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Life-Cycle Wage Inequality and Firms' Heterogeneity

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Life-Cycle Wage Inequality

- Wage inequality increases over the life-cycle
  - Human capital returns and accumulation
  - Search and matching

- Information on wage dynamics identifies permanent and transitory components of inequality

- Wage mobility: highlight sources of inequality growth and policy implications

- Baker and Solon (2003); Meghir and Pistaferri (2004); Cappellari (2004); Moffitt and Gottschalk (2012); Blundell, Graber and Mogstad (2015), Cappellari and Leonardi (2016)

Wage Inequality and Firms

- A parallel literature has looked at firms' effect in wage inequality

- Is it the worker or the firm? Do identical workers earn differently in different firms?
  - Rents
  - Efficiency wages
  - Employer-provided insurance

- Is it really a firm effect or do high-wage workers work in high-wage firms (sorting)?

- Abowd, Kramarz, Margolis (AKM 1999) ; Guiso, Pistaferri and Schivardi (2005) ; Card, Heining and Kline (2013); Macis and Schivardi (2016); Card et al. (2017); Devicienti, Fanfani and Maida (2017)

Bridging between Life-Cycle Inequality and Firm-Related Inequality

- Job-to-job mobility is one of the main vehicles of earnings growth, with a strong life-cycle component
- Does inequality grows more within or between matches?
- Correct identification of match effect requires controlling for firm-level unobservables
- Does the timing of matches matter?
  - Early employers may extract information on workers' ability that is useful also for later employers, with persistent effects on the wage distribution
- Policy implications: reducing young workers' mismatch may have long term impacts on wage inequality
- A small literature: Friedrich et al (2016); Mogstad et al. (2017)

This paper

Contributes to the literature on firms effects in life-cycle wages by:

1. Introducing life-cycle dynamics in the dispersion of wage shocks (both between and within matches)

2. Accounting for firm-workers sorting over the life-cycle (age-based sorting)

3. Isolating life-cycle from historical trends in wage inequality

4. Proposing a novel identification strategy that exploits information on the wage covariance structure of co-workers

Preview of Findings

- When workers are young, inequality grows substantially both within and between job spells

- At older ages, within-match inequality growth slows down (and virtually stops at 45), while inequality keeps on growing between matches

- Firms account for about 15% of inequality over the life-cycle

- Sorting of workers in firms accounts for one quarter of overall inequality, even more for young workers

Data

- VisitINPS: Population of job spells in the private non-agricultural sector of the Italian economy, 1985 – 2016

- Fresh spells since February 1974

- Men aged 25-55, excluding apprenticeships (3%) and managers (2%)

- At least 10 potential individual observations: birth cohorts 1939-1982

- At least 5 consecutive individual observations

- At least 8 full-time equivalent (FTE) working weeks per year

- Subpopulation of N=13.5 millions workers and K=XX millions firms, with TxN=167 millions data points on wages
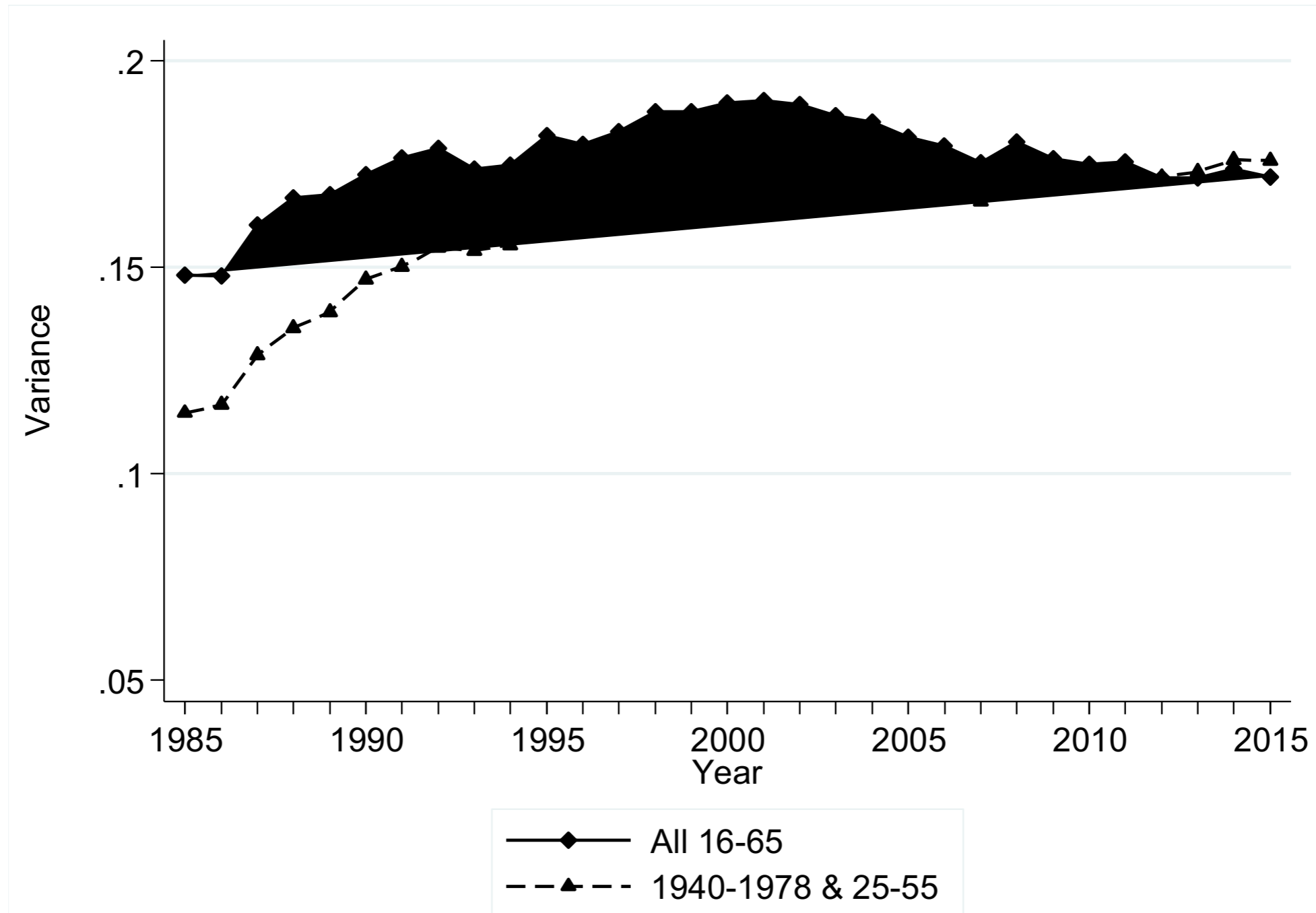
Data: Wages

- Collapse multiple spells at the same firm within the year

- Prevalent firm: yearly maximum of FTE weeks

- Daily wages: gross annual earnings at the firm/(FTE days)
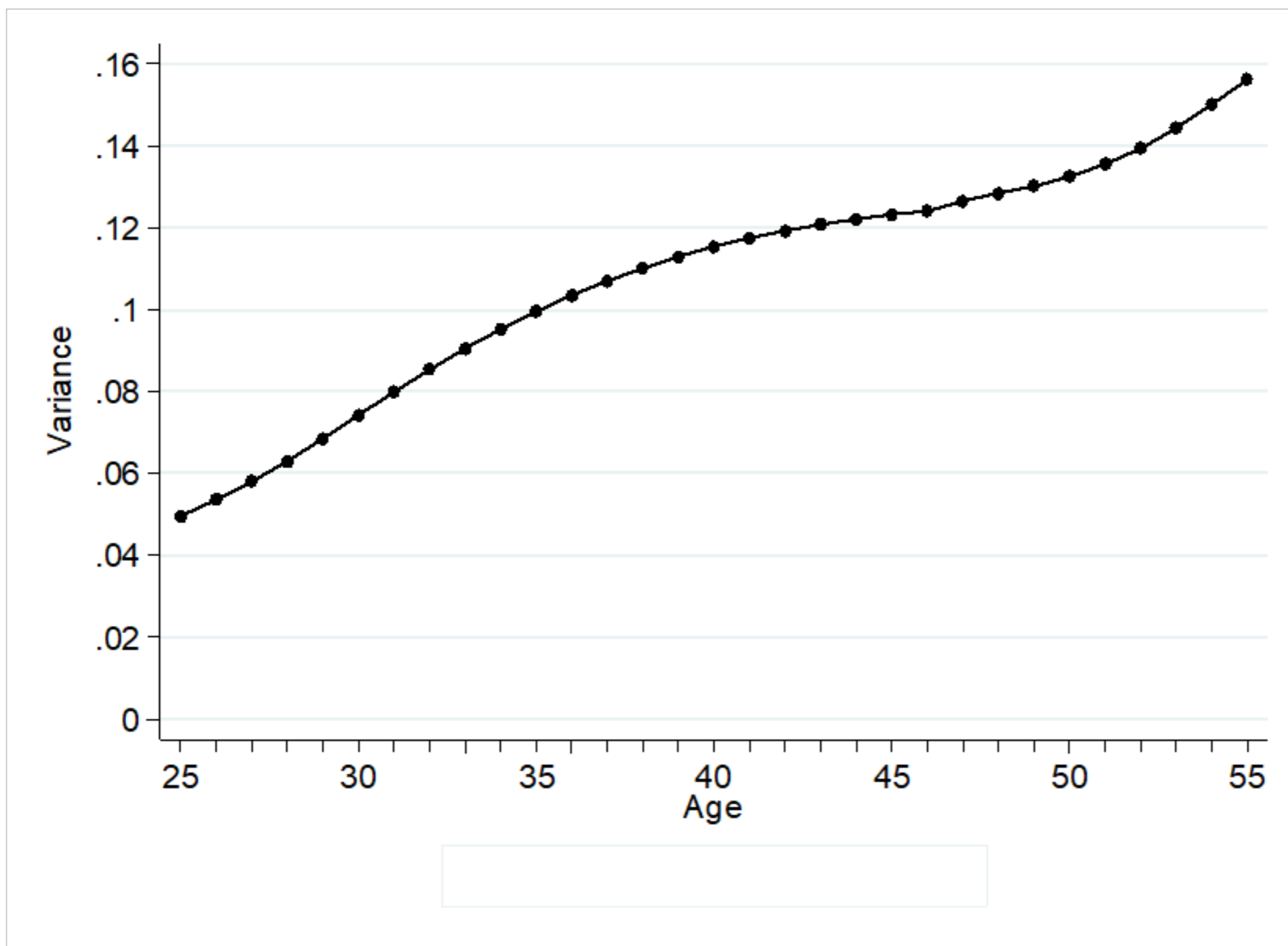
- Winsorize at 0.5% of each tail each year

Population 16-65 vs Sub-population: Wage Average
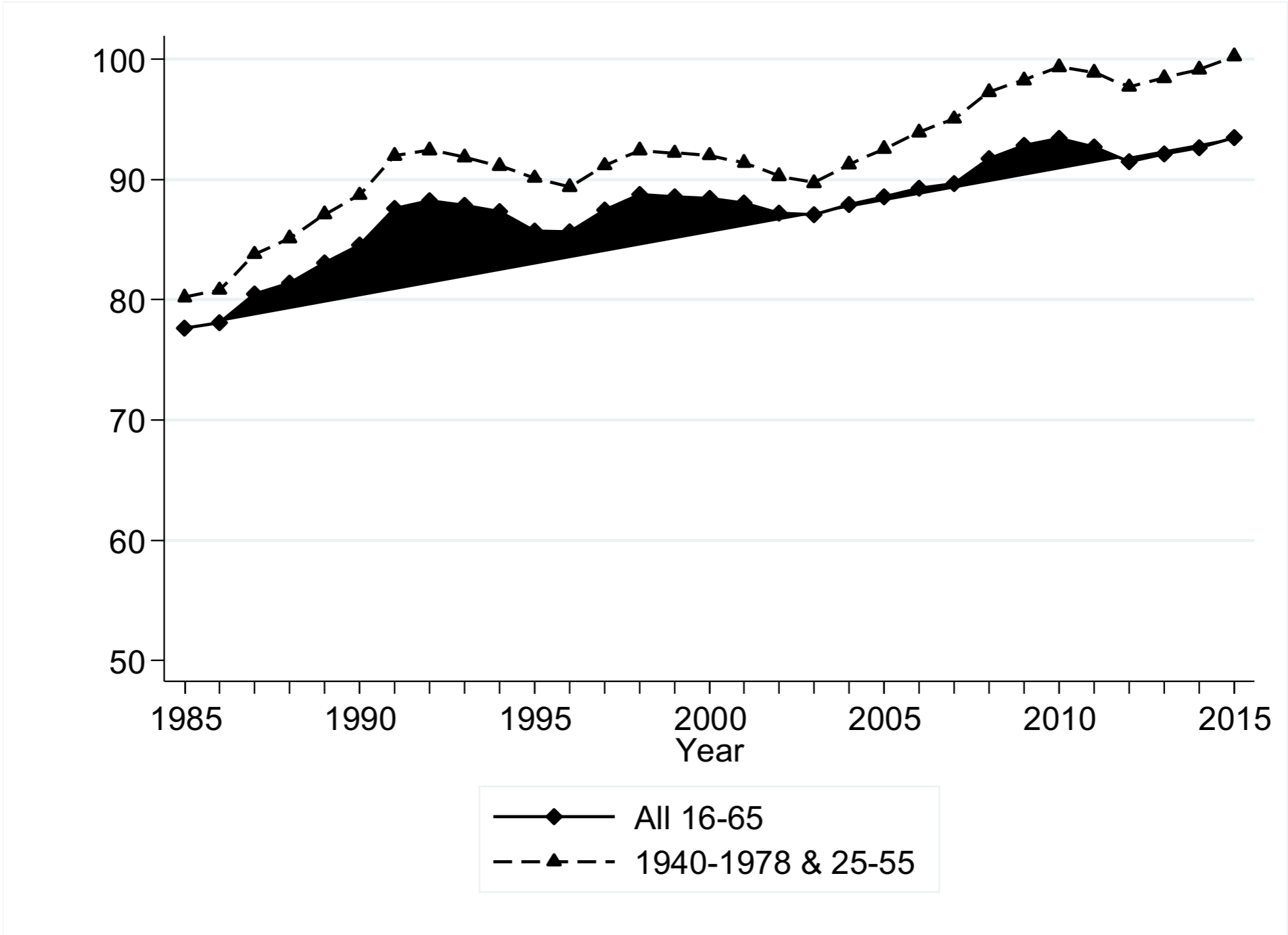
Population 16-65 vs Sub-population: Log-Wage Variance

Life-Cycle of Log-Wage Variance

Model: Life-Cycle wages

- Wages evolve over the life cycle through the arrival of
  - Individual-specific shocks
    - Between matches (General Human Capital)
    - Within matches (Firm-Specific Human Capital; Employer Learning)
  - Firm-specific shocks that are common to all the workers employed in a given firm
  - Sorting
- Wage shocks may be
  - Long-lasting or
  - Purely transitory

Identification

- The model is estimated by matching empirical wage moments to their counterparts implied by the model.

- Individual covariance= Life cycle + Stayer*Match + Stayer*Firm + Sorting

- Individual moments alone do not provide enough information to isolate firm and sorting effects

Identification

- We generate extra-information by looking at the *co-workers covariance structure*.

- Co-workers: individuals sharing the firm at any point in time, not necessarily contemporaneous.

- Note: they don't need to be actually working together, they just need to be exposed to the same firm at some point of their lives

- Take wage covariance in those years when they are working for that firm

- Coworkers covariance = Firm + Sorting

Wage covariance structure

- Two types:
  - Individual
  - Co-workers
- Individual is the standard used so far in the literature on permanent vs transitory shocks:
  - Cross product of wage residuals for person i between t and s
  - Average over i
- Do it by birth year: identify life-cycle vs calendar time
- 133.000 obs per-covariance on average

Co-workers covariance structure

- Take all employees of firm j in t and s
- Form all the possible pairwise matches of co-workers
- Average within the firm
- Average across firms using sqrt(#employees) to weight (makes inference person-representative)
- Issue: big firms
- Solution: take all employees if <200; otherwise take stratified (by occupation) random sample of size 200
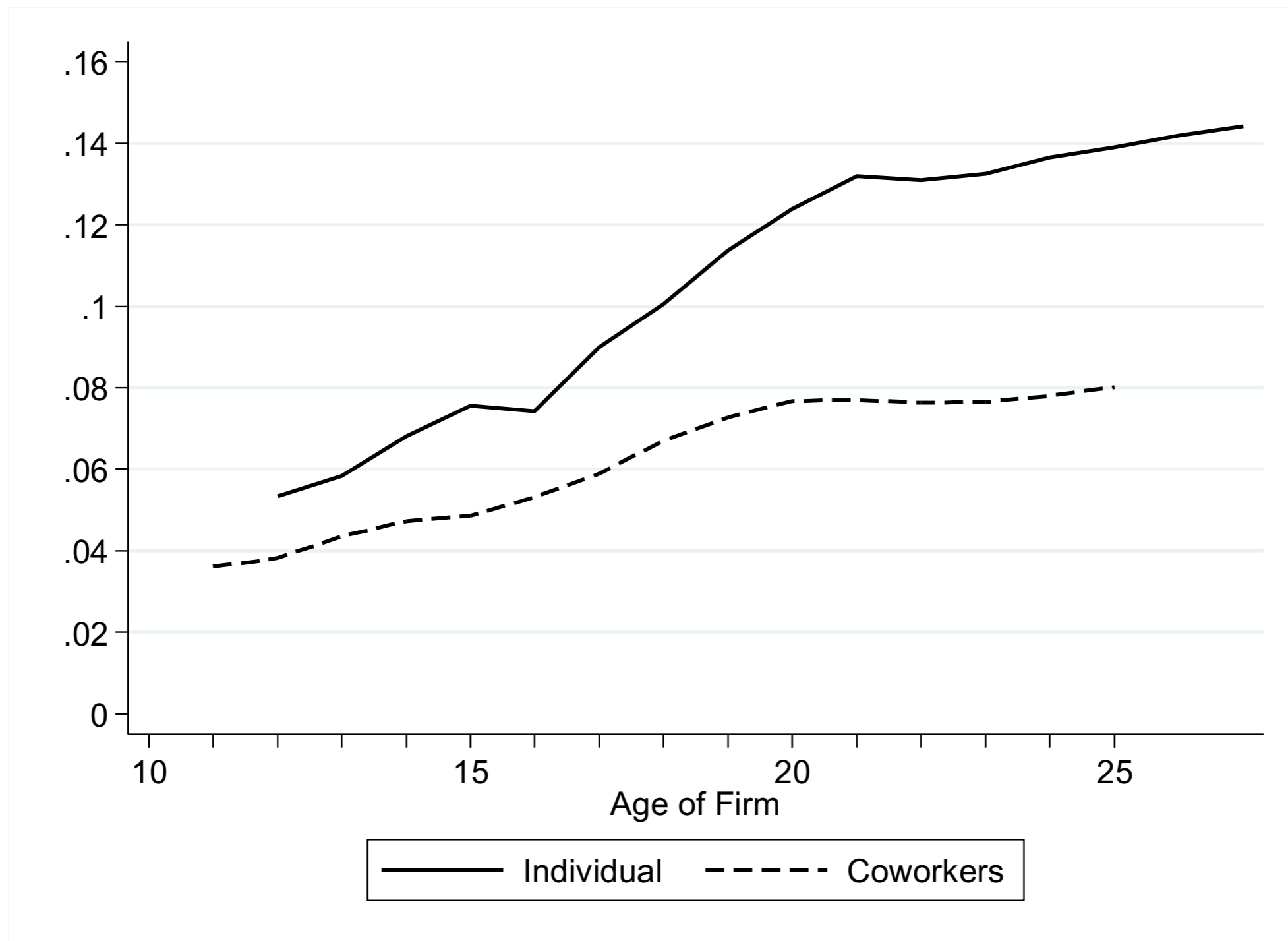- Do it by birth cohort
- 1.2 mlns pairs per covariance on average
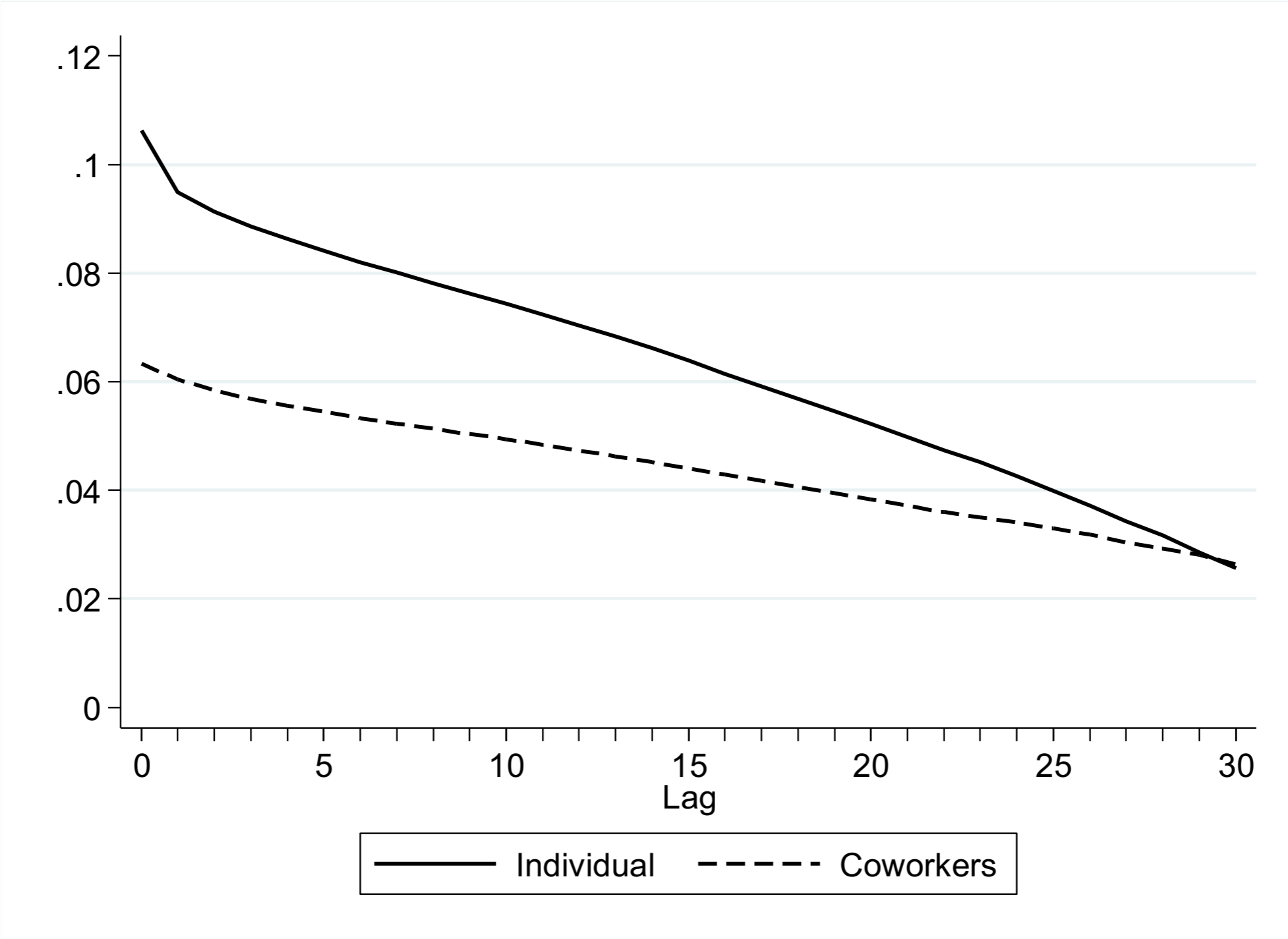
Wage Variance
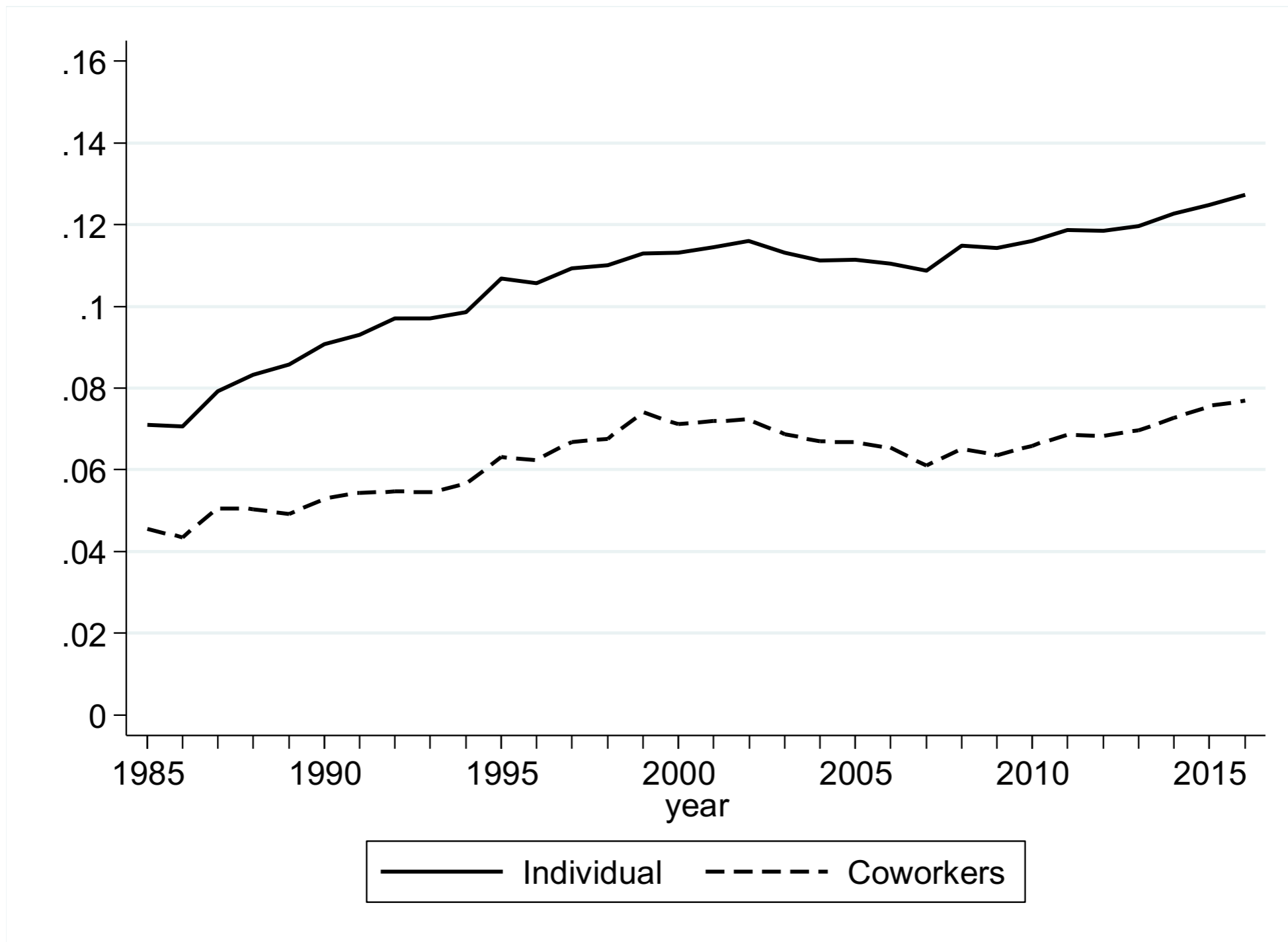
Life-Cycle of Wage Variance
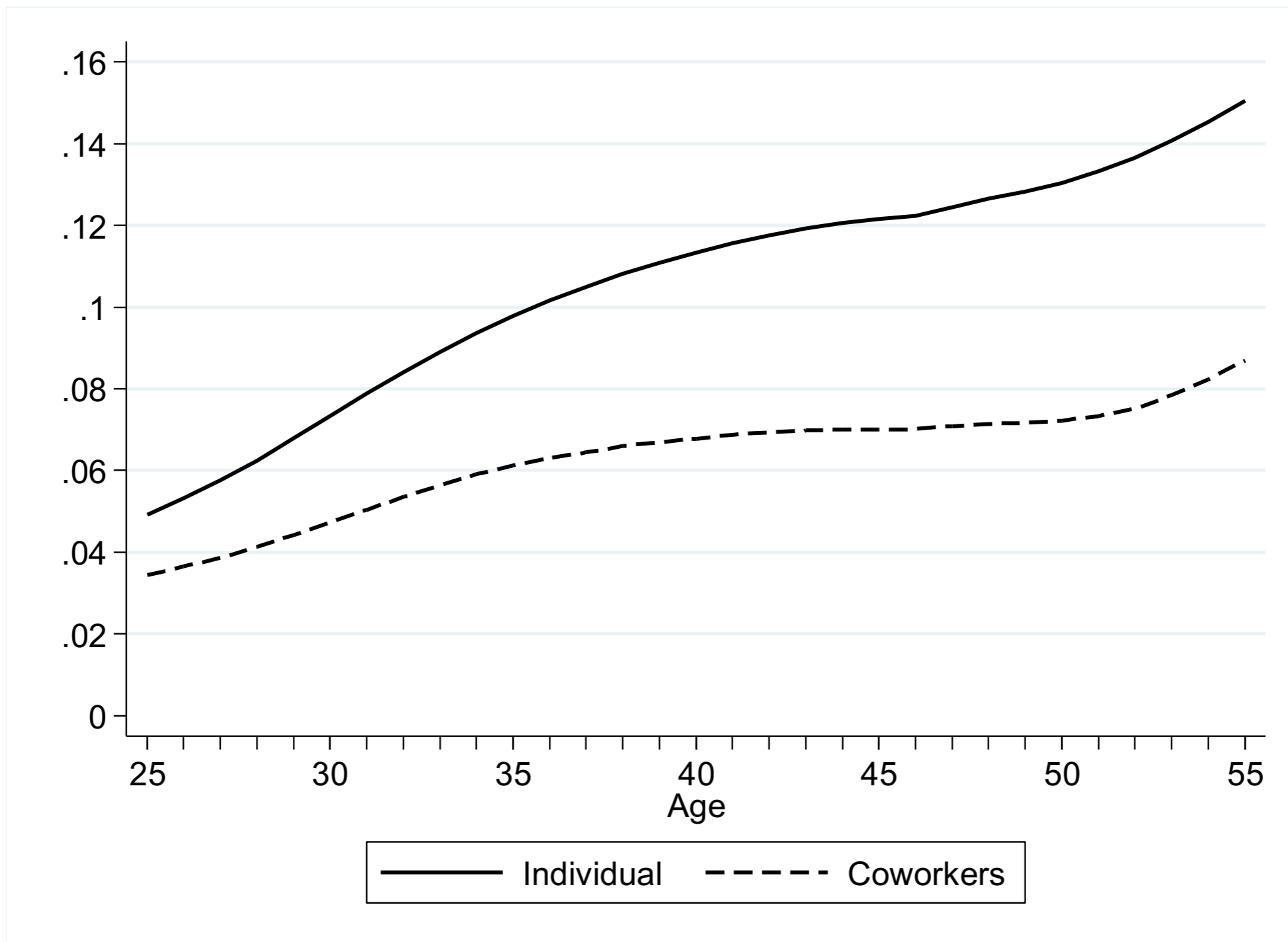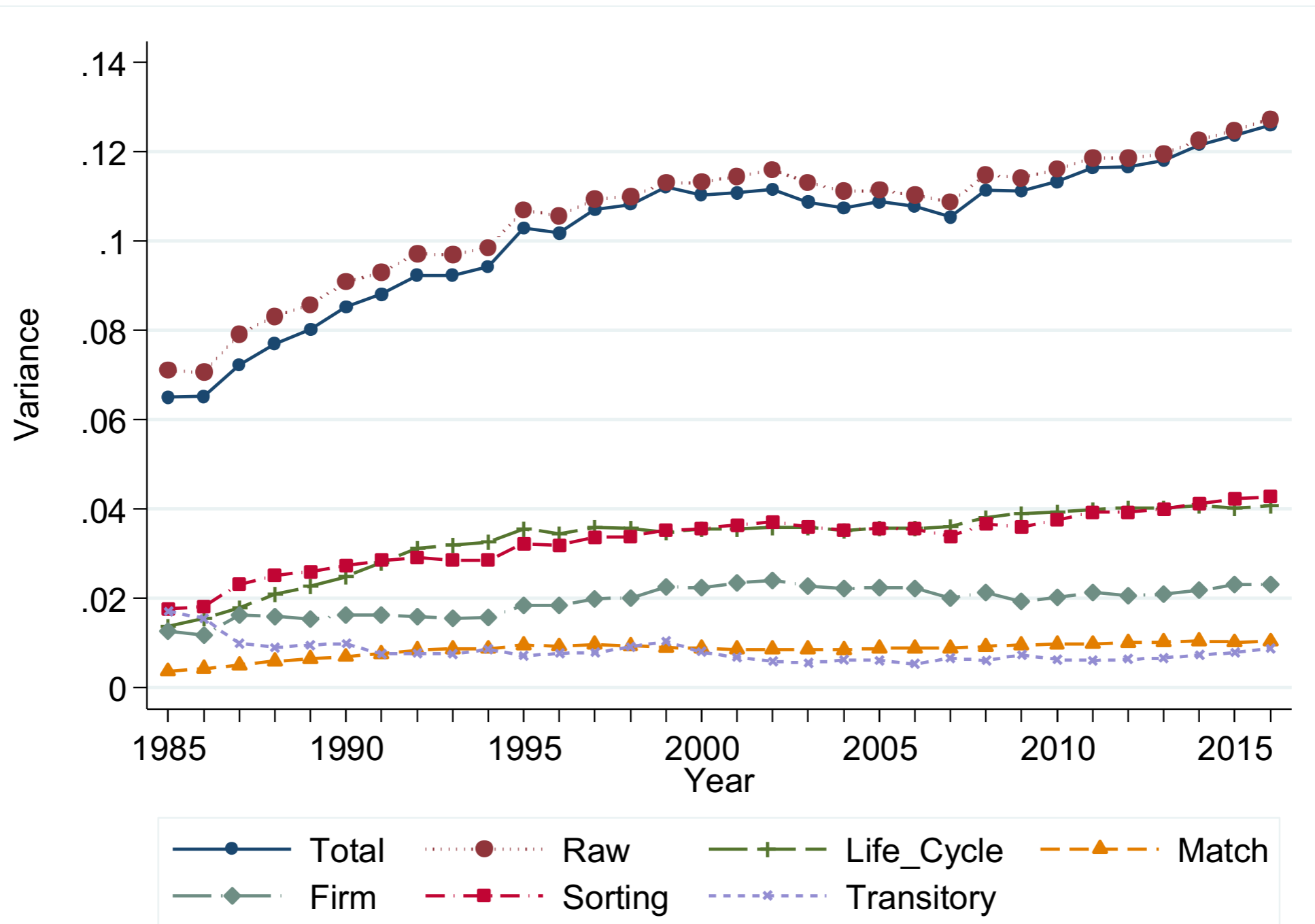
Firm Life-Cycle of Wage Variance

Wage Autocovariance

Results

Evolution over time

Average decomposition over time

	Prediction	As % of Total
Individual - Life-Cycle	0.0331	32.40
Individual - Match	0.0085	8.31
Firm	0.0195	19.02
Sorting	0.0331	32.38
Transitory	0.0081	7.87
Total	0.1023	

Individual effects

	Life-Cycle		Match	
	Coeff.	S.E.	Coeff.	S.E.
Initial condition	0.0036	0.0001		
Shock at age				
25			0.0010	0.0001
26 − 35	0.0011	0.00002	0.0008	0.00003
36 − 45	0.0007	0.00002	0.0008	0.00003
46 − 50	0.0003	0.00004	0.0006	0.00003
51 − 55	0.0011	0.0001	0.0004	0.00005

Life-Cycle Variances
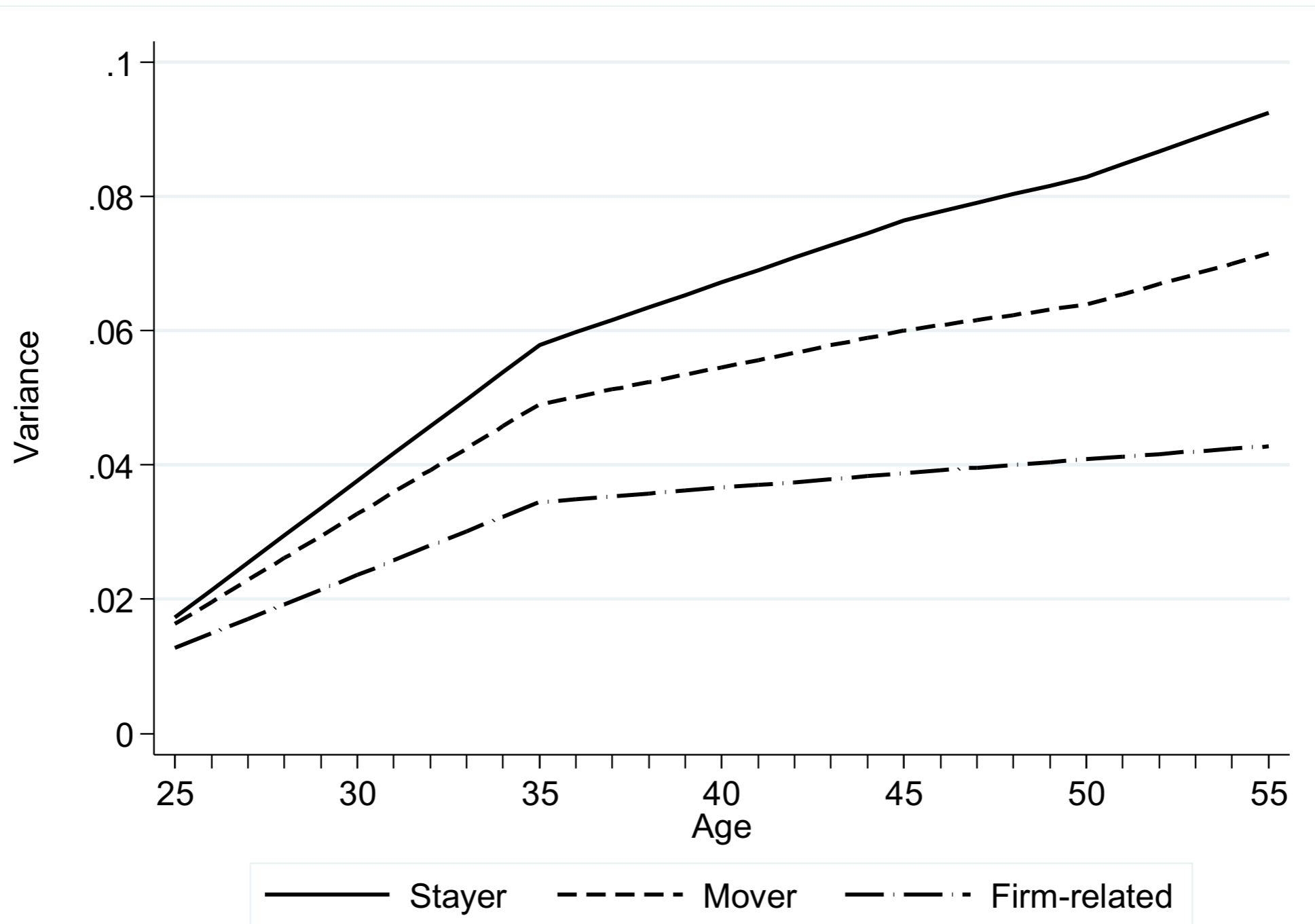
Average decomposition over age

	Prediction	As % of Total
Individual - Life-Cycle	0.0170	20.99
Individual - Match	0.0121	14.95
Firm	0.0127	15.75
Sorting	0.0208	25.65
Transitory	0.0183	22.66
Total	0.0809	

Interpretation

- Life cycle shocks capture heterogeneity in ability
  - Matters both at the beginning and at the end of the career (where it may reflect selection)

- Matching shocks capture release of information on ability to employer
  - Matters mostly at the beginning: late employers are already informed (from earlier matches) and there is not much information upgrading

- Sorting grows more at the beginning, consistently with evidence on matching

Summary and Conclusion

- When workers are young, inequality grows substantially both within and between job spells

- At older ages, within-match inequality growth slows down (and virtually stops at 45), while inequality keeps on growing between matches

- Firm effects account for significant share of overall inequality on average in the career

- Sorting of workers in firms accounts for a major share of overall inequality, grows when young

- Early matches are key for life-cycle wage inequality