Rising Wage Inequality, 
the Decline of Collective Bargaining, 
and the Gender Wage Gap

Dirk Antonczyk, Bernd Fitzenberger, Katrin Sommerfeld

"Increasing Labor Market Flexibility"
IAB Workshop Nürnberg, 19th March 2011
Collective Wage Bargaining Coverage

Type of contract:
- Sectoral
- Firm
- Individual

Year: 2001 - 60% Sectoral, 30% Individual
Year: 2006 - 50% Sectoral, 40% Individual
Wage Inequality
Gender Wage Gap

![Graph showing the gender wage gap over time. The graph compares the wage gap in 2001 (solid line) and 2006 (dashed line). The y-axis represents the gender wage gap, and the x-axis represents the tau (time) scale. The graph indicates a decrease in the gender wage gap around the mid-30s, with a subsequent increase by the late 70s.](image-url)
This paper investigates the link between
Decline in bargaining coverage
Recent increase in wage inequality
Development of the Gender Wage Gap
Literature

- Decline of union membership and of coverage
- Collective bargaining is associated with wage compression
- Rising Wage Dispersion, After All!
- Declining Gender Wage Gap ...
- ... but recently stagnating
Data

- German Structure of Earnings Survey, 2001 and 2006 (GSES; “Verdienststrukturerhebung”)
- Random sample of all German firms with at least ten employees, mainly in private sector
- Linked employer-employee data set
- Information on bargaining regime on individual level
- Use full-time employees in West Germany, aged 25-55
- 2001: 420,000 employees, 17,000 firms
  2006: 830,000 employees, 22,600 firms
- Logarithmized gross real hourly wage
## Decomposition of collective bargaining coverage

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
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<tbody>
<tr>
<td><strong>Total decline in coverage</strong></td>
<td>-16,8</td>
<td>-19,3</td>
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<tr>
<td><strong>Coefficients</strong></td>
<td>-14,7</td>
<td>-17,3</td>
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<tr>
<td><strong>Characteristics</strong></td>
<td>-2,1</td>
<td>-2,0</td>
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<td><strong>Standard error counterfactual</strong></td>
<td>(0,7)</td>
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Development of Wages and the Gender Wage Gap
Econometric Approach

- Wage equations via quantile regressions
- Decomposition into Coefficients and Characteristics effect

\[ \Delta_{06/01} = \Delta_1^T + \Delta_2^T + \Delta_3^T + \Delta_4^T + \Delta_5^T + \Delta_6^T + \Delta_7^T \]

### Sequential Decomposition Results

<table>
<thead>
<tr>
<th></th>
<th>90-10</th>
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<tbody>
<tr>
<td>Overall 2006-2001</td>
<td>0.131</td>
<td>0.034</td>
<td>0.098</td>
<td>0.113</td>
<td>0.054</td>
<td>0.060</td>
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<td>Personal Coefficients</td>
<td>0.018</td>
<td>0.007</td>
<td>0.011</td>
<td>0.041</td>
<td>0.020</td>
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<td>Firm Coefficients</td>
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<td>Bargaining Coefficients</td>
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<td>Residual</td>
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<td>Firm Characteristics</td>
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<td>0.019</td>
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Sequential decomposition of $\Delta$ male wage distribution

Unconditional Difference

Personal Coefficients

Firm Coefficients

Bargaining Coefficients

Residual

Bargaining Regime

Firm Characteristics

Personal Characteristics

Personal Coefficients

Firm Coefficients

Bargaining Coefficients

Residual

Bargaining Regime

Firm Characteristics

Personal Characteristics
Sequential decomposition of $\Delta$ female wage distribution
Sequential decomposition of $\Delta$ GWG

Unconditional Difference
Personal Coefficients
Firm Coefficients
Bargaining Coefficients
Residual
Bargaining Regime
Firm Characteristics
Personal Characteristics
Personal Characteristics
Conclusions I

Sharp decline of collective bargaining coverage

- 2001: ca. 30% not covered
- 2006: ca. 50% not covered
- Firm-level bargaining also declines
- Decline stronger for females
- Almost exclusively within sectors

- Contributed to the increase in wage dispersion…
- … but not to the development of the GWG
Conclusions II

Increase in wage dispersion

- Stronger real wage losses in the lower part
- Driven by returns to firm characteristics ...
- ... which are driven by sector coefficients
- Smaller contributions from firm characteristics and from personal coefficients
- Counteracted by personal characteristics
Conclusions III

Gender Wage Gap

- Increases in the middle of the distribution
- Small decreases in the lower part
- Labor demand effects tended to raise the GWG
- Individual-specific characteristics would have improved the relative position of women, had not other components counteracted this tendency
Thank you

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Institute for Economic Research
Department of Applied Econometrics
Albert-Ludwigs-University Freiburg, Germany
Literature

Econometric Approach

- Wage equations via quantile regressions
- Decomposition:
  \[
  \hat{q}_{male}(\tau) - \hat{q}_{female}(\tau) = \\
  \left[ \hat{q}_{male}(\tau) - \hat{q}_{\beta_f,x_m}(\tau) \right] + \left[ \hat{q}_{\beta_f,x_m}(\tau) - \hat{q}_{female}(\tau) \right]
  \]
  Coefficient effect \hspace{1cm} Characteristics effect

- \( \hat{q}_{\beta_f,x_m}(\tau) \): estimated counterfactual quantile function
Sequential Decomposition

\( P = \text{Personal, i.e. individual-specific characteristics} \)
\( F = \text{Firm, i.e. establishment-specific characteristics} \)
\( B = \text{Bargaining regime, i.e. sectoral, firm or no collective bargaining} \)

\[
\Delta^{06/01}_\tau = q^{06}_\tau (\alpha^{06}_P, \alpha^{06}_F, \alpha^{06}_B, \bar{\alpha}^{06}_0, B^{06}, F^{06}, P^{06}) \\
- q^{01}_\tau (\alpha^{01}_P, \alpha^{01}_F, \alpha^{01}_B, \bar{\alpha}^{01}_0, B^{01}, F^{01}, P^{01})
\]

\[
= \Delta^{1}_\tau + \Delta^{2}_\tau + \Delta^{3}_\tau + \Delta^{4}_\tau + \Delta^{5}_\tau + \Delta^{6}_\tau + \Delta^{7}_\tau
\]

- Personal
- Firm
- Coverage
- Time-trend
- Coverage
- Firm
- Personal

Coefficients

Characteristics
Sequential Decomposition

$$
\Delta^1_t = q^6_t(\alpha^6_P, \alpha^6_F, \alpha^6_B, \bar{\alpha}_0, B^6, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^6_F, \alpha^6_B, \bar{\alpha}_0, B^6, F^6, P^6)
$$

$$
\Delta^2_t = q^6_t(\alpha^1_P, \alpha^6_F, \alpha^6_B, \bar{\alpha}_0, B^6, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^1_F, \alpha^6_B, \bar{\alpha}_0, B^6, F^6, P^6)
$$

$$
\Delta^3_t = q^6_t(\alpha^1_P, \alpha^1_F, \alpha^6_B, \bar{\alpha}_0, B^6, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^6, F^6, P^6)
$$

$$
\Delta^4_t = q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^6, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_1^0, B^6, F^6, P^6)
$$

$$
\Delta^5_t = q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^6, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^1, F^6, P^6)
$$

$$
\Delta^6_t = q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^1, F^6, P^6) - q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^1, F^1, P^6)
$$

$$
\Delta^7_t = q^6_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^1, F^1, P^6) - q^1_t(\alpha^1_P, \alpha^1_F, \alpha^1_B, \bar{\alpha}_0, B^1, F^1, P^1)
$$

Helicopter Counterfactuals
# Real log wage distributions and gender differentials

## Overall

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<thead>
<tr>
<th></th>
<th>2001</th>
<th>2006</th>
<th>Δ 2006-2001</th>
<th>GWG</th>
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<td>Female</td>
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<td>2.61</td>
<td>2.80</td>
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<td>2.85</td>
<td>3.08</td>
<td>2.88</td>
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<td>90%</td>
<td>3.33</td>
<td>3.08</td>
<td>3.37</td>
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## GWG by bargaining regime

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<td>0.22</td>
<td>0.18</td>
<td>0.21</td>
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<tr>
<td>25</td>
<td>0.20</td>
<td>0.19</td>
<td>0.17</td>
<td>0.17</td>
<td>-0.03</td>
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<tr>
<td>50</td>
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<td>0.18</td>
<td>0.17</td>
<td>0.18</td>
<td>0.00</td>
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<tr>
<td>75</td>
<td>0.18</td>
<td>0.19</td>
<td>0.20</td>
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<td>90</td>
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<td>0.25</td>
<td>0.25</td>
<td>0.23</td>
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## Wage distributions and GWG by bargaining regime

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<tr>
<td>10%</td>
<td>2.28</td>
<td>2.08</td>
<td>2.25</td>
<td>2.07</td>
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<td>-0.01</td>
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<td>2.45</td>
<td>2.25</td>
<td>2.44</td>
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<td>0.02</td>
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<td>0.17</td>
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<tr>
<td>50%</td>
<td>2.65</td>
<td>2.48</td>
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<td>2.50</td>
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<td>0.01</td>
<td>0.19</td>
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<td>0.04</td>
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<tr>
<td>75%</td>
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Employment shares and coverage by sector

- Share of employees without collective contract
- Relative size of sector

- ○ 2001
- ● 2006

Number to the left denotes sector
Unconditional Difference: Males
Personal Coefficients: Males

Quantile

Return
Firm Coefficients: Males

Quantile Return

![Graph showing firm coefficients for males with quantiles on the x-axis and coefficients ranging from -0.06 to 0.04 on the y-axis.](image-url)
Bargaining Coefficients: Males

Quantile Return
Residual: Males

Quantile

Return
Bargaining Regime: Males

Quantile Return

Graph showing the relationship between quantiles and returns for males in a bargaining regime.
Personal Characteristics: Males

Quantile

Return
Unconditional Difference: Females
Personal Coefficients: Females

Quantile Return

Graph showing the distribution of personal coefficients for females. The x-axis represents quantiles ranging from 0 to 100, and the y-axis shows the return values ranging from -0.06 to 0.04. The graph includes multiple curves, each representing a different quantile.
Firm Coefficients: Females

The graph shows the quantile-quantile (Q-Q) plot for firm coefficients, specifically for females. The x-axis represents the quantiles ranging from 0 to 100, while the y-axis shows the firm coefficients ranging from -0.06 to 0.02. The plot includes two curves, one solid and one dotted, indicating the distribution of firm coefficients across different quantiles.
Bargaining Regime: Females
Firm Characteristics: Females
Unconditional Difference: GWG

The graph illustrates the difference between 2006 and 2001 quantiles. The x-axis represents the quantiles, ranging from 0 to 100, and the y-axis shows the difference in values. The graph shows variations in the difference across different quantiles, with peaks and troughs indicating changes in the unconditional difference.
Bargaining Coefficients: GWG

The graph shows the distribution of bargaining coefficients for different quantiles. The x-axis represents quantiles ranging from 0 to 100, while the y-axis represents the range from -0.3 to 0.1. The black line and dotted line illustrate the pattern and variation of the coefficients across the quantiles.
Residual: GWG
Bargaining Regime: GWG
Firm Characteristics: GWG

The graph shows the distribution of a variable across different quantiles. The x-axis represents the quantile, ranging from 0 to 100, and the y-axis shows the variable's return, ranging from 0 to 0.04. The graph consists of two lines: a dotted line and a solid line, each representing different quantiles or categories of GWG firms. The dotted line fluctuates around the 0.02 mark, while the solid line shows a more pronounced trend, peaking around the 60 quantile.
Personal Characteristics: GWG