

Debt-Financed Overexpansion and Employment Dynamics: Why Large Firms Are More Cyclically Sensitive

Soku Byoun^{*a}

^a*Hankamer School of Business, Baylor University*

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Abstract

Using firm-level data, this study shows that debt-financed prior expansions by large, unconstrained firms are a key driver of subsequent employment declines. Panel vector autoregression (PVAR) results reveal an asymmetric response: employment shocks to small firms generate positive and persistent effects on large firms' employment, whereas shocks to large firms do not significantly affect small firms. This asymmetry suggests that large firms expand employment in response to rising employment among small firms, potentially leading to overexpansion.

Local projection estimates show that large firms exhibit significantly stronger positive employment responses to demand shocks than small firms, while large firms exhibit significantly lower employment growth than small firms over three- to five-year horizons following debt-financed expansion shocks.

Regression analysis further indicates that the adverse effects of prior expansion are particularly pronounced among large firms with high financial leverage. These firms appear more vulnerable due to the combined burden of financial and operating leverage. In contrast, while leverage buildups negatively affect subsequent employment overall, they do not exhibit differential effects across firm size or leverage levels. Evidence from the 2008 Financial Crisis reinforces these findings: debt-financed expansions prior to the crisis were associated with sharper employment contractions among large firms. These findings suggest that debt-financed overexpansion is a central mechanism explaining why large firms are more responsive to aggregate fluctuations.

JEL Classification: G32, G35

Keywords: Leverage, Employment, Business Cycle, Credit Cycle, Overexpansion

^{*}Professor and Carr P. Collins Endowed Chair of Finance, Hankamer School of Business, Baylor University, One Bear Place, #98004, Waco, TX 76798-8004, USA. Email: Soku_Byoun@Baylor.edu. Phone: (254) 710-7849. Fax: (710) 710-1092.

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1 Introduction

The relationship between firm size and sensitivity to aggregate fluctuations has generated substantial debate in the macroeconomics and finance literature. The conventional view, rooted in theories of credit market frictions, posits that small firms should exhibit greater cyclical sensitivity due to their limited access to external financing and higher vulnerability to credit supply shocks (Fazzari et al., 1988; Gertler and Gilchrist, 1994; Berger and Udell, 1998; Chodorow-Reich, 2013; Mian and Sufi, 2014). This financial constraint channel predicts that during recessions, when credit conditions tighten, small firms should contract employment more sharply than their larger counterparts. However, recent empirical evidence challenges this prediction. Moscarini and Postel-Vinay (2012) document that large firms exhibit greater employment declines relative to small firms during downturns, a pattern inconsistent with the financial constraint channel. Crouzet and Mehrotra (2020) provide further evidence that financial frictions cannot fully account for differential cyclicity across firm sizes. These findings raise a fundamental puzzle: if small firms face tighter financial constraints, why do large firms display greater employment volatility over the business cycle?

This paper proposes a novel resolution to this puzzle by shifting focus from financial constraints to *overexpansion*. We argue that large firms' greater employment cyclicity stems primarily from their propensity to overexpand during booms—particularly when such expansion is debt-financed—rather than from financial constraints per se. Our firm-level empirical strategy allows us to distinguish between two channels through which leverage affects employment: the *financial constraint channel*, whereby high leverage limits firms' ability to maintain employment during downturns, and the *overexpansion channel*,

whereby debt-financed expansion during booms creates operating leverage that subsequently constrains employment when demand weakens. By examining how individual firms’ prior expansion decisions and leverage positions jointly affect their employment responses to demand shocks, we isolate these competing mechanisms and demonstrate that overexpansion, rather than financial constraints, primarily explains the employment-size puzzle.

Our empirical findings support this overexpansion hypothesis. Large firms exhibit greater employment sensitivity to demand shocks and rely more heavily on debt to finance employment expansion than small firms. Consequently, they experience more pronounced long-term adverse effects from the combined pressures of operating and financial leverage following debt-financed expansions. Specifically, we find that prior debt-financed expansion has disproportionately negative impacts on subsequent employment growth among large firms, with effects emerging 3-5 years after expansion and dissipating thereafter. In contrast, financial leverage buildups per se do not exhibit distinctive effects concentrated among high-leverage firms or small firms, casting doubt on the primacy of the financial constraint channel.

Large firms’ vulnerability to overexpansion reflects both their advantages and their risks. Large firms typically enjoy superior access to credit markets and offer higher wages, enabling more aggressive expansion during economic booms.¹ Because large firms can better absorb the short-term costs of leveraged expansion, they may be less concerned about the

¹Beck et al. (2008) document that large firms more easily expand external financing, while Frank and Yang (2025) show that large firms increase debt financing more than small firms in response to productivity shocks. Chatterjee and Eyigungor (2023) show that large firms can—and do—borrow a larger fraction of their future cash flows. Okun (1973) introduces the idea of “cyclical upgrading of labor,” wherein employment shifts toward higher-paying industries during expansions and reverses in downturns. Montgomery and Hariharan (1991) suggest that large firms, facing fewer frictions, drive aggregate fluctuations. Debt-financed expansion may also reflect managerial overconfidence or agency problems when substantial resources are under management control (Ma and Shleifer, 2025).

adverse consequences of financial leverage.² However, this access to operating resources and capital markets can lead to excessive workforce expansion in response to optimistic demand projections, increasing exposure to overexpansion risks.³ When anticipated demand fails to materialize, operating leverage from prior expansions—especially when debt-financed—imposes lasting negative effects on employment due to the compounded risks of financial and operating leverage.⁴

The literature has largely overlooked the role of overexpansion, a nontrivial omission given that shifts in credit supply often coincide with changes in expected investment returns and product market demand—factors that critically shape employment decisions. Labor costs represent substantial fixed obligations and become particularly salient under economic uncertainty, constraining managerial flexibility and intensifying exposure to adverse shocks. While overborrowing increases financial leverage, overexpansion amplifies operating leverage, introducing distinct risk exposures.⁵ Furthermore, prior studies have often failed to account for concurrent debt issuance. Firms typically reduce both debt and employment in response to declining demand; ignoring these joint adjustments risks omitted variable bias and

²Precisely because of these short-term costs, small firms may exhibit greater caution in their borrowing behavior. Indeed, the corporate finance literature documents that small firms utilize significantly less financial leverage than large firms (Rajan and Zingales, 1995; Frank and Goyal, 2003).

³Pigou (1927) and Beaudry et al. (2011) suggest that economic fluctuations are directly related to bouts of optimism and pessimism. Macroeconomic optimism may inflate asset valuations, easing credit constraints and fueling consumption booms. Expectations of sustained asset appreciation can facilitate overborrowing, while overly optimistic demand forecasts promote overexpansion. Beaudry and Portier (2014) show how changes in perceptions about the economy’s future needs can cause business-cycle-type fluctuations, while Belo et al. (2014) emphasize how labor adjustment costs render employment decisions inherently forward-looking.

⁴Rognlie et al. (2018) develop a macroeconomic model showing how “overbuilding,” driven by monetary policy, induces demand-driven recessions.

⁵Prior studies underscore the critical role of labor costs in shaping operating leverage. See, for example, Van Horne (1977); Ferri and Jones (1979); Mandelker and Rhee (1984); Reinartz and Schmid (2016); Matsa (2018); Chen et al. (2019); and Kahl et al. (2019). These studies illustrate that firms often face a tradeoff between financial and operating leverage, particularly under bankruptcy risk.

undermines identification of overborrowing effects.⁶ It is therefore premature to interpret the predictive power of financial leverage buildups for subsequent employment declines as evidence of a financial constraint channel without accounting for concurrent expansion decisions.

This paper disentangles the effects of overborrowing and overexpansion—each exerting distinct pressures on employment dynamics over the demand cycle—and provides new insights into how financing and operating structures condition employment outcomes across firm sizes in response to demand shocks. We employ three complementary empirical strategies. First, we examine the dynamic interplay among financial leverage, employment, and demand through a panel vector autoregression (PVAR) framework. The impulse response functions reveal that financial leverage shocks are transitory, yet they lead to persistent declines in both demand and employment. Importantly, the transitory nature of leverage shocks does not imply leverage buildups, as observed in household leverage dynamics (Mian et al., 2017). Instead, positive shocks to employment and demand predict future increases in financial leverage, suggesting that demand-side dynamics contribute to leverage accumulation beyond credit supply effects. The PVAR results further show that leverage shocks reduce employment across both small and large firms, but the negative effects are more persistent for large firms. Moreover, large firms expand employment following positive shocks to small firms’ employment, but not vice versa—suggesting greater susceptibility to overexpansion among large firms.

Second, we employ local projections (Jordà, 2005) to trace out the complete dynamic

⁶Firms may use short-term debt and fixed-term workers more intensely to absorb demand shifts (Oi, 1962; Sharpe, 1994; Caggese and Cunat, 2008).

adjustment path of employment following demand shocks, leverage shocks, and debt-financed expansion shocks (the interaction of expansion and leverage). Local projections offer key advantages over PVAR: they allow us to estimate horizon-specific responses without imposing recursive restrictions, and they enable us to test whether debt-financed expansion affects employment trajectories differently across firm sizes through explicit interactions. Our results show that large firms exhibit significantly stronger employment responses to demand shocks than small firms, with differentials growing over time. However, leverage shocks alone produce no significant differential effects. Critically, when examining debt-financed expansion shocks, the pattern reverses: small firms exhibit significantly higher employment growth than large firms from years 3-5, with differentials of 0.10-0.15 percentage points, before convergence after year 6. This delayed negative effect for large firms is consistent with overexpansion: debt-financed growth during booms leads to medium-term retrenchment as operating leverage binds.

Third, we directly test the overexpansion hypothesis by examining how prior expansion and leverage buildups affect subsequent employment growth over three- to five-year horizons designed to capture business cycle dynamics. We find that prior expansions have disproportionately negative impacts on future employment among high-leverage firms, consistent with the overexpansion mechanism. While leverage buildups also negatively affect subsequent employment growth, this effect is not concentrated among high-leverage firms or small firms, contrary to financial constraint predictions. Additional analyses reveal that prior expansions combined with high leverage significantly reduce subsequent employment growth only among large firms. These findings suggest that large firms are particularly vulnerable

to the compounded effects of financial and operating leverage, indicating that they are more prone to overexpansion.

We further explore the relationship between debt-financed expansion and employment dynamics in the context of the 2008 Financial Crisis. Firms with substantial prior expansions and high financial leverage experienced the most severe employment losses following the crisis, with effects especially pronounced among large firms. In contrast, the adverse impact of leverage buildups on employment during this period was not limited to high-leverage firms or small firms. Taken together, these findings provide additional evidence that the overexpansion channel plays a central role in explaining differential employment outcomes between small and large firms in the aftermath of the 2008 Financial Crisis.

2 Related Literature and Contribution

2.1 The Firm Size-Cyclicalities Puzzle

Standard theories of financial constraints predict that small firms should exhibit greater employment cyclicalities than large firms. In models with capital market imperfections, small firms face steeper costs of external finance and tighter borrowing constraints, amplifying their exposure to aggregate demand fluctuations (Bernanke et al., 1999). Empirical research has long documented that small firms are particularly susceptible to shocks due to tighter liquidity constraints and greater exposure to credit market frictions (Fazzari et al., 1988; Gertler and Gilchrist, 1994; Berger and Udell, 1998; Chodorow-Reich, 2013; Mian and Sufi, 2014). Accordingly, when credit supply contracts, the adverse effects of overborrowing should be more pronounced for small firms, *ceteris paribus*.

Recent evidence, however, challenges this view and reveals a striking puzzle. [Moscarini and Postel-Vinay \(2012\)](#) find that large firms—not small firms—exhibit greater employment sensitivity to aggregate fluctuations. [Crouzet and Mehrotra \(2020\)](#) further demonstrate that differences in cyclical employment sensitivity between small and large firms cannot be fully explained by financial constraints alone. These studies do not dispute that small firms are more financially constrained; rather, they raise the fundamental question of why large firms display heightened employment sensitivity to aggregate shocks despite their superior access to credit markets.

Several explanations have been proposed. [Moscarini and Postel-Vinay \(2012\)](#) develop a model in which large firms offer higher wages and more stable employment relationships, making their hiring decisions more responsive to aggregate conditions through a job ladder mechanism. [Kudlyak and Sanchez \(2017\)](#) emphasize differences in labor force composition, arguing that large firms employ workers with characteristics that make them more sensitive to cyclical fluctuations. [Haltiwanger et al. \(2013\)](#) highlight the role of young firms in job creation and destruction, suggesting that the size-cyclical relationship may reflect underlying dynamics related to firm age rather than size per se.

Our paper contributes to this literature by proposing and testing an alternative mechanism: large firms’ greater propensity for debt-financed overexpansion during booms amplifies their employment contractions during subsequent downturns. This overexpansion channel operates distinctly from financial constraints. While prior studies focus primarily on contemporaneous employment responses to aggregate shocks, our analysis highlights how past financing and expansion decisions exert differential long-term effects on employment

across firm sizes. Critically, we show that the adverse effects of debt-financed expansion among large firms emerge gradually over 3-5 years, precisely because their superior access to financial markets allows them to absorb short-term costs that would immediately constrain smaller firms. This delayed manifestation of overexpansion effects helps reconcile why large firms can appear less constrained in the short run while exhibiting greater employment volatility over the business cycle.

2.2 Leverage Cycles and Employment Dynamics

A growing body of research documents the existence of leverage cycles, wherein aggregate financial leverage plays a crucial role in propagating business cycles. [Bernanke and Gertler \(1989\)](#) show how aggregate shocks can be amplified by procyclical movements in credit supply, which in turn create leverage cycles. [Schularick and Taylor \(2012\)](#) and [Adrian and Shin \(2010, 2014\)](#) demonstrate that rising financial leverage in the financial sector is a robust predictor of economic downturns.

More recently, this insight has been extended to other sectors. [Mian and Sufi \(2014\)](#) and [Mian et al. \(2017\)](#) demonstrate that household leverage accumulation—fueled by credit supply expansion—was a key driver of the sharp employment contraction during the 2007-2009 recession, primarily through its dampening effect on consumer demand. Their work emphasizes how leverage buildups in the household sector create vulnerabilities that manifest as employment losses when credit conditions tighten or asset values decline.

The relationship between firm-level financial leverage and employment, however, remains unsettled. [Giroud and Mueller \(2017, 2022\)](#) show that increases in firm leverage are

associated with future employment losses, particularly among high-leverage firms, suggesting that financial constraints bind when leverage is elevated. In contrast, [Mian and Sufi \(2014\)](#) and [Mian et al. \(2017\)](#) find that nonfinancial firms, unlike households, did not exhibit significant overborrowing prior to the financial crisis, questioning whether firm leverage operates through similar channels as household leverage.

We contribute to this debate by distinguishing between two distinct channels through which leverage affects employment: the *overborrowing channel*, whereby excessive leverage creates financial constraints that limit employment during downturns, and the *overexpansion channel*, whereby leverage finances expansion that creates operating leverage and subsequent employment vulnerability. Our findings suggest that credit supply-induced borrowing may be less harmful for employment than borrowing undertaken to finance expansion based on overly optimistic demand projections. Credit booms—often fueled by overoptimism—can lower borrowing costs and ease collateral requirements ([Greenwood and Hanson, 2013](#); [Geanakoplos, 2003](#)), enabling firms to expand in anticipation of strong demand growth. Paradoxically, large firms’ superior access to credit makes them more susceptible to such overexpansion than small firms, who face tighter constraints on both borrowing and expansion.

Our findings also speak to the broader debate about the mechanisms through which leverage affects real outcomes. [Kaplan et al. \(2020\)](#) argue that leverage has limited direct impact on consumption, suggesting that wealth effects—particularly the drop in housing prices—dominate in the absence of binding credit constraints. In contrast, [Aruoba et al. \(2024\)](#) attribute a substantial portion of wealth effects to financial constraints, arguing that

leverage magnifies the real effects of asset price changes. We provide firm-level evidence linking leverage directly to employment outcomes through a specific mechanism: debt-financed overexpansion. Firms may borrow to expand in response to consumer demand fueled by optimism (Bianchi, 2011), and their employment subsequently suffers from the combined effects of financial and operating leverage—consistent with the “investment hangover” effect described by Rognlie et al. (2018).

2.3 Expectation-Driven Overexpansion

A related literature examines how optimistic expectations drive overexpansion that subsequently amplifies downturns. Beaudry and Portier (2014) develop a model in which changes in agents’ expectations about future economic fundamentals can generate business cycle fluctuations even absent contemporaneous productivity shocks. When firms become optimistic about future demand, they expand capacity and employment; if optimism proves unfounded, the resulting excess capacity necessitates painful contractions. Pigou (1927) and Beaudry et al. (2011) similarly emphasize how waves of optimism and pessimism drive economic fluctuations.

Empirical evidence supports the view that firms overexpand based on extrapolated expectations from past performance or sentiment-driven optimism (Arif and Lee, 2014; Gennaioli et al., 2016; López-Salido et al., 2017; Barrero, 2022). Jochem and Peters (2019) document how overoptimism spreads across firms along supply chains, suggesting that sentiment-driven expansion can propagate throughout the economy. Optimism about asset valuations can further facilitate leveraged expansions (Rognlie et al., 2018), as rising asset

prices both ease collateral constraints and validate optimistic projections, creating a self-reinforcing dynamic.⁷

We extend this literature in two ways. First, we provide firm-level evidence on how expectation-driven overexpansion manifests differently across firm sizes. Large firms, with superior access to credit and greater organizational capacity, can act more aggressively on optimistic expectations, making them particularly vulnerable to overexpansion. Second, our empirical framework disentangles the effects of *overborrowing* (leverage accumulation *per se*) from *overexpansion* (employment expansion financed by debt), revealing that it is the combination—debt-financed expansion—rather than either component alone that drives subsequent employment vulnerability. This distinction is crucial because expansion fueled by readily available credit becomes particularly problematic during downturns, as it simultaneously increases financial leverage (through debt) and operating leverage (through fixed labor costs).

2.4 Operating Leverage, Financial Leverage, and Employment

Our study contributes to the literature examining the interaction between operating leverage and financial leverage in shaping firm dynamics. Operating leverage arises when firms have high fixed costs relative to variable costs, amplifying the impact of demand fluctuations on profitability (Lev, 1974). For most firms, labor costs constitute a major component of operating leverage, particularly when employment relationships involve significant hiring, training, and firing costs (Oi, 1962; Hamermesh, 1989).

⁷Beaudry and Portier (2014) suggest that overexpansion driven by speculation can propagate business cycles. Both supply-driven and demand-driven credit booms may reflect overoptimism (Kindleberger and Aliber, 2005; Greenwood and Hanson, 2013; Baron and Xiong, 2017; Mian et al., 2017).

The corporate finance literature has long recognized that firms face a tradeoff between operating and financial leverage under bankruptcy risk.⁸ Firms with high operating leverage typically choose lower financial leverage to manage total risk exposure, suggesting that the two forms of leverage are substitutes in optimal capital structure decisions. However, this substitution relationship may break down during optimistic periods when firms simultaneously expand employment (increasing operating leverage) and finance expansion through debt (increasing financial leverage), creating compounded exposure.

Despite theoretical recognition of the operating-financial leverage interaction, empirical studies of employment dynamics have largely examined financial leverage in isolation. This omission is consequential because firms that expand employment aggressively during booms simultaneously increase both operating leverage (through higher fixed labor costs) and financial leverage (if expansion is debt-financed). [Caggese and Cunat \(2008\)](#) suggest that high-leverage firms may adopt more flexible employment arrangements to manage production volatility, while [Oi \(1962\)](#) and [Sharpe \(1994\)](#) argue that large firms with high financial leverage may rely on more elastic labor technologies, resulting in greater employment fluctuations in response to demand shocks.

Our paper addresses this gap by examining how prior expansion decisions, particularly when financed through debt, create compounded leverage exposures that amplify subsequent employment adjustments. We show that the interaction between operating and financial leverage is especially important for understanding large firms' employment dynamics. Because large firms can more easily expand both employment and debt during booms, they

⁸See [Van Horne \(1977\)](#); [Ferri and Jones \(1979\)](#); [Mandelker and Rhee \(1984\)](#); [Reinartz and Schmid \(2016\)](#); [Matsa \(2018\)](#); [Chen et al. \(2019\)](#); and [Kahl et al. \(2019\)](#).

accumulate greater combined leverage exposure. When demand weakens, this compounded leverage creates rigidities: financial leverage limits access to credit needed to maintain employment, while operating leverage (in the form of committed labor costs) creates fixed obligations that cannot be easily shed. The resulting employment contractions are more severe and prolonged than would be predicted by examining either form of leverage in isolation.

Furthermore, we contribute methodologically by introducing a long-term perspective on the interaction of demand, financial leverage, and employment dynamics. This approach allows us to trace out how the effects of debt-financed expansion evolve over 3-5 year horizons, revealing delayed impacts that would be obscured in studies focusing on contemporaneous or short-run relationships. Our findings demonstrate that properly accounting for the joint dynamics of operating and financial leverage is essential for understanding employment cyclicity across firm sizes.

3 Data and Summary Statistics

Our initial sample comprises U.S. non-financial firms from the annual Compustat database for the 1973–2022 period. We restrict the sample to firms with positive values for the number of employees (Compustat item EMP) and net sales (item SALE).

Firm financial leverage (FL) is defined as the ratio of total debt—debt in current liabilities (item DLC) plus long-term debt (item DLTT)—to the market value of total assets. Market value is calculated as the sum of the market capitalization (number of outstanding shares (item CSHO) $\times$ current market price (item PRCC_F)), total debt, and preferred stock

liquidating value (item PSTKL) minus deferred taxes and investment tax credit (item TXDITC). We report results using market-value FL in the main analysis and provide robustness checks using book-value FL. To mitigate the influence of outliers, we require total assets (item AT) to be greater than 1 million, winsorize all other variables at the 1st and 99th percentiles, and restrict FL to lie between zero and one.

We use the change in $\log(\text{Sales})$ as a proxy for product demand growth. Net stock issuance ($\Delta Equity$) is calculated as new equity issued (item SSTK) minus repurchase (item PRSTKC) scaled by lagged assets. Net debt issuance ($\Delta Debt$) is defined as new debt issued (item DLTIS) minus debt payments (item DLTR) plus the change in current portion of long-term debt (item DLCCH), also scaled by lagged assets.

Firms are classified into low, medium, and high FL categories based on terciles of the the annual FL distribution. This classification allows us to use the bottom tercile—comprising firms with minimal leverage—as the reference group in regression analyses. Firm size is defined within industry: firms below the annual median number of employees within a three-digit SIC are classified as small, and those above as large. This industry-relative measure reflects the competitive dynamics relevant to overexpansion. [Moscarini and Postel-Vinay \(2012\)](#) argue that employment size better captures current productivity and labor market conditions than asset size, which reflects past decisions. We also test robustness of our results using alternative size measures. To examine three- to five-year changes, we require firms to have at least seven to eleven consecutive years of data, depending on the horizon.

Table [1](#) provides summary statistics for the full sample (Panel A) and separately for small and large firms (Panel B). The average market (book) FL ratio is 0.215 (0.231) for

all firms, 0.201 (0.202) for small firms, and 0.226 (0.242) for large firms, confirming higher leverage for large firms than small firms. Average annual employment growth rate is 3.3% for all firms, 1.2% for small firms, and 4.7% for large firms. Notably, the changes in both book- and market-value FL is 0.003 for large firms, which is significantly higher than -0.002 and -0.000 , respectively, for small firms. Small firms rely more equity financing, while large firms predominantly use debt.

Figure 1 also compares annual employment growth, net debt issuance, and net equity issuance between small and large firms. Panel A shows that small firms experienced negative employment growth following the 2000 and 2008 recessions and relied more on equity (dashed line) than debt. Panel B shows that large firms experienced less severe employment declines during these recessions, but the drop from pre-recession highs was more abrupt, underscoring the importance of examining changes in employment growth. Overall, large firms' employment growth is financed by more debt (higher FL), while small firms rely more on equity (lower FL). These patterns highlight the importance of jointly considering prior financing and employment decisions when analyzing the FL-employment dynamics.

Figure 2 plots five-year employment growth against contemporaneous changes in FL and sales. Column A shows results for small firms, and Column B for large firms. In the first row, both groups exhibit a positive association between employment growth and FL changes, though small firms tend to reduce FL when employment growth is low. The second row shows a positive relationship between employment and sales growth for both groups, with large firms displaying greater sensitivity—potentially indicative of overexpansion.

Figure 3 illustrates subsequent five-year employment growth relative to prior five-year

changes in FL and employment. In the top panels, small firms show little correlation between prior FL buildup and future employment, while large firms exhibit a negative relationship. In the bottom panels, prior employment expansion predicts future employment declines for both groups. These patterns raise key questions: Why do large firms suffer more from FL buildups? What role does prior expansion play? Are large firms more sensitive to FL due to financial frictions? We will explore these questions in the following sections.

Table 2 reports estimates of the concurrent relationships between employment growth, demand growth, and FL buildup over one to five years. We include interactions with *Large* (based on the median number of employees) to assess differential responses. The results show that employment growth is positively associated with both demand growth ($\Delta \log(Sale)$) and FL buildup (ΔFL). The positive coefficients on *Large* and $Large \times \Delta \log(Sale)$ suggest that large firms exhibit higher average employment growth and greater sensitivity to demand. The significant positive coefficients on $Large \times \Delta FL$ indicate that FL buildup contributes more to employment growth among large firms than small firms. These findings support the overexpansion channel: large firms expand more aggressively in response to demand growth, financed by relatively more debt. This underscores the importance of jointly considering prior expansion and FL buildup when analyzing subsequent employment outcomes.

4 Full Dynamic Relations among Leverage, Employment, and Demand

We begin by examining the full dynamic relations among financial leverage (FL), employment, and product demand before estimating single-equation models. Using a

Panel Vector Autoregression (PVAR) framework, we first characterize the intertemporal interactions among these variables and explore heterogeneity across small and large firms. Theories of financial constraints have clear dynamic predictions: constrained firms should not only respond more strongly on impact but also exhibit slower recovery due to persistent balance sheet impairment (Buera and Shin, 2011). Firm-level impulse responses can test these dynamic predictions directly.

4.1 Identification

To investigate the dynamic relationships among firm FL, employment, and demand, we construct an explicit measure of shocks to FL. By controlling for changes in FL attributable to demand, the PVAR framework isolates residuals orthogonal to demand-driven FL, which we interpret as supply-driven overborrowing shocks.

The model is based on annual data for the vector $Y_{it} = (\log(\text{Sale})_{it}, \log(\text{Emp})_{it}, FL_{it})$, where $\log(\text{Sale})_{it}$ is the logarithm of sales, $\log(\text{Emp})_{it}$ is the logarithm of employees, and FL_{it} is the financial leverage ratio. The PVAR specification is:

$$A_0 Y_{it} = \alpha_i + A_1 Y_{it-1} + A_2 Y_{it-2} + \cdots + A_p Y_{it-p} + ind * t + \epsilon_{it}, \quad (1)$$

where α_i denotes firm fixed effects, $ind * t$ captures industry-year effects, and ϵ_{it} is a vector of serially and mutually uncorrelated innovations. The recursive structure of A_0^{-1} allows the the reduced-form errors (u_t) to be expressed as $u_t = A_0^{-1} \epsilon_t$:

$$u_{it} \equiv \begin{pmatrix} u_{it}^{\log(Sale)} \\ u_{it}^{\log(Emp)} \\ u_{it}^{FL} \end{pmatrix} = \begin{bmatrix} a_{11} & 0 & 0 \\ a_{21} & a_{22} & 0 \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{pmatrix} u_{it}^{demand\ shock} \\ u_{it}^{employment\ shock} \\ u_{it}^{leverage\ shock} \end{pmatrix}. \quad (2)$$

This recursive ordering implies that FL may contemporaneously respond to demand and employment shocks, but FL innovations do not immediately affect other variables. However, FL shocks can influence future employment and demand. Employment may respond to demand shocks, but employment innovations do not contemporaneously affect demand. This Cholesky decomposition aligns with the supply-driven overborrowing hypothesis and enables identification of FL shocks that are orthogonal to changes in other variables. The resulting impulse responses functions (IRFs) capture the dynamic effects of FL shocks while controlling for endogenous feedback.

4.2 Estimating PVAR

We estimate the PVAR using the full sample, stacking cross-sectional observations and applying the generalized method of moments (GMM) with an iterative bootstrap procedure to correct for potential Nickell bias due to fixed effects. Unit root tests do not indicate nonstationarity, and all eigenvalues lie within the unit circle, satisfying the stability condition. We set the lag order to $p = 3$ based on the minimum Akaike information criterion. VAR-Granger causality tests reveal bidirectional causality between demand and employment, motivating an alternative Cholesky ordering where employment innovations affect other

variables contemporaneously.

Figure 4 presents orthogonalized IRFs from the PVAR. Confidence intervals are computed using 200 Monte Carlo draws from the fitted reduced-form VAR distribution, with standard errors clustered at the firm level. The vertical axis in each panel denotes the response variable.

Responses to FL shocks (first row): The top-left panel (FL:FL) shows that leverage shocks dissipate rapidly, reverting to baseline within a year, indicating no persistent leverage buildup. However, leverage shocks generate negative and persistent effects on both employment (FL:ln(Emp)) and sales (FL:ln(Sale)). The negative impact on employment emerges after a brief delay, peaking around year 2-3 and persisting for 5-6 years. Sales exhibit a sustained negative response of comparable magnitude and duration. These dynamics reveal that while leverage shocks themselves are transitory, increased leverage has lasting negative effects on employment and demand.

Responses to employment shocks (second row): FL responds positively to an employment shock (ln(Emp):FL), returning to baseline within three years, suggesting a feedback loop between hiring and debt. Employment responds positively to its own shock (ln(Emp):ln(Emp)), though effects decay quickly. Demand also responds positively to employment shocks (ln(Emp):ln(Sale)), with the effect peaking within one year and gradually reverting to baseline over 4 years. This relationship indicates that employment expansion either signals future demand growth or directly enhances sales through channels not fully captured by lagged variables.

Responses to Demand shocks (third row): FL responds positively but transiently to a demand shock ($\ln(\text{Sale}):\text{FL}$). Employment exhibits a strong and persistent positive response to demand shocks ($\ln(\text{Sale}):\ln(\text{Emp})$), consistent with firms adjusting their workforce to meet sustained demand increases. This represents the strongest cross-variable response in the system, underscoring the dominant role of demand in driving employment decisions. Sales display high autocorrelation ($\ln(\text{Sale}):\ln(\text{Sale})$), with shocks generating persistent effects, indicating substantial momentum in demand dynamics and suggesting that sales growth becomes highly persistent once initiated.

Overall, the IRFs indicate that FL shocks predict future declines in employment and demand, despite being transitory. In contrast, demand shocks have more persistent positive effects on employment. These findings suggest that employment declines following FL shocks may not be solely attributable to overborrowing.

We verify robustness by reversing the Cholesky ordering of sales and employment. This alternative ordering imposes a contemporaneous response of sales to employment shocks by construction, but the subsequent dynamic responses of employment to its own innovations and to leverage shocks remain qualitatively unchanged.⁹

4.3 Differential Responses between Small and Large Firms

We examine whether employment responses differ systematically between small and large firms, motivated by empirical evidence in [Moscarini and Postel-Vinay \(2012\)](#) on firm-size heterogeneity in labor market dynamics. We initially estimate a PVAR incorporating

⁹While Cholesky ordering affects the contemporaneous structure of orthogonalized IRFs, it does not alter the underlying reduced-form parameter estimates or the medium-run dynamics we emphasize.

firm-size interactions for all three variables—leverage, employment, and sales. However, preliminary analysis reveals that (i) sales responses are similar across firm sizes, and (ii) VAR-Granger causality tests provide no evidence that leverage Granger-causes employment or sales for either size group when estimated separately. Consequently, we simplify the specification to focus on differential employment responses while pooling sales and leverage dynamics. The resulting system takes the form:

$$u_{it}^* \equiv \begin{pmatrix} u_{it}^{\log(Sale)} \\ u(l)_{it}^{\log(Emp)} \\ u(s)_{it}^{\log(Emp)} \\ u_{it}^{FL} \end{pmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{pmatrix} u_{it}^{demand\ shock} \\ u(l)_{it}^{employment\ shock} \\ u(s)_{it}^{employment\ shock} \\ u_{it}^{leverage\ shock} \end{pmatrix}, \quad (3)$$

where indices (l) and (s) denote large and small firms, respectively. This Cholesky decomposition allows employment shocks from both firm-size groups to affect each other contemporaneously and to influence leverage, while leverage shocks affect employment only with a lag. The lower-triangular structure reflects our identifying assumption that sales shocks propagate first, followed by employment adjustments, with leverage responding to both.

We classify firms as large or small based on whether their employment (or alternatively, total assets) exceeds the sample median in each year. Results are robust to alternative size definitions and to reversing the ordering of large and small firm employment in the Cholesky decomposition.

Figure 5 presents orthogonalized IRFs from the PVAR using employment-based size classification. The second column displays responses for small firms, and the third column for large firms.

Employment response of small firms to an FL shock (FL:log(Emp)(s)) fluctuates around zero over the subsequent four years. In contrast, large firms exhibit negative and persistent response (FL:log(Emp)(l)), with employment declining over the first 2-3 years before partially recovering. These patterns indicates that FL shocks exert more persistent and negative impacts on large firms' employment.

Interestingly, an employment shock originating in small firms generates positive spillovers to large firms' employment (log(Emp)(s):log(Emp)(l)), with effects peaking withing next two years. However, the reverse—large firms' employment shock affecting small firms' employment (log(Emp)(l): log(Emp)(s))—produces a negative and transitory response. This asymmetry may reflect competitive dynamics where large firms' expansion crowds out small firms' hiring opportunities, or alternatively, that small firms contract defensively when large competitors aggressively expand.

The employment responses to demand shocks are substantially larger and faster for large firms (log(Sale):log(Emp)(l)) than for small firms (log(Sale):log(Emp)(s)), suggesting that large firms adjust their workforce more aggressively to demand fluctuations. Small firms exhibit more gradual employment adjustment, potentially due to tighter financial constraints.

These findings reveal substantial heterogeneity in how firms of different sizes respond to financial and demand shocks. The asymmetric spillovers between size groups indicate that employment dynamics cannot be fully understood by analyzing firms in isolation or

aggregate.

4.4 Dynamic Employment Responses: Local Projections

We employ local projections ([Jordà, 2005](#)) to examine how employment growth responds dynamically to shocks, conditional on firm size. This approach allows us to trace out horizon-specific responses without imposing VAR restrictions and to test whether debt-financed expansion affects employment trajectories differently across firm sizes.

Figure 6 presents employment impulse responses to three shocks, estimated separately for large and small firms. Panel A shows that large firms exhibit significantly stronger employment responses to sales (demand) shocks than small firms, with the differential growing from near zero on impact to approximately 0.15 percentage points by year 10. This pattern suggests that large firms more aggressively translate demand opportunities into sustained employment growth.

Panel B examines leverage shocks. Neither firm size exhibits significant employment responses to leverage changes, and the confidence intervals overlap throughout the horizon. This indicates that leverage per se does not systematically drive employment dynamics absent concurrent demand changes.

Panel C reveals the key finding: responses to debt-financed expansion (the interaction of employment and leverage) show a reversed pattern. Small firms exhibit significantly higher employment growth than large firms from years 3-5, with differentials of 0.10-0.15 percentage points, before convergence after year 6. This delayed negative effect for large firms is consistent with overexpansion: debt-financed growth during booms leads to medium-

term retrenchment for large firms. The 3-year lag suggests that overexpansion consequences materialize gradually through declining profitability before constraining employment.

These results demonstrate that the interaction between financial and real decisions—not either alone—drives differential employment dynamics, with large firms particularly vulnerable to overexpansion.

Given that the leverage shocks generate effects on employment lasting three to five years, we focus on the changes over these horizons in the single-equation analyses that follow.

5 Regression Results

5.1 Leverage and Employment Dynamics

We begin by estimating a specification similar to that of [Giroud and Mueller \(2017, 2022\)](#), using the following regression framework:

$$\begin{aligned} \Delta \log(Emp)(n)_{it} = & \alpha_i + \beta_1 FL(M)_{it} + \beta_2 FL(H)_{it} + \beta_3 \Delta FL(-n)_{it} + \beta_4 FL(M)_{it} \times \Delta FL(-n)_{it} \\ & + \beta_5 FL(H)_{it} \times \Delta FL(-n)_{it} + \beta_6 \Delta \log(Sale)(n)_{i,t} + Ind \times t + \varepsilon_{it}, \end{aligned} \quad (4)$$

where $\Delta \log(Emp)(n)_{i,t}$ denotes firm i 's employment growth from period t to $t+n$; α_i captures firm fixed effects; $FL(M)_{it}$ and $FL(H)_{it}$ are indicator variables for firms in the middle and top tercile financial leverage (FL), respectively; $\Delta FL(-n)_{it}$ is the change in financial leverage from $t-n$ to t ; $\Delta \log(Sale)(n)_{i,t}$ is sales growth from t to $t+n$; and $Ind \times t$ denotes 3-digit SIC industry-by-year fixed effects. By including industry-by-time fixed effects, we absorb all variation in aggregate credit conditions, monetary policy, and industry-specific trends, thereby identifying solely from the differential responses of medium- and high- versus low-

leverage firms within narrowly defined industry-time cells. This approach also addresses concerns that apparent size-related cyclicalities may reflect industry composition effects. The interaction term $FL(H)_{it} \times \Delta FL(-n)_{it}$ captures the effect of financial leverage buildup that results in high leverage, consistent with the overborrowing channel.

To account for both demand-driven overexpansion and deleveraging effects, we extend the specification as follows:

$$\begin{aligned}
\Delta \log(Emp)(n)_{it} = & \alpha_i + \beta_1 FL(M)_{it} + \beta_2 FL(H)_{it} + \beta_3 \Delta FL(-n)_{it} + \beta_4 FL(M)_{it} \times \Delta FL(-n)_{it} \\
& + \beta_5 FL(H)_{it} \times \Delta FL(-n)_{it} + \beta_6 \Delta \log(Sale)(n)_{i,t} + \beta_7 \Delta \log(Emp)(-n)_{it} \\
& + \beta_8 FL(M)_{it} \times \Delta \log(Emp)(-n)_{it} + \beta_9 FL(H)_{it} \times \Delta \log(Emp)(-n)_{it} \\
& + \beta_{10} \Delta Debt(n)_{it} + Ind \times t + \varepsilon_{i,t},
\end{aligned} \tag{5}$$

where $\Delta \log(Emp)(-n)_{i,t}$ captures prior employment expansion from $t - n$ to t , and $\Delta Debt(n)_{i,t}$ measures concurrent debt issuance from t to $t + n$. The interaction term $FL(H)_{it} \times \Delta \log(Emp)(-n)_{it}$ captures the effect of debt-financed prior expansion, consistent with the overexpansion mechanism.

Table 3 presents estimation results with standard errors clustered at the firm level. Panel A reports results using three-year changes. Column (1) presents estimates from equation (4) for the full sample. The coefficient estimates on $FL(M)$ and $FL(H)$ are negative and statistically significant, indicating that higher financial leverage is associated with lower subsequent employment growth. The coefficient on $\Delta FL(-3)$ is also negative and significant, consistent with the findings of Giroud and Mueller (2022) and suggesting that leverage

buildup predicts future employment declines. However, the interaction terms $FL(M)_{it} \times \Delta FL(-3)$ and $FL(H)_{it} \times \Delta FL(-3)$ are not statistically significant, implying that the adverse effects of leverage buildup are not disproportionately concentrated among high-leverage firms.

Columns (2) and (3) present results separately for small and large firms. The coefficients on $FL(M)$, $FL(H)$, and $\Delta FL(-3)$ remain negative and significant, while the estimates on the interaction terms remain insignificant for both size groups.

Column (4) estimates equation (5) by incorporating prior employment expansion and its interactions with medium and high financial leverage, along with concurrent debt issuance. The coefficients on $\Delta \log(Emp)(-3)$, $FL(M) \times \Delta \log(Emp)(-3)$, and $FL(H) \times \Delta \log(Emp)(-3)$ are all negative and significant, while the coefficient on $\Delta Debt(3)$ is positive and significant. These results suggest that prior expansion reduces future employment growth, particularly among high-leverage firms, whereas concurrent debt issuance supports employment growth.

Columns (5) and (6) estimate equation (5) separately for small and large firms. Once prior expansion and concurrent debt issuance are included in the specification, the coefficients on $FL(M)$ and $FL(H)$ become statistically insignificant for both groups, suggesting that omitting these variables may overstate the direct effects of financial leverage levels. The coefficient on $\Delta \log(Emp)(-3)$ is negative and significant for both groups. The estimate on $FL(M) \times \Delta \log(Emp)(-3)$ is negative and highly significant only for large firms, while the coefficient estimate on $FL(H) \times \Delta \log(Emp)(-3)$ is negative and significant for both size groups. These findings indicate that large firms are more vulnerable to prior expansions accompanied by moderate to high leverage, whereas small firms are affected only when prior

expansion is paired with high leverage.

Notably, across all specifications, the coefficient estimates on $\Delta \log(Sale)(3)$ and $\Delta Debt(3)$ are significantly larger for large firms, suggesting that their employment is more sensitive to concurrent demand growth and financing conditions.

Panel B reports results for the four-year horizon. For brevity, we omit the coefficient estimates on control variables, which exhibit qualitatively similar patterns. Across all specifications, prior expansions interacted with high leverage predict lower future employment growth, especially among large firms. In contrast, the interaction between leverage buildup and high leverage remains insignificant, further supporting the overexpansion channel over the overborrowing channel.

We also note that the estimates for $FL(M) \times \Delta FL(-4)$ become positive in the presence of controls for prior expansion and debt issuance, further suggesting that the negative effects of financial leverage may be overstated without controlling for these dynamics.

Panel C presents results for the five-year horizon. Only the interaction term $FL(H) \times \Delta FL(-5)$ remains negative and significant for large firms. These results suggest that large firms with high leverage are particularly susceptible to employment declines following prior expansions, consistent with the overexpansion channel rather than the overborrowing channel.

5.2 Leverage-Employment Dynamics during the 2008 Financial Crisis

In this section, we investigate the dynamic relationship between prior expansions, financial leverage buildups, and subsequent employment growth around the 2007-2008 Financial Crisis. The Financial Crisis provides a compelling setting to examine overborrowing effects, as the crisis is widely attributed to supply-driven household overborrowing and failures in the mortgage market.

Table 4 reports the results, using 2006 as the reference year for measuring prior and subsequent changes. In Column (1), the coefficient on $FL(H)$ is negative and significant, while the coefficient on $\Delta FL(-3)$ and its interactions are statistically insignificant. This suggests that leverage buildups leading to high leverage immediately before the crisis were not the primary drivers of subsequent employment declines. When we estimate the model separately for small and large firms in Columns (2) and (3), the negative effect of $FL(H)$ is significant only among large firms.

When we include prior expansion and concurrent debt issuance in Columns (4)-(6), the coefficients on $\Delta \log(Emp)(-3)$ are insignificant, indicating that prior expansions without elevated leverage did not contribute to employment declines during the early stages of the post-crisis recession. This may reflect the mitigating effects of aggressive monetary policy responses that helped firms maintain employment (Moscarini and Postel-Vinay, 2012). However, the interaction term $FL(H)_{it} \times \Delta \log(Emp)(-3)$ is negative and significant for large firms, suggesting that debt-financed expansion prior to the crisis had particularly

adverse effects on their employment outcomes. Notably, the main effect of high leverage becomes insignificant once prior expansion and debt issuance are included, reinforcing the interpretation that it is the combination of high leverage and prior expansion by large firms—rather than leverage alone—that drives employment losses.

Panels B and C report results using four- and five-year horizons, respectively. The coefficient estimates on the interaction terms $FL(H) \times \Delta \log(Emp)(-4)$ and $FL(H) \times \Delta \log(Emp)(-5)$ remain negative and significant only for large firms. These findings suggest that the longer-term employment declines among large, high-leverage firms were driven by debt-financed expansions prior to the crisis. This is consistent with [Moscarini and Postel-Vinay \(2012\)](#), who find that large firms tend to shed proportionally more jobs in the later stages of recessions. In contrast, the coefficients on interactions between leverage buildup and high leverage— $FL(H)_{it} \times \Delta FL(-4)$ and $FL(H)_{it} \times \Delta FL(-5)$ —remain insignificant.

Taken together, these results indicate that large firms with high leverage bore additional long-term negative consequences from prior expansions during the post-crisis recession. The Financial Crisis appears to have had a prolonged impact on large firms that had previously overexpanded while increasing leverage. In contrast, we find limited evidence that leverage buildups significantly affected subsequent employment, even among small firms with high leverage.

6 Robustness

We conducted a series of robustness checks to assess the reliability of our findings. For brevity, we report abbreviated results in the Appendix, focusing on the effects of debt-

financed overexpansion.

6.1 Survivorship Bias

Our sample contains substantially fewer small firms than large firms surviving over three to five years. This pattern suggests that small firms most adversely affected may have exited the sample, while large firms that survived—often by reducing employment—remain observable.

To address this survivorship bias, we classify firms by financial leverage and size conditional on survival over the relevant horizon. This approach ensures that no firm is excluded due to attrition.

The results are qualitatively consistent with those reported above. Table [A1](#) presents estimates for the full sample period, showing that the interaction terms between financial leverage and prior expansion remain negative and statistically significant. Although the marginal effects of prior expansion are less differentiated between moderate and high-leverage firms, the differences remain highly significant during the Financial Crisis period, as shown in Table [A2](#). All subsequent results in this section are also based on financial leverage and size classifications conditional on firm survival, mitigating concerns about survivorship bias.

6.2 Alternative Size Proxies

We test the robustness of our results to alternative firm size definitions. When firm size is defined by total assets (Tables [A3](#) and [A4](#)) and by sales (Tables [A5](#) and [A6](#)), large firms with high leverage continue to exhibit negative employment outcomes following prior expansions. As argued by [Moscarini and Postel-Vinay \(2012\)](#), employment size reflects

forward-looking decisions, whereas asset-based measures capture past decisions. Accordingly, we prefer employment size as it more accurately reflects operating leverage. Nonetheless, we confirm that our findings are robust to alternative size proxies.

6.3 Book-Value Leverage

To further test robustness, we replace market-value financial leverage with book-value leverage. The results, reported in the Appendix, are broadly consistent. Regression results using book-value leverage are similar to those reported above, except during the Financial Crisis (Table A8). In this period, the negative effects of prior expansions for high-leverage firms remain robust only among large firms, suggesting that large firms with debt-financed expansions are particularly vulnerable during the crisis. Overall, the evidence indicates that large firms with elevated book-value leverage are more exposed to the adverse consequences of prior expansions, especially over longer horizons. Large firms appear to endure lasting effects of the crisis due to elevated leverage and aggressive expansion strategies.

6.4 Using Prior Debt Issuance

We also estimated regressions using prior debt issuance rather than changes in financial leverage, recognizing that leverage may vary due to factors unrelated to debt issuance. Debt issuance may better capture credit supply effects. We define prior debt issuance as the cumulative sum of debt issuance scaled by lagged assets over the preceding years.

As shown in Table A9, the interaction term between prior debt issuance and high leverage ($FL(H) \times \Delta Debt$) exhibits little effect. In contrast, the coefficient on the interaction between leverage and prior expansion ($FL(H)_{it} \times \Delta \log(Emp)(-n)_{it}$) remains negative and highly

significant only for large firms. The dynamic patterns around the 2008 Financial Crisis, shown in Table [A10](#), are consistent with these findings.

Taken together, these results suggest that employment declines among large, high-leverage firms are driven by prior expansion rather than debt issuance, indicating that these firms may have overexpanded.

7 Robustness

We conducted a series of robustness checks to assess the reliability of our findings. For brevity, we report abbreviated results in the Appendix, focusing on the effects of debt-financed overexpansion.

7.1 Survivorship Bias

Our sample contains substantially fewer small firms than large firms surviving over three to five years. This pattern suggests that small firms most adversely affected may have exited the sample, while large firms that survived—often by reducing employment—remain observable. To address this survivorship bias, we classify firms by FL and size conditional on survival over the relevant horizon. This approach ensures that no firm is excluded due to attrition.

The results are qualitatively consistent with those reported above. Table [A1](#) present estimates for the full sample period, showing that the interaction terms between FL and prior expansion remain negative and statistically significant. Although the marginal effects of prior expansion are less differentiated between moderate and high FL firms, the differences remain highly significant during the Financial Crisis period, as shown in Table [A2](#). All the

subsequent results in this section are also based on FL and size classifications conditional on firm survival, mitigating concerns about survivorship bias

7.2 Alternative Size Proxy

We test the robustness of our results to alternative firm size definitions. When firm size is defined by total assets (Tables [A3](#) and [A4](#)) and by sales (Tables [A5](#) and [A6](#)), large firms with high FL continue to exhibit negative employment outcomes following prior expansions. As argued by [Moscarini and Postel-Vinay \(2012\)](#), employment size reflects forward-looking decisions, whereas asset-based measures capture past decisions. Accordingly, we prefer employment size as it more accurately reflects operating leverage. Nonetheless, we confirm that our findings are robust to alternative size proxies.

7.3 Book-value Leverage

To further test robustness, we replace the market-value FL with book-value FL. The results, reported in Tables [A7](#) and [A8](#) in the Appendix, are broadly consistent, except during the Financial Crisis. In this period, the negative effects of prior expansions for high FL firms remain robust only among large firms, suggesting that large firms with debt-financed expansions are particularly vulnerable to the crisis. Overall, evidence indicates that large firms with elevated book FL are more exposed to the adverse consequences of prior expansions, especially over longer horizons. Large firms appear to endure lasting effects of the crisis due to elevated FL and aggressive expansion strategies.

7.4 Using Prior Debt Issuance

We also estimated regressions using prior debt issuance rather than changes in FL, recognizing that FL may vary due to factors unrelated to debt issuance. Debt issuance may better capture the credit supply effects. We define prior debt issuance as the cumulative sum of debt issuance scaled by lagged assets over the preceding years.

As shown in Table A9, the interaction term between prior debt issuance and high FL ($FL(H) \times \Delta Debt$) exhibit little effects. In contrast, the coefficient on the interactions between FL and prior expansions ($FL(H) \times \Delta \log(Emp)$) remain negative and highly significant only for large firms. The dynamic patterns around the 2008 Financial Crisis, shown in A10, are consistent with these findings.

Taken together, these results suggest that employment declines among large, high-FL firms are driven by prior expansion rather than debt issuance, indicating that these firms may have overexpanded.

8 Conclusion

This study investigates why large firms exhibit greater sensitivity to aggregate shocks by analyzing firm-level dynamics of financial leverage, expansion, and demand. The central innovation lies in distinguishing two mechanisms: credit supply-driven overborrowing and demand-driven overexpansion. Overborrowing is expected to affect smaller firms more acutely due to financial constraints, whereas overexpansion is hypothesized to be more prevalent among larger firms with superior financial and operating capacities.

Our panel vector autoregression (PVAR) analysis yields several key findings. Leverage

shocks are transitory but have persistently negative effects on both employment and demand. In contrast, demand shocks exert persistent and positive effects on financial leverage. Importantly, demand among large firms responds persistently to demand shocks originating from small firms, but not vice versa. This asymmetry supports the hypothesis that large firms, with greater access to financial and operating resources, are more susceptible to overexpansion.

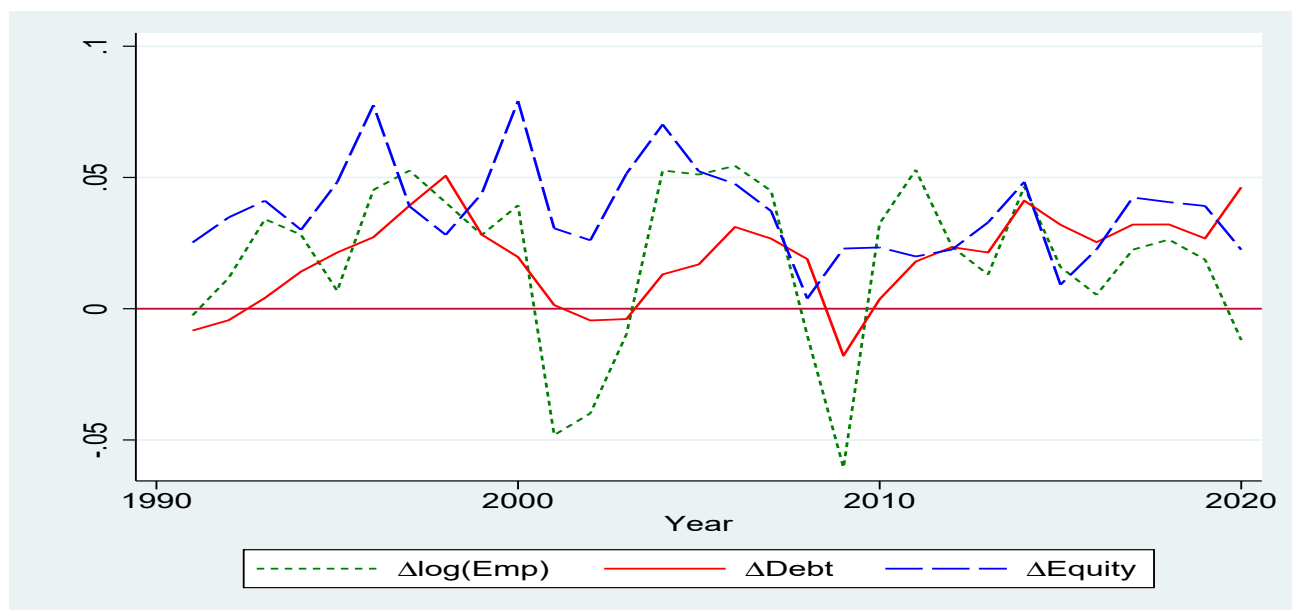
We also trace out the complete adjustment dynamics of employment following demand shocks, leverage shocks, and debt-financed expansion shocks (the interaction of expansion and leverage) using local projections ([Jordà, 2005](#)). Our results show that large firms exhibit significantly stronger positive employment responses to demand shocks than small firms, while the differential response is insignificant following leverage shocks. Moreover, large firms exhibit significantly lower employment growth than small firms over three- to five-year horizons following debt-financed expansion shocks.

Regression results further corroborate that debt-financed prior expansion is a primary driver of employment contraction among large firms. The observed decline in employment is not attributable to leverage accumulation, but rather to the interaction between prior expansion and high leverage. These findings suggest that large firms may be particularly vulnerable to excessive operating leverage, especially in the form of labor costs incurred during expansionary periods.

In sum, the evidence points to debt-financed overexpansion as the principal transmission channel through which large firms experience sharper employment contractions during economic downturns. These results underscore the importance of jointly managing financial

and operating leverage to mitigate adverse labor market outcomes. The interactions between small and large firms may play an important role in propagating shocks through the labor market. Such an understanding of a debt-financed overexpansion and employment dynamics is essential for formulating an effective policy response.

Panel A: Small Firms



Panel B: Large firms

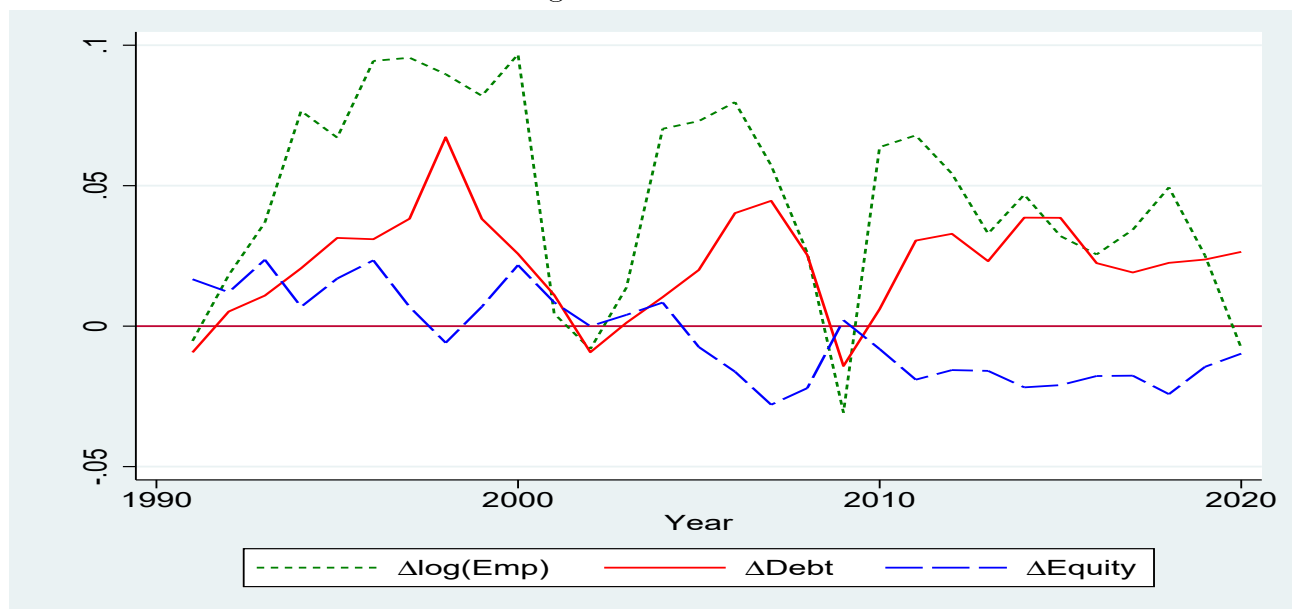


Figure 1: Annual Employment Growth and Financing for Small and Large Firms

The figures present annual employment growth rate, net debt issuance, and net equity issuance for small firms in Panel A and large firms in Panel B.

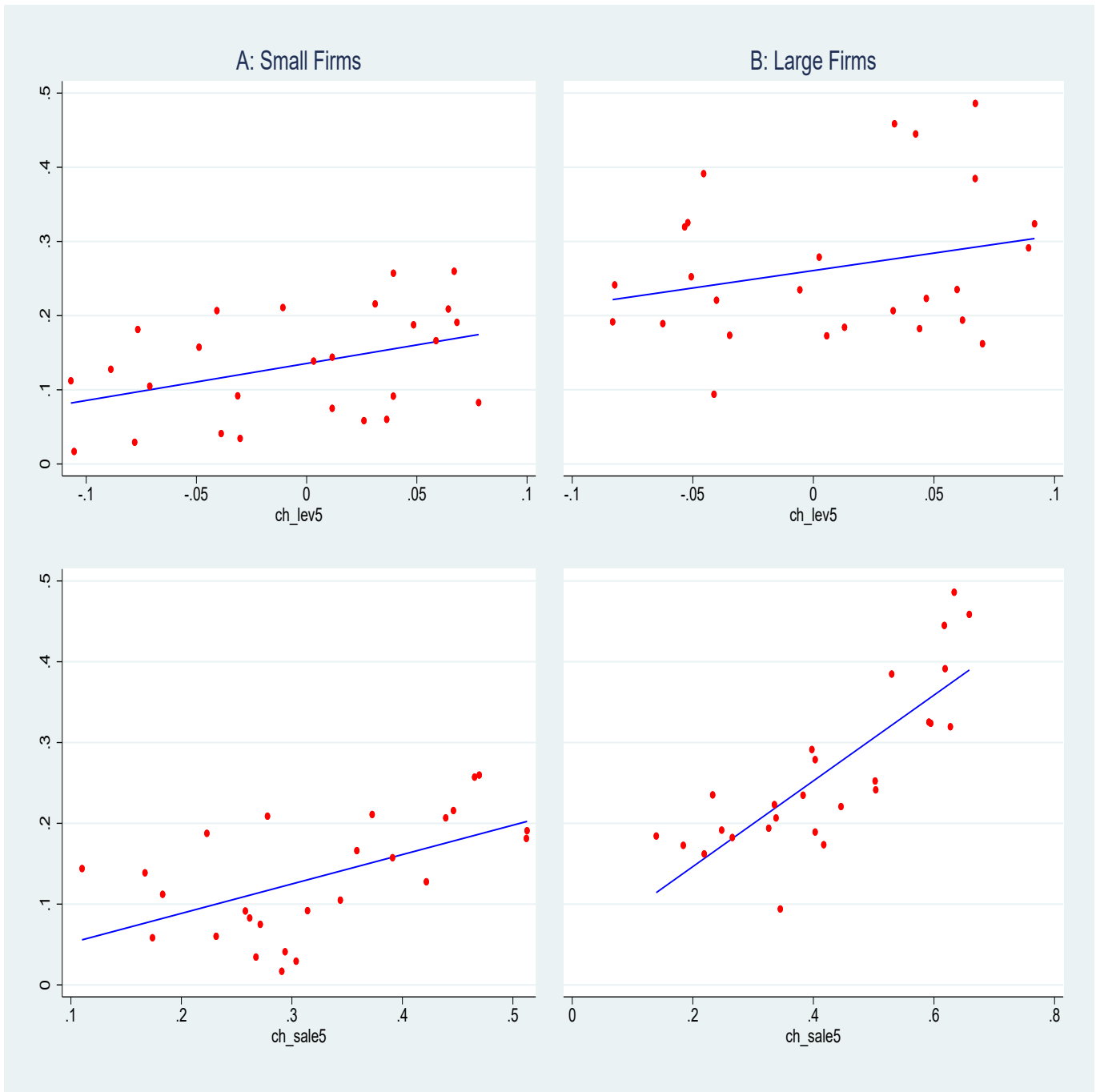


Figure 2: 5-year Employment Growth Relative to Financial Leverage Change and Sales Growth for Small and Large Firms

The figures present scatter plots with the fitted lines illustrating the relationship between 5-year $(t - 5, t)$ employment growth and concurrent 5-year financial leverage change and sales growth. Each variable is shown separately for small firms in Panel A and Large firms in Panel B.

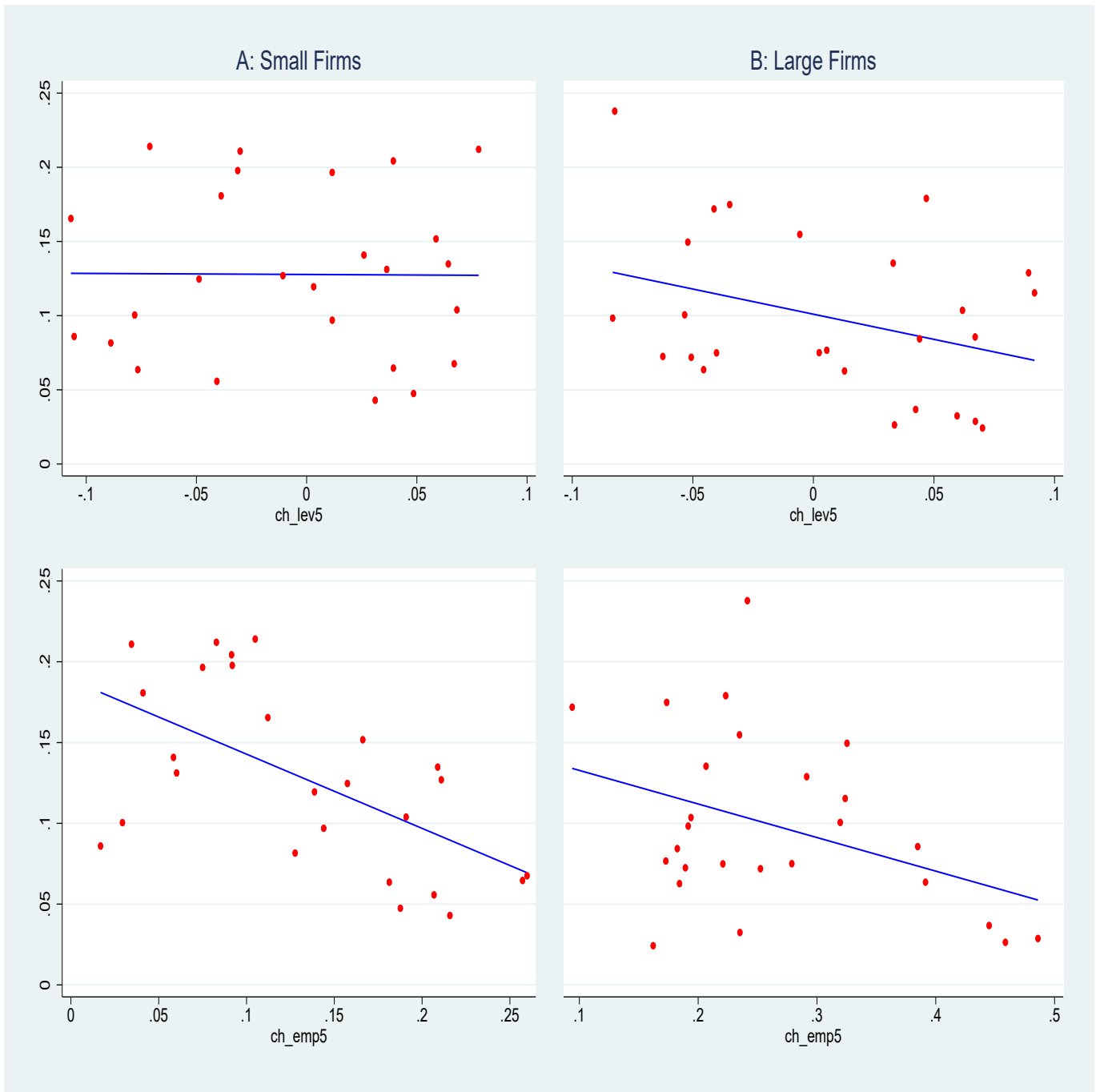


Figure 3: Post 5-year Employment Growth Relative to Prior 5-year Financial Leverage Change and Employment Growth for Small and Large Firms

The figures present scatter plots with the fitted lines illustrating the relationship between post 3-year ($t, t + 5$) employment growth and prior 5-year ($t - 5, t$) financial leverage change and employment growth. Each variable is shown separately for small firms in Panel A and large firms in Panel B.

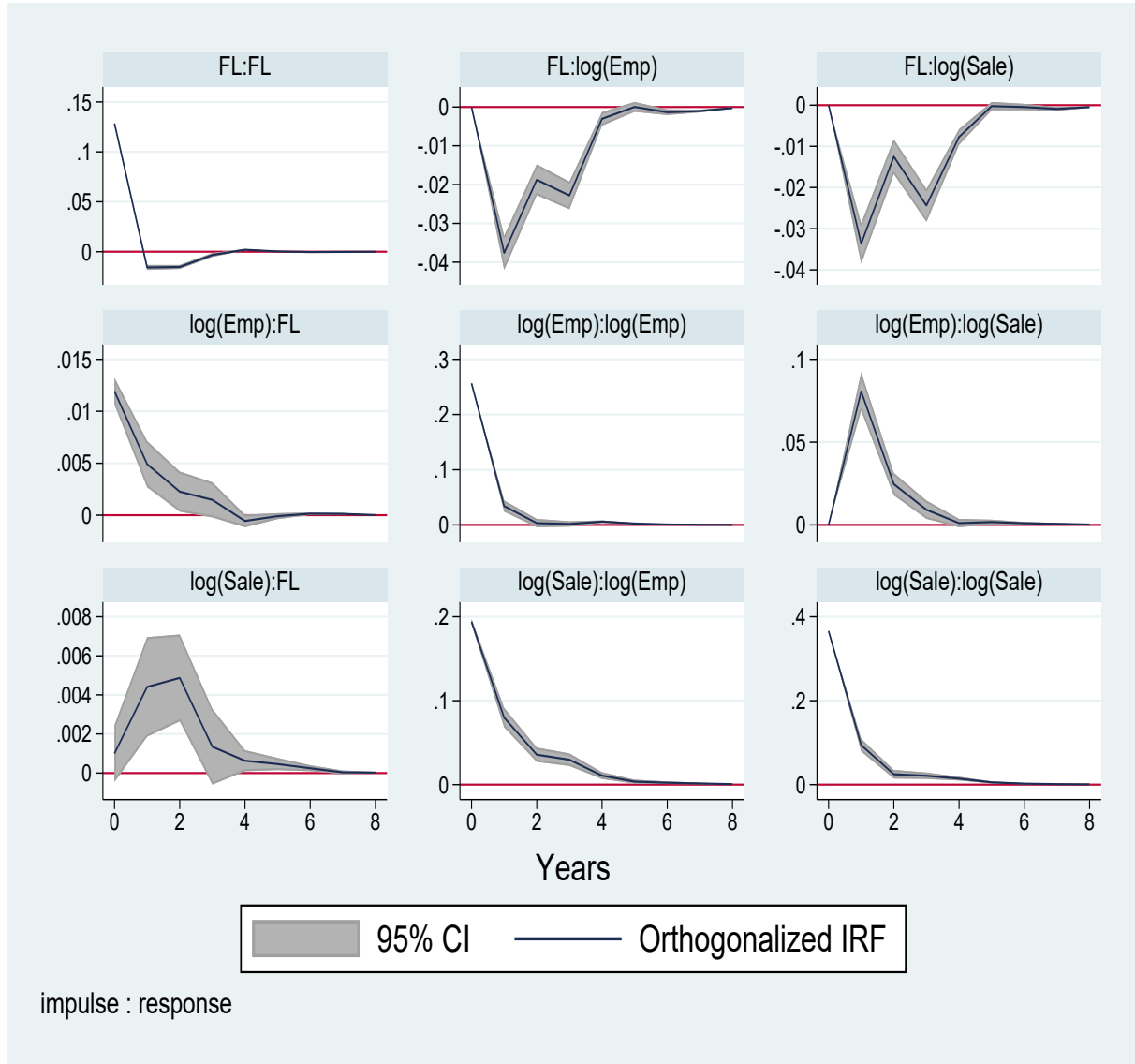


Figure 4: Impulse Responses from a Panel VAR in Sales, Employment, and Leverage

This figure presents orthogonalized impulse response functions (IRFs) derived from a three-variable vector autoregression (VAR) model including log sales, log employment (Emp), and the financial leverage ratio (FL). In each panel, the first variable represents the source of the shock, while the second variable is the response. The VAR is estimated in levels, incorporating firm and year fixed effects. To address Nickell bias, the reduced-form VAR coefficients are adjusted using an iterative bootstrap procedure. Shaded areas indicate 95% confidence intervals (CIs), which account for contemporaneous cross-firm residual correlation and are computed via wild bootstrap by resampling cross-sections of residuals.

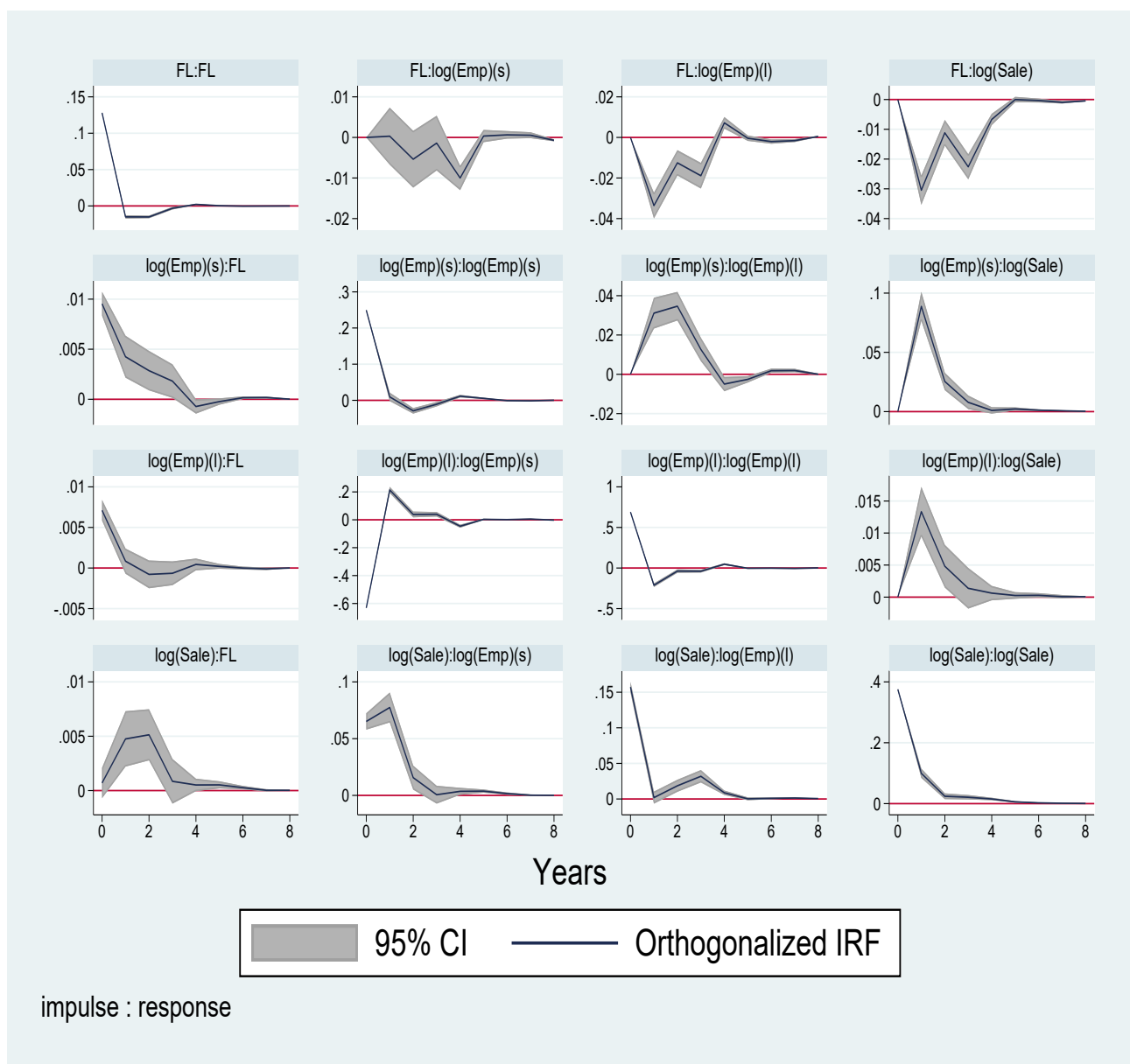


Figure 5: Impulse Responses of Small and Large Employers

This figure presents orthogonalized impulse response functions (IRFs) from a four-variable vector autoregression (VAR) model including $\log(\text{Sale})$, $\log(\text{Emp})(l)$, $\log(\text{Emp})(s)$, and financial leverage ratio (FL) where large (l) and small (s) employers are based on the median number of employees. The VAR is estimated in levels with firm and year fixed effects. In each panel, the first variable represents the source of the shock, while the second variable is the response. Large and small employers are classified based on the median number of employees. The VAR is estimated in levels with firm and year fixed effects. To correct for Nickell bias, the reduced-form VAR coefficients are adjusted using an iterative bootstrap procedure. Shaded areas indicate 95% confidence intervals, which account for contemporaneous cross-firm residual correlation and are computed via wild bootstrap by resampling cross-sections of residuals.

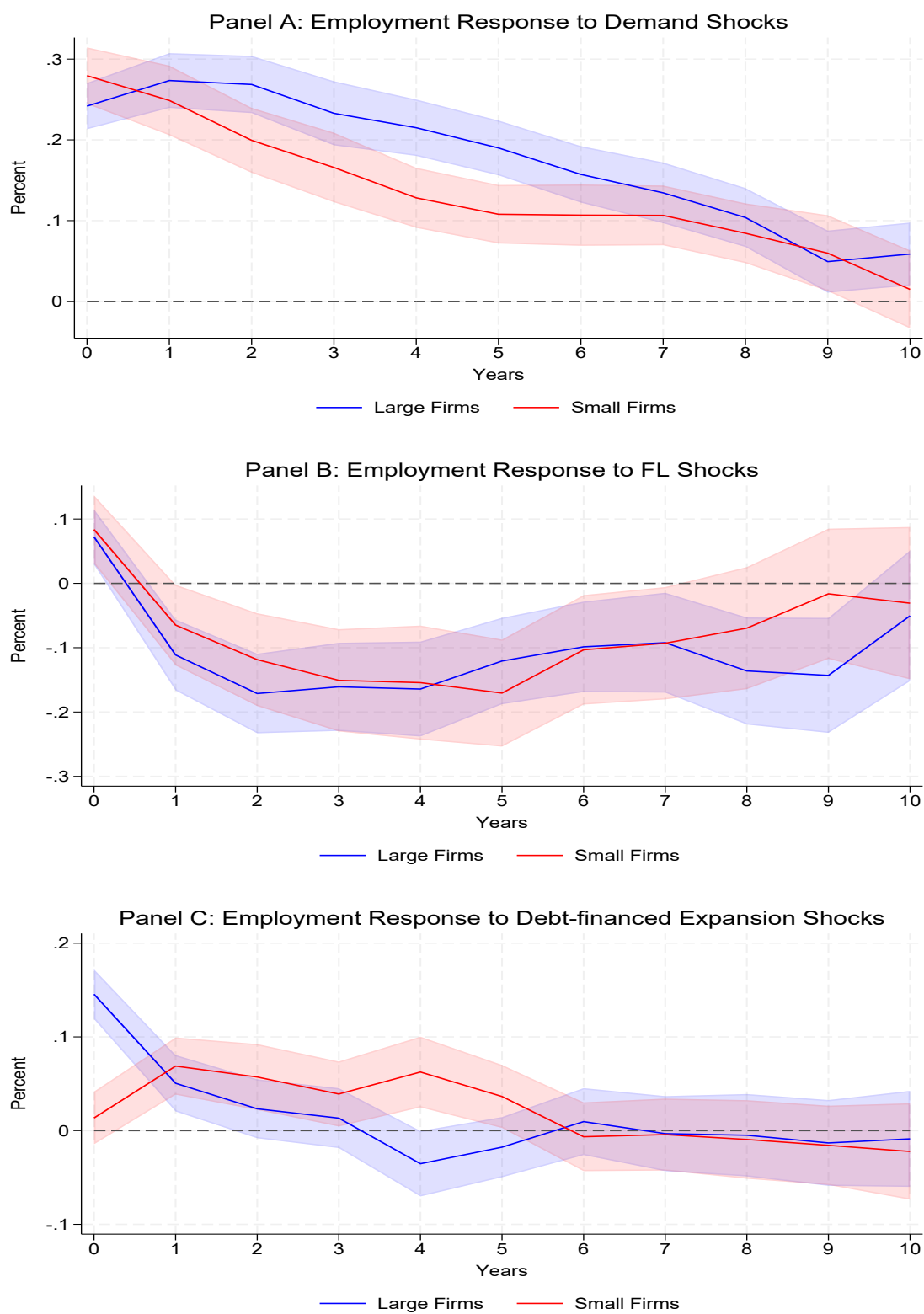


Figure 6: The Effects of Demand, FL and Debt-financed Expansion for Small and Large Firms

The figures present the impulse response functions (IRFs) for percentage change in subsequent employment in response to demand shock (Panel A), financial leverage shock (Panel B), and leveraged prior expansion shock (Panel C).

Table 1: Summary Statistics

Panel A provides summary statistics for all firms, and Panel B reports the means for small and large firms, along with their differences and associated t -statistics over the 1980–2020 period. Employment is the number of employees (Compustat item EMP). $\log(\text{Market})$ is the logarithm of the market value of total assets. FL is the ratio of debt in current liabilities (item DLC) and long-term debt (item DLTT) to total assets (Book) or market value of assets (Market). High and low FL firms are defined as those above and below the sample median book FL, respectively, in a given year. $\Delta \log(\text{Sales})$ is the change in log sales. $\Delta \log(\text{Emp})$ is the change in log employment. ΔFL is the change in leverage. ΔDebt is calculated as new debt issued (item DLTIS) minus debt payments (item DLTR) plus the change in the current portion of long-term debt (item DLCCH), divided by lagged assets. ΔEquity is new stock issued (item SSTK) minus repurchases (item PRSTKC), divided by lagged assets. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: All Firms

	Mean	SD	Min	Max
Employment (000s)	16.442	60.110	0.001	2300.000
$\log(\text{Emp})$	0.710	2.197	-5.298	5.671
$\log(\text{Market Value})$	6.395	2.458	-2.391	14.348
FL(Market)	0.215	0.220	0.000	0.982
FL(Book)	0.231	0.266	-0.000	17.675
$\log(\text{Sale})$	6.119	2.296	-0.870	11.707
$\Delta \log(\text{Emp})$	0.033	0.222	-1.534	1.543
$\Delta \text{FL}(\text{Market})$	0.001	0.107	-0.544	0.604
$\Delta \text{FL}(\text{Book})$	0.002	0.137	-8.510	8.238
$\Delta \log(\text{Sale})$	0.065	0.246	-1.516	2.037
ΔDebt	0.020	0.130	-0.312	1.309
ΔEquity	0.019	0.158	-0.346	2.900
Observations	54890			

Panel B: Small vs Large Firms

	(1) Small Firms	(2) Large Firms	(3) Mean Difference	
	Mean	Mean	Difference	t-Stat
Employment (000s)	2.226	26.798	-24.573***	(-56.288)
$\log(\text{Emp})$	-0.913	1.892	-2.805***	(-188.059)
$\log(\text{Market})$	4.725	7.612	-2.887***	(-167.446)
FL(Market)	0.201	0.226	-0.025***	(-13.091)
FL(Book)	0.202	0.242	-0.040***	(-22.224)
$\log(\text{Sale})$	4.524	7.281	-2.757***	(-170.515)
$\Delta \log(\text{Emp})$	0.012	0.047	-0.035***	(-17.700)
$\Delta \text{FL}(\text{Market})$	-0.002	0.003	-0.005***	(-5.060)
$\Delta \text{FL}(\text{Book})$	-0.000	0.003	-0.003***	(-3.373)
$\Delta \log(\text{Sale})$	0.050	0.075	-0.025***	(-11.443)
ΔDebt	0.016	0.023	-0.007***	(-5.943)
ΔEquity	0.044	0.000	0.043***	(29.456)
Observations	23133	31757	54890	

Table 2: The Concurrent Effects of Demand and Debt Increases on Employment Growth

The dependent variable $\Delta \log(Emp)$ represents employment growth from from $t - n$ to t where n is one to five years. *Large* is a dummy variable equal to 1 for large firms—defined as those above the sample median of the number of employees in a given year(t)—and 0 otherwise. $\Delta \log(Sales)$ is sales growth from $t - n$ to t , and $\Delta Debt$ measures debt issuance from t to $t + 3$. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

VARIABLES	(1) One Year	(2) Three Year	(3) Four Year	(4) Five Year
<i>Large</i>	0.0473*** [0.0045]	0.0876*** [0.0085]	0.1031*** [0.0120]	0.1145*** [0.0153]
$\Delta \log(Sale)$	0.3745*** [0.0126]	0.5346*** [0.0143]	0.5522*** [0.0173]	0.5876*** [0.0197]
<i>Large</i> $\times$ $\Delta \log(Sale)$	0.1312*** [0.0156]	0.1350*** [0.0158]	0.1357*** [0.0185]	0.1157*** [0.0207]
ΔFL	0.1657*** [0.0188]	0.1144*** [0.0207]	0.1126*** [0.0311]	0.1129*** [0.0356]
<i>Large</i> $\times$ ΔFL	0.1014*** [0.0231]	0.1018*** [0.0252]	0.0935** [0.0399]	0.0751* [0.0456]
Firm fixed effects	Yes	Yes	Yes	Yes
Industry $\times$ Year	Yes	Yes	Yes	Yes
Observations	53,211	53,211	42,257	34,112
R-squared	0.4563	0.7031	0.7505	0.7962

Table 3: The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. Small and large are firms with below and above the sample median number of employees in a given year (t), respectively. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes

VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$\Delta \log(Sale)(3)$	0.5989*** [0.0108]	0.5010*** [0.0165]	0.6729*** [0.0143]	0.5627*** [0.0111]	0.4683*** [0.0168]	0.6347*** [0.0152]
$FL(M)$	-0.0452*** [0.0062]	-0.0291** [0.0114]	-0.0461*** [0.0070]	-0.0230*** [0.0068]	-0.0112 [0.0119]	-0.0102 [0.0078]
$FL(H)$	-0.1007*** [0.0085]	-0.0831*** [0.0158]	-0.0950*** [0.0096]	-0.0613*** [0.0092]	-0.0502*** [0.0172]	-0.0404*** [0.0109]
$\Delta FL(-3)$	-0.0583* [0.0346]	-0.0682 [0.0529]	-0.0736 [0.0497]	-0.0174 [0.0342]	-0.0185 [0.0517]	-0.0702 [0.0487]
$FL(M) \times \Delta FL(-3)$	-0.0313 [0.0366]	-0.0097 [0.0560]	-0.0275 [0.0523]	-0.0051 [0.0362]	-0.0033 [0.0550]	0.0326 [0.0519]
$FL(H) \times \Delta FL(-3)$	-0.0496 [0.0375]	-0.0080 [0.0558]	-0.0233 [0.0556]	-0.0259 [0.0364]	-0.0071 [0.0544]	0.0438 [0.0523]
$\Delta Debt(3)$				0.2438*** [0.0140]	0.2250*** [0.0215]	0.2442*** [0.0203]
$\Delta \log(Emp)(-3)$				-0.0913*** [0.0113]	-0.1394*** [0.0171]	-0.0237 [0.0145]
$FL(M) \times \Delta \log(Emp)(-3)$				-0.0210 [0.0130]	0.0077 [0.0202]	-0.0686*** [0.0164]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0372** [0.0152]	-0.0072 [0.0236]	-0.0834*** [0.0211]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	53,211	20,401	29,588	53,211	20,401	29,588
R-squared	0.7027	0.7282	0.7731	0.7194	0.7435	0.7855

Panel B: Estimates with Four-Year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(M) \times \Delta FL(-4)$	-0.0100 [0.0388]	-0.0210 [0.0599]	0.0168 [0.0519]	0.0337 [0.0384]	0.0128 [0.0590]	0.0834 [0.0520]
$FL(H) \times \Delta FL(-4)$	-0.0286 [0.0411]	0.0138 [0.0649]	0.0053 [0.0544]	0.0021 [0.0402]	0.0332 [0.0630]	0.0659 [0.0531]
$\Delta Debt(3)$				0.2209*** [0.0155]	0.2337*** [0.0266]	0.2074*** [0.0204]
$\Delta \log(Emp)(-3)$				-0.0910*** [0.0127]	-0.1429*** [0.0203]	-0.0395*** [0.0150]
$FL(M) \times \Delta \log(Emp)(-4)$				-0.0306** [0.0138]	-0.0029 [0.0229]	-0.0680*** [0.0168]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0387** [0.0165]	-0.0094 [0.0265]	-0.0841*** [0.0231]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,323	15,231	24,133	42,323	15,231	24,133
R-squared	0.7588	0.7827	0.8184	0.7726	0.7968	0.8286

Panel C: Estimates with Five-Year Changes						
$FL(M) \times \Delta FL(-5)$	0.0151 [0.0503]	0.0312 [0.0836]	-0.0089 [0.0555]	0.0675 [0.0484]	0.0742 [0.0775]	0.0494 [0.0550]
$FL(H) \times \Delta FL(-5)$	-0.0396 [0.0542]	-0.0037 [0.0917]	-0.0380 [0.0600]	-0.0008 [0.0521]	0.0343 [0.0851]	0.0084 [0.0592]
$\Delta Debt(3)$				0.2184*** [0.0173]	0.2302*** [0.0321]	0.1949*** [0.0233]
$\Delta \log(Emp)(-3)$				-0.1023*** [0.0152]	-0.1557*** [0.0231]	-0.0619*** [0.0180]
$FL(M) \times \Delta \log(Emp)(-5)$				-0.0266* [0.0159]	0.0046 [0.0239]	-0.0569*** [0.0193]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.0414** [0.0178]	-0.0141 [0.0270]	-0.0706*** [0.0243]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,794	11,479	19,626	33,794	11,479	19,626
R-squared	0.7957	0.8197	0.8448	0.8091	0.8327	0.8543

Table 4: The Effect of Leverage Buildup on Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2006$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$\Delta \log(Sale)(3)$	0.5774*** [0.0396]	0.5661*** [0.0520]	0.5810*** [0.0748]	0.5700*** [0.0392]	0.5614*** [0.0535]	0.5724*** [0.0698]
$FL(M)$	-0.0214	-0.0332	-0.0440**	-0.0161	-0.0288	-0.0158
$FL(H)$	-0.0374* [0.0191]	-0.0229 [0.0349]	-0.0675*** [0.0239]	0.0032 [0.0224]	0.0010 [0.0380]	0.0066 [0.0292]
$\Delta FL(-3)$	-0.3429** [0.1425]	-0.4605** [0.2339]	-0.1301 [0.1811]	-0.3517** [0.1434]	-0.4469* [0.2373]	-0.1335 [0.1625]
$FL(M) \times \Delta FL(-3)$	0.1033 [0.1633]	0.2299 [0.2756]	-0.0954 [0.2088]	0.1415 [0.1652]	0.2615 [0.2770]	-0.0962 [0.1950]
$FL(H) \times \Delta FL(-3)$	0.0759 [0.1728]	0.3285 [0.2570]	-0.2437 [0.2664]	0.1585 [0.1652]	0.3444 [0.2589]	-0.1197 [0.2298]
$\Delta Debt(3)$				0.1474*** [0.0480]	0.1242 [0.0788]	0.1865*** [0.0626]
$\Delta \log(Emp)(-3)$				0.0535 [0.0415]	0.0247 [0.0603]	0.1119** [0.0492]
$FL(M) \times \Delta \log(Emp)(-3)$				0.0043 [0.0567]	-0.0124 [0.1051]	-0.0428 [0.0587]
$FL(M) \times \Delta \log(Emp)(-3)$				-0.1811*** [0.0617]	-0.1093 [0.0862]	-0.2709*** [0.0829]
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,061	819	1,149	2,061	819	1,149
R-squared	0.5213	0.5163	0.5639	0.5321	0.5203	0.5848

Panel B: Estimates with Four-Year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(M) \times \Delta FL(-4)$	0.1359 [0.1343]	0.5842*** [0.2176]	-0.3476** [0.1548]	0.1645 [0.1384]	0.5987*** [0.2225]	-0.2846* [0.1477]
$FL(H) \times \Delta FL(-4)$	-0.0063 [0.1484]	0.1900 [0.2093]	-0.2961 [0.2051]	0.0779 [0.1435]	0.1952 [0.2177]	-0.1220 [0.1667]
$\Delta Debt(3)$				0.1362*** [0.0456]	0.1249* [0.0673]	0.1725*** [0.0656]
$\Delta \log(Emp)(-3)$				0.0603* [0.0339]	0.0416 [0.0540]	0.1006*** [0.0366]
$FL(M) \times \Delta \log(Emp)(-4)$				-0.0281 [0.0448]	-0.0614 [0.0704]	-0.0651 [0.0541]
$FL(M) \times \Delta \log(Emp)(-4)$				-0.1594** [0.0625]	-0.0707 [0.0815]	-0.2536*** [0.0831]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,808	684	1,033	1,808	684	1,033
R-squared	0.5973	0.5914	0.6678	0.6059	0.5957	0.6847

Panel C: Estimates with Five-Year Changes						
$FL(M) \times \Delta FL(-5)$	0.2573* [0.1349]	0.5676** [0.2515]	-0.1206 [0.1534]	0.2767** [0.1395]	0.5938** [0.2554]	-0.0709 [0.1472]
$FL(H) \times \Delta FL(-5)$	0.0773 [0.1548]	0.3006 [0.2544]	-0.1914 [0.2136]	0.1730 [0.1492]	0.3179 [0.2583]	-0.0073 [0.1732]
$\Delta Debt(3)$				0.0874* [0.0461]	0.0796 [0.0702]	0.0977 [0.0602]
$\Delta \log(Emp)(-3)$				0.0729* [0.0391]	0.0262 [0.0614]	0.1293*** [0.0360]
$FL(M) \times \Delta \log(Emp)(-5)$				0.0019 [0.0463]	-0.0220 [0.0737]	-0.0560 [0.0483]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.2175*** [0.0644]	-0.1342 [0.0862]	-0.3279*** [0.0868]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,585	581	908	1,585	581	908
R-squared	0.6483	0.6400	0.7218	0.6611	0.6444	0.7455

Appendix

Table A1: [Surviving Firms] The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. Small and large are firms with below and above the sample median number of employees in a given year (t), respectively. Panels B and C report estimates based on four- and five-year changes, respectively. In all regressions we include the control variables, firm fixed effects and industry $\times$ year effects. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	-0.0414 [0.0352]	-0.0292 [0.0477]	0.0489 [0.0581]	-0.0182 [0.0342]	-0.0149 [0.0463]	0.1151** [0.0535]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0356** [0.0147]	-0.0229 [0.0202]	-0.0967*** [0.0226]
Observations	52,564	26,016	23,146	52,564	26,016	23,146
R-squared	0.7021	0.7233	0.7827	0.7186	0.7399	0.7947
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0344 [0.0394]	-0.0225 [0.0539]	0.0506 [0.0576]	-0.0064 [0.0384]	0.0123 [0.0516]	0.1053* [0.0580]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0335** [0.0158]	-0.0229 [0.0213]	-0.0746*** [0.0226]
Observations	42,323	20,859	18,206	42,323	20,859	18,206
R-squared	0.7590	0.7803	0.8317	0.7727	0.7947	0.8405
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	-0.0472 [0.0525]	-0.0063 [0.0746]	-0.0456 [0.0646]	-0.0089 [0.0505]	0.0302 [0.0702]	-0.0025 [0.0657]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.0315* [0.0173]	-0.0073 [0.0232]	-0.0630*** [0.0227]
Observations	33,794	16,536	14,117	33,794	16,536	14,117
R-squared	0.7958	0.8200	0.8570	0.8091	0.8323	0.8649

Table A2: [Surviving Firms] The Effect of Combined Leverage on Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2007$. FL is defined as total debt over book value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. In all regressions we include the control variables and industry fixed effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	0.0727 [0.1432]	0.2332 [0.1802]	-0.2101 [0.2878]	0.1587 [0.1379]	0.2837 [0.1836]	-0.0475 [0.2452]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.1649*** [0.0570]	-0.1113 [0.0723]	-0.2224** [0.0871]
Observations	2,037	1,027	926	2,037	1,027	926
R-squared	0.5222	0.5263	0.5601	0.5328	0.5319	0.5770

Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0102 [0.1421]	0.1691 [0.1690]	-0.3781 [0.2760]	0.0672 [0.1380]	0.1923 [0.1710]	-0.1851 [0.2393]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.1485*** [0.0572]	-0.0697 [0.0663]	-0.2437*** [0.0863]
Observations	1,808	918	802	1,808	918	802
R-squared	0.5980	0.6021	0.6689	0.6060	0.6057	0.6871

Panel C: Estimates with Five-Year Changes						
$FL(M) \times \Delta FL(-5)$	0.0727 [0.1432]	0.2332 [0.1802]	-0.2101 [0.2878]	0.1587 [0.1379]	0.2837 [0.1836]	-0.0475 [0.2452]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1928*** [0.0615]	-0.1942** [0.0788]	-0.2469** [0.0982]
Observations	1,585	803	694	1,585	803	694
R-squared	0.6487	0.6487	0.7245	0.6593	0.6562	0.7419

Table A3: [Surviving Firms and Assets as Size] The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables, firm fixed effects and industry $\times$ year effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	-0.0436 [0.0350]	-0.0023 [0.0467]	0.0090 [0.0616]	-0.0208 [0.0339]	-0.0010 [0.0449]	0.0620 [0.0569]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0352** [0.0146]	-0.0122 [0.0202]	-0.0867*** [0.0255]
Observations	53,211	26,376	23,410	53,211	26,376	23,410
R-squared	0.7028	0.7223	0.7705	0.7194	0.7392	0.7851
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0344 [0.0394]	-0.0416 [0.0539]	0.0283 [0.0675]	-0.0064 [0.0384]	-0.0269 [0.0520]	0.0770 [0.0681]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0335** [0.0158]	-0.0044 [0.0211]	-0.0727** [0.0303]
Observations	42,323	20,818	18,227	42,323	20,818	18,227
R-squared	0.7590	0.7763	0.8183	0.7727	0.7916	0.8291
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	-0.0472 [0.0525]	-0.0125 [0.0754]	-0.0471 [0.0725]	-0.0089 [0.0505]	0.0150 [0.0699]	-0.0050 [0.0771]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.0315* [0.0173]	0.0027 [0.0234]	-0.0597* [0.0316]
Observations	33,794	16,574	14,141	33,794	16,574	14,141
R-squared	0.7958	0.8133	0.8473	0.8091	0.8280	0.8579

Table A4: [Surviving Firms and Assets as Size] The Effect of Combined Leverage on Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2006$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables and industry fixed effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	0.1209 [0.1667]	0.1543 [0.1907]	0.2959 [0.3390]	0.1925 [0.1593]	0.1801 [0.1884]	0.4493 [0.3134]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.1692*** [0.0573]	-0.1331 [0.0822]	-0.2211*** [0.0852]
Observations	2,061	1,036	937	2,061	1,036	937
R-squared	0.5219	0.5208	0.5606	0.5322	0.5263	0.5756
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0102 [0.1421]	0.0573 [0.1628]	0.1099 [0.2785]	0.0672 [0.1380]	0.0734 [0.1625]	0.3763 [0.2871]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.1485*** [0.0572]	-0.1044 [0.0823]	-0.2302*** [0.0801]
Observations	1,808	917	806	1,808	917	806
R-squared	0.5980	0.5937	0.6701	0.6060	0.6001	0.6839
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	0.0727 [0.1432]	0.0393 [0.1715]	0.0756 [0.3006]	0.1587 [0.1379]	0.0605 [0.1731]	0.3773 [0.2921]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1928*** [0.0615]	-0.1448* [0.0799]	-0.2938*** [0.0898]
Observations	1,585	806	693	1,585	806	693
R-squared	0.6487	0.6572	0.7044	0.6593	0.6624	0.7274

Table A5: [Surviving Firms and Sales as Size] The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables, firm fixed effects and industrytimesyear effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	-0.0436 [0.0350]	-0.0334 [0.0500]	0.0355 [0.0512]	-0.0208 [0.0339]	-0.0239 [0.0475]	0.0886* [0.0502]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0352** [0.0146]	-0.0233 [0.0207]	-0.0886*** [0.0203]
Observations	53,211	26,281	23,456	53,211	26,281	23,456
R-squared	0.7028	0.7137	0.7802	0.7194	0.7335	0.7930
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0344 [0.0394]	-0.0352 [0.0563]	-0.0085 [0.0610]	-0.0064 [0.0384]	-0.0132 [0.0536]	0.0533 [0.0622]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0335** [0.0158]	-0.0176 [0.0219]	-0.0814*** [0.0230]
Observations	42,323	20,787	18,215	42,323	20,787	18,215
R-squared	0.7590	0.7735	0.8234	0.7727	0.7914	0.8332
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	-0.0472 [0.0525]	-0.0223 [0.0767]	-0.0537 [0.0677]	-0.0089 [0.0505]	0.0152 [0.0716]	-0.0140 [0.0694]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.0315* [0.0173]	-0.0088 [0.0240]	-0.0605*** [0.0233]
Observations	33,794	16,521	14,161	33,794	16,521	14,161
R-squared	0.7958	0.8138	0.8545	0.8091	0.8300	0.8629

Table A6: [Surviving Firms and Sales as Size] The Effect of Prior Debt Issuance on Subsequent Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2007$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables and industry fixed effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	0.1209 [0.1667]	0.0949 [0.2393]	0.2476 [0.2194]	0.1925 [0.1593]	0.1471 [0.2221]	0.2428 [0.2018]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.1692*** [0.0573]	-0.1901** [0.0931]	-0.2119*** [0.0707]
Observations	2,061	1,033	941	2,061	1,033	941
R-squared	0.5219	0.5041	0.6062	0.5322	0.5163	0.6222

Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.0102 [0.1421]	-0.0125 [0.2067]	0.1162 [0.1745]	0.0672 [0.1380]	0.0495 [0.1891]	0.2639 [0.1828]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.1485*** [0.0572]	-0.1723* [0.1040]	-0.1718*** [0.0611]
Observations	1,808	913	809	1,808	913	809
R-squared	0.5980	0.5933	0.6891	0.6060	0.6019	0.7005

Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	0.0727 [0.1432]	0.0609 [0.2223]	0.1430 [0.1737]	0.1587 [0.1379]	0.1354 [0.2020]	0.2522 [0.1691]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1928*** [0.0615]	-0.2621** [0.1041]	-0.1986*** [0.0633]
Observations	1,585	804	693	1,585	804	693
R-squared	0.6487	0.6455	0.7518	0.6593	0.6588	0.7625

Table A7: [Book-Value Leverage] The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over book value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. In all regressions we include the control variables, firm fixed effects, and industry $\times$ year effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(M) \times \Delta FL(-3)$	0.0126 [0.0455]	0.0758 [0.0726]	0.0296 [0.0560]	0.0219 [0.0442]	0.0534 [0.0696]	0.0805 [0.0517]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0362** [0.0157]	-0.0356 [0.0253]	-0.0622*** [0.0205]
Observations	53,819	20,540	30,015	53,819	20,540	30,015
R-squared	0.6919	0.7171	0.7693	0.7102	0.7347	0.7829
Panel B: Estimates with Four-Year Changes						
$FL(M) \times \Delta FL(-4)$	-0.3877* [0.2233]	-0.2959 [0.3369]	-0.4015 [0.2816]	-0.3684 [0.2259]	-0.2845 [0.3254]	-0.2796 [0.2456]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0395** [0.0176]	-0.0171 [0.0306]	-0.0736*** [0.0236]
Observations	42,257	15,131	24,215	42,257	15,131	24,215
R-squared	0.7520	0.7775	0.8144	0.7670	0.7929	0.8253
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	0.0698 [0.1941]	0.5313* [0.2739]	-0.3671 [0.2851]	0.1064 [0.1887]	0.4728* [0.2744]	-0.1615 [0.2436]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.0343* [0.0193]	-0.0091 [0.0299]	-0.0600** [0.0255]
Observations	34,112	11,497	19,946	34,112	11,497	19,946
R-squared	0.7911	0.8171	0.8421	0.8053	0.8309	0.8524

Table A8: [Book-Value Leverage] The Effects of Combined Leverage on Subsequent Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2006$. FL is defined as total debt over book value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures debt issuance from t to $t + 3$. In all regressions we include the control variables and industry fixed effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta FL(-3)$	-0.2710 [0.1923]	-0.2329 [0.2796]	-0.2642 [0.2834]	-0.2618 [0.1932]	-0.2597 [0.2850]	-0.1640 [0.2426]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.1215* [0.0633]	-0.0247 [0.0915]	-0.2205** [0.0880]
Observations	1,972	980	991	1,972	980	991
R-squared	0.5100	0.5079	0.5499	0.5153	0.5088	0.5662

Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta FL(-4)$	-0.3877* [0.2233]	-0.2959 [0.3369]	-0.4015 [0.2816]	-0.3684 [0.2259]	-0.2845 [0.3254]	-0.2796 [0.2456]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0614 [0.0706]	0.0779 [0.0997]	-0.1723* [0.0937]
Observations	1,808	679	1,041	1,808	679	1,041
R-squared	0.5915	0.5688	0.6688	0.5979	0.5762	0.6806

Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta FL(-5)$	0.0698 [0.1941]	0.5313* [0.2739]	-0.3671 [0.2851]	0.1064 [0.1887]	0.4728* [0.2744]	-0.1615 [0.2436]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1600** [0.0669]	-0.0578 [0.1003]	-0.2880*** [0.0863]
Observations	1,602	579	926	1,602	579	926
R-squared	0.6323	0.6100	0.7188	0.6468	0.6262	0.7367

Table A9: [Debt Issuance] The Effects of Combined Leverage on Subsequent Employment Growth

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables, firm fixed effects and industry $\times$ time $\times$ year effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta Debt(-3)$	-0.0153 [0.0335]	-0.0142 [0.0400]	0.0110 [0.0425]	0.0208 [0.0336]	0.0132 [0.0401]	0.0741* [0.0440]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0290* [0.0150]	-0.0188 [0.0194]	-0.0748*** [0.0214]
Observations	54,216	28,371	25,218	54,216	28,371	25,218
R-squared	0.6386	0.6373	0.7047	0.6582	0.6583	0.7217
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta Debt(-4)$	-0.0315 [0.0345]	-0.0152 [0.0395]	-0.0111 [0.0373]	0.0095 [0.0362]	0.0143 [0.0410]	0.0590 [0.0420]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.0377** [0.0161]	-0.0288 [0.0208]	-0.0667*** [0.0222]
Observations	43,332	22,939	19,988	43,332	22,939	19,988
R-squared	0.6984	0.7020	0.7551	0.7147	0.7198	0.7665
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta Debt(-5)$	0.0698 [0.1941]	0.5313* [0.2739]	-0.3671 [0.2851]	0.1064 [0.1887]	0.4728* [0.2744]	-0.1615 [0.2436]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1600** [0.0669]	-0.0578 [0.1003]	-0.2880*** [0.0863]
Observations	1,602	579	926	1,602	579	926
R-squared	0.6323	0.6100	0.7188	0.6468	0.6262	0.7367

Table A10: [Debt Issuance] The Effects of Combined Leverage on Subsequent Employment Growth Following the 2008 Financial Crisis

In Panel A, the dependent variable $\Delta \log(Emp)(3)$ represents employment growth from t to $t + 3$, where $t = 2007$. FL is defined as total debt over market value of assets. $FL(M)$ is a dummy variable equal to 1 for medium financial leverage (FL) firms—defined as those in the middle tercile of FL in a given year—and 0 otherwise. $FL(H)$ is a dummy variable equal to 1 for high financial leverage (FL) firms—defined as those in the top tercile of FL in a given year—and 0 otherwise. $\Delta FL(-3)$ denotes the change in firm FL from $t - 3$ to t . $\Delta \log(Sales)(3)$ is firm i 's sales growth from t to $t + 3$, and $\Delta \log(Emp)(-3)$ is firm i 's employment growth from $t - 3$ to t . $\Delta Debt(3)$ measures firm i 's debt issuance from t to $t + 3$. In all regressions we include the control variables and industry fixed effects. Panels B and C report estimates based on four- and five-year changes, respectively. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Panel A: Estimates with Three-year Changes						
VARIABLES	(1) ALL	(2) SMALL	(3) LARGE	(4) ALL	(5) SMALL	(6) LARGE
$FL(H) \times \Delta Debt(-3)$	-0.1437** [0.0621]	-0.1564** [0.0794]	-0.0775 [0.1770]	-0.1354** [0.0636]	-0.1681** [0.0818]	-0.0189 [0.1797]
$FL(H) \times \Delta \log(Emp)(-3)$				-0.0673* [0.0378]	-0.0051 [0.0601]	-0.1197** [0.0551]
Observations	2,105	1,065	969	2,105	1,065	969
R-squared	0.5502	0.5315	0.6394	0.5560	0.5335	0.6518
Panel B: Estimates with Four-Year Changes						
$FL(H) \times \Delta Debt(-4)$	-0.0825 [0.0647]	0.0037 [0.0863]	-0.3328** [0.1363]	-0.0881 [0.0666]	-0.0063 [0.0897]	-0.1982 [0.1414]
$FL(H) \times \Delta \log(Emp)(-4)$				-0.1068*** [0.0384]	-0.0542 [0.0597]	-0.1719*** [0.0591]
Observations	1,803	911	809	1,803	911	809
R-squared	0.5988	0.5817	0.6982	0.6048	0.5832	0.7123
Panel C: Estimates with Five-Year Changes						
$FL(H) \times \Delta Debt(-5)$	-0.1139* [0.0646]	-0.0205 [0.0857]	-0.0678 [0.1863]	-0.1191* [0.0660]	-0.0450 [0.0875]	0.0445 [0.1862]
$FL(H) \times \Delta \log(Emp)(-5)$				-0.1108*** [0.0360]	-0.0903* [0.0547]	-0.1470** [0.0593]
Observations	1,537	783	662	1,537	783	662
R-squared	0.6755	0.6827	0.7269	0.6846	0.6892	0.7472

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