The risk relevance of restructuring

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Abstract

This study investigates the degree to which restructuring expense reveals systematic risk. Restructuring expense includes costs of employee termination and relocation, and therefore it provides information about when and to what degree the firm is reducing an important factor of production, labor. Firms reduce labor when they expect declines in demand for their products. If demand is expected to decline market-wide, labor needs will be lower across the overall economy. If an individual firm reduces its labor needs in concert with the overall market, this is indicative of the firm's exposure to the expected aggregate demand shock and therefore undiversifiable risk. Following this logic, this paper measures firm sensitivity to aggregate demand shocks as the degree to which a firm's restructuring expense coincides with declines in aggregate employment growth. Firms with higher levels of this restructuring-based measure of systematic risk have higher market betas as measured through conventional stock return-based measures. Further, these firms also appear to realize demand shocks after restructuring, as they have lower sales and operating expense growth, in conjunction with lower aggregate sales and GDP growth, after restructuring. These results highlight the informativeness of restructuring expense with respect to firm investments in human capital and exposure to systematic risk.

1 Introduction

Firm valuation involves assessing future cash flows and their riskiness. The role of the earnings in determining future cash flows is well-studied in academic research and in practice. More recently, however, academic research has turned its attention to the role that operating earnings plays in risk assessment (Ball, Sadka, and Tseng, 2022; Ellahie, 2021). The objective of this paper is to build on this foundation by investigating the risk relevance of an expense often excluded from measures of earnings: restructuring.

Restructuring expense is comprised of costs accrued for changing the scope or manner in which business is conducted and includes employee termination benefits and relocation expenses (Financial Accounting Standards Board, ASC 420-10-05-1). Generally accepted accounting principles (GAAP) require the inclusion of restructuring expense in operating earnings, but it is often excluded from non-GAAP earnings and operating earnings measures provided by third parties, including Compustat (Laurion, 2020).

However, restructuring expense can be informative about the degree to which a firm is reducing its investment in a key factor of production, labor. Layoffs and employee relocation generate severance and separation costs that are accrued as restructuring expense. Firms must have communicated the plan to employees to incur the expense, and because of adjustment costs and other frictions in labor markets, firms are not likely to accrue the expense lightly, making restructuring a credible signal of labor disinvestment (Anderson, Banker, and Janakiraman, 2003; Banker, Byzalov, and Chen, 2013).

Reducing a factor of production such as labor indicates expectations that demand for the firm's output is declining. The reason for the demand decline is important in risk assessment. If the reason is idiosyncratic, then the risk is diversifiable. However, if the reason is macroeconomic, and the demand decline is economy-wide, then the risk is undiversifiable. Firms vary in their exposure to economy-wide shocks, so determining the context in which firms reduce labor investment is critical in assessing the diversifiablility of the risk signaled by restructuring.

If the expected decline in demand is economy-wide, then many firms throughout the economy will reduce their labor assets. If an individual firm reduces its labor assets concurrently, it is likely also exposed to the aggregate shock and therefore carries systematic risk. Based on this logic, this study proposes that the timing of firm restructuring expenses provides systematic risk relevant information. Specifically, firms that take larger restructuring charges when aggregate employment trends are weaker carry more systematic risk relative to firms that take restructuring charges in a pattern uncorrelated with aggregate labor markets.

Using a sample of firms that incurred quarterly restructuring expense between 1996 and 2020 and quarterly aggregate employment growth from the Bureau of Labor Statistics (BLS), tests provide evidence that restructuring expenses indicate labor disinvestment and have a systematic component. Specifically, the data indicate a positive correlation between the change in the number of employees at the firm and annual restructuring expense, consistent with restructuring indicating firm disinvestment in labor assets. Also, there is a positive correlation between aggregate employment growth and restructuring charges, suggesting a systematic labor-related component to restructuring.[1] Separating firms into groups based on labor adjustment costs indicates that firms with lower labor adjustment costs, as measured by higher industry unemployment, have a stronger correlation between restructuring and aggregate labor growth, providing further evidence that restructuring is indicative of labor disinvestment and has a systematic component.

I construct the restructuring-based measure of systematic risk, β_i^{EMPL}, following the familiar capital asset pricing model formula. Specifically, β_i^{EMPL} is the coefficient from a

[1] Higher restructuring expenses are more negative amounts in the data.

timeseries regression of firm restructuring expense on aggregate labor growth. Higher levels of β_i^{EMPL} indicate that a firm is more likely to be exposed to expected aggregate demand shocks that are manifesting as changes in aggregate employment. The measure correlates with measures of firm dependence on labor as a factor of production, i.e., labor leverage, consistent with restructuring charges reflecting disinvestment in labor assets.

As an initial test, I calculate average firm market betas using the the Fama-French-Carhart 4-factor model (Carhart, 1997; Fama and French, 1993), and regress these on the restructuring-based measure of systematic risk, β_i^{EMPL}. The measures are significantly correlated. I also construct an operating earnings-based alternative to β_i^{EMPL} by regressing operating earnings on aggregate labor growth. The operating earnings alternative measure does not substitute for the information provided by restructuring charges and neither do the extant measures of labor leverage. The association between the restructuring-based measure, β_i^{EMPL}, and returns-based betas is stronger when firms have higher labor adjustment costs, consistent with restructuring providing a more credible signal of expected demand shocks when adjustment costs are higher.

I also construct quintile portfolios based on the restructuring-based measure of systematic risk, β_i^{EMPL}, and estimate the Fama-French-Carhart 4-factor model by portfolio. Market betas increase from the first to the fifth quintile, and monotonically increase from the second to the fifth quintile, consistent with the restructuring expenses providing systematic risk-relevant information. Results are consistent when estimating market betas by β_i^{EMPL} portfolio conditional on the operating earnings-based measure or estimating market betas using out-of-sample returns.

Additional tests investigate differences in post-restructuring outcomes for firms with higher restructuring-based systematic risk measures. Consistent with these firms experiencing expected negative aggregate demand shocks after reducing labor assets, firms with higher measures of restructuring-based systematic risk, β_i^{EMPL}, have bigger drops in revenue and expense growth over the two-years starting in the year of restructuring relative to firms that have lower β_i^{EMPL}. Further, when firms with higher β_i^{EMPL} incur restructuring expense, aggregate sales and GDP growth is lower thereafter, consistent with the realization of aggregate demand shocks after firms with high β_i^{EMPL} restructure.

The tests indicate an overall increase in systematic risk for firms with higher levels of the restructuring-based measures of systematic risk, β_i^{EMPL}, however, the progression is not consistently monotonic. Specifically, the lowest quintile of β_i^{EMPL}, which has an average β_i^{EMPL} of -0.529 occasionally demonstrates higher systematic risk than the next highest portfolio which has a mean of β_i^{EMPL} of -0.036. This study proposes and finds evidence suggesting that this is because industry-level employment growth is more relevant for assessing systematic risk. Labor markets are industry-specific and may vary in the timing with which they reflect aggregate demand shocks.

Findings from this study can shed light on the informativeness of restructuring charges in assessing risk. Restructuring expense is not persistent, meaning it is not expected to continue in future periods, and therefore is often omitted from non-GAAP earnings or measures of operating earnings (Laurion, 2020). Further, restructuring expense has been criticized for being susceptible to managerial manipulation (Bens and Johnston, 2009). However, findings in this paper suggest that restructuring expenses are timely in light of the firm's exposure to aggregate demand shocks and can provide risk-relevant information, as they provide information about dis-investment in an important intangible factor of production.

Further, this study sheds light on the value of reporting human capital investments in the financial statements. The FASB has proposed a new standard requiring the disaggregation of income statement items into more granular categories, including employee compensation, because compensation expenses may behave differently in certain economic situations (Financial Accounting Standards Board, 2023). While this level of disaggregation is not yet available, restructuring expense can provide some indication of the usefulness of this standard and how changes in employee compensation can be useful in assessing firm risk. Further, the SEC has issued disclosure requirements around human capital as part of amended Item 101 of Regulation S-K. Researchers have highlighted the need for firms to provide better information about human capital investments for investors (Banks et al., 2022). Also, there has been a call for more research evaluating the role of financial statements in firm risk assessment, particularly around intangible assets (Barth, 2015). The results from this study provide insights related to these topics by demonstrating how human capital related expenses can provide information about firm risk to investors.

The remainder of this paper is organized as follows. Section 2 provides a discussion of the research related to systematic risk, labor disinvestment, restructuring charges, and the hypothesis tested in this study. Section 3 describes the research design and measurement. Section 4 describes the data, section 5 provides the results of the tests, and section 6 provides additional analyses. Section 7 concludes the study.

2 Related literature and hypothesis

From the firm perspective, labor is a factor of production that generates output for the firm to sell.[2] The firm should adjust their investment in labor based on changes in their product demand expectations. This study proposes that the timing of labor adjustments can be informative about firm risk.

There may be several reasons why a firm is expecting a demand shock. This study

[2] I do not delineate between human capital and labor in this paper, although I recognize that in other contexts the terms may not be interchangeable. The term "labor assets" refers to the intangible and generally unrecorded value that retaining employee talent brings to the firm.

considers two collectively exhaustive categories of these reasons: idiosyncratic and systematic. Idiosyncratic reasons are relevant to the firm specifically, but not the broader market. Product demand shocks caused by the firm's product design, for example, fall into this category. These generate risk to the firm, but are diversifiable, as the same risk is not affecting all firms in the same way at the same time. Systematic demand shocks, on the other hand, affect a broad cross-section of firms in the same way, and therefore are undiversifiable and have a significant effect on firm valuation. For example, a demand shock created by interest rate changes.

If the demand shock is economy-wide, many firms will reduce their labor assets, resulting in changes in aggregate employment (Gali, 1999). If an individual firm is simultaneously adjusting its labor asset, it is likely a sign that it is also affected by the demand shock and therefore exposed to systematic risk. All other things being equal, the more the firm is affected by the aggregate shock, the more the firm will make adjustments to its labor assets.

In this way, the timing and degree of labor adjustments at the firm indicates whether the firm is exposed to systematic or idiosyncratic risk. If the firm is adjusting labor in concert with the aggregate market, the firm is exposed to aggregate demand shocks and carries systematic risk. If the firm adjusts labor independently of the aggregate market then it is exposed to idiosyncratic risk. This leads to the main hypothesis of this study:

Hypothesis 1 *Firms that reduce labor assets when aggregate employment growth is lower carry more systematic risk than firms that reduce labor assets independently of aggregate employment growth.*

There are several reasons why firms that reduce labor assets when aggregate employment growth is lower may not carry more systematic risk than other firms. It is well documented that firms do not adjust labor as quickly as demand shocks would suggest (Fay and Medoff, 1985). One reason is that firms face labor adjustment costs (Anderson, Banker, and

Janakiraman, 2003; Golden, Mashruwala, and Pevzner, 2020; Hamermesh and Pfann, 1996). Laying off employees requires dealing with regulatory, reputational, and morale-related issues, and therefore firms may delay or forgo labor disinvestments in light of aggregate demand shocks. Firms may instead carry higher inventories or cash to weather the downward change in demand (Ghaly, Anh Dang, and Stathopoulos, 2017; Topel, 1982). Accordingly, it is an empirical question as to whether changes in labor assets provides information about systematic risk.

This study focuses on restructuring expense as an indication of labor disinvestment. Restructuring costs are related to exit and disposal activities, and include: a) involuntary termination benefits, b) costs to relocate employees, c) costs to terminate a contract that is not a lease, and d) costs to consolidate or close facilities (Financial Accounting Standards Board, ASC 420-10-05-1). A restructuring liability and related expense are recorded at fair value when the restructuring is probable and when the firm has communicated the termination benefits to affected employees. Restructuring costs are generally not recognized in expense over the period that the restructuring occurs but instead all at once.

Because restructuring expenses are defined this way, they have the potential to signal labor disinvestment. The costs to terminate employees involuntarily or relocate employees are included in the expense, and for firms that depend heavily on labor as an input to production, this likely is a substantial fraction of the restructuring expense. The benefits also must be communicated to employees, so management has committed to the costs and can more precisely estimate them because the firm would have the compensation details before communicating plans to employees. Also, because the expense is reported at once, the timing of the decision to reduce labor investment is more precisely determinable as compared to changes in labor expenses or headcount. Finally, because the expense is denominated in monetary units, and not employees, the value of the human capital that is being removed is incorporated into the expense. As a result, releasing high-value skilled labor results in higher expense relative to lower-value unskilled labor. This is important, because skilled labor is difficult to replace and therefore provides a stronger signal of an expected demand shock (Ghaly, Anh Dang, and Stathopoulos, 2017).

While restructuring has potential to be informative about labor disinvestment, it may fail to be so for a few reasons. Restructuring expense is not comprised of only labor costs. The costs of closing facilities is also part of the expense, and therefore it is not a strictly labor-related expense. Further, restructuring has been criticized as an expense subject to managerial manipulation. Specifically, Bens and Johnston (2009) find that firms overstate restructuring expenses as part of "big bath" manipulations, but that the introduction of EITF No. 94-3 and higher SEC scrutiny moderate this manipulation. Also, restructuring expense is only a signal of labor *dis*investment, not investment. GAAP does not allow for firms to use restructuring expense to indicate hiring efforts in expectation of positive demand shocks. Therefore the signal provided by restructuring expense is one-sided, limiting the scope of information that it can communicate about changes in the labor assets of the firm.

The papers closest to this are those that use other elements of the financial statements to assess cross-sectional variation in systematic risk. Studies have investigated whether betas constructed from earnings can provide systematic risk information. Early studies, including Ball and Brown (1969) and Gonedes (1973), demonstrate that earnings can provide information about systematic risk by calculating and demonstrating the association between earnings betas and future returns. However, Ismail and Kim (1989) suggests that earnings betas provide a subset of the information that cash flow betas provide, perhaps because earnings is less objective and difficult to understand. More recently, Ellahie (2021) constructs an earnings beta by regressing aggregate earnings on firm earnings using 11 different measures of earnings, finding that earnings can provide a more effective measure of expected return relative to using firm and market returns. Ball, Sadka, and Tseng (2022) investigates the association between aggregate productivity and firm operating earnings, finding that the association indicates systematic risk. While these studies have developed the foundation for earnings as an indicator of systematic risk, they do not consider how specific expenses, such as restructuring, can provide information about systematic risk.

3 Research Design and Measurement

3.1 Restructuring as a human-capital related expense

While restructuring expense is defined by GAAP to include costs related to disinvestment in labor assets, the novelty of its use in the human capital literature prompts its validation. Accordingly, this study conducts a series of tests that assess whether restructuring expense correlates with other signals of labor disinvestment.[3]

The most direct test is whether restructuring expenses increase when the firm has lower employee growth. If restructuring generates more costs (is more negative) as the number of employees terminated increases, then the expense should be positively correlated with change in firm employees. Firms are required to report the number of their employees annually along with their financial statements, which also include restructuring expense. I measure restructuring expense, $restr_{i,t}$, as annual restructuring expense as a fraction of total assets as of the beginning of the annual period, where i indicates firm and t indicates quarter. The change in employees is the difference between the number of employees as of the end of year t less the number for year $t-1$ as a fraction of total assets as of the end of

[3]This study uses restructuring expense instead of employee growth for a few reasons. First, restructuring expense is reported as a dollar value, and therefore it is increasing in the value of the human capital that is terminated. Second, restructuring is reported quarterly and therefore empirically provides greater frequency of observation. Finally, restructuring expense is an important component of income and of interest to accountants and standard setters.

year $t-1$.

It is also important that restructuring expense displays a systematic component. Specifically, do restructuring charges fluctuate with aggregate employment? If so, then presumably the sample of firms for which we can observe restructuring is exposed to aggregate shocks affecting aggregate employment. This is important because aggregate employment is not exclusive to publicly listed firms that file financial statements. The wider breadth of firms encompassed by aggregate employment can provide better information about changes in the macroeconomy, but such changes may not be relevant to the sample we observe (Ball, Sadka, and Tseng, 2022). I measure shocks to aggregate employment as seasonally-adjusted quarterly aggregate employment growth, $EMPL_t$, which is the percent change in employment from the same quarter a year ago for all workers in the non-farm business sector. I use quarterly observations to match the frequency of restructuring observations and the non-farm business sector to provide an aggregate sample that is likely to be representative of the changes in labor growth across the US economy.

I test the association between aggregate employment growth and restructuring expense in the regression:

$$restr = \alpha_i + \beta_1 * EMPL_t + \varepsilon, \quad (1)$$

where $EMPL_t$ is defined above. The measure of restructuring, $restr$ is one of three measures. The first is $restr_{i,t}$ as defined above and measured quarterly on a rolling four-quarter basis. In this case, I am regressing a variable with both timeseries and cross-sectional variation on a variable with only timeseries variation, and therefore I cluster t-statistics by year because standard errors will be correlated in the cross-section. I also include firm fixed-effects to reduce the cross-sectional variation captured by β_1. Second, I construct an aggregate measure of restructuring expense, $AGGrestr_t$, which is the cross-sectional quarterly mean of $restr_{i,t}$. Finally, I calculate a measure of restructuring based only on the frequency of firms reporting restructuring, $NUMrestr_t$, calculated as the cross sectional sum of firms with non-zero measures of $restr_{i,t}$, divided by 1,000. The aggregate measures of restructuring, $AGGrestr_t$ and $NUMrestr_t$, are measured at the same frequency as aggregate labor market growth, $EMPL_t$.

Finally, if restructuring expenses reflect labor asset disinvestment, they should vary depending on adjustment costs, i.e., the costs related to terminating employees. Prior research documents that firms are less likely to adjust labor investment downwards in the presence of demand shocks if adjustment costs are high. Following Golden, Mashruwala, and Pevzner (2020), I use industry unemployment levels as observable variation in adjustment costs. Consistent with Topel (1982), firms that have an available pool of labor are more likely to layoff employees relative to firms dealing in a tighter labor market, as these firms can reverse their decision more readily. Unemployment levels are increasing in the availability of labor, and therefore firms operating in industries with higher unemployment have lower adjustment costs and should more readily incur restructuring expense when aggregate employment growth is low. Specifically, the correlation between aggregate employment growth and restructuring expense should be more positive in industries with higher unemployment levels. I test this with a modification to equation (1):

$$restr = \alpha_i + \beta_1 * EMPL_t + \beta_2 * UNEMPL_i + \beta_3 * EMPL_t * UNEMPL_i + \varepsilon. \quad (2)$$

I measure unemployment, $UNEMPL_i$, using the industry unemployment data from the BLS, which I match to firms using 2-digit NAICS based on industry names. I find the timeseries average industry unemployment for each industry and split the sample cross-sectionally at the median. As a result, $UNEMPL_i$ is an indicator for firms in an industry with unemployment above the median. All other variables are as defined above, with the exception of $AGGrestr_t$ and $NUMrestr_t$, which are aggregated quarterly by level of unemployment, $UNEMPL_i$, instead of across the entire cross-section.

3.2 The restructuring-based measure of systematic risk

Restructuring, as an indication of labor disinvestment, is by itself insufficient to determine whether the firm is exposed to systematic risk. The firm may be reducing its investment in labor because of an expected demand shock that is either economy-wide or specific to the firm. The context in which the firm takes the restructuring expense can provide the information needed to determine which is the case. If the firm is terminating employees when aggregate employment growth is also low, the firm is likely exposed to an expected aggregate demand shock affecting a large fraction of the economy.

Following this logic, the restructuring-based measure of systematic risk is calculated as β_i^{EMPL} from:

$$restr_{i,t} = \alpha_i + \beta_i^{EMPL} * EMPL_t + \varepsilon_{i,t}, \tag{3}$$

where $restr_{i,t}$ is as defined above measured quarterly, $EMPL_t$ is aggregate employment growth as defined above, i is the firm, and t is the quarter.

The higher the level of β_i^{EMPL}, the more the firm is affected by expected aggregate demand shocks as indicated by its labor disinvestment. This regression approach follows the pattern of estimating a market beta, where firm returns are regressed on market returns, and the coefficient from the regression is the measure of systematic risk.

To provide some comfort that the restructuring-based measure of systematic risk is related to the timing of disinvestment in labor, I provide some additional analysis. If firms are cutting labor investment in expectation of a demand shock, it is likely that labor is a substantial cost to the firm. Therefore, if the average firm is affected by aggregate demand shocks, the firms which cut labor in expectation of demand shocks should be those for which labor is a substantial cost.

Considering this relation, I obtain measures of labor leverage, that is, operating leverage that is generated from the use of labor in production (Donangelo et al., 2019; Lev, 1974; Rosett, 2001, 2003). Specifically, I select measures shown in Donangelo et al. (2019) and Rosett (2001) to have relations with labor leverage:

- Labor share, LS_i, which is the ratio of labor expenses to the sum of labor expenses, operating profits, and the change in finished goods inventories. Labor expenses are not disclosed by all firms, and therefore this measure is available for only the fraction of the sample for which Compustat has data. Labor leverage is increasing in LS_i

- Extended labor share, ELS_i, which is the same as labor share above, but labor expenses are estimated for the firm as the number of employees times the industry average labor expenses. Labor leverage is increasing in ELS_i.

- Employees, Emp_i, which is the number of employees in the firm divided by total assets as of the beginning of the fiscal year. Labor leverage is increasing in Emp_i.

- Sales per employee, $SperEmp_i$, the ratio of firm sales revenue divided by the number of employees. Labor leverage is decreasing in $SperEmp_i$.[4]

- Labor to capital, LK_i, which is the number of employees divided by the book value of net property, plant, and equipment. Labor leverage is increasing in LK_i.

- Tangibility, $Tang_i$, which is the book value of net property, plant, and equipment divided by total assets. Labor leverage is decreasing in $Tang_i$.

- Total assets, AT_i, the log of total assets. Labor leverage is decreasing in AT_i.

[4]This is not used directly in Donangelo et al. (2019) or Rosett (2001), but is a modification of the measure of employees, Emp_i, with a focus on output per employee instead of assets per employee.

- Debt-to-equity, DE_i, the book value of firm debt divided by the market value of firm equity. Labor leverage is decreasing in DE_i.

All measures are firm timeseries averages of annual observations because the restructuring-based measure of systematic risk, β_i^{EMPL}, is time-invariant by firm in the main sample.

There is also the concern that restructuring is reflecting the current performance of the firm or is an expense that firms take when performance is poor as part of a "big bath" that accompanies aggregate economic downturns (Bens and Johnston, 2009). To address this concern, tests include an earnings-based alternative measure of systematic risk. Substituting restructuring with the growth operating earnings in equation (3) provides the following:

$$oigrow_{i,t} = \alpha_i + \beta_i^{OI} * EMPL_t + \varepsilon_{i,t}, \tag{4}$$

where $oigrow_{i,t}$ is the quarterly operating earnings growth relative to the same quarter a year ago, scaled by total assets as of the beginning of the 12-month period. The measure is intended to identify firms that have earnings that fluctuate in concert with aggregate employment growth. Because earnings is reported every quarter, it has potential to identify firms exposed to aggregate shocks as demonstrated in Ball, Sadka, and Tseng (2022), which also investigates the movements of operating earnings with macroeconomic trends.[5]

3.3 Risk measurement

3.3.1 Firm-specific approach

I measure systematic risk using the beta on the market returns using the Fama-French-Carhart four factor model (Carhart, 1997; Fama and French, 1993). This measure is widely

[5]In this paper, and in Ball, Sadka, and Tseng (2022), operating earnings does not include restructuring expense.

used in the literature as a measure of systematic risk. It is calculable for a wide range of firms and has been validated as a timely and effective measure of systematic risk.

For each firm, I estimate the annual market beta using a regression of firm returns, less the risk free rate, on the aggregate market returns, less the risk-free rate, and the returns for the SMB, HML, and UMD portfolios over a historical 60 month window:

$$\begin{aligned}[R_{i,s} - RF_s] = \alpha_{i,t} + \beta_{i,t}^{FF} * \left[R_s^{mkt} - RF_s\right] + \beta_{i,t}^{SMB} * R_s^{SMB} + \\ \beta_{i,t}^{HML} * R_s^{HML} + \beta_{i,t}^{UMD} * R_s^{UMD} + \varepsilon_{i,s}\end{aligned} \tag{5}$$

where $R_{i,s}$ is the stock return for month s and firm i, RF_s is the risk-free rate for month s, and R_s^{mkt}, R_s^{SMB}, R_s^{HML}, and R_s^{UMD} are the returns of the aggregate market, size, value, and momentum portfolios for month s. The $\beta_{i,t}^{FF}$ is the level of systematic risk exposure for firm i for the year t. Because the restructuring-based measure of systematic risk is at a firm level, and not a firm-year level, I calculate the firm-level systematic risk of the firm as the time-series mean of $\beta_{i,t}^{FF}$, β_i^{FF}. I also use a de-levered version of this beta, β_i^{FFDL}, which removes the effect of leverage from beta by dividing β_i^{FF} by one plus the firm debt-to-equity ratio times one minus the statutory tax rate.

To test whether the firms that reduce labor assets when labor growth is low, I follow Rosett (2001) and regress the returns-based measure of risk, β_i^{FF}, on the restructuring-based measure of systematic risk, β_i^{EMPL}:

$$\beta_i^{FF} = \alpha_0 + \gamma_1 * \beta_i^{EMPL} + \gamma_2 * \beta_i^{OI} + Controls + \varepsilon_i, \tag{6}$$

where the controls are the measures of labor leverage, LS_i, Emp_i, $SperEmp_i$, LK_i, $Tang_i$, AT_i, and DE_i. The controls also include firm characteristics that are linked to risk, specifically, firm size, $Size_i$, and the market-to-book ratio, mb_i. Size is the timeseries mean of the log of the firm equity market value. Market-to-book is the timeseries mean of the firm equity market value divided by the book value of equity.

To the extent that firms are affected by aggregate demand shocks and reduce labor investments in expectation of such shocks, those firm should have a higher restructuring-based measure of systematic risk, β_i^{EMPL}, and a higher returns-based measure of systematic risk, β_i^{FF}, and therefore I expect γ_1 to be positive. Because the earnings-based alternative measure of systematic risk and the measures of labor leverage are included as controls, a significant positive coefficient suggests that restructuring provides information about systematic risk that is distinct from these other measures.

To provide further insight into the variation in the informativeness of restructuring with respect to systematic risk, I test whether the relation between the restructuring-based measure of systematic risk, β_i^{EMPL}, varies based on labor adjustment costs. Lower labor adjustment costs increase the incentives to adjust labor. As a result, labor adjustments in such firms may provide a less credible signal of an expected demand shock, as the cost of adjustment is low. On the other hand, for firms with high adjustment costs, the likelihood of adjustment is lower, but the signal from adjustments is more credible. Accordingly, I expect that the association between the restructuring-based measure, β_i^{EMPL}, and the returns-based measure, β_i^{FF}, to be lower for firms with lower adjustment costs. I acknowledge the possibility that firms with high adjustment costs may not adjust labor in a timely way, resulting in a less clear signal of expected demand shocks and a lower association between β_i^{EMPL} and β_i^{FF}. I measure variation in adjustment costs using industry unemployment, $UNEMPL_i$, as defined above, and alter equation (6):

$$\begin{aligned}\beta_i^{FF} = \alpha_0 + \gamma_1 * \beta_i^{EMPL} + \gamma_2 * \beta_i^{OI} + \gamma_3 * UNEMPL_i + \\ \gamma_4 * \beta_i^{EMPL} * UNEMPL_i + Controls + \varepsilon_i.\end{aligned} \tag{7}$$

Because adjustment costs are decreasing in industry unemployment, and I expect firms with lower adjustment costs to provide less credible signals of expected demand shock through restructuring, I expect that γ_4 is negative.

3.3.2 Portfolio approach

As an alternative approach, this study employs portfolios constructed based on the restructuring-based measure of systematic risk, β_i^{EMPL}. This approach provides a more direct association between the firm characteristic represented by β_i^{EMPL} and return characteristics, because the returns-based measure of systematic risk is estimated for each portfolio specifically. Also, this approach can reveal any non-linearities in the relation between β_i^{EMPL} and systematic risk as indicated by the returns-based measure.

I construct portfolios of the restructuring-based measure of systematic risk, β_i^{EMPL}, based on the cross-sectional quintile rank. Portfolio membership is time-invariant as is β_i^{EMPL}. For each portfolio, I estimate:

$$\begin{aligned} [R_{i,s} - RF_s] = \alpha_p + \beta_p^{FF} * \left[R_s^{mkt} - RF_s\right] + \beta_p^{SMB} * R_s^{SMB} + \\ \beta_p^{HML} * R_s^{HML} + \beta_p^{UMD} * R_s^{UMD} + \varepsilon_{i,s}, \end{aligned} \tag{8}$$

where the variables are defined above in equation (5), and the subscript p indicates portfolio. Because I expect that firms that are more exposed to aggregate demand shocks record restructuring expense when aggregate labor growth is lower, the relation between restructuring and aggregate employment growth, β_i^{EMPL}, is increasing in systematic risk. Therefore, I expect that portfolios which have higher levels of β_i^{EMPL} also have higher systematic risk as measured by the returns-based measure, β_p^{FF}.

The inclusion of returns to the size, value, and momentum portfolios, R_s^{SMB}, R_s^{HML}, and R_s^{UMD}, controls for common risk factors that may be associated with the restructuring based measure, β_i^{EMPL}. To ensure that the information provided by restructuring expense is distinct from that of operating earnings, I form 25 portfolios based on the quintile of the restructuring-based measure, β_i^{EMPL}, and the earnings-based alternative, β_i^{OI}. To the extent that β_i^{EMPL} provides information about systematic risk that is distinct from that of operating earnings, the returns-based measure of systematic risk, β_p^{FF}, should be higher for higher levels of β_i^{EMPL} at all levels of β_i^{OI}.

3.3.3 Out-of-sample portfolio approach

Because the restructuring-based measure of systematic risk, β_i^{EMPL}, is estimated in the timeseries, as is the returns-based measure, β_i^{FF}, the estimation windows overlap and systematic risk is measured as a time-invariant characteristic. As an alternative, this study employs a test that uses returns observed after the determination of restructuring-based systematic risk, β_i^{EMPL}.

To do this, I use use quarterly restructuring, $restr_{i,t}$, and aggregate employment growth, $EMPL_t$, to estimate the restructuring-based measure, β_i^{EMPL}, for each firm for each year, starting in 2010 and going through 2020. Specifically, β_i^{EMPL} is estimated using a growing window of quarterly observations starting from 1996 and ending in each of the years between 2010 and 2020. I construct annual quintile portfolios based on the levels of the restructuring-based measure, β_i^{EMPL}. Firm returns are associated with each portfolio starting from June of the year subsequent to portfolio construction.

I estimate equation (8) by portfolio. Because the restructuring-based measure, β_i^{EMPL}, is intended to identify firms that are exposed to aggregate demand shocks and record restructuring in expectation of such shocks, I expect that portfolios with higher levels of β_i^{EMPL} provide higher estimations of returns-based systematic risk, β_p^{FF}.

4 Data and Sample

4.1 Sample

I collect restructuring expense from the quarterly Compustat file. The file provides restructuring expense starting in 1996, and so my sample also starts in that year and ends in 2020. Firm stock returns are from the CRSP monthly stock return file. I collected the Fama-French-Carhart portfolio returns from Kenneth French's website at Dartmouth College.[6] I collect quarterly aggregate employment growth from the BLS website. Firms that do not record restructuring throughout the sample period are excluded from the determination of the restructuring-based measure of systematic risk, β_i^{EMPL}, because they do not provide restructuring data to calculate the measure.[7] Aggregate employment is provided by calendar quarter and I match it to the Compustat fiscal quarter that ends on or within three months after the calendar quarter end. As a reference, all variable definitions are provided in table 1.

Table 2 provides descriptive statistics for restructuring, $restr_{i,t}$, operating earnings growth, $oigrow_{i,t}$, and aggregate employment, $EMPL_t$.[8] Restructuring is reported as a negative number, so lower numbers indicate more restructuring. The mean of restructuring is -0.0034, but the median is 0, indicating a left-skewed distribution. This is consistent with other special items, which are recorded occasionally to report expected bad news (Basu, 1997; Hayn and Hughes, 2006). Operating income growth also appears left-skewed with a mean of -0.0022 and a median of 0.0015, again potentially reflecting the conservatism in earnings. Aggregate employment growth, $EMPL_t$, is less skewed, with a mean of 0.0060 and a median of 0.0017. The positive mean and median are consistent with the general

[6]These are available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html.

[7]211,759 firm-year observations are eliminated from the sample because the firm does not have restructuring expense throughout the sample period. This is about 41% of the potential sample.

[8]Aggregate employment does not vary cross-sectionally and is duplicated for the timeseries of each firm in this table.

growth in employment occurring economy-wide over the 25 years in the sample.

4.2 Validation of restructuring as a measure of labor disinvestment

The first test of whether restructuring is a plausible measure of labor disinvestment by firms is testing the correlation between the growth in the number of employees and restructuring expense. Because the number of employees is only reported annually, I use data collected from the Compustat annual file. The untabulated significant (p-value < 0.0001) Pearson (Spearman) correlation between restructuring as a fraction of beginning total assets and employee growth scaled by beginning total assets is 0.07 (0.15), indicating that firms are more likely to record more restructuring expense when their own employee growth is low. This is consistent with restructuring providing information about firm disinvestment in labor.

Table 3 provides the bi-variate correlations of restructuring, $restr_{i,t}$, operating earnings, $oigrow_{i,t}$, and aggregate employment growth, $EMPL_t$. The Pearson (Spearman) correlation between restructuring, $restr_{i,t}$ and aggregate employment growth, $EMPL_t$, is 0.16 (0.12). The significantly positive association indicates a systematic component to restructuring expense, as the average firm in the sample is likely to have more restructuring expense when aggregate employment growth is low. Operating earnings growth, $oigrow_{i,t}$, has a lower Pearson (Spearman) correlation with aggregate employment, $EMPL_t$, of 0.02 (-0.00), suggesting a weaker relation.

Table 4 provides the summary statistics from the regression of equation (1) testing the relation between restructuring expense, $restr_{i,t}$, and aggregate employment growth, $EMPL_t$. Column 1 indicates that $EMPL_t$ has a coefficient of 0.473 with a t-statistic of 3.57, indicating a significant relation between restructuring and aggregate unemployment growth in the presence of firm fixed effects and annual standard error clustering. Column 3 provides confirmation of this positive relation, with $EMPL_t$ having a significant coefficient of 0.493 (t-statistic of 6.81) in the regression of the aggregated measure of restructuring, $AGGrestr_t$. Column 4 provides statistics from the regression of the aggregate frequency of restructuring expense, $NUMrestr_t$, on aggregate employment growth, $EMPL_t$. The coefficient on $EMPL_t$ is positive and significant (coefficient = −95.483, t-statistic = −4.89), indicating that as employment growth declines, the number of firms taking restructuring expense increases, again consistent with restructuring having a systematic relation with aggregate employment growth.

Columns 2, 5, and 6 of table 4 provide summary statistics from the regression of equation (2), which tests whether the relation between restructuring, $restr_{i,t}$, and aggregate employment growth, $EMPL_t$, varies with adjustment costs, measured by unemployment, $UNEMPL_i$. Column 2 provides evidence in the panel sample that, as adjustment costs go down, firms are more likely to take restructuring expense when aggregate employment growth is lower, as the interaction between $EMPL_t$ and $UNEMPL_i$ is positive (coefficient = 0.230, t-statistic = 3.87). Columns 5 and 6 use aggregated data to investigate the same relation. Column 5 also shows a significant coefficient in the interaction between $EMPL_t$ and $UNEMPL_i$ (coefficient = 0.182, t-statistic = 1.89), providing confirming evidence that as adjustment costs decline, firms are more willing to take restructuring when aggregate employment growth declines. Column 6 provides similar confirming evidence, but using the frequency of restructuring expense. The negative coefficient on the same interaction of −29.345 (t-statistic = −2.15) suggests that, when adjustment costs are low, firms are more likely to take on restructuring expense when aggregate employment growth is low. Overall, these results provide evidence that restructuring has a systematic component that is related to employment growth and that restructuring is likely to capture the decision of the firm to reduce their labor assets.

5 Results

5.1 The risk relevance of restructuring expense

Table 5 provides descriptive statistics for the 3,367 firms for which the restructuring-based measure of systematic risk, β_i^{EMPL}, can be constructed. The restructuring-based measure, β_i^{EMPL}, has a mean of 0.4773 and a median of 0.0822, indicating some right-skewness in the distribution, consistent with a relatively small fraction of firms having a high sensitivity of restructuring expense to aggregate employment growth, $EMPL_t$. Further, the 25$^{\text{th}}$ percentile is -0.0499, indicating that a substantial fraction of the sample has restructuring expenses that move counter-cyclically with aggregate employment growth. The returns-based measure of systematic risk, β_i^{FF}, has a mean around one, and the de-levered version, β_i^{FFDL}, has a slightly lower mean, both consistent with what would be expected for an average market beta across a diversified sample. The standard deviation of the operating earnings-based alternative measure, β_i^{OI}, has a standard deviation of 0.1614, which is higher than that of the restructuring-based measure, β_i^{EMPL}, indicating a wider variation across firms in their operating earnings sensitivity to aggregate employment growth. The labor leverage measures and risk controls are available for a majority of the sample, with the exception of labor share, LS_i, which is only available for 750 firms, reflecting the voluntary nature of the disclosure.

Table 6 provides the Pearson correlations between the restructuring-based measure of systematic risk, β_i^{EMPL}, the returns-based measures, $\beta_i^{FF}$and β_i^{FFDL}, the operating earnings-based alternative measure, β_i^{OI}, and industry unemployment, $UNEMPL_i$, with each other and the controls for equation (6). The restructuring-based measure of systematic risk, β_i^{EMPL}, has a significant and positive correlation with the returns-based measures, $\beta_i^{FF}$and β_i^{FFDL}, of 0.14 and 0.20, consistent with β_i^{EMPL} increasing with the systematic risk of the firm. The operating earnings-based alternative measure has lower correlations with $\beta_i^{FF}$and β_i^{FFDL} of 0.05 and -0.01. The restructuring-based measure of systematic risk, β_i^{EMPL}, also has significant correlation in the expected direction with several of the measures of labor leverage from the literature, including sales per employee, $SperEmp_i$, number of employees, Emp_i, extended labor share, ELS_i, the debt-to-equity ratio, DE_i, the labor-to-capital ratio, LK_i, total assets, AT_i, and tangibility, $Tang_i$. This suggests that firms that have higher dependence on labor as a factor of production are also more likely to record restructuring at times of lower aggregate employment growth, consistent with the restructuring-based measure of systematic risk, β_i^{EMPL}, being more relevant to firms with higher labor costs.

The summary statistics from the estimation of equation (6) are tabulated in table 7. The the results in column 1 indicate that the restructuring-based measure of systematic risk, β_i^{EMPL}, has a significant association with the returns-based measure of systematic risk, β_i^{FF}, with a coefficient of 0.054 (t-statistic = 8.38). The operating earnings based alternative measure, β_i^{OI}, controls for operating earnings information that may substitute for restructuring expense, indicating that restructuring expense provides systematic risk information that is not otherwise conveyed by operating earnings. This is evidence consistent with hypothesis 1, that firms that reduce labor investments when aggregate employment growth is lower carry more systematic risk than firms that reduce labor investments at other times. Column 2 provides similar results for β_i^{EMPL} when using the de-levered returns-based measure, β_i^{FFDL} (coefficient = 0.071, t-statistic = 11.49). Column 3 also provides consistent information (β_i^{EMPL} coefficient = 0.042, t-statistic = 3.11), and because it includes the measures of labor leverage, it also provides evidence that the risk information conveyed by β_i^{EMPL} is distinct from that provided by traditional measures of labor leverage.

Columns 4, 5, and 6 of table 7 provide summary statistics from the regression of equation

(7). All three columns provide information consistent with the estimation of equation (6), with the restructuring-based measure, β_i^{EMPL}, having positive and significant coefficients in all three columns (coefficients are between 0.073 and 0.107 with t-statistics between 3.05 and 8.25). Further, the coefficient on the interaction between β_i^{EMPL} and $UNEMPL_i$ is negative and significant in all three columns (coefficients between -0.030 and -0.056, t-statistics between -1.91 and -3.84), providing evidence that firms that have higher labor adjustment costs provide a more credible signal of expected demand shocks when they restructure.

Table 8 provides the summary statistics from the estimation of equation (8) by quintile rank of the restructuring-based measure of systematic risk, β_i^{EMPL}. The results are consistent with those reported in table 7, in that they indicate that systematic risk is increasing in the level of β_i^{EMPL}. The lowest portfolio of β_i^{EMPL}, which has a mean β_i^{EMPL} of -0.529, has an estimated $\beta_i^{FF}$of 0.969, while the highest portfolio has an estimated $\beta_i^{FF}$of 1.186. Both the fourth and fifth highest portfolios have estimations of β_i^{FF} that are significantly higher than the lowest portfolio at the p-value of 0.10 level. The results are consistent with hypothesis 1, that firms with labor asset reductions at times of lower aggregate employment growth carry more systematic risk than firms that reduce labor investments at other times. Of note is that the levels of β_i^{FF} are not increasing monotonically. The lowest portfolio of β_i^{EMPL} has a β_i^{FF} of 0.969, while the second highest has a β_i^{FF} of 0.854, and the levels of β_i^{FF} increase with the portfolios of β_i^{EMPL} thereafter. The absolute magnitude of β_i^{EMPL} is the lowest for portfolio 2, with β_i^{EMPL} having a mean of -0.036 compared to that of portfolio 1, -0.529, so a negative relation between restructuring expense and aggregate employment appears to bear more systematic risk than no relation. One possibility is that some industries may have industry-level employment patterns that are different from those of aggregate employment, and the risk of the firm is better represented in the association between labor investment reductions at the firm level and the industry, versus aggregate, level. I explore this possibility in the additional analyses below.

Table 9 provides the estimation of equation (8) by quintile of the restructuring-based measure, β_i^{EMPL}, and the operating earnings-based alternative measure, β_i^{OI}. The results are consistent with those in table 8 in that the level of β_i^{FF} is significantly higher for the highest portfolio of β_i^{EMPL} relative to the lowest portfolio at all levels of β_i^{OI}, with the estimations for the highest portfolio β_i^{FF} being between 1.078 and 1.301, and those for the lowest portfolio being between 0.870 and 1.114. The results are consistent with β_i^{EMPL} providing an indication of systematic risk, and the information in restructuring expense is not also in operating earnings. The non-linear relation between β_i^{EMPL} and β_i^{FF} that is in table 8 is also apparent in table 9.

The out-of-sample estimations of equation (8) by quintile portfolio of the restructuring-based measures of systematic risk, β_i^{EMPL}, are in table 10. The results are consistent with those in table 8, as the levels of the returns-based measure of systematic risk, β_i^{FF}, are increasing from portfolio 1 to portfolio 5, although portfolio 2 is slightly higher than portfolios 1 and 3 (differences of 0.003 and 0.001), and both portfolio 4 and 5 have significantly higher levels of β_i^{FF}(coefficients = 0.989 and 1.024) relative to the lowest portfolio (coefficient = 0.901). The results provide assurance that the results in table 8 are not attributable to the overlapping estimation of β_i^{EMPL} and the returns for estimating β_i^{FF}. This is additional evidence that firms that have restructuring charges that increase when aggregate employment growth is lower have higher systematic risk relative to firms that have restructuring expenses that are uncorrelated with aggregate employment growth.

6 Additional Analyses

6.1 Post-restructuring outcomes

To further explore the characteristics of firms with high restructuring-based measures of systematic risk, I investigate differences in post-restructuring outcomes. The tests in section 5 provide evidence that firms that have higher restructuring when aggregate employment growth is lower are exposed to more systematic risk. The premise is that firms will reduce their labor assets if they are expecting a negative demand shock. To the extent that the negative demand shock is economy-wide, it will affect a broad cross-section of firms, reducing aggregate employment growth. Firms that reduce their labor assets when aggregate employment growth is declining are likely exposed to the aggregate demand shock, and therefore the timing of the reduction in labor assets is revealing the nature of the risk of the firm.

Firms with high systematic risk are exposed to aggregate demand shocks, and the more significant the effect of these shocks on the firm, the more they should affect firm demand, labor investment, and systematic risk. In other words, if firms appear to have high levels of systematic risk as revealed by their labor investment, then those same firms should realize the effect of the demand shocks on output and actually reduce the costs of labor. In line with this logic, I test whether firms that have high restructuring-based measures of systematic risk also realize lower demand and lower expenses after restructuring than other firms.[9] Further, to the extent that firms have more exposure to expected aggregate demand shocks, and the firms adjust appropriately based on this expectation, then negative aggregate demand shocks should be more likely to follow restructuring by firms with higher

[9] Embedded in this test is the assumption that, on average, aggregate demand shocks are harder for the firm to recover from than idiosyncratic demand shocks because the source of an aggregate shock is unrelated to business decisions. Therefore firms with higher exposure to aggregate demand shocks will have lower demand and lower labor needs for longer than other firms.

β_i^{EMPL}.

To test the above, for each quintile of the restructuring-based measure of systematic risk, β_i^{EMPL}, I calculate the means of two firm characteristics, sales growth and expense growth, and two aggregate characteristics, aggregate sales growth and GDP growth, for the years that firms take (do not take) a restructuring charge. I expect that the means of the four measures will be lower for the years after the restructuring relative to the other years, and if exposure to expected aggregate demand shocks is increasing in β_i^{EMPL}, then I expect that the difference between the means is increasing in the quintile of β_i^{EMPL}.

I measure the effects of demand shocks on the firm via two-year post-restructuring sales growth, $SalesGrow_{i,t}$. Specifically, $SalesGrow_{i,t}$ is the level of firm sales for the year after year t less the level as of the year before year t, divided by total assets as of the end of the year prior to year t, where year t is the year with or without restructuring. I measure the effect on expenses as the two-year post-restructuring expense growth, $ExpGrow_{i,t}$. Specifically, $ExpGrow_{i,t}$ is the difference between operating expenses in the year after year t and the year prior to year t, scaled by total assets as of the beginning of the two-year period. Operating expenses are calculated as sales revenue less operating income before depreciation and amortization and exclude restructuring expense. If firms with higher restructuring-based measures of systematic risk, β_i^{EMPL}, are more affected by demand shocks and also reduce their labor expenses in response, then firms with higher levels of β_i^{EMPL} should also have lower levels of sales growth, $SalesGrow_{i,t}$, and expense growth, $ExpGrow_{i,t}$, following restructuring relative to other years.

I measure subsequent aggregate demand shocks via aggregate sales growth, $AggSaleGrow_t$, and GDP growth, $GDPgrow_t$. Aggregate sales growth is the cross-sectional average of the four-quarter change in sales, divided by total assets as of the beginning of the period, weighted by the market value of firm equity at the beginning of the period. Aggregate sales growth is measured monthly and includes all firms with quarters ending in that month. $AggSalesGrow_t$ is the timeseries mean of this aggregate sales growth over the 24 months starting as of the beginning of year t. GDP growth is the percent change in the seasonally-adjusted GDP from the same quarter in the prior year. $GDPgrow_t$ is the timeseries mean of quarterly GDP growth over the four quarters starting in the first quarter after year t.[10] If firms with higher restructuring-based measures of systematic risk, β_i^{EMPL}, are more likely to take restructuring in expectation of aggregate demand shocks, then I expect that $AggSaleGrow_t$ and $GDPgrow_t$ will be lower for years after restructuring for firms in higher quintiles of β_i^{EMPL}.

The means of post-restructuring sales growth, $SalesGrow_{i,t}$, post-restructuring expense growth, $ExpGrow_{i,t}$, aggregate sales growth, $AggSaleGrow_t$, and GDP growth, $GDPgrow_t$ by whether firms took restructuring charges and quintile of the restructuring-based measure of systematic risk, β_i^{EMPL}, are presented in table 11. The column indicating the difference between years with restructuring and without shows that, for all quintiles of β_i^{EMPL}, the measures are lower for the years of restructuring versus otherwise. However, the differences are increasing in magnitude from the lowest quintile to the highest quintile of β_i^{EMPL} for all of the firm and aggregate measures of growth. The increases are nearly monotonic, demonstrating only some non-linearity in the lowest portfolio, consistent with the result in table 8. Specifically, the difference in $SalesGrow_{i,t}$ ($ExpGrow_{i,t}$) changes from -0.179 (-0.177) in the lowest portfolio to -0.293 (-0.275) in the highest portfolio, and the difference in differences is statistically significant at a 1% level. For the aggregate measures, the difference increases in magnitude for $AggSalesGrow_t$ ($GDPgrow_t$) from -0.011 (-0.003) in the lowest portfolio to -0.017 (-0.010) in the highest portfolio, and the difference in differences is statistically significant at a 1% (5%) level. The results are consistent with

[10] I use only the quarters after year t because GDP lags aggregate accounting information by about one year (Konchitchki and Patatoukas, 2014a,b).

expectations, providing evidence that firms with higher levels of β_i^{EMPL} are more exposed to aggregate demand shocks, and they take restructuring charges in expectation of these shocks.

6.2 Industry-based aggregate employment

The results in tables 8 and 9 indicate a non-linearly increasing relation between the quintile of the restructuring-based measure of systematic risk, β_i^{EMPL}, and the returns-based measure of systematic risk, β_i^{FF}. More specifically, the lowest quintile of β_i^{EMPL} has a higher level of β_i^{FF} than the second quintile in all cases. Also, the lowest quintile of β_i^{EMPL} has a mean β_i^{EMPL} of -0.529 while the second quintile has a mean of -0.036, meaning that the firms in the lowest quintile have a negative relation between restructuring expense, $restr_{i,t}$ and aggregate employment growth, $EMPL_t$, while the second quintile has almost no relation between the variables. One possibility is that the firms in the lowest quintile are indeed exposed to aggregate demand shocks, and reduce their investment in labor in expectation, but the aggregate demand shocks affect their labor markets at a different time than the average firm. This may be the case if the labor that the firm uses is particularly specialized to the industry, consistent with Neal (1995). More generally, the use of one measure for changes in aggregate employment growth across all firms, $EMPL_t$, may be too course of an approach to account for the variation in labor markets across industries.

As an alternative, I construct an industry-based measure of restructuring-based systematic risk, $\beta_i^{IndEMPL}$. The measure is constructed in the same way as β_i^{EMPL}, but the measure of aggregate employment growth is specific to the firm's industry. The industry-level employment growth data are gathered from the publicly available tables provided by the BLS which provide the data based on NAICS classification for specific industries.[11]

[11] I use the four-digit NAICS industries because data for more granular classifications are less populated in the BLS tables. I require a minimum of 12 years of data to estimate $\beta_i^{IndEMPL}$.

The data are only available annually, so I use annual observations of restructuring expense from the Compustat annual file to construct the industry-based β_i^{EMPL}. The industry-based β_i^{EMPL}, $\beta_i^{IndEMPL}$, has 1,997 firm observations, of which 1,748 also have aggregate measures of β_i^{EMPL}. The industry-based measure, $\beta_i^{IndEMPL}$, has a Pearson (Spearman) correlation with the aggregate measure of β_i^{EMPL} of 0.53 (0.55).

The results of estimating equation (8) using $\beta_i^{IndEMPL}$ are presented in table 12. The results are consistent with those in table 8, but each portfolio starting from portfolio 2 to portfolio 5 has a significantly higher estimated β_i^{FF} than that estimated for portfolio 1, and they increase monotonically as $\beta_i^{IndEMPL}$ increases. Overall, the results provide evidence that firms that restructure when industry employment growth is lower have higher systematic risk than firms that restructure at other times, and they provide some additional evidence that industry-based employment growth may be more relevant than aggregate employment growth when assessing systematic risk.

7 Conclusion

This study investigates the information content of a specific accounting expense related to human capital: restructuring. Restructuring is often excluded from measures of earnings because it is not indicative of the continuing operations of the company, that is, it is not persistent. However, this study's findings provide evidence that restructuring is a value-relevant component of earnings, specifically with regards to risk assessment. The premise is that restructuring is defined by GAAP to include costs of eliminating or relocating employees, and tests in this study provide empirical support for that notion. Because labor is an important factor of production, the timing of restructuring charges can be informative about the demand expectations of the firm. If the firm's demand expectations are declining in concert with those of the aggregate economy, likely the firm is affected by an economy-wide demand shock. Firms with more exposure to aggregate demand shocks are those that are exposed to undiversifiable, or systematic, risk, an important consideration for asset pricing.

The tests in this study validate restructuring as associated with disinvestment in labor at the firm level, and they demonstrate that restructuring has a systematic component that is associated with economy-wide movements in the growth rate of employment. I develop a restructuring-based measure that quantifies the degree that a firm reduces its investment in labor when aggregate employment growth is lower. The measure is positively correlated with traditional measures of the use of labor as a factor of production and is largely uncorrelated with a measure of the degree that operating earnings moves with aggregate employment growth, suggesting that restructuring provides information that is not contained in operating earnings. A series of tests show that this restructuring-based measure is positively associated with market beta, the conventional measure of systematic risk. Additional tests show that firms with higher levels of the restructuring-based measure of systematic risk have lower sales and expense growth after restructuring, consistent with these firms experiencing aggregate demand shocks, and that industry-level labor growth may be more relevant in assessing systematic risk, consistent with the significance of labor market specificity.

Overall, the results in this study may be of interest to standard setters considering what types of accounting numbers may be informative about human capital. Work in both academia and practice has highlighted the importance of human capital in firm valuation. This study adds to that literature by demonstrating the information content of the timing of labor asset reductions. The results in this study indicate that restructuring, an accrual subject to criticism and often excluded from measures of earnings, is informative about changes in firm human capital investment and therefore the exposure of the firm to systematic risk.

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Table 1: Variable definitions

Variable	Description
$restr_{i,t}$	Firm restructuring expense over the prior four quarters scaled by total assets as of the beginning of the four quarter period.
$oigrow_{i,t}$	Firm operating earnings growth from the same quarter a year ago, scaled by total assets as of the beginning of the four quarter period.
$EMPL_t$	The percentage change in aggregate employment from the same quarter in the prior year, divided by 1,000.
$UNEMP_i$	An indicator for firms that are in an industry with average unemployment over the sample period greater than the median firm's industry.
$AGGrestr_t$	The mean of $restr_{i,t}$ across firms by calendar quarter.
$NUMrestr_t$	The number of firms reporting non-zero $restr_{i,t}$ in the sample by calendar quarter, divided by 1,000.
β_i^{EMPL}	The restructuring-based measure of systematic risk, measured as the coefficient from firm-level regressions of restructuring ($restr_{i,t}$) on aggregate employment ($EMPL_t$).
β_i^{FF}	The coefficient on the return on the market less the risk free rate in the Fama-French-Carhart 4-factor regression specified in Equation (5) using rolling five-year monthly returns.
β_i^{FFDL}	β_i^{FF} unlevered using the firm debt-to-equity ratio and the statutory tax rate.
β_i^{OI}	The coefficient from firm-level regressions of operating income growth ($oigrow_{i,t}$) on aggregate employment ($EMPL_t$).
$size_i$	The firm-level timeseries mean of the market value of equity.
mb_i	The firm-level timeseries mean of the market to book ratio.
$SperEmp_i$	The firm-level timeseries mean of the ratio of firm sales revenue divided by the number of employees.
Emp_i	The firm-level timeseries mean of the number of employees divided by beginning of year total assets.
LS_i	The firm-level timeseries mean of labor share as in Donangelo et al. (2019). Labor share is calculated as the ratio of labor expenses to the sum of labor expenses, operating profits, and the change in finished goods inventories.
ELS_i	The firm-level timeseries mean of extended labor share as in Donangelo et al. (2019). Extended labor share is calculated identically to LS_i, but labor expenses are estimated for the firm as the number of employees times the industry average labor expenses.
DE_i	The firm-level timeseries mean of the book value of firm debt divided by the market value of firm equity.

LK_i	The firm-level timeseries mean of the number of employees divided by the book value of net property, plant, and equipment.
AT_i	The firm-level timeseries mean of the log of total assets.
$Tang_i$	The firm-level timeseries mean of the book value of net property, plant, and equipment divided by total assets.
β_p^{FF}	The coefficient on the return on the market less the risk free rate in the Fama-French-Carhart 4-factor regression specified in Equation (8) for the portfolio of β_i^{EMPL}.
β_p^{SMB}	The coefficient on the size portfolio returns in the Fama-French-Carhart 4-factor regression specified in Equation (8) for the portfolio of β_i^{EMPL}.
β_p^{HML}	The coefficient on the value portfolio returns in the Fama-French-Carhart 4-factor regression specified in Equation (8) for the portfolio of β_i^{EMPL}.
β_p^{UMD}	The coefficient on the momentum portfolio returns in the Fama-French-Carhart 4-factor regression specified in Equation (8) for the portfolio of β_i^{EMPL}.
$SalesGrow_{i,t}$	Sales growth for the two year period starting in year t calculated as the two-year change in annual sales from the end of the year prior to year t divided by total assets as of the beginning of the two-year period.
$ExpGrow_{i,t}$	Total expense growth for the two year period starting in year t, calculated as the two-year change in annual operating expenses from the end of the year prior to year t divided by total assets as of the beginning of the two-year period. Expenses are calculated as firm sales revenue minus operating income before depreciation expenses.
$AggSalesGrow_t$	The mean aggregate sales growth over the two-year period starting in year t. Aggregate sales growth is the weighted cross-sectional average of the four-quarter change in firm sales divided by total assets as of the beginning of the period. Aggregate sales growth is weighted by the market value of firm equity as of the beginning of the four-quarter period and is calculated monthly based on the quarter-end date.
$GDPgrow_t$	The mean GDP growth over a four-quarter period starting immediately after year t. Aggregate GDP growth is calculated quarterly as the percent change in seasonally-adjusted GDP from the same quarter the year before.
$\beta_i^{IndEMPL}$	The restructuring-based measure of systematic risk calculated the same way as β_i^{EMPL}, but using industry-level employment growth.

Table 1: Variable definitions.

Table 2: Descriptive statistics for firm-year restructuring, operating income growth, and aggregate employment growth

Variable	N	Mean	SD	25P	Med	75P
$restr_{i,t}$	307,660	−0.0034	0.0095	−0.0014	0	0
$oigrow_{i,t}$	307,660	−0.0022	0.0336	0.0060	0.0015	0.0105
$EMPL_t$	307,660	0.0006	0.0023	−0.0001	0.0017	0.0020

Table 2: Descriptive statistics for the firm-year measures of restructuring and operating earnings and aggregate employment growth. Aggregate employment does not vary across firms for fiscal quarters ending in the same calendar quarter. The table includes observations for which all variables are present for the years 1996–2020. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%.

Table 3: Correlations for firm-year restructuring, operating income growth, and aggregate employment growth

		$restr_{j,t}$	$oigrow_{j,t}$	$EMPL_t$
1	$restr_{i,t}$		−0.60*	0.12*
2	$oigrow_{i,t}$	0.01*		−0.00
3	$EMPL_t$	0.16*	0.02*	

Table 3: Bi-variate correlations for the 307,660 firm-year observations for the years 1996–2020. Aggregate employment does not vary across firms for fiscal quarters ending in the same calendar quarter. The table includes observations for which all variables are present for the years 1996–2020. Significance at the p<0.1 level is indicted with *. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. Pearson (Spearman) correlations are above (below) the diagonal.

Table 4: Restructuring charges and aggregate labor productivity growth

VARIABLES	(1) $restr_{i,t}$	(2) $restr_{i,t}$	(3) $AGGrestr_t$	(4) $NUMrestr_t$	(5) $AGGrestr_t$	(6) $NUMrestr_t$
$EMPL_t$	0.473^{***}	0.308^{***}	0.493^{***}	-95.483^{***}	0.349^{***}	-26.810^{***}
	(3.57)	(2.88)	(6.81)	(−4.89)	(5.12)	(−2.78)
$UNEMP_i$		−0.000			-0.002^{***}	0.353^{***}
		(−1.20)			(−7.47)	(10.59)
$EMPL_t \times UNEMP_i$		0.230^{***}			0.182^{*}	-29.345^{**}
		(3.87)			(1.89)	(−2.15)
Constant			-0.004^{***}	1.024^{***}	-0.002^{***}	0.290^{***}
			(−20.40)	(21.46)	(−13.96)	(12.30)
Obs	307,660	284,538	101	101	202	202
R-squared	0.240	0.243	0.319	0.194	0.413	0.431
FE	Firm	Firm	None	None	None	None
Cluster	Year	Year	None	None	None	None

Table 4: Summary statistics from the regressions of firm restructuring on aggregate employment growth for the years 1996–2020. The t-statistics are below the coefficients in parentheses. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. Columns 1 and 2 use a panel of firm-years, columns 3 and 4 use an aggregate quarterly timeseries, and columns 5 and 6 use a quarterly timeseries that calculates restructuring variables separately for high and low unemployment industries. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1. Constants are not reported for regressions with fixed effects.

Table 5: Descriptive statistics for firm-level variables

	N	Mean	SD	25P	Median	75P
β_i^{EMPL}	3,367	0.4773	1.1567	−0.0499	0.0822	0.7177
β_i^{FF}	3,309	1.0540	0.4354	0.7565	1.0206	1.3104
β_i^{FFDL}	3,309	0.8271	0.4184	0.5348	0.7970	1.0697
β_i^{OI}	3,367	0.1614	2.9741	−0.6978	0.3784	1.5069
$UNEMP_i$	3,318	0.6456	0.4784	0.0000	1.0000	1.0000
$size_i$	3,319	13.1233	1.7446	11.8385	13.0796	14.3049
mb_i	3,319	2.6861	3.4587	1.3677	2.0758	3.3905
$SperEmp_i$	3,304	453.1990	719.3153	164.3924	242.6463	421.6023
Emp_i	3,316	0.0066	0.0087	0.0016	0.0041	0.0077
LS_i	750	0.4340	0.5167	0.3370	0.4748	0.6735
ELS_i	3,139	0.5081	0.7766	0.3552	0.5752	0.7494
DE_i	3,319	1.4256	4.7432	0.1054	0.3068	0.8910
LK_i	3,238	−3.8236	1.3778	−4.3792	−3.6187	−2.9577
AT_i	3,319	6.5384	2.0070	5.0667	6.5285	7.8863
$Tang_i$	3,280	0.2356	0.2147	0.0716	0.1648	0.3348

Table 5: Descriptive statistics for the restructuring-based measure of systematic risk and firm characteristics. All measures are time-invariant. The table includes observations for the years 1996–2020. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%.

Table 6: Pearson correlations for firm-level variables

		β_i^{EMPL}	β_i^{FF}	β_i^{FFDL}	β_i^{OI}	$UNEMPL_i$
2	β_i^{FF}	0.14*				
3	β_i^{FFDL}	0.20*	0.80*			
4	β_i^{OI}	−0.03	0.05*	−0.01		
5	$UNEMP_i$	0.12*	0.11*	0.20*	0.01	
6	$size_i$	−0.05*	0.12*	0.08*	0.11*	−0.13*
7	mb_i	0.05*	0.03*	0.17*	−0.05*	0.07*
8	$SperEmp_i$	−0.10*	−0.01	−0.11*	0.08*	−0.25*
9	Emp_i	0.06*	−0.09*	−0.02	0.03*	0.21*
10	LS_i	0.04	0.02	0.00	0.10*	0.08*
11	ELS_i	0.03*	−0.05*	−0.03*	0.06*	0.02
12	DE_i	−0.06*	0.03*	−0.32*	0.04*	−0.09*
13	LK_i	0.15*	−0.05*	0.14*	−0.14*	0.17*
14	AT_i	−0.11*	0.05*	−0.19*	0.17*	−0.26*
15	$Tang_i$	−0.08*	0.00	−0.15*	0.16*	0.02

Table 6: Bi-variate correlations for the restructuring-based measure of systematic risk and firm characteristics. All measures are time-invariant. The table includes observations for the years 1996–2020. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%.

Table 7: Regression of the returns-based measures of systematic risk on the restructuring-based measure of systematic risk and controls

VARIABLES	(1) β_i^{FF}	(2) β_i^{FFDL}	(3) β_i^{FFDL}	(4) β_i^{FF}	(5) β_i^{FFDL}	(6) β_i^{FFDL}
β_i^{EMPL}	0.054***	0.071***	0.042***	0.073***	0.107***	0.075***
	(8.38)	(11.49)	(3.11)	(5.29)	(8.25)	(3.05)
β_i^{OI}	0.009***	−0.001	0.016***	0.009***	−0.001	0.013**
	(3.44)	(−0.46)	(2.68)	(3.51)	(−0.37)	(2.31)
$UNEMPL_i$				0.100***	0.173***	0.123***
				(5.98)	(11.05)	(4.50)
$\beta_i^{EMP} \times UNEMPL_i$				−0.030*	−0.056***	−0.056*
				(−1.91)	(−3.84)	(−1.95)
$size_i$			0.196***			0.181***
			(13.74)			(12.49)
mb_i			−0.001			−0.001
			(−0.35)			(−0.21)
$SperEmp_i$			−0.000			−0.000
			(−0.96)			(−0.79)
Emp_i			−2.776			−2.547
			(−1.49)			(−1.38)
LS_i			−0.014			−0.016
			(−0.62)			(−0.71)
DE_i			0.003			0.001
			(1.29)			(0.34)
LK_i			0.012			−0.000
			(0.68)			(−0.01)
AT_i			−0.186***			−0.172***
			(−13.25)			(−11.92)
$Tang_i$			−0.104			−0.194**
			(−1.20)			(−2.19)
Constant	1.026***	0.793***	−0.481***	0.964***	0.685***	−0.472***
	(126.43)	(102.44)	(−3.88)	(73.24)	(55.26)	(−3.85)
Obs	3,309	3,309	737	3,308	3,308	736
R-squared	0.024	0.039	0.396	0.034	0.073	0.413

Table 7: Summary statistics from the regressions of equations (6) and (7). The t-statistics are below the coefficients in parentheses. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Estimation of the returns-based measure of systematic risk by portfolio of the restructuring-based measure of systematic risk

Portfolio of β_i^{EMPL}	Lowest (1)	(2)	(3)	(4)	Highest (5)
Mean β_i^{EMPL}	−0.529	−0.036	0.111	0.567	2.115
	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$
β_p^{FF}	0.969***	0.854***	0.971***	1.053***,‡	1.186***,‡
	(99.01)	(115.52)	(131.36)	(125.99)	(125.47)
β_p^{SMB}	0.750***	0.530***	0.517***	0.653***	0.798***
	(58.49)	(55.16)	(54.21)	(61.27)	(67.97)
β_p^{HML}	−0.098***	0.313***	0.260***	0.069***	−0.102***
	(−7.78)	(32.71)	(27.27)	(6.42)	(−8.47)
β_p^{UMD}	−0.139***	−0.107***	−0.119***	−0.172***	−0.223***
	(−16.93)	(−17.22)	(−19.09)	(−24.74)	(−28.98)
Constant	0.001**	0.003***	0.003***	0.002***	−0.000
	(2.45)	(9.04)	(9.27)	(5.63)	(−0.26)
Obs	138,120	150,864	151,918	151,419	139,223
R-squared	0.132	0.147	0.169	0.167	0.188

Table 8: Summary statistics from the estimation of equation (8). The t-statistics are below the coefficients in parentheses. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1. Significant positive differences in β^{FF} from the lowest portfolio of β_i^{EMPL} at a p<0.10 level is indicated with ‡.

Table 9: Estimation of the returns-based measure of systematic risk by portfolio of the restructuring-based measure of systematic risk conditional on the earnings-based alternative measure

β_i^{EMPL} portfolio	(1)	(2)	(3)	(4)	(5)
β_i^{OI} portfolio					
(1)	0.995***	0.887***	1.002***	1.014***	1.165***,‡
(2)	0.870***	0.784***	0.850***	0.978***,‡	1.092***,‡
(3)	0.911***	0.775***	0.898***	1.016***,‡	1.078***,‡
(4)	0.955***	0.892***	1.053***,‡	1.087***,‡	1.205***,‡
(5)	1.114***	1.064***	1.101***	1.174***,‡	1.301***,‡

Table 9: This table provides the estimates of β_p^{FF} from the estimation of equation (8) by portfolios determined by the level of the restructuring-based measure of systematic risk, β_i^{EMPL}, and the level of the operating income alternative measure, β_i^{OI}. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1. Significant positive differences in β_p^{FF} from the lowest portfolio of β_i^{EMPL} at a p<0.10 level is indicated with ‡.

Table 10: Estimation of the returns-based measure of systematic risk using out-of-sample returns by portfolio of the restructuring-based measure of systematic risk

Portfolio of β_i^{EMPL}	Lowest (1)	(2)	(3)	(4)	Highest (5)
	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$
β_p^{FF}	0.901***	0.904***	0.903***	0.989***,‡	1.024***,‡
	(60.07)	(72.83)	(75.63)	(76.06)	(75.46)
β_p^{SMB}	0.728***	0.548***	0.451***	0.535***	0.584***
	(30.15)	(27.44)	(23.50)	(25.58)	(26.78)
β_p^{HML}	0.039**	0.248***	0.278***	0.106***	0.067***
	(2.02)	(15.63)	(18.22)	(6.39)	(3.85)
β_p^{UMD}	−0.105***	−0.077***	−0.070***	−0.114***	−0.092***
	(−5.45)	(−4.80)	(−4.52)	(−6.81)	(−5.26)
Constant	−0.002***	0.000	0.001**	−0.001**	−0.000
	(−2.93)	(0.48)	(2.38)	(−2.47)	(−0.82)
Obs	45,017	45,872	45,663	44,891	43,836
R-squared	0.151	0.192	0.196	0.197	0.197

Table 10: Summary statistics from the estimation of equation (8) using returns measured after the determination of β_i^{EMPL}. The t-statistics are below the coefficients in parentheses. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1. Significant positive differences in β_p^{FF} from the lowest portfolio of β_i^{EMPL} at a p<0.10 level is indicated with ‡.

Table 11: Post-restructuring firm sales and expense growth and aggregate sales and GDP growth by portfolio of the restructuring-based measure of systematic risk

$restr_{i,t} < 0$		No	Yes	Difference
	β_i^{EMPL} portfolio			
$SalesGrow_{i,t}$	(1)	0.290	0.110	-0.179
	(2)	0.205	0.091	-0.114
	(3)	0.275	0.084	-0.191
	(4)	0.299	0.082	$-0.217^{\ddagger\ddagger}$
	(5)	0.339	0.046	$-0.293^{\ddagger\ddagger\ddagger}$
$ExpGrow_{i,t}$	(1)	0.266	0.089	-0.177
	(2)	0.183	0.078	-0.105
	(3)	0.244	0.064	-0.180
	(4)	0.261	0.065	-0.196
	(5)	0.305	0.030	$-0.275^{\ddagger\ddagger\ddagger}$
$AggSalesGrow_t$	(1)	0.029	0.018	-0.011
	(2)	0.028	0.018	-0.010
	(3)	0.030	0.018	$-0.013^{\ddagger}$
	(4)	0.033	0.018	$-0.016^{\ddagger\ddagger\ddagger}$
	(5)	0.036	0.019	$-0.017^{\ddagger\ddagger\ddagger}$
$GDPgrow_t$	(1)	0.045	0.042	-0.003
	(2)	0.045	0.043	-0.002
	(3)	0.046	0.041	-0.006
	(4)	0.048	0.040	$-0.008^{\ddagger}$
	(5)	0.050	0.040	$-0.010^{\ddagger\ddagger}$

Table 11: Means of $SalesGrow_{i,t}$, $ExpGrow_{i,t}$, $AggSalesGrow_t$, and $GDPgrow_t$ by β_i^{EMPL} portfolio and whether the firm incurred restructuring in the fiscal year. Differences in means are presented in the rightmost column. The ‡, ‡‡, and ‡‡‡, indicate that the difference is lower than the difference in the lowest β_i^{EMPL} portfolio at a p<0.1, p<0.05, and p<0.01 level of statistical significance with errors clustered by fiscal year. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%.

Table 12: Estimation of the returns-based measure of systematic risk by portfolio of the restructuring-based measure of systematic risk based on industry employment growth

Portfolio of $\beta_i^{IndEMPL}$	Lowest (1)	(2)	(3)	(4)	Highest (5)
	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$	$R_{i,t} - RF_t$
β^{FF}	0.926***	0.987***,‡	0.996***,‡	1.080***,‡	1.151***,‡
	(93.47)	(108.92)	(105.17)	(114.26)	(108.70)
β^{SMB}	0.646***	0.608***	0.664***	0.727***	0.756***
	(49.62)	(52.06)	(54.71)	(60.33)	(56.72)
β^{HML}	0.052***	0.202***	0.104***	0.020*	−0.098***
	(4.01)	(16.93)	(8.38)	(1.65)	(−7.08)
β^{UMD}	−0.125***	−0.128***	−0.140***	−0.185***	−0.212***
	(−14.57)	(−16.37)	(−17.21)	(−22.89)	(−23.79)
Constant	0.003***	0.003***	0.003***	0.003***	0.002***
	(8.05)	(9.50)	(8.66)	(7.94)	(4.36)
Obs	112,735	120,055	114,863	116,621	107,617
R-squared	0.130	0.150	0.152	0.176	0.176

Table 12: Summary statistics from the estimation of equation (8) using the restructuring-based measure of systematic risk that is based on industry employment growth, $\beta_i^{IndEMPL}$. The t-statistics are below the coefficients in parentheses. The variable definitions appear in table 1. All continuous variables are winsorized at 1% and 99%. The statistical significance of coefficients is indicated as: *** p<0.01, ** p<0.05, * p<0.1. Significant positive differences in β^{FF} from the lowest portfolio of β_i^{EMPL} at a p<0.10 level is indicated with ‡.