Income Inequality and Income Risk: Old Myths vs. New Facts

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1 This lecture summarizes research conducted jointly with Jae Song, Serdar Ozkan, Fatih Karahan, Greg Kaplan, Nick Bloom, Till von Wachter, Luigi Pistaferri, David Price, Sergio Salgado, David Domeij, Rocio Madera, Chris Busch, and Priscilla Fialho.
Blind Men and the Elephant

It’s a Fan!

It’s a Wall!

It’s a Rope!

It’s a Spear!

It’s a Snake!

It’s a Tree!
Motivation

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  - small sample size
  - large measurement (survey-response) error
  - non-random attrition
  - top-coding, etc.
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- Survey-based US panel datasets have important limitations:
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- **myths** about income inequality and income risk.
Data: SSA Master Earnings File

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- Currently covers 36 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)
One Baseline Sample

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- **Firms:** Full population (100%) of US firms.
Five Myths
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   - **Myth #1:** Rise in income inequality partly (or largely) driven by rising within-firm inequality (e.g., CEO pay)
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3. **Life-cycle:**
   - **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?

\[ \text{var}(w_i) \quad \text{betw. firm inequality} \]
\[ + \text{var}(w_{it} w_j | \{z\}) \quad \text{with.-firm ineq.} \]

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Where Do the Wage Gains Go?

- Piketty and Saez (2003, QJE) wrote an influential paper documenting rise of aggregate income share held by top 1%.

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As an example, Paul Krugman (NY Times, Feb 23 2015):

"As for wages and salaries . . . all the big gains are going to a tiny group of individuals holding strategic positions in corporate suites..."
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- Our findings: This view misses the “big picture”.
Fact #1: Rise in Inequality is Fractal
Our findings

1. **Result 1**: Inequality Rose Across the **Entire** Wage Distribution.

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   − Contradicts typical media accounts that *rising inequality == rising top income shares.*

2. **Next question:** What is the role of employer’s in rising inequality?
Fact #1: What is the Role of Employers?
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![Graph showing log change in total earnings, average log earnings at firm, and individual earnings/firm average within industry.](image-url)
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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.
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Our findings, cont’d

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   - Q: What is driving the rise in between-firm inequality?

   > **Answer:** 1/2 rising segregation, 1/2 increased sorting.
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     - **Answer:** 1/2 rising segregation, 1/2 increased sorting.

3. **Next question:** Is the CEO pay driving rising inequality?
The primary reason for increased income inequality in recent decades is the rise of the supermanager.
Rise in Income Inequality

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Piketty (2013, p. 315)
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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.

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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 #1A: Top Paid Workers vs Firm Pay

By Individual’s Percentile: Top 1%, 1982–2012

- Individuals
- Firms
- Individual/Firm
Fact #1B: Dodd-Frank: CEO/median pay

Log Change Since 1981

Year

1980 1990 2000 2010

Subgroup: 100 ≤ Firm Size < 10k
Fact #1B: **Mega Firms (10,000+ FTE)**

![Graph showing changes in log paid empl salaries since 1981 for different percentile groups within mega firms. Log Change Since 1981 on the y-axis, Years 1980-2010 on the x-axis. The graph compares Highest-Paid Empl, 5th-Highest Paid, 10th-Highest Paid, 25th-Highest Paid, 50th-Highest Paid, 100th-Highest Paid, and Median at Firm. The subgroup is 10000 ≤ Firm Size.](image-url)
Fact #1C: Rise in Inequality
Rise in Inequality *Without Top Executives*

![Graph showing the rise in inequality without top executives.](image-url)
Rise in Inequality *Without Top Executives*

![Graph showing the rise in inequality without top executives.](image-url)
Rise in Inequality: 1000+ FTE

Log Change, 1982−2012

- Indv Total Wage
- Indv Total Wage (Non−Top 1 Employees)
- Indv Total Wage (Non−Top 5 Employees)

Percentile of Indv Total Wage

Indv Total Wage
Indv Total Wage (Non−Top 1 Employees)
Indv Total Wage (Non−Top 5 Employees)

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Myths vs. Facts
Top 1% Inequality: **Baseline**

- **Baseline**
  - Log Change, 1982–2012
  - Percentile of Indv Total Wage

**Legend:**
- Red: Indv Total Wage
- Blue: Indv Total Wage (Non–Top 1 Employees)
- Green: Indv Total Wage (Non–Top 5 Employees)
Robustness

This pattern is pervasive. It holds within

- most industries (44 of 49 Fama-French industries)
- US regions (Census regions, counties)
- across firms of different sizes
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.
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- Moffitt and Gottschalk (1995) documented it first in a now-famous paper, and it has been confirmed by a large subsequent literature.
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- 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. (2014)
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- Administrative data: the opposite conclusion emerges robustly.

- See, e.g., Congressional Budget Office (2007); Sabelhaus and Song (2010); Guvenen et al. (2014).

- 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
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Cross Sectional Dispersion by Sex (30 to 50 yrs)
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
Myth #3:

The variance of idiosyncratic shocks rises substantially during recessions.
Myth #3: Countercyclical Shock Variances

\[ y_{t+k} - y_t \]

Density

Expansion

Recession
Countercyclical Variance

- Constantinides and Duffie (1996): countercyclical variance can generate interesting and plausible asset pricing behavior.
Countercyclical Variance

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- Existing indirect parametric estimates find a tripling of the variance of persistent innovations during recessions (e.g., Storesletten et al (2004)).
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- 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.
Fact #3: No Change in Variance

Storesletten et al (2004)'s benchmark estimate: 1.75
Fact #3: Procyclical Skewness

\[ y_{t+k} - y_t \]

- Expansion
- Recession

Density

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Myths vs. Facts
Fact #3: Procyclical Skewness
Fact #3: Procyclical Skewness: Longer Series

Kelly Skewness Dispersion of Wage Growth (1yr)

Years

Men Women

Kelly Skewness

-0.3
-0.15
0
0.15
0.3

How About in Europe? Robustness

- We find exactly the same patterns for Sweden, Germany, and France:
  - flat shock variance, procyclical skewness (Busch, Domeij, Guvenen and Madera, 2016; and Busch, Fialho, Guvenen, 2016).

- 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

- Procyclical skewness of income shocks is a common feature of modern business cycles.
Firm-level Data

- Salgado, Guvenen, Bloom (2016): examine firm level variables in a panel of firms covering 44 countries:
  - growth rate of sales, profits, employment, inventories
  - stock prices

- Robust evidence of procyclical skewness for all variables in 90% of the countries.

Firm Variables: Procyclical Skewness

Skewness: Kelly
(normalized to mean 0, SD 1)

GDP growth deciles

Sales
Employment
Stock Returns

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Myths vs. Facts
Firm Variables: Slightly Countercyclical Dispersion

Dispersion: P90−P10 (normalized to mean 0, SD 1)

GDP growth deciles

Micro Sales  Micro Returns
Macro GDP  Macro Returns

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Myths vs. Facts
Myth #4:

Business cycle risk is mostly *ex-post* risk
Fact #4: Business Cycle Risk is Predictable
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%
Risk and Inequality Over the Life Cycle
Myth #5:

It is OK to model income growth...

...as a lognormal distribution

⇒ it is OK to assume...

...zero skewness and no excess kurtosis
Distribution of Income Shocks

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\[ y_t = z_t^i + \varepsilon_t^i \quad \varepsilon_t^i \sim \mathcal{N}(0, \sigma^2_\varepsilon) \]
\[ z_t^i = \rho z_t^i + \eta_t^i \quad \eta_t^i \sim \mathcal{N}(0, \sigma^2_\eta) \]
Kurtosis
Myth #5: Lognormal Histogram of $y_{t+1} - y_t$
Fact #5: Excess Kurtosis

Kurtosis: 28.5

Kurtosis: 3.0

\( y_{t+1} - y_t \)

Density

\( N(0, 0.43^2) \)

US Data, Ages 35-54, P90 of \( \bar{Y} \)
Fact #5: Excess Kurtosis

| $x$ ▼ | Prob($|y_{t+1} - y_t| < x$) |
|-------|-----------------------------|
|       | 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

Myths vs. Facts

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Skewness
Fact #5: Skewness of $y_{t+1} - y_t$
Double Pareto Tails of Earnings Growth

\[ \log \text{Density} \]

- US Data
- \( \mathcal{N}(0, 0.51^2) \)
- Slope: 1.40
- Slope: -2.18
Do Higher-Order Moments Matter?

- Guvenen-Karahan-Ozkan-Song (2016):
  - the welfare costs of idiosyncratic fluctuations are **25-40% of lifetime consumption** compared to 10-12% with Gaussian shocks. (RRA=2)
Do Higher-Order Moments Matter?

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➤ Constantinides-Ghosh (2015, JF), Golosov-Troshkin-Tsyvinski (2016, AER), Schmidt (2016), Kaplan-Moll-Violante (2016) find substantially different results when higher-order moments are taken into account.
Recap: Five **Myths** vs Five **Facts**

1. **Long-run trends:**
   - 
   - 
   - 

2. 
   - 
   - 

3. 
   - 
   - 

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   - **Myth #6:**
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   - **Fatih Guvenen**

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3. **Life-cycle:**
   - **Fact #5:** Income shocks are **very non-Gaussian**
Final Thoughts

- Public funding for collecting micro panel data for research purposes is woefully inadequate.

- To provide perspective:
  - NASA’s annual budget: $\sim 20 \text{ Billion} \text{ dollars}$
  - International Space Station total cost: $\sim 150 \text{ Billion} \text{ dollars}$.
  - All worthy efforts. Now consider this:
  - US gov’t transfer payments in 2014: $\sim 1.9 \text{ trillion} \text{ dollars}$.

  - For micro research on distributional issues, PSID’s annual budget (only US panel with consumption data): $\sim 3 \text{ million} \text{ dollars}$!

- Increased public funding for good quality data is essential for good quality economic research.
Final Thoughts, cont’d

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  - Still there is hope: Private companies (Mint.com, Credit agencies) and research products (Michigan-Berkeley project) are becoming more useful for researchers.
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- Challenges: Data on consumption.. still very limited.
  - Still there is hope: Private companies (Mint.com, Credit agencies) and research products (Michigan-Berkeley project) are becoming more useful for researchers.

- I hope these new facts will feed back into theory and policy work.


