Asymmetric Labor Income Risk: Implications for Risk-Taking in Financial Markets

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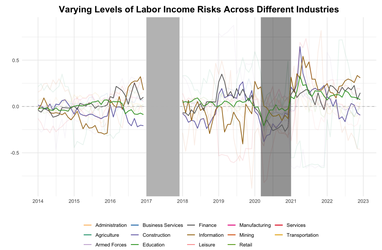
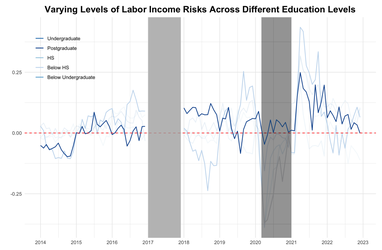
Stylized Facts





Survey of Income and Program Participation

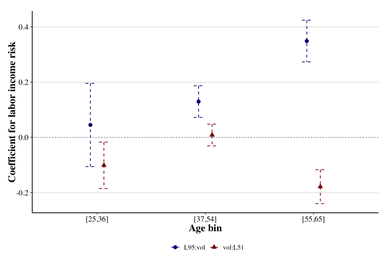
The Survey of Income and Program Participation (SIPP) is a nationally representative longitudinal survey containing comprehensive information on the dynamic of income, employment, household composition, and government program participation, conducted by the Census Bureau.

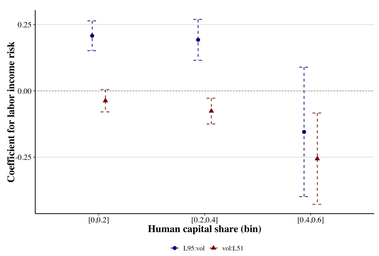
- In this research, I am constructing my panel using surveys conducted from 2013 to 2022.
- Based on statistics provided by the Bureau of Labor Statistics, typical weekly earnings for full-time workers fluctuated between \$795 and \$1,009 from 2014 to 2021. When extrapolated to a monthly scale, this translates to roughly \$3,180 to \$4,036. In my analysis, the figure stands at \$3,281.

Main takeaways

The capacity of households to engage in financial risks is intimately connected to the volatility and skewness of their labor market returns.

- Nonparamatric approach to portfolio decision problem with both macro (procyclicality of skewness) and micro (individual level labor income variance) elements.
- Households with a greater dependence on **human capital** are at an increased risk of experiencing financial distress from stock market downturns due to their exposure to human capital risk.





Theoretical Foundation

From Campbell and Viceira (2001), an agent with constant relative risk aversion (CRRA) will choose his optimal risky allocation following:

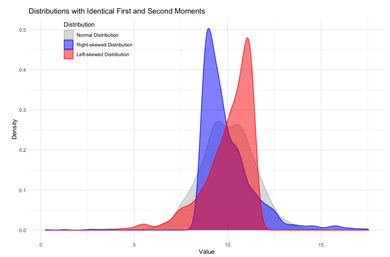
$$\text{RS} = \pi = \frac{\mu - r}{\gamma \sigma_s^2} + \left(\frac{\mu - r}{\gamma \sigma_s^2} - \beta_H \right) \frac{H}{W} \tag{1}$$

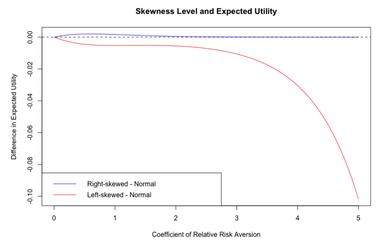
In this paper, I focus on the effect of H, which can be interpreted as the certainty equivalent of future earnings, such that:

$$H_{t-1,it} \approx \bar{H}_{it} - \frac{\gamma}{2} \frac{\text{Var}_{t-1}(H_{it})}{W_{it}} + \frac{\gamma^2 + \gamma}{6} \frac{\text{Skew}_{t-1}(H_{it})}{W_{it}^2} \tag{2}$$

This implies that $\text{Var}_{t-1}(H_{it})$ should have a negative effect on π, while $\text{Skew}_{t-1}(H_{it})$ should exert a positive influence on π.

Distributions with identical first and second moments





- Investors with a moderate level of risk aversion derive utility from **upside surprise** and experience disutility from **downside risk**.
- Investors with a high level of risk aversion are unaffected by **upside surprise** but suffer from **downside risk**.

Motivation

- Standard portfolio choice models with Gaussian income risk fail to explain:
  - Why households experiencing higher labor income volatility tend to hold more risky assets
    Merton (1969), Cocco, Gomes and Maenhout (2005), Fagereng, Guiso and Pistaferri (2018)

  My paper bridges the gap between these two strands of the literature
- Scarce reduced-form evidence on how higher-order moments of income risk influence portfolio decisions:
  - Most papers focus on income risk variance
    Betermier et al. (2012), Fagereng et al. (2018)
  - Findings regarding covariance are mixed
    Vissing-Jorgensen (2002), Massa and Simonov (2006), Calvet and Sodini (2014), Bonaparte et al. (2014)
  - Higher-order moments conditional on stock market returns
    Catherine, Sodini, and Zhang (2024)

Empirical approach

Labor income variance can be categorized into two types based on its distribution: opportunity risk and disaster risk.

To measure the distribution of workers' labor income risk, I assume that in any given month of any year, workers within the same education × industry cluster experience independent shocks, $\varepsilon_{l,t}$, drawn from an identical distribution. Hence, labor income risk can be segregated into aggregate risk and idiosyncratic risk components:

$$Labor\ Income\ Risk_{it} = \underbrace{Skewness_{gt}}_{aggregate} \times \underbrace{Variance_{it}}_{idiosyncratic}$$

$$RS_{i,M} = \alpha + \beta_1 \cdot var_{i,Y} + \beta_2 \cdot sk_{g(i,M)} + \beta_3 \cdot \underbrace{sk_{g(i,M)} \times var_{i,Y}}_{\text{Labor income risk}} + Control_{i,M} + \varepsilon_{i,M}$$

Where i stands for individual ID, M means at the monthly level, Y means at the annual level, and $g(i, M)$ means at the group level.

I include controls for demographics such as age, gender, education level, and dummy variables for housing status and unemployment status.

$$RS_{i,M} = Risky\ Share_{i,M} = \frac{Sum\ of\ value\ of\ stocks\ and\ mutual\ funds}{Sum\ of\ value\ of\ financial\ assets}$$

$$var_{i,Y} = Variance(\varepsilon)_{i,Y} = \sigma_{i,Y} = E[(\varepsilon_{i,M|Y} - \mu_{i,Y})^2]$$

$$sk_{g(i,M)} = \underbrace{(P90 - P50)}_{L9050} \text{ or } \underbrace{(P50 - P10)}_{L5010}$$

Distribution of risk and asset allocation

	Dependent variable: % of direct stock holdings					
	(1)	(2)	(3)	(4)	(5)	(6)
Opportunity ($L9050$)	0.341***		0.336***	0.132		0.161*
	(3.91)		(3.85)	(1.49)		(1.80)
Disaster ($L5010$)	**−0.243*****		**−0.246*****		**−0.203*****	**−0.211*****
	(-3.31)		(-3.36)		(-2.74)	(-2.81)
Idiosyncratic variance		0.057***	0.057***	**−0.084*****	0.055**	**−0.059****
		(3.51)	(3.49)	(-3.36)	(2.44)	(-2.22)
Opportunity × variance (Opportunity Risk)				0.146***		0.173***
				(7.36)		(8.04)
Disaster × variance (Disaster Risk)					0.003	**−0.047*****
					(0.19)	(-3.00)
Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year–month FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.028	0.028	0.028	0.028	0.028	0.028
Observations	259,485	259,485	259,485	259,485	259,485	259,485

Notes. Weighted OLS estimates. The dependent variable is the household share of directly held stocks (bounded in $[0, 100]$). Robust t-statistics are in square brackets. All specifications include the full set of household controls (log income, log wealth, age, age^2, education, gender, unemployment and housing dummies), industry fixed effects, and year–month fixed effects. ***/**/* denote significance at the 1%, 5%, and 10% levels.

- The puzzling positive correlation between labor income volatility and risky asset holdings can be partly explained by the **volatility arising from opportunity**.