

Bargaining, Sorting and the Gender Wage Gap: Quantifying The Impact of Firms on the Relative Pay of Women

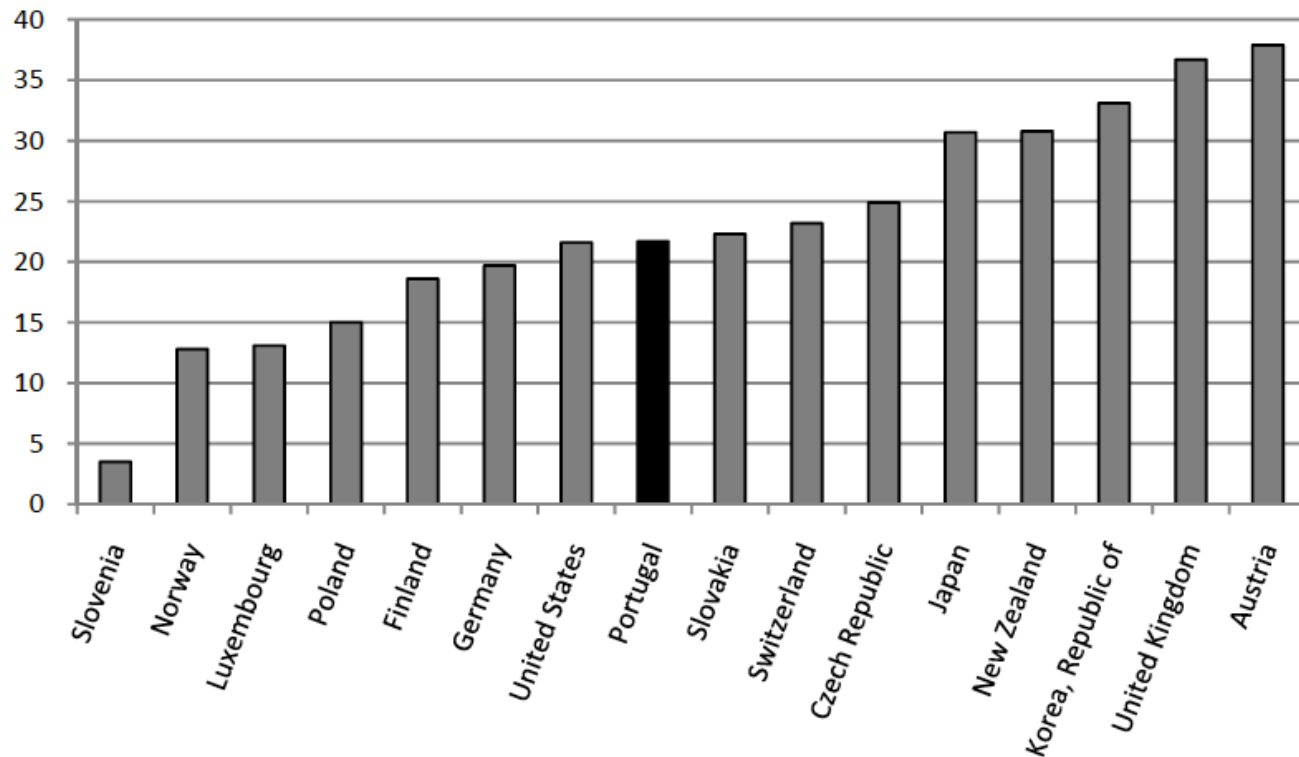
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Women Earn Less Than Men

Figure 2 - Gender pay gap (%)



Source: ILO, ILOSTAT Database, www.ilo.org, accessed July 10, 2013.

Notes: Difference between average earnings of men and women, expressed as a percentage of the average earnings of men. Refers to full-time workers only, except in the case of Korea, New Zealand, and Switzerland. For Portugal and Korea, includes only private sector workers. Data referring to 2010.

Neoclassical Explanations

Competitive model: wage gap determined by *market-wide* supply and demand factors.

- Becker (1957): skill gap + discriminatory preferences of marginal employer
 - But observable skill measures often close. So, need lots of selection on unobservables (e.g., Mulligan and Rubinstein, 2008)
 - Or lots of discrimination (Goldin, 2002; Fortin, 2005)
- Compensating diffs: different tastes for work arrangements/flexibility, (e.g., Goldin, 2013)

Beyond Market Prices: A Role for Firms?

Frictional labor markets: firms can offer/negotiate wage premiums. Two additional channels for gap:

- Sorting channel (F's work at diff. firms)
- Bargaining channel (F's get lower premium)

Antecedents

- Bargaining: women get smaller premiums
 - “Women don’t ask” (Babcock and Laschever, 2003; Babcock et al., 2006)
 - Related: gender diffs in competitiveness (Gneezy et al., 2003; Buser et al., 2014)
 - Monopsony (Robinson, 1933; Manning, 2003)
- Sorting: women under-represented at higher-premium firms.
 - “Women don’t sort” (Loprest, 1992, etc.)
 - Regulated banks hired fewer women (Black and Strahan, 2001)

Antecedents (cont.)

Legislation/policies aimed at gender (and race) discrimination focus on equity *within firms*:

- Equal pay laws – limit bargaining channel
- Fair hiring regulations – limit sorting channel

This paper

- Study gender wage gap in Portugal
- Primary focus: between-firm wage differentials
 - Estimate firm wage effects (ala AKM, 1999)
 - Are firm effects lower for M's than F's?
 - Do women work at lower wage firms?
- *High dimensional* Oaxaca (>1M covariates):
 - Decomposition of wage gap into components attributable to firm effects.
 - Relate M/F firm eff's to productivity
- Also look at within-firm differentials
 - How do M/F wages respond to *changes* in profitability?

Key Findings

- F's receive about 90% of M premiums
 - Same ratio between firms and within firms over time
 - Relative bargaining power most important for high-skilled women
- F's less likely to work at high wage firms
 - Sorting more important for low skilled groups
- Combined impact $\approx 20\%$ of gender wage gap.

Outline

- Data overview
- Econometric Framework
- Between-firm analysis
 - Nonparametric evidence on importance of firms by gender
 - AKM estimation by gender
 - Oaxaca decomposition of firm effects
 - Relate firm effects to productivity
- Within-firm analysis
 - Wage response of job-stayers to firm shocks

About Portugal

- High female-LFPR country
 - 85% of women age 25-45 in LF in 2010
 - 90% of private sector F's work full time
- Mean gender gap = 18% (2002-2009)
- Until 2010: 85% collective bargaining coverage
 - Some institutional pressure on gender gaps? May lessen between-firm gender effects.
 - But pretty big “wage cushion” over contractual minimum wages (Cardoso and Portugal, 2005)

Wage Data

- Quadros de Pessoal (QP), annual census of workers (reported by firm)
 - Most firms (>96%) have 1 establishment
- Full roster of workers each October
 - 2002-2009: 20m obs. 4.5m workers, 0.5m firms
 - No gov't workers or “contractors”
- Administrative measures of:
 - Usual monthly earnings and hours for each employee
 - Education/occupation/gender/D-o-B
 - Firm sales last year, shareholder equity, location (hi-resolution) and industry

Financial Data

- Value added and sales data for firms
 - Firms report balance sheet and income statement annually to Conservatoria do Registro
- Data collected by financial service firms (for use by banks, lenders). Packaged/sold by Bureau van Dijk as “SABI”
- “Fuzzy” match to QP using zip code/parish; 5-digit ind.; founding year; annual sales; initial equity
 - See appendix (80% of matches exact on 4+ vars)

Table 1: Descriptive Statistics for Various Samples of Employees in QP, 2002-2009

	All QP (Age 19-65):		Dual-Connected Set	
	Males	Females	Males	Females
Mean Age	38.1	36.9	38.0	36.4
Mean Years Schooling	8.0	8.8	8.6	9.1
Fraction 6 yrs ed.	0.23	0.20	0.20	0.19
Fraction 9 yrs ed	0.21	0.20	0.22	0.19
Fraction w/ Degree	0.09	0.13	0.11	0.15
Mean Log Real Hrly Wage	1.59	1.41	1.71	1.48
Mean Monthly Hours	162.6	158.0	162.8	157.1
Fraction Fems at Firm	0.24	0.70	0.30	0.64
Number per-year obs.	9,070,492	7,226,310	6,012,521	5,012,736
Number of persons	2,119,687	1,747,492	1,450,288	1,247,503
Number of firms	349,692	336,239	84,720	84,720

Analysis Sample

- Firm effects only identified within “connected sets” - we use largest connected sets of men and women (91% of men; 88% of women)
- Gender segregation: 21% of men at all-male firms; 19% of women at all-female firms
 - Cannot estimate the gap in firm effs at a 1-sex firm
 - all M’s mean log wage= 1.59, @male firms=1.28
 - all F’s mean log wage = 1.41, @female firms=1.19
 - M-F gap = 0.18, @1-sex firms = 0.09
- Focus on *dual-connected* firms

Econometric Framework

- Wage determination:

$$w_{it} = a_{it} + \gamma^{G(i)} S_{iJ(i,t)t}$$

a_{it} = alternative market wage

$S_{iJ(i,t)t}$ = surplus in current match

$\gamma^{G(i)}$ = gender specific rent sharing coefficient

Surplus and Market Wage

- Variance components specification of surplus:

$$S_{iJ(i,t)t} = \bar{S}_{J(i,t)} + \phi_{J(i,t)t} + m_{iJ(i,t)}$$

Surplus = fixed, firm-wide component
+ time-varying firm component
+ match effect

- Market wage has fixed and varying components:

$$a_{it} = \alpha_i + X'_{it}\beta^{G(i)} + \varepsilon_{it}$$

Reduced Form

- Assumptions so far yield:

$$w_{it} = \alpha_i + \psi_{J(i,t)}^{G(i)} + X'_{it}\beta^{G(i)} + r_{it}$$

$$\psi_{J(i,t)}^{G(i)} \equiv \gamma^{G(i)} \bar{S}_{J(i,t)}$$

- AKM model with *gender-specific* firm effects
- If $\gamma^M > \gamma^F$ men gain more at high wage firms

Problem: Everyone hates AKM!

- Need “exogenous mobility” assumption – changes in residual components of joiners and leavers both equal to zero
 - Rules out sorting based on:
 - individual shocks
 - firm shocks
 - match component
- Also need additive separability of worker and firm effects

Probing for Violations

If worker i moves from firm 1 to firm 2:

$$\Delta w_{it} = \psi_2 - \psi_1 + \Delta X'_{it}\beta + \Delta r_{it}$$

Restrictions with “exogenous mobility”:

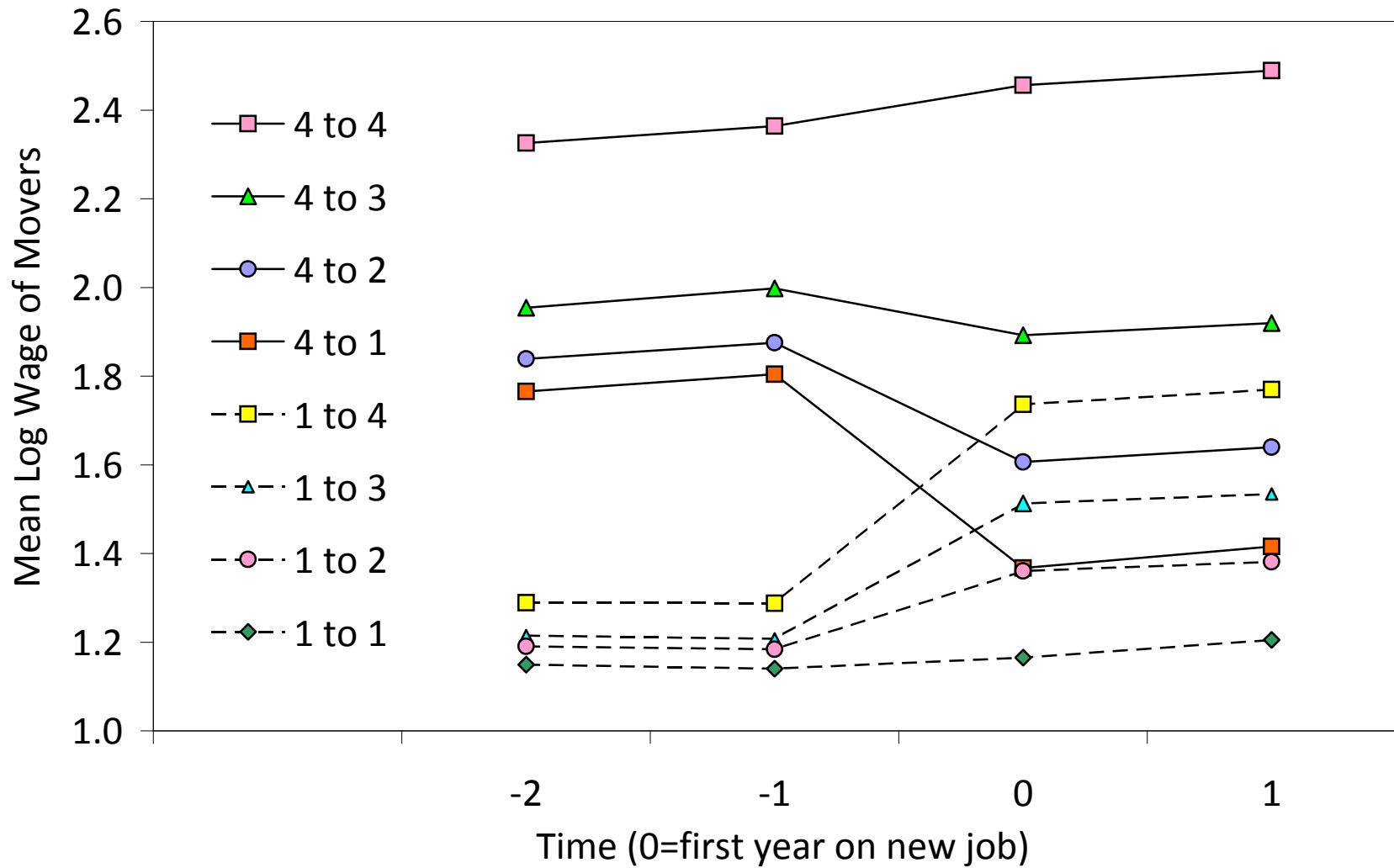
1. Symmetry about zero:

$$E[\Delta w_{it} | 1 \rightarrow 2, \Delta X_{it} = 0] = -E[\Delta w_{it} | 2 \rightarrow 1, \Delta X_{it} = 0]$$

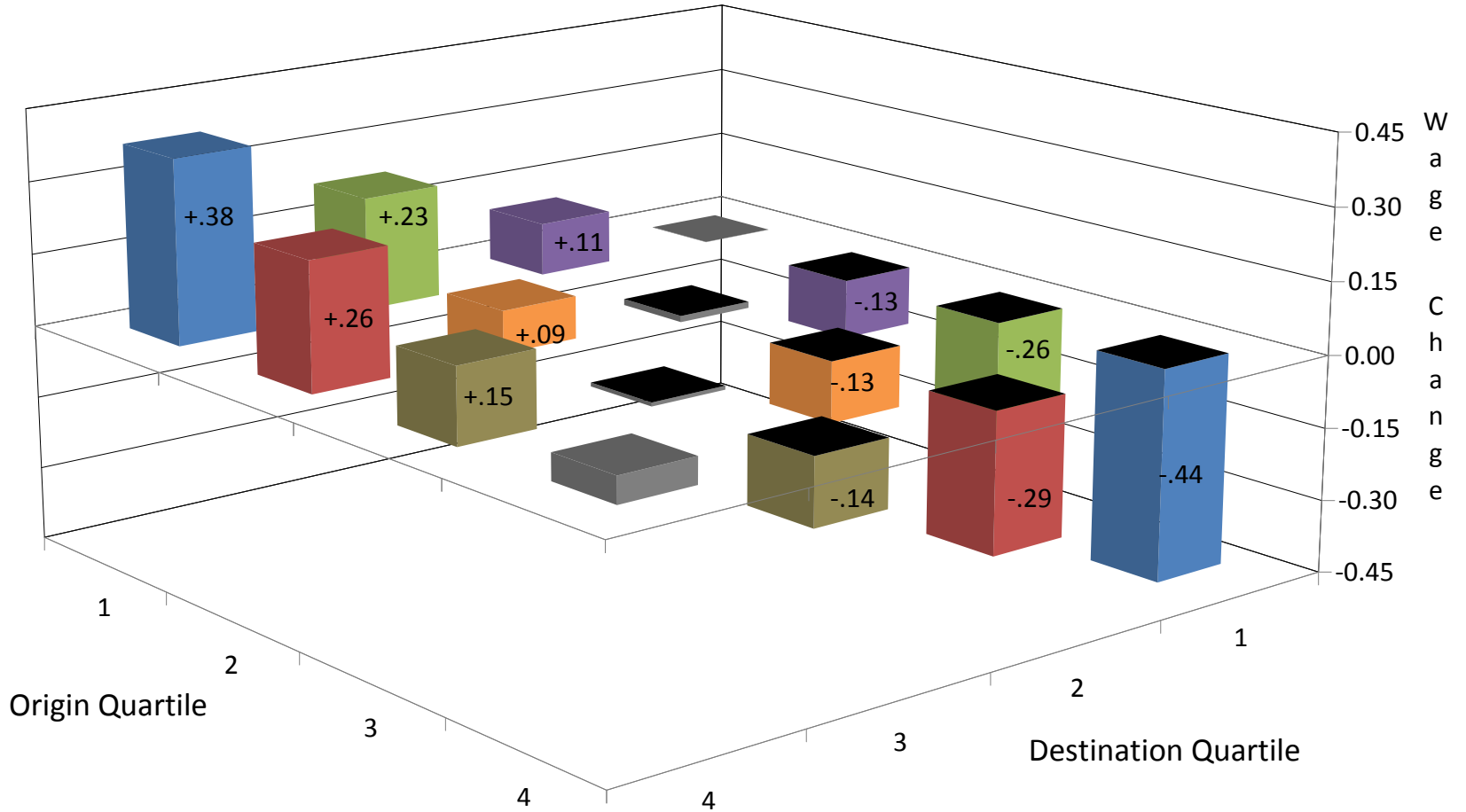
2. No pre-/post- trends:

$$E[\Delta w_{it} | \Delta X_{it} = 0, \textit{Stayer}] = 0$$

Figure 2a: Mean Wages of Male Job Changers By O/D Co-worker Group



Appendix Figure A1: Regression-Adjusted Wage Changes Associated with Transitions Between Co-Worker Quartiles - Men



Appendix Figure B3: Regression-Adjusted Changes in Wages for Male Movers
Across Coworker Wage Quartiles

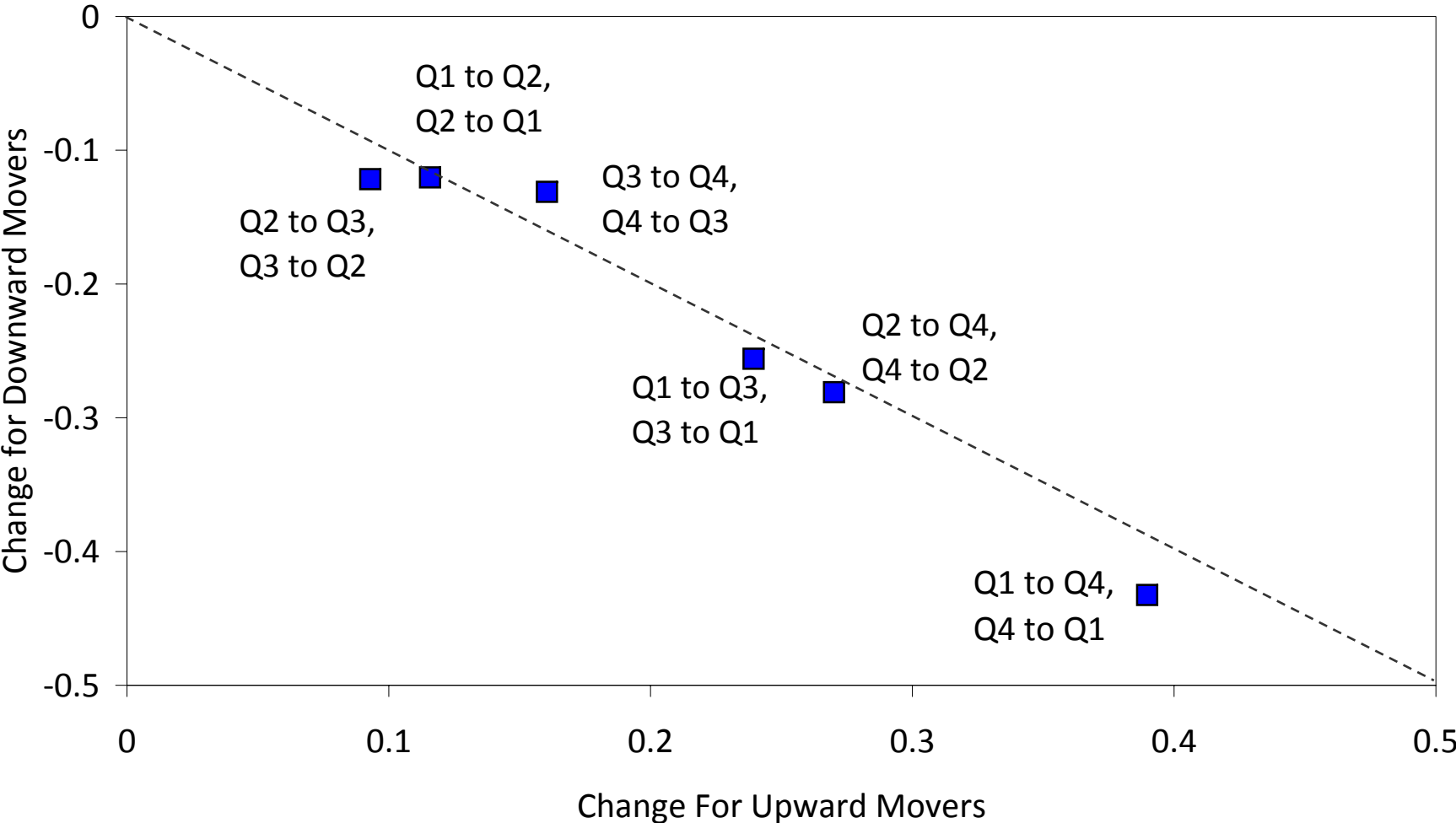
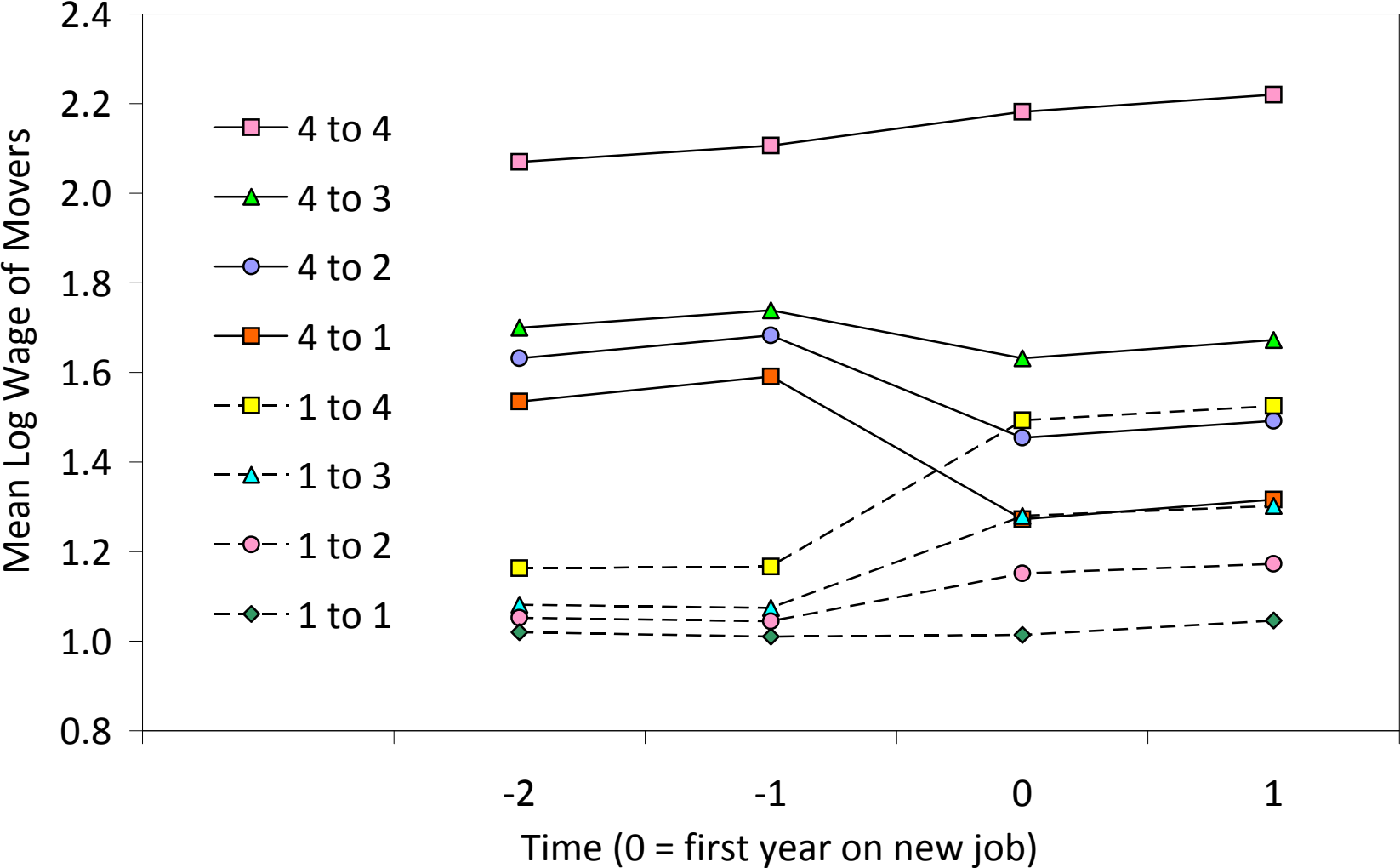
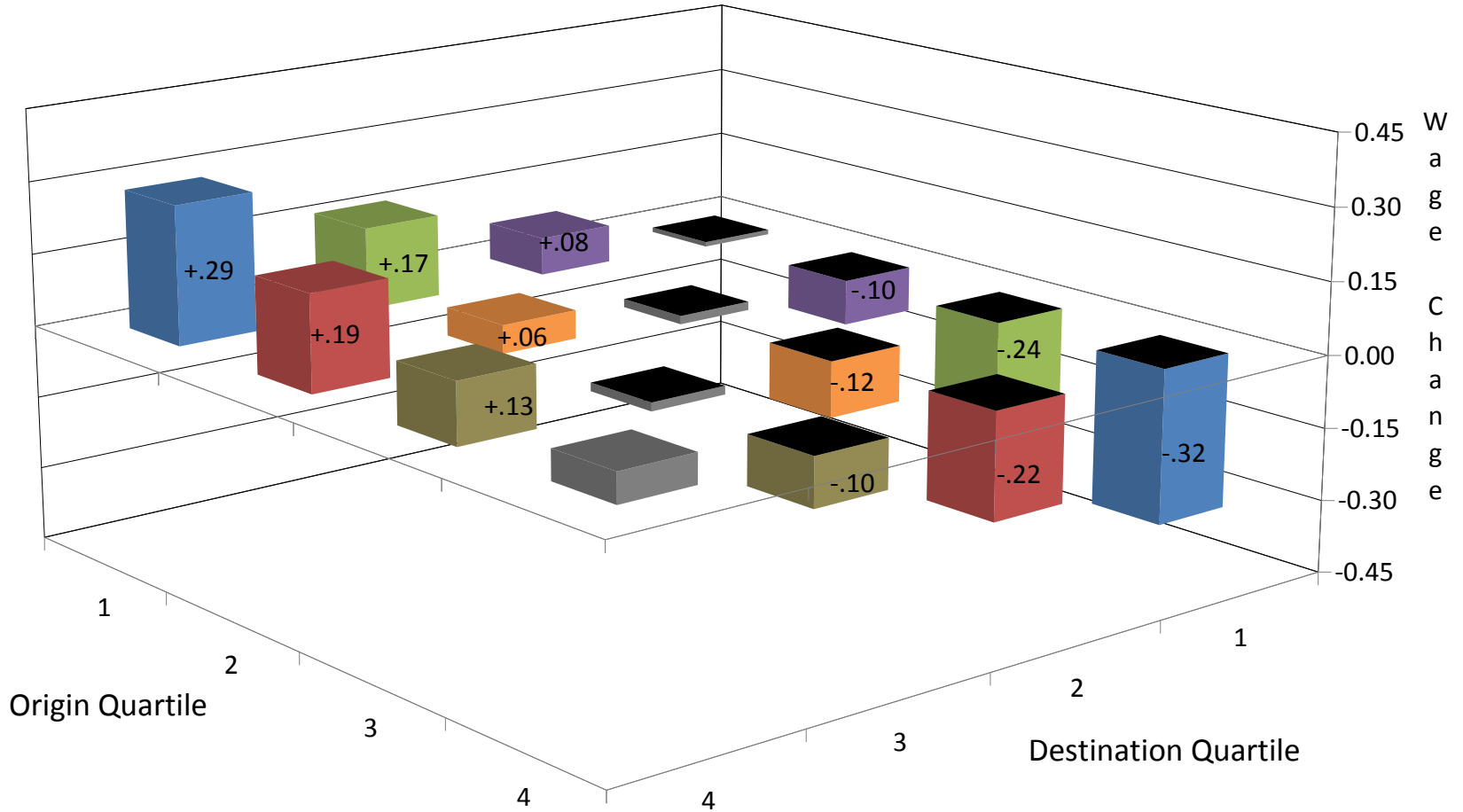


Figure 2b: Mean Wages of Female Job Changers by O/D Coworker Group



Appendix Figure A2: Regression-Adjusted Wage Changes Associated with Transitions Between Co-Worker Quartiles - Women



Appendix Figure B4: Regression-Adjusted Changes in Wages for Female Movers
Across Coworker Wage Quartiles

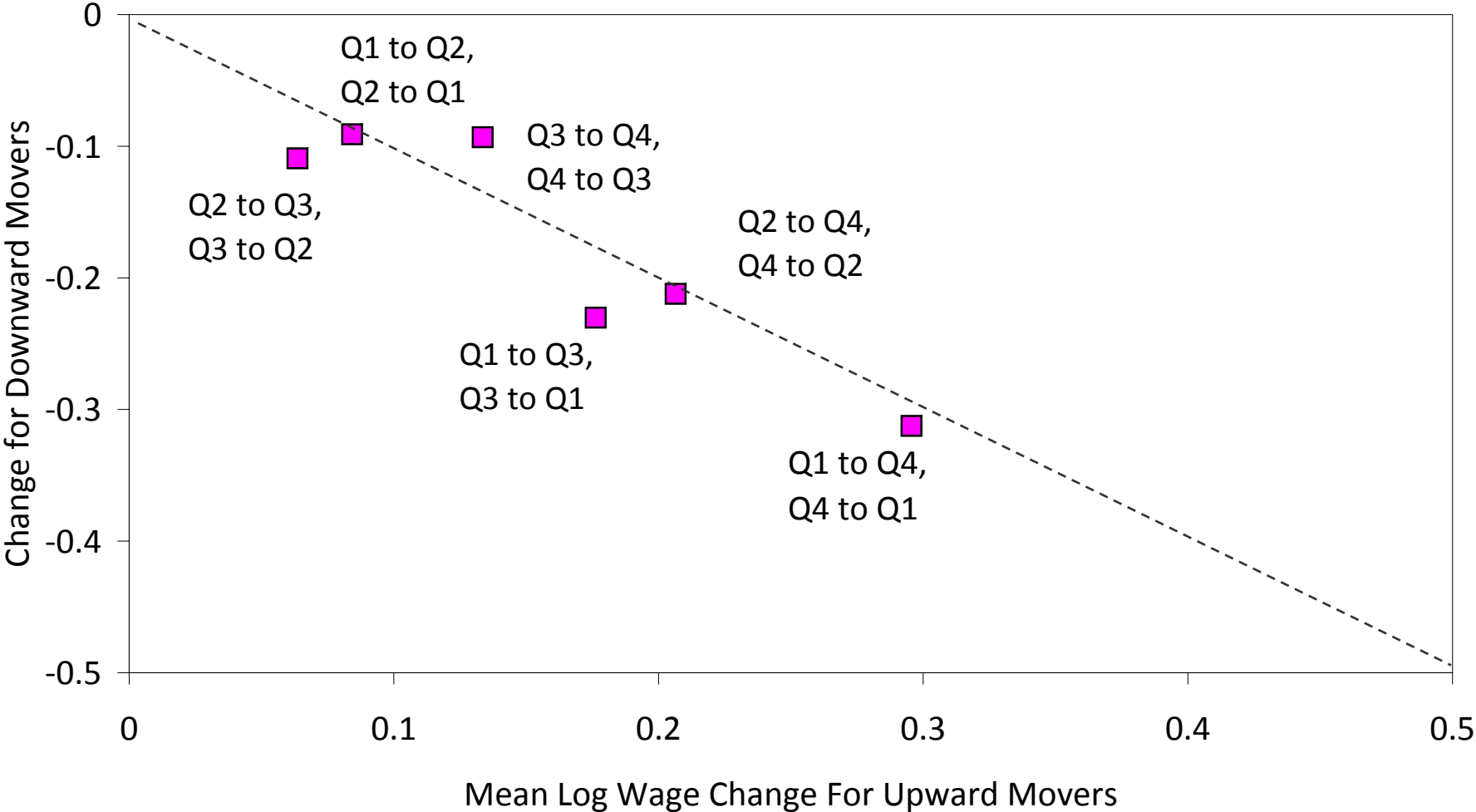
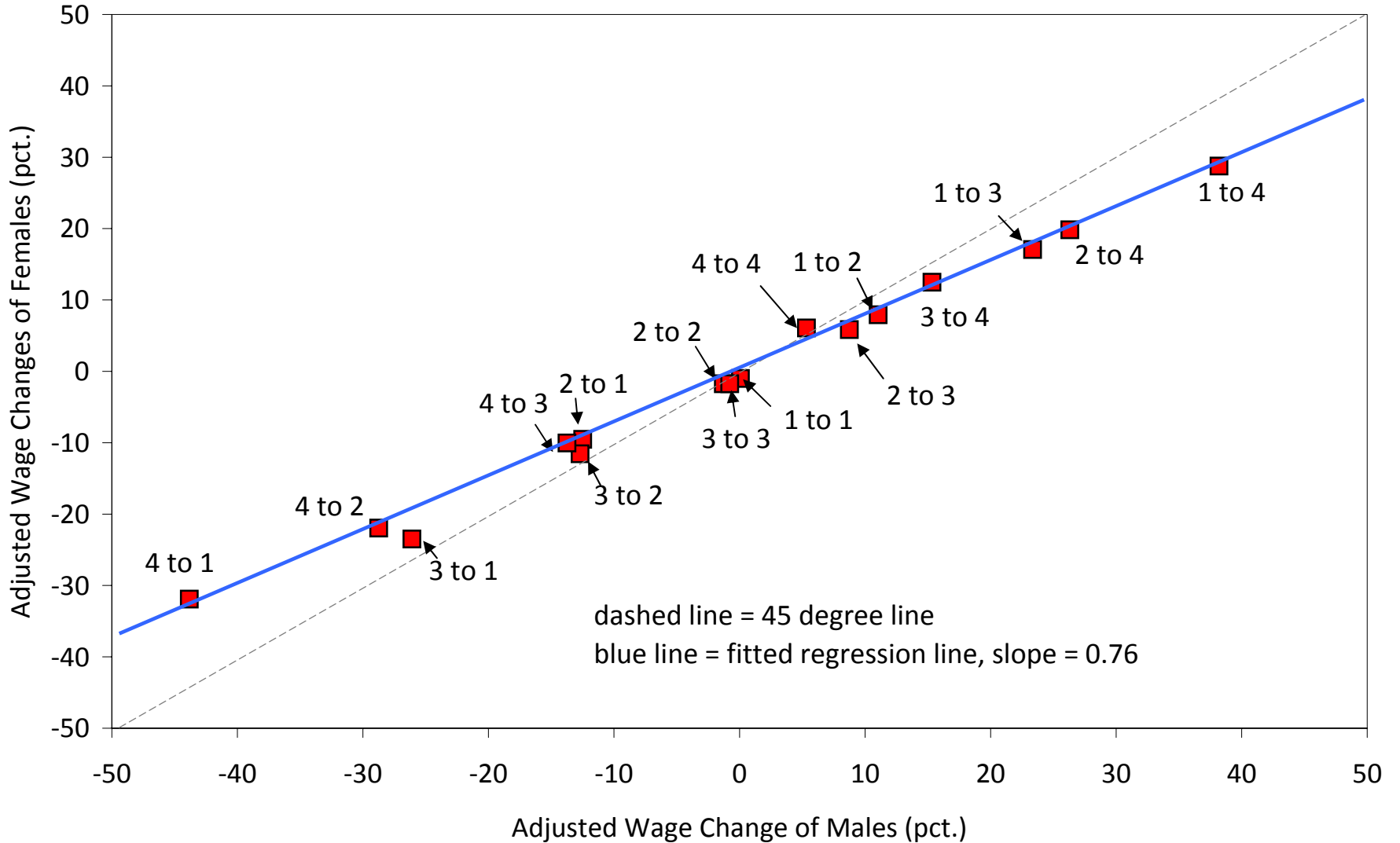


Figure 3: Comparison of Adjusted Wage Changes of Male/Female Job Movers by Quartile of Coworker Wages of Origin and Destination Jobs



Appendix Figure B2: Job Survival Rates for New Jobs Starting 2002-2008

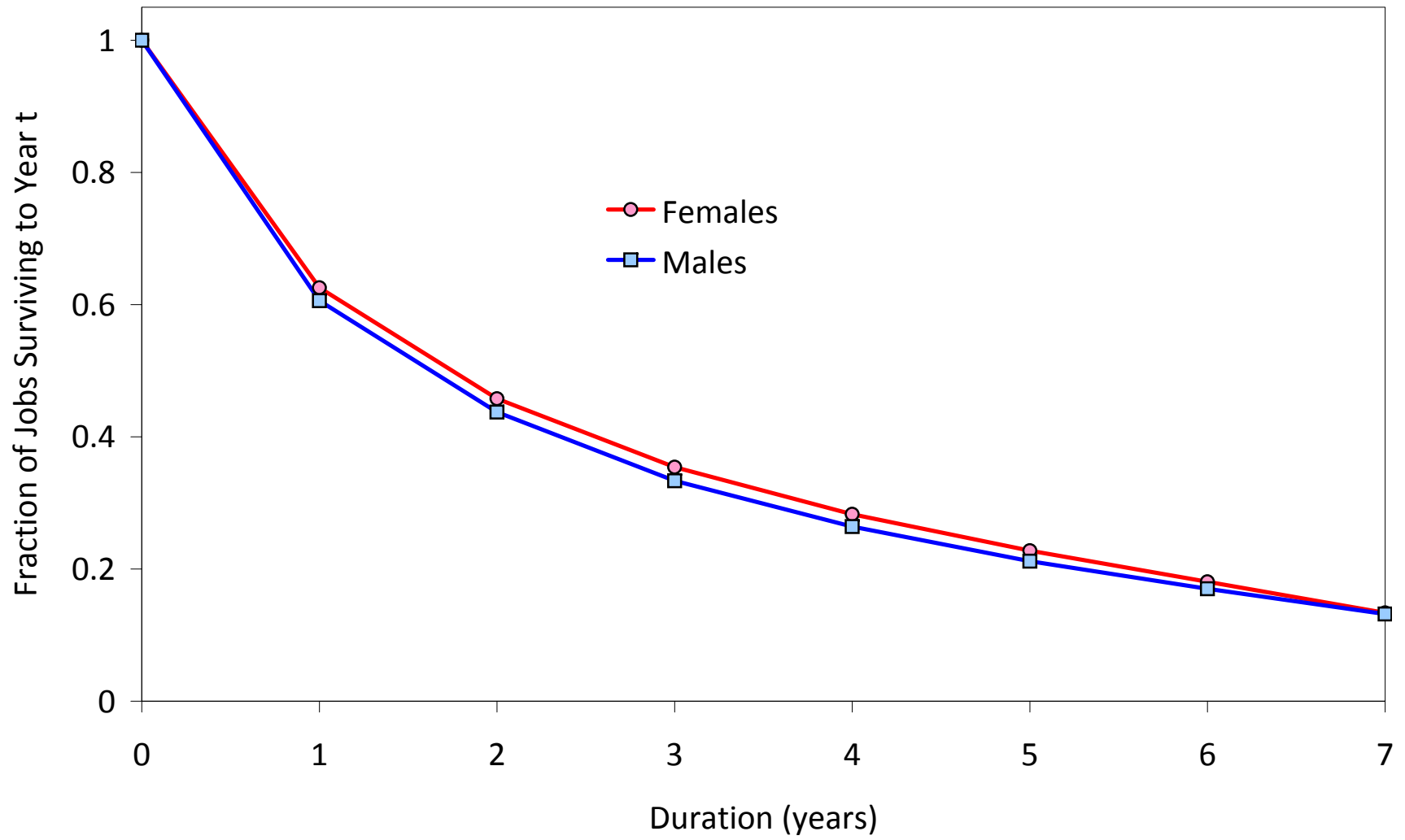
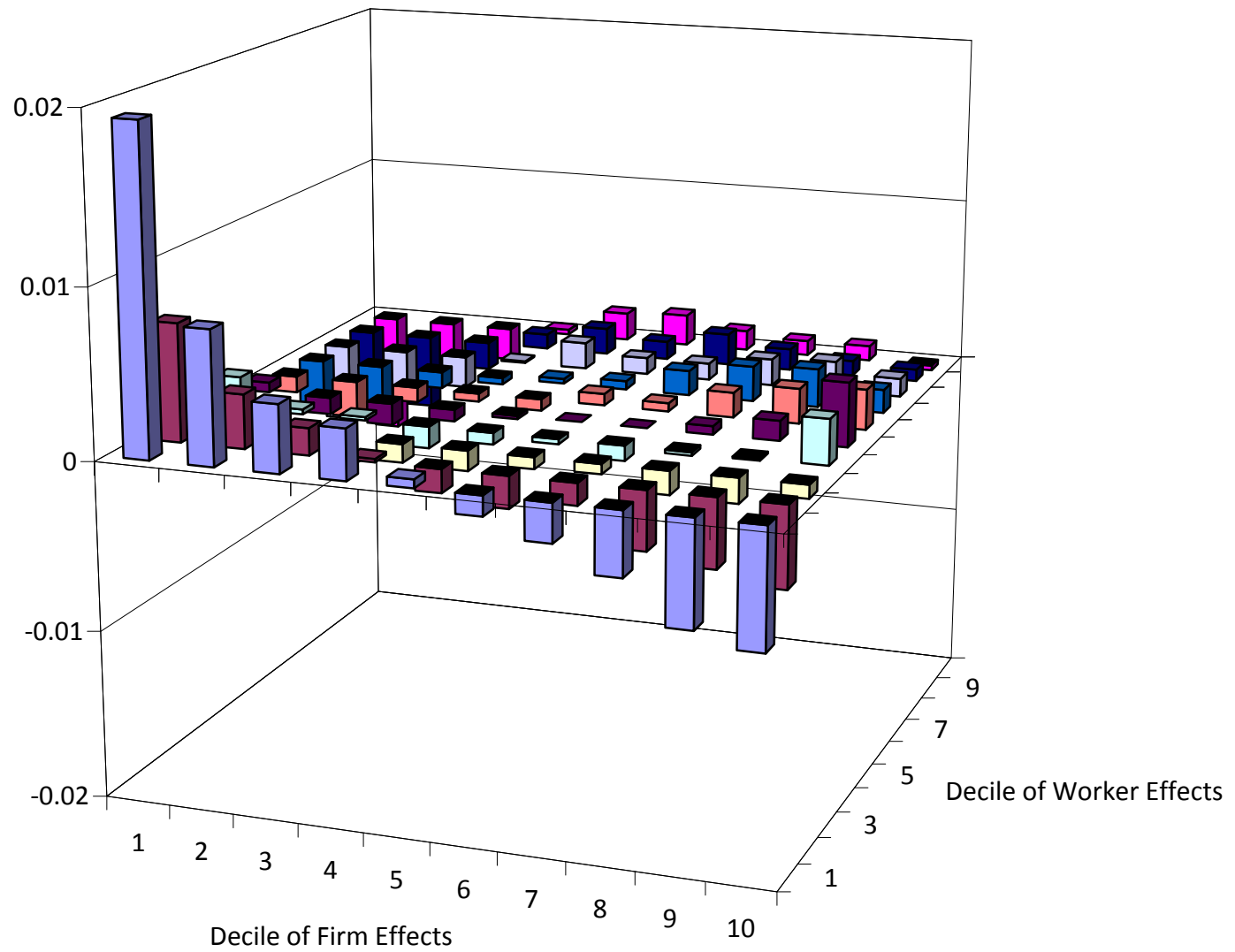


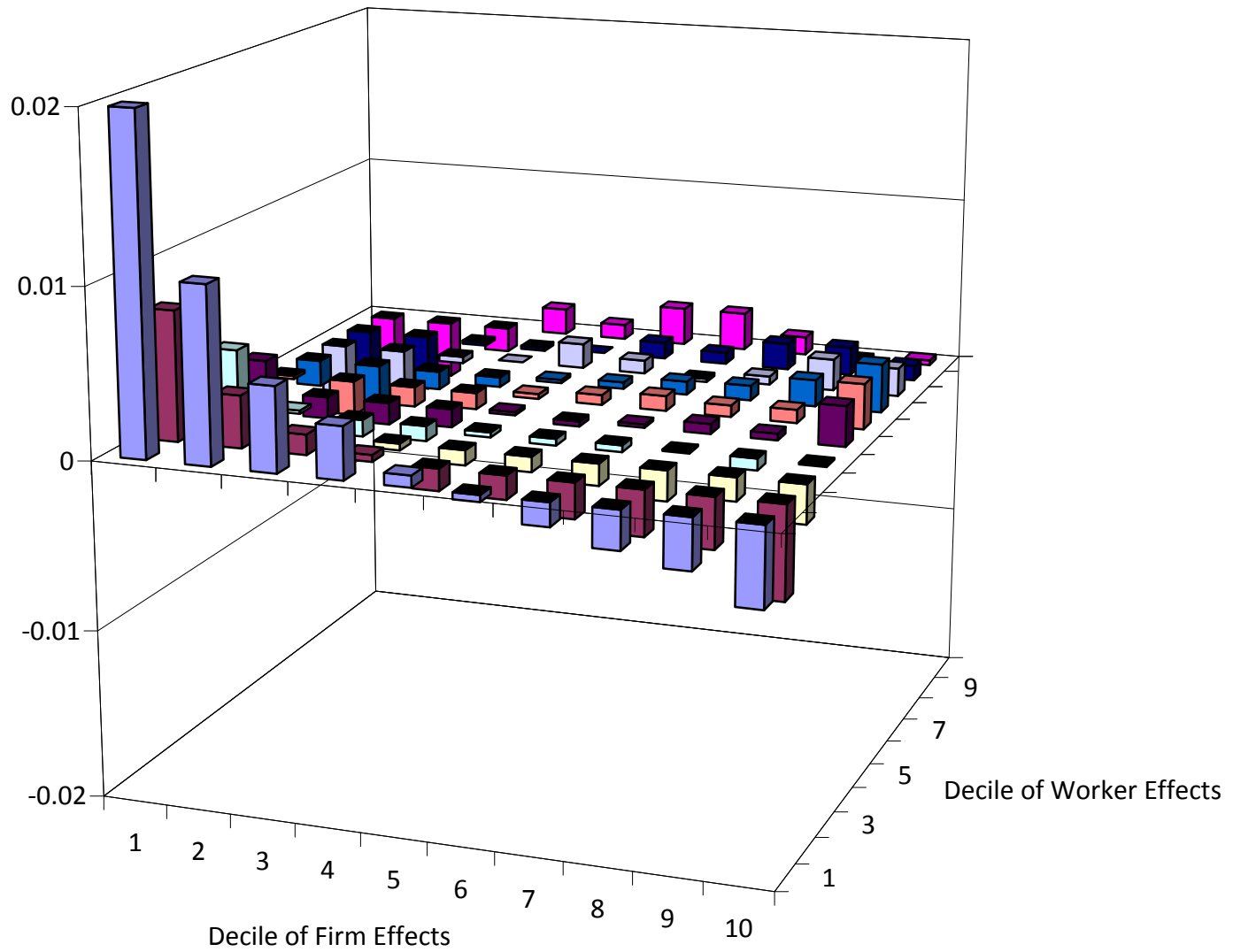
Table 3: Summary of Estimated Models for Male and Female Workers

	Males	Females	German Men
<i><u>Summary of Parameter Estimates: AKM Model</u></i>			
Std. dev. of pers. effects (person-yr obs.)	0.420	0.400	0.357
Std. dev. of firm effects (person-yr obs.)	0.247	0.213	0.230
Std. dev. of Xb (across person-yr obs.)	0.069	0.059	0.084
Correlation of person/firm effects	0.167	0.152	0.249
Adjusted R-squared	0.934	0.940	0.927
Correlation male / female firm effects	0.590		
<i><u>Comparison job-match effects model:</u></i>			
Adjusted R-squared	0.946	0.951	0.949
Std. deviation match effect in AKM model	0.062	0.054	0.075
<i><u>Share of variance of log wages due to:</u></i>			
person effects	57.6	61.0	51.2
firm effects	19.9	17.2	21.2
covariance of person/firm effects	11.4	9.9	16.4
Xb and associated covariances	6.2	7.5	5.2
residual	4.9	4.4	5.9

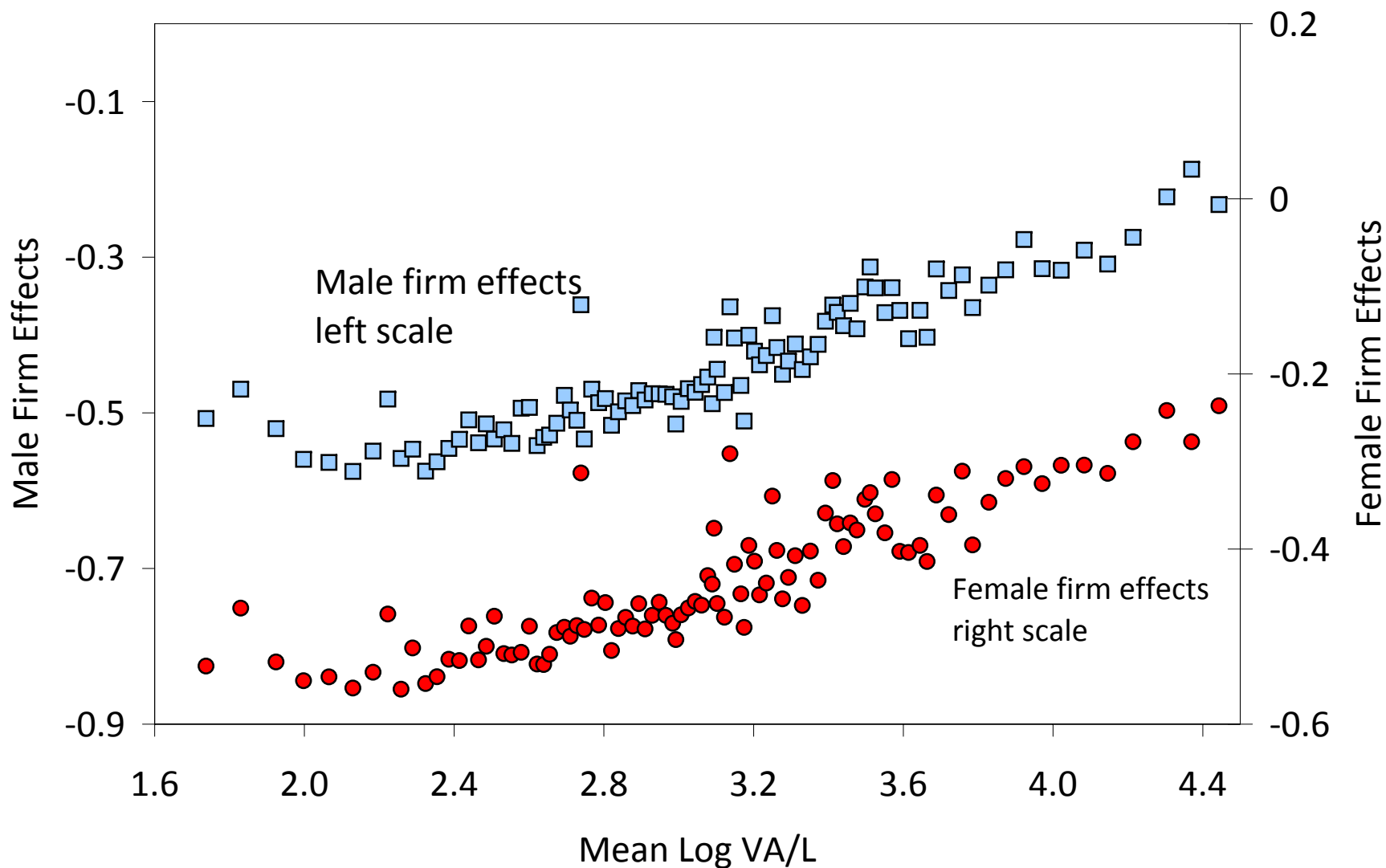
Appendix Figure A1: Mean Residuals for Males by Decile of Worker and Firm Effects



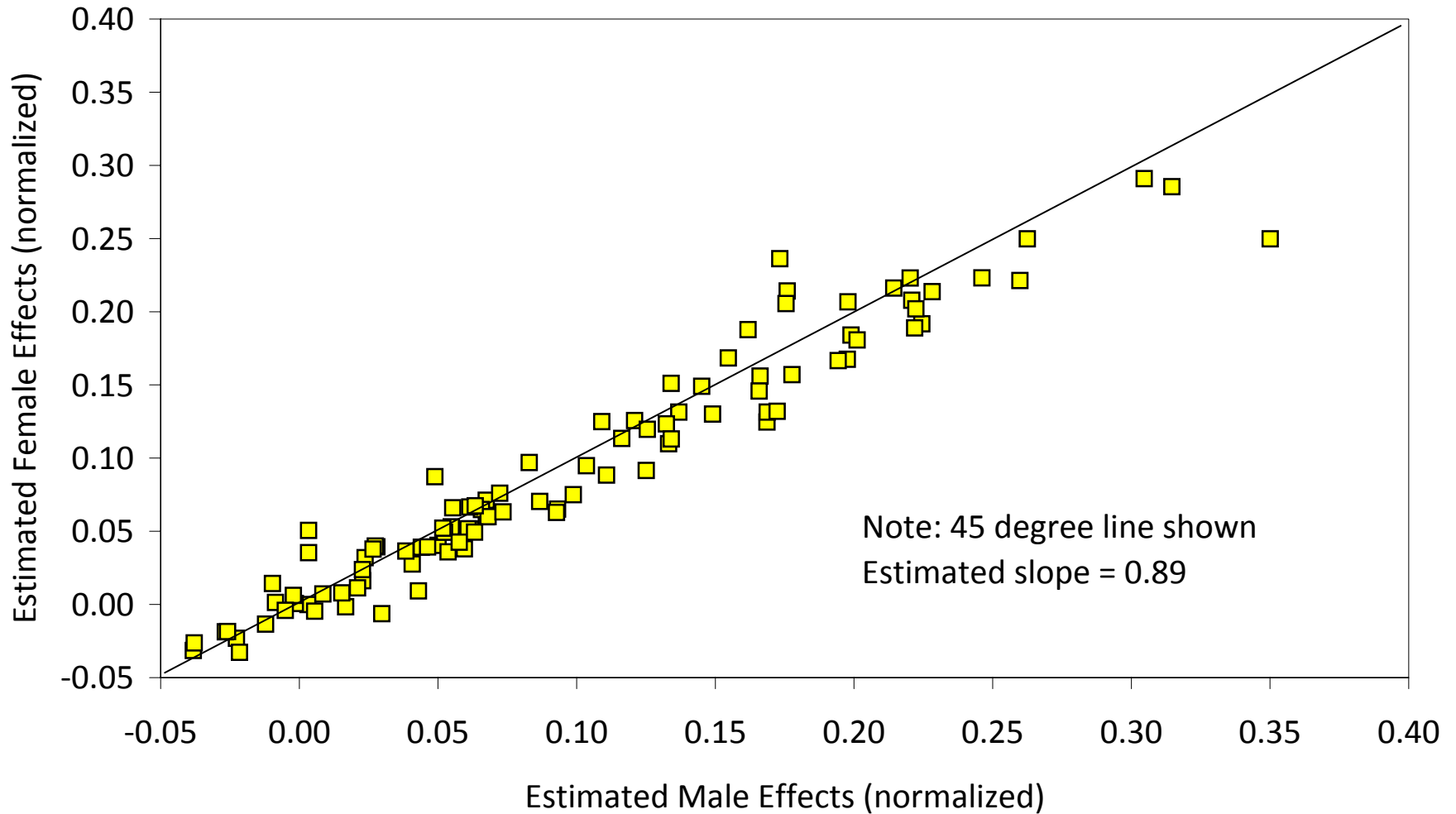
Appendix Figure A2: Mean Residuals for Females by Decile of Worker and Firm Effects



Firm Fixed Effects for Males/Female vs. Log Value Added/Worker



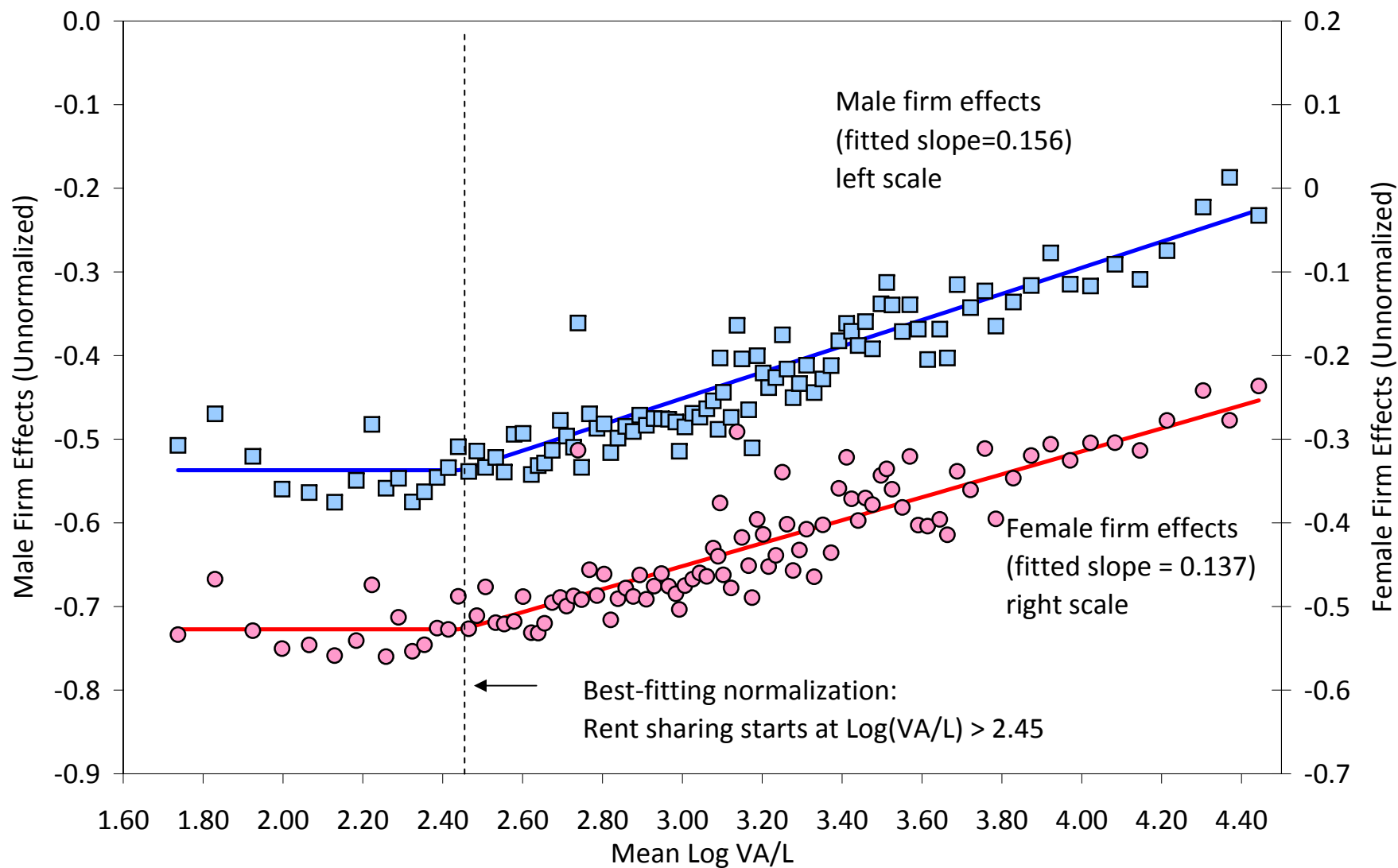
Estimated Firm Effects for Female and Male Workers:
Firm Groups Based on Mean Log VA/L



Normalization Issues

- Reference group problem (Oaxaca and Ransom, 1999)
 - Need to quantify how much surplus women have in order to compare to men.
- Our approach – assume firms with low value added have zero rents.
 - If wrong and these firms have positive rents then bargaining effects will be understated
 - Because women are underpaid even at “0-rent” firms
- But: how to define “low” value added?

Figure 4: Firm Fixed Effects vs. Log Value Added/Worker



Decomposition of Firm Wage Setting Effects

$E[\psi^m \mid \text{male}] = \text{mean premium for males}$

$E[\psi^f \mid \text{female}] = \text{mean premium for females}$

$$\begin{aligned} E[\psi^m \mid \text{male}] - E[\psi^f \mid \text{fem}] &= \text{contrib. to gap} \\ &= E[\psi^m \mid \text{male}] - E[\psi^f \mid \text{male}] + E[\psi^f \mid \text{male}] - E[\psi^f \mid \text{fem}] \\ &= \underbrace{E[\psi^m - \psi^f \mid \text{male}]}_{\text{bargaining}} + \underbrace{E[\psi^f \mid \text{male}] - E[\psi^f \mid \text{fem}]}_{\text{sorting}} \end{aligned}$$

1st alternative:

$$\begin{aligned} & E[\psi^m | \text{male}] - E[\psi^f | \text{male}] + E[\psi^f | \text{male}] - E[\psi^f | \text{fem}] \\ &= E[\psi^m - \psi^f | \text{male}] + E[\psi^f | \text{male}] - E[\psi^f | \text{fem}] \\ & \quad \text{B.P. (male dist}^n) + \text{Sorting } (\psi^f) \end{aligned}$$

2nd alternative:

$$\begin{aligned} & E[\psi^m | \text{male}] + E[\psi^m | \text{fem}] - E[\psi^m | \text{fem}] - E[\psi^f | \text{fem}] \\ &= E[\psi^m - \psi^f | \text{fem}] + E[\psi^m | \text{male}] - E[\psi^m | \text{fem}] \\ & \quad \text{B.P. (female dist}^n) + \text{Sorting } (\psi^m) \end{aligned}$$

Table 3: Contribution of Firm-Level Pay Components to Gender Wage Gap

	Wage Gap (1)	<u>Mean Premiums:</u>		Total Effect of Firm Pay (4)	Decompositions			
		Men (2)	Women (3)		Sorting		Bargaining	
					Using M Effects (5)	Using F Effects (6)	Using M Distrib (7)	Using F Distrib (8)
All	0.234	0.148	0.099	0.049 (21.2)	0.035 (14.9)	0.047 (19.9)	0.003 (1.2)	0.015 (6.3)
<u>By Age:</u>								
<30	0.099	0.114	0.087	0.028 (28.2)	0.019 (18.9)	0.029 (29.3)	-0.001 1.2	0.009 (9.3)
31-40	0.228	0.156	0.111	0.045 (19.7)	0.029 (12.6)	0.040 (17.8)	0.004 (1.9)	0.016 (7.0)
>40	0.336	0.169	0.099	0.069 (20.6)	0.050 (15.0)	0.064 (19.1)	0.005 (1.5)	0.019 (5.6)

Table 3: Contribution of Firm-Level Pay Components to Gender Wage Gap

	Wage Gap (1)	<u>Mean Premiums:</u>		Total Effect of Firm Pay (4)	Decompositions			
		Men (2)	Women (3)		Sorting		Bargaining	
					Using M Effects (5)	Using F Effects (6)	Using M Distrib (7)	Using F Distrib (8)
All	0.234	0.148	0.099	0.049 (21.2)	0.035 (14.9)	0.047 (19.9)	0.003 (1.2)	0.015 (6.3)
<u>By Educ.</u>								
< HS	0.286	0.115	0.055	0.059 (20.8)	0.045 (15.6)	0.061 (21.4)	-0.002 0.6	0.015 (5.2)
HS	0.262	0.198	0.137	0.061 (23.3)	0.051 (19.6)	0.051 (19.5)	0.010 (3.8)	0.010 (3.7)
Univ.	0.291	0.259	0.213	0.047 (16.1)	0.025 (8.7)	0.029 (9.9)	0.018 (6.2)	0.022 (7.4)

Figure 6: Evolution of Wage Gap and Components Over the Lifecycle

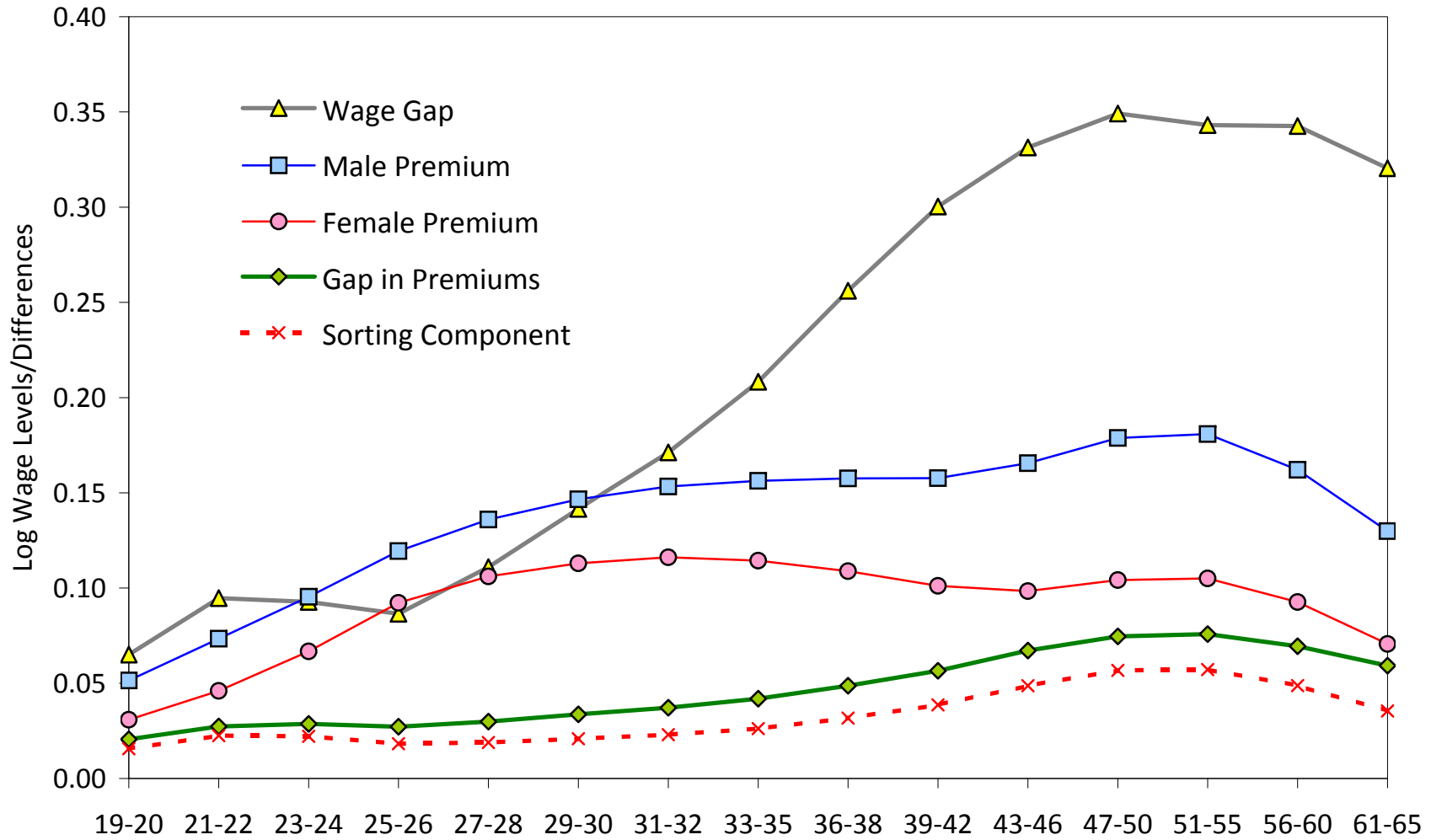


Table 4: Contribution of Firm-Level Pay Components to Gender Wage Gap, by Modal Occupation

	Wage Gap (1)	<u>Mean Premiums</u>		Total Effect of Firm Pay (4)	Decompositions			
		Men (2)	Women (3)		Sorting		Bargaining	
					Using M Effects (5)	Using F Effects (6)	Using M Dist. (7)	Using F Dist. (8)
All	0.234	0.148	0.099	0.049 (21.2)	0.035 (14.9)	0.047 (19.9)	0.003 (1.2)	0.015 (6.3)
Managers (69% male)	0.251	0.217	0.205	0.012 (4.9)	-0.001 (-0.3)	0.001 (0.2)	0.012 (4.6)	0.013 (5.2)
Profess'ial (47% male)	0.143	0.264	0.232	0.032 (22.0)	0.005 (3.5)	0.015 (10.4)	0.017 (11.6)	0.027 (18.5)
Technical (63% male)	0.135	0.249	0.189	0.060 (44.3)	0.038 (28.0)	0.040 (29.4)	0.020 (14.8)	0.022 (16.3)
Clerks (40% male)	0.159	0.239	0.177	0.063 (39.5)	0.049 (30.8)	0.052 (32.6)	0.011 (6.9)	0.014 (8.7)
Services (33% male)	0.162	0.065	0.052	0.013 (7.7)	0.013 (8.3)	0.023 (14.0)	-0.010 (-6.3)	-0.001 (-0.6)

Appendix Table B4: Decompositions by Industry

	Wage Gap	Male Premium	Female Premium	Total Effect	Sorting		Bargaining	
					male effects	female effects	male effects	female effects
All	0.234	0.148	0.099	0.049	0.035	0.047	0.003	0.015
Food Products	0.315	0.119	0.041	0.078	0.038	0.041	0.037	0.041
Textiles	0.263	0.048	0.013	0.035	0.002	0.032	0.003	0.033
Chemicals	0.254	0.284	0.181	0.104	0.061	0.042	0.061	0.043
Metals	0.253	0.153	0.165	-0.012	-0.012	-0.007	-0.005	0.001
Construction	-0.042	0.071	0.097	-0.026	-0.015	-0.002	-0.024	-0.011
Trade	0.211	0.106	0.083	0.023	0.015	0.015	0.008	0.008
Hotels and Rest.	0.164	0.003	0.019	-0.015	0.001	0.011	-0.027	-0.017
Finance	0.207	0.416	0.390	0.025	0.008	0.006	0.019	0.017

Comparison of Decomposition Under Baseline and Alternative Normalizations

	Wage Gap (1)	<u>Mean Premiums:</u>		Effect of Firm Pay Premiums (4)	Decompositions			
		Effects (2)	Effects (3)		Sorting		Bargaining	
					Using M Effects (5)	Using F Effects (6)	Using M Dist (7)	Using F Dist (8)
Baseline	0.234	0.148	0.099	0.049 (21.2)	0.035 (14.9)	0.047 (19.9)	0.003 (1.2)	0.015 (6.3)
Alt. Normal. (Rest&Hotel)	0.234	0.146	0.076	0.071 (30.2)	0.035 (15.0)	0.047 (19.9)	0.024 (10.2)	0.035 (15.2)

Appendix Table B6: Relationship Between Estimated Firm Effects and Mean Total Hours of Workers of Same Gender

	Models for Males				Models for Females			
	No Industry		Industry Controls		No Industry		Industry Controls	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Mean Hours of Workers at Firm (Same Gender)	-0.16 (0.03)	-0.12 (0.05)	-0.06 (0.03)	0.02 (0.05)	-0.05 (0.03)	-0.13 (0.05)	0.03 (0.02)	0.03 (0.04)
1st Stage Coeff.	--	0.54 (0.00)	--	0.45 (0.01)	--	0.65 (0.00)	--	0.60 (0.00)

Instrument = mean log hours of other gender group at same firm

Appendix Table C2: Decompositions of Gender Wage Gap --- High School+, Age 25+

	Decompositions							
	<u>Mean Premiums:</u>			Total Effect of Firm Wages	Sorting		Bargaining	
	Wage Gap	Males	Females		Using M Effects	Using F Effects	Using M Dist	Using F Dist
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
All	0.272	0.170	0.131	0.038 (14.0)	0.015 (5.4)	0.020 (7.4)	0.018 (6.6)	0.023 (8.6)
< 30	0.115	0.127	0.097	0.030 (26.4)	0.008 (6.6)	0.016 (14.0)	0.014 (12.4)	0.023 (19.8)
31-40	0.226	0.174	0.140	0.034 (14.9)	0.011 (4.6)	0.015 (6.6)	0.019 (8.2)	0.023 (10.2)
>40	0.313	0.212	0.180	0.032 (10.1)	0.006 (1.9)	0.010 (3.3)	0.021 (6.8)	0.026 (8.2)
Hschool	0.274	0.152	0.100	0.052 (19.1)	0.031 (11.2)	0.035 (12.7)	0.018 (6.5)	0.022 (7.9)
Univ.	0.287	0.195	0.170	0.025 (8.9)	0.000 (0.0)	0.007 (2.5)	0.018 (6.4)	0.026 (9.0)

Gender or occupation?

- Classify occ's based on %Female
- Classify workers into mainly female (“pink”) occ's and mainly male (“blue”) occ's
- Fit four more AKM models: (M,F)×(pink,blue)

Table 5: Contribution of Firm-Level Pay Components to Gender Wage Gap: All Workers versus Workers in "Female" and "Male" Occupations

Wage Gap (1)	Mean Premiums:		Total Effect of Firm Pay (4)	Decompositions			
	Men (2)	Women (3)		Sorting		Bargaining	
				Using M Effects (5)	Using F Effects (6)	Using M Dist. (7)	Using F Dist. (8)
<u>A. All Workers at Dual Connected Firms</u>							
0.234	0.148	0.099	0.049 (21.2)	0.035 (14.9)	0.047 (19.9)	0.003 (1.2)	0.015 (6.3)
<u>B. Workers with "Female" Occupations at Firms with M&F in "Female" Occupations</u>							
0.240	0.127	0.097	0.031 (12.8)	0.026 (10.8)	0.043 (17.8)	-0.012 (-5.1)	0.005 (1.9)
<u>C. Workers with "Male" Occupations at Firms with M&F in "Male" Occupations</u>							
0.137	0.177	0.133	0.044 (31.9)	0.015 (11.1)	0.027 (20.0)	0.016 (11.9)	0.028 (20.8)

Firm effects and productivity

Estimate:

$$\psi_{J(i,t)}^g = \pi^g \overline{EVA}_{J(i,t)} + \nu_{J(i,t)}^g$$

$$\overline{EVA}_{J(i,t)} \equiv \max \{ 0, \overline{VA}_{J(i,t)} - \hat{\tau} \}$$

where \overline{VA}_j is mean log value added per worker for years observed in SABI

Table 6: Relationship Between Firm Effects and Measures of Surplus per Worker

	Number Firms (1)	Regressions of Firm Effects on Measure of Surplus		Ratio : Col (3) / Col (4) (4)
		Males (2)	Females (3)	
<u>Surplus Measure:</u>				
1. Excess Mean Log Value Added per Worker	47,477	0.156 (0.006)	0.137 (0.006)	0.879 (0.031)
2. Mean Log Sales per Worker	75,163	0.072 (0.005)	0.064 (0.004)	0.897 (0.036)
3. Excess Mean Log Sales per Worker	75,163	0.092 (0.006)	0.081 (0.006)	0.883 (0.038)

Appendix Figure D1: Firm Fixed Effects vs. Mean Log Sales/Worker

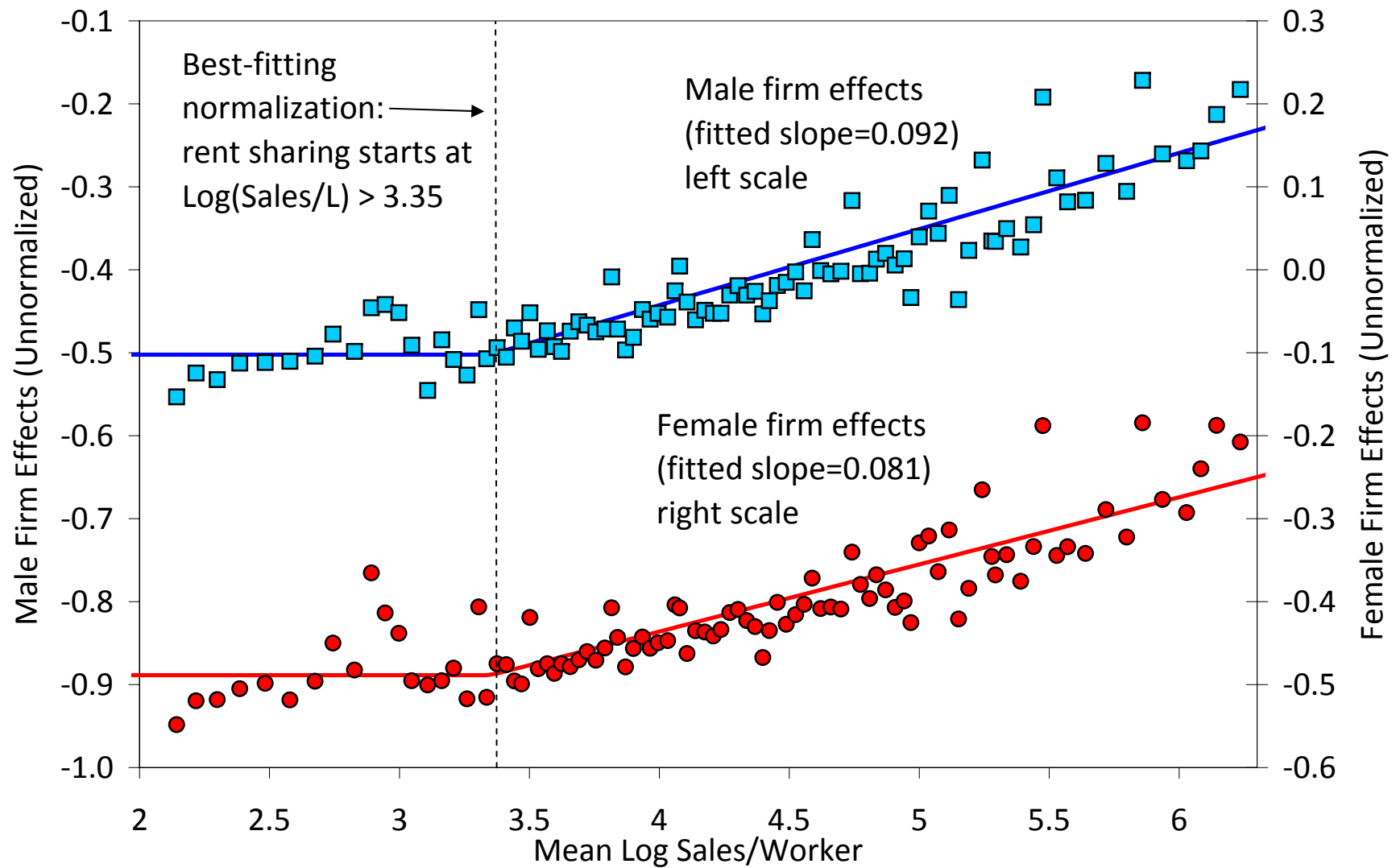


Table 6: Relationship Between Firm Effects and Measures of Surplus per Worker

	Number Firms (1)	Regressions of Firm Effects on Measure of Surplus		Ratio : Col (3) / Col (4) (4)
		Males (2)	Females (3)	
<u>Surplus Measure:</u>				
1. Excess Mean Log Value Added per Worker	47,477	0.156 (0.006)	0.137 (0.006)	0.879 (0.031)
2. Mean Log Sales per Worker	75,163	0.072 (0.005)	0.064 (0.004)	0.897 (0.036)
3. Excess Mean Log Sales per Worker	75,163	0.092 (0.006)	0.081 (0.006)	0.883 (0.038)

Appendix Table C3: Comparison of Models for Firm Effects Using Base Sample and Workers with High School or More Education, Age 25 or Older

	Number Firms (1)	Regressions of Firm Effects on Excess Mean $\log(VA/L)$		Ratio: Females to Males (4)
		Males (2)	Females (3)	
1. Base Sample -- Dual Connected Firms	47,477	0.156 (0.006)	0.137 (0.007)	0.879 (0.031)
2. Restricted Sample -- HS+ Education, Age 25+	15,499	0.161 (0.004)	0.133 (0.004)	0.825 (0.023)

How much of FE gap is due to VA?

- We find $\pi^M - \pi^F \approx 0.02$
- Also, women sort to lower VA firms (gap ≈ 0.18)
- Total contribution of value added to gender gap:
$$\pi^M E[\overline{EVA}_{J(i,t)} | G(i) = M] - \pi^F E[\overline{EVA}_{J(i,t)} | G(i) = F]$$
- This evaluates to ≈ 0.04
 - **Roughly 80% of firm effect gap!**

Appendix Table B8: Decomposition of Male-Female Wage Gap, Based on Observable Measure of Surplus

	Males (1)	Females (2)	Gap (3)
1. Effect of Firm Pay Premiums (from Table 3)	0.148	0.099	0.049
2. Rent sharing coefficients	0.156	0.137	0.019
3. Mean net surplus (Excess mean log VA/L)	0.743	0.566	0.178
4. Mean Wage Premium due to measured surplus (= row 2 × row 3)	0.116	0.078	0.038
5. Share of Total Effect of Pay Premiums explained by measured surplus (row 1 / row 4)	0.784	0.785	0.776

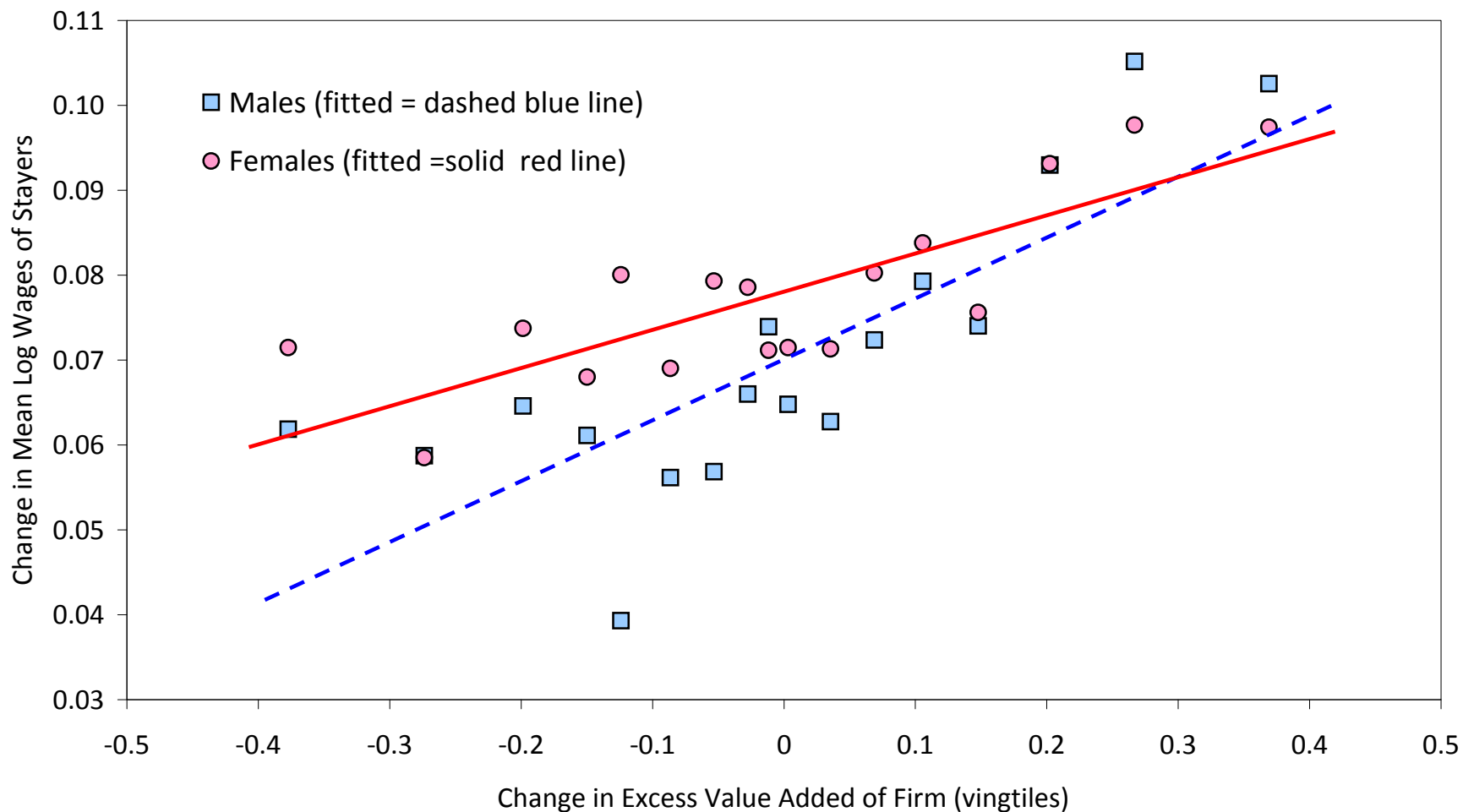
Job Stayers

- For workers in a stable match, estimate long differenced (2006-2009) specification of form:

$$\Delta w_i = \Delta X_i' \beta^{G(i)} + \theta^{G(i)} \Delta EV A_{J(i,1)} + \xi_i$$

- To deal with measurement error, instrument for value added change over 2006-2009 using change over 2007-2008.

Figure 6: Changes in Excess Value Added and Changes in Wages of Stayers, 2006-2009



Note: Data for stayers are grouped into 20 cells based on changes in log value added per worker in excess of 2.45. Bottom and top vingtiles not shown.

Table 7: Effects of Changes in Measured Surplus per Worker on Wages of Stayers

	# Firms	Estimated Rent Sharing		Ratio
		Males	Females	
	(1)	(2)	(3)	(4)
Surplus Measure and Sample:				
1. Excess Mean Log Value Added/Wkr (Winsorized at +/- 0.50). Smlp = Stayers at Firms with VA data, 2006-9	33,104	0.049 (0.007)	0.045 (0.008)	0.911 (0.086)
2. Excess Mean Log Value Added/Wkr (Not Winsorized). Smpl=Stayers at Firms with VA data, 2006-9	33,104	0.035 (0.006)	0.031 (0.006)	0.894 (0.091)
3. Excess Mean Log Value Sales/Wkr (Winsorized at +/- 0.50). Smpl = Stayers at Firms with Sales data, 2005-8	44,266	0.021 (0.006)	0.018 (0.005)	0.876 (0.182)

Conclusions

- Bargaining and sorting effects both matter
 - Women get $\approx 90\%$ of the rents captured by men.
 - They also tend to work at firms that pay less irrespective of gender.
- Eliminating both effects would yield a reduction in the gender wage gap of $\approx 20\%$
 - Bargaining more important for highly-skilled
- 80% of firm effect gap explained by gap in *observed VA*