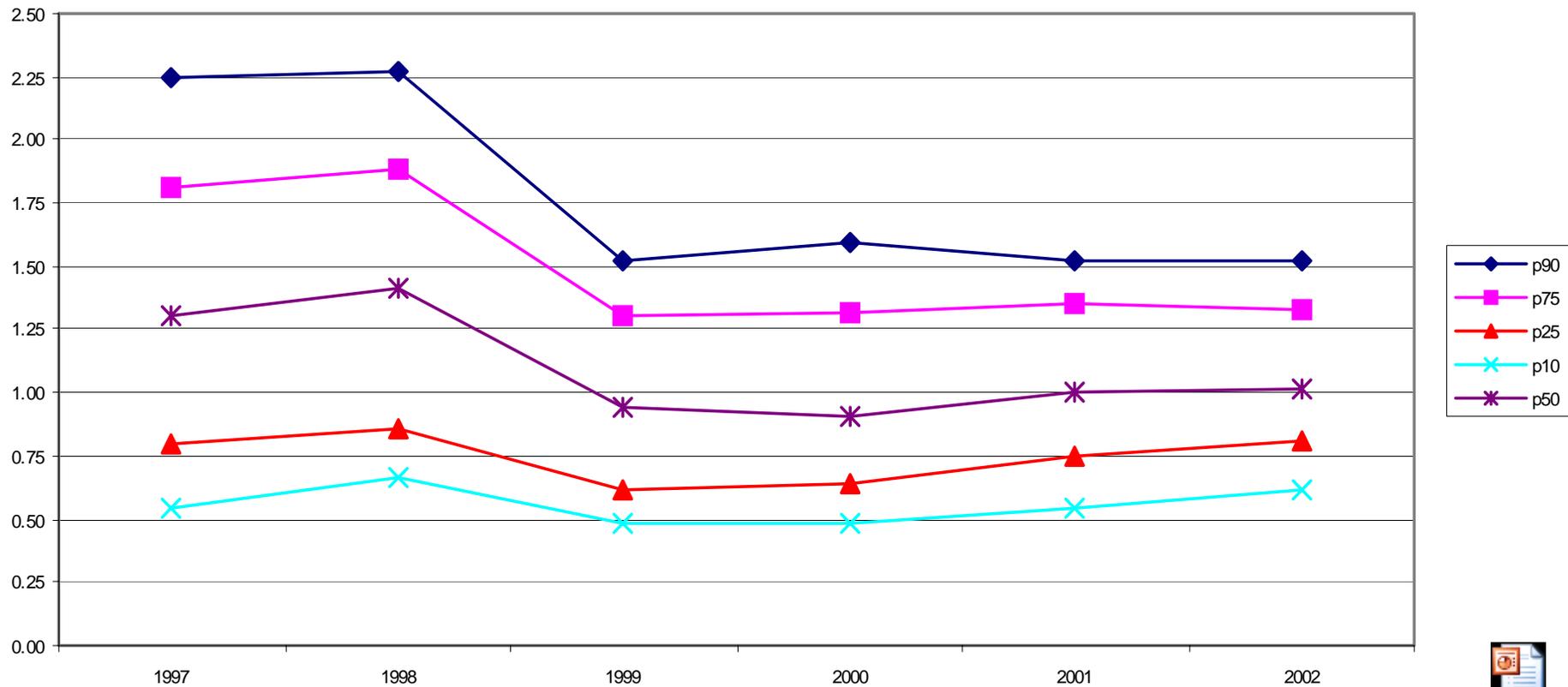
QuantileRegression

Composition of total compensation – all employees

Year	Wage	Monthly bonus (no workers)	Other bonus (only workers)	Extra bonus
1997	83%	8%	4%	5%
1998	90%	6%	4%	0%
1999	86%	7%	2%	5%
2000	85%	7%	4%	5%
2001	79%	8%	3%	11%
2002	77%	10%	4%	9%

Real wages (and real compensation) fall substantially in the aftermath of the crisis – nominal wages are never cut

Figure 2 Distribution of basic real wage in thousand of rubles - all employees



Who bears burden of shock?

- **Not all employees affected in the same way** (previous graphs)
- Substantial wage mobility across quintiles:
 - fall in real wages is most pronounced in the upper half of the wage and total compensation distributions (in absolute and relative terms)
 - employees in the lower quantiles of the earnings distribution experience larger nominal wage growth than employees in the higher quantiles
 - fall in inequality that comes about because strong relative losses of persons in the higher part of the distribution
 - long-tenured workers experience lower wage growth
 - accountants (and managers) have the lowest wage growth



TransitionMatrix



WageGrowthRegressions



2 RobustnessChecks

Results: Employment and Turnover

Turnover

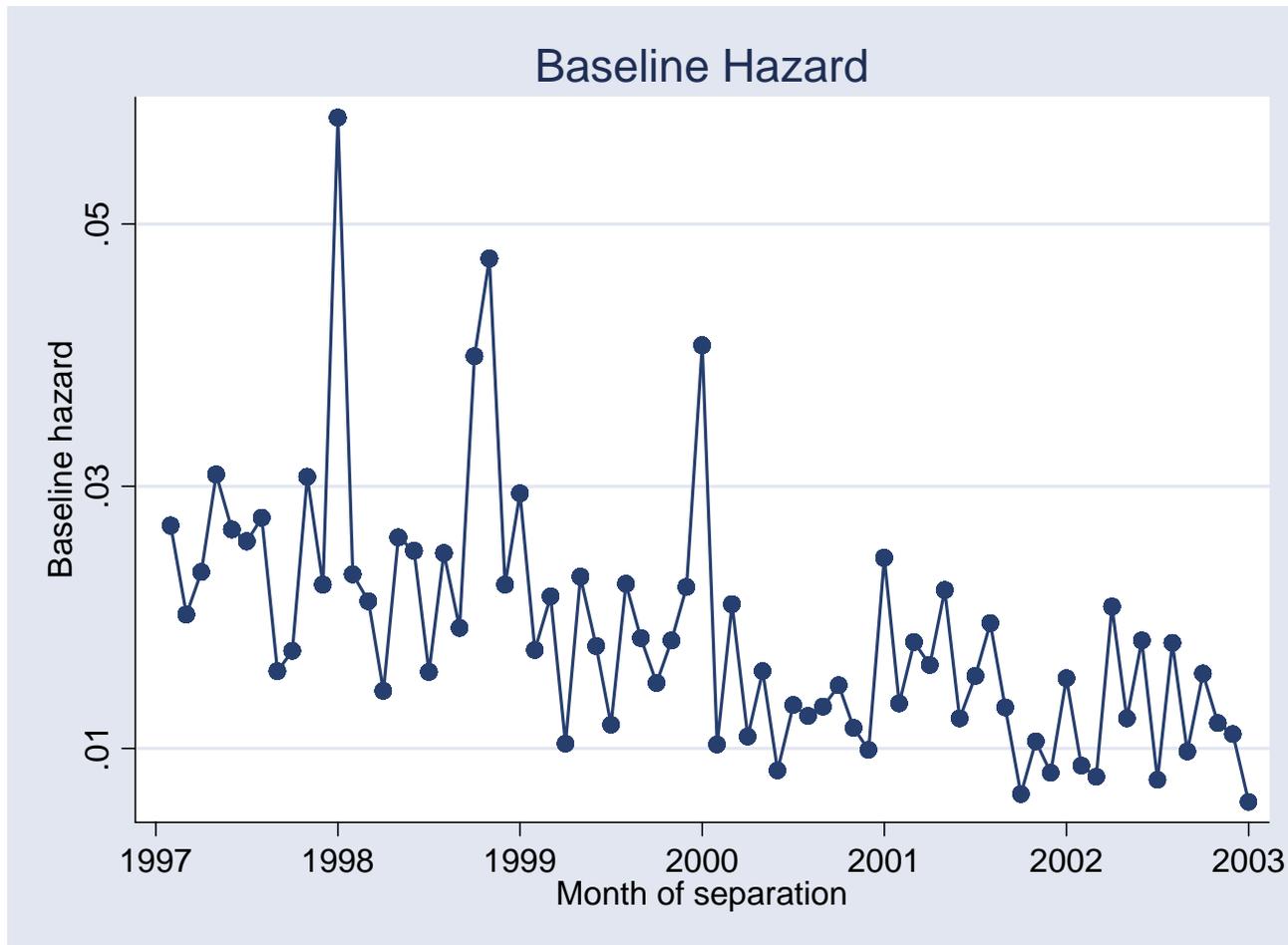
- Inflow and outflow rates were much higher before the crisis than afterwards.
- Before crisis hiring rates are high because separation rates (predominantly quit rates) are high.
- Financial crisis restrained many from quitting
- Similar to turnover patterns at industrial firms in the same local labor market (worsening outside option)

Table 2: Hiring and Separation Rates (in %), 1997-2002

Total Employment		
Year	In	Out
1997	13.9	13.2
1998	14.7	13.5
1999	9.6	9.5
2000	9.2	6.7
2001	9.6	6.5
2002	6.7	6.1



The job separation rate trends downward over 1997 – 2002 and is roughly twice as large before the crisis than afterwards



Determinants of separation rates:

(Estimates from Cox proportional hazard models)

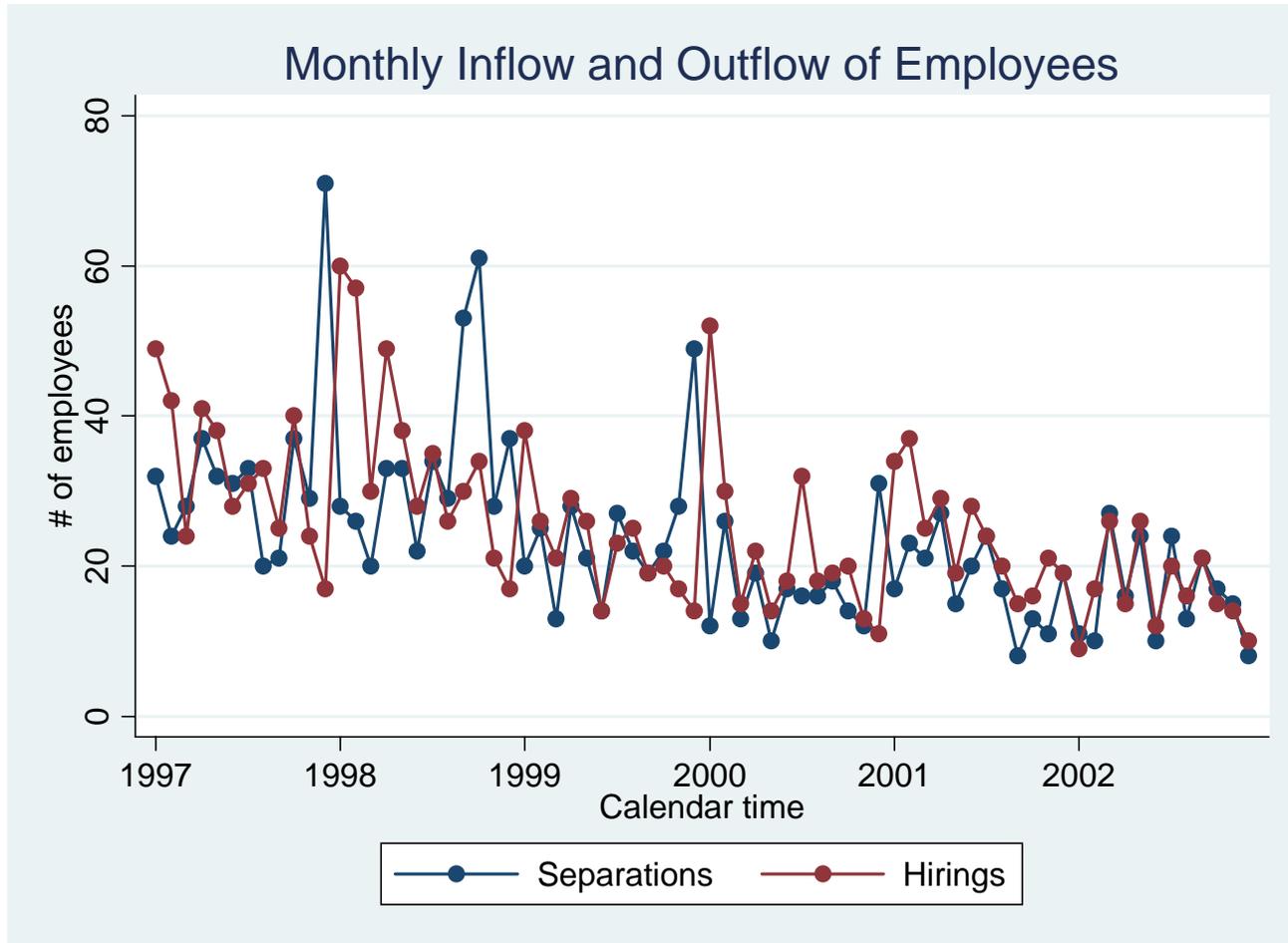


CoxEstimationResults

- Tenure: small impact
- Educational attainment: in 2nd period those with more than basic education have higher propensity to separate
- Age: very young and those reaching retirement age have far higher hazard than core age group (30-35); those over age of 45 but far from retirement have substantially lower separation rates
- Gender: women have higher separation rates, especially in high turnover period
- Children: employees with children are more reluctant to leave firm
- Employee type: production workers and especially accountants are more likely to separate
- Location in wage distribution: in first period, polar deciles have higher hazards, in second period only lowest decile

Replacement Hirings ?

Separations Granger cause Hirings



Extraction of rents and approaching outside option

- Firm reacts to falling outside opportunities by eroding rents taking advantage of high inflation



WagePolicy



OutsideOption

- Time patterns of regional turnover, hiring being replacement hiring, ↑ regional U rate post-crisis, ↓ relative wage gaps



- Local labor market conditions are of paramount importance in wage policies of top management – this is confirmed in interview with CEO

Main findings

- External conditions affect personnel policies
- “Price” rather than “quantity” adjustment:
 - employment remained stable
 - nominal wages are never cut but real wages and real compensation fell substantially
- Firm takes advantage of worsening outside options (high inflation) and extracts rents
- Firm curbs earnings most for those who earned highest rents before crisis → strong compression of real wages and total compensation
 - At the bottom end of the wage distribution, firm pays roughly the opportunity cost throughout the reported period (few rents pre-crisis)
- Changes in the wage structure differ across the five employee categories
 - The differential treatment of employee groups within the firm seems to suggest that market forces strongly influence the wage policies of our firm

**The Gender Earnings Gap inside a Russian
Firm: First Evidence from Personnel Data –
1997 to 2002**

Proportion of females in the firm

Proportion of females

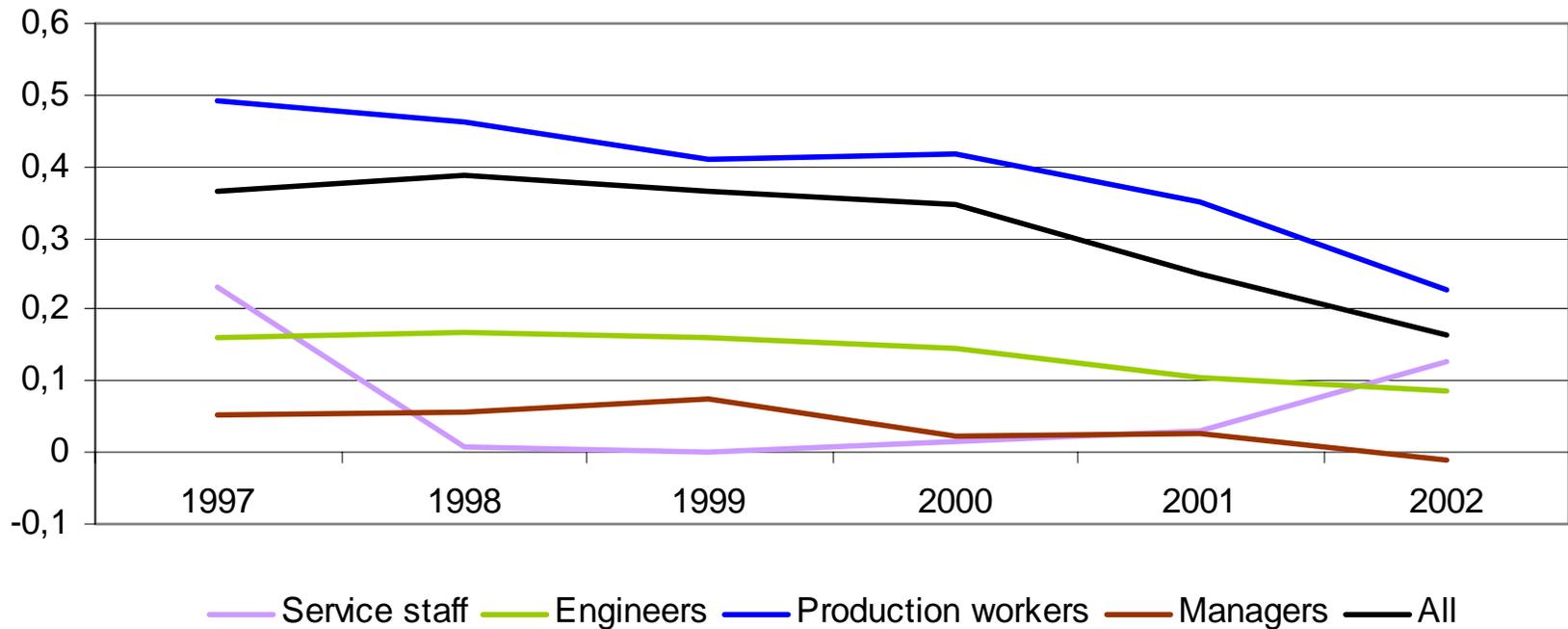
	1997	2002
All	0.39	0.38
Production workers	0.31	0.31
Engineers	0.55	0.53
Service staff	0.41	0.33
Managers	0.17	0.21
Accountants	0.97	0.97

Occupational distribution (%)

	Production workers	Service staff	Engineers/ Technical staff	Accounting staff	Managers	N
1997						
Males	69.75	4.68	19.70	0.11	5.76	1,772
Females	48.85	5.06	37.83	6.39	1.87	1,126
2002						
Males	69.89	5.61	19.43	0.11	4.96	1,853
Females	51.74	4.46	36.04	5.53	2.23	1,121

Evolution of the GEG inside the firm

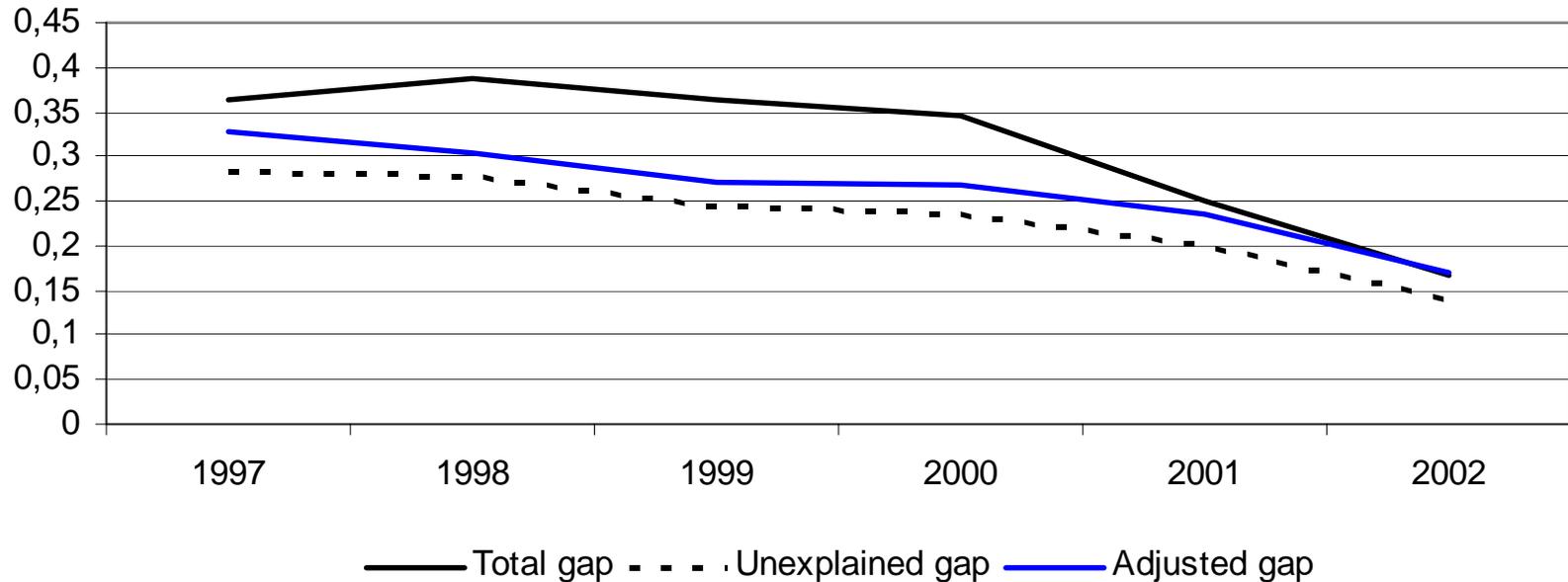
Gender wage gap by occupations, 1997-2002



GEG at the means

Oaxaca-Blinder (1973) decomposition, all employees

Oaxaca-Blinder decomposition and regressions results:
Gender wage gap, 1997-2002



DeterminantsWages



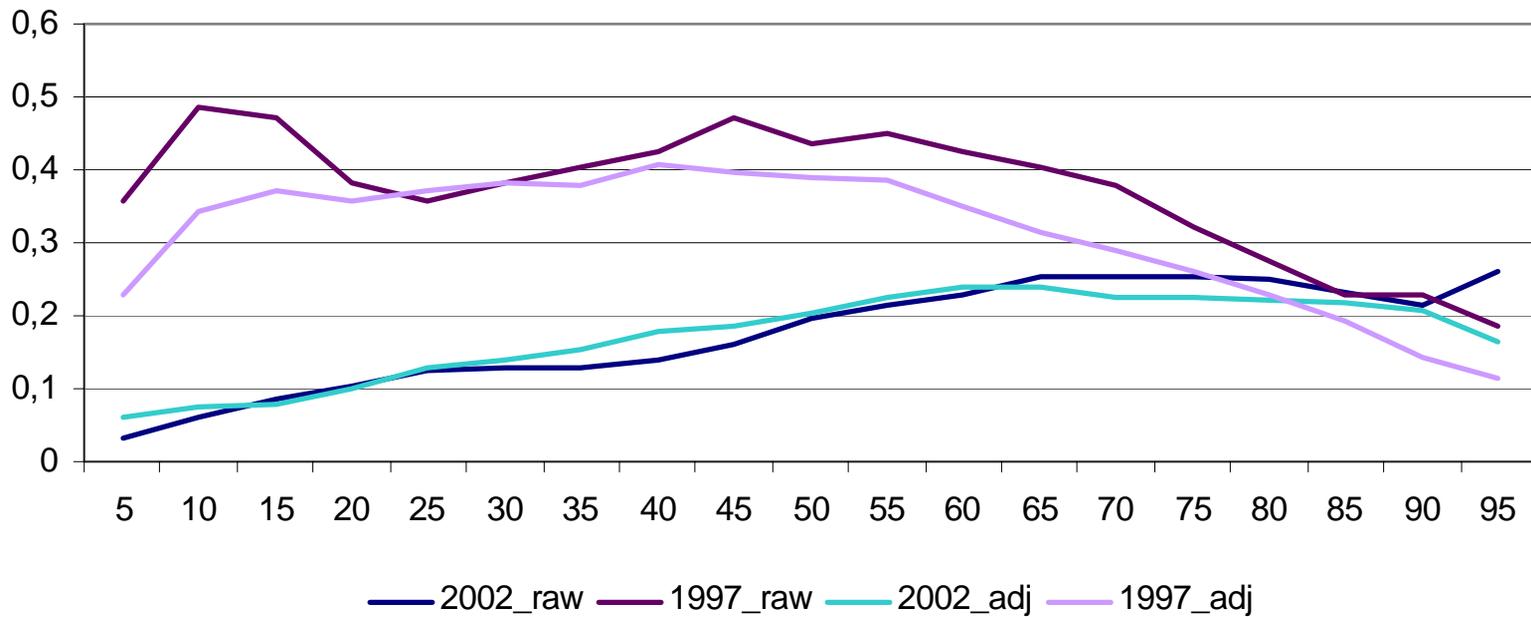
OB

GEG at the means

- At best one third of the gap is explained by differences in productive characteristics
- GEG decreased between 1997 and 2002 by approx. 20 points
- GEG for the entire workforce is driven by the earnings differentials for engineers and production workers
- GEG is small and for the most part insignificant for managers (in line with Lazear and Rosen, 1990) and (in some years) for service staff
- Workers have by far the highest gaps, little of which is explained by differences in observed characteristics

GEG at the quantiles: raw and adjusted gaps

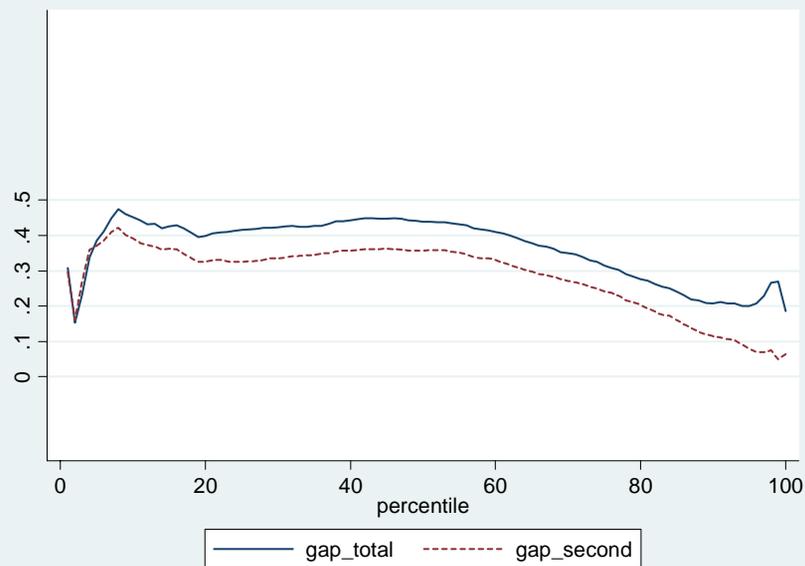
GWG at the quantiles: 1997 and 2002



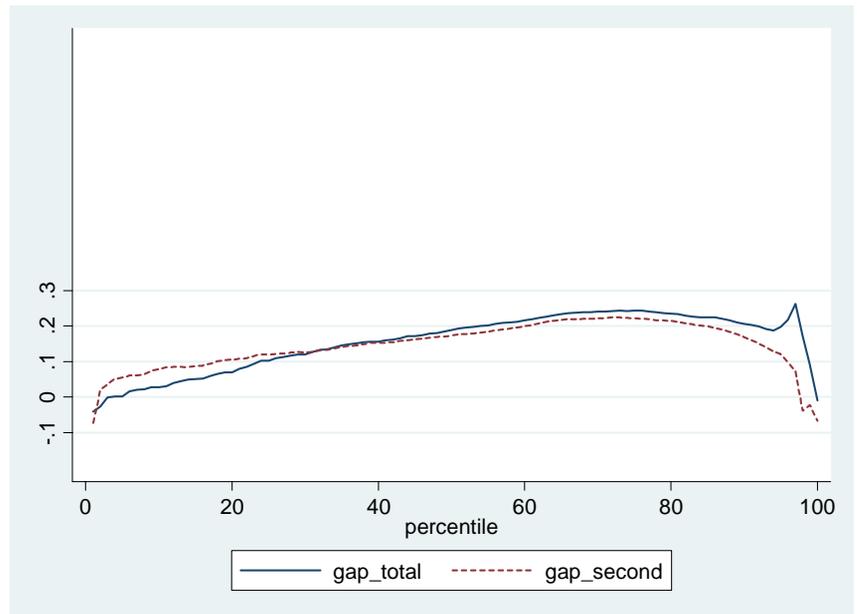
GEG at the quantiles

Machado-Mata (2005) decomposition:
total gap and gap due to coefficients

1997



2002



GEG at the quantiles: MM (2005)

- In general, GEG has roughly an inverted U-shape profile across wage distribution, apart from 2002
- There is evidence for an increase of a “glass ceiling” effect by 2002
- The highest quantile in 1997 and the lowest in 2002 exhibit particularly low gender differentials
- The main portion of the GEG is due to the differences in coefficients

Evolution of the GEG: 1997-2002

Change in GEG at the mean: Juhn-Murphy-Pierce (1991) decomposition

- About 29 percent of the decrease can be explained by changes in observed characteristics and prices
- Changes in observed characteristics about four times as important as changes in observed prices
- About 6 points of the reduction of the gap is because women improve their position in the male residual earnings distribution
- About 8 points are due to a narrowing of this distribution
- The joint contribution of gender-specific effect has the most weight (contrary to the early years of transition, see Brainerd, 2000)



JMP

Change in GEG at the quantiles: Machado-Mata (2005) decomposition

Gap	10	25	50	75	90
Actual:					
(1) Actual gap 2002 ¹	0.060	0.125	0.196	0.254	0.216
(2) Actual gap 1997 ¹	0.485	0.375	0.436	0.322	0.228
(3) actual 2002 / actual 1997	0.124	0.350	0.450	0.789	0.947

- Raw gap fell more at the bottom than at the top.
- Is that due to changes in Xs or changes in β s?

¹The actual gap is the coefficient on the male dummy in the quantile regressions without covariates.

Counterfactual exercise: Women

- If the distribution of **women's Xs had not changed from 1997**, the gap would have decreased at the bottom, but would have stayed almost the same throughout the rest of the distribution
- Thus, women's characteristics were better in 1997 at the bottom, but not in the rest of the distribution. That does not help to explain the larger fall at the bottom.
- If women in 2002 had the **returns to their characteristics as in 1997**, the gap would have been even negative at the top (benefiting women over men) and would have risen a lot at the bottom.
- Changes in β s contributed to the large reduction in the gap at the bottom and an increase at the top. Thus, a large increase in the prices of women's characteristics at the bottom (i.e. decrease in "discrimination") is an explanation of the larger fall of the GEG at the bottom.

Counterfactual exercise: Men

- If men in 2002 **had characteristics of 1997**, the gap would have been slightly larger at the bottom 10th percentile and almost the same in the rest of the distribution
- Thus, at the very bottom men's Xs were slightly better in 1997 than in 2002, and worsening in men's Xs contributed to the fall in the gap there (however, to a small extent). The best from the bottom have moved away
- If men in 2002 **had 1997 β s**, the gap would have been larger everywhere. Men's β s in 1997 were better than in 2002 and decline in rewards for men contributed to reducing the gap throughout the whole distribution. The reduction in β s, however, is higher at the top than at the bottom.



It is increased rewards of women at the bottom + a slight worsening in men's characteristics

What have we learnt so far?

- GEG is the largest for production workers (absent for managers)
- The gap (and its change) is largely unexplained by productivity characteristics at the mean and at the quantiles
- The gap declines from 1997 to 2002, and the “*glass ceiling*” effect emerges
- Potential explanations of the decline: change in prices and composition effect. BUT: It is not the less-skilled women who separate (Hunt, 2002)
- The decline of GEG is largely due to a decline in the lowest part of the distribution:
 - men with better characteristics leave the bottom of the wage distribution, which also improves relative position of women in residual male wage distribution
 - decreased rewards for men
 - mainly: the rewards to characteristics for women improve disproportionately at the bottom of the distribution.

Potential explanations of the existence of the GEG

Potential reasons behind

- The GEG declines from 36% to 17% between 1997 and 2002, however is still present
- Potential reasons:
 - Bonuses
 - Arrears
 - Trade-off between job security and wages
 - Discrimination
 - Segregation
 -

Potential explanations of the GEG

- NOT bonuses, since the decomposition and regression results for total compensation (including bonuses) are very similar to those of the GEG
- NOT wage arrears, since existed only in 1998 in this firm, were negligible and not differed by gender
- NOT secure jobs, since females *ceteris paribus* have higher probability than males to quit and to be laid-off
- IT IS segregation

Segregation

- Production workers have the highest GEG that contributes most to the overall gap
- Production workers have jobs that are linked to levels - 8 for “primary workers” and 6 for “auxiliary workers”: so far for 2002 only
- Controlling for such hierarchical levels is a descriptive exercise because of the endogeneity of these levels
- Ransom and Oaxaca (2005): “But this makes the male/female wage difference that we observe all the more startling: among these workers, although wages were set by a collective bargaining that was, ostensibly, gender neutral, a large wage differential arose because women were placed in jobs different from those assigned to similar men”

Distribution of workers by wage levels: Auxiliary levels

	Males		Females	Gap
Auxiliary 1	n.a.		0.459 (0.118)	n.a.
		<i>[1.00]</i>		
Auxiliary 2	n.a.		0.642 (0.218)	n.a.
		<i>[1.00]</i>		
Auxiliary 3	0.738 (0.172)		0.726 (0.143)	0.012 (0.029)
		<i>[0.85]</i>		
Auxiliary 4	0.796 (0.154)		0.795 (0.159)	0.001 (0.059)
		<i>[0.90]</i>		
Auxiliary 5	1.028 (0.147)		1.020 (0.128)	0.008 (0.021)
		<i>[0.83]</i>		
Auxiliary 6	1.260 (0.475)		1.267 (0.335)	-0.007 (0.324)
		<i>[0.67]</i>		

Distribution of workers by wage levels: Primary levels

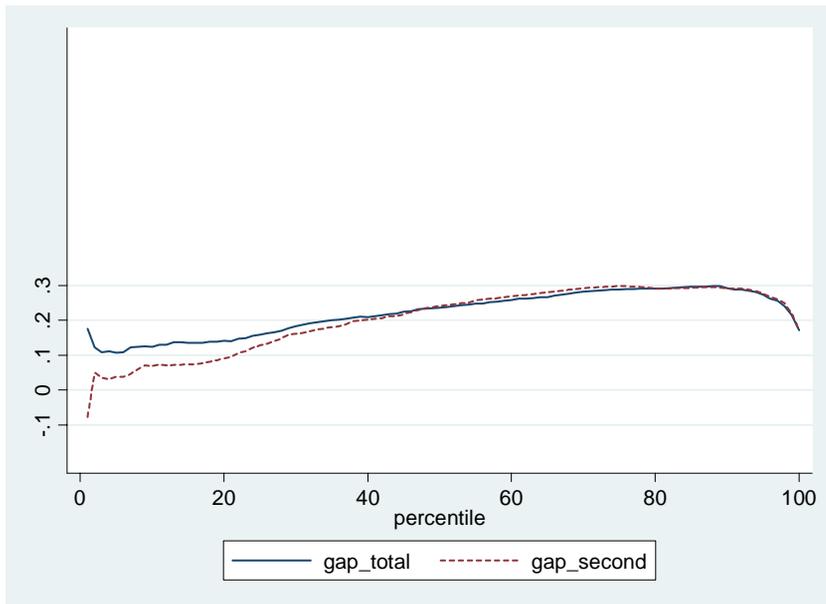
Primary 1	0.466 (0.075)		n.a.	n.a.
Primary 2	0.803 (0.205)	<i>[0]</i>	0.857 (0.146)	-0.054 (0.065)
Primary 3	1.053 (0.248)	<i>[0.04]</i>	1.143 (0.207)	-0.090 (0.056)
Primary 4	1.284 (0.223)	<i>[0.04]</i>	1.131 (0.343)	0.153*** (0.056)
Primary 5	1.429 (0.148)	<i>[0.08]</i>	1.326 (0.153)	0.103* (0.062)
Primary 6	1.605 (0.153)	<i>[0.03]</i>	n.a.	n.a.
Primary 7	1.622 (0.167)	<i>[0]</i>	n.a.	n.a.
Primary 8	1.630 (0.035)	<i>[0]</i>	n.a.	n.a.
		<i>[0]</i>		

Oaxaca-Blinder decomposition with job levels

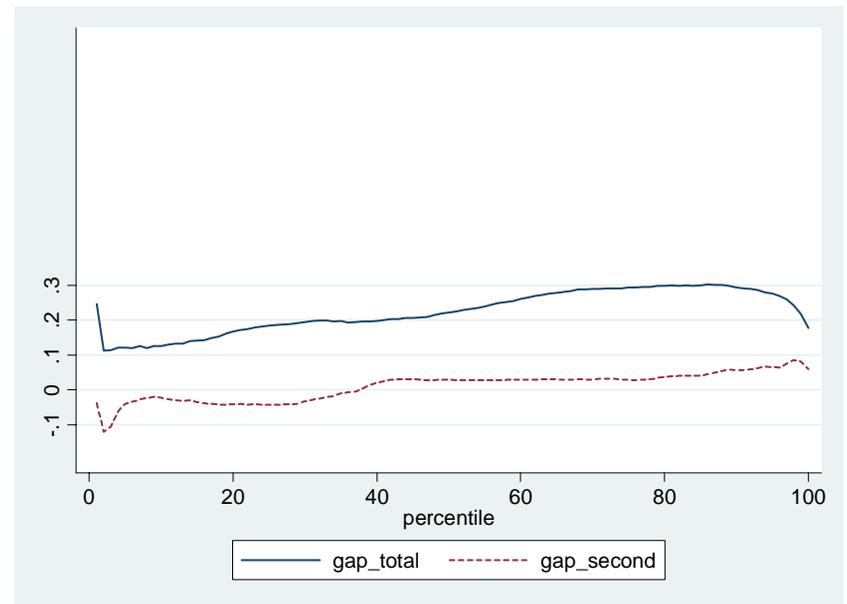
Wages	
Total difference	0.228*** (0.016)
Explained	0.222*** (0.025)
Unexplained	0.007 (0.026)
Total compensation	
Total difference	0.196*** (0.017)
Explained	0.199*** (0.028)
Unexplained	-0.003 (0.028)

Machado-Mata decomposition with job levels

No levels



With levels



Main findings

- There exists an intra-firm GEG, which is driven by the GEG for production workers
- GEG declines over 1997-2002
- Reason behind the decline:
 - Increased rewards for women at the lower end of the distribution (and outflow of men with better characteristics at the bottom)
- Consistent with the increasing competition that firm faces and with the reduction on childcare facilities in the second half of 1990s
- Explanation of the existence of GEG: existence of segregation in the internal labor market in Russia:
 - for production workers the gap is almost completely explained when workers' levels are included into the regressions
- In spite of a seemingly gender-neutral wage policy of the top management, large earnings differentials arises because overwhelming numbers of women are placed in low-paid job levels