

Value Factor and Idiosyncratic Labor Income Risk

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Abstract

We present evidence of a robust relationship between idiosyncratic labor income risk and equity risk factors in the US market. Notably, the value factor stands out as more significant than other factors in explaining well-known patterns in idiosyncratic labor income risk. Idiosyncratic labor earnings dispersion tends to increase with greater dispersion in factor exposure or greater factor volatility, reflecting significant heterogeneity in exposure to equity risk factors across different income quintiles and sectors. Furthermore, we identify a positive correlation between idiosyncratic earnings skewness and the value factor, suggesting that labor earnings tail risk is driven by value-related risks in the job market. Extending our analysis to firm-level data, we find that firms' net income and revenue dispersion also correlate with risk factor volatility, mirroring the patterns observed in labor earnings.

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Introduction

Understanding the dynamics of labor income risk is relevant for individuals' financial planning, as individuals may search for ways to hedge against potential labor income volatility, and for governments, as insights into income risk can provide inputs for economic policy. Traditional analyses often focus on the relationship between labor income and macroeconomic variables, but less attention has been given to the intersection of individual earnings risks and financial market risks. Recent work by Guvenen et al. (2014) and Guvenen et al. (2017) expand the understanding of income dynamics by showing that labor income risk varies significantly across demographic dimensions such as age, sex, and income level and that these variations become skewed and more volatile during downturns. In particular, workers may have heterogeneous exposure to market risks. In the other direction, research in the finance literature has highlighted the importance of labor income risk in asset pricing. For instance, Constantinides and Duffie (1996) argue that consumer heterogeneity, due to idiosyncratic labor income risks, plays a crucial role in explaining the equity risk premium. Similarly, Meeuwis (2022) emphasizes the role of idiosyncratic labor income risk as a key priced risk. Additionally, Ai and Bhandari (2018) and Storesletten, Telmer, and Yaron (2007) explore how labor income risk and incomplete insurance mechanisms influence the equity premium.

Building on these insights, our research explores the possibility that individuals' labor earnings may have heterogeneous exposure to equity risk factors. We hypothesize that what macroeconomists call idiosyncratic risks may be partially due to the fact that workers face heterogeneous exposures not only to macroeconomic and market-wide forces but also to more specific risks. Here we assume that these risks can be identified using measures of equity market risks, such as the Fama-French five factors.

Under this assumption, these equity risks may also explain the dispersion and skewness of both individual income and firm-level outcomes. For instance, consider a person working

at a small tech startup versus another employed at a multinational oil and gas company. The first worker would likely have a higher exposure to the size factor, as smaller firms tend to have distinct risk characteristics compared to larger corporations. Similarly, a person employed by a consumer non-cyclical firm, like a supermarket, may face different risk exposures than someone working at a bank, where factors such as operating profitability — often associated with quality—may be more prominent. These examples illustrate how individual employment characteristics, such as the sector of employment, can link individuals to specific equity risk factors.

One of our notable findings is that the value factor (HML) appears especially relevant in explaining labor earnings dispersion and skewness. Why might value be important? Value firms—often mature companies with high book-to-market ratios—can be more sensitive to adverse economic conditions or sector-specific downturns. This vulnerability can lead to more pronounced fluctuations in both firm revenue and wages, implying a greater pass-through of firm-specific risk to the workforce. Put differently, value companies may “share” more risk with their workers because of tighter margins, lower growth opportunities, or fewer financial buffers compared to high-growth firms. Consequently, workers employed in these value-oriented settings experience higher income volatility (both on average and in the form of tail risks), which is reflected in the strong role of the HML factor in our analysis. Our core premise is that part of a firm’s risk exposure is passed on to its employees. The empirical analysis suggests that in certain sectors or for certain groups of workers, these equity risk factors provide helpful explanations for the variability and skewness of their labor earnings. Hence, if a firm is strongly exposed to the value factor, labor income in that firm will tend to be more volatile whenever the underlying value factor experiences higher volatility.

Our analysis finds significant heterogeneity in worker betas with respect to equity risk factors, indicating that exposure to equity risks varies widely among different income

quintiles and sectors. Lower earners have higher susceptibilities to fluctuations in key market factors like market (MKT), size (SMB), and value (HML), while middle-income groups demonstrate greater stability.

This differential exposure is relevant for understanding how labor income risk interacts with financial market risk. We find a statistically significant relationship between the cross-sectional variance in labor income and the Fama-French five factors, especially strong in the case of the value factor (HML). Moreover, the dispersion in idiosyncratic earnings is higher whenever we observe a higher dispersion in factor betas or a higher time-series volatility in factor returns.

Additionally, our findings suggest that the value factor not only correlates with the variability of earnings, but also links with the skewness in earnings distributions, indicating its potential utility as a hedge factor in portfolio strategies. When we look at intra-sector workers' earnings, we also find that higher value and size beta dispersion correlate with higher intra-sector earnings variance. When it comes to firms fundamentals, we find a positive relation between HML return variance and dispersion in revenue growth and net income growth.

As our first and main contribution, we show that adding equity risk factors, such as the Fama-French's five factors, helps us explain patterns in labor income risk. Building on Guvenen (2007), who highlights the importance of individual-specific income growth rates in understanding consumption inequality, our analysis connects labor income variability directly to financial markets dynamics.

Expanding on Guvenen et al. (2014), who document countercyclical left-skewness in earnings shocks, and Busch et al. (2022), who show procyclical income growth skewness, this research also introduces equity risk factors into the analysis of earnings skewness. We consider state-dependent and cyclical risks in labor income distribution, aligning with Schmidt (2022), who constructs a measure of cyclical idiosyncratic tail risk in asset prices,

and Meeuwis (2022), who models idiosyncratic income risk within a New Keynesian framework. By including equity factors, our findings highlight how the dynamics of financial markets amplify income distribution asymmetries, which is particularly relevant to understanding labor income risks during economic downturns.

Our analysis also examines firm-level fundamentals, adding a new dimension to how equity risk factors impact income distributions for both individuals and firms. Storesletten, Telmer, and Yaron (2007) analyze the influence of capital on the equity premium under idiosyncratic risk. Constantinides and Duffie (1996) emphasize the role of income heterogeneity and incomplete markets in shaping asset prices, highlighting that both individual- and firm-level income dynamics are closely tied to systemic financial risks. Our results suggest that firm fundamentals, like individual earnings, are exposed to heterogeneous financial risk factor sensitivities.

Across all dimensions of our analysis, the value factor emerges as particularly influential, displaying a significant relationship with labor income variance, skewness, and firm-level fundamentals. Related to these results, research by Liew and Vassalou (2000) demonstrates that the Fama-French factors, including the value factor (HML), are predictive of future economic growth, suggesting their relevance as proxies for broader economic risks. Vassalou (2003) further supports this by showing that HML and SMB incorporate information about future GDP growth, connecting their performance to fundamental economic news. Choi (2013) identifies the value factor's link to conditional asset risk and leverage, emphasizing its role during economic downturns when equity betas for value firms rise sharply.

While this is not the purpose of this paper, our results suggest that the existence of the value premium may be linked to its connection to labor income risk. The literature has not so far related labor income idiosyncratic risk to cross-sectional asset pricing patterns. Nevertheless, other papers in the finance literature have suggested that labor income idiosyncratic risk may help explain market-wide risk premium. For example,

Constantinides and Duffie (1996) emphasize that heterogeneous exposures to uninsurable idiosyncratic income shocks can significantly influence asset prices, arguing that such heterogeneity leads to higher equity premiums in incomplete market models. Storesletten, Telmer, and Yaron (2007) extend this perspective by demonstrating how countercyclical variations in idiosyncratic labor income risk interact with capital accumulation to affect the equity premium. Their findings show that during economic downturns, increased income volatility exacerbates risk premiums, providing a macroeconomic mechanism that ties labor income risk to broader asset pricing outcomes.

Our analysis proceeds in three stages, utilizing US data from the Survey of Income and Program Participation (SIPP) and Kenneth French's factors database¹. In the first stage, we run a Mincerian equation to identify idiosyncratic labor income. Subsequently, we conduct a regression of changes in idiosyncratic labor income on the equity risk factors to document heterogeneity in factor exposures across different worker profiles, including earnings quintiles and sectors. This stage establishes how individual earnings are related to financial market risks. In the second stage, we estimate the dispersion in betas among grouped individuals, building a time series for beta dispersion. Concurrently, we estimate the time series variance of equity risk factor series. We then regress the cross-sectional variance of earnings changes on these created measures, which illustrates that heterogeneity in individual risk factor exposure might explain why we observe that financial market risk correlates to labor income risk as well. In the third stage, we estimate the cross-sectional earnings skewness, creating a time series for skewness at each period. We then regress this measure on the equity risk factor returns, particularly focusing on the value factor (HML). This analysis explores how the value factor helps in explaining the tail risks of labor income.

We further explore the sectorial dimension of our analysis by looking at intra-sector beta dispersion and the correlation between the value factor and sectorial firms fundamentals.

¹https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Additionally, we check if value factor variance also correlates to intra-sector earnings and revenue growth dispersion by looking at S&P 500 firms using the NAICS sector classification from 2010 to 2024.

Recent studies have advanced our understanding of labor income risk and its cyclical behavior. For example, Busch et al. (2022) document procyclical fluctuations in income growth skewness across various countries, while Meeuwis et al. (2023) demonstrate how time-varying risk premia affect fluctuations in idiosyncratic income risk, particularly impacting low-wage workers. Additionally, Gomes, Iachan, and Santos (2020) identify disparities in earnings fluctuations between formal and informal sectors in Brazil, with informality linked to more volatile earnings and asymmetric shocks during sector transitions. Building on these findings, our research contributes by indicating that labor income may possess a factor structure, which implies that equity risk translates into labor income risk. Furthermore, we show that the value factor, alongside GDP growth, might be useful in explaining tail risk in labor income, enhancing the understanding of how macroeconomic conditions and financial market dynamics interact with labor income.

The rest of the paper is organized as follows. Section 2 discusses data and methods, section 3 presents results using SIPP data for the US and section 4 concludes.

Data and Methods

Data Description

This study primarily uses data from the Survey of Income and Program Participation (SIPP) for the United States. The SIPP dataset, spanning 2013 to 2021, provides detailed information on American households' income and program participation, including labor earnings, demographic characteristics, and job sector information. We restrict our analysis to the post-2014 SIPP panels to ensure structural consistency, as the survey underwent

a major redesign in 2014 that altered its methodology. These methodological changes complicate cross-period comparisons and could introduce artificial discontinuities in longitudinal trends. By focusing on the redesigned SIPP, we avoid harmonization challenges and ensure that observed patterns reflect actual economic dynamics rather than survey design artifacts. This rich dataset allows for an in-depth exploration of labor income dynamics across different segments of the U.S. workforce. To assess the impact of financial risk factors on earnings, we incorporate the Fama-French five factors (US) dataset obtained from Kenneth French's website. These factors represent different dimensions of risk in the U.S. stock market and serve as proxies for financial market conditions. By merging the SIPP data with the Fama-French five factors, we can analyze the relationship between financial market dynamics and individual earnings in the U.S. context. Additional financial data comes from Eikon, both for fundamental and price data. The sample spans the period between 2010 and 2024. All data is analyzed at a quarterly frequency.

Methods

Our methodological approach uses workers microdata and cross-sectional regressions to examine the heterogeneity in earnings growth exposure regarding financial risk factors. We specify a model where changes in residual net earnings are regressed against a set of independent variables representing heterogeneous factor risks, macroeconomic risks, and idiosyncratic risks. This allows us to isolate the effect of financial risk factors on labor income risk. We employ pooled OLS regressions to test the hypothesis that financial risk factors help explain the variance in earnings growth among individuals with different characteristics.

Analytical Framework

We begin with the construction of an earnings model that bases on the Mincer equation, a standard approach in labor economics for analyzing determinants of earnings. This

model incorporates a range of variables to control for individual, temporal, and sectoral influences on earnings:

$$\begin{aligned} \text{Earnings Model: } \ln y_{i,t} = & AGE_j + YEAR_t + QUARTER_t \\ & + INDUSTRY_k + REGION_p + e_{i,t} \end{aligned} \quad (1)$$

Here, $\ln y_{i,t}$ represents the natural logarithm of earnings for individual i at time t , capturing the log-linear relationship between earnings and the included covariates. AGE_j , $YEAR_t$, and $QUARTER_t$ control for age effects, year-to-year changes, and seasonal variations, respectively, while $INDUSTRY_k$ and $REGION_p$ account for industry-specific (NAICS Industry code) and regional (monthly state of residence) influences on earnings. $e_{i,t}$ denotes the idiosyncratic earnings component, which we aim to isolate and examine.

Residual Earnings Change

To capture the dynamics of earnings over time, we calculate the change in residual earnings as follows:

$$\text{Residual Earnings Change: } \Delta \hat{e}_{i,t} = \hat{e}_{i,t} - \hat{e}_{i,t-4} \quad (2)$$

This measure, $\Delta \hat{e}_{i,t}$, represents the year-over-year change in idiosyncratic earnings, eliminating regular patterns and focusing on the fluctuations attributable to external factors, including risk exposures.

Risk Exposure Model

To measure the relation of equity risk factors and earnings changes, we employ a risk

exposure model that links residual earnings changes to a set of financial risk factors:

$$\text{Risk Exposure Model: } \Delta \hat{\epsilon}_{i,t} = \alpha_G + \sum_{j=1}^J \beta_{G,j} F_{j,t} + \epsilon_{i,t} \quad (3)$$

In this model, $\Delta \hat{\epsilon}_{i,t}$ is regressed against financial risk factors $F_{j,t}$, where $\beta_{G,j}$ measures the sensitivity of group G earnings to each risk factor. α_G captures group-specific fixed effects, and $\epsilon_{i,t}$ is the error term, representing unexplained variations in earnings changes.

This framework, based in the Mincer equation and extended to incorporate financial risk exposures, enables an examination of how equity risk factors correlate to labor income volatility. By focusing on the changes in idiosyncratic earnings and their relation to risk factors.

Heterogeneity Analysis

We employ pooled OLS regressions, stratifying the sample by income levels and sectors, to identify systematic variations in factor betas and assess their implications for earnings dynamics. This allows us to understand how exposure to financial risk factors differs across various worker profiles. For example, we can compare the factor betas of high-income earners to those of low-income earners, or the betas of workers in different industries, to see if certain groups are more or less sensitive to specific risk factors. This analysis helps to better capture how financial market risks might affect different segments of the workforce.

Variance Analysis

Building on the observed heterogeneity in individual exposures to financial risk factors, we hypothesize that both the time-series variance of the risk factors ($\text{Var}(F_t)$) and the cross-sectional variance in individual betas ($\text{Var}(\beta_i)$) are key drivers of the cross-sectional variance in idiosyncratic earnings ($\text{Var}(\Delta \hat{\epsilon}_{i,t})$). Specifically, $\text{Var}(F_t)$ reflects the fluctuations

in the underlying market conditions over time, while $\text{Var}(\beta_i)$ captures differences across individuals in their sensitivity to these conditions. Together, these variances represent complementary dimensions of risk, where the former highlights systemic shocks and the latter emphasizes individual heterogeneity. We use the following baseline model to decompose the variance in idiosyncratic earnings into components attributable to factor and beta variance:

$$\text{Var}(\Delta\hat{\epsilon}_{i,t}) = \text{Var}(\beta_i)\text{Var}(F_t) + E[\beta_i]^2\text{Var}(F_t) + E[F_t]^2\text{Var}(\beta_i) + \text{Var}(\epsilon_{i,t}) \quad (4)$$

This analytical framework sets the stage for our regression models by highlighting the importance of both factor and beta variances in explaining earnings variance. In other words, we investigate whether workers with more exposure to financial risk factors or who are exposed to more volatile risk factors themselves experience greater fluctuations in their earnings.

To further explore the stability of risk exposures over time and their influence on earnings variance, we proceed with the cross-sectional and time-series analyses. Initially, we estimate group betas through the previous regression (3). We identify heterogeneity in betas across income groups using pooled OLS for each group. Subsequently, we conduct a cross-sectional analysis for each period, computing idiosyncratic earnings variance ($\text{Var}(\Delta\hat{\epsilon}_{i,t})$), estimating factor variance ($\text{Var}(F_t)$) for each risk factor quarterly, and calculating beta variance ($\text{Var}(\beta_i)$) across groups each quarter. This approach provides insights into the temporal dynamics of financial risk factors and labor income, affirming the hypothesis that higher $\text{Var}(F_t)$ or $\text{Var}(\beta_i)$ is associated with greater $\text{Var}(\Delta\hat{\epsilon}_{i,t})$. Additionally, we also build the betas for intra-sector income groups, such that each income group in each sector has a beta, and we build a time series with the dispersion of the betas in inside each sector.

We build a toy model to elucidate the intuition. Lets suppose we have a factor with returns that follows an i.i.d. standard normal distribution and that we have five individuals with beta coefficients $-2, -1, 0, 1$ and 2 , with an earnings equation that follows the structure $\Delta Y_i = \beta \times X_i$. So, in a period where the factor has a return of 0.5 , individual 1 has a change in earnings of -1 , individual 2 has a change of -0.5 , individual 3 a change of 0 , individual 4 a change of 0.5 , and individual 5 a change of 1 . Now, we perform a simple test where we double the beta coefficients of each individual $(-4, -2, 0, 2, 4)$, a second test where we double the variance of the factor returns, and a last test where we double the coefficients and double the variance of the factor returns. We simulate 100 periods on this toy model and plot the time series and the density plots for the earnings changes in figure 1. As expected, increasing beta dispersion or factor variance, increases earnings changes dispersion as well.

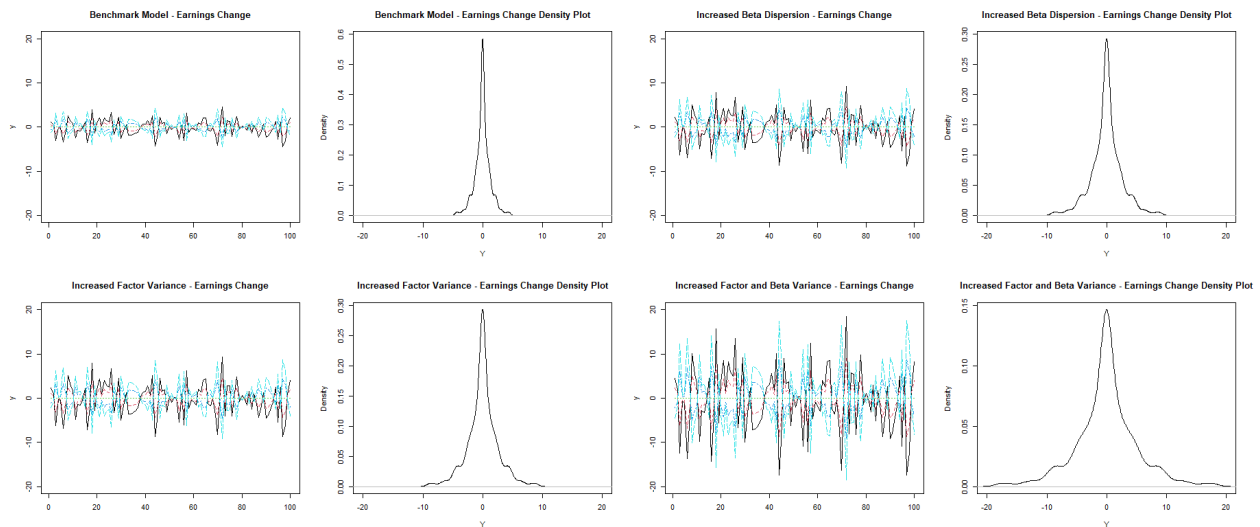


Figure 1: Toy Model - Beta dispersion, factor variance and earnings variance

Skewness Analysis

We examine the skewness of earnings to understand the asymmetry of its distribution around the mean. Skewness provides insights into the likelihood of extreme earnings fluctuations, which can have significant implications for financial planning and risk man-

agement. For this analysis, we utilize Kelly's measure of skewness:

$$S_k = \frac{(P90 - P50) - (P50 - P10)}{(P90 - P10)} \quad (5)$$

This formula uses percentiles to gauge earnings dispersion. A positive skewness value indicates that the distribution has a longer tail on the right side, meaning there is a greater likelihood of experiencing large positive earnings deviations from the mean compared to large negative deviations. Conversely, a negative skewness value indicates a longer tail on the left side, suggesting a higher probability of large negative deviations. Our analysis focuses on the relationship between earnings skewness and both macroeconomic factors and equity risk factors. We investigate whether GDP growth, a key macroeconomic indicator, has a significant impact on earnings skewness. Additionally, we examine the relationship between earnings skewness and the Fama-French five factors, particularly the value factor (HML). This allows us to explore how these factors contribute to earnings risk asymmetry and the potential for extreme earnings fluctuations.

$$\text{Skew}(\Delta\hat{\epsilon}_{i,t}) = \alpha_i + \beta_{i,j}F_{j,t} + \epsilon_{i,t} \quad (6)$$

We employ linear regressions to quantify these relationships, regressing earnings skewness on the equity factors. This analysis allows us to test the hypothesis that the value factor, along with other financial and macroeconomic factors, significantly relate to the asymmetry of earnings distributions.

Firms Fundamentals

To investigate the relationship between sectorial fundamentals and the value factor (HML), we collect revenue and net income growth data for S&P 500 firms, classified under the NAICS sector classification, such that the sectors are the same from the ones used in

the SIPP. We use data from Eikon for the period 2010 to 2024. Revenue and Net Income growth are calculated for each firm and extreme values from the top and bottom 0.5% of observations are dropped. We then compute the dispersion (standard deviation of earnings growth) for each variable growth in each sector.

Results

Heterogeneous Factor Exposure

Our analysis reveals significant heterogeneity in worker betas with respect to equity risk factors. This heterogeneity indicates that exposure to market risks varies widely among workers across different income quintiles and sectors. Regression models demonstrate that these differences in factor exposures help explain the variance in earnings growth, supporting our hypothesis that financial market conditions are connected to labor income dispersion. Figure 2 illustrates the heterogeneity in worker betas across earnings quintiles for various risk factors. Notably, the betas for MKT, SMB, and HML are highest among the lowest earners, suggesting their income is most vulnerable to fluctuations in these factors. For middle income levels, betas for these factors tend to be closer to zero, indicating that these groups might enjoy greater stability. For higher income groups, coefficients tend to be higher, in absolute terms. This variability in risk exposure helps the understanding of how the financial market fluctuations link with labor income risk. Workers in certain sectors or income brackets may be more vulnerable to market downturns, potentially exacerbating income inequality and economic instability.

One reason for the observed pattern could be that lower-income earners are more likely to work in smaller or value-oriented firms with fewer buffers against adverse shocks. As a result, the “pass-through” of firm-level risk to wages is greater in these firms. Studies by Friedrich, Laun, Meghir, and Pistaferri (2024) and Guvenen et al. (2021) show that

lower-income or lower-skilled employees face a concentrated pass-through of financial and macro volatility. In these environments, wage cuts and earnings drops are more frequent and have more persistent effects, amplifying the link between market fluctuations and individual pay. Middle earners may have somewhat more stable labor contracts or work at firms that better shield employees from day-to-day market volatility. In effect, these groups experience less of that “pass-through” of firm-level shocks. Meanwhile, higher earners frequently occupy positions at more profitable or large-cap firms, which typically maintain stronger financial buffers. Moreover, higher earners often hold roles that offer stronger insulation from adverse shocks compared to those of middle or low-income workers.

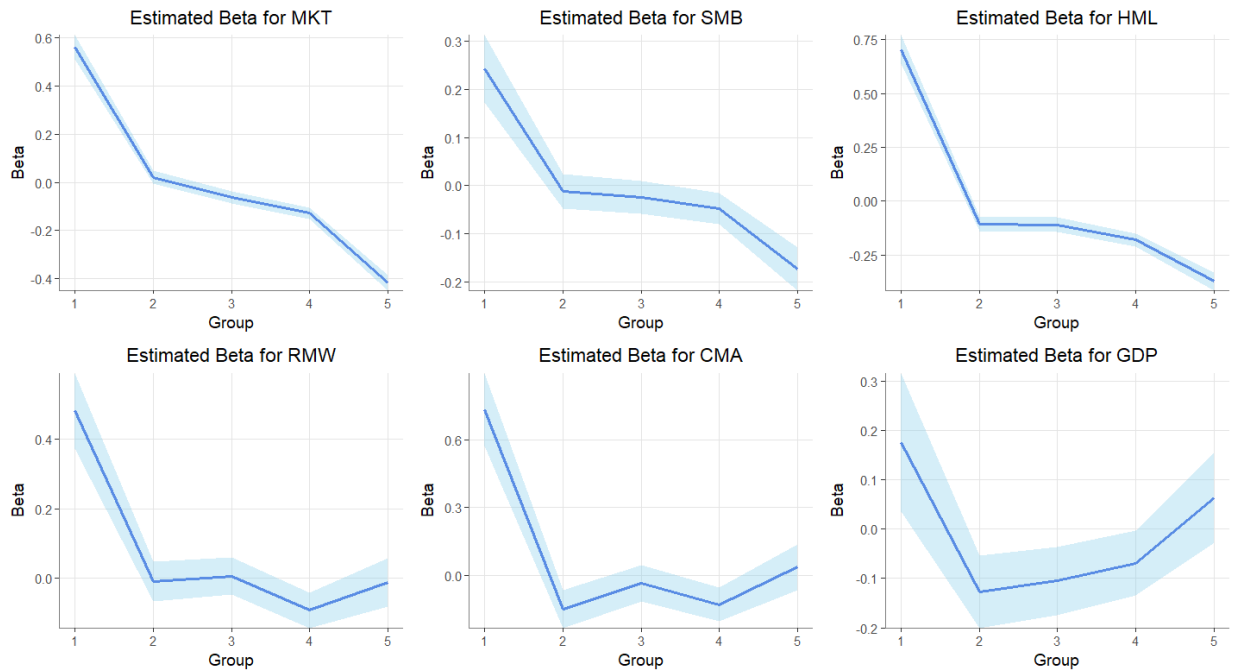


Figure 2: Worker Betas - Pooled OLS coefficients of change in idiosyncratic earnings on risk factors, by earnings quintile.

Table 1 further explores the relationship between earnings variance and the Fama-French five factors: Market, SMB (Small Minus Big), HML (High Minus Low), RMW (Robust Minus Weak), and CMA (Conservative Minus Aggressive). Due to the common volatility component inherent in equity risk factors, variance metrics across these factors exhibit high correlation. Given our sample size constraints, including all factors simultaneously

Table 1: Idiosyncratic Earnings Variance and Factor Variance

	<i>Dependent variable:</i>				
	Earnings Variance				
	(1)	(2)	(3)	(4)	(5)
Var(MKT)	0.390** (0.181)				
Var(SMB)		0.484*** (0.172)			
Var(HML)			0.453** (0.175)		
Var(RMW)				0.351* (0.184)	
Var(CMA)					0.247 (0.190)
Constant	15.704*** (0.207)	15.367*** (0.262)	15.575*** (0.220)	15.506*** (0.287)	15.594*** (0.320)
Observations	28	28	28	28	28
R ²	0.152	0.234	0.206	0.124	0.061
Adjusted R ²	0.119	0.204	0.175	0.090	0.025

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the variance of idiosyncratic earnings growth across individuals. The independent variables are the quarterly time-series variances of the five Fama-French factors. Each column represents a separate univariate regression for each factor, with each observation corresponding to a quarter in the sample period.

would induce severe multicollinearity, inflating standard errors and rendering coefficient estimates unstable. Therefore, we estimate separate regressions for each factor to obtain reliable estimates of their individual relationships with earnings variance. The analysis reveals that the coefficients for the Market, SMB, HML, and RMW factors are positively correlated with earnings variance, indicating a statistically significant relationship between these factors and earnings volatility. This suggests that fluctuations in these financial risk factors are associated with greater variability in individual earnings. The positive correlation with the value factor (HML) is particularly noteworthy. This finding suggests that workers in industries or job roles associated with high book-to-market ratios may experience more pronounced fluctuations in their earnings. This aligns with the notion that value stocks tend to be more sensitive to economic conditions and exhibit higher volatility compared to growth stocks.

Moving beyond the direct impact of factor variances, in table 2 we look at the relationship between earnings variance and the interaction between individual beta variances and the Fama-French five factors. This analysis investigates how dispersion in workers' sensitivity to these factors (beta variances) interact with the factors' variance themselves to influence earnings variability. Specifically, the SMB, HML and RMW beta variance interaction shows a significant coefficient. In contrast, the Market factor interaction and CMA interaction are not statistically significant. The results indicate that the interaction terms between beta variances and factor variances are meaningful in explaining variations in earnings. This indicates that workers' earnings risks are not only affected by market conditions but also by how their earnings are exposed to these conditions. For example, two workers in the same industry may experience different levels of earnings volatility depending on their individual sensitivities to the value factor. This individual sensitivity can be influenced by factors such as their earnings quintile or specific job role within the sector. It suggests that both the macroeconomic environment and individual-level responses to this environment contribute to earnings volatility. This shows the importance of considering

Table 2: Earnings Variance, Factor Variance and Beta Variance - Interaction

	<i>Dependent variable:</i>				
	Idiosyncratic Earnings Variance				
	(1)	(2)	(3)	(4)	(5)
Var(MKT Beta) x Var(MKT)	0.461 (0.412)				
Var(SMB Beta) x Var(SMB)		0.179** (0.070)			
Var(HML Beta) x Var(HML)			0.121* (0.063)		
Var(RMW Beta) x Var(RMW)				0.262** (0.118)	
Var(CMA Beta) x Var(CMA)					0.041 (0.073)
Constant	15.700*** (0.235)	15.360*** (0.258)	15.514*** (0.255)	15.376*** (0.277)	15.709*** (0.276)
Observations	21	21	21	21	21
R ²	0.062	0.258	0.160	0.206	0.016
Adjusted R ²	0.012	0.219	0.115	0.164	-0.035

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the variance of idiosyncratic earnings growth across individuals. The independent variable in each column is an interaction term that multiplies the time-series variance of a Fama-French factor (measured quarterly) by the cross-sectional variance of individual factor betas (measured across workers within earnings quintiles). Each column represents a separate univariate regression for each factor.

not only aggregate market risks but also individual-level risk exposures when assessing and managing labor income risk.

Earnings Skewness

Next we explore the skewness of earnings distributions to understand the asymmetry in earnings growth across different workers and its relationship to financial risk factors and macroeconomic conditions. This analysis utilizes Kelly's measure of skewness, which captures the degree to which the distribution of earnings deviates from symmetry around its mean. A positive skewness indicates a higher likelihood of experiencing large positive earnings deviations, while a negative skewness suggests a greater probability of large negative deviations. Linear regressions are employed to assess the relationship between earnings skewness and the Fama-French five factors, as well as GDP growth. The results reveal significant coefficients for HML (value factor) and CMA (Conservative Minus Aggressive factor), along with GDP growth, indicating a relationship between these factors and earnings skewness. Results can be seen in table 3. The strong statistical significance of the HML factor suggests that value-related aspects of jobs or industries may influence the likelihood of seeing more pronounced earnings increases or decreases. The significant coefficient for GDP growth reaffirms the macroeconomic influence on earnings skewness. This suggests that periods of economic expansion or recessions may be associated with greater earnings skewness, potentially leading to wider disparities in earnings outcomes across different workers. For example, the identified relationships suggest that individuals in certain sectors or with specific risk exposures might experience more significant fluctuations in their earnings, potentially leading to increased economic inequality and instability.

To further investigate the relationship between earnings skewness and the value factor, Table 4 examines whether HML and GDP growth jointly explain earnings skewness patterns.

Table 3: Earnings Skewness and Equity Risk Factors

	<i>Dependent variable:</i>					
	<i>Idiosyncratic Earnings Skewness</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
MKT	0.077 (0.196)					
SMB		0.144 (0.194)				
HML			0.497*** (0.170)			
RMW				0.292 (0.188)		
CMA					0.397** (0.180)	
GDP						0.486*** (0.171)
Constant	1.009*** (0.208)	1.046*** (0.191)	1.095*** (0.168)	0.970*** (0.189)	1.054*** (0.177)	0.664*** (0.214)
Observations	28	28	28	28	28	28
R ²	0.006	0.021	0.247	0.085	0.158	0.236
Adjusted R ²	-0.032	-0.017	0.218	0.050	0.126	0.207

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the skewness of idiosyncratic earnings growth across individuals. The independent variables are quarterly returns of the five Fama-French factors (columns 1-5) and quarterly GDP growth (column 6). Each column represents a separate univariate regression, with each observation corresponding to a quarter in the sample period.

Given that both variables showed strong independent effects in Table 3, it is important to assess whether these effects persist when both are included simultaneously, or whether one subsumes the other. The results demonstrate that both HML and GDP growth retain their statistical significance when included together, with the combined specification achieving a substantially higher explanatory power than either factor alone. This suggests that the value factor and macroeconomic conditions capture distinct dimensions of earnings skewness, with HML potentially reflecting industry-specific or sectoral risk exposures, while GDP growth captures broader business cycle effects on earnings distributions.

One potential explanation for the value factor (HML) as a significant predictor of idiosyncratic earnings skewness is the inherent characteristics of value-driven economic activities. Value firms, often characterized by high book-to-market ratios, tend to operate in more mature industries with stable cash flows but limited growth opportunities. This stability may translate into lower earnings volatility for workers in these sectors. However, value firms can also be more susceptible to economic downturns or industry-specific shocks, potentially leading to pronounced negative earnings deviations and increased skewness in earnings distributions. Another possible explanation relates to the compensation structures and employment contracts prevalent in value-driven industries. For example, workers in these sectors may have a higher proportion of their compensation tied to performance-based bonuses or stock options. While this can lead to higher earnings during periods of economic expansion, it can also result in significant earnings declines during downturns, contributing to earnings skewness. Furthermore, the positive correlation between the value factor and earnings skewness aligns with the notion of tail risk. Value stocks are often considered to have higher tail risk compared to growth stocks, meaning they are more susceptible to extreme negative returns. Our findings suggest that this tail risk may also be present in labor income, particularly for workers exposed to value-driven economic activities. This connection between the value factor and labor income tail risk offers a potential explanation for the premium associated with this factor in asset pricing

models, as investors may be willing to accept lower average returns on value factor assets in exchange for the diversification benefits and risk reduction they provide against labor income risk.

Table 4: Earnings Skewness and HML Factor

	<i>Dependent variable:</i>		
	<i>Idiosyncratic Earnings Skewness</i>		
	(1)	(2)	(3)
GDP	0.486*** (0.171)		0.439*** (0.151)
HML		0.497*** (0.170)	0.451*** (0.151)
Constant	0.664*** (0.214)	1.095*** (0.168)	0.751*** (0.190)
Observations	28	28	28
R ²	0.236	0.247	0.437
Adjusted R ²	0.207	0.218	0.392

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the skewness of idiosyncratic earnings growth across individuals. The independent variables are quarterly GDP growth (column 1), the HML factor return (column 2), and both variables jointly (column 3). Each observation represents a quarter in the sample period.

Intra-Sector Analysis

In table 5 we can see the results from the Intra-Sector Beta Variance and Earnings Variance. It shows positive and statistically significant coefficients for SMB and HML beta variances indicating that greater exposure to these risk factors is associated with higher earnings variance within sectors. This suggests that firms with higher sensitivity to size (SMB) and value (HML) factors experience more pronounced earnings variability, likely due to their inherent exposure to market conditions that disproportionately affect smaller and value-oriented firms. Figure 3 illustrates this heterogeneity by displaying HML betas across sectors and earnings quintiles. The figure reveals substantial variation in value factor

exposure both across industries and within sectors by earnings level. Notably, workers in the highest earnings quintile (group 1, shown in red) exhibit consistently positive and often large HML betas across most sectors, while those in the lowest quintile (group 5, shown in cyan) display negative or near-zero betas. This pattern suggests that high earners are more exposed to value factor risk, while low earners may actually have earnings that move counter-cyclically to the value factor, in line with results from figure 2. These findings highlight the importance of understanding sector-specific dynamics and their link to factor sensitivities, as different equity risk factors can drive substantial heterogeneity in earnings variance within industries.

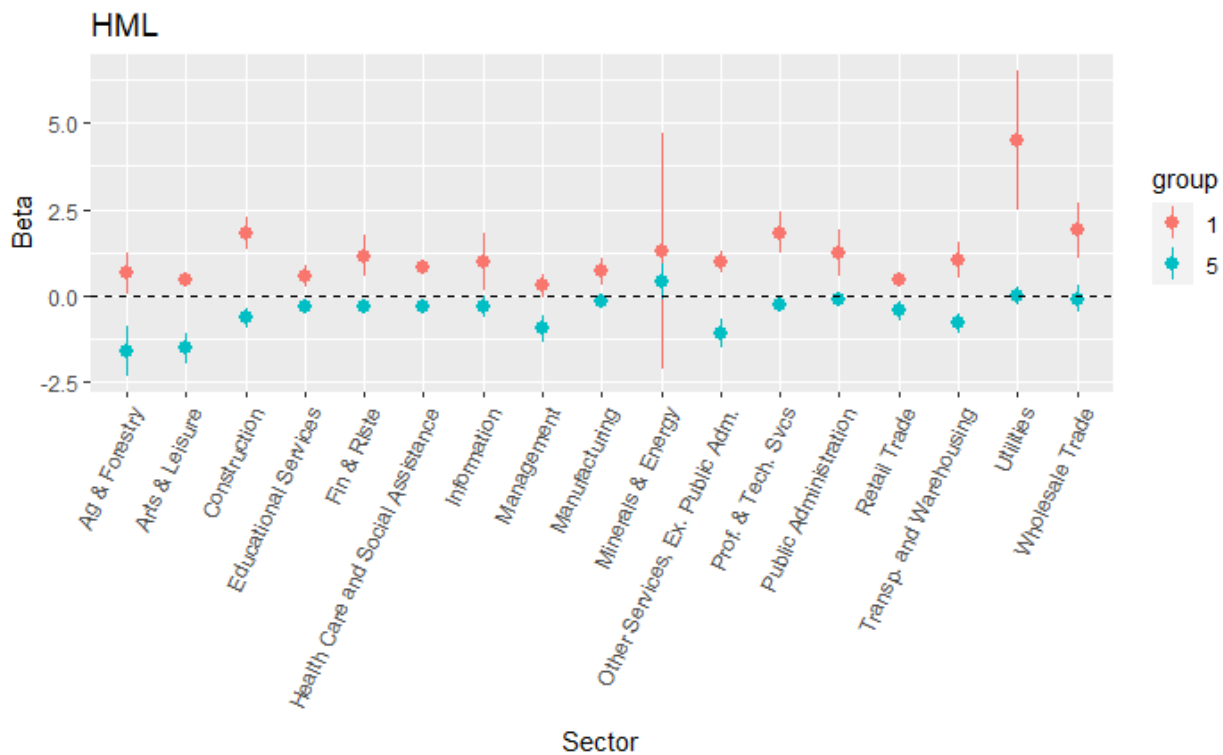


Figure 3: Worker Betas - Risk Factors - Intra-sector and by earnings quintiles

The results in the table 7, that shows the Firms Fundamentals regressions, highlight the significant role that HML variance plays in explaining intra-sector earnings dispersion for firms, similarly to individuals. The findings suggest that sectors with greater HML variance experience higher dispersion in revenue growth and net income growth among

Table 5: Intra-Sector Beta Variance and Idiosyncratic Earnings Variance

	<i>Dependent variable:</i>					
	Intrasector Earnings Variance					
	(1)	(2)	(3)	(4)	(5)	(6)
Var(MKT beta)	-0.067 (0.051)					
Var(SMB beta)		0.218*** (0.050)				0.152*** (0.058)
Var(HML beta)			0.207*** (0.050)			0.131** (0.058)
Var(RMW beta)				-0.022 (0.052)		
Var(CMA beta)					0.029 (0.052)	
Constant	-0.000 (0.051)	-0.000 (0.050)	-0.000 (0.050)	-0.000 (0.051)	-0.000 (0.051)	-0.000 (0.050)
Observations	378	378	378	378	378	378
R ²	0.005	0.047	0.043	0.0005	0.001	0.060
Adjusted R ²	0.002	0.045	0.040	-0.002	-0.002	0.055

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the within-sector variance of idiosyncratic earnings growth. The independent variables are the cross-sectional variances of individual factor betas, measured across workers within each sector-quarter.

Table 6: Earnings Variance, Factor Variance and Intra-Sector Beta Variance - Interaction

	<i>Dependent variable:</i>				
	Idiosyncratic Earnings Variance				
	(1)	(2)	(3)	(4)	(5)
Var(MKT Beta) x Var(MKT)	0.461 (0.412)				
Var(SMB Beta) x Var(SMB)		0.179** (0.070)			
Var(HML Beta) x Var(HML)			0.121* (0.063)		
Var(RMW Beta) x Var(RMW)				0.262** (0.118)	
Var(CMA Beta) x Var(CMA)					0.041 (0.073)
Constant	15.700*** (0.235)	15.360*** (0.258)	15.514*** (0.255)	15.376*** (0.277)	15.709*** (0.276)
Observations	21	21	21	21	21
R ²	0.062	0.258	0.160	0.206	0.016
Adjusted R ²	0.012	0.219	0.115	0.164	-0.035

*p<0.1; **p<0.05; ***p<0.01

This table presents coefficients from cross-sectional regressions where the dependent variable is the variance of idiosyncratic earnings growth across individuals. The independent variable is the interaction between two components: (1) the time-series variance of each Fama-French factor (measured quarterly), and (2) the cross-sectional variance of individual factor betas across workers within earnings quintiles and sectors.

firms. This indicates that value-driven economic activities, as represented by HML, are linked to increased heterogeneity in firm performance within sectors. Such increased dispersion can be attributed to the varying impacts of macroeconomic factors on firms with different financial profiles within a sector. The variability in firm fundamentals driven by HML also suggests that workers in sectors with high HML variance might face greater earnings risk due to the heterogeneous nature of firms' responses to economic shocks, as we have analyzed previously. This result brings light to a possible channel for the results found throughout this paper. Risk Factors correlate to firms earnings and to individuals working in the firms as well.

Table 7: Intra-Sector Fundamentals Growth and HML Variance

	<i>Dependent variable:</i>	
	<i>Disp. Rev. Growth</i>	<i>Disp. Net Inc Growth</i>
	(1)	(2)
HML Variance	0.234*** (0.035)	0.164*** (0.036)
Constant	-0.000 (0.035)	0.000 (0.036)
Observations	770	770
R ²	0.055	0.027

*p<0.1; **p<0.05; ***p<0.01

This table reports the regression coefficients of a cross sectional regression of firms revenues and net income growth cross sectional dispersion on HML factors quarterly time series variance.

Results Summary

Our analysis of SIPP data provides evidence of the significant relation of equity risk factors with labor income. We find substantial heterogeneity in worker betas, highlighting the varied relation of market risks across different segments of the workforce. Regression analysis reveal a relationship between the variance of equity risk factors and idiosyncratic earnings variance, suggesting that fluctuations in financial markets correlate with individ-

ual earnings stability. Furthermore, both higher beta variance and the interaction between beta variance and factor variance display a significant connection to idiosyncratic risk. Most notably, the value factor (HML) emerges as a significant link to idiosyncratic earnings skewness, together with the more standard GDP growth metric. This finding corroborates existing literature on the procyclicality of earnings skewness relative to GDP growth and extends our understanding by linking the value factor to earnings skewness. The positive correlation suggests that aspects of the premium associated with the value factor might be explained by its connection to labor income risk, particularly its ability to capture tail risk and serve as a potential hedge factor in portfolios. Overall, our research shows the importance of considering financial market dynamics when analyzing labor income risk, as it significantly relates to earnings variability and skewness, with implications for both individuals and policymakers.

Conclusion

This study has investigated the relationship between equity risk factors and labor income, with a particular focus on the value factor (HML) and its relation to workers earnings. By using US data from the Survey of Income and Program Participation (SIPP), we have explored the connection between financial market dynamics and individual earnings.

Our analysis reveals significant heterogeneity in worker betas, indicating that individuals exhibit diverse exposures to financial market risks. This heterogeneity is significant across different income quintiles and sectors, which we show that may be relevant when assessing labor income risks. We find a significant relationship between the variance of equity risk factors and idiosyncratic earnings variance, demonstrating that fluctuations in financial markets have an association with individual earnings stability. Moreover, both the variance in individual betas and the interaction between beta variance and factor variance also display significant coefficients on the idiosyncratic risk regression.

Most notably, our research identifies the value factor as a significant variable to explain idiosyncratic earnings skewness in the U.S. context. This finding suggests that value-related aspects of jobs or industries may contribute to the likelihood of pronounced earnings fluctuations for workers in those sectors. This connection between the value factor and labor income tail risk offers a potential explanation for the premium associated with this factor in asset pricing models, as it may serve as a valuable hedge against labor income risk in investment portfolios. Specifically, the positive correlation between the value factor and earnings skewness implies that growth firms, with their typically lower book-to-market ratios, may offer a hedge against tail risk in labor income. This is because growth firms tend to exhibit lower earnings volatility and skewness compared to value firms. By including assets with high exposure to growth factors in their portfolios, investors can potentially offset the risk of extreme fluctuations in their labor income. This increased demand for growth factor exposure due to its hedging properties could contribute to lower average returns on growth assets. Consequently, the value factor, which goes long on value firms and short growth firms, would command a positive premium due to the relatively higher returns offered by value firms compared to growth firms.

Intra-sector analysis for worker earnings further demonstrates that equity risk factors significantly relate to individual earnings variability within sectors. Workers in industries characterized by greater sensitivity to size (SMB) and value (HML) risk factors tend to experience higher earnings volatility, which suggests that labor income in these sectors is more exposed to fluctuations in market conditions. This means that workers in smaller firms or those associated with high book-to-market ratios face greater uncertainty in their earnings, which might be due to the firms' inherent risk exposures. Conversely, sectors where MKT, RMW, and CMA beta variances are not significant may offer more stable earnings prospects for workers, as these risk factors do not lead to substantial intra-sector variability. Understanding these dynamics is relevant for assessing the risks faced by workers and developing strategies to mitigate income instability across different sectors.

Additionally, the intra-sector analysis through the lens of the firms reveals that different equity risk factors drive substantial heterogeneity in earnings variance within industries. Specifically, the significant coefficients of HML volatility indicates that firms are more prone to higher intra-sector earnings variability when factor volatility increases as well. This suggests that those with higher book-to-market ratios are particularly sensitive to market conditions that amplify earnings dispersion. These findings suggest the importance of sector-specific dynamics and their relationship with equity risk factor sensitivities.

Furthermore, our results indicate how “value firms” – often constrained by tighter profit margins or more volatile revenues – tend to share more of their risk with employees. This pass-through of shocks is particularly evident among lower-wage workers, who experience larger earnings swings when their firm’s value exposure intensifies. By contrast, middle-income segments appear somewhat less vulnerable to these same disruptions. In effect, value firms’ limited ability to buffer financial downturns translates into higher wage variability for workers, highlighting a form of “risk sharing” where employees bear a notable portion of the company’s market-driven uncertainties.

In conclusion, this study makes several important contributions. First, it broadens our understanding of the economic forces influencing labor income by demonstrating the significant relation of equity risk factors, particularly the value factor, with earnings variability, for individuals and firms, and workers earnings growth skewness. Second, it bridges the gap between financial economics and labor market analysis by suggesting that factors traditionally associated with asset pricing can also be informative in understanding labor income risk. Finally, the findings offer implications for developing hedging strategies based on financial risk exposures, as well as for policy-making aimed at mitigating the adverse effects of financial market fluctuations on workers.

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Appendix

$$\Delta \hat{e}_{i,t} = \alpha_i + \beta_j \text{GDP}_t + \epsilon_{i,t}$$

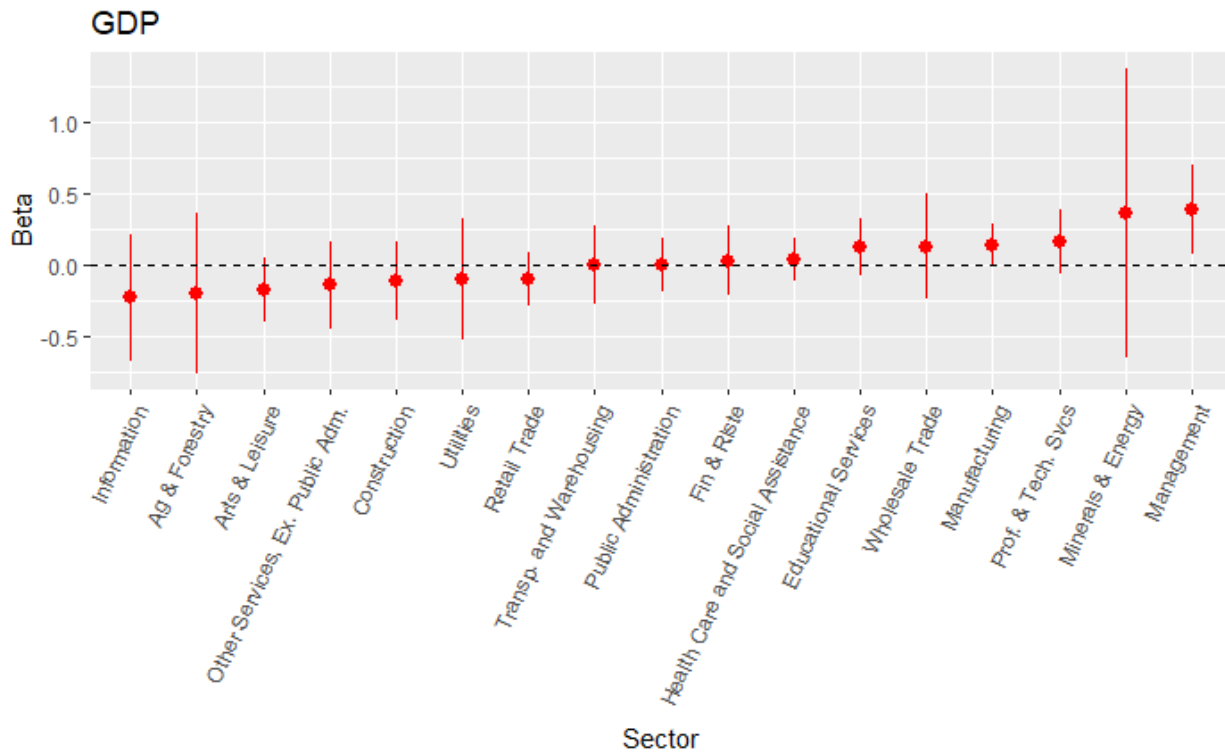


Figure 4: Worker Betas - By Sector - GDP

$$\Delta \hat{\epsilon}_{i,t} = \alpha_i + \beta_j \text{MKT}_{i,t} + \epsilon_{i,t}$$

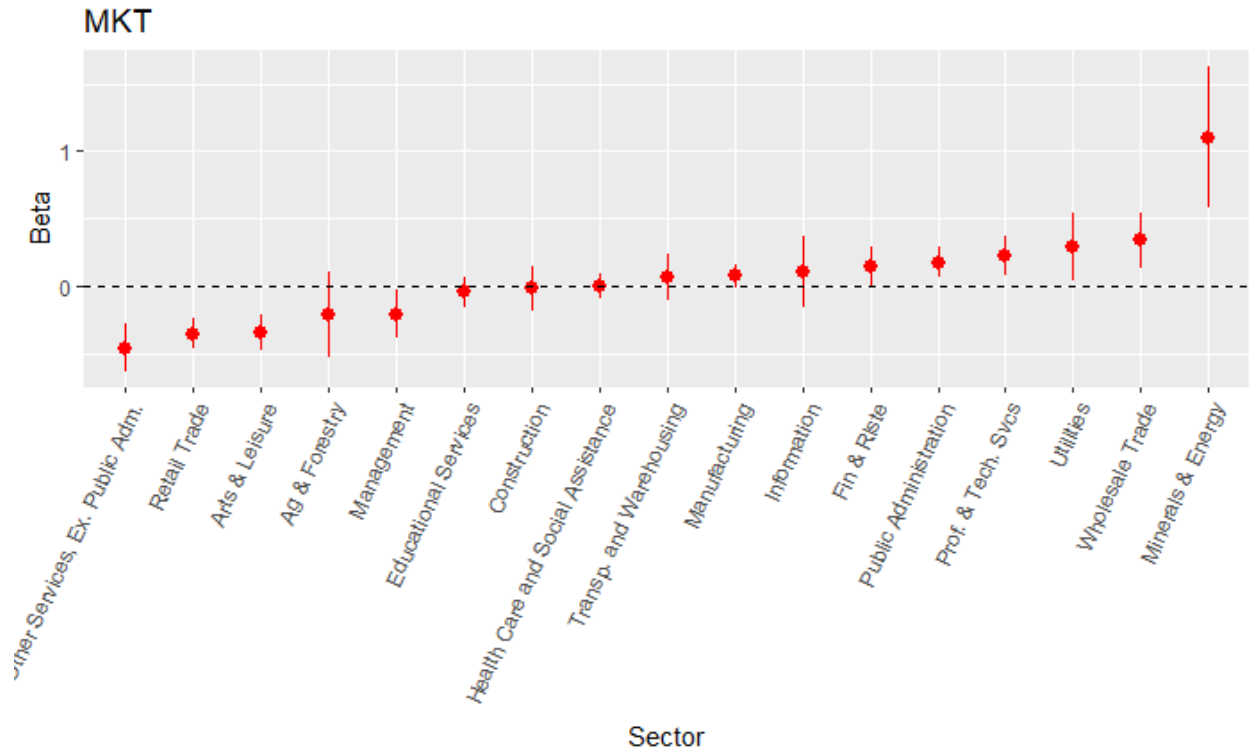


Figure 5: Worker Betas - By Sector - MKT

$$\Delta \hat{\epsilon}_{i,t} = \alpha_i + \beta_j \text{SMB}_{i,t} + \epsilon_{i,t}$$

$$\Delta \hat{\epsilon}_{i,t} = \alpha_i + \beta_j \text{HML}_{i,t} + \epsilon_{i,t}$$

$$\Delta \hat{\epsilon}_{i,t} = \alpha_i + \beta_j \text{RMW}_{i,t} + \epsilon_{i,t}$$

$$\Delta \hat{\epsilon}_{i,t} = \alpha_i + \beta_j \text{CMA}_{i,t} + \epsilon_{i,t}$$

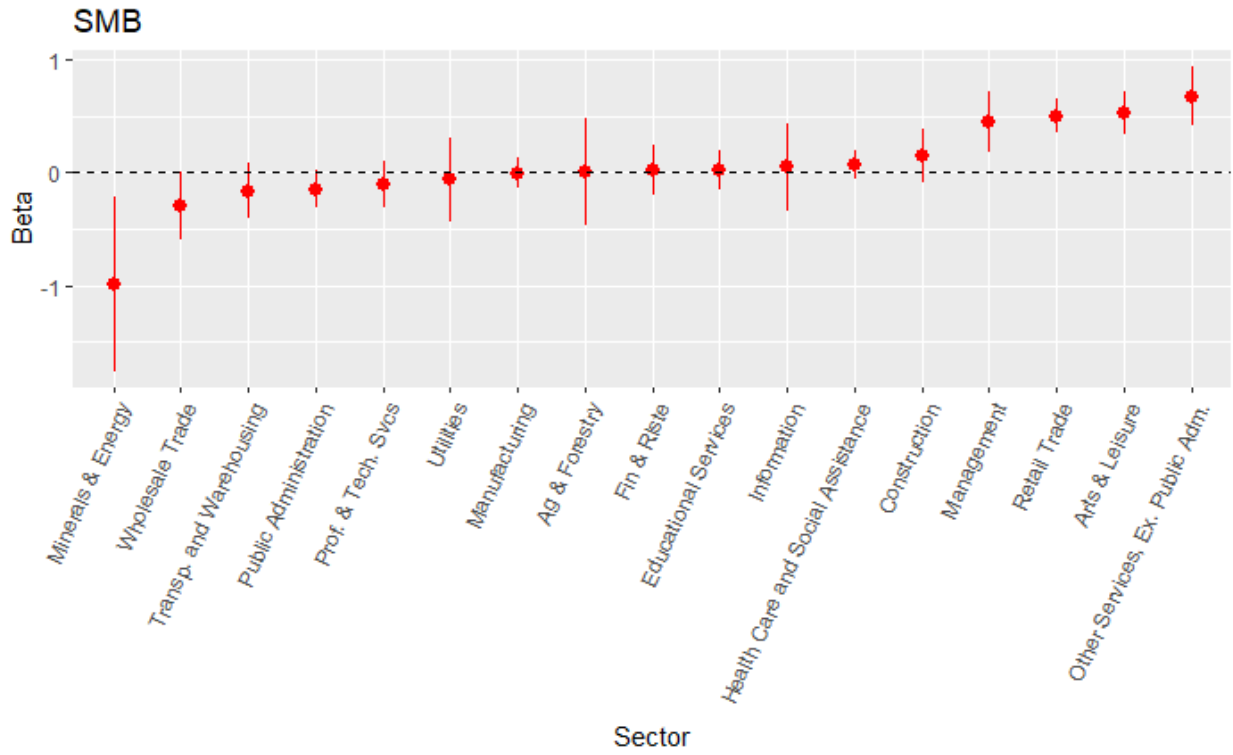


Figure 6: Worker Betas - By Sector - SMB

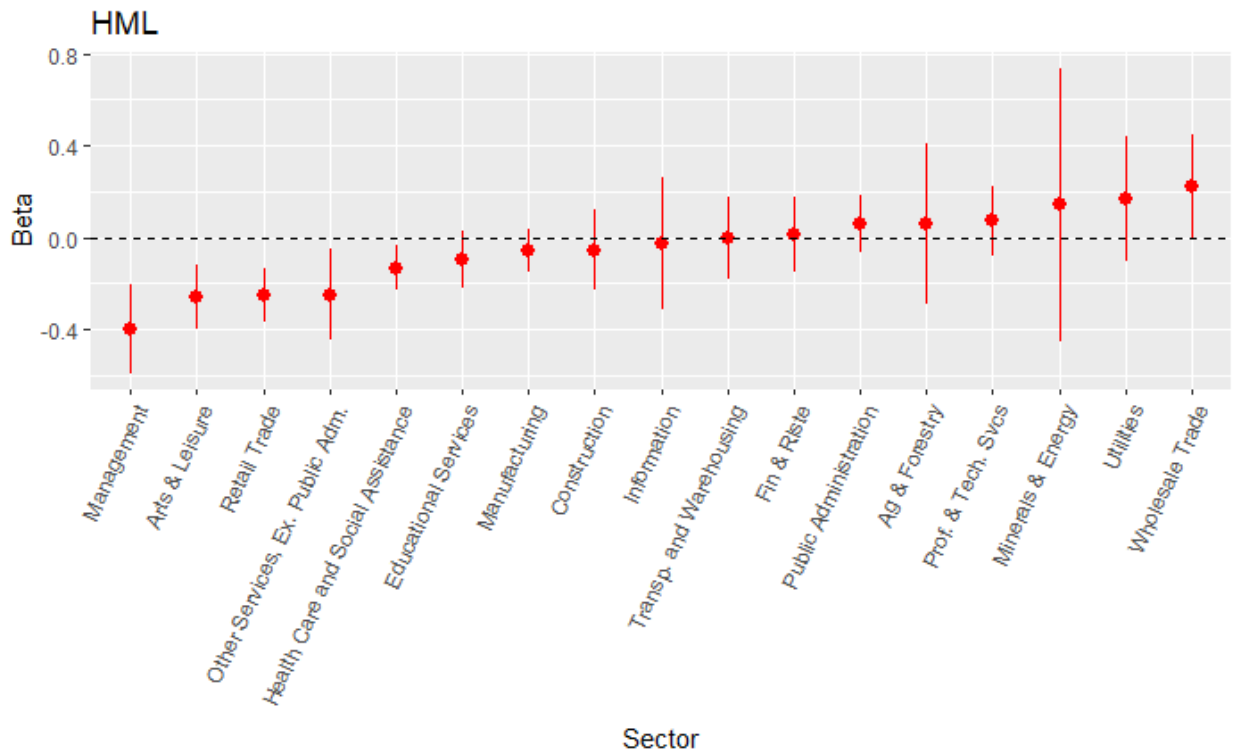


Figure 7: Worker Betas - By Sector - HML

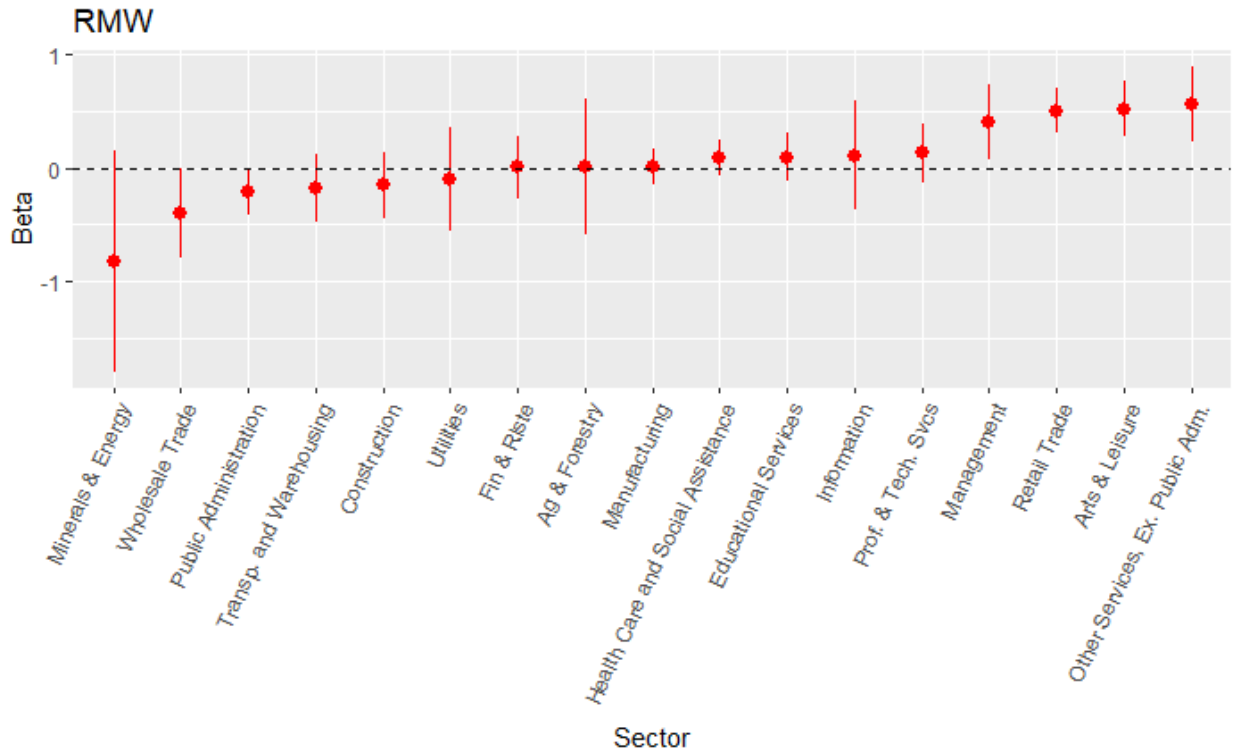
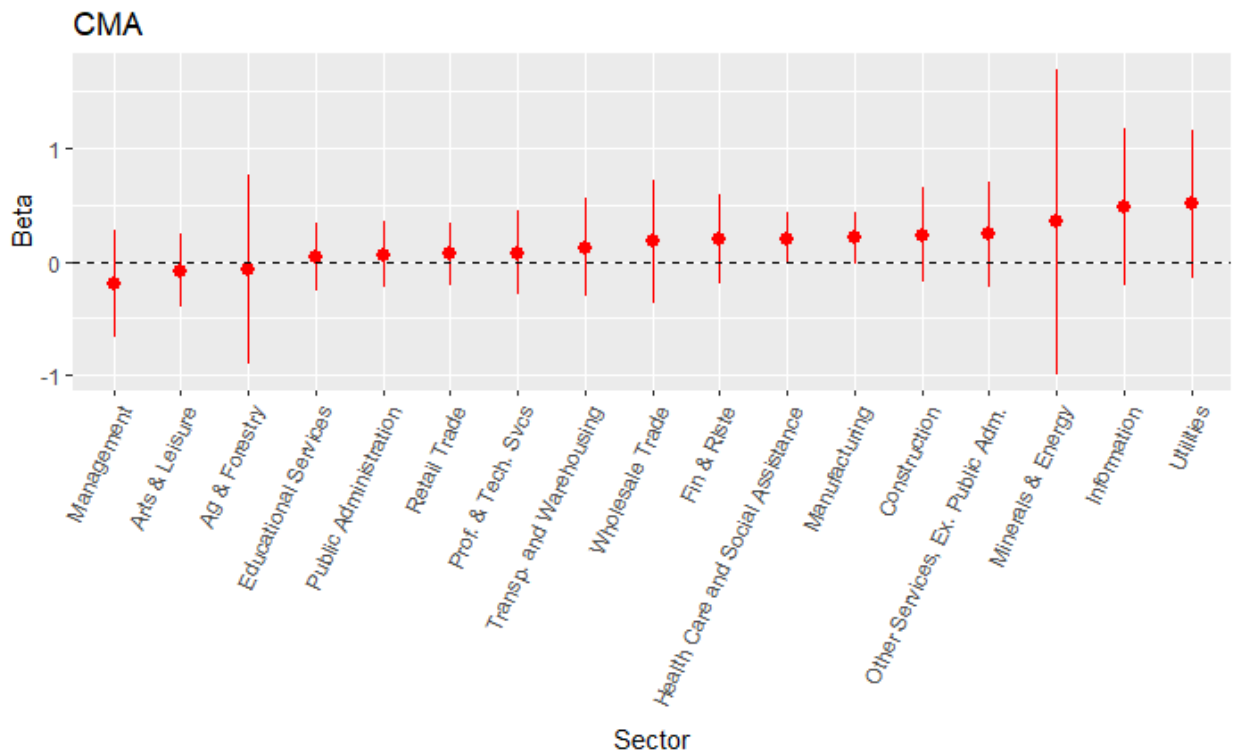


Figure 8: Worker Betas - By Sector - RMW



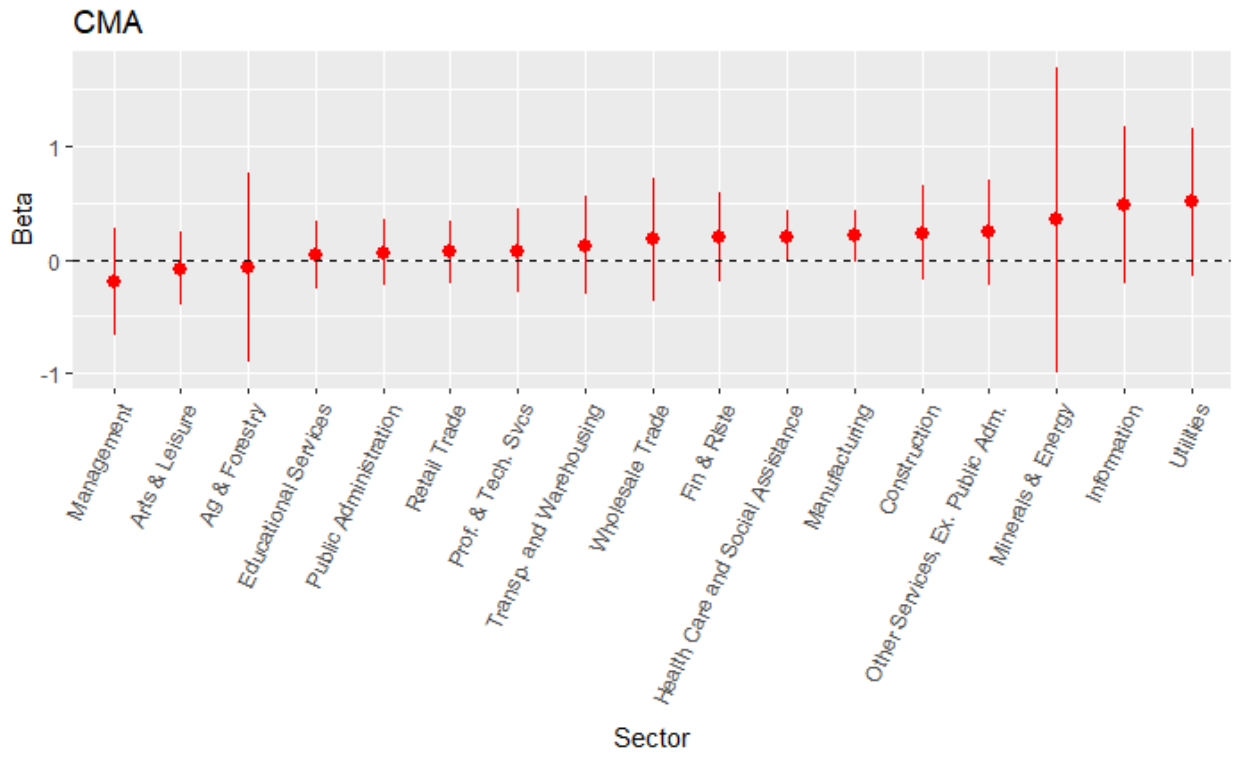


Figure 9: Worker Betas - By Sector - CMA

Table 8: Earnings Variance and Beta Variance

	<i>Dependent variable:</i>				
	Idiosyncratic Earnings Variance				
	(1)	(2)	(3)	(4)	(5)
MKT Beta	-0.541** (0.193)				
SMB Beta		0.401* (0.210)			
HML Beta			0.483** (0.201)		
RMW Beta				0.468** (0.203)	
CMA Beta					0.192 (0.225)
Constant	16.059*** (0.209)	15.049*** (0.444)	14.873*** (0.433)	15.292*** (0.296)	15.604*** (0.320)
Observations	21	21	21	21	21
R ²	0.293	0.161	0.234	0.219	0.037
Adjusted R ²	0.256	0.117	0.193	0.178	-0.014

*p<0.1; **p<0.05; ***p<0.01