

Earnings Dynamics & Labor Reforms: The Italian Case

Eran B. Hoffmann
Hebrew U

Davide Malacrino
IMF

Luigi Pistaferri
Stanford & NBER

Global Income Dynamics Conference, November 2020

The views expressed in this presentation are those of the authors and do not necessarily represent the views of the IMF, its Executive Board or its management.

Italy: Inequality and Volatility \uparrow , Mobility \downarrow

- How has the earnings distribution evolved over time in Italy?
- Significant trends in inequality, volatility, mobility:
 - ▶ inequality went up, mostly decline at the bottom
 - ▶ volatility increased, mostly younger cohorts
 - ▶ mobility decreased
- A string of labor reforms contribute to trends
 - ▶ younger cohorts face a dual labor market
 - ▶ rise in part-time jobs \rightarrow increases hours inequality
 - ▶ rise in temporary contracts \rightarrow increases volatility \Rightarrow headwind against labor productivity growth

Outline

- Data
- Core analysis
- Background on Italy
- Country-specific analysis
 - ▶ evidence on hours worked & contract type
- Conclusion

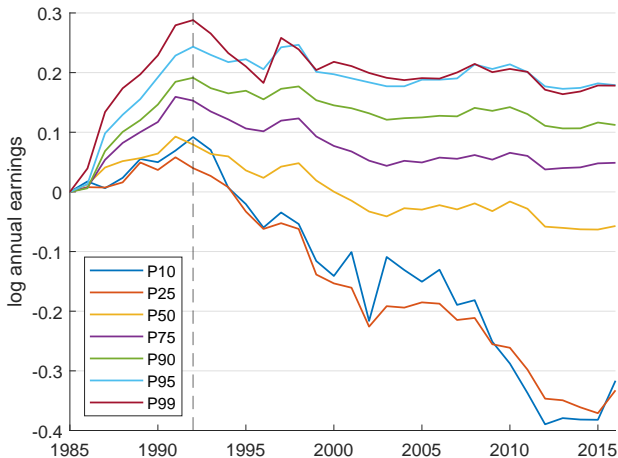
Dataset: INPS

- Social-security records of private-sector jobs, 1985-2016
 - ▶ $24/365=6.6\%$ random sample
 - ▶ all regular income plus bonuses, overtime, etc.
 - ▶ omits public sector + self employed (16% + 20% of employment, respectively)
 - ▶ top coded: 99.5th earnings percentile
- Key indicators:
 - ▶ full-time/part-time work
 - ▶ temporary/open-ended contract (after 1998)
 - ▶ occupation: white/blue collar, managerial
 - ▶ firm size and sector
- Important feature: weeks worked – reliable indicator of labor supply

Core analysis

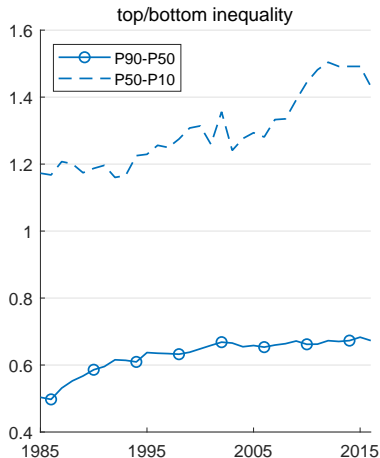
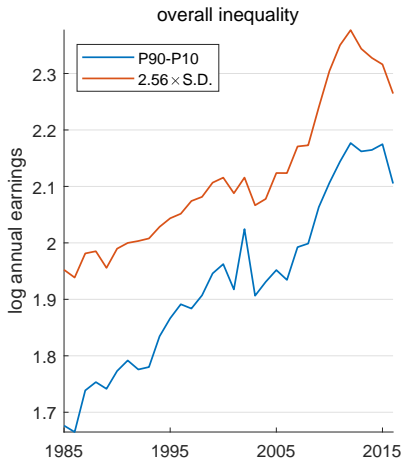
What happened to the cross-section of earnings?

- 1985-1992: earnings rise; mostly above top quartile
- 1992-2016: earnings fall; mostly below median



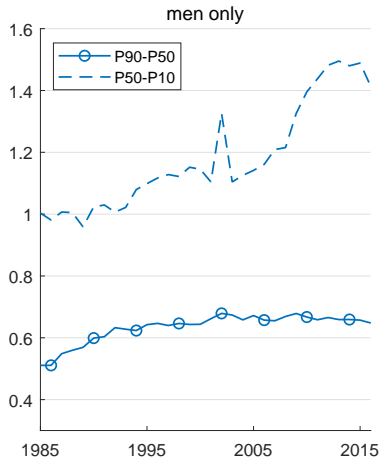
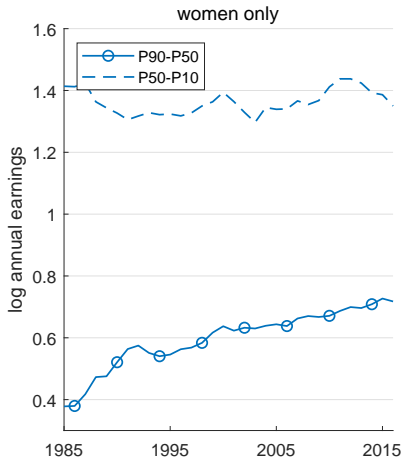
What happened to inequality?

- Inequality rising except early 2000s & after 2012
- $P90-P10 < 2.56 \times S.D.$ \Rightarrow leptokurtic distribution
- Timing differs between top & bottom inequality trends



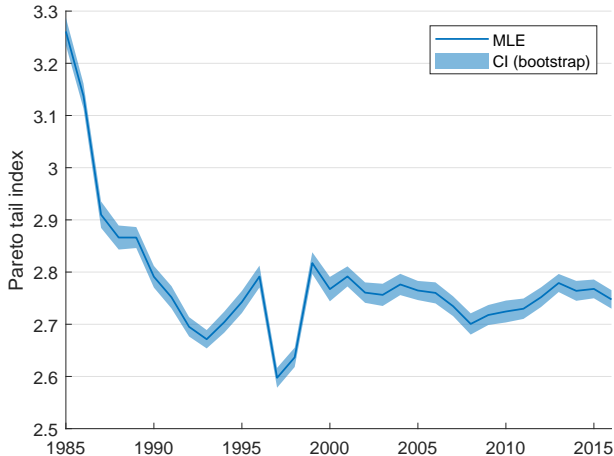
Inequality trends differ by gender

- Rise in top inequality driven by women; bottom by men



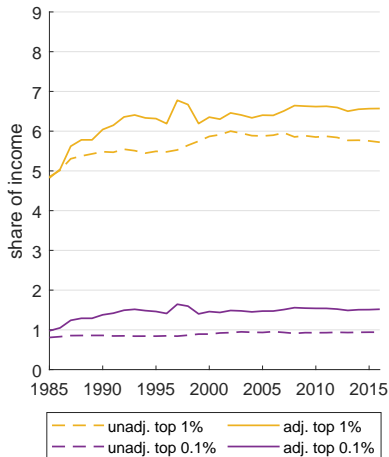
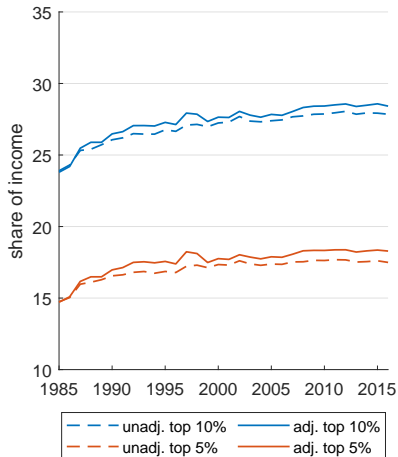
Right-tail distribution

- Estimate Pareto tail index with MLE, adapted for top-coding
- Tail index declined from 3.2 to 2.8, 1985-2016
 - ⇒ increasing income share to the very top



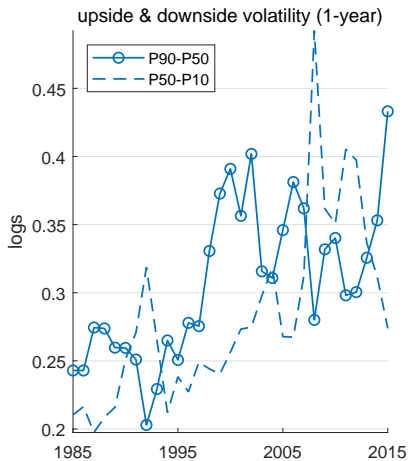
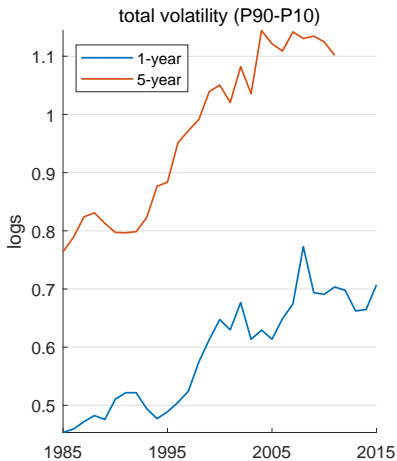
Top income shares

- Adjusted for top-coding using Pareto-tail index estimate



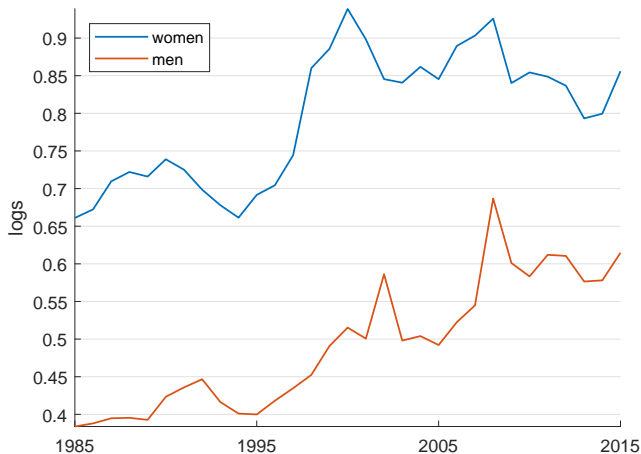
Volatility trends

- Upside & downside contribute to trend, procyclical skewness



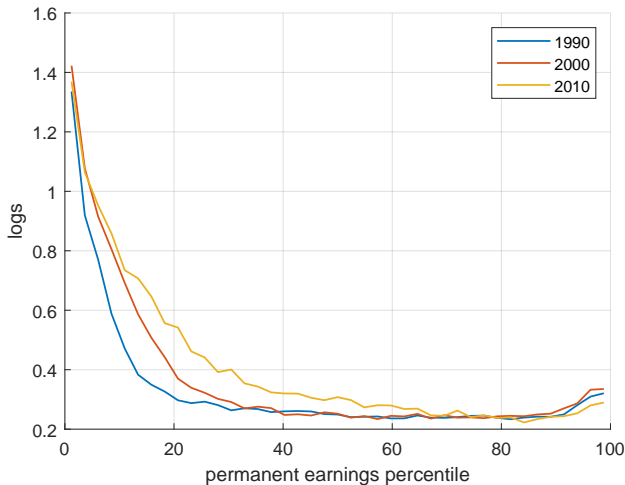
Volatility trends similar by gender; level differs

- Volatility is rising for women & men, similar timing
- Mean difference is large: 0.3



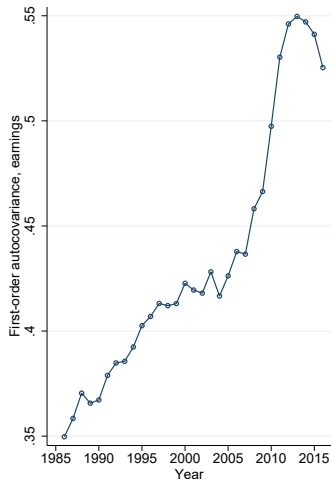
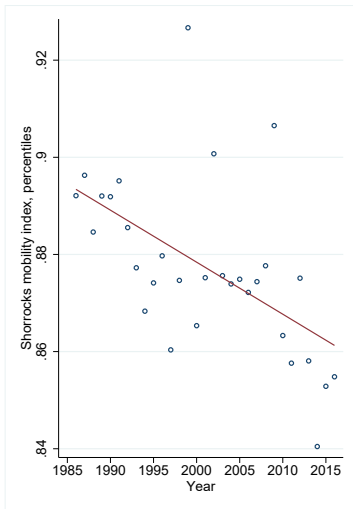
Which workers were affected by vol. trends?

- 1990→2000: bottom third of workers; 2000→2010: mostly 10-60
- Volatility of top third stable



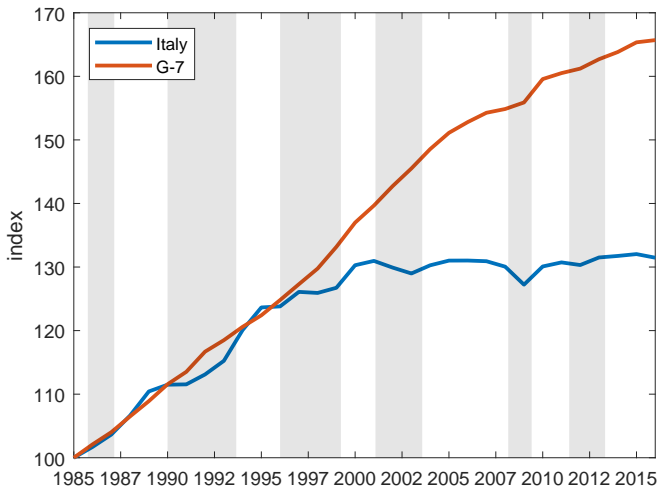
Earnings mobility decreased over time

- Shorrocks index $[(100 - Tr(M))/99] \downarrow$ in the last 30 years
- Autocovariance of earnings \uparrow



Country-specific analysis: Italy

Italy: Slowdown in labor productivity



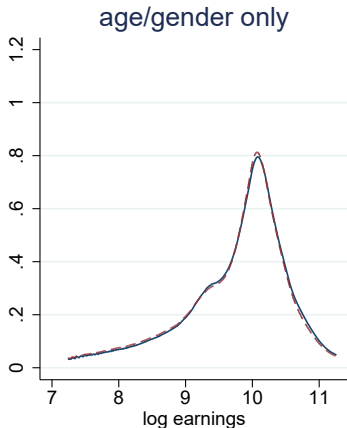
Changes in the nature of a worker/job 1985-2016

- Rise in women share of labor force: 33% to 38%
- Aging: Elderly dependency rate from 19% to 33% demographics
- Rise in temporary work contracts: 8% to 17% (after 1998)
- Rise in part-time work: ~0% to 28% (47% for women)
- Fall in mean weeks worked per worker: 46 weeks to 40 weeks (-15%)

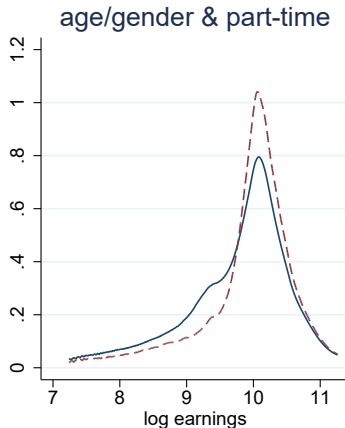
What composition trends drive inequality?

- DiNardo-Fortin-Lemieux decomposition, base year = 1985

▶ blue=actual dist., red=counterfactual P10-p90



— actual density in 2016
- - - counterfactual distribution



— actual density in 2016
- - - counterfactual distribution

Outline of country-specific analysis

- Special feature of the data: weeks worked + contract type
- Focus on three questions
 - 1 Hours vs. hourly earnings: which drives core trends?
 - 2 Temporary contracts: stepping stone or slippery slope?
 - 3 Can slower human capital accumulation explain productivity puzzle?

Hours vs. hourly earnings

- Data on weeks worked & part-time status \rightarrow hours worked
- Annual earnings = hours worked \times hourly earnings, in logs

$$y = h + w$$

- Decompose inequality

$$\sigma^2(y) = \sigma^2(h) + \sigma^2(w) + 2\sigma(h, w)$$

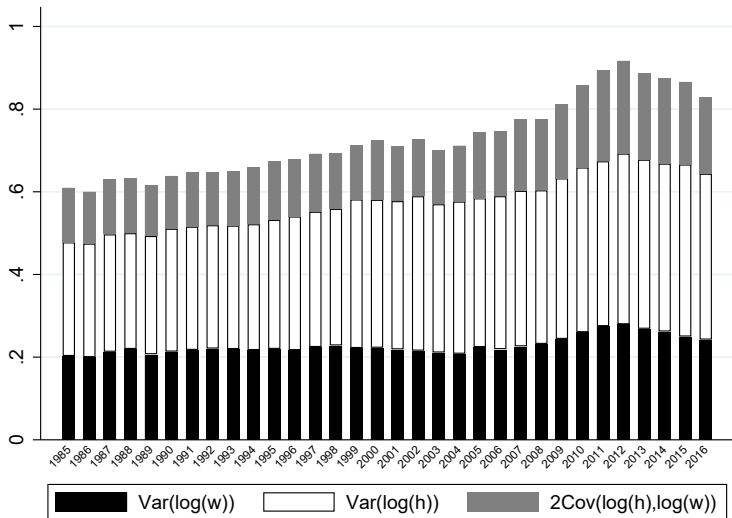
- Decompose volatility

$$\sigma^2(\Delta y) = \sigma^2(\Delta h) + \sigma^2(\Delta w) + 2\sigma(\Delta h, \Delta w)$$

- Which component drives trends?

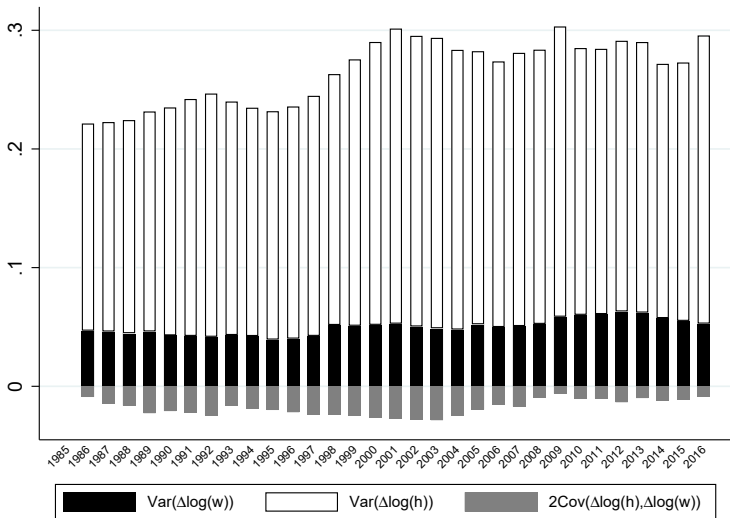
Trends in inequality: hours vs. hourly earnings

- Hours alone explain 58% of rise in inequality; 82% with cov



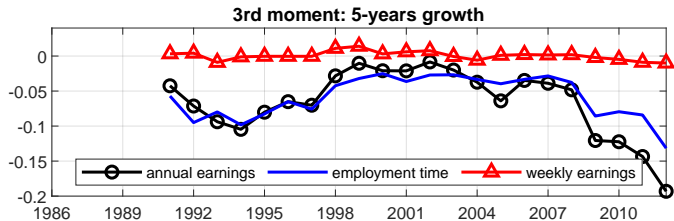
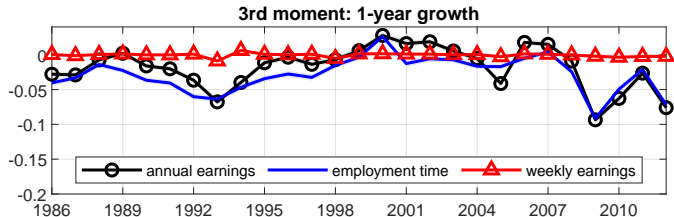
Trends in volatility: hours vs. hourly earnings

- Hours explain virtually all of the rise in volatility



Weeks of work drive skewness in earnings growth

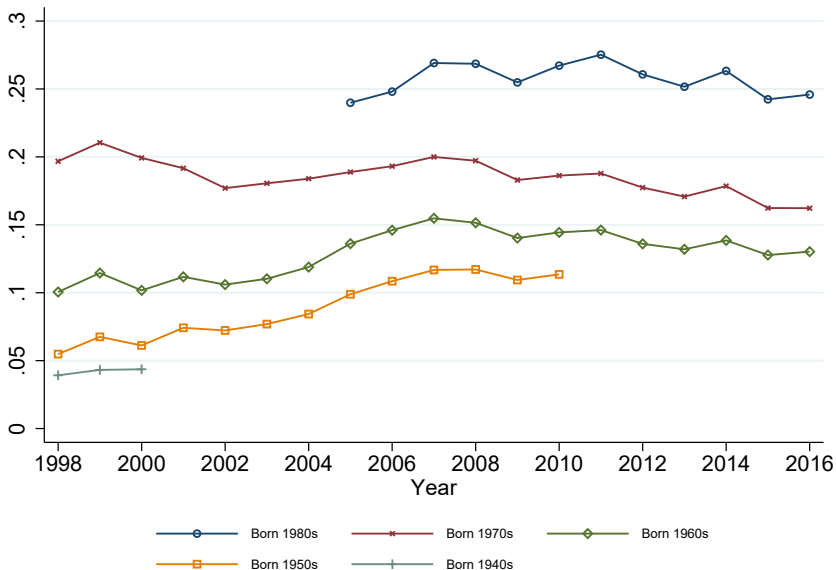
- Hoffmann and Malacrino (2019) decompose moments
- Fluctuations (and tails) driven by weeks, not weekly earnings



Temp. contracts: stepping stone or slippery slope?

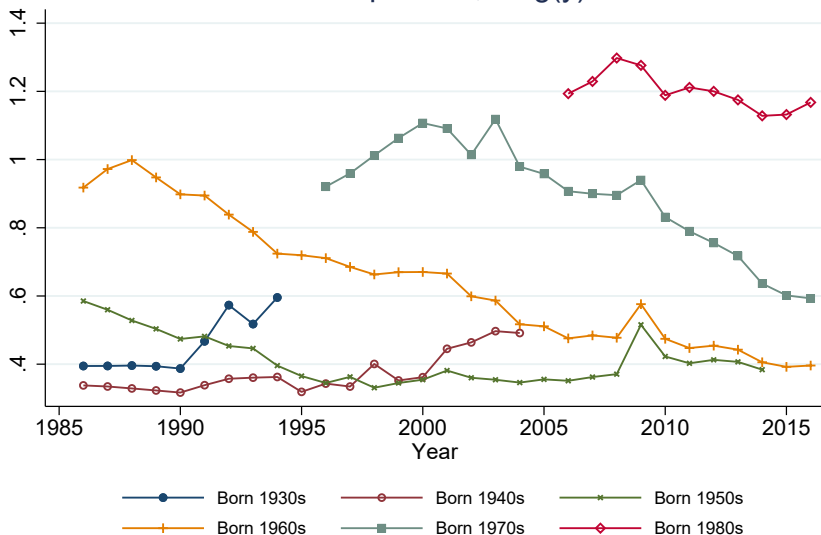
- Reforms gradually removed restriction on temporary contracts
 - ▶ end of temporary contract = 45% of all separations in 2016 separations
- What is the effect of temporary contracts?
 - ▶ evidence for dual markets: the volatility of young vs. old cohorts
 - ▶ contribution of end of temporary contracts to volatility

Dual labor market: temp. jobs by cohort



Volatility by cohort

90-10 pctl. diff, $\Delta \log(y)$



Does end of temporary contract contribute to volatility?

- Estimate the contribution of labor market events to volatility

- ▶ rolling 3-year individual-level volatility

$$\hat{\sigma}_{i,t}^2 = \frac{1}{3} \sum_{j=-1}^1 \Delta y_{i,t-j}^2 - \left(\frac{1}{3} \sum_{j=-1}^1 \Delta y_{i,t-j} \right)^2$$

- ▶ regress on separation dummies by cause + controls

- Controls: age profile, gender, occupation, part-time, ft→pt, pt→ft, job switcher, sector switcher, change in weeks worked, region & year fe; worker fe

Volatility by cause of separation

dependent variable: $\hat{\sigma}_{i,t}^2$	(1)	(2)
end of contract	0.202 (0.002)	0.134 (0.002)
layoff	0.267 (0.002)	0.135 (0.002)
quit	0.169 (0.002)	0.073 (0.002)
worker fixed effects?	no	yes
adj. R2	0.084	0.449
observations	5.8M	5.8M
mean volatility stayers	.0975	.0975
p-value: layoff=eoc	≈ 0	.651

- End-of-contract & layoff same effect, $\approx 2.5 \times$ mean vol. of stayers
- Quits contribute less, important fixed effects \rightarrow heterogeneous volatility

Slower hc accumulation explains prod. puzzle?

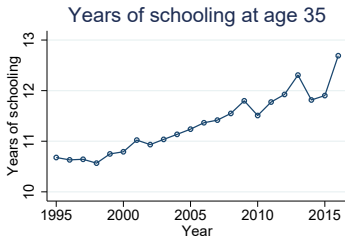
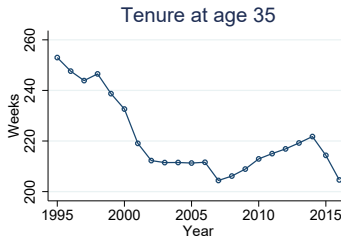
- Human capital theory emphasizes schooling and on-the-job training

$$y = \beta_0 + \beta_1 \text{schooling} + \beta_2 \text{experience} + \beta_3 \text{tenure} + \varepsilon$$

- Temp job for young cohorts, switch more \Rightarrow lowers hc
- What happened to the three components?

OECD tertiary education

Experience & tenure ↓, schooling ↑



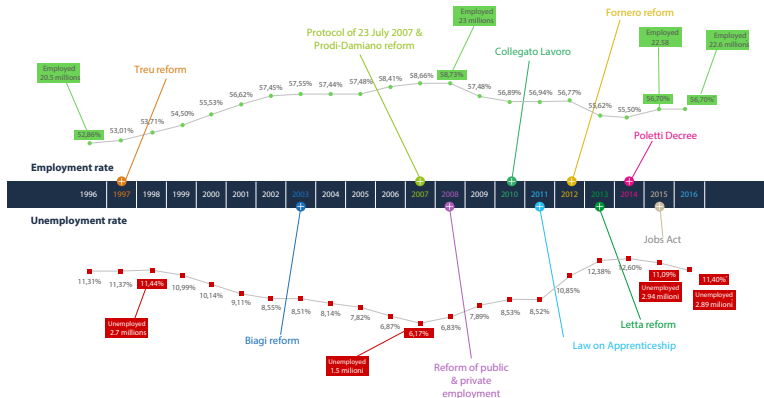
- Experience = weeks worked ages 25 to 35
- Tenure = weeks worked continuously at current firm

Conclusion

- Significant rise in inequality & volatility
- Hours vs. hourly earnings: hours explain rise in both
- New contracts are important drivers of trends
 - ▶ part time explains rise in hours inequality
 - ▶ end of temporary contracts drives volatility trend
 - ▶ weak support for the “stepping stone” hypothesis⇒ massive differences across cohorts
- Declines in experience & tenure: headwind against prod. growth

Backup slides

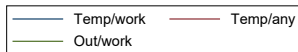
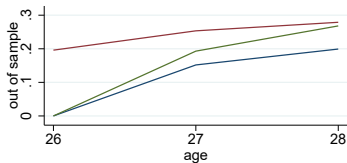
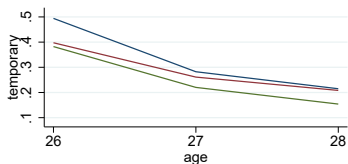
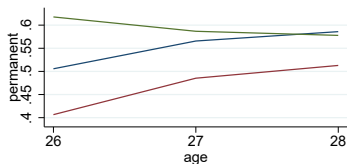
Labor market reforms



Source: Istat
Age classes: 15 +

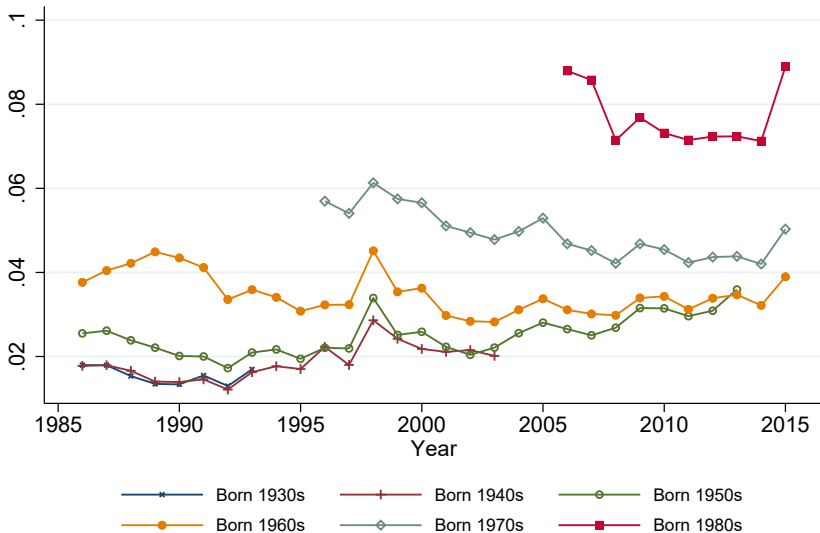
Transition out of temp jobs

shares by labor mkt state at 25 and 26



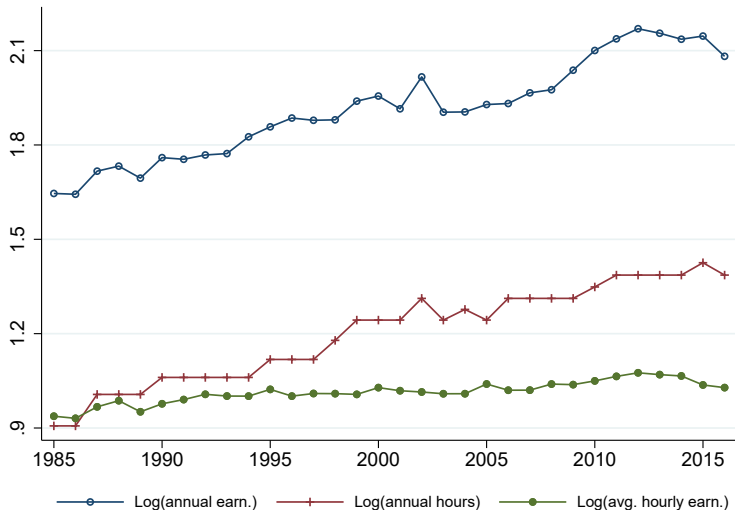
Volatility by cohort: extensive margin

Intermittent workers



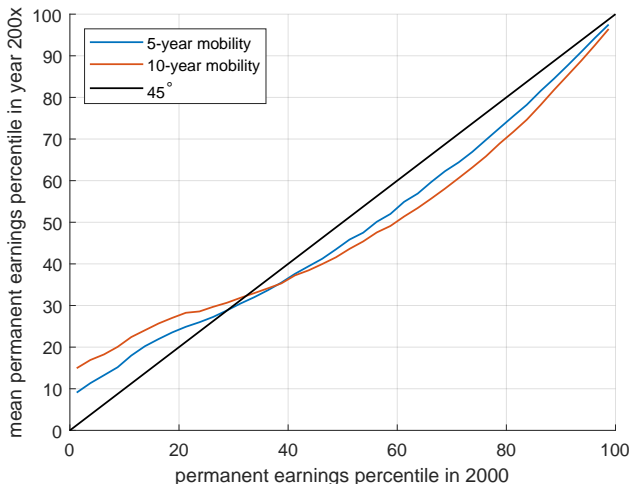
Trends in inequality: hours vs. hourly earnings

- Trend in P90-P10 also driven by hours weekly



Earnings mobility low at the top, higher elsewhere

- Low mobility may be due to an increase in initial heterogeneity
- Probability of moving up is lowest in the middle upward mob.



Changes in the labor force and the earnings distribution

- Composition of labor force significantly changed amount and changes in labor supply
- Info on weeks and part-time status → earnings components and inequality.
- Info on cause of separation (available since 2005):
 - ▶ How did type of separation changed over time?
 - ▶ Have changes contributed to high volatility in most recent years?
- Cohort analysis
 - ▶ Higher exposure to new policy environment → changes in evolution of inequality → connection to mobility

Inequality

- Use information on weeks and part-time status to get measure of hours worked
- Consider decomposition

$$\log Y_{it} = \log W_{it} + \log H_{it} \rightarrow$$
$$Var(y_{it}) = Var(w_{it}) + Var(h_{it}) + 2Cov(y_{it}, h_{it})$$

increase in $Var(h_{it})$ accounts for 75% increase in $Var(y_{it})$

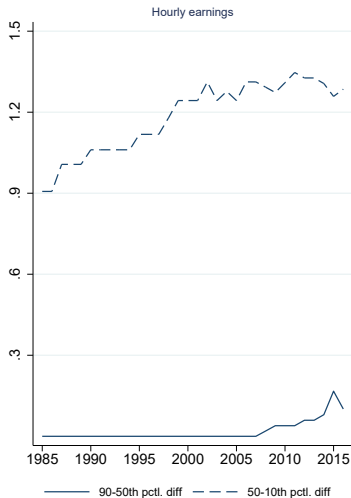
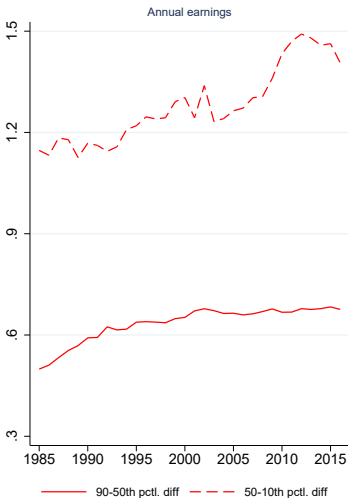
- Beginning of the period: no temporary contracts, and no part time contracts \rightarrow no dispersion in h_{it}
- End of the period: dispersed employment time accounts for much of “trend” in earnings dispersion (different from “cycle” as in US)

Trends in inequality: annual vs. hourly

- increase in dispersion driven by upper tail

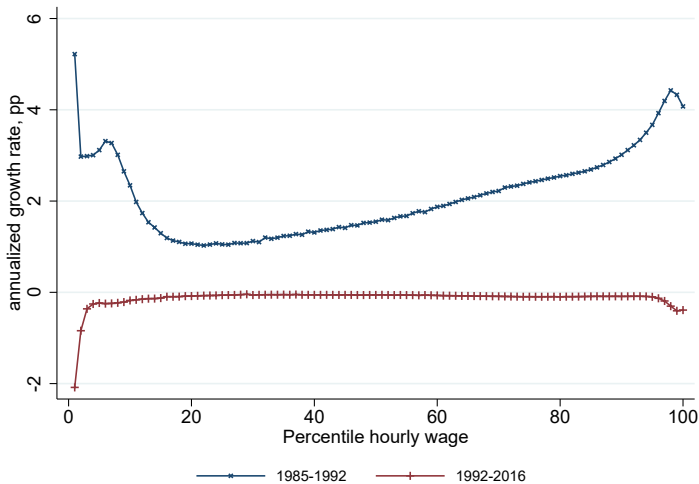
weekly

all percentiles



Growth across percentiles

- U-shaped growth until 1992, no growth after that

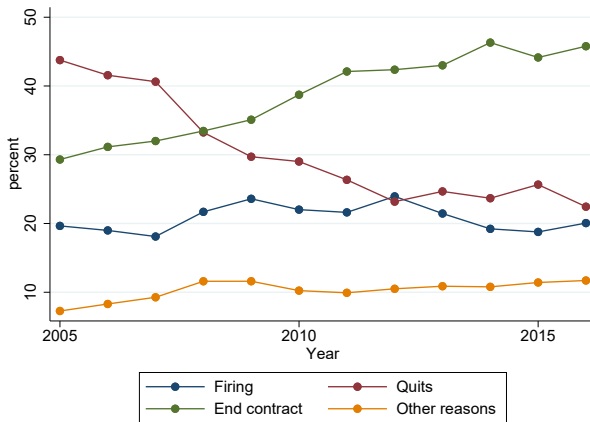


Volatility

- Volatility grows in late 90s jointly to widespread use of temporary contracts
- Can policy trends help explain increased volatility in earnings?
- Information on cause of separation can shed light on
 - ▶ expansion of temporary contracts
 - ▶ relevance as a source of separation
 - ▶ association with earnings volatility

Separations by cause

- Rise of temp contract → end-contract main cause
- Less quits consistent with prolonged economic slowdown



Labor market dualism and mobility

- Consider earnings process:

$$y_{i(b)t} = z_{i(b)t} + f_{i(b)} + \varepsilon_{i(b),t}, \quad z_{i(b)t} = \rho z_{i(b)t-1} + \eta_{i(b),t}$$

for individual i in cohort b in year t and mobility **decreases** with

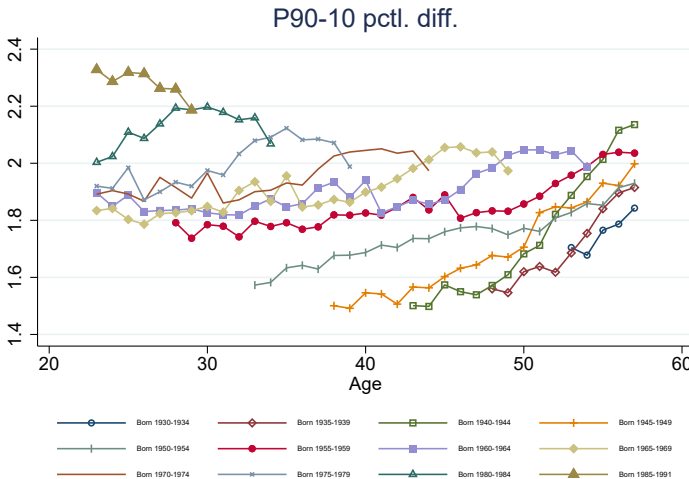
$$Cov(y_{i(b)t}, y_{i(b)t-1}) = Var(f_{i(b)}) + \sum_{s=1}^{\infty} \rho^{2s-1} Var(\eta_{i(b),t-s})$$

i.e. with ρ , $Var(\eta_{i(b),t})$, $Var(f_{i(b)})$

- Increase dualism \rightarrow larger $Var(f_{i(b)})$ and $Var(\eta_{i(b),t-s})$
- Less secure contracts \rightarrow larger $Var(\varepsilon_{i(b),t})$
- As new contracts become more common across younger generation we expect
 - ▶ Larger dispersion at entry
 - ▶ Possibly lower increase in variance over time, as temporary components play larger role

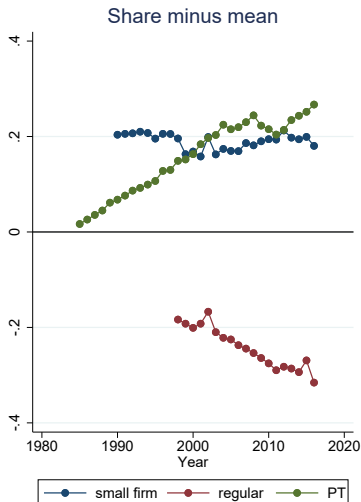
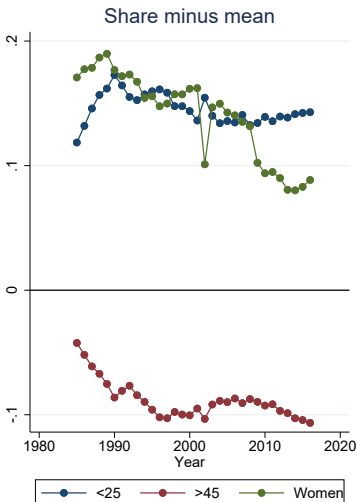
Earnings inequality in different cohorts

- Initial dispersion increases, while gradient declines



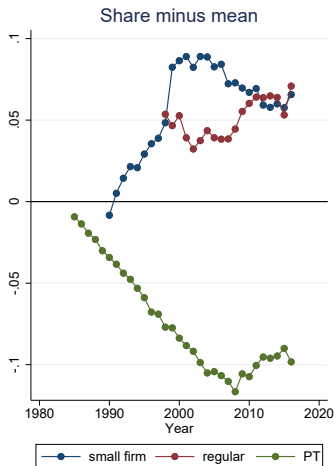
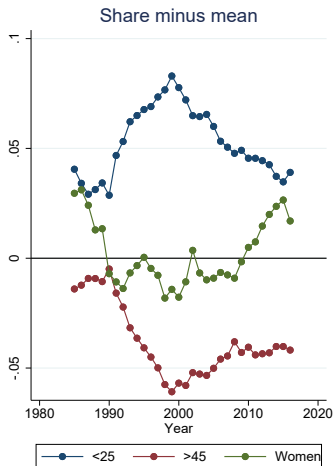
Composition effects: bottom 10

- Bottom gets younger, more men [back to main](#)
- More part time and less open end contracts



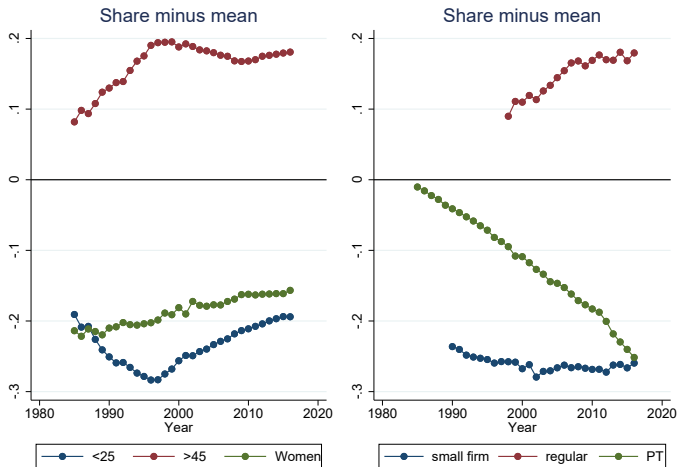
Composition effects: middle 20 (P40-P60)

- Women increase as avg rate, older workers from 2000 [back to main](#)
- More in small firms, less part time, average regular contracts



Composition effects: top 10

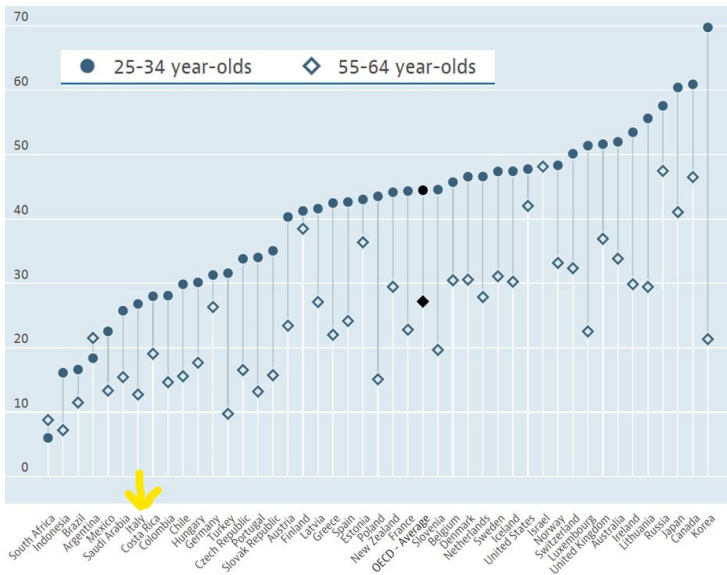
- More women, and older workers [back to main](#)
- More regular contracts and less part time



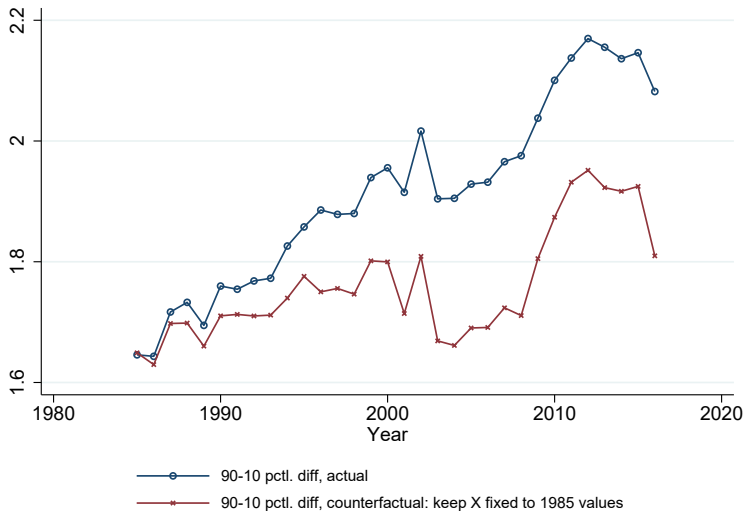
Adjusted earnings track productivity slowdown



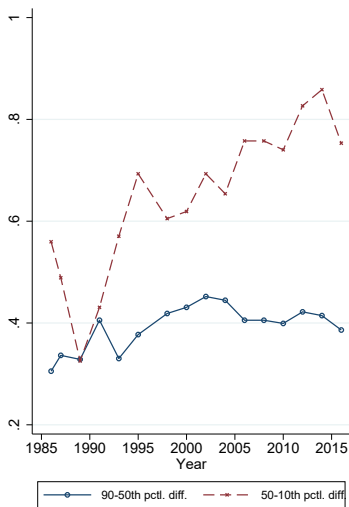
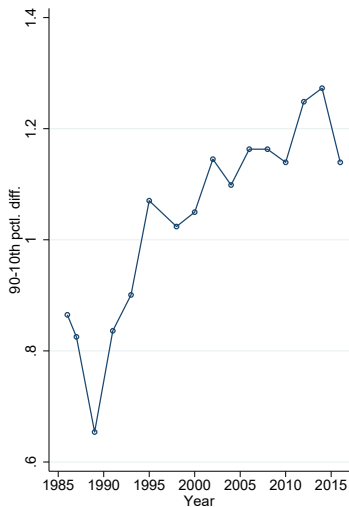
Share of people with tertiary education



Counterfactual increase in inequality

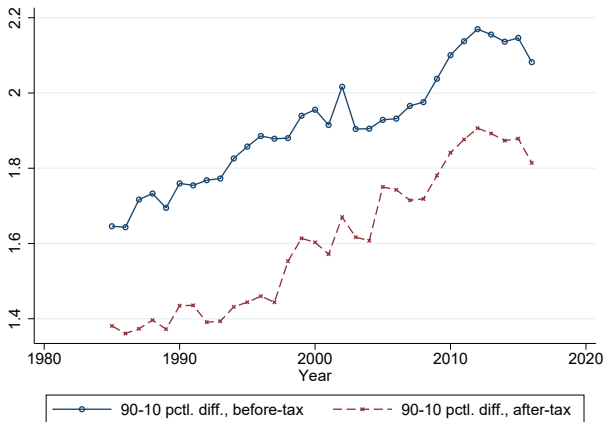


Inequality among public employees

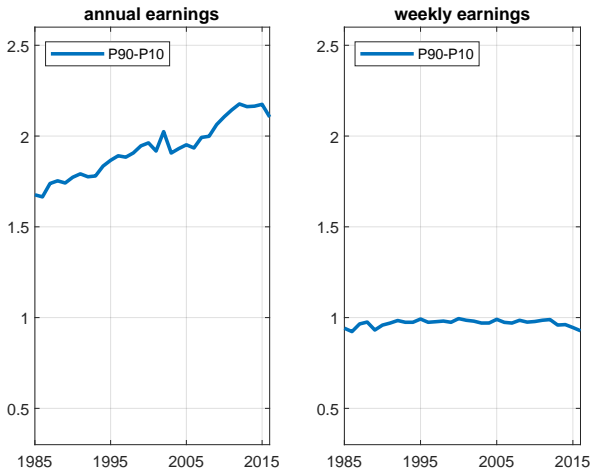


Inequality after tax

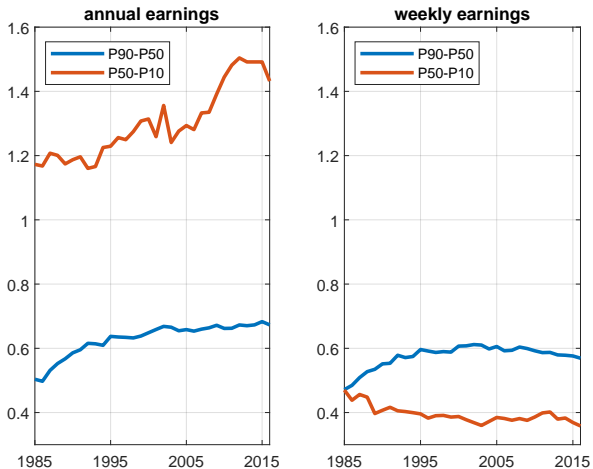
- lower level, converging trends (reduced progressivity in taxation)



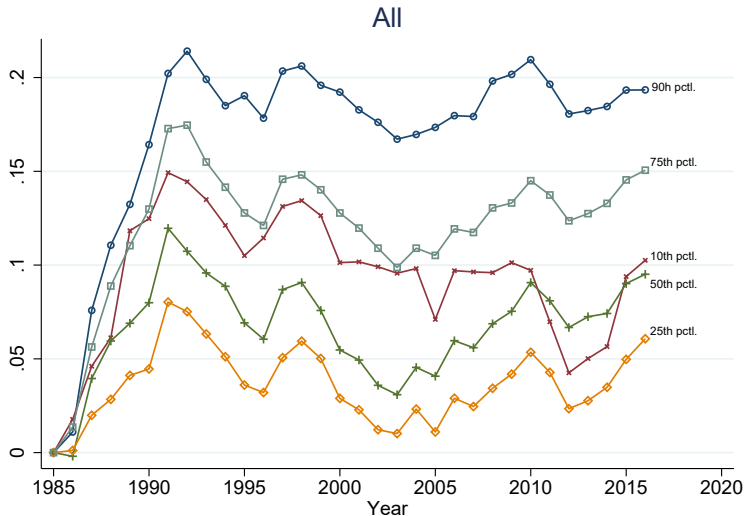
Trends in inequality: annual vs. weekly



Trends in inequality: annual vs. weekly



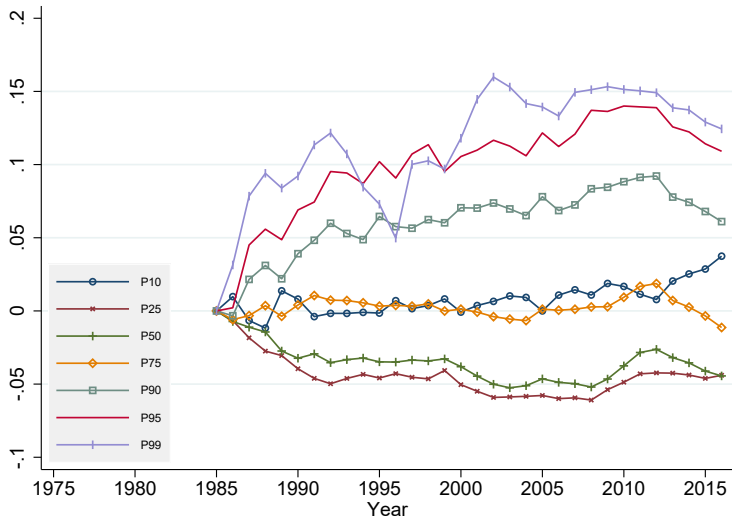
Percentiles: hourly earnings



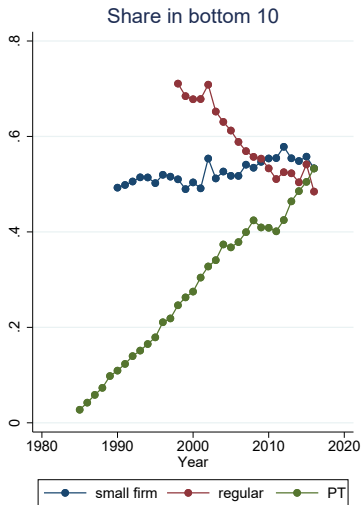
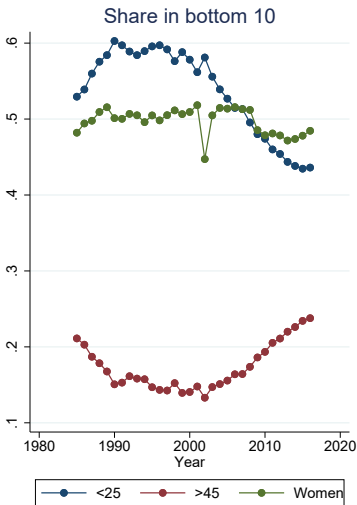
[back](#)

[weekly](#)

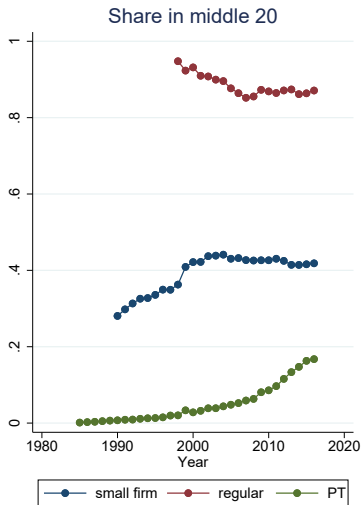
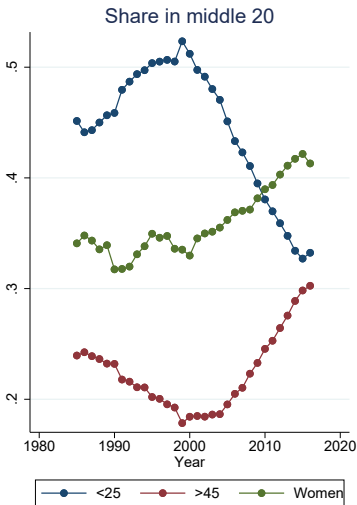
Percentiles: weekly earnings



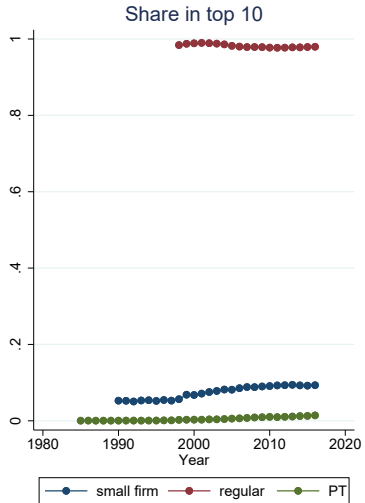
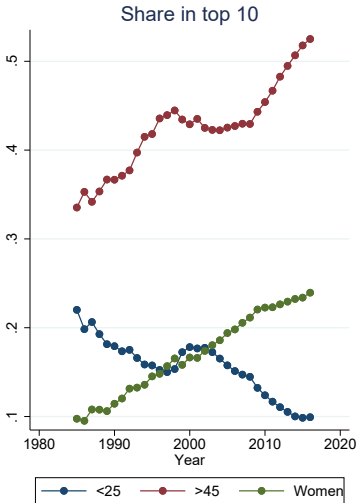
Composition effects: bottom 10



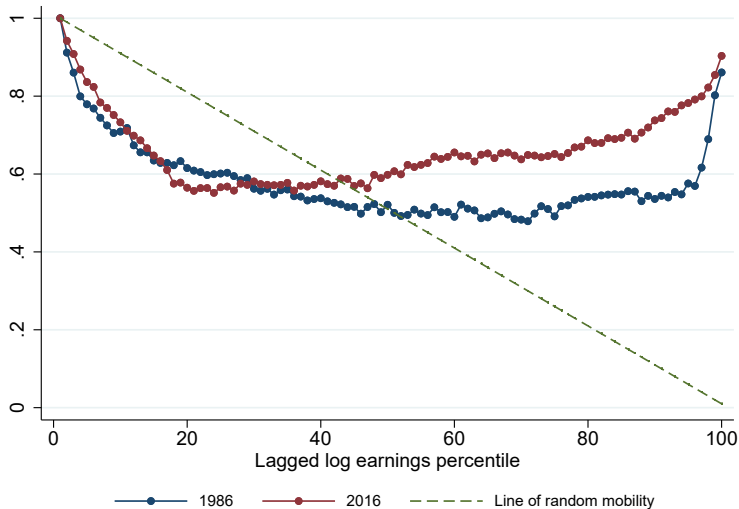
Composition effects: middle 20 (P40-P60)



Composition effects: top 10



Probability of staying or moving up lowest in the middle



Demographics

