Income Inequality and Income Risk: Old Myths vs. New Facts[1]

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[1] This lecture summarizes research conducted jointly with Serdar Ozkan, Fatih Karahan, Greg Kaplan, Nick Bloom, David Price, and Jae Song.

Not everything that counts can be counted...

... and not everything that can be counted counts.

Sign on Einstein's office wall at Princeton

Motivation

- Nature of income inequality/risk: critical for many questions in social sciences.
- Survey-based US panel datasets have important limitations:
  - small sample size
  - large measurement (survey-response) error
  - non-random attrition
  - top-coding, etc.
- $\Longrightarrow$ myths about income inequality and income risk.

Data: SSA Master Earnings File

- Population sample: Universe of all individuals with a U.S. Social Security number
- Currently covers 35 years: 1978 to 2013
- Basic demographic info: sex, age, race, place of birth, etc.
- Earnings data:
  - Salary and wage earnings from W-2 form, Box 1
    - No topcoding
    - Unique employer identifier (EIN) for each job held in a given year.
    - 4–5 digit SIC codes for each employer
  - Self-employment earnings from IRS tax forms (Schedule SE)

Our Sample

- Individuals: 10% representative panel of US population from 1978 to 2013
- Salary and wage workers (from W-2 forms)
  - exclude self-employed (data top coded before 1994)
  - Focus on workers aged 25–60
  - Key Advantages:
    - Very large sample size (400+ million individual-year observations)
    - No survey response error (W-2 forms sent from employer directly to SSA)
    - No sample attrition
    - No top-coding (earnings measure **includes** exercised stock options and vested restricted stock units)
- Firms: Full population (100%) of US firms.

Five Myths

Five Myths

1. Long-run trends:
   1. Myth #1: Rise in income inequality partly (or largely) driven by rising within-firm inequality (e.g., CEO pay)
   2. Myth #2: Income risk has been trending up in the past 40 years.
2. Business cycle:
   1. Myth #3: Income risk over the business cycle is...

      mostly about countercyclical variance of shocks
   2. Myth #4: Top 1% are largely immune to business cycle risk
3. Life-cycle:
   1. Myth #5: Idiosyncratic income shocks can be modeled fairly well with a lognormal distribution.

Long-Run Trends in

Inequality and Risk

Rise in Income Inequality

- 20+ years of research into the determinants of rising wage inequality.
- Conventional wisdom:
  - 1/3 is observables (education and age)
  - 2/3 residual or unobservables (innate ability? search frictions?)
- Today:
  - Rising between-firm or within-firm inequality?

$$\Delta \text{var}(w_t^i) \equiv \underbrace{\Delta \text{var}_j(\overline{w}_j)}_{\text{betw. firm inequality}} + \underbrace{\Delta \text{var}(w_t^i - \overline{w}_j)}_{\text{with.-firm ineq.}}$$

  - Results from "Firming Up Inequality" with Song, Price, and Bloom (2015)

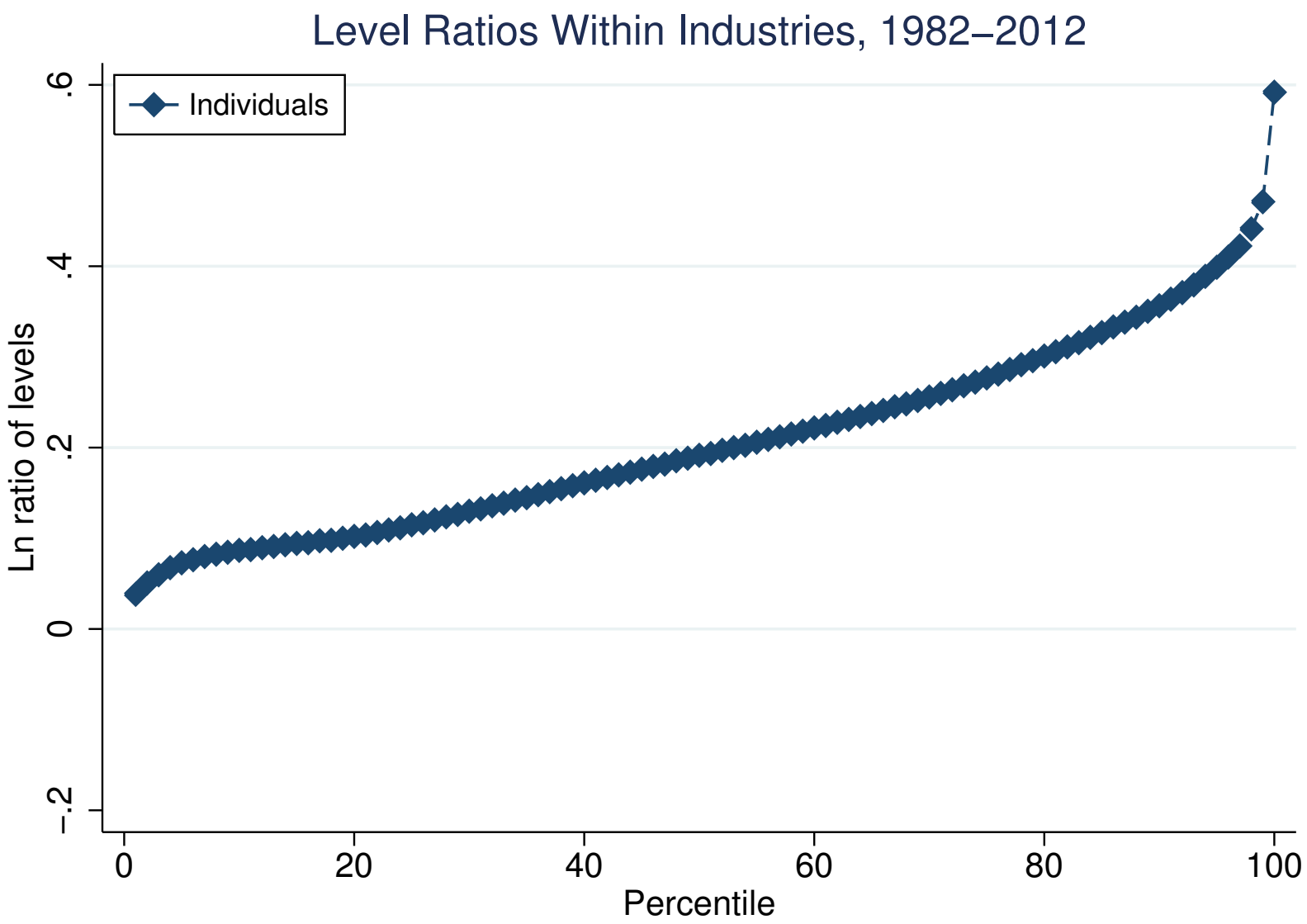
Where Do the Wage Gains Go?

As for wages and salaries . . . all the big gains are going to a tiny group of individuals holding strategic positions in corporate suites or astride the crossroads of finance.

Paul Krugman (NY Times, Feb 23 2015)

- $\Rightarrow$ Suggests rise in inequality is mainly due to growing gap between bottom 99% and top 1% or 0.1%.

Fact #1: Rise in Inequality is Fractal

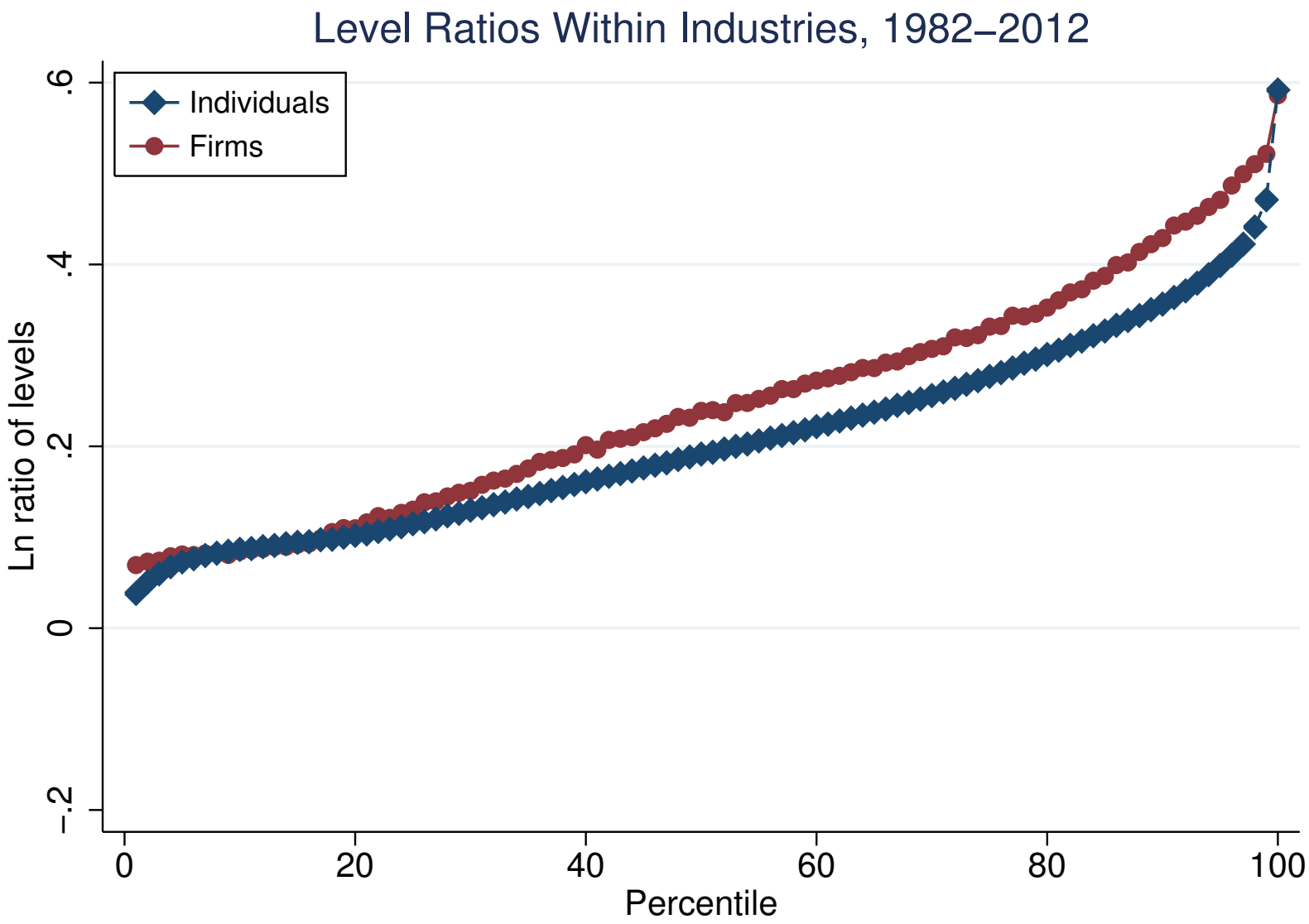


Our findings

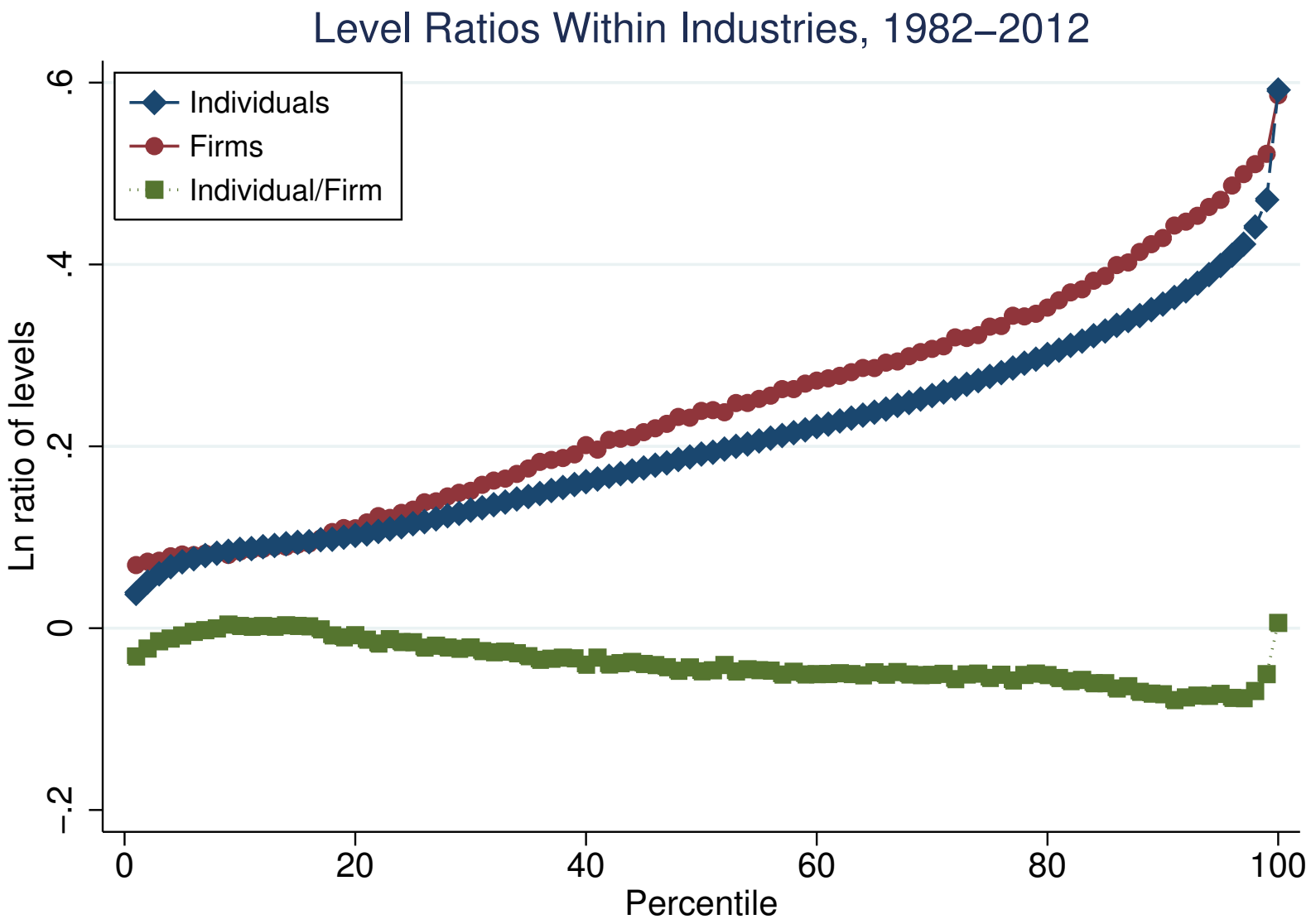
1. Result 1: Inequality Rose Across the Entire Wage Distribution. Contradicts Krugman's claim.

2. Next question: What is the role of employer's in rising inequality?

Fact #1: What is the Role of Employers?



Fact #1: What is the Role of Employers?



Our findings, cont'd

1. **Result 1:** Inequality rose across the entire wage distribution. Contradicts Krugman's claims (and many other such claims made in the media).

2. **Result 2:** Almost all of the rise in wage inequality happened across firms, i.e., by rising gap in the average pay across firms.

    - Almost no change in pay inequality within employers since 1982.

3. **Next question:** What is the role of employers in *rising top end inequality*?

    - Alternatively put: has the ratio of top executive to average employee pay increased as some have claimed?

Rise in Income Inequality

The primary reason for increased income inequality in recent decades is the rise of the supermanager.

Piketty (2013, p. 315)

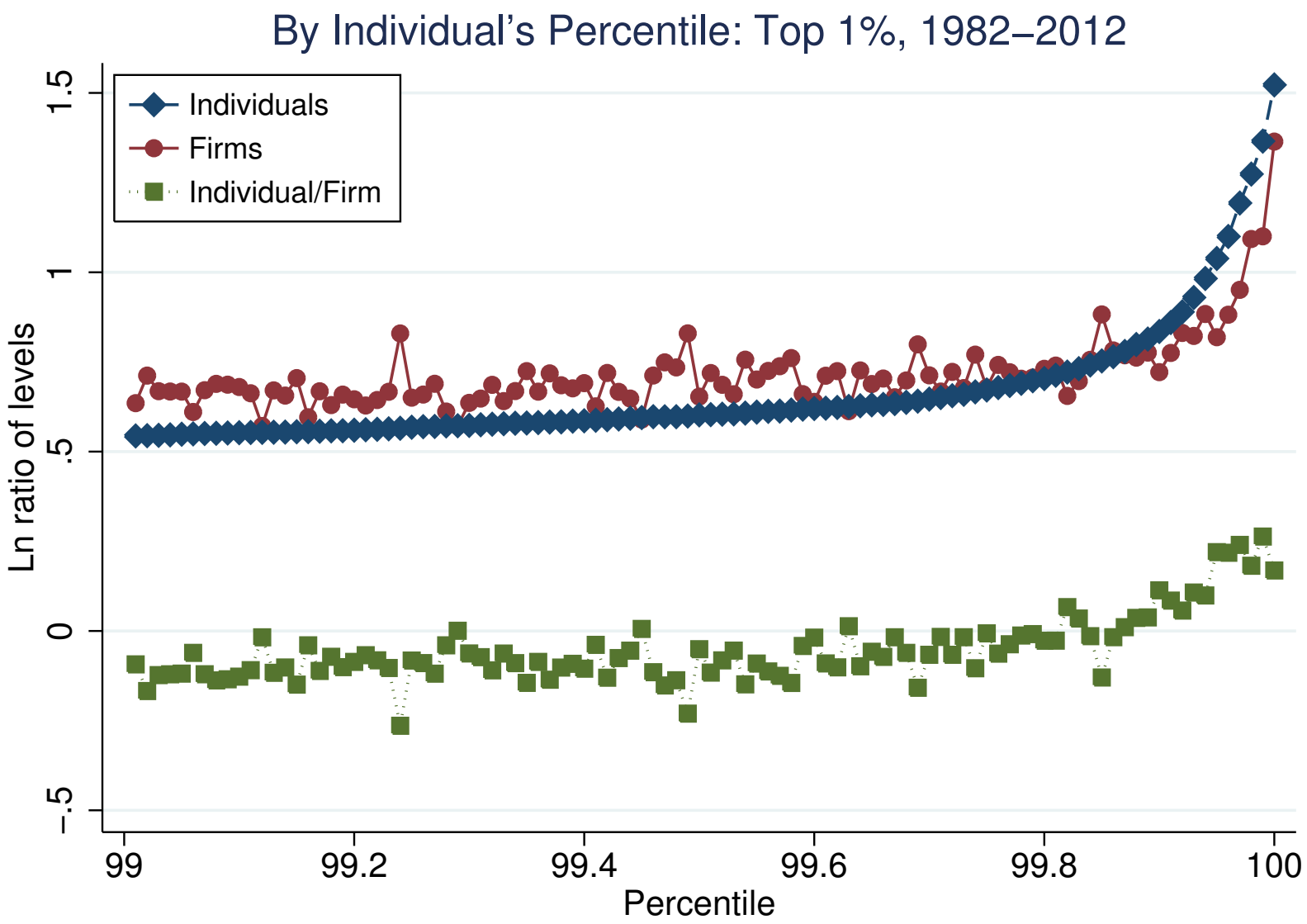
Wage inequalities increased rapidly in the United States and Britain because US and British corporations became much more tolerant of extremely generous pay packages after 1970.

Piketty (2013, p. 332)

A key driver of wage inequality is the growth of chief executive officer earnings and compensation.

Mishel and Sabadish (2014)

Fact #1: CEO and Top Executive Pay



Our findings, cont'd

1. **Result 3:**
   1. The pay of workers in the top 0.01% increased by 500% from 1982 to 2012.
   2. The pay gap between these top earners *and* the average employee at the same firm has increased by only 20% during the same time.
   3. Alternatively put: the rise in CEO to average employee wage ratio explains a very small part of rising inequality. The bulk of the action comes between firms.
2. **Next question:** Why? What is driving the rise in between-firm inequality?
   - **Answer:** We don't know yet. We are currently investigating possible mechanisms.

Robustness

- This pattern is pervasive. It holds within
  - most industries
  - regions
  - across firms of different sizes
- Non-changing within-firm inequality does not mean pay structure did not change:
  - Younger workers are now paid less relative to firm average
  - gender gap has shrunk within firms at all levels.

Myth #2:

The volatility of income shocks...

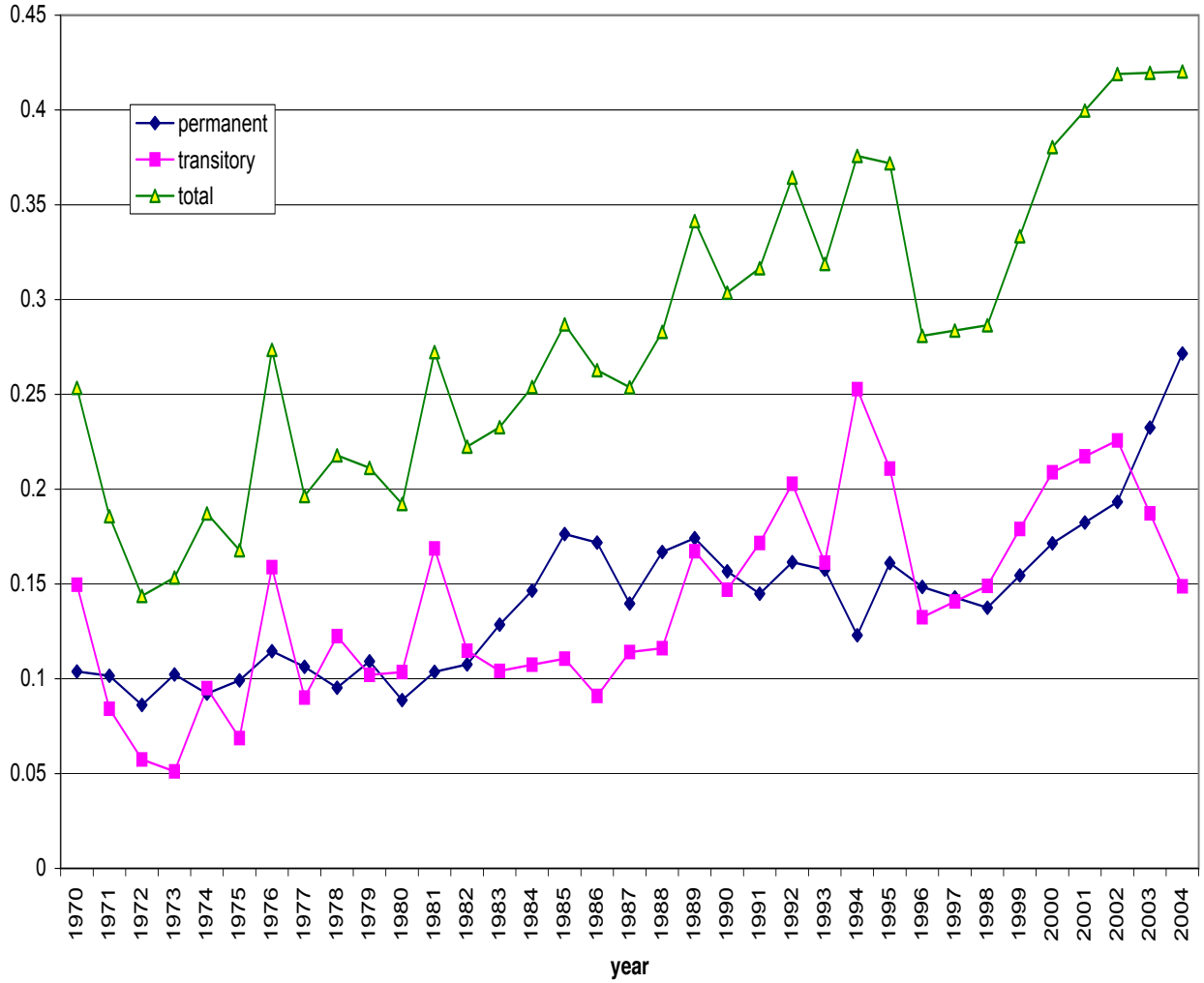
has increased significantly over the past 40 years.

Myth #2: Upward Trend in Income Risk

- This conclusion has been reached by virtually all papers that use PSID data.
- Moffitt and Gottschalk (1995) documented it first in a now-famous paper, and it has been confirmed by a large subsequent literature.
- Opening quote from Ljungqvist and Sargent (2008, ECMA):

> *A growing body of evidence points to the fact that the world economy is more variable and less predictable today than it was 30 years ago... [There is] more variability and unpredictability in economic life*
>
> *Heckman (2003).*

Figure 10: Permanent, Transitory, and Total Variances for those 30-39 with Education Greater than 12

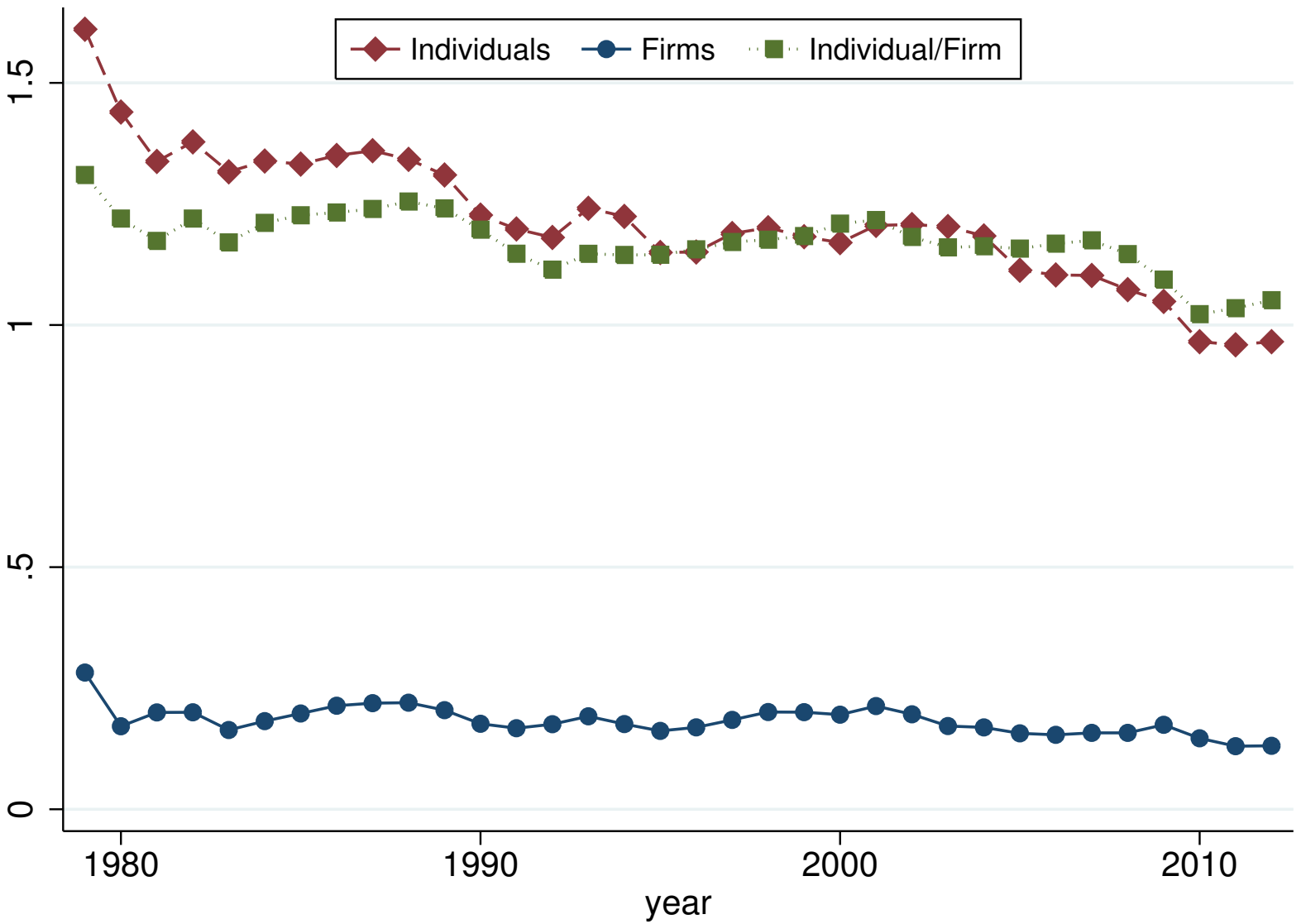


Source: Moffitt and Gottschalk (2012)

Fact #2: No Upward Trend in Volatility

- Administrative data: the opposite conclusion emerges robustly
- See, e.g., Congressional Budget Office (2007); Sabelhaus and Song (2010); Guvenen et al. (2014b)
- In fact, volatility of earnings changes has been declining within most
  - industries
  - age groups
  - gender groups
  - U.S. regions
  - etc.

Fact #2: No Upward Trend in Volatility



Robustness

- Declining wage volatility holds within every private industry, with the exception of agriculture (2% of employment).
- It is also robust to alternative measures of dispersion (top end: P90-50, bottom end, P50-10, and so on)

Risk and Inequality Over the

Business Cycle

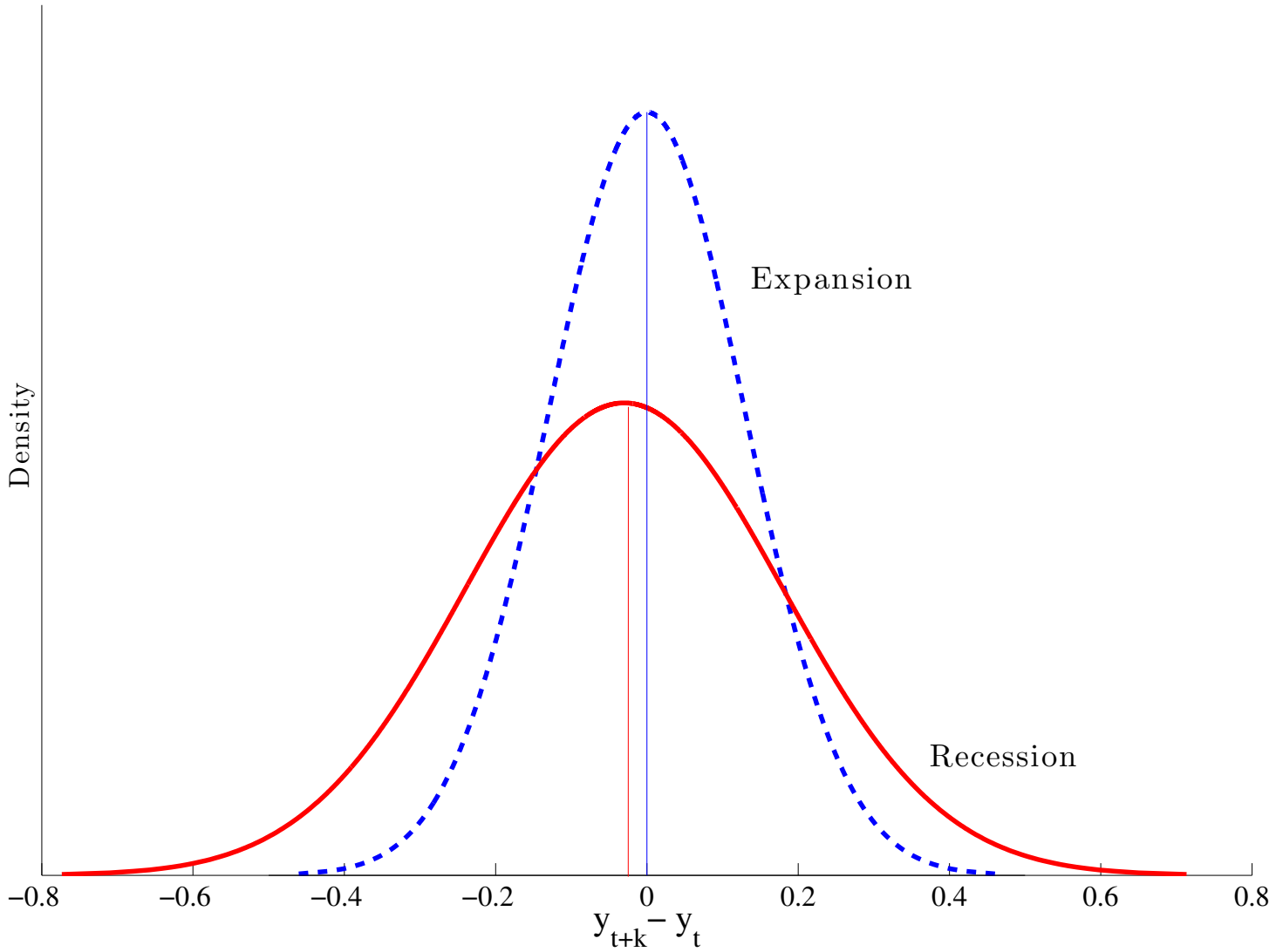
Business Cycle Variation in Shocks

Myth #3:

The variance of idiosyncratic income shocks

rises substantially during recessions.

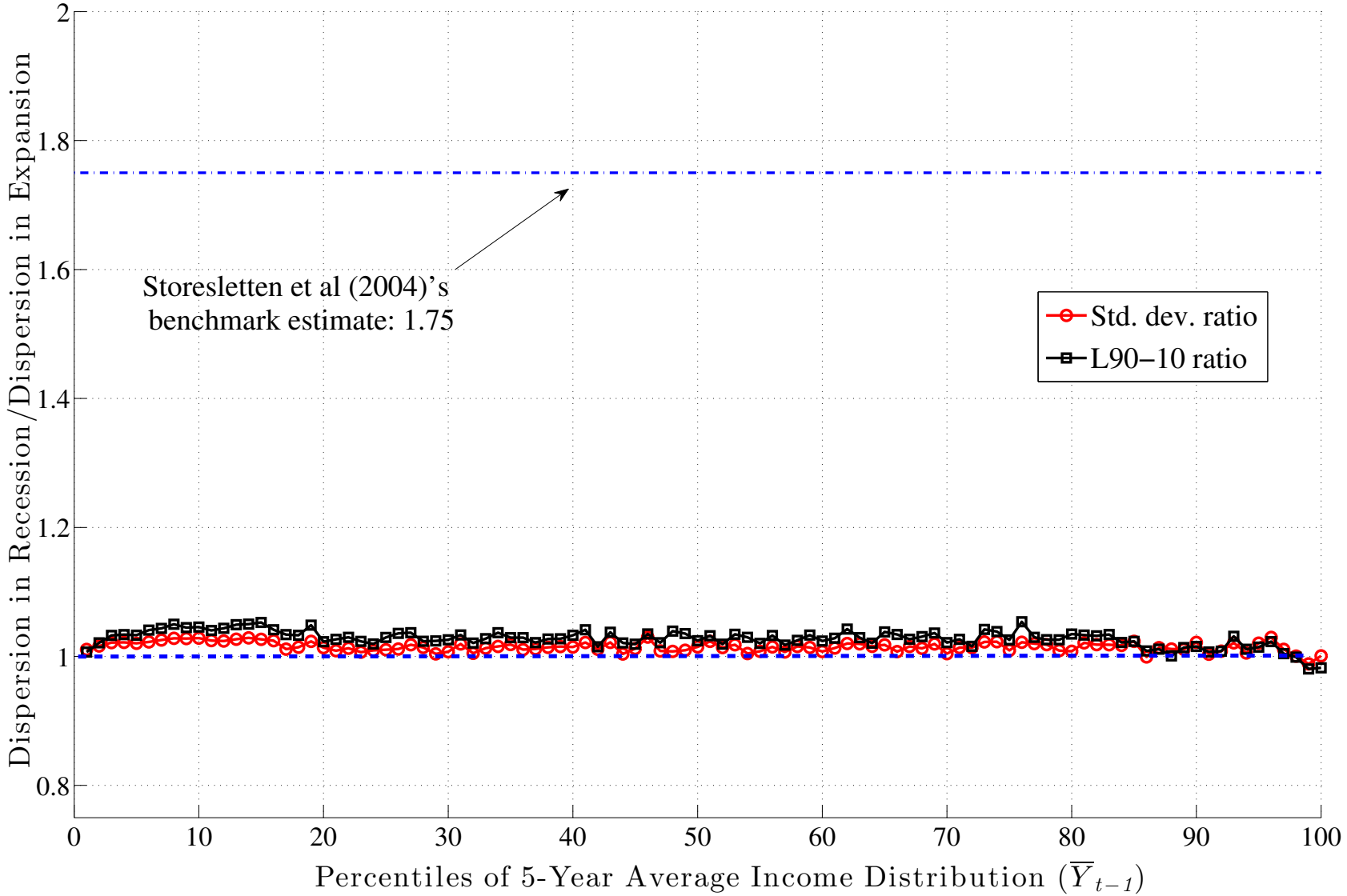
Myth #3: Countercyclical Shock Variances



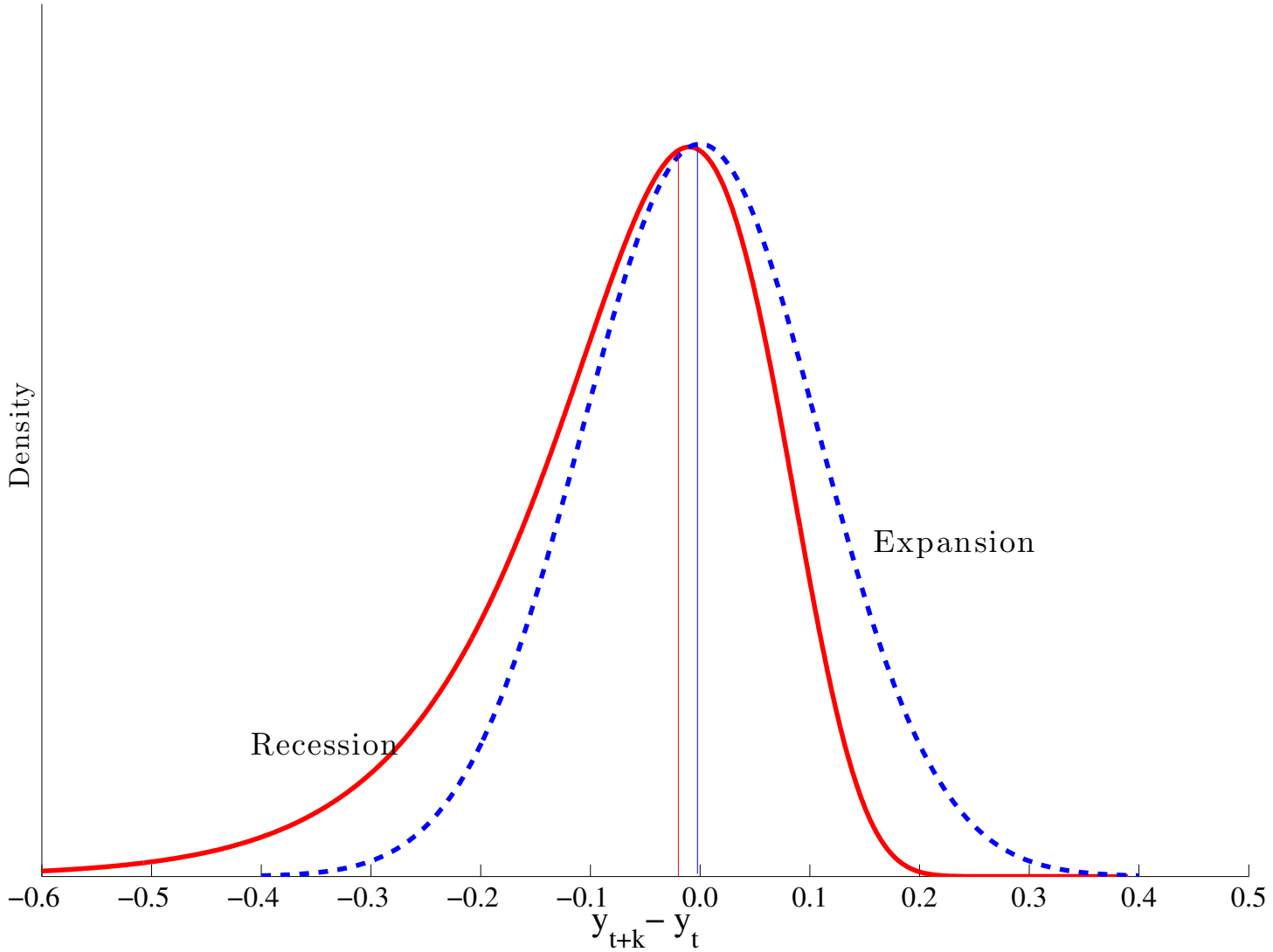
Countercyclical Variance

- Constantinides and Duffie (1996): countercyclical variance can generate interesting and plausible asset pricing behavior.
- Existing indirect parametric estimates find a tripling of the variance of persistent innovations during recessions (e.g., Storesletten et al (2004)).
- Our direct and non-parametric estimates show no change in variance over the cycle. See the next figure.
- The following figures on Myths 2 to 4 are from Guvenen et al. (2014b).

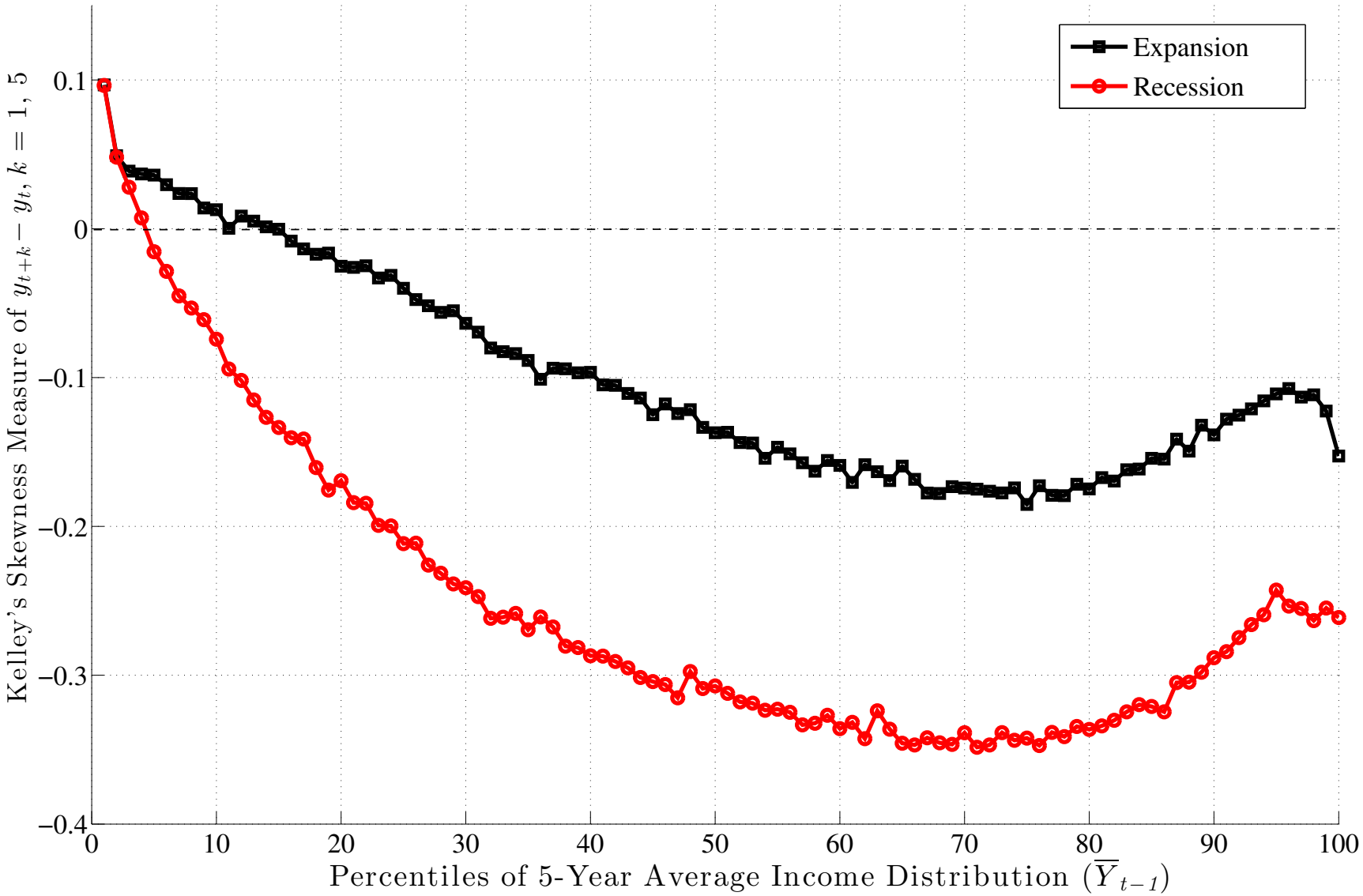
Fact #3: No Change in Variance



Fact #3: Countercyclical Left-Skewness



Fact #3: Countercyclical Skewness



Robustness

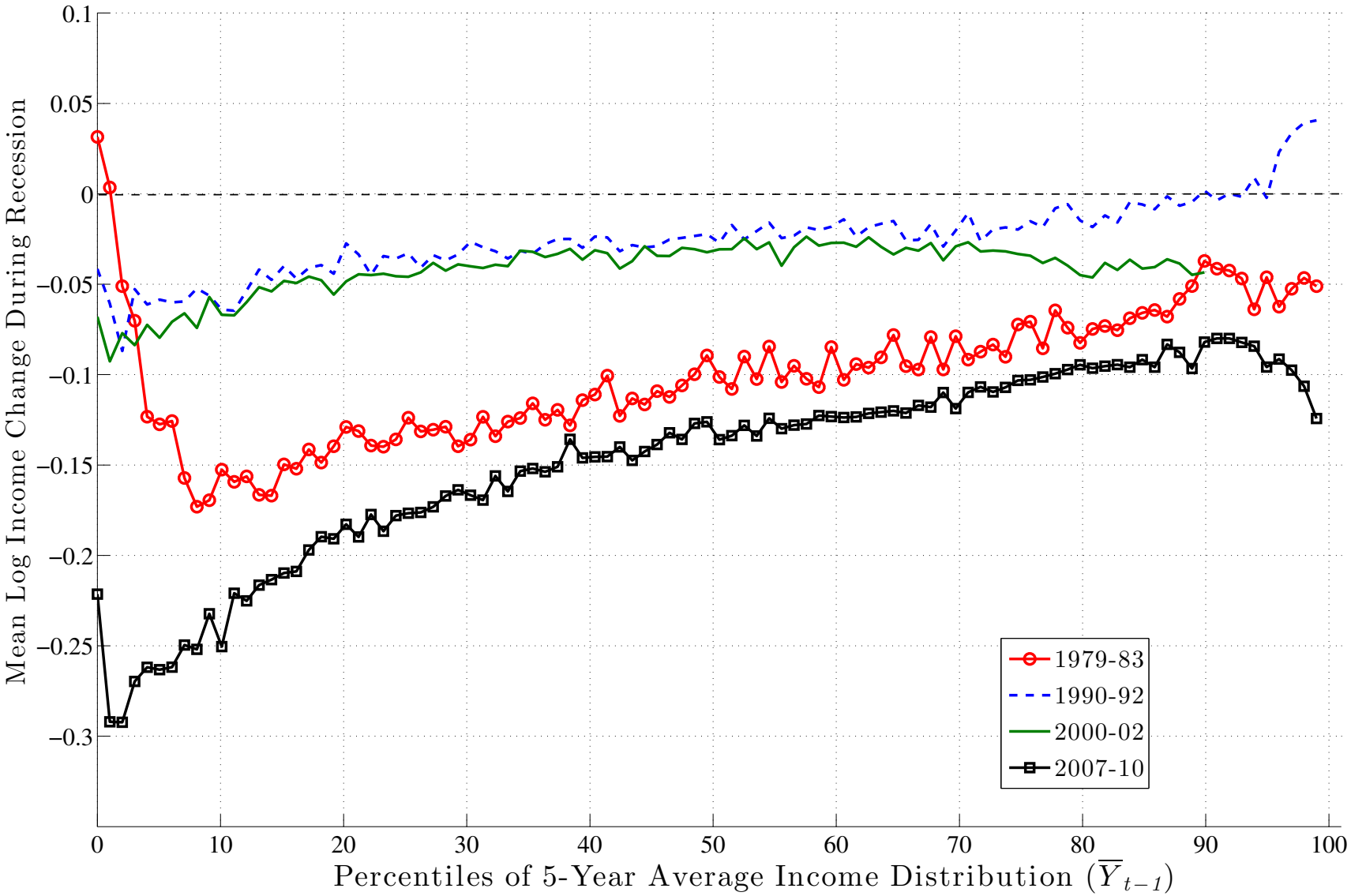
- In ongoing work (with Busch, Domeij, and Madera), we find precisely the same patterns for Sweden and Germany.
- Moving from individual to household income, as well as incorporating government policy has little effect on countercyclical left-skewness in the US.
- Gov't policy more effective in Germany and Sweden.

Is Business Cycle Risk Predictable?

Myth #4:

Business cycle risk is mostly *ex-post* risk

Fact #4: Business Cycle Risk is Predictable



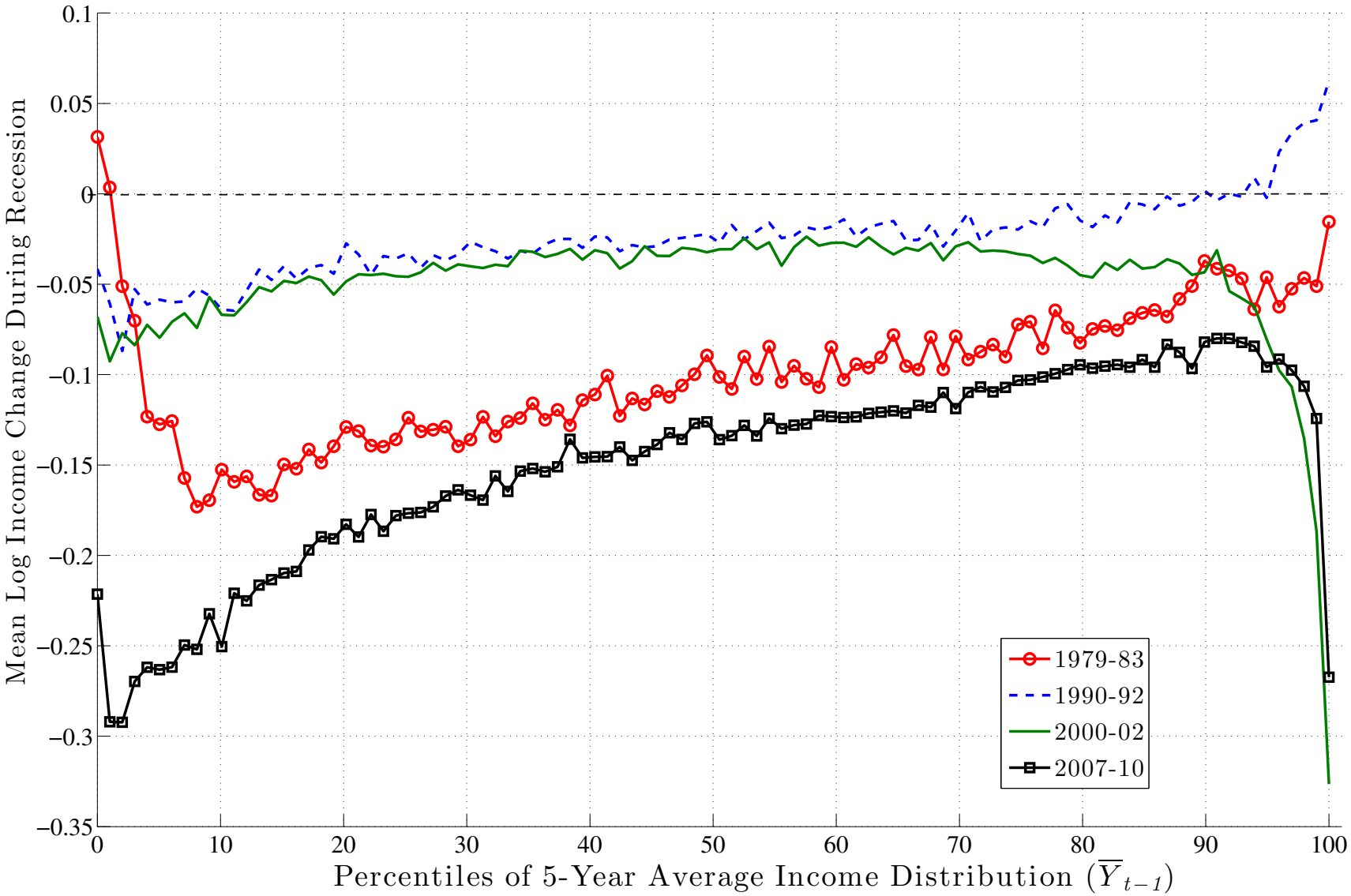
Business Cycle Risk for Top 1%

Myth #4:

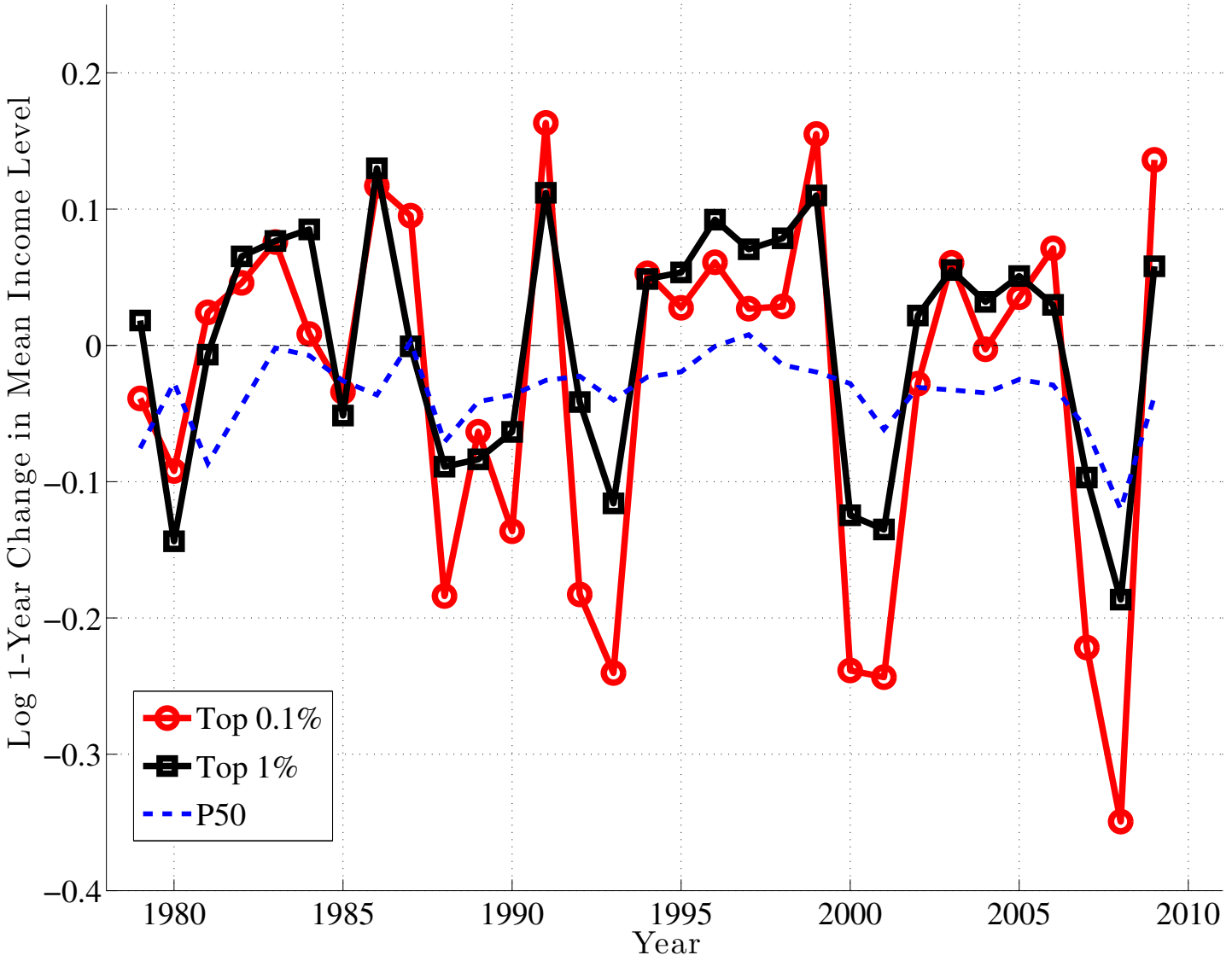
The top 1% are largely immune

to the pain of business cycles.

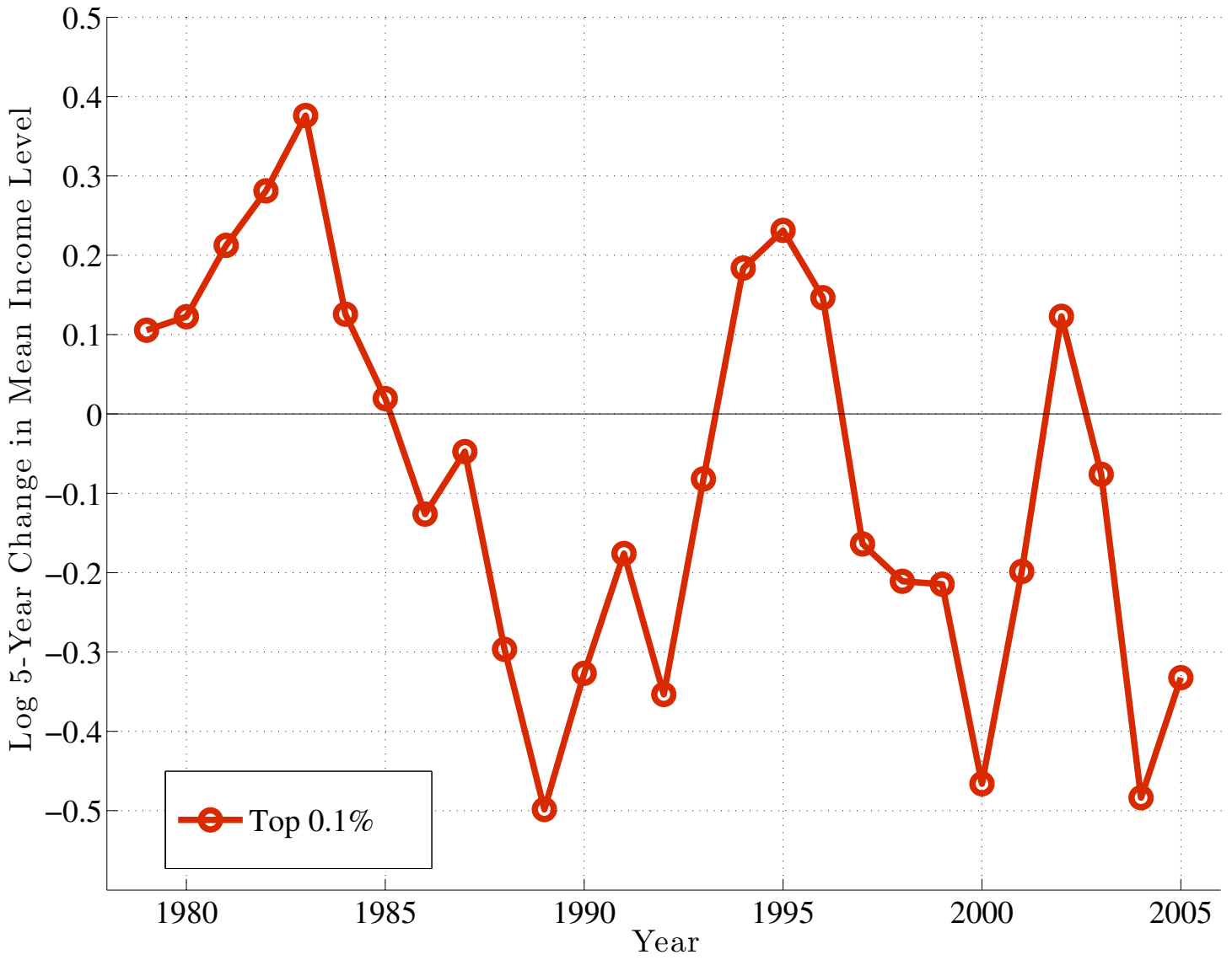
Fact #4: The "Suffering" of the Top 1%



Fact #4: 1-Year Income Growth, Top 1%



Fact #4: 5-Year Income Growth, Top 0.1%



Cyclicality of Top Earnings, By Industry

Table: $\Delta Y_t^j = a^j + \beta^j \Delta GDP_t + \text{error}$

Sector j :	β^j	
	P99.9+	Bottom 99%
Durable Manufacturing	9.72^{***}	0.91^{***}
Engineers, Soft., Comp.	9.40^{**}	0.83^{*}
Business Consult.	9.46^{***}	0.43^{*}
Finance, Insurance	6.99^{***}	0.60^{**}
Construct., Real Estate	6.83^{***}	1.40^{***}
Transport., Communic.	6.54^{**}	0.26
Nondur. Manufacturing	5.20^{**}	0.65^{***}
Wholesale Trade	4.65^{***}	0.86^{***}
Legal	1.17	-0.32^{*}
Media, Arts, Sports	-0.31	0.58
Health	-0.75	-0.45^{*}

Note: t-stats are computed using bootstrapped standard errors.

Risk and Inequality Over the

Life Cycle

Distribution of Income Shocks

Myth #5:

It is OK to model income growth...

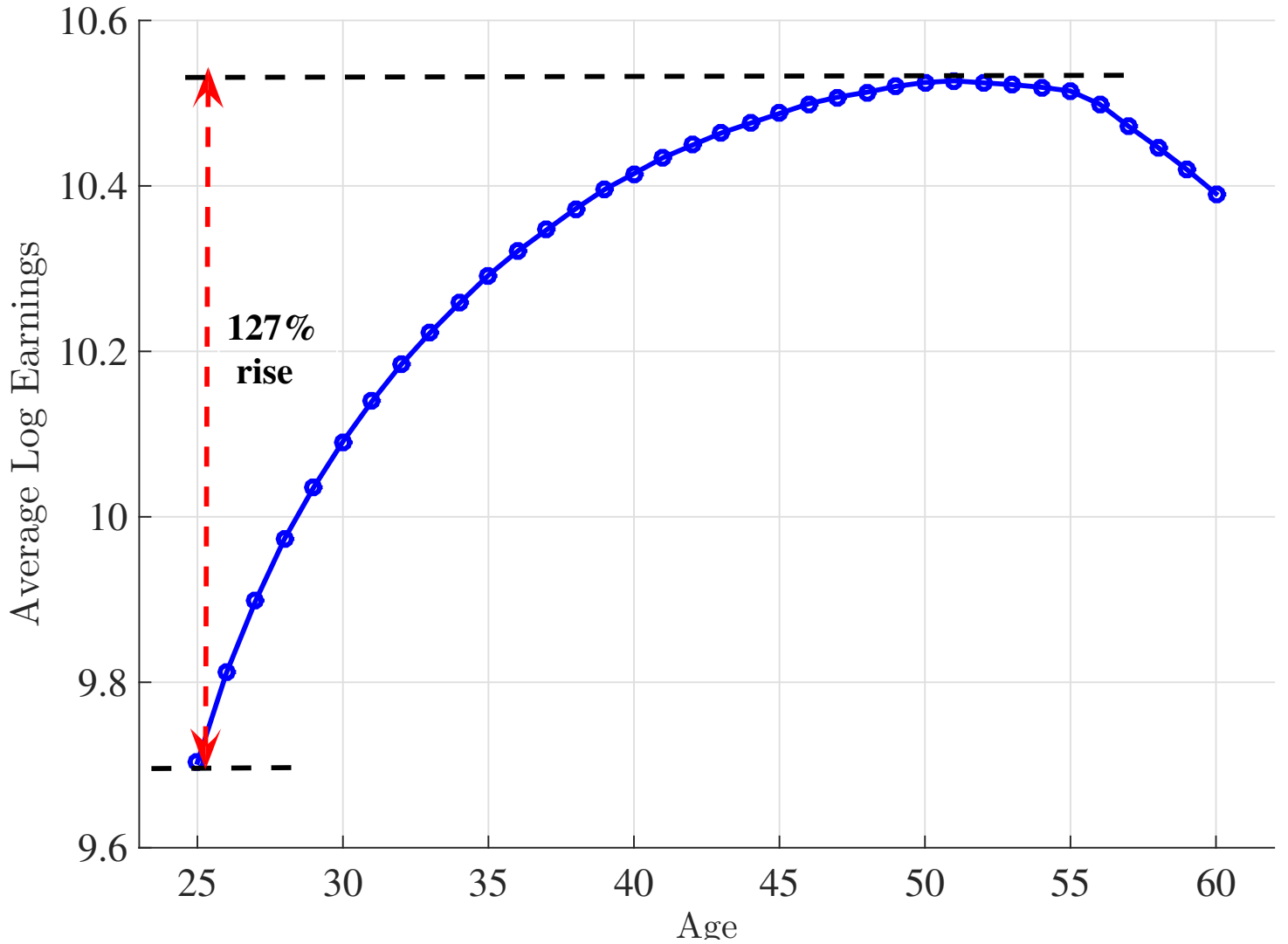
...as a lognormal distribution

$\Longrightarrow$ it is OK to assume...

...zero skewness and no excess kurtosis

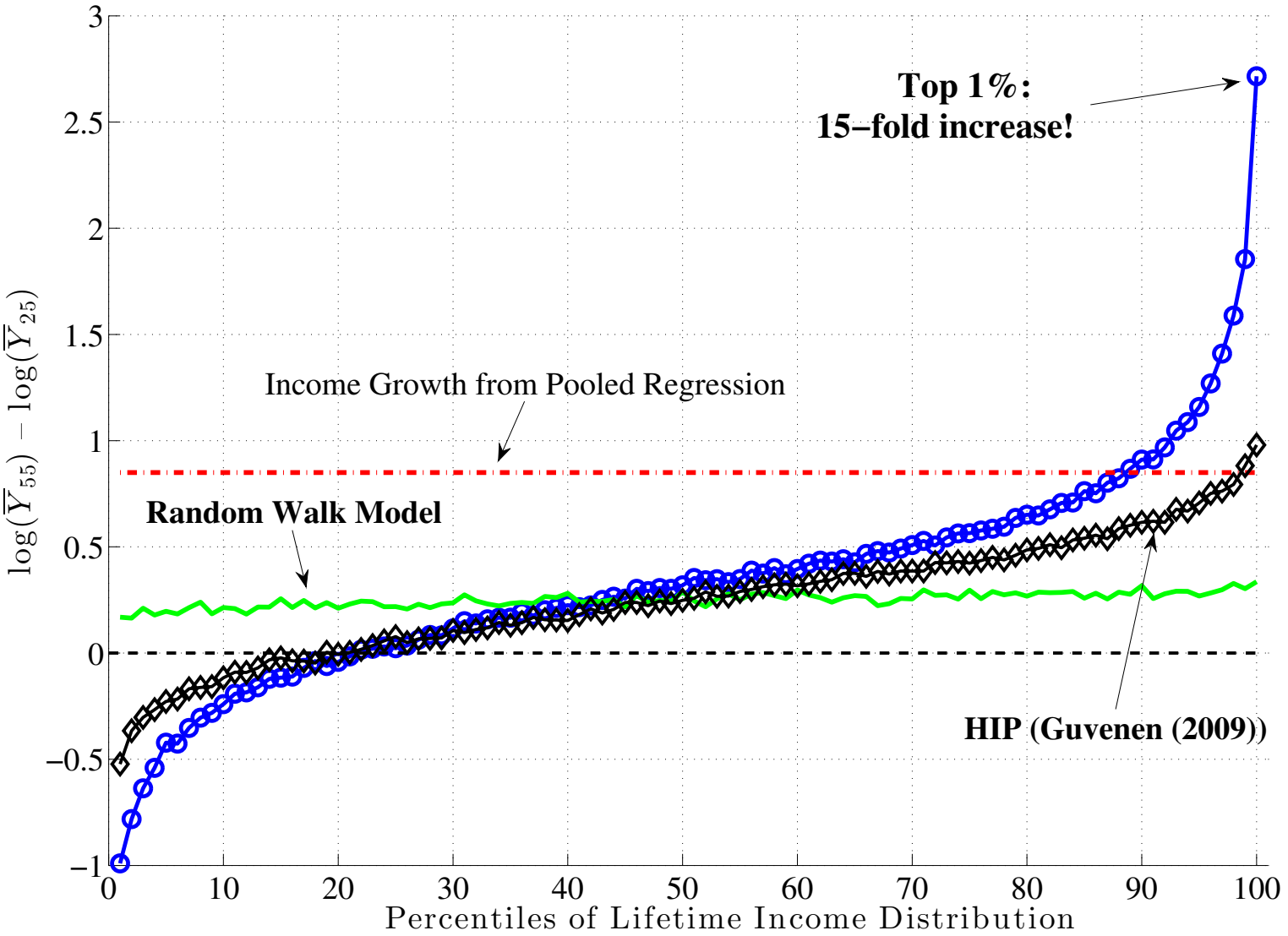
$$y_t = z_t^i + \varepsilon_t^i \qquad \varepsilon_t^i \sim \mathcal{N}(0, \sigma_\varepsilon^2)$$
$$z_t^i = \rho z_t^i + \eta_t^i \qquad \eta_t^i \sim \mathcal{N}(0, \sigma_\eta^2)$$

Myth #5: Lifecycle Profile of Income



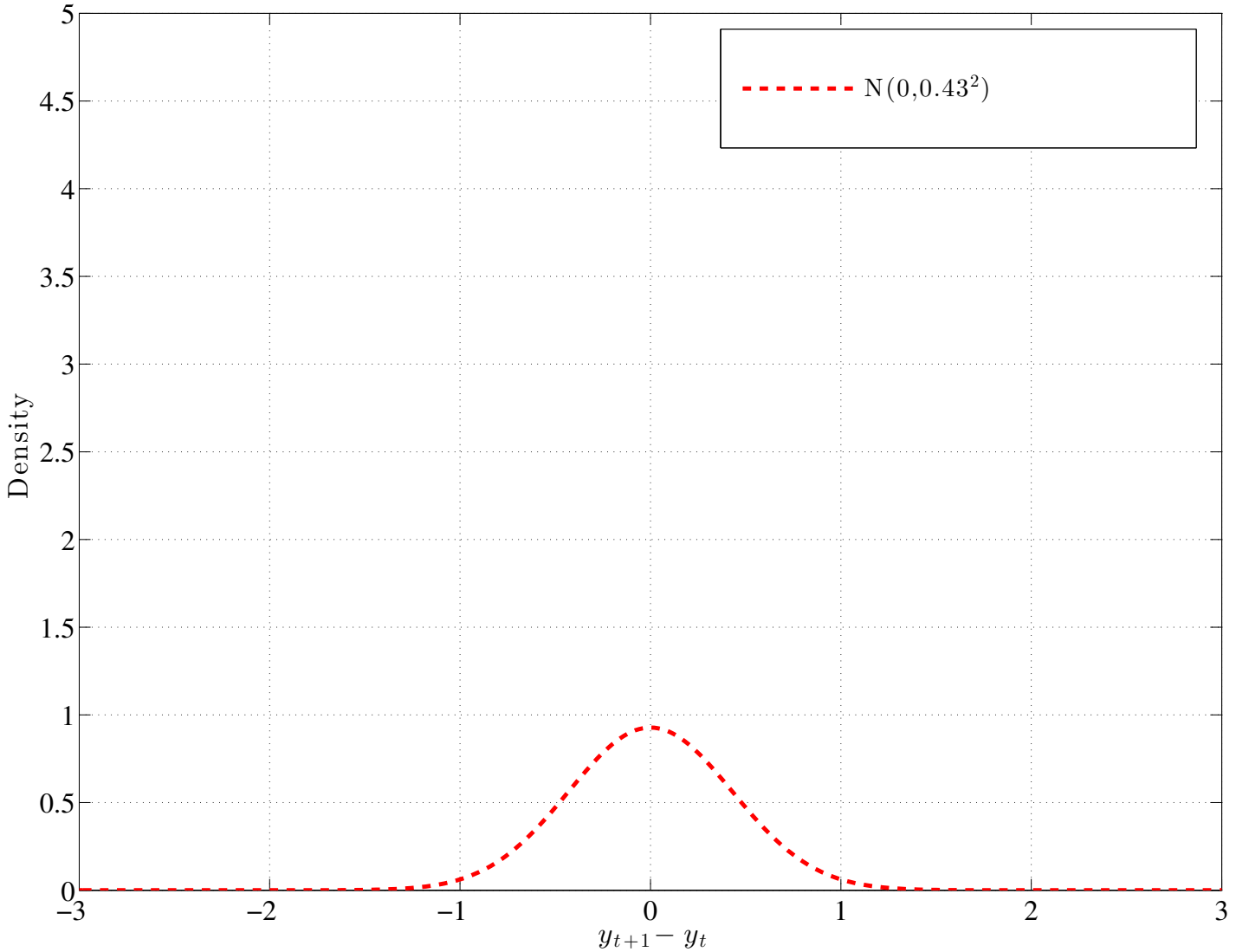
Source for the rest of this section: Guvenen et al. (2014a)

Fact #5: Lifecycle Profiles of Income

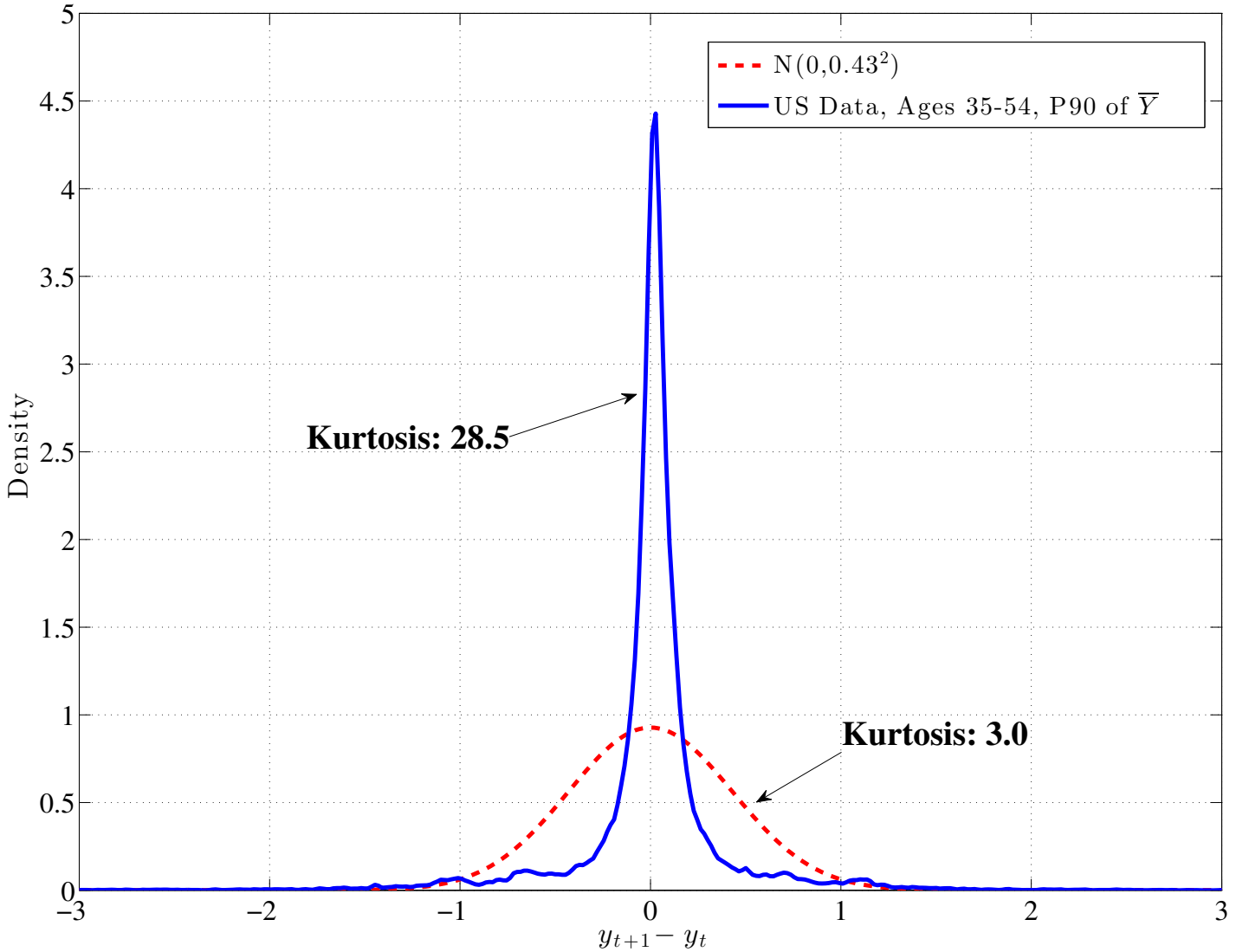


Kurtosis

Myth #5: Lognormal Histogram of $y_{t+1} - y_t$



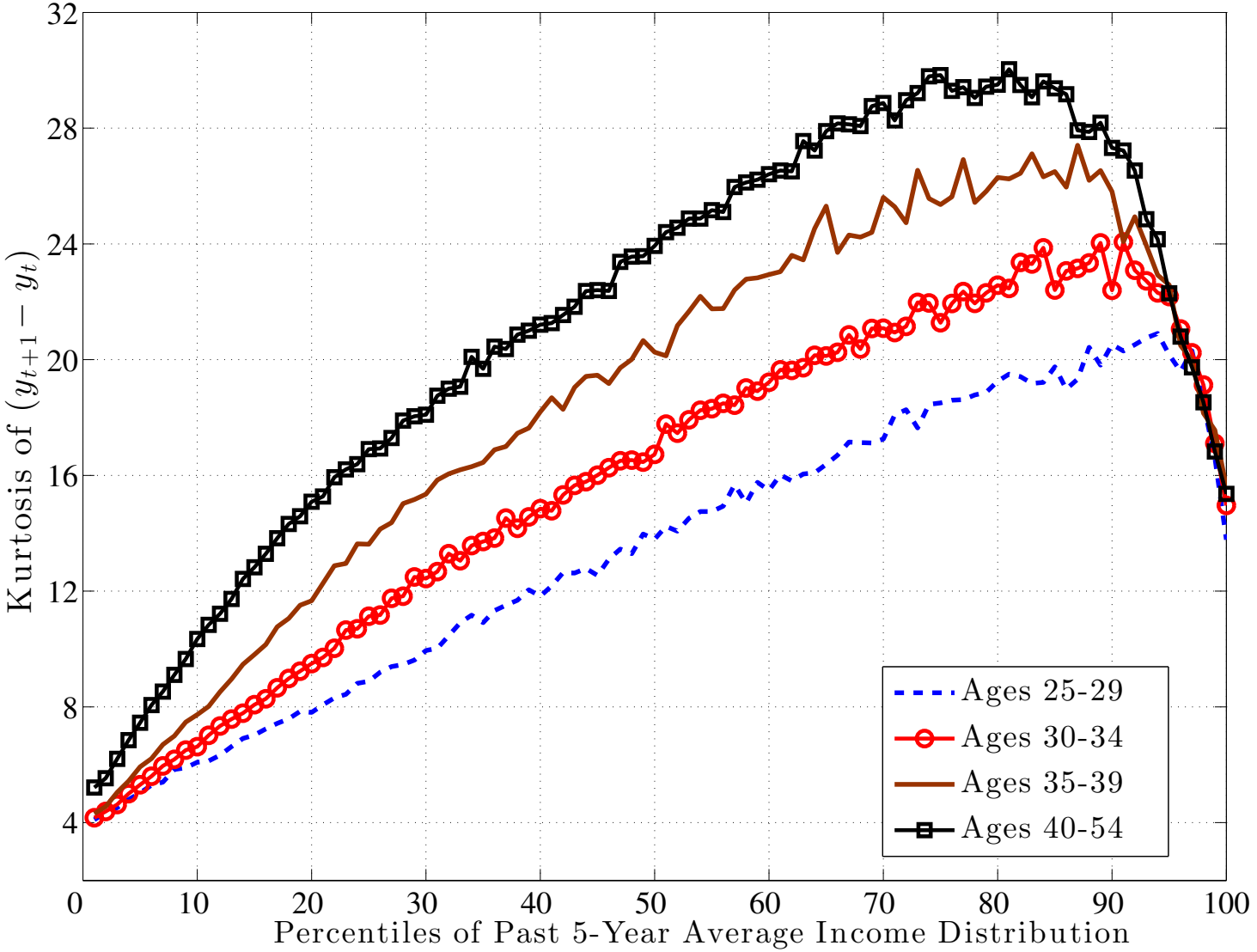
Fact #5: Excess Kurtosis



Fact #5: Excess Kurtosis

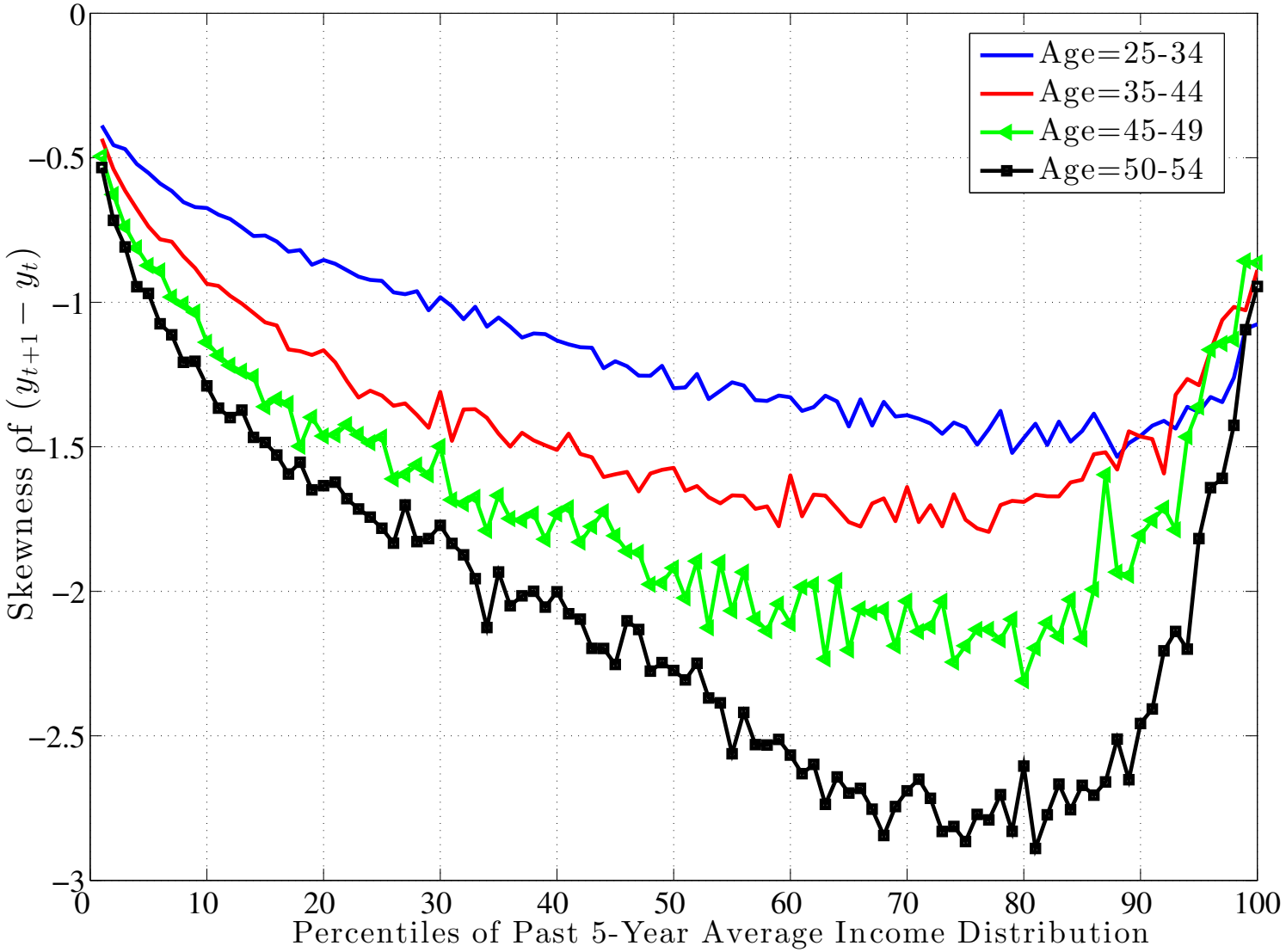
	Prob($\lvert y_{t+1} - y_t \rvert < x$)	
$x \downarrow$	Data	$N(0, 0.43^2)$
0.05	0.39	0.08
0.10	0.57	0.16
0.20	0.70	0.30
0.50	0.80	0.59
1.00	0.93	0.94

Fact #5: Excess Kurtosis

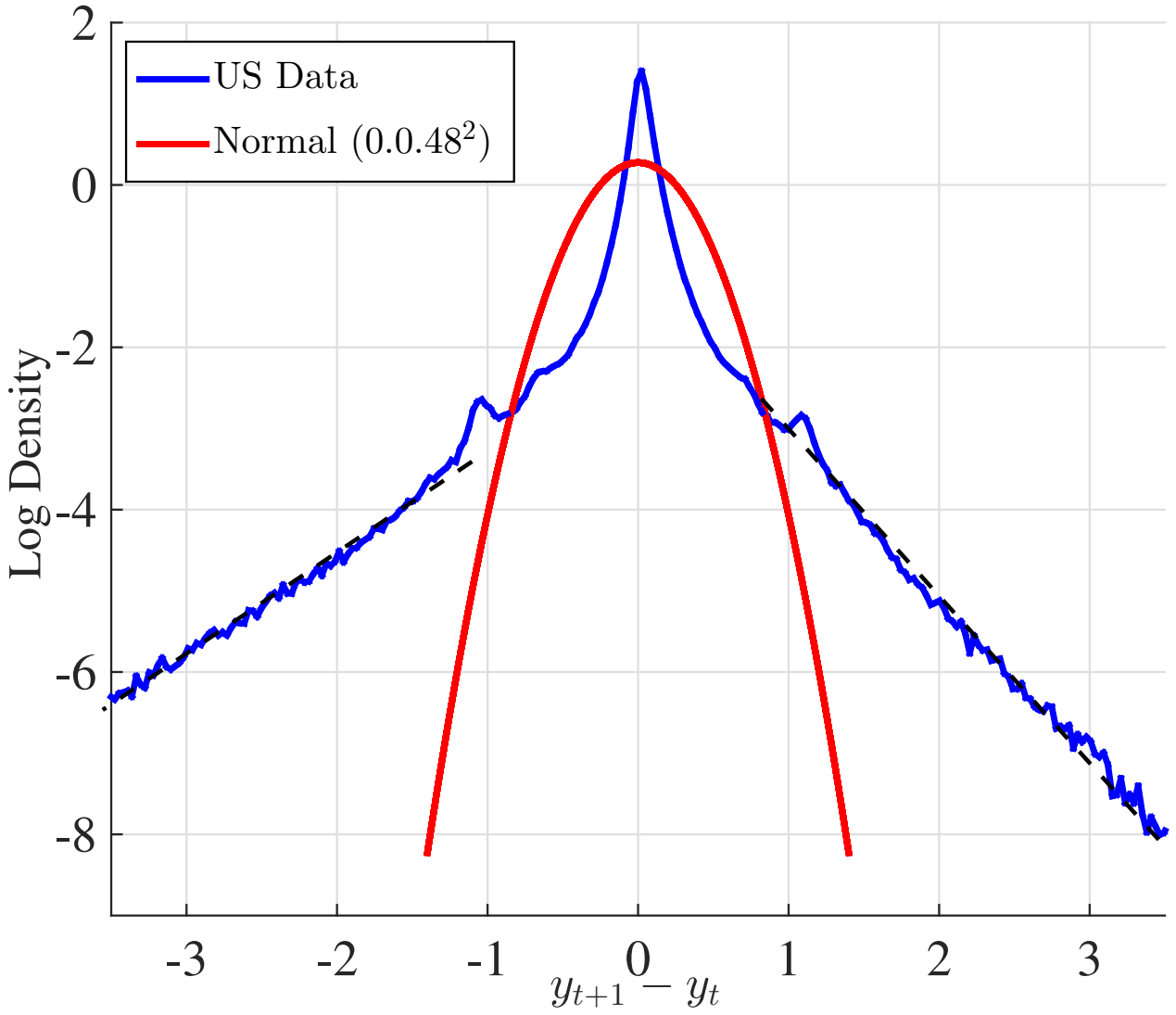


Skewness

Fact #5: Skewness of $y_{t+1} - y_t$



Double Pareto Tails of Earnings Growth



Final Thoughts

- Public funding for collecting micro panel data for research purposes is woefully inadequate.
- To provide perspective:
  - NASA's annual budget: ~20 Billion dollars
  - International Space Station total cost: ~150 Billion dollars.
  - All worthy efforts. Now consider this:
  - US gov't transfer payments in 2014: ~1.9 trillion dollars.
    - For micro research on distributional issues, PSID's annual budget (only US panel with consumption data): ~3 million dollars!
- Increased public funding for good quality data is essential for good quality economic research.

Final Thoughts, cont'd

- In the absence of good quality data, we have played the "blind men and the elephant" for too long.
- But there is hope: some fantastic datasets are becoming more accessible:
  - Data on earnings and covariates available from IRS, SSA, and LEHD through various calls for proposals.
  - Administrative data for Europe is especially impressive and becoming more accessible
- Challenges: Data on consumption.. still very limited.
  - Still there is hope: Data from various private companies (Mint.com, Credit agencies) are becoming more useful for researchers.
- We hope these new (or revised) facts will feed back into theory and policy work.

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