Wage Mobility in East and West Germany

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Comments welcome

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2. Data and Measurement
3. Inequality and Mobility Patterns
4. Explanation: Hypotheses and Method
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1. Introduction

- Wage mobility: - variability of individual wages over time
  - labor market characteristic
- Relevance: - balances inequality
  - recently rising inequality
- Issues addressed here:

  (a) briefly describe wage inequality

  (b) describe wage mobility in West (since 1975) and East Germany (since 1992)

  (c) study patterns behind these developments

- Contribution:
  - apply previously untapped data (long running, precise, recent) - SIAB
  - direct attention to an under-explored issue
  - separately consider East and West Germany
  - apply a broad set of mobility indicators
  - apply RIF-regressions and decomposition analysis to study determinants of mobility

2. Data and Measurement

- Data: SIAB, Sample of Integrated Labour Market Biographies, 2 percent random sample drawn from the Integrated Employment Biographies (IEB) of the IAB
- IEB covers the mandatorily insured labor force (employed, unemployed, job-seeking) 80 % of total
- data available for 1975-2008, East and West Germany
- individual information linked to employer information (BHP)

- Sample:

  - full-time employed, at least one day in a year
  - age 25-60
  - East / West by place of work (Berlin=East after 1992)

- Sample to describe wage mobility between year t and t + k:

  - full-time employed in t and t+k, not necessarily in between
  - meet age-restriction in both periods
  - reside in the same region (East / West) in both periods

- Annual sample size: > 45,000 East > 183.000 West

- Pooled sample size: 686,903 East 2,435,101 West

- Dependent variable:

  - real daily gross wages (2008=100)

  - drop employment spells with daily wage < 10 Euro

  - consistent top coding:

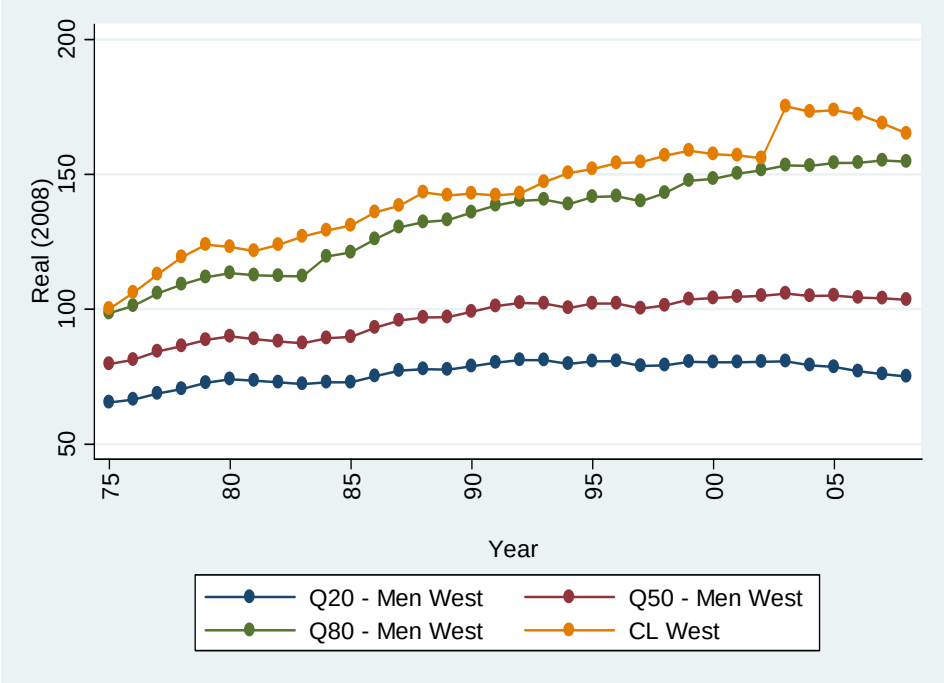
    censor at 90th / 85th percentile in East / West Germany based on complete annual regional wage distribution of full time workers

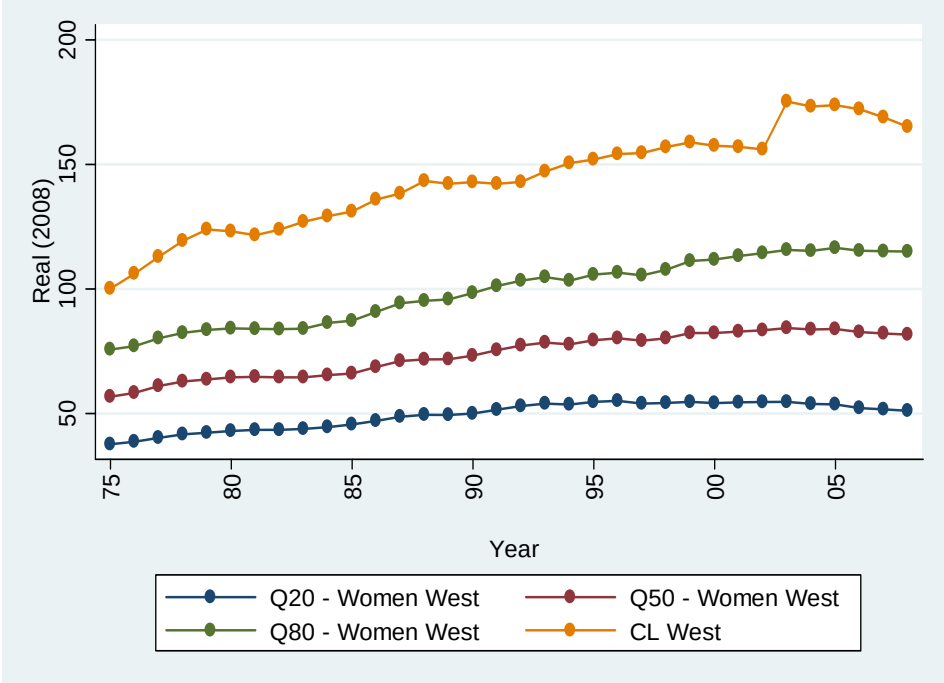
3. Inequality and Mobility Patterns

3.1 Inequality (3 indicators)

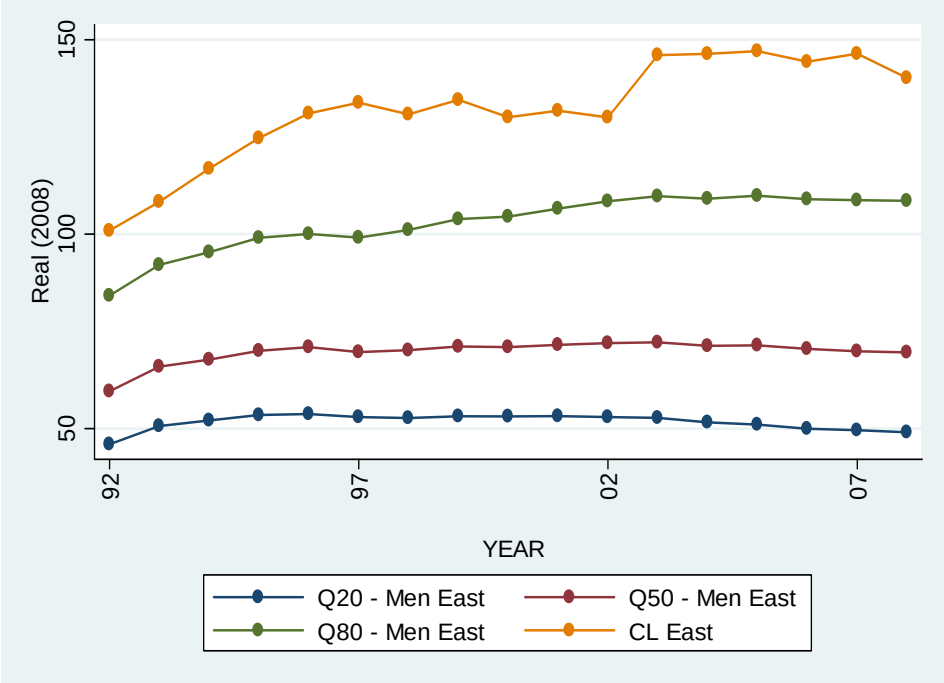
3.1.1. Development of 20th, 50th, and 80th percentiles of real wages

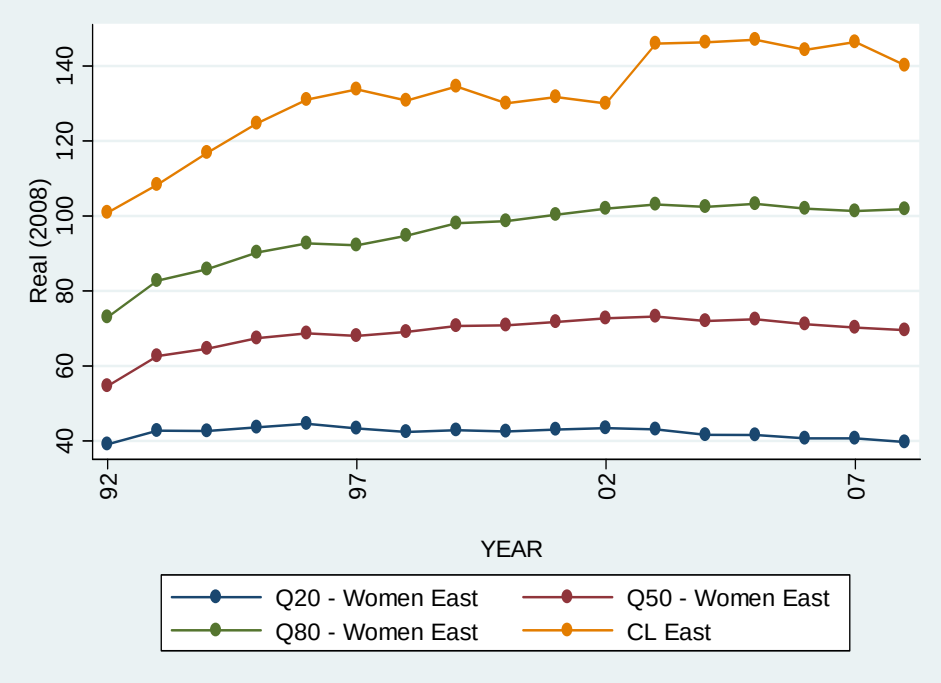
(a) West (1975-2008)





(b) East (1992-2008)

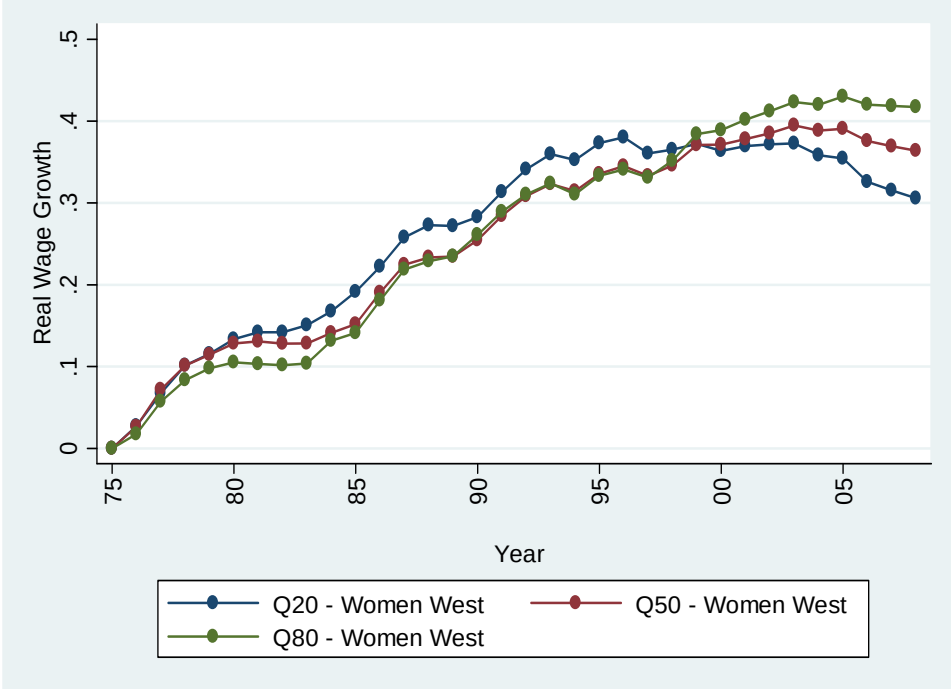




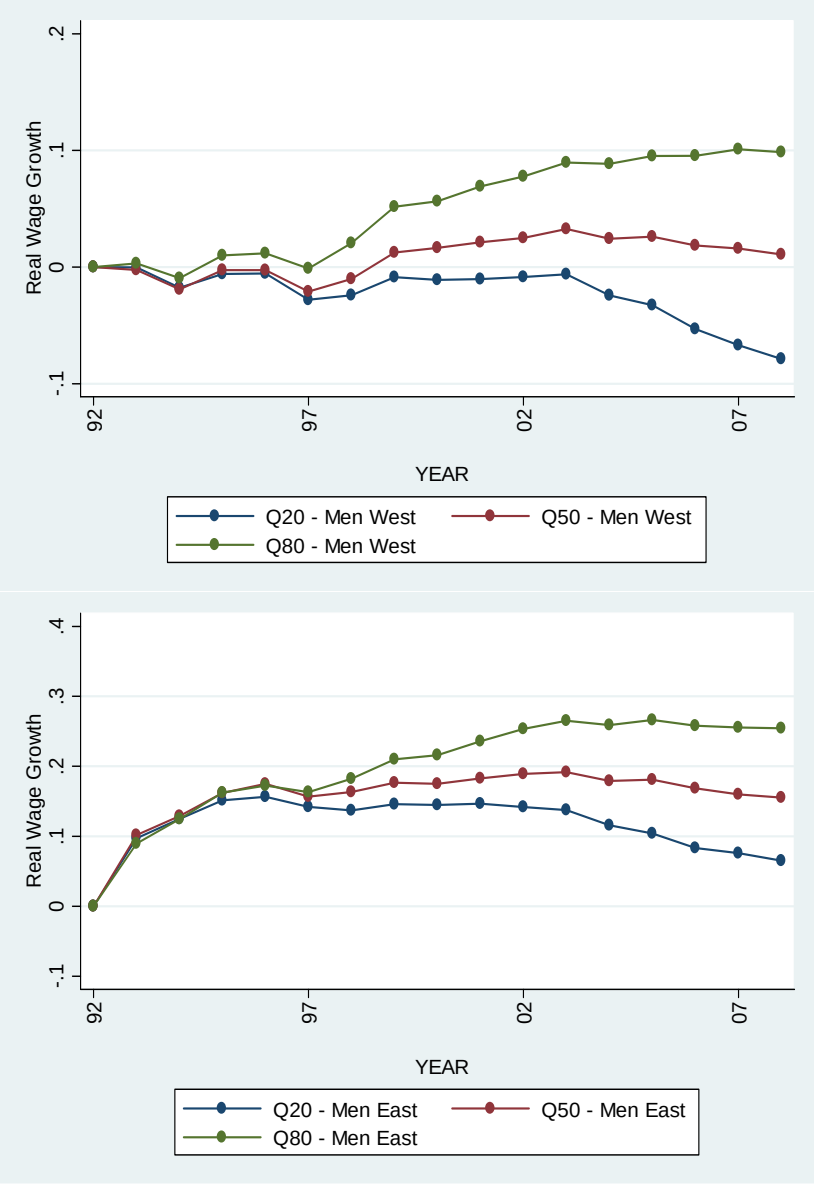
- Censoring innocuous

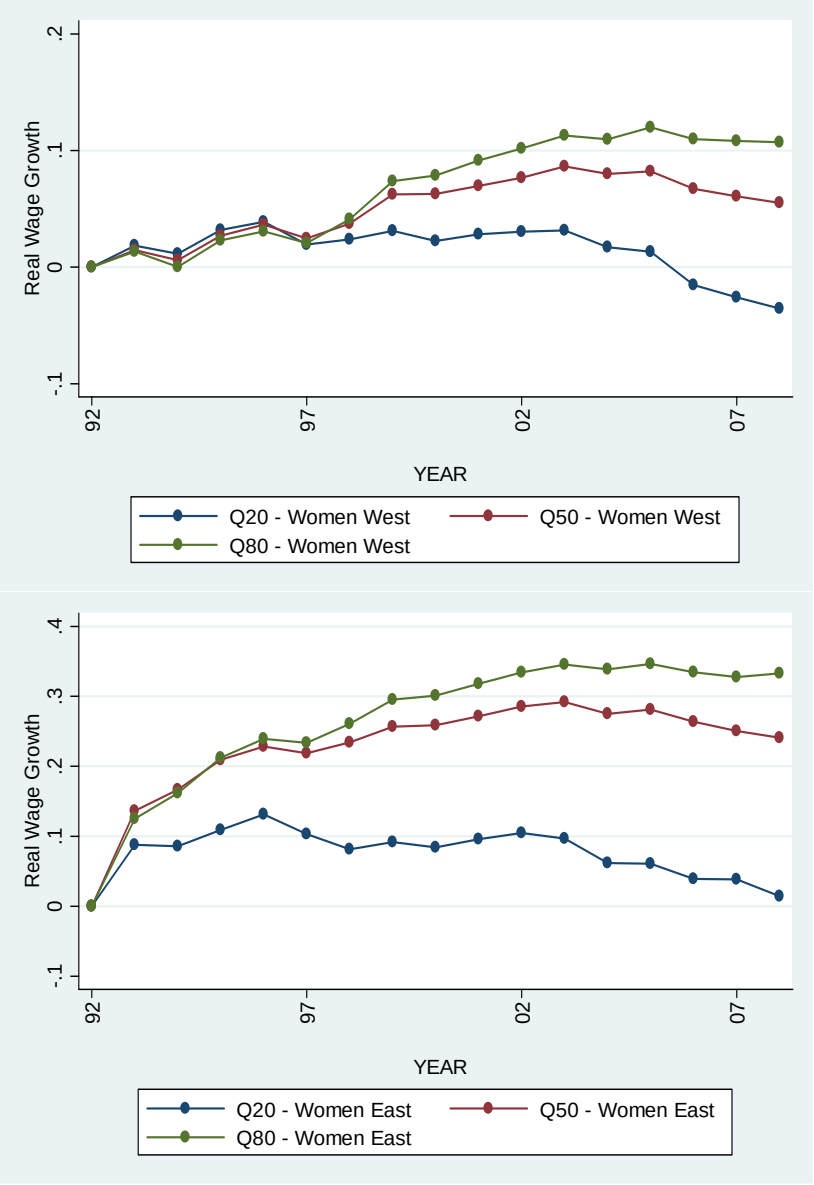
3.1.2. Annual wage growth

(a) West (1975-2008)

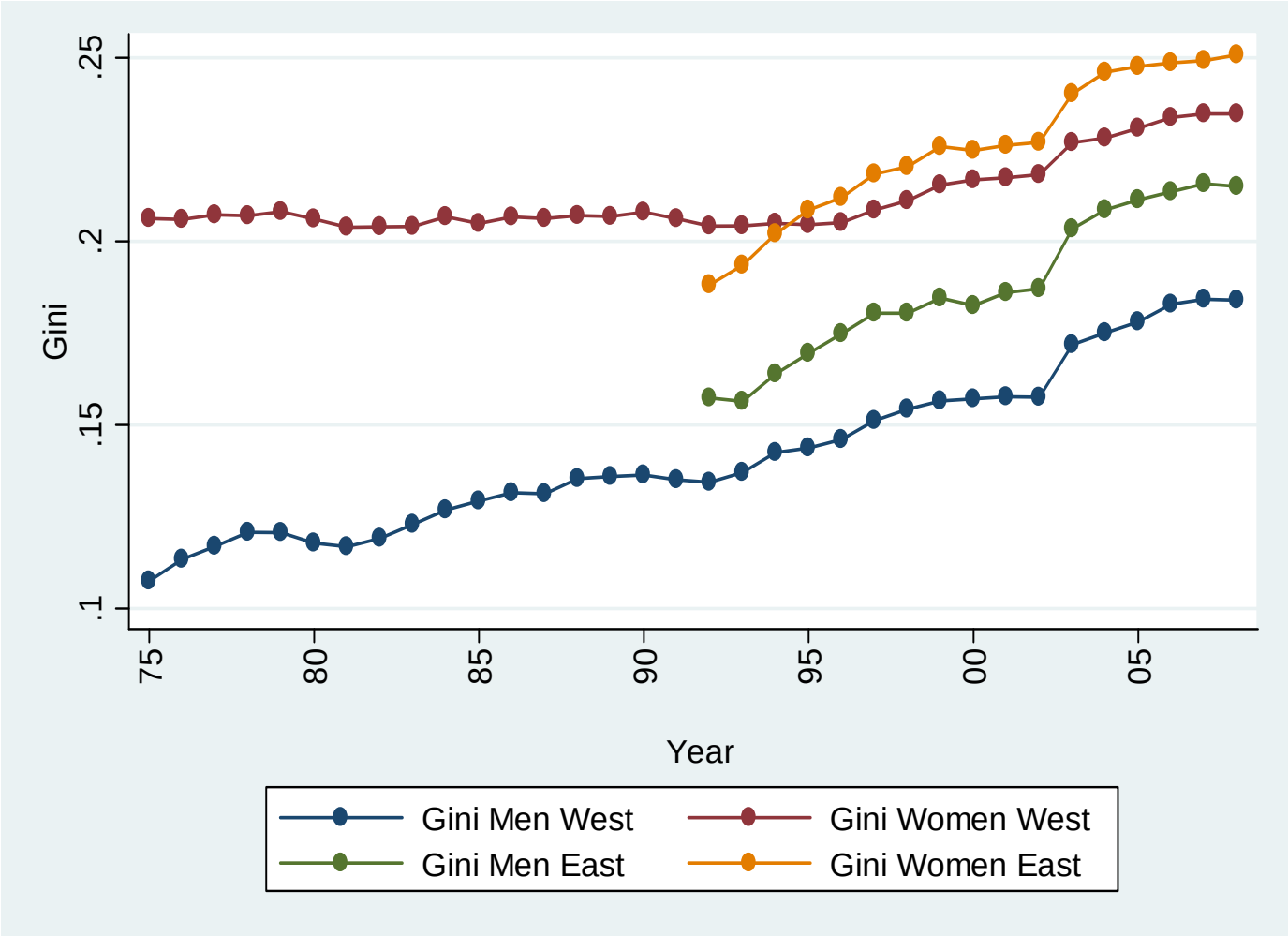


(b) West and East (1992-2008)





3.1.3. Development of Gini coefficients



Note: Shows complete uncensored part of the annual distribution

3.2 Mobility

- **7 Indicators:**

1 Rank transition matrix: probability of quintile jump

2 Distribution of individual rank changes

3 Probability of change in rank by < 10 points

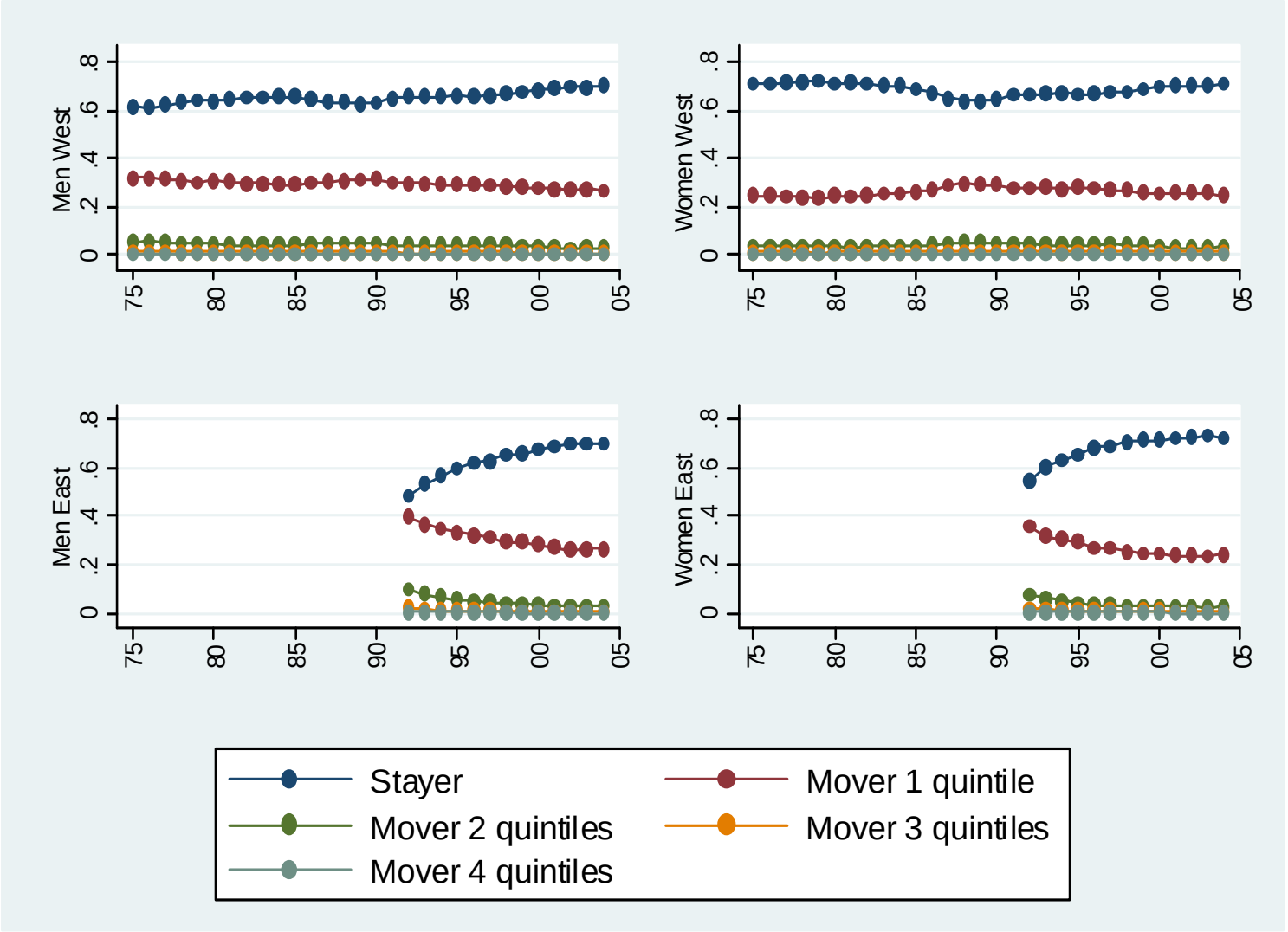
4 Rank correlation coefficients (t+1, t+4, t+9)

5 Shorrocks Index (i) mean log deviation and (ii) Gini

6 Mean absolute change in real wages

7 Mean relative change in real wages

- **Indicator 1:** Rank transition matrix: prob. of quintile jump (based on ranks in regional distributions)

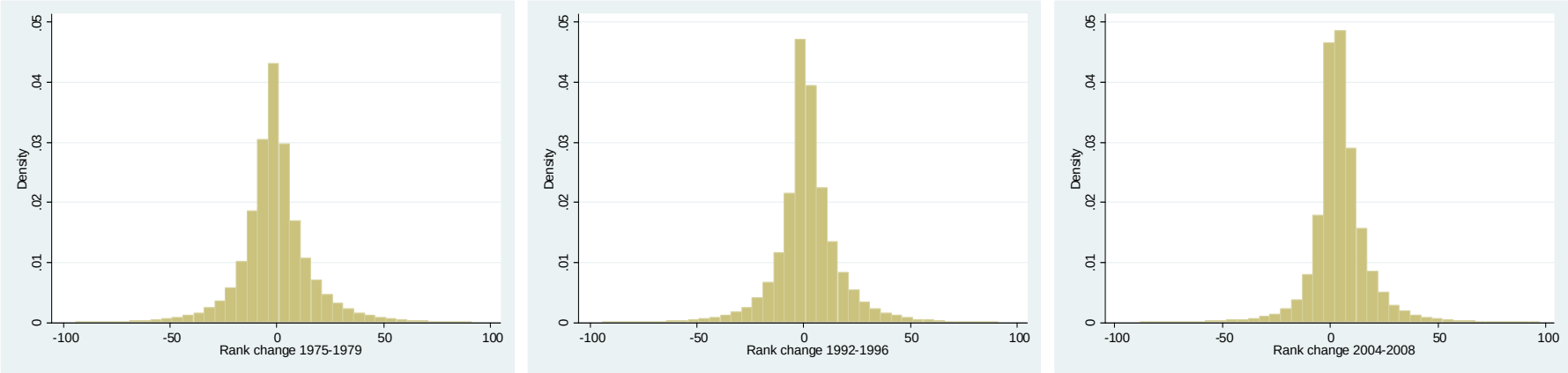


- Indicator not affected by censoring.
- West Germany: slightly rising immobility.
- East Germany: immobility ("staying") increased from below 50 to over 64 percent in 8 years.

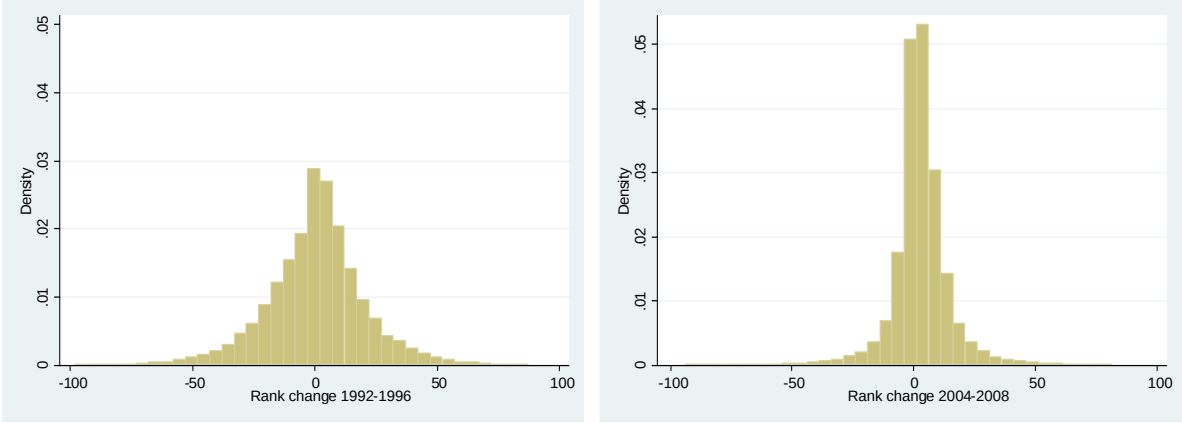
  => mobility declining

- **Indicator 2:** Distribution of individual rank changes
  (based on ranks in annual regional distributions)

(a) West Germany 1975-1979, 1992-1996, and 2004-2008



(b) East Germany 1992-1996 and 2000-2004



- Change in variance of East German distribution over time

=> mobility declining in East Germany

- **Indicator 6:** Mean absolute change, uncensored real wages

Start	West Germany			East Germany		
t	t-t+1	t-t+4	t-t+9	t-t+1	t-t+4	t-t+9
1975	4.68	11.70	14.66			
1980	4.45	8.22	15.09			
1985	5.80	12.25	19.22			
1990	6.50	11.14	17.34			
1992	5.49	10.18	15.68	8.04	16.21	20.02
1994	5.90	10.53	17.64	5.81	10.73	16.86
1996	5.26	10.89	16.50	4.40	9.12	14.28
1998	6.51	11.38	16.33	4.76	9.05	13.18
2000	5.88	10.77		4.28	8.66	
2002	5.72	10.34		4.27	7.93	
2004	5.50	10.33		4.04	8.08	
2006	5.79			4.15		

=> mobility declining in East Germany

- **Indicator 7:** Mean relative change, uncensored real wages

Start	West Germany			East Germany		
t	t-t+1	t-t+4	t-t+9	t-t+1	t-t+4	t-t+9
1975	0.07	0.16	0.20			
1980	0.06	0.11	0.19			
1985	0.07	0.15	0.23			
1990	0.08	0.13	0.20			
1992	0.07	0.12	0.18	0.14	0.25	0.31
1994	0.07	0.12	0.19	0.09	0.16	0.24
1996	0.06	0.13	0.18	0.07	0.14	0.21
1998	0.08	0.13	0.19	0.07	0.13	0.19
2000	0.07	0.12		0.06	0.13	
2002	0.07	0.12		0.06	0.12	
2004	0.06	0.12		0.06	0.12	
2006	0.07			0.06		

=> mobility declining in East Germany

4. Explanation: Hypotheses and Method

- (a) What explains the change in mobility?
  (b) How can it be measured?

- Hypotheses: mobility shifts related to changes in

  Z personal characteristics

  J job stability characteristics

  E employment characteristics

  R regional characteristics

- Potential mechanisms:

Z - personal: sex / age / nationality / education / initial rank / ever migrate West (9)

J - job stability: employer change / unemployment exp / tenure (7)

E - employment: employer size and change, employer wage distribution, initial and final occupation and industry, change of occupation and industry (47)

R - regional: state unemployment, GDP growth, share self-employed (3)

- Empirical Approach:

  (1) Separate composition from structure effect

  (2) Quantify contribution of factor groups Z, J, E, R

- Mobility indicator:

  Variance of rank change distribution; individual changes in relative wage rank between t and t+4

- Challenge: Decompose a variance (vs. mean or quantiles)

- Procedure: RIF (recentered influence function) - regression
  Firpo, Fortin, Lemieux, 2009, Econometrica

- Idea:
  - individual contribution to variance-influence function

    $$IF\left(y_i;\sigma^2\right)=\left(y_i-\int z\cdot dF_y\left(z\right)\right)^2-\sigma^2.$$

  - recentered by adding original variance

    $$RIF\left(y_i;\sigma^2\right)=\left(y_i-\int z\cdot dF_y\left(z\right)\right)^2=\left(y_i-\mu\right)^2.$$

  - model as linear function

    $$E\left(RIF\left(y;\sigma^2\right)\mid X\right)=X\cdot\gamma.$$

  - apply standard O-B-decomposition

- Model: $\mathrm{RIF}\left(y_i;\sigma^2\right)=\gamma_0+Z\gamma_1+J\gamma_2+E\gamma_3+R\gamma_4+\varepsilon$

- To be decomposed: $\Delta_O^{\sigma^2}=\sigma_1^2-\sigma_0^2.$

- (a) Aggregate decomposition: $\Delta_O^{\sigma^2}=\Delta_S^{\sigma^2}+\Delta_X^{\sigma^2}$

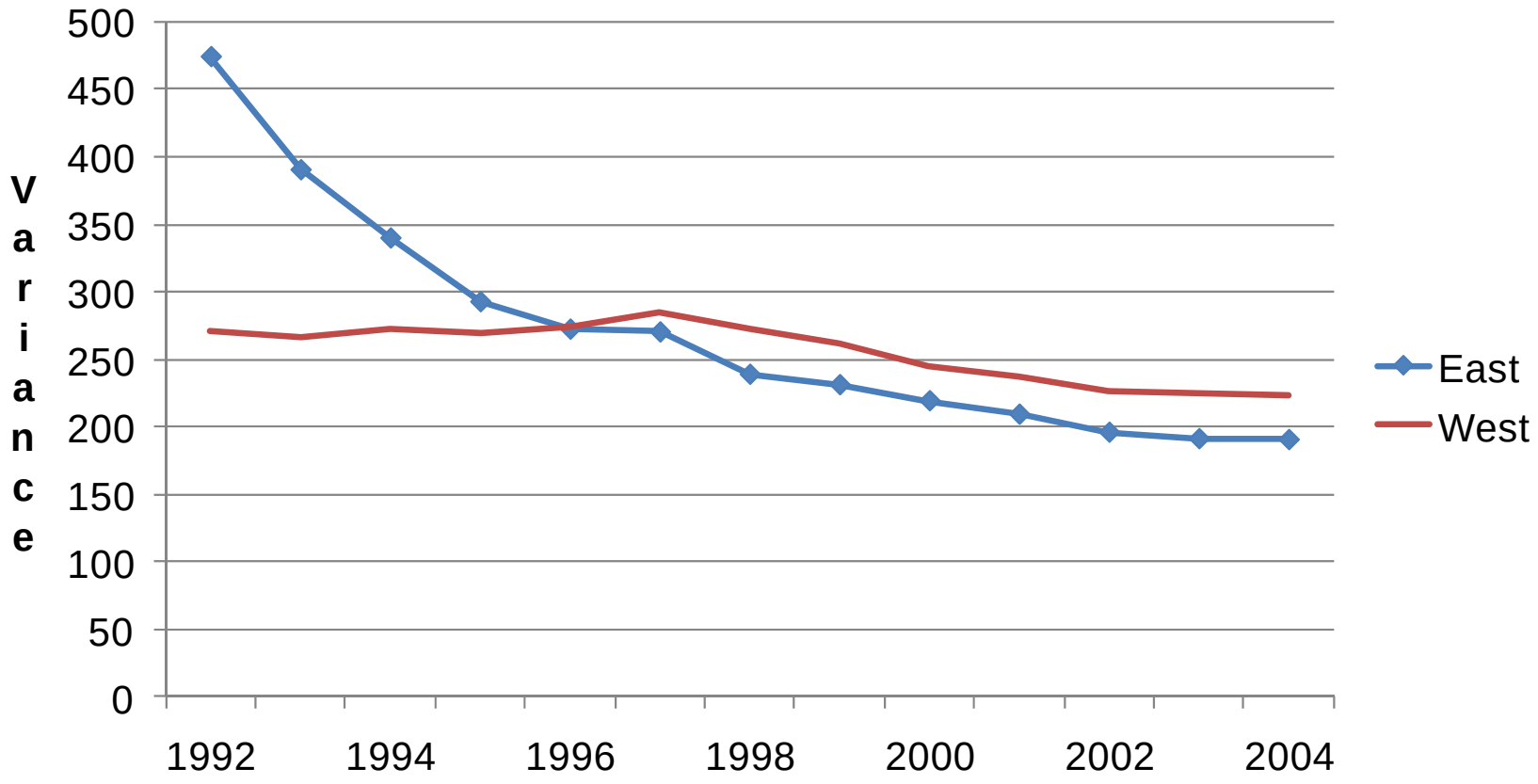
  using $\hat{\Delta}_S^{\sigma^2}=E\left[X,T=1\right]'\cdot\left(\hat{\gamma}_1-\hat{\gamma}_0\right)$

  and $\hat{\Delta}_X^{\sigma^2}=\left(E\left[X\mid T=1\right]-E\left[X\mid T=0\right]\right)'\cdot\hat{\gamma}_0.$

- (b) Detailed decomposition - contribution of factor groups.

5. Results

5.1 Dependent Variable



5.2 (Annual) Explanatory Power of Factor Groups

	East					West				
	Z	J	E	R	All	Z	J	E	R	All
A. Partial R-Squared										
1992	0.00	0.02	0.06	0.00	0.08	0.01	0.02	0.03	0.00	0.10
1993	0.00	0.02	0.06	0.00	0.10	0.01	0.02	0.03	0.00	0.10
1994	0.01	0.02	0.05	0.00	0.11	0.01	0.02	0.03	0.00	0.10
1995	0.01	0.02	0.05	0.00	0.11	0.01	0.02	0.03	0.00	0.09
1996	0.01	0.03	0.05	0.00	0.12	0.01	0.02	0.03	0.00	0.10
1997	0.01	0.02	0.05	0.00	0.11	0.01	0.02	0.04	0.00	0.10
1998	0.01	0.02	0.04	0.00	0.11	0.01	0.02	0.04	0.00	0.10
1999	0.01	0.02	0.04	0.00	0.11	0.00	0.02	0.03	0.00	0.10
2000	0.01	0.03	0.04	0.00	0.12	0.00	0.02	0.03	0.00	0.10
2001	0.01	0.03	0.05	0.00	0.12	0.00	0.02	0.03	0.00	0.10
2002	0.01	0.03	0.07	0.00	0.14	0.00	0.02	0.03	0.00	0.10
2003	0.00	0.02	0.05	0.00	0.13	0.00	0.02	0.04	0.00	0.11
2004	0.01	0.02	0.04	0.00	0.11	0.01	0.02	0.05	0.00	0.11

5.3 Coefficients vary over time: F-statistics of interactions in fully interacted model

	East	West
1992	-	-
1993	5.3	2.7
1994	6.4	8.4
1995	11.0	11.0
1996	11.8	14.1
1997	12.4	29.8
1998	14.1	27.8
1999	14.6	18.2
2000	15.8	11.2
2001	17.4	10.9
2002	16.5	12.1
2003	13.3	9.8
2004	14.3	15.6

5.4 Decomposition Results - Aggregate

	East			West		
	Early	Late	Full	Early	Late	Full
t=0:	1992/3	1998/9	1992/3	1992/3	1998/9	1992/3
t=1:	1998/9	2003/4	2003/4	1998/9	2003/4	2003/4
Mobility t=0	432.9**	235.1**	432.9**	268.6**	267.4**	268.6**
Mobility t=1	235.1**	190.9**	190.9**	267.4**	224.5**	224.5**
Difference	197.8**	44.27**	242.0**	1.232	42.87**	44.10**
Composition	99.59**	-1.398	155.5**	-5.801	11.23**	3.926
Structure	98.16**	45.67**	86.53**	7.033	31.64**	40.18**

5.5 Decomposition Results - Detailed

	East			West		
	Early	Late	Full	Early	Late	Full
t=0:	1992/3	1998/9	1992/3	1992/3	1998/9	1992/3
t=1:	1998/9	2003/4	2003/4	1998/9	2003/4	2003/4
Composition	99.59**	-1.39	155.5**	-5.801	11.23**	3.93
Z	4.69**	7.13**	12.35**	4.39**	4.09**	7.89**
J	59.73**	8.55**	72.10**	-2.56**	7.73**	4.57*
E_start	-32.30**	-10.11**	-44.15**	-21.95**	-7.40**	-42.37**
E_dynamic	29.66**	16.02**	46.52**	-8.30**	10.37**	2.60**
E_end	-5.77**	-0.66	-8.82**	10.48**	-8.47**	16.22**
R	43.58*	-22.31**	77.50**	12.13**	4.91	15.03**

6. Conclusions

- First study of wage mobility using German administrative data

Descriptive Results:

- Confirm: rising wage inequality
- Find: decreasing mobility, particularly in East Germany

Relevance:

> impact of increasing inequality magnified by falling intertemporal wage mobility

Explanation:

- Consider individual (Z), job stability (J), employment (E), and regional (R) factors

- Aggregate decomposition yields that composition effects
  - behind up to 2/3 of East German mobility decline
  - associated with about 1/4 of later West German shift

- Detailed decomposition yields
  - key determinants: changes in job stability
  - East: also regional factors

Relevance and overall lessons learned:

> new evidence: substantial shifts in mobility

> East German mobility now even below West German levels

> structural change ongoing in both regions

> observable factors matter, but less so recently and in West

> no evidence that developments are driven by E-W migration

=> impact of increased wage inequality increasingly permanent over the life cycle

Thank you, comments welcome.