Labor Market Frictions, Human Capital Accumulation, and Consumption Inequality

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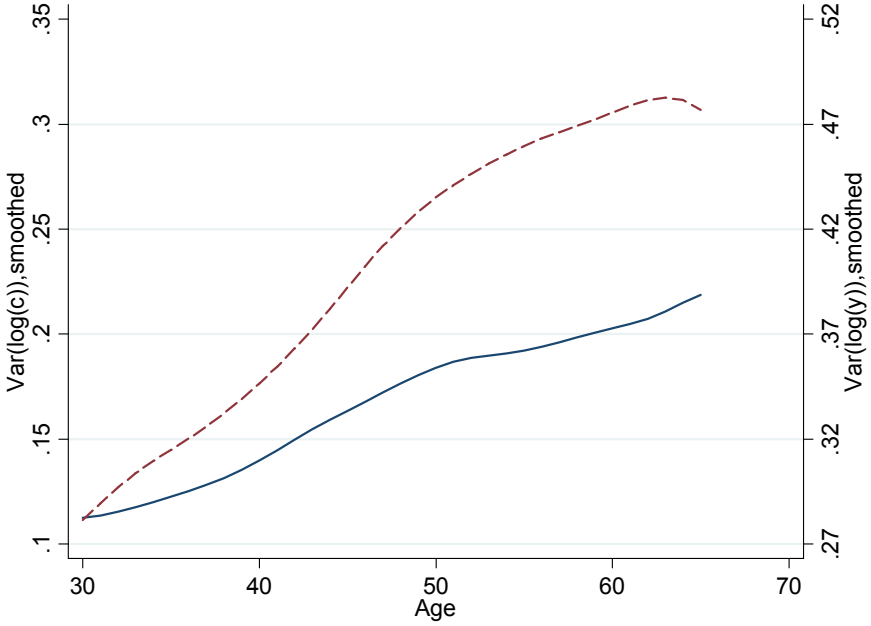
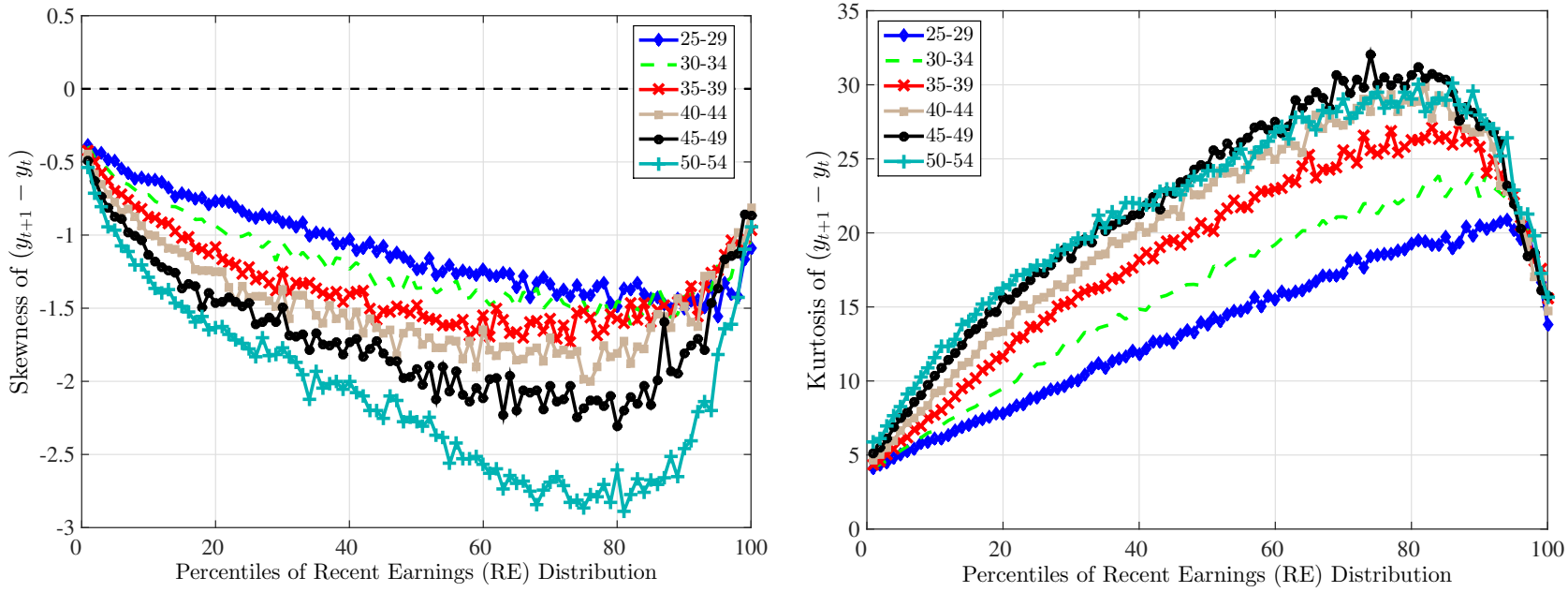
Introduction

- What is the relative contribution of shocks to human capital accumulation and the stochastic job ladder in determining the uncertainty workers face in the labor market?



source: Meghir & Pistaferri (2011)



source: Guvenen, Karahan, Ozkan and Song (2015)

Related Literature

- Statistical models of income processes

  Lillard and Willis (1978); Lillard and Weiss (1979); MaCurdy (1982); Abowd and Card (1989); Topel and Ward (1992); Gottschalk and Moffit (1995); Baker and Solon (2003); Meghir and Pistaferri (2004); Guvenen (2007); Altonji, Smith and Vidangos (2013); Guvenen, Karahan, Ozkan and Song (2015); Arellano, Blundell and Bonhomme (2015).

- Choices, information and risk

  Deaton and Paxson (1994); Blundell and Preston (1998); Krueger and Perri (2004); Storesletten, Telmer, and Yaron (2004); Cunha, Heckman and Navarro (2005); Blundell, Pistaferri and Preston (2008); Kaplan and Violante (2010); Lise (2013); Guvenen and Smith (2013) ...

- Job-search, learning and human capital accumulation

  Rubinstein and Weiss (2006); Yamaguchi (2010); Burdett, Carrillo-Tudela and Coles (2011); Bowlus and Liu (2013); Bagger, Fontaine, Postel-Vinay and Robin (2014); Lise and Postel-Vinay (2015)

Model Ingredients

Equilibrium random search model of the labour market

- Time is continuous, workers are risk averse, discount the future at rate ρ, and exit the market at rate ξ
- Workers search for jobs when unemployed and for better jobs when employed
- Firms recruit new workers and counter outside offers to retain their existing workers

Worker and firm heterogeneity

- Differences in ability/productivity
- Human capital accumulation depends on worker and firm type

Incomplete markets (Aiyagari-Beweley-Huggett)

- No complete set of state-contingent claims
- Single riskless asset to transfer resources over time

Technology

A match between a worker of type $\mathbf{h_t}$ and a firm or type y produces

$$f(\mathbf{h}_t, y) = h_0 h_{1t} y$$

The worker supplies human capital $\mathbf{h}_t = \{h_0, h_{1t}\}$

- fixed worker type h_0
- time-variant human capital h_{1t}

The firm is characterized by the fixed productivity type y

Home production takes the form

$$b(\mathbf{h}_t) = h_0 h_{1t} b$$

Human Capital Accumulation

The time varying component h_{1t} follows a diffusion process:

$$\frac{\mathrm{d}h_{1t}}{h_{1t}} = \mu(h_0, y)\mathrm{d}t + \sigma \mathrm{d}\mathscr{B}_t,$$

$$\mu(h_0, y) = \mu_0 + \mu_1 \log h_0 + \mu_2 \log y$$

Human capital accumulation

- The drift rate depends on the current match.
- It is assumed to be non-decreasing in the firm-type.

Idiosyncratic productivity- and health shocks

- Deviations form the deterministic path are captured by the Brownian motion $\mathscr{B}_t$ with diffusion parameter σ

Meetings and Transitions

- Search is random and sequential.
- Both employed and unemployed workers are contacted by a firm at type dependent contact rate

$$\lambda(h_0) = \exp(\lambda_0 + \lambda_1 \log h_0)$$

and receive offers from the sampling distribution

$$\Gamma(y) \quad y \in [\underline{y}, \overline{y}]$$

the decision to accept or reject the offer is endogenous

- A worker becomes unemployed at type dependent separation rate

$$\delta(h_0) = \exp(\delta_0 + \delta_1 \log h_0)$$

and leaves the labor market at rate

$$\xi$$

Wages

The wage is assumed to be a piece-rate $0 < \theta \leq 1$ of match output:

$$w_t = h_0 h_{1t} y \theta_t$$

$$\log w_t = \log h_0 + \log y + \log h_{1t} + \log \theta_t$$

Wages

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Firms compete based on current output:
Suppose a worker currently matched with firm y is contacted by a firm of type y':

- if $y' > y$ the worker moves to firm y' and the piece rate there starts at

$$\theta' = \frac{y}{y'}$$

- if $y \geq y'$ the worker stays at y and the piece rate is updated to

$$\theta = \max\left\{\theta, \frac{y'}{y}\right\}$$

Worker Values

Worker with assets a, human capital (h_0, h_1), matched to firm y, at piece-rate θ:

$$
\begin{aligned}
&[\rho + \lambda(h_0) + \delta(h_0) + \xi] W(a, h_0, h_1, y, \theta) \\
&\qquad = \max_{a - \underline{a} \geq c \geq 0} u(c) + \frac{\partial}{\partial a} W(a, h_0, h_1, y, \theta)[ra + \theta h_0 h_1 y - c] \\
&\qquad + \mu(h_0, y) h_1 \frac{\partial}{\partial h_1} W(a, h_0, h_1, y, \theta) + \frac{\sigma^2}{2} h_1^2 \frac{\partial^2}{\partial h_1^2} W(a, h_0, h_1, y, \theta) \\
&\qquad + \lambda(h_0) \int \max \Big\{ W(a, h_0, h_1, y', y/y'), \\
&\qquad\qquad W(a, h_0, h_1, y, \max\{\theta, y'/y\}) \Big\} d\Gamma(y') \\
&\qquad + \delta(h_0) W(a, h_0, h_1, b, 1) + \xi R(a, h_0, h_1)
\end{aligned}
$$

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&\qquad + \delta(h_0) \int W(a, h_0, \alpha h_1, b, 1) d\Lambda(\alpha) + \xi R(a, h_0, h_1)
\end{aligned}
$$

Data

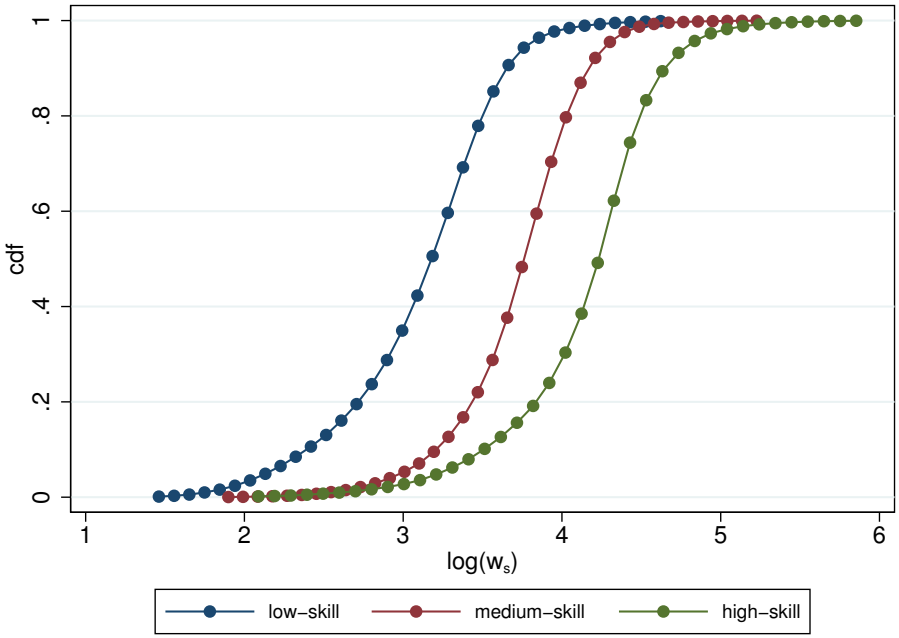
- Linked Employer-Employee data from Germany spanning the years 1975-2010
  - 2% random sample consisting of 212,380 male workers who started their career during the sample
  - worker id, firm id, wages, worker flows,...
- Income and Expenditure Survey (EVS)
  - Repeated cross-section carried out every 5 years starting from 1978

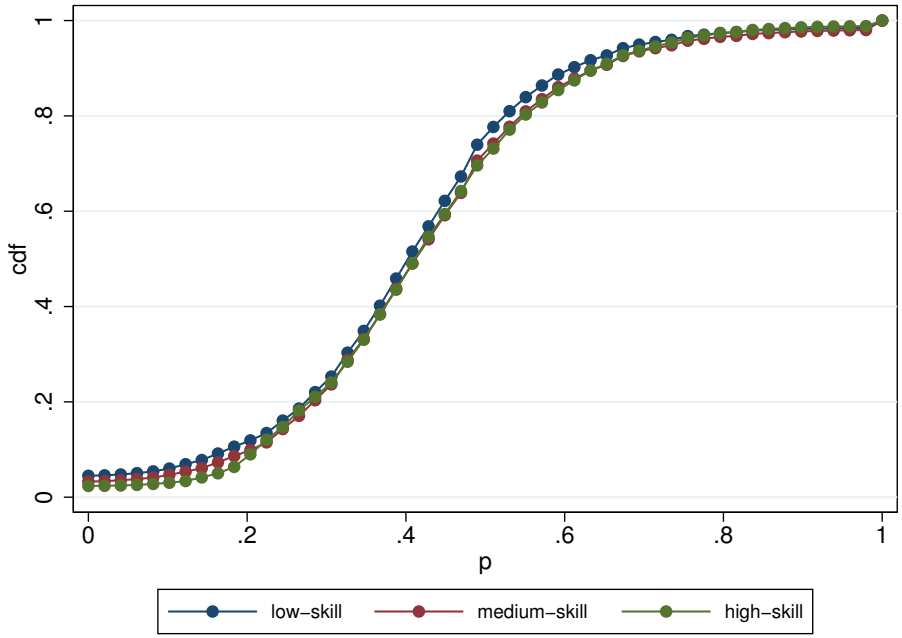
▸ Details

Identification

- Worker types h_0 are identified from their first wage
- Firms are ranked and binned into types based on the share of workers they hire from other firms; The sampling distribution is identified from job types accepted out of unemployment
- $\delta(h_0)$ and $\lambda(h_0)$ are identified by separation rates and unemployment rates, conditional on h_0
- Human capital accumulation (type dependent mean and variance) is identified using three job spells using the difference in starting wages between spell 2 and 3. (If spell 1 and 2 are at the same firm type it is especially helpful)

Estimated Distribution of Worker Types and Firm Types

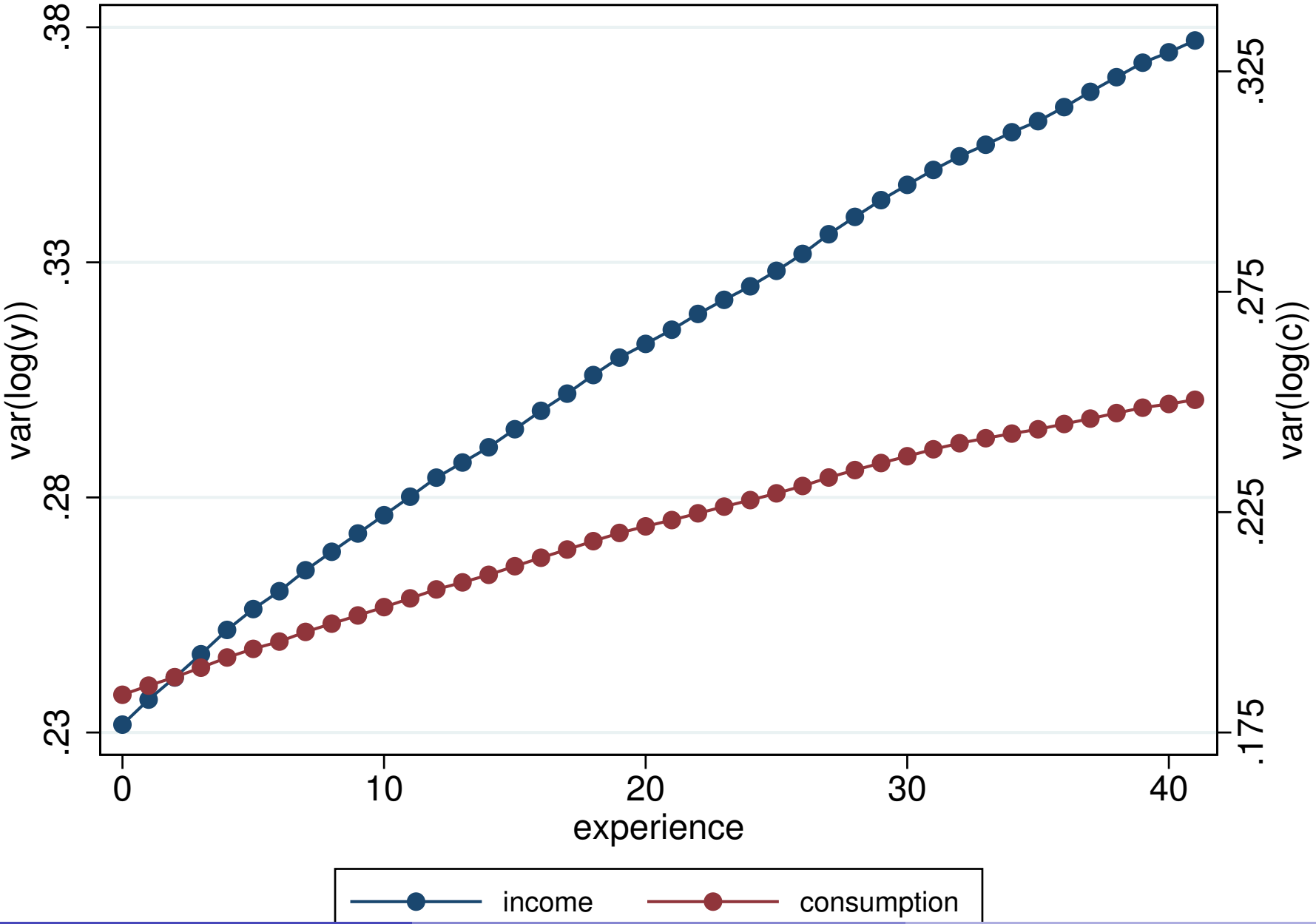




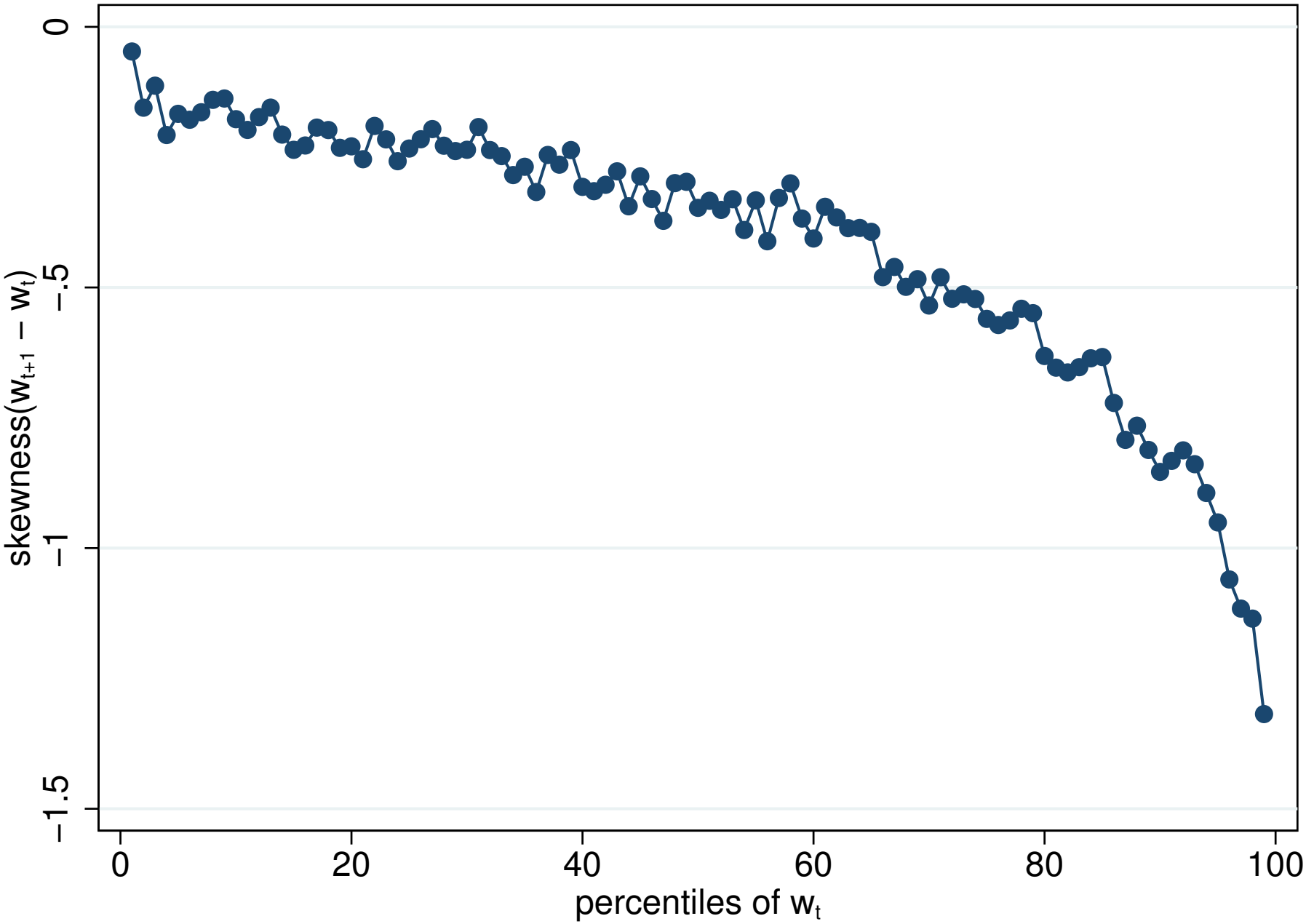
Parameter Estimates (preliminary)

	low-skilled	high-skilled
Contact rates: $\lambda(h_0) = \exp(\lambda_0 + \lambda_1 \log h_0)$		
λ_0	–2.632	–2.733
λ_1	–0.0910	–0.1102
Destruction rates: $\delta(h_0) = \exp(\delta_0 + \delta_1 \log h_0)$		
δ_0	–3.585	–4.912
δ_1	0.1316	–0.345
Human capital, drift: $\mu(h_0, y) = \mu_0 + \mu_1 \log h_0 + \mu_2 \log y$		
μ_0	0.000	0.000
μ_1	–0.003	–0.0034
μ_2	0.001	0.0025
Human capital, variance of shocks: σ^2		
σ^2	0.0174	0.02007

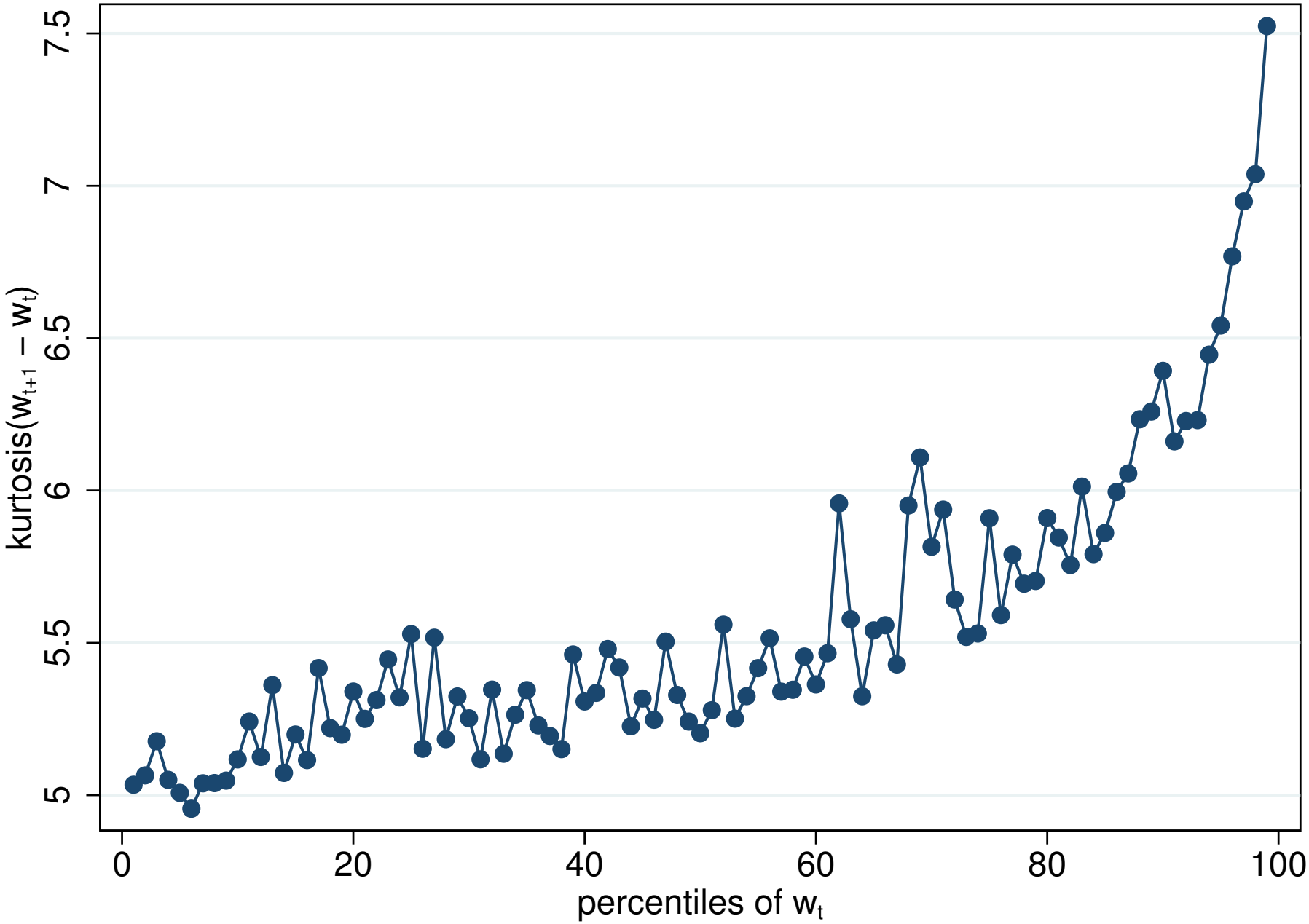
Linear increase in earnings and consumption variance



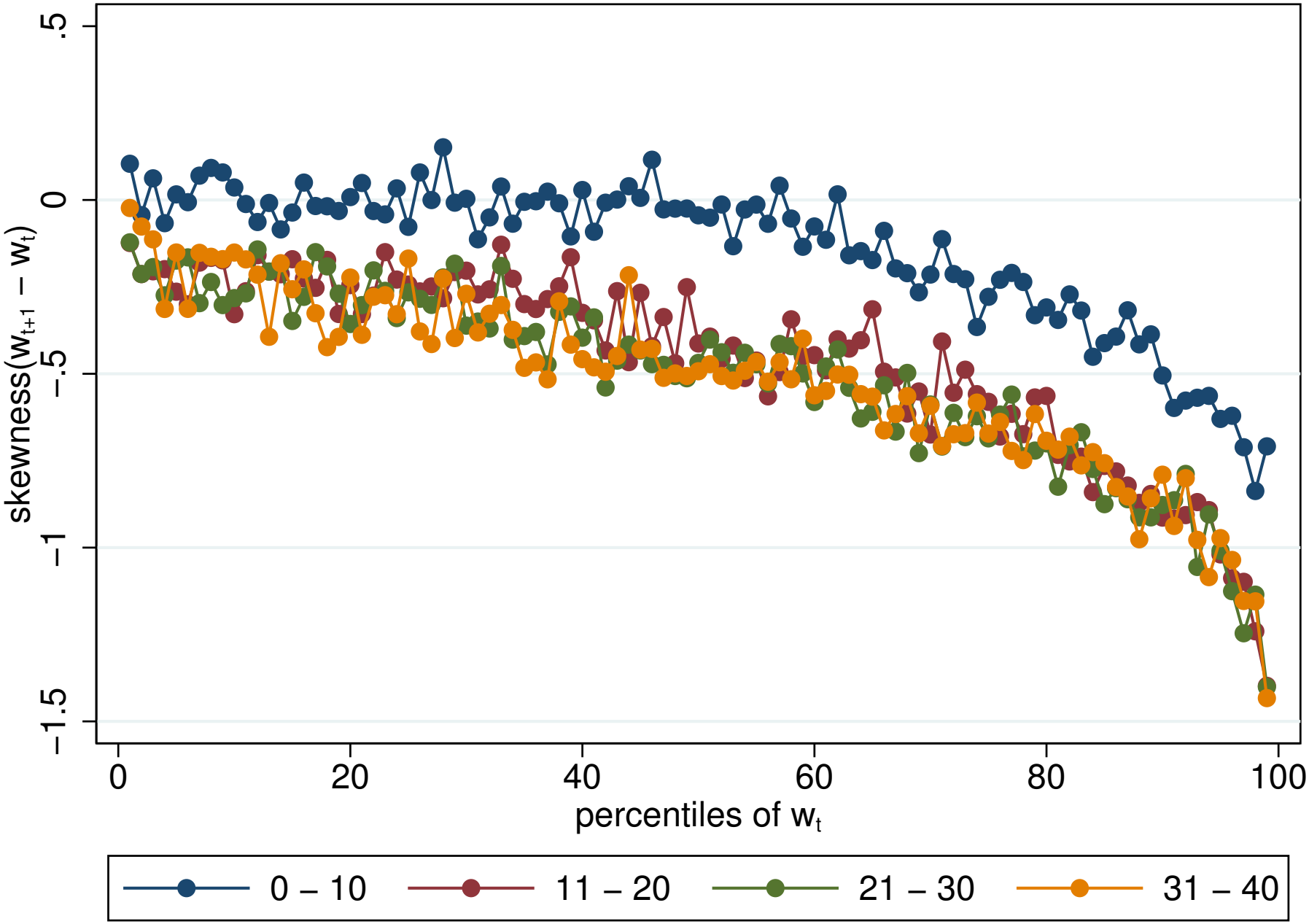
Negative skewness of Δw_{t+1}, decreasing in w_t



Excess Kurtosis of Δw_{t+1}, increasing in w_t



Negative skewness of Δw_{t+1}, decreasing with experience(?)



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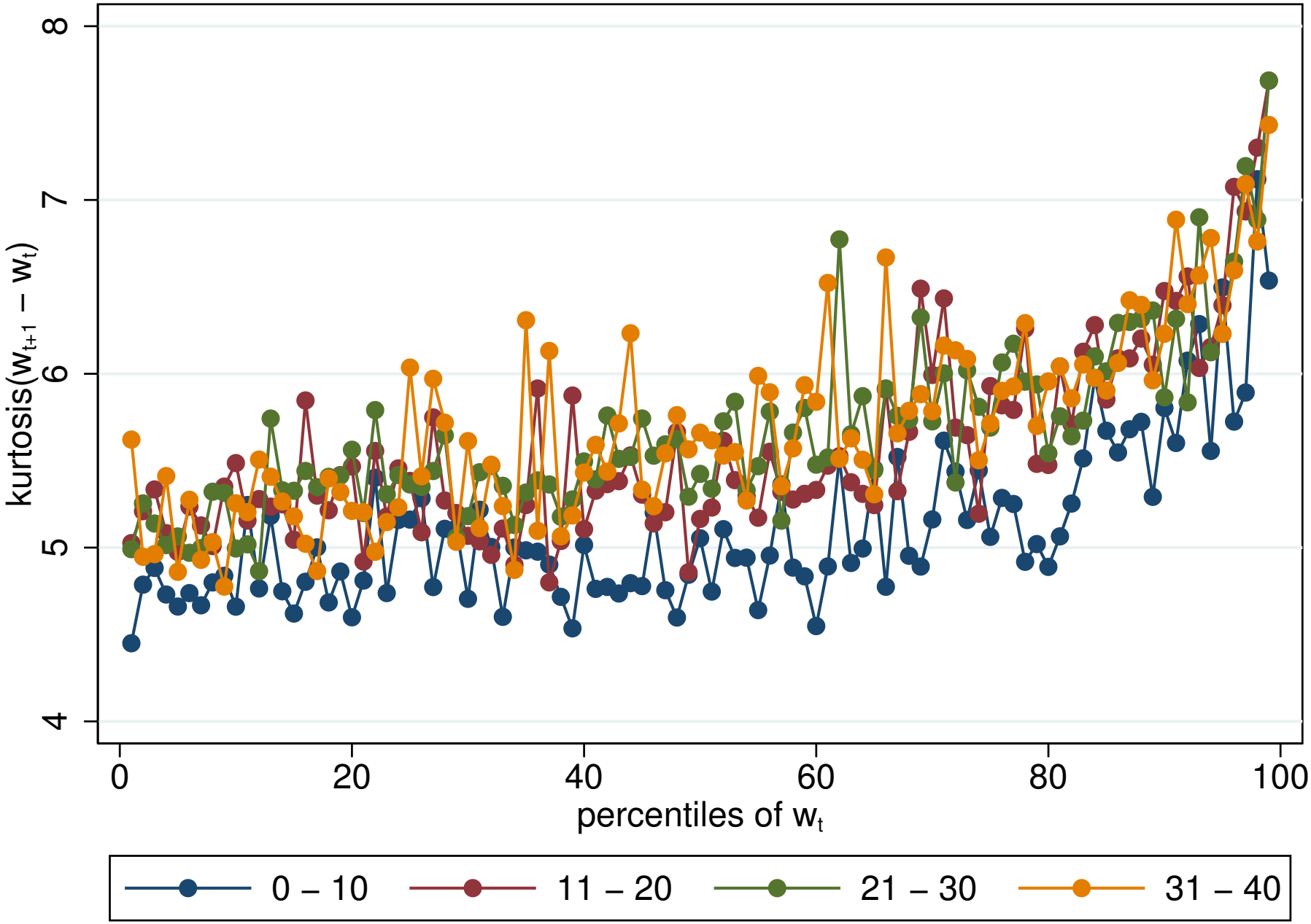
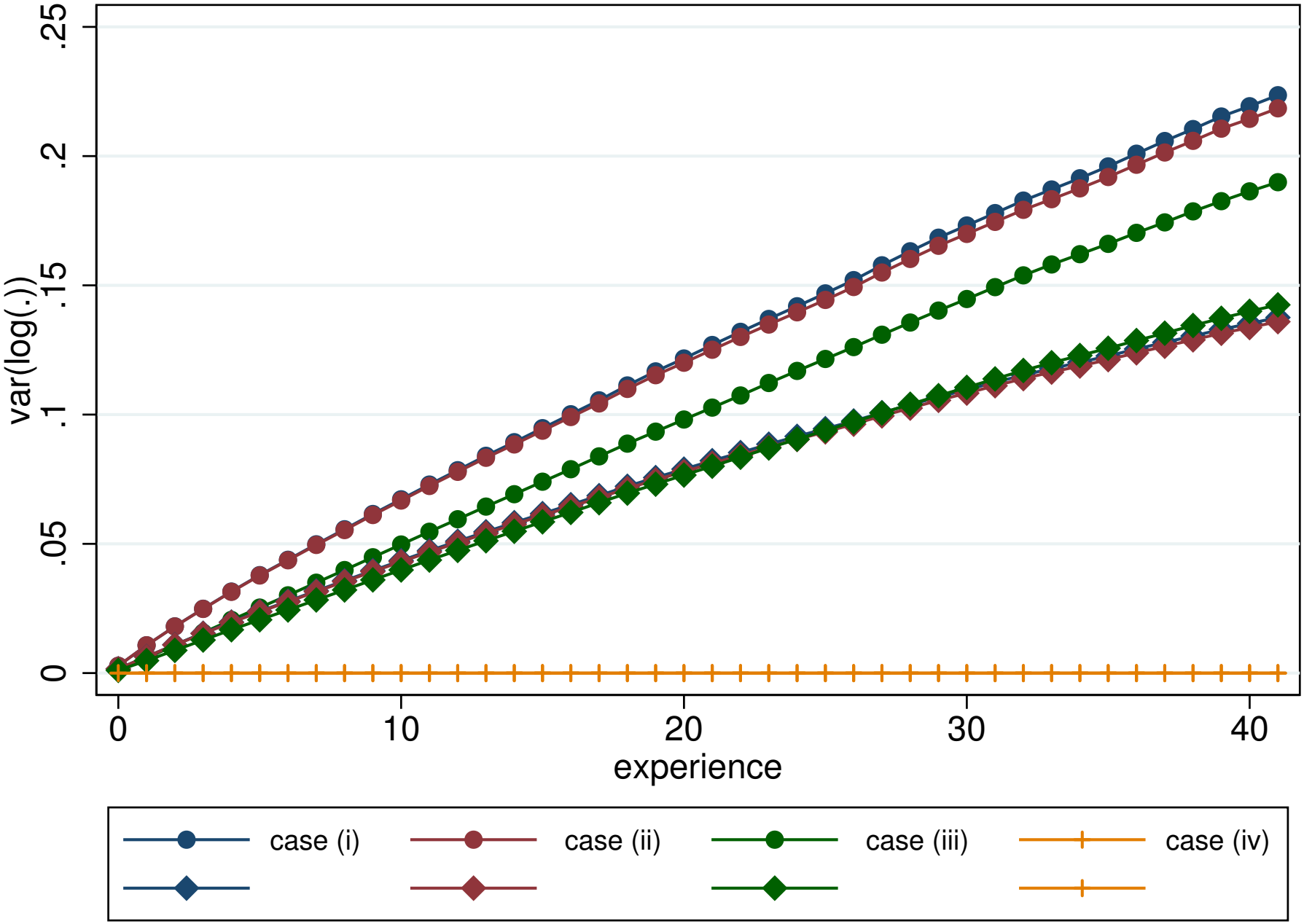
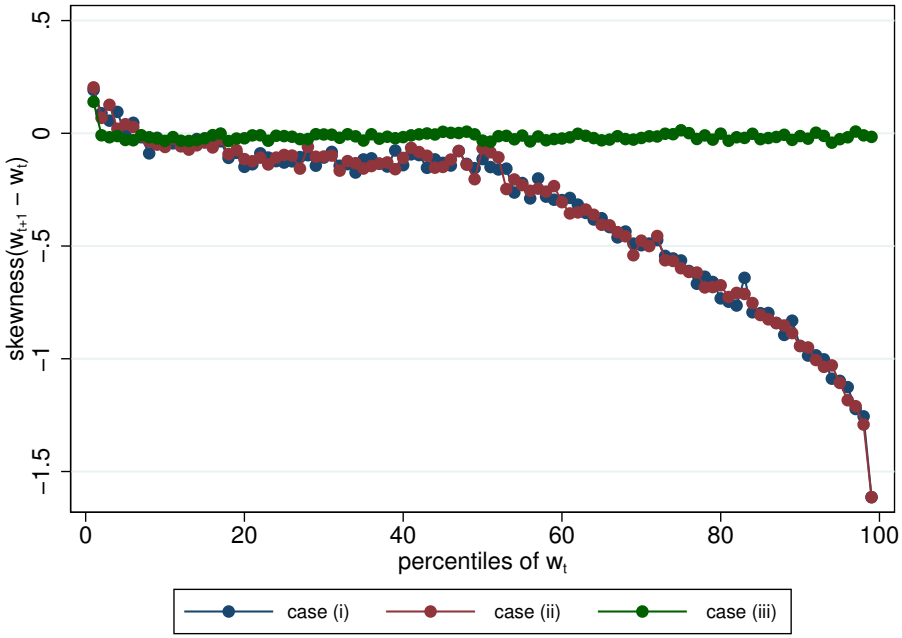
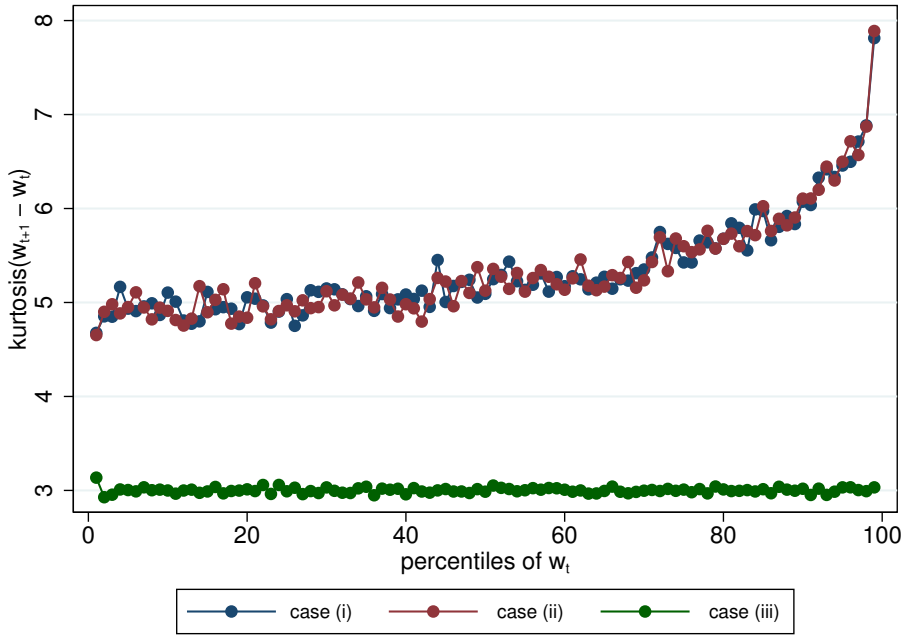


Rising variance is almost all due to shocks to human capital



Skewness and Kurtosis almost all due to job ladder





Conclusion

- Persistent shocks account for the rising variance of log earnings and consumption
- The job ladder accounts qualitatively for the patterns of the skewness and kurtosis of conditional year-over-year wage changes
- Our preliminary results do not produce the quantitative patterns of the skewness and kurtosis using loss of search capital alone
- We conjecture loss of human capital at job loss will beef up the quantitative effects

Linked Employer-Employee Data: SIAB 7510 & BHP

Employment Spells

- reported with exact start- and end-dates
- spells can end for a number of reasons: changes in the wage paid, changing employer, switching to part-time,...

Wages and Hours

- Wages are provided by firms and are very accurate due to the threat of legal sanctions for misreporting.
- Hours are not reported, but information on full-time, long and short part-time work.
- The reported wages are average daily wages for each spell.
- Drawback: Top-coding at the social security contribution limit.

Worker Flows

- worker-flows at the estbalishment level from the Establishment History Panel (BHP)

▸ Data

Sample Restrictions

Sample of labour market entrants between 1975-2010:

- males based in West-Germany
- age restrictions upon entry
- divided into three mutually exclusive skill groups

Based on the employment spell data, we generate a panel data set at monthly frequency.

- spells that last for less than one month are dropped.
- unemployment is proxied by non-employment

Income and Expenditure Survey (EVS)

- Federal Statistical Office (Destatis)
- Repeated cross-section carried out every 5 years starting from 1978.
- Detailed household and consumption data.
- Information on earnings and income.
- Large representative sample of around 60,000 households.