Firm Shocks and Retirement Savings*

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ABSTRACT

We investigate whether firm-level idiosyncratic shocks affect retirement savings in defined contribution pension plans. We find that retirement account contributions by both employees and employers increase after an improvement in idiosyncratic firm performance and decline after an increase in idiosyncratic firm uncertainty. Retirement contributions by employers are more sensitive to idiosyncratic shocks than employee contributions. However, even if firms do not adjust their matching rates, employees adjust their retirement contributions to idiosyncratic firm shocks. Our results indicate that firms share their risk exposure with their employees and that short-term stock price fluctuations affect long-term retirement savings.

Keywords: Retirement savings, idiosyncratic firm shocks, 401(k) plans, company matches.

JEL Codes: G11; G18; G28; G40; G51, H31.

1 Introduction

Retirement savings have become one of the main financial assets of U.S. households, accounting for 27% of total household wealth in the U.S. as of 2024.[1] In particular, defined contribution (DC) pension plans have experienced significant growth over the past two decades, emerging as the predominant type of retirement savings for most U.S. employees. Stable and consistent retirement savings are critical for ensuring long-term financial well-being of households. However, studies of retirement saving behavior, especially in response to economic shocks, have been sparse. In this paper, we focus on firm-specific shocks and aim to provide a systematic study of how these exposures affect DC retirement savings.

Firm-specific shocks can affect both employer and employee contributions to DC plans. First, the existing literature examining whether companies insure workers against firm-specific shocks (e.g., Guiso, Pistaferri, and Schivardi (2005), Juhn, McCue, Monti, and Pierce (2018), and Kline, Petkova, Williams, and Zidar (2019)) has focused primarily on wage compensation, while retirement benefits, an important component of overall labor income, have been largely overlooked. It is unclear whether employers will pass on shocks to employees by altering retirement benefits. Since adjustments to retirement benefits may be less salient to employees than wage cuts and are easier for firms to implement without renegotiating individual contracts, firms may be more likely to pass through idiosyncratic shocks to workers by changing retirement benefits. On the other hand, the recent literature (Cole and Taska (2023)) shows that DC retirement benefits are an important element in determining a firm's attractiveness in the labor market, especially for high-income and older employees. Thus, to maintain competitiveness, firms may avoid altering retirement benefits, thereby providing insurance to workers from firm-specific shocks.

Second, the risk associated with firm-specific shocks may change employee retirement savings behavior. Although uncertainty in labor income can lead workers to engage in

[1] According to the ICI, total U.S. retirement assets, encompassing various retirement plans, reached $42.4 trillion in the third quarter of 2024, representing 27.1% of total household wealth.

precautionary savings and reduce consumption (Zeldes (1989), Deaton (1989), and Di Maggio et al. (2022)), retirement savers may exhibit certainty equivalent behavior as suggested by life-cycle studies (Carroll and Samwick (1997) and Gourinchas and Parker (2002)) and show less sensitivity to labor income risk. In addition, DC retirement savings are illiquid, as early withdrawals incur significant penalties. Therefore, when facing elevated labor market risk, rather than increasing savings, liquidity concerns may prompt workers to reduce DC contributions to enhance their financial flexibility.

Overall, it is unclear how firm-specific shocks affect overall retirement savings, a research question we aim to investigate comprehensively in this study. To link firm shocks to employer-sponsored DC plan contributions, we perform a comprehensive manual mapping between public companies in the Compustat database and Form 5500 fillings with the Department of Labor (DOL). Our matching procedure results in 78,946 plan-year observations from 8,390 employer-sponsored DC plans during the period from 2000 to 2020, representing 68% of all public companies in Compustat and CRSP in terms of total market capitalization.

We focus on idiosyncratic firm-level shocks, which are particularly important in understanding both firms' behaviors in insuring workers against firm-level fluctuations and employee' saving and consumption behaviors under labor income uncertainty. We propose two baseline shock measures, a signed performance shock and an unsigned uncertainty shock. The measures are based on stock return residuals constructed following the literature (Gilchrist, Sim, and Zakrajšek (2014); Alfaro and Park (2020); Di Maggio et al. (2022)) by running a Fama-French three-factor model using daily stock returns over each quarter. By removing the aggregate market and other systematic components from firm returns, the residuals mainly capture firm-specific variation driven by factors such as firm-level idiosyncratic demand or technological shocks. The idiosyncratic firm performance shock is estimated as the average of the residuals over the previous four quarters, whereas the idiosyncratic firm uncertainty shock is estimated as the standard deviation of the residuals over the previous four quarters.

Our paper starts by providing an overview of DC retirement savings contributions by both

the sponsor companies and their employees, which has not been systematically documented in the prior literature. We observe that the average employee contribution is $5,189.25, while the average firm contribution per worker is $2,138.14. The variation is large with the top 10 percent of firms having average employee contributions over $10,505.31 annually, while the bottom 10 percent of firms have average employee contributions less than $446.40. On the employer side, the top 10 percent contribute over $4,884.73 per worker, while the bottom 10 percent contribute nothing. To further understand the matching benefit provided by firms, we compute the relative ratio of firm contribution over worker contribution (*Firm-to-Employee Ratio*). We observe that firms on average match 41% of their workers' contributions.

After documenting the significant variation in the contributions to DC pension plans, we next turn to our main analyses of whether and how firm-specific shocks affect DC retirement savings. We find an increase in both employee and employer retirement contributions after an improvement in idiosyncratic firm performance and after a reduction in idiosyncratic risk, indicating significant adjustments to retirement savings when facing firm-specific shocks. For example, both firms and employees reduce contributions by large economic magnitudes in response to negative firm shocks. A one-standard-deviation decrease (increase) in idiosyncratic firm performance (uncertainty) leads an average employee to reduce retirement savings by $25 ($60) in the following year, equivalent to a 0.73% (1.39%) change in annual employee contributions. The employer responses are larger, resulting in a decrease of $32 ($44) in sponsor contributions, or a 3.20% (3.65%) change, over the year following the adverse firm shocks. Overall, our evidence shows that firm-specific shocks significantly affect employees' total DC retirement savings through combined effects on employee and employer contributions, which amounts to a total reduction of 0.95% (1.73%) in annual employee retirement savings following a one standard deviation adverse firm performance (uncertainty) shock.

Further analyses reveal that the impact of idiosyncratic firm performance on retirement savings originates from both positive and negative shocks. Moreover, examining response

probabilities using logit regressions, we find that both workers and firms are significantly less likely to increase contributions when experiencing a negative performance shock. Employers are also significantly more likely to suspend contributions to DC accounts when faced with negative firm shocks. For example, following a one-standard-deviation decrease in idiosyncratic performance, firms are 8% less likely to increase, 4% more likely to decrease, and 14% more likely to entirely suspend contributions. In addition, analyses employing alternative firm shocks based on accounting measures, such as sales growth and earnings, confirm our baseline findings.

After establishing the main results, we dive deeper into understanding the underlying mechanisms. First, we investigate the role of employer matching, and direct and indirect responses by both firms and workers to firm shocks. Since most firms provide matching to employee retirement contributions, the observed firm contribution changes could simply reflect passive firm matching to employee contributions rather than active firm actions in changing retirement benefits. To investigate this, we examine the relative *Firm-to-Employee Ratio*. If firms actively change employee retirement benefits, negative firm shocks should result in a decrease in the *Firm-to-Employee Ratio*.[2] Consistent with this, we find a significant positive (negative) relation between idiosyncratic firm performance (uncertainty) and the subsequent change in the *Firm-to-Employee Ratio*, suggesting that employers actively change retirement benefits and thereby pass through firm-specific shocks to workers on non-wage compensation.

The observed response of the employees could reflect a direct response to firm-specific shocks due to labor market risk or an indirect response to changes in firm matching incen-

[2]The *Firm-to-Employee Ratio* should stay the same or move toward the opposite direction of firm shocks if the firm simply matches worker contribution changes following the firm shock. For example, based on codified matching schedules, Arnoud et al. (2021) document that approximately 70% of firms offer a single-tier match schedule (e.g., a 50% match on employee contributions up to 6% of employee salaries), with almost all of the remaining plans offering a two-tier match schedule (e.g., an initial 100% matching up to 3% of employee contributions followed by a 50% match on the next 2%). Under both matching schedules, an increase in worker contributions following a positive firm shock will lead to either a proportional or lower change in firm contributions depending on whether firm matching hits the tiered limit (or the cap), resulting in either no change or a decrease in the observed Firm-to-Employee Ratio.

tives. To understand this, we examine sub-samples of firms with and without firm matching changes. We observe that workers respond to firm shocks even in the absence of employer matching changes, suggesting a direct employee reaction to labor market risk. Moreover, employee responses without firm matching changes are stronger than with firm matching changes, which is consistent with a crowd-out effect of employer contributions. Overall, our evidence shows that both firms and workers react directly to firm-specific shocks in adjusting DC contributions.

Second, we investigate the role of financial constraints in channeling firm shocks by employing two proxies: the Merton (1997) Distance to Default (DD) measure constructed following Bharath and Shumway (2008) and the firm leverage ratio. Consistent with financial constraints lowering firms' ability to insulate workers against shocks and intensifying labor market risk, we find stronger effects of firm-specific shocks on both employer and employee contributions for firms with lower distances to default and with higher leverage ratios. The effect is particularly strong for the uncertainty shock, where a one-standard-deviation decrease in the distance to default doubles the negative effect of uncertainty on total retirement savings in DC accounts. Lastly, our results are not driven by incentives provided by the Employer Stock Ownership Plans (ESOP), which differs from the labor market risk channel. We find that ESOPs account for only 15% of our sample and in the majority of the non-ESOP plans, workers react directly to firm-specific shocks.

We perform a series of additional analyses. Interestingly, including state- and industry-level shocks in our analysis, do not affect the effects of firm-level shocks. Moreover, we find an independent and significant effect of state-level performance shocks on both employee and employer DC contributions, whereas industry-level shocks are insignificant. Thus, there is a local spillover effect on retirement contributions. Lastly, we find consistent results for two equally divided subperiods and for the sample excluding the financial crisis period from 2008 to 2009. Our results are robust across subsamples of high and low firm size, subsamples of high and low active participants, and the sample excluding very small plans with less than

100 active participants.

Our paper contributes to the literature in labor economics that examines whether firms insulate workers from undiversifiable labor market risk. The implicit contract theory (Baily (1974) and Azariadis (1975)) establishes that risk-neutral firms should provide insurance to risk-averse workers and insulate their salaries from adverse shocks to production. The more recent literature has examined various aspects that affect a firm's insurance provision, such as types of shocks (Guiso, Pistaferri, and Schivardi (2005)), competitiveness of the labor market (Lamadon, Mogstad, and Setzler (2022), Garin et al. (2019)), job search frictions (Balke and Lamadon (2022)), and occupational categories (Juhn, McCue, Monti, and Pierce (2018), Friedrich, Laun, Meghir, and Pistaferri (2019)). The empirical evidence is mixed. Using Italian data, Guiso, Pistaferri, and Schivardi (2005) show that firms provide full insurance for temporary fluctuations, but only partial insurance for permanent fluctuations. Using linked employer-employee data for the United States, Juhn, McCue, Monti, and Pierce (2018) find that the elasticity of worker earnings to persistent shocks in firm revenues is small, consistent with the hypothesis that firms insulate workers from idiosyncratic shocks. In addition, for certain occupations, performance pay may act as a countervailing force to wage insurance. Similarly, Kline, Petkova, Williams, and Zidar (2019) find that patent-induced shocks to firm productivity are partially passed on to wages of senior employees. However, the existing literature has mainly focused on wage compensation, such as base salaries or bonus pay. Retirement benefits, a key component of overall compensation, have been largely overlooked. Our paper fills this gap by documenting that when faced with idiosyncratic shocks, firms pass through these fluctuations to employees by reducing employer contributions to DC retirement accounts, with economically significant magnitudes. Our findings therefore underscore the broader impact of firm shocks on their employees' financial well-being.

Our paper also relates to the literature on how labor market risk affects employee saving and consumption behaviors. Firm-level idiosyncratic shocks can reduce firm investments and employment, exposing workers to greater employment and labor income risk. The previous

literature shows that income uncertainty leads individuals to engage in precautionary behaviors, such as increasing savings and reducing consumption (Zeldes (1989), Deaton (1989); Hahm and Steigerwald (1999); Gourinchas and Parker (2002); Ben-David, Fermand, Kuhnen, and Li (2018)). Focusing on the labor market risk channel, Di Maggio et al. (2022) illustrate that increased firm-level uncertainty reduces workers' compensation, leading to reductions in workers' durable goods consumption. Our paper contributes to this literature by focusing on the impact of labor market risk on retirement savings, which account for almost one-third of total household wealth in the U.S. As highlighted by the life-cycle models (Carroll and Samwick (1997) and Gourinchas and Parker (2002)), retirement savings differ from the buffer-stock savings aimed at smoothing near-term consumption. Our paper provides a direct test of retirement saving behavior under labor market uncertainty. We show that changes in employee contributions to DC retirement plans are positively related to firm-level idiosyncratic shocks, in contrast to precautionary saving behaviors.

Our paper contributes to an emerging literature studying non-wage employment benefits. The literature has focused mostly on non-wage and non-pecuniary benefits such as remotework, working conditions, or job flexibility (Mas and Pallais (2017), Maestas, Mullen, Powell, Von Wachter, and Wenger (2023) and Wiswall and Zafar (2018)) and finds that non-wage job features constitute an important part of job valuation (Sorkin (2018), Luttmer and Samwick (2018), Taber and Vejlin (2020), Lamadon, Mogstad, and Setzler (2022), Adda and Dustmann (2023)). On the other hand, a few emerging studies focus on non-wage compensation, such as retirement and health benefits, which are becoming increasingly important and attracting growing attention. Cole and Taska (2023) show that employees, especially those in high-income and older occupations, place a greater value on DC retirement benefits compared to wage income and that non-wage compensation can affect firms' attractiveness in the labor market. Ouimet and Tate (2023) examine both within- and between-firm variation in non-wage benefits, including health insurance, retirement, and leave benefits, finding that non-wage benefits contribute to inequality and influence employee turnover. Gao, Ge,

Schmidt, and Trillo (2023) focus on employer-sponsored healthcare insurance and study the effect of health insurance premiums on firm decisions, including firms' employment and technology investment choices. Our paper contributes to this literature by studying how idiosyncratic shocks experienced by employers impact their employees' retirement saving benefits, which has vital implications for workers' long-term financial well-being.

Finally, our paper contributes to the literature on DC retirement plans. Research on DC retirement contributions has been limited so far, with a few studies primarily focusing on the effect of aggregate shocks such as the Great Recession on employee matching suspensions. For example, Arnoud et al. (2021) document that about 10% of large plans suspended firm matching during the 2009 financial crisis period, confirming earlier reports by Munnell and Quinby (2010) and Dushi, Iams, and Tamborini (2013). Butrica and Smith (2016), on the other hand, examine how participants responded to economic booms and bursts during the pre-2010 period, finding that employee DC participation and contributions declined during recessions. This literature has thus far focused on a few aggregate events and limited samples. Through a comprehensive matching of public companies to their DC plan filings in Form 5500, our paper provides a much-needed systematic investigation of both employer and employee DC contribution behaviors over the past two decades. Moreover, distinct from previous studies on undiversifiable aggregate risk, our paper ties into the labor economics literature and focuses on firm-level idiosyncratic shocks to better understand the unique implications of such fluctuations on both firms' and workers' behaviors regarding retirement benefits.

The remainder of the paper is organized as follows. In Section 2, we discuss data and sample constructions. Section 3 presents the baseline analyses and main results. Additional analyses and robustness checks are provided in Section 4 and Section 5 concludes.

2 Data and Sample Construction

We focus our study on public firms covered in both Compustat and CRSP that offer a defined contribution (DC) pension plan over the period from 2000 to 2020. We provide the data sources, sample construction, and summary statistics in this section.

2.1 Data Sources

We use three main data sources. First, information on DC pension plans comes from Form 5500. Sponsors of employee benefit plans subject to the Employee Retirement Income Security Act (ERISA) must file Form 5500 annually with the Department of Labor (DOL) and the Internal Revenue Service (IRS) to report information on the plans' financial conditions, investments, and operations. We focus on DC pension plans and obtain information on both employer and the employee contributions from Schedule H of the Form. Form 5500 also provides information on plan characteristics, such as plan total assets and the number of active participants. Second, we obtain daily stock returns from the Center for Research in Security Prices (CRSP) database, which we use to construct firm-level idiosyncratic shocks for all public firms. Finally, to construct alternative accounting-based firm shock measures and control for additional firm characteristics, we collect firm financial and accounting information from Compustat, including earnings, sales, cash holdings, leverage, and book values.

We need to link firm-level idiosyncratic shocks to the DC retirement savings made by both firms and their employees. Such a link is not readily available. A few previous papers (e.g., Rauh (2006) and Rauh, Stefanescu, and Zeldes (2020)) made a manual mapping between Compustat and Defined Benefit (DB) pension plans from Form 5500 for periods before 2010. A systematic mapping between public firms and their DC pension plans has not been established. This task is particularly challenging because DC plans have grown significantly in recent decades, vastly outnumbering DB plans in the retirement landscape. To assemble a comprehensive sample of filings, we begin by extracting all Form 5500 filings between 2000

to 2020 when research files are available and restricting our sample to DC plans. This results in a total of 268,558 unique DC plans, which we aim to manually map to a sample of 12,657 public firms that are covered by both Compustat and CRSP.

We begin the mapping process using sponsor company names and the employer identification numbers (EINs). This allows us to generate a first-pass link across databases. In many cases, Form 5500 reports the name and EIN of one of the subsidiaries of the parent sponsor company. To enhance the link, we further match using the names of all subsidiaries reported by all sponsors in the 10-k filings provided by WRDS. Firms with multiple plans are retained in the sample.

Appendix Table IA.2 presents an overview of our sample. Column (1) reports the number of DC plan sponsors from Form 5500 for each year. For this study, we focus on publicly-traded companies covered in both Compustat and CRSP, as shown in column (2). The majority of DC plans in the Form 5500 database are sponsored by private companies and are therefore not included in our sample. The matched sample is reported in columns (3) and (4). Our mapping covers 58% of Compustat/CRSP firms, representing 68% of public traded companies by total market capitalization. Firms may sponsor multiple plans, which are included in our sample, with their numbers reported in the last two columns of the table. Our mapping process yields a final matched sample of 78,946 plan-year observations from 8,390 plans sponsored by 5,723 public companies.

2.2 Variable Definitions

Firm idiosyncratic shocks are important in understanding firms' behavior in insuring workers against firm-specific fluctuations, as well as employees' saving and consumption behavior (Guiso, Pistaferri, and Schivardi (2005) and Di Maggio et al. (2022)). Therefore, to study how firm shocks impact DC retirement savings, we employ as our base measures two stock-return-based firm shocks: the idiosyncratic firm performance shock (*Performance Shock*) and the idiosyncratic firm uncertainty shock (*Uncertainty Shock*).

To construct these measures, we estimate a Fama-French three-factor model based on equation (1) for each firm using daily stock returns over each quarter following Di Maggio et al. (2022):

$$R_{f,t} - r_{0,t} = \alpha_f + \beta_{f,m} * (R_{m,t} - r_{0,t}) + \beta_{f,SMB} * SMB_t + \beta_{f,HML} * HML_t + \varepsilon_{f,t} \quad (1)$$

where $R_{f,t}$ is the daily return for firm f, $r_{0,t}$ is the daily Treasury-bill rate, $R_{m,t}$ is the daily value-weighted stock market return, SMB_t is the difference in daily returns between small and large capitalization stocks, and HML_t is the difference in daily returns between high and low book-to-market stocks. $\varepsilon_{f,t}$ is the daily residual component. All factor returns are obtained from Ken French's website.

This regression procedure removes the aggregate market component and other systematic factors (i.e., size and value) from the daily stock returns of the firm. The residual components ($\varepsilon_{f,t}$), therefore, mainly capture firm-specific variations due to, for example, firm-level idiosyncratic demand or technological shocks, which are our primary focus in this paper. Next, we define the idiosyncratic firm performance shock as the abnormal firm return obtained from the above procedure each quarter, averaged over the prior four quarters. Lastly, the idiosyncratic firm uncertainty shock is estimated as the standard deviation of the residuals each quarter, averaged over the prior four quarters.

In addition to stock-return-based shock measures, we employ two alternative firm shock measures based on accounting information. Specifically, we compute *Earnings Performance* and *Earnings Uncertainty* using the earnings-to-asset ratio of a firm, and *Sales Performance* and *Sales Uncertainty* using sales growth.

Our main variables of interest are employee and employer contributions to DC plans. First, we define *Worker Contribution* (*Firm Contribution*) as the total annual employee (employer) contributions to a plan divided by the total number of active participants. All contribution amounts are adjusted to 2020 dollars. To understand the matching benefits

provided by firms, we compute two proxies of the firm matching rate: the ratio of employer contributions to employee contributions (*Firm-to-Employee Ratio*), and the ratio of employer contributions to total contributions (*Firm Share*). To measure annual changes in contributions, we compute the log change (*LogChg*), the percentage change (*PctChg*), and the dollar change (*DollarChg*) for both employee and employer contributions. In addition, we compute changes in the the matching ratios.

2.3 Summary Statistics

The summary statistics are reported in Table 1. First, we observe that companies in our sample experience an average idiosyncratic performance shock of 0.03% with a standard deviation of 0.20% based on daily abnormal returns. The average idiosyncratic uncertainty shock is 2.50% with a standard deviation of 1.74% based on daily abnormal returns.

Next, we examine both employee and employer contributions in our sample. We observe that employees at publicly-traded companies on average contribute $5,189.25 annually to their DC retirement plans, with a median of $4,557.80. The variation of employee contributions across firms is large: the top 10 percent contribute over $10,505.31, while the bottom 10 percent contribute less than $446.40 annually. The average (median) annual sponsor contribution per worker is $2,138.14 ($1,500.51). Interestingly, while the top 10 percent companies contribute over $4,884.73 per employee, the bottom 10 percent contribute nothing. When examining the sponsor matching rate, firms on average match 41% of their workers' contributions with a standard deviation of 47%. In addition, employer contributions account for 28% of the total DC contributions on average, with the bottom 10 percent companies contributing nothing while the top 10 percent contributing over 49% of the total contributions.

We also notice significant variation in the changes in contributions. Using the percentage change in contributions as an example, employees, on average, change their contributions by 6% annually during our sample period with a standard deviation of 39%, while sponsors change their contributions even more by an average of 17% per year and a standard deviation

of 96%. Regarding firm matching rate, although the mean change is zero, the standard deviations for changes in the two contribution ratios (i.e., *Firm-to-Employee Ratio* and *Firm Share*) are 13% and 6%, respectively.

Finally, firms in our sample are publicly-traded companies. They tend to be large firms with an average (median) market capitalization of $6,821.81 ($745.95) million and an average DC plan size of $335.95 ($28.01) million. These plans have on average 4,262 active participants with the median being 705. The average (median) account size is $81,780.66 ($44,924.23).

Overall, these statistics provide us with a basic overview of the retirement savings behavior of both DC sponsors and their employees, which has not been systematically documented in the literature before. The significant variations in both the levels and the changes in contributions are particularly interesting, given the earlier evidence in the DC plan literature on employee inertia in plan participation and asset allocations (Madrian and Shea (2001), Agnew, Balduzzi, and Sunden (2003), Sialm, Starks, and Zhang (2015), and Pool, Sialm, and Stefanescu (2016)), as well as the limited number of matching suspensions under normal market conditions (Arnoud et al. (2021)).

Therefore, in the next part of the paper, we examine whether and how firm-specific shocks contribute to the variation in the retirement savings.

3 Idiosyncratic Firm-Level Shocks and Retirement Savings

In this section, we analyze the relation between firm-level idiosyncratic shocks and DC contributions by both employees and employers.

3.1 Base-Case Results

We investigate this relation formally using the following regression framework:

$$\begin{aligned} Y_{f,p,t} =& \beta_1 * Performance_{f,t-1} + \beta_2 * Uncertainty_{f,t-1} \\ &+ X'_{f,t-1}\beta_3 + P'_{p,t-1}\beta_4 + \alpha_f + \alpha_t + \epsilon_{f,p,t}, \end{aligned} \tag{2}$$

where $Y_{f,p,t}$ is the change in either the employee or the employer contributions. The main independent variables are the firm performance shock ($Performance_{f,t-1}$) and the firm uncertainty shock ($Uncertainty_{f,t-1}$). Both are measured over the previous year. Our coefficients of interest are β_1 and β_2, which measure the effects of idiosyncratic performance and uncertainty shocks on retirement savings in the subsequent year, respectively. We also control for additional plan characteristics ($P_{p,t-1}$), including the logarithm of account size ($AccountSize$) and the logarithm of the number of active participants ($ActPart$), and firm characteristics ($X_{f,t-1}$), including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage, and cash holdings. All control variables are measured over the prior year. The observations are at the firm-plan-year level. All specifications control for firm- and time-fixed effects (i.e., α_f and α_t). Variable definitions are provided in Table IA.1 in the Internet Appendix.

Table 2 reports the results. The first three columns focus on the changes in employee contributions, while the last three columns focus on the changes in the firm contributions. We start by examining the effect of an idiosyncratic performance shock. Focusing on employees' behavior first, the coefficients associated with all three change variables are significantly positive, as revealed in the first three columns. Thus, when a firm experiences a positive idiosyncratic performance shock, its employees will increase their DC retirement contributions over the subsequent year. The economic magnitude is significant. For example, the coefficient on the dollar change in column (3) shows that a one-standard-deviation increase in idiosyncratic firm performance leads to an increase in the retirement savings of employees

by $25 over the following year. This corresponds to a 0.73% change in annual employee contributions based on the coefficient reported in column (2).[3]

Second, as revealed in the next three columns, firms also react strongly to idiosyncratic firm-level performance shocks by adjusting the retirement benefits provided to their employees. The positive significant coefficients on all three change variables show that firms increase their contributions to employees' retirement accounts following positive idiosyncratic performance shocks. In terms of economic magnitude, a one-standard-deviation increase in idiosyncratic firm performance (i.e., 3.21%) leads the company to increase their contributions to their employees' DC accounts by $32 per worker over the following year, corresponding to a 3.21% change in firm contributions, as revealed by the coefficients in columns (5) and (6).

In addition to performance shocks, we also examine how idiosyncratic uncertainty shocks at the firm level influence retirement saving behavior. The coefficients on the uncertainty shock are all negative and significant, demonstrating a negative impact of firm-level uncertainty on retirement contributions. The negative relationship holds for both employees and firms. The economic magnitude is comparable to or larger than that of the performance shock. First, for employees, the coefficient in column (3) reveals that a one-standard-deviation increase in idiosyncratic firm uncertainty (i.e., 27.58% annual) leads an average employee to decrease their retirement contributions by $60 over the following year, which corresponds to a 1.39% change in annual employee contributions based on the coefficient shown in column (2). On the employer side, a one-standard-deviation increase in idiosyncratic uncertainty shock leads the sponsor company to decrease its contributions to employee DC accounts by $44 per worker, corresponding to a 3.65% change, over the following year.

Adding the impact on both employee and employer contributions together, a one-standard-deviation idiosyncratic firm performance shock (i.e., 3.21%) will result in a total change in workers' retirement savings by $58, which is a 0.95% change relative to the total

[3]Given that one standard deviation of performance shock is 0.202% daily, the coefficient of 0.036 in column (2) (and 125.367 in column (3)) indicates a percentage change in contributions of 0.202 *0.036= 0.73% (and a dollar change of 0.202*125.367=$25.32) over the next year.

median employee retirement savings annually. The total effect of the uncertain shock is even larger. A one-standard-deviation idiosyncratic firm uncertainty shock leads to a $104, or a 1.72%, change in workers' total DC retirement savings. As a comparison, focusing primarily on wage income, Guiso, Pistaferri, and Schivardi (2005), study the insurance that firms provide to their workers and show that a 10 percent permanent change in idiosyncratic firm performance induces about a 0.7 percent variation in workers' earnings using Italian data.

Lastly, examining firm-level and plan-level characteristics, we observe that, small and growth firms, and firms with more cash and lower leverage tend to have higher retirement savings growth. Lower account balances and a larger number of active participants are associated with higher increases in retirement savings. More importantly, firm idiosyncratic shocks exhibit significant impact on retirement saving behavior controlling for these variables.

Overall, our evidence shows that firm-specific shocks significantly affect employee DC retirement savings through changes in both employee and employer contributions, with a large economic magnitude.

3.2 Positive vs. Negative Shocks

We next investigate whether the effect of idiosyncratic performance shocks on retirement savings derives mainly from positive or negative shocks. To do so, we decompose the performance shock into the positive and negative components. Specifically, *Performance_Pos* (*Performance_Neg*) equals performance when the variable is positive (negative), and 0 otherwise. We run the baseline regression as in equation (2), replacing *Performance Shock* with *Performance_Pos* and *Performance_Neg*. The results are reported in Table 3.

We expect the coefficients to be positive for both performance shocks, if positive performance leads to contribution increases and negative performance to contribution reductions. This is largely what we observe. For employees, the coefficients are positive for both positive and negative shocks, although not always significant. For firms, the coefficients are all significantly positive for both positive and negative shocks, regardless of how contribution

changes are measured. The economic magnitudes on positive and negative shocks are largely comparable. In addition, uncertainty shocks continue to exhibit a significant impact on both employee and employer retirement contributions.

Overall, both positive and negative idiosyncratic performance shocks tend to affect DC retirement savings.

3.3 Increases, Decreases, and Suspensions of Contributions

To better understand how employees and employers react to idiosyncratic firm shocks, we investigate whether they are more likely to increase, decrease, or suspend DC contributions in response to performance shocks.

We define three types of responses for both employees and employers based on the change in contributions. *Increase* and *Decrease* are indicator variables that equal one if the change in contributions is positive or negative, while *Suspend* equals one if the contribution amount drops to zero. Overall, as illustrated in Table 1, changes in contributions come from both increases and decreases in contributions, highlighting the large variations in retirement savings behavior. Specifically, for employees, increases in contributions account for 54% of the sample observations, while decreases in contributions account for 39%. Thus, 7% do not make any changes. Among the decreases, only 1% of workers completely suspend their DC contributions. On the firm side, 49% (39%) increase (decrease) employer contributions and 12% make no changes. The suspension rate is higher for firms, with 3% completely suspending employer contributions.

To estimate the probability of different types of responses from both employees and employers following firm-specific shocks, we perform logit regressions where the dependent variables are the three response dummies. The results are reported in Table 4.

Our base analysis in Table 2 reveals a positive relation between the idiosyncratic performance shock and the retirement contributions. If the observed relation comes from both upward and downward adjustments in contributions in response to the shock, we should

observe both a positive coefficient for the *Increase* dummy and a negative coefficient for the *Decrease* dummy. This is what we observe in Table 4 from both employee and employer responses. The coefficients on the *Increase* dummy are significantly positive, while those on the *Decrease* dummy are significantly negative, indicating that both workers and firms are more likely to increase contributions and less likely to decrease contributions when firms experience positive performance shocks. Additionally, for firms, we observe a significant negative coefficient for the *Suspend* dummy, suggesting that when facing negative idiosyncratic performance shocks, employers are more likely to suspend contributions to employees' DC accounts entirely. For example, following a one-standard-deviation increase in idiosyncratic performance, firms are 8% more likely to increase contributions. On the other hand, following a one-standard-deviation decrease in idiosyncratic performance, firms are 4% more likely to decrease contributions and 14% more likely to suspend contributions entirely to their employee DC plans.[4]

We next turn to a firm-specific uncertainty shock. Our baseline results show that higher idiosyncratic uncertainty discourages both employee and employer DC contributions. Thus, we should expect a negative (positive) coefficients on the uncertainty for contribution *Increase* (*Decrease* and *Suspend*). Our results are largely consistent with these predictions, with firms' reactions being especially strong. For example, following uncertainty shocks, employers are significantly less likely to increase contributions and instead, they are more likely to suspend contributions. Workers are also more likely to decrease contributions with increased employer uncertainty.

[4]For example, given that a one-standard-deviation performance shock is 0.202% in daily abnormal returns, the coefficient of 0.376 in column (4) from the logit model indicates an odds ratio of exp(0.202 *0.376) = 1.08, suggesting that the firm will be 8% more likely to increase contributions than it would decrease the contributions.

3.4 Alternative Measures of Firm-Level Shocks

In our base-case specification, we define idiosyncratic firm shocks using company stock returns. In this section, we define alternative firm shocks using accounting measures to further validate our results.

Our first set of alternative firm shock measures is based on firms' sales growth. Specifically, we define *Sales Performance* of a firm as the percentage change in the firm's quarterly sales, averaged over the previous year. *Sales uncertainty* is defined as the standard deviation of the firm's percentage sales growth over the previous year. Our second set of alternative firm shock measures is based on firms' earnings-to-asset (ETA) ratios. The ETA ratio in each quarter is computed as the earnings before interest, taxes, depreciation, and amortization divided by the total assets of the firm. We define the *Earnings Performance* and *Earnings Uncertainty* of a firm as the average and the standard deviation of a firm's quarterly ETA ratio over the previous year.

As reported in Table 1, the average sales performance of firms in our sample is 5% with a standard deviation of 18%. Sales uncertainty exhibits an average of 18% and a standard deviation of 35%. On the other hand, the standard deviation of earnings performance and earnings uncertainty are 5% and 4%, respectively.

We estimate the same baseline regression as in equation (2) using these alternative firm shock measures. The results for the sales-based and earnings-based shock measures are reported in Panels A and B in Table 5, respectively. These results are largely consistent with our baseline results reported in Table 2. Both sales performance and earnings performance shocks are positively associated with changes in retirement contributions in the following year. All coefficients on performance shocks are positive (with only one exception) and are mostly significant. In addition to performance shocks, uncertainty shocks based on accounting measures also exhibit a negative impact on retirement savings, with the effect being more significant on employer contributions.

Compared to stock return-based measures, accounting information-based measures may

be noisier due to the lower frequency of data, but the economic magnitudes are largely comparable to, if not larger than the baseline results. Specifically, using the dollar changes reported in columns (3) and (6) in Table 5 as an example, we evaluate the total impact of accounting-based shocks on both employer and employee contributions. When adding the effects together, a one-standard-deviation increase in sales performance (uncertainty) leads to a total reduction in workers' retirement contributions by 2.43% (and 1.34%) in the following year, relative to the medium total contribution level. Turing to earnings-based shocks, a one-standard-deviation increase in earnings performance (uncertainty) results in a total reduction in workers' total retirement contributions by 0.43% (and 1.71%).

Overall, alternative firm shocks based on accounting measures confirm our baseline findings of a strong impact of firm-level fluctuations on DC retirement savings.

4 Mechanisms

In this section, we dive deeper into understanding the observed employee and employer contribution changes, and the underlying mechanisms. We perform a series of additional analyses, investigating the role of retirement benefit incentives and the direct and indirect responses, the role of firms' financial constraints, and various subsamples.

4.1 Employer matching

To understand the underlying drivers of both employee and employer responses to idiosyncratic firm shocks, we first investigate the role of employer matching, an important retirement benefit incentive.

Most sponsor companies provide matching to employee contributions under the DC retirement accounts.[5] The observed employer contribution changes could reflect firm's active

[5]Based on matching schedules of a random plan sample, Arnoud et al. (2021) document that about 81% of DC retirement plans offer a employer match.

decisions to alter employee retirement benefits to pass the idiosyncratic shocks onto workers, or a passive action to match employee contribution changes.

To shed light on the mechanism, we examine the changes in relative contributions between firms and workers. We compute two contribution ratios to capture company matching relative to employee contributions. The first ratio, *Firm-to-Employee Ratio*, is the ratio of firm contributions to worker contributions, reflecting how much a firm matches, on average, each dollar contributed by its employees. The second ratio, *Firm Share*, is the ratio of firm contributions to total retirement contributions, measuring the firm's share of total retirement savings. We then calculate the annual changes in these two contribution ratios. Additionally, we examine cases where the firm increases, decreases, or suspends its matching contributions, based on changes in *Firm Share*.

Table 6 reports the results. In the first two columns, we rerun the baseline regression using the changes in the two contribution ratios as the dependent variables. In the last three columns, we employ logit regressions to examine the likelihood of increases, decreases, or suspensions in firm matching. If employers actively adjust firm contributions in response to idiosyncratic firm shocks, beyond the amount passively driven by firm matching to changes in worker contributions, we should observe significant changes in the relative contribution ratios.[6] Indeed, for both ratios, we observe a positive relation between idiosyncratic firm performance and a negative relation between idiosyncratic uncertainty and the change in the contribution ratio. Specifically, using the *Firm-to-Employee Ratio* shown in column (1) as an example, a one-standard-deviation firm performance shock leads to a 0.51 percentage

[6]If firms only passively match worker contribution changes following the shocks, the observed relative contribution ratio would either remain unchanged or move in the opposite direction of the firm shock under the most common concave one- or two-tiered matching practices, depending on whether the tiered limit (or matching cap) has been reached. – Specifically, based on codified matching schedules of a representative DC plan sample, Arnoud et al. (2021) document that approximately 70% of firms offer a simple single-tier match schedule (e.g., a 50% match on employee contributions up to 6% of employee salaries), with almost all of the remaining firms offering a two-tier match schedule (e.g., an initial 100% matching up to 3% of employee contributions, followed by a 50% match on the next 2%). Under both matching schedules, if a firm makes no change in the matching rate, an increase in worker contributions following a positive firm shock will lead to either a proportional or a less then proportional change in firm contributions depending on whether firm matching reaches the tier limit or cap, resulting in either no change or a decrease in the observed relative contribution ratio.

point increase in the firm's match ratio and a one-standard-deviation firm uncertainty shock leads to 0.70 percentage point decrease in the firm's match ratio. Moreover, the last three columns reveal that firms experiencing positive idiosyncratic performance are significantly more likely to increase, and less likely to decrease or suspend firm matching in the following year. On the other hand, when experiencing uncertainty shocks, firms are significantly less likely to increase and more likely to suspend firm matching contributions subsequently.

Therefore, our evidence illustrates that, following idiosyncratic firm-level shocks, employers make active adjustments to employee retirement benefits, effectively passing through the shocks to workers via non-wage compensation.

4.2 Employee Responses

The observed responses by employees to firm-specific shocks could reflect a direct response due to a re-optimization of life-cycle savings decisions, or an indirect response to changes in firm matching policies. To understand the drivers of employee responses, we examine cases with and without firm matching changes following idiosyncratic firm shocks.

If employees respond to firm shocks directly, we should expect them to adjust their contributions subsequently even without any employer matching changes. On the other hand, if firms alter the match rate, such change could either amplify or dampen workers' incentives to adjust their retirement savings. For example, if adverse shocks prompt firms to reduce the matching rate, it can serve as an additional disincentive for workers to contribute to their retirement accounts, potentially intensifying the reductions in employee contributions. Alternatively, there may be a crowding-out effect, since reductions in employer matching may incentivize workers to save more or reduce contributions less in response to firm-specific shocks.

To better understand the employee response, we split firms into subsamples depending on whether firms change the relative contribution ratio (e.g.,*Firm Share*) in response to idiosyncratic firm shocks. We measure the change in *Firm Share* in the year following the shock,

that is, contemporaneously to the change in employee and employer contributions.[7] Since we do not observe the exact matching schedules of the firm, we define NO matching change as cases where the change in the ratio is within a narrow range around zero. Specifically, we apply two thresholds: changes within +/− 0.1% or within +/− 1% of zero, capturing 16% and 53% of the sample, respectively. This is consistent with the fact that firms infrequently change their matching schedules.

We re-estimate our baseline regression separately for the samples with and without matching changes, based on the two classification thresholds defined above. The results are reported in Panels A and B of Table 7, respectively. Focusing on Panel A first, we observe that for firms that do not make any matching changes (first three columns), their employees still make strong adjustments to DC contributions in response to firm-specific shocks. The effects are consistent with our baseline results. Workers significantly increase their contributions following positive firm shocks. The last three columns reveal that workers also react to firm shocks and in a consistent manner if their employers do make changes to the matching rate following the shock. Panel B of Table 7 depicts a similar picture of employee behavior. Comparing the two subsamples, we observe that employee responses are stronger for the half of the sample where firms make minimal matching rate changes, suggesting that employer incentive changes do not intensify employee retirement saving behaviors in response to firm-shocks. Instead, the pattern may be consistent with a crowding-out effect.

Another underlying firm retirement benefit incentive that may affect workers' saving behavior are Employer Stock Ownership Plans (ESOP). An ESOP is an employee retirement benefit plan that includes the company stock to give workers ownership in the company. Therefore, as the company stock performance fluctuates, it directly affects the return and the risk of workers' retirement portfolios, which, in turn, could affect workers' saving behavior. However, this incentive differs from reactions to labor income risk induced by firm idiosyncratic shocks (Kim and Ouimet (2014)). To understand this, we split our sample into

[7] We also measure the changes in *Firm Share* in the prior year, concurrent to the firm shock. The results are consistent.

ESOP and Non-ESOP plans. As shown in Table 8, ESOP plans only account for 15% of our sample and our results are not driven by these plans. Instead, employees react directly and strongly to firm-specific shocks in the majority of non-ESOP plans.

Overall, our evidence shows that both firms and workers react directly to firm-specific shocks in adjusting DC contributions. Employers therefore use active retirement benefit adjustments as a way to share firm-level risk with their employees. On the other hand, employees react to firm idiosyncratic shocks directly in the absence of any changes in retirement plan incentive, suggesting a labor market risk channel.

4.3 The Role of Financial Constraints

Financial constraints of a firm may play an important role in affecting how a firm and its employees react to firm-specific shocks regarding DC retirement contributions. Firms that face more stringent financial constraints or are in financial distress should have a lower ability to insulate their employees against idiosyncratic firm-level shocks. Moreover, negative and volatile firm performance may impose a bigger threat to employees in terms of their labor income and employment uncertainties when the firm is already facing financial difficulties, and thus induce greater employee responses. Therefore, we expect stronger effect of firm-specific shocks on both workers' and firms' retirement savings behaviors when firms are more financially constrained.

To capture a firm's financial constraints, we employ two measures. First, we use the distance to default (DD) based on Merton's Distance to Default Model (1974) as our main proxy of firms' financial constraints. The distance to default has been widely used in both the financial industry and the academic literature to measure firms' default risk (Schaefer and Strebulaev (2008), Gilchrist and Zakrajšek (2012), Ottonello and Winberry (2020), Di Maggio et al. (2022)). We follow the iterative procedure developed in Bharath and

Shumway (2008) to estimate the DD measure based on the following equation:

$$DD = [ln(V/F) + (\mu_V - 0.5 * \sigma_V^2)]/\sigma_V \tag{3}$$

where, F is the face value of the firm's debt, V is the firm's value, μ_V is the annual expected return on V, and σ_V is the annual volatility of the firm's value. The underlying value of the firm and its volatility can be estimated from the value of the firm's equity, the volatility of its equity, and the firm's observed capital structure. We then compute the firm-specific DD over the one-year horizon following the above equation. Second, we also use the leverage ratio as a measure of a firm's financial constraints, where the leverage ratio is computed as the sum of short-term and long-term debt of the firm divided by the firm's total assets. To capture high distress, we define the $Hleverage$ dummy, which equals one for firms ranked in the top leverage ratio quartile.

As shown in Table 1, our sample firms have an average DD of 6.93 with a standard deviation of 4.92. The average leverage ratio is 0.22 with a standard deviation of 0.21.

Next, we run the following regression and interact both the performance and uncertainty shocks with firms' financial constraints:

$$\begin{aligned} Y_{f,p,t} \quad = \quad & \beta_1 * Performance_{f,t-1} + \beta_2 * Uncertainty_{f,t-1} \\ & \gamma_1 * Performance_{f,t-1} * FC_{f,t-1} + \gamma_2 * Uncertainty_{f,t-1} * FC_{f,t-1} + \gamma_3 * FC_{f,t-1} \\ & + X'_{f,t-1}\beta_3 + P'_{p,t-1}\beta_4 + \alpha_f + \alpha_t + \epsilon_{f,p,t} \end{aligned} \tag{4}$$

where, financial constraints ($FC_{f,t-1}$) are either the DD or $Hleverage$ of the firm measured over the previous year. The results are reported in Table 9. Panel A reports the effect of distance to default, while Panel B reports the effect of high leverage.

Higher financial constraints and elevated default risks should intensify the impact of firm shocks on retirement contributions and the effects should be especially strong for the

idiosyncratic uncertainty shock. This is what we observe. As Panel A of Table 9 shows, the coefficients (γ_2) on the interaction term between the uncertainty shock and DD are all significantly positive. This is true for both firms and employees. Thus, firms that are closer to default are more aggressive in reducing the retirement benefits they offer to their employees, and employees in these firms also react more strongly to the firm uncertainty shock in lowering their retirement contributions.

The effect of financial constraints is economically large. For example, the coefficients in columns (3) and (6) show that a one-standard-deviation decrease in the distance to default (i.e., an increase in the probability of default) intensifies the effect of an uncertainty shock on both employee and employer contributions by 99% each.[8] More specifically, as the base effect, reflected by the coefficient on *Uncertainty*, a one standard deviation firm uncertainty shock reduces workers' total retirement contributions by \$112.92 (i.e., a 1.86% reduction from the median). Yet, a one standard deviation decrease in the DD will intensify such a reduction to \$224.87 (i.e., 3.71%), essentially doubling the negative effect.[9]

We observe highly consistent results from Panel B using high leverage as a measure of financial constraints. The coefficients on the interaction term of an uncertainty shock and $HLeverage$ are all negative for both employees and firms, indicating that a higher leverage amplifies the uncertainty shock.

We do not observe a strong effect of financial constraints for the firm-specific performance shock. Interestingly, in unreported tests, when we decompose the performance shock into positive and negative shocks, we find that high financial constraints reduce the effect of

[8]Given that one standard deviation of DD is 4.923, the coefficients of 7.557 and 5.527 on the interaction term shown in columns (3) and (6) indicate an additional effects on employee and employer contributions of 37.203 (=4.923*7.557) and 27.209 (=4.923*5.527). These correspond to 99% of the base effect (37.203/37.397=99%, 27.209/27.579=99%).

[9]Given that one standard deviation of an uncertainty shock is 1.738% daily, the coefficients of −37.397 and −27.576 in columns (3) and (6) indicate a total decrease in employee and employer contributions of −\$112.92 (=1.738 *(−37.397+(−27.576)). For the interaction effect, given that one standard deviation of DD is 4.923, the coefficients of 7.557 and 5.527 on the interaction terms shown in columns (3) and (6) indicate an additional decrease in total employee and employer contributions of −\$111.95 (=1.738*(-4.923) *(7.557+5.527)).

positive performance shocks (positive coefficients on the interaction) and intensify the effect of negative performance shocks (negative coefficients on the interaction). Nevertheless, we find financial constraints affect uncertainty shocks more strongly than performance shocks.

Overall, our results show that financial constraints can play an important role in intensifying the impact of firm-specific shocks on retirement savings.

4.4 Subsamples and Other Analyses

In this subsection, we provide additional analyses, focusing particularly on subsamples. First, to understand how state- and industry-level shocks affect retirement savings, we construct State and Industry Shocks as the value-weighted averages of firm shocks by state and by Fama-French 48 industry, respectively, while excluding the shocks by the firm itself. As revealed in Table 10, including both state- and industry-level shocks in our analysis does not affect the effects of firm-level shocks on retirement savings. Moreover, we find an independent and positive effect of the state-level performance shock on employee and employer DC contributions, whereas industry effects are insignificant. The economic magnitude of the state effect is strong. As indicated by the coefficients in columns (2) and (5), a one-standard-deviation increase in idiosyncratic state-level performance (i.e., 0.79%) leads the firm (its employees) to increase contributions to the DC accounts by 2.05% (0.40%), whereas a one-standard-deviation idiosyncratic firm performance shock results in an increase of employer (employee) contributions by 3.15% (0.73%).

Second, we look at whether our results vary across subperiods. We divide our sample equally into two subperiods: 2001 to 2010, and 2011 to 2020. The results are reported in Table 11. Our results are consistent across the two subperiods. In both periods, we observe that both workers and firms react to firm shocks in adjusting retirement contributions. Retirement savings are positively (negatively) associated with idiosyncratic performance (uncertainty) shocks. In unreported tests, we find robust results excluding the financial crisis periods of 2008 and 2009 from our sample.

Third, we investigate whether our results vary across small and large firms, as well as plans with a low and a high number of active participants. We first divide our sample equally into two subsamples based on firm size. We observe in Panel A of Table 12 that our results hold for both subsamples. Employers appear to react similarly to firm shocks in their contribution decisions regardless of firm size, while employees seem to react more strongly to firm uncertainty if they work for smaller firms. In addition, we also find consistent results for both high and low active-participant subsamples, reported in Panel B of Table 12. If anything, employers seem to respond more strongly in adjusting retirement benefits for plans with less active participants, while employees of small plans tend to react more to firm uncertainty shocks. Finally, to eliminate the possibility that our results are driven by very small plans, we rerun our analysis excluding firms with fewer than 100 active participants. The results in Panel C of Table 12 are consistent with our base-case results.

5 Conclusions

Our paper shows that firm-specific shocks have an impact on retirement contributions by both firms and their employees. Firms share their firm-specific risks with their employees by reducing retirement contributions after negative firm-specific shocks. In addition, employees also reduce their own retirement contributions after negative idiosyncratic shocks, even if the firms do not adjust their matching rates. Thus, short-term firm-specific shocks can have a long-lasting impact on the financial well-being in retirement.

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Table 1: Summary Statistics

The table reports summary statistics for the variables used in our analyses. For each variable, the mean, standard deviation (Std), median, 10th percentile (10th) and 90th percentile (90th) are reported. The variable definitions are provided in Table IA.1 in the Internet Appendix.

	Unit	Mean	Std	10th	Median	90th
Performance Shock	% daily	0.03	0.20	-0.17	0.02	0.22
Uncertainty Shock	% daily	2.50	1.74	0.98	2.01	4.59
Earnings Performance		0.00	0.05	-0.04	0.01	0.03
Earnings Uncertainty		0.02	0.04	0.00	0.01	0.05
Sales Performance		0.05	0.18	-0.03	0.02	0.12
Sales Uncertainty		0.18	0.35	0.03	0.10	0.34
Firm Contribution		2138.14	2549.34	0.00	1500.51	4884.73
Worker Contribution		5189.25	3832.07	446.40	4557.80	10505.31
Firm Contribution_LogChg		-0.02	1.68	-0.46	0.00	0.48
Firm Contribution_PctChg		0.17	0.96	-0.43	0.02	0.78
Firm Contribution_DollarChg		43.38	969.98	-649.00	0.00	789.64
Worker Contribution_LogChg		-0.08	0.92	-0.24	0.01	0.24
Worker Contribution_PctChg		0.06	0.39	-0.23	0.02	0.30
Worker Contribution_DollarChg		95.86	1538.41	-1092.30	38.44	1301.21
Firm-to-Employee Ratio		0.41	0.47	0.00	0.34	0.77
Firm Share		0.28	0.22	0.00	0.26	0.49
Firm-to-Employee Ratio_Chg		0.00	0.13	-0.08	0.00	0.09
Firm Share_Chg		0.00	0.06	-0.04	0.00	0.04
Worker Contribution_inc		0.54	0.50	0.00	1.00	1.00
Worker Contribution_dec		0.39	0.49	0.00	0.00	1.00
Worker Contribution_stop		0.01	0.11	0.00	0.00	0.00
Firm Contribution_inc		0.49	0.50	0.00	0.00	1.00
Firm Contribution_dec		0.39	0.49	0.00	0.00	1.00
Firm Contribution_stop		0.03	0.18	0.00	0.00	0.00
Size	millions	6821.81	25786.79	52.51	745.95	13774.31
BM		0.68	0.77	0.17	0.53	1.24
Leverage		0.22	0.21	0.00	0.18	0.49
Cash		0.17	0.20	0.01	0.09	0.49
EBIT		0.07	0.17	-0.05	0.10	0.21
Sale	millions	4831.62	16362.22	46.02	604.60	10785.14
Distance to Default		6.93	4.92	1.46	6.10	13.35
PlanAsset	millions	335.95	1681.52	2.79	28.01	551.20
AccountSize		81780.66	753281.89	8719.30	44924.23	157042.30
ActPart		4262.10	14543.18	109.00	705.00	8842.00

Table 2: Idiosyncratic Firm-Level Shocks and Retirement Savings

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.031**	0.036***	125.367**	0.340***	0.159***	160.546***
	(2.173)	(2.959)	(2.172)	(4.595)	(3.409)	(3.864)
Uncertainty Shock	-0.010**	-0.008***	-34.670*	-0.066***	-0.021**	-25.429***
	(-2.671)	(-3.667)	(-1.941)	(-3.924)	(-2.402)	(-2.964)
AccountSize	-0.104***	-0.154***	-320.643***	-0.125***	-0.183***	-134.214***
	(-11.056)	(-13.129)	(-10.573)	(-8.492)	(-11.431)	(-11.391)
ActPart	0.129***	0.066***	239.540***	0.107***	0.062***	98.420***
	(8.934)	(7.694)	(10.077)	(6.515)	(4.733)	(12.006)
Size	-0.038***	-0.016***	45.937	-0.077***	-0.059***	-27.064**
	(-4.408)	(-4.326)	(1.543)	(-4.802)	(-6.146)	(-2.508)
BM	-0.039**	-0.005	-24.368*	-0.040***	-0.010	-21.584
	(-2.116)	(-1.143)	(-1.751)	(-3.578)	(-1.131)	(-1.471)
Leverage	-0.061*	-0.028	-89.162	-0.099	-0.041	-75.835**
	(-1.740)	(-1.153)	(-1.382)	(-1.647)	(-0.812)	(-2.484)
Cash	0.064*	-0.041	-534.245***	0.224***	0.013	-91.967*
	(1.785)	(-1.703)	(-5.108)	(2.962)	(0.217)	(-2.064)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,274	45,631	49,274	49,411	44,931	49,411
R-squared	0.139	0.178	0.152	0.082	0.119	0.089

Table 3: Idiosyncratic Firm-Level Shocks and Retirement Savings: Positive vs. Negative Shocks

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of positive vs. negative idiosyncratic firm performance shocks on both employee and employer contributions to DC retirement plans. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year, where we decompose firm performance shock into positive and negative components. *Performance_Pos*(*Performance_Neg*) equals performance when the variable is positive (negative), and 0 otherwise. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance_Pos	0.014	0.041**	211.127**	0.273**	0.160*	149.772***
	(0.648)	(2.741)	(2.607)	(2.322)	(1.979)	(3.440)
Performance_Neg	0.056	0.028	-4.671	0.442***	0.157*	176.764*
	(1.264)	(0.982)	(-0.038)	(3.032)	(2.028)	(1.806)
Uncertainty Shock	-0.009*	-0.009***	-40.452**	-0.061***	-0.021*	-24.701***
	(-1.952)	(-3.582)	(-2.254)	(-2.956)	(-1.963)	(-3.123)
AccountSize	-0.104***	-0.154***	-320.576***	-0.125***	-0.183***	-134.217***
	(-11.063)	(-13.125)	(-10.581)	(-8.478)	(-11.421)	(-11.383)
ActPart	0.129***	0.066***	239.603***	0.107***	0.062***	98.410***
	(8.928)	(7.695)	(10.081)	(6.504)	(4.734)	(12.004)
Size	-0.038***	-0.016***	45.555	-0.076***	-0.059***	-27.017**
	(-4.386)	(-4.337)	(1.545)	(-4.753)	(-6.122)	(-2.507)
BM	-0.039**	-0.005	-24.485*	-0.040***	-0.010	-21.572
	(-2.118)	(-1.144)	(-1.735)	(-3.577)	(-1.135)	(-1.471)
Leverage	-0.061*	-0.028	-91.572	-0.097	-0.041	-75.525**
	(-1.732)	(-1.154)	(-1.426)	(-1.642)	(-0.820)	(-2.528)
Cash	0.063*	-0.041	-532.598***	0.222***	0.013	-92.194*
	(1.771)	(-1.700)	(-5.093)	(2.931)	(0.219)	(-2.078)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,274	45,631	49,274	49,411	44,931	49,411
R-squared	0.139	0.178	0.152	0.082	0.119	0.089

Table 4: Idiosyncratic Firm-Level Shocks and Retirement Savings: Contribution Increase, Decrease and Suspension

This table reports the coefficient estimates and t-statistics from Logit regressions analyzing the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans. The dependent variables are *Increase*, *Decrease* and *Suspend* of contributions, defined as dummy variables that equal 1 if the change the contributions are positive, negative and if the contribution amount drops to zero, respectively. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. All regressions control for additional plan characteristics, including the logarithm of account size (*AccountSize*) and the logarithm of active participants (*ActPart*), and firm characteristics, including the logarithm of market value (*Size*), the book-to-market ratio (*BM*), leverage (*Leverage*) and cash holdings (*Cash*) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	Increase	Decrease	Suspend	Increase	Decrease	Suspend
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.195***	-0.218***	0.022	0.376***	-0.181**	-0.632***
	(2.934)	(-2.969)	(0.081)	(6.421)	(-2.107)	(-5.554)
Uncertainty Shock	0.008	0.046**	0.031	-0.066***	-0.030	0.187***
	(0.387)	(2.219)	(0.708)	(-2.955)	(-1.381)	(10.978)
AccountSize	-0.025	0.236***	-0.005	-0.011	0.202***	-0.176***
	(-1.173)	(10.693)	(-0.093)	(-0.860)	(16.459)	(-5.697)
ActPart	0.207***	-0.038***	-0.560***	0.166***	0.002	-0.258***
	(17.089)	(-3.156)	(-15.771)	(15.426)	(0.158)	(-6.781)
Size	-0.079***	-0.048***	0.417***	-0.059***	-0.047***	0.089**
	(-5.644)	(-3.638)	(9.907)	(-5.949)	(-4.149)	(2.069)
BM	-0.092***	0.018	0.192***	-0.055***	0.011	0.079***
	(-5.625)	(1.454)	(3.140)	(-2.708)	(0.654)	(3.019)
Leverage	-0.066	0.179***	0.015	-0.140*	0.064	0.352**
	(-0.891)	(2.635)	(0.049)	(-1.930)	(0.801)	(2.272)
Cash	0.435***	-0.008	-1.514***	-0.031	-0.449***	-0.679***
	(7.230)	(-0.126)	(-2.793)	(-0.359)	(-5.450)	(-4.144)
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,750	49,750	49,750	49,892	49,892	49,892

Table 5: Accounting-Based Firm-Level Shocks and Retirement Savings

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of alternative accounting-based firm-level shocks on both employee and employer contributions to DC retirement plans. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are alternative firm-level shocks defined using accounting information of the firm. Panel A reports results based on *Sales Performance* and *Sales Uncertainty*, which are defined as the average and standard deviation of the firm's quarterly percentage sales growth over the previous year, respectively. Panel B reports results based on *Earnings Performance* and *Earnings Uncertainty*, which are defined as the average and standard deviation of the firm's quarterly earnings-to-asset ratio over the previous year, respectively. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Sales Performance and Uncertainty

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Sales Performance	0.047	0.074**	565.882**	0.527***	0.199**	263.317***
	(1.060)	(2.232)	(2.354)	(4.088)	(2.324)	(3.535)
Sales Uncertainty	0.014	0.014	-164.132	-0.212***	-0.032	-67.409*
	(0.511)	(0.943)	(-1.545)	(-3.213)	(-0.793)	(-1.876)
AccountSize	-0.098***	-0.152***	-308.614***	-0.114***	-0.176***	-126.525***
	(-10.685)	(-12.832)	(-9.799)	(-7.994)	(-11.020)	(-10.825)
ActPart	0.126***	0.065***	235.330***	0.103***	0.060***	94.808***
	(8.572)	(7.502)	(9.677)	(6.120)	(4.408)	(11.713)
Size	-0.033***	-0.015***	57.272*	-0.065***	-0.057***	-24.394**
	(-3.890)	(-3.429)	(1.985)	(-3.124)	(-5.903)	(-2.406)
BM	-0.039**	-0.006	-22.140	-0.064***	-0.017**	-30.930**
	(-2.118)	(-1.304)	(-1.311)	(-5.201)	(-2.201)	(-2.381)
Leverage	-0.070*	-0.034	-99.998	-0.155**	-0.066	-77.928**
	(-1.852)	(-1.455)	(-1.398)	(-2.818)	(-1.314)	(-2.222)
Cash	0.050	-0.047*	-528.216***	0.262**	0.013	-78.334
	(1.411)	(-1.987)	(-5.552)	(2.724)	(0.210)	(-1.539)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,866	45,219	48,866	49,000	44,511	49,000
R-squared	0.136	0.180	0.155	0.080	0.120	0.087

Table 5: continued

Panel B: Earnings Performance and Uncertainty

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Earnings Performance	0.262**	0.051	-87.706	1.595***	0.036	517.887**
	(2.531)	(0.606)	(-0.164)	(4.599)	(0.145)	(2.349)
Earnings Uncertainty	0.030	-0.107	-1,900.450***	-0.656	-0.470*	-689.071**
	(0.406)	(-1.214)	(-3.607)	(-1.393)	(-1.822)	(-2.337)
AccountSize	-0.100***	-0.153***	-315.180***	-0.119***	-0.179***	-129.768***
	(-10.730)	(-12.825)	(-10.028)	(-8.635)	(-10.997)	(-11.149)
ActPart	0.126***	0.065***	237.571***	0.103***	0.060***	96.323***
	(8.528)	(7.554)	(9.823)	(6.128)	(4.446)	(11.898)
Size	-0.030***	-0.013***	64.210*	-0.076***	-0.057***	-28.315**
	(-3.785)	(-3.064)	(2.025)	(-3.842)	(-5.734)	(-2.626)
BM	-0.024*	-0.002	-9.291	-0.053***	-0.014	-27.003*
	(-1.755)	(-0.538)	(-0.691)	(-3.701)	(-1.528)	(-1.953)
Leverage	-0.063*	-0.034	-103.752	-0.112*	-0.074	-67.544**
	(-1.738)	(-1.499)	(-1.681)	(-1.928)	(-1.553)	(-2.110)
Cash	0.054	-0.045*	-528.886***	0.254**	0.022	-76.007
	(1.611)	(-1.919)	(-5.402)	(2.817)	(0.370)	(-1.567)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,207	45,538	49,207	49,346	44,784	49,346
R-squared	0.137	0.180	0.155	0.081	0.120	0.088

Table 6: Idiosyncratic Firm-Level Shocks and Firm Responses: Contribution Ratio Change

This table reports the coefficient estimates and t-statistics from the OLS and Logit regressions analyzing the impact of idiosyncratic firm-level shocks on employer responses in changing the firm relative to worker contribution ratio. The dependent variables in the OLS regressions are the changes in the firm to worker contribution ratio (*Firm-to-Employee Ratio*) and the firm to total contribution ratio(*Firm Share*). The dependent variables in the Logit regressions are increase, decrease and suspend dummies based on the change in the worker to total contribution ratio. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Contribution Ratio Change		Contribution Ratio Change (Logit)		
VARIABLES	Firm-to-Employee	Firm Share	Increase	Decrease	Suspend
	(1)	(2)	(3)	(4)	(5)
Performance Shock	0.025***	0.017***	0.372***	-0.224**	-0.632***
	(3.159)	(3.720)	(4.192)	(-2.216)	(-5.554)
Uncertainty Shock	-0.004**	-0.002**	-0.049***	0.006	0.187***
	(-2.158)	(-2.787)	(-3.679)	(0.405)	(10.978)
AccountSize	-0.006***	-0.002***	0.097***	0.201***	-0.176***
	(-3.711)	(-3.762)	(5.336)	(11.675)	(-5.697)
ActPart	0.001	-0.000	0.055***	0.086***	-0.258***
	(0.668)	(-0.578)	(4.030)	(7.984)	(-6.781)
Size	-0.006***	-0.002***	-0.036***	-0.037***	0.089**
	(-4.201)	(-3.345)	(-3.699)	(-3.045)	(2.069)
BM	-0.003	-0.001	-0.035**	0.005	0.079***
	(-1.254)	(-1.021)	(-2.456)	(0.313)	(3.019)
Leverage	-0.001	-0.003	0.062	-0.045	0.352**
	(-0.234)	(-1.061)	(1.013)	(-0.609)	(2.272)
Cash	0.011*	0.006*	-0.108	-0.370***	-0.679***
	(1.913)	(1.932)	(-1.129)	(-5.538)	(-4.144)
Firm FE	Yes	Yes	No	No	No
Ind FE	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	45,354	47,782	48,276	48,276	49,892
R-squared	0.064	0.069			

Table 7: Idiosyncratic Firm-Level Shocks and Employee Retirement Savings: With and Without Firm Matching Change

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on employee contributions to DC retirement plans, with and without changes in employer matching incentives. The dependent variables are the log change, percentage change and dollar change in employee contributions. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. In Panel A (Panel B), No firm matching change is defined as if the change in *Firm Share* is within +/− 0.1% around 0 (within +/− 1% around 0). All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Matching Change Within +/− 0.1% around 0

	Worker Contribution Change					
	Without Firm Matching Change			With Firm Matching Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.056**	0.055	352.785***	0.035**	0.040***	98.952
	(0.022)	(0.034)	(108.748)	(0.016)	(0.014)	(64.142)
Uncertainty Shock	-0.014***	-0.015***	-57.500**	-0.011**	-0.008**	-33.329*
	(0.003)	(0.004)	(23.124)	(0.005)	(0.003)	(17.596)
AccountSize	-0.070***	-0.191***	-291.630***	-0.121***	-0.160***	-385.817***
	(0.010)	(0.027)	(46.033)	(0.012)	(0.012)	(34.996)
ActPart	0.060***	0.063***	226.963***	0.143***	0.067***	247.162***
	(0.013)	(0.017)	(48.217)	(0.017)	(0.008)	(23.865)
Size	-0.003	-0.018	147.711*	-0.046***	-0.017***	17.589
	(0.008)	(0.011)	(77.604)	(0.011)	(0.004)	(21.653)
BM	0.004	0.000	38.969	-0.045**	-0.006	-38.633**
	(0.008)	(0.008)	(33.644)	(0.021)	(0.006)	(16.268)
Leverage	0.055	0.050	383.348*	-0.086*	-0.034	-145.590**
	(0.043)	(0.053)	(191.610)	(0.043)	(0.026)	(64.816)
Cash	-0.079*	-0.096	-497.442*	0.080*	-0.034	-516.355***
	(0.043)	(0.060)	(273.206)	(0.041)	(0.025)	(112.142)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,747	5,386	7,747	40,446	39,125	40,446
R-squared	0.241	0.300	0.248	0.157	0.181	0.162

Table 7: continued

Panel B: Matching Change Within +/− 1% around 0

	Worker Contribution Change					
	Without Firm Matching Change			With Firm Matching Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.043**	0.043**	218.160***	0.033	0.048**	93.007
	(2.811)	(2.237)	(3.164)	(1.251)	(2.679)	(1.071)
Uncertainty Shock	-0.010***	-0.011***	-46.746***	-0.010	-0.006	-16.491
	(-5.031)	(-5.500)	(-2.948)	(-1.310)	(-1.442)	(-0.821)
AccountSize	-0.081***	-0.145***	-286.412***	-0.121***	-0.162***	-364.962***
	(-9.398)	(-8.241)	(-8.487)	(-7.718)	(-12.418)	(-10.470)
ActPart	0.057***	0.053***	215.794***	0.175***	0.077***	266.587***
	(6.176)	(5.268)	(7.453)	(8.610)	(8.303)	(10.104)
Size	-0.009**	-0.017***	50.628	-0.061***	-0.016***	28.769
	(-2.146)	(-3.406)	(1.495)	(-3.549)	(-2.865)	(0.920)
BM	-0.000	-0.002	2.926	-0.067*	-0.008	-55.577**
	(-0.034)	(-0.388)	(0.210)	(-1.965)	(-1.158)	(-2.169)
Leverage	0.008	-0.003	84.428	-0.110	-0.053	-228.691**
	(0.425)	(-0.158)	(1.031)	(-1.410)	(-1.477)	(-2.151)
Cash	-0.044*	-0.050*	-415.252***	0.110*	-0.044	-631.951***
	(-1.897)	(-1.842)	(-3.207)	(1.934)	(-1.211)	(-4.173)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,355	23,032	25,355	22,920	21,599	22,920
R-squared	0.215	0.242	0.215	0.199	0.215	0.199

Table 8: Idiosyncratic Firm-Level Shocks and Employee Retirement Savings: ESOP and Non-ESOP Plans

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on employee contributions to DC retirement plans, for ESOP and non-ESOP plans. The dependent variables are the log change, percentage change and dollar change in employee contributions. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Worker Contribution Change					
	ESOP Plans			Non-ESOP Plans		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	-0.007	0.035	65.313	0.033*	0.038***	125.361**
	(-0.085)	(0.679)	(0.541)	(1.951)	(2.982)	(2.104)
Uncertainty Shock	-0.003	-0.003	9.355	-0.012***	-0.009***	-38.205*
	(-0.258)	(-0.356)	(0.385)	(-3.144)	(-3.718)	(-2.011)
AccountSize	-0.072***	-0.098***	-172.512***	-0.123***	-0.165***	-390.546***
	(-3.959)	(-5.571)	(-5.212)	(-10.608)	(-12.010)	(-10.374)
ActPart	0.095***	0.037***	166.105***	0.132***	0.072***	265.771***
	(4.562)	(4.706)	(6.829)	(8.938)	(7.939)	(10.728)
Size	-0.015	0.001	35.796	-0.045***	-0.021***	26.197
	(-0.934)	(0.063)	(1.231)	(-4.358)	(-5.363)	(0.827)
BM	0.003	0.003	-3.467	-0.051*	-0.008	-36.033**
	(0.275)	(0.438)	(-0.192)	(-2.008)	(-1.416)	(-2.175)
Leverage	0.130	-0.002	227.843	-0.078**	-0.034	-146.414*
	(1.350)	(-0.024)	(0.887)	(-2.145)	(-1.330)	(-2.032)
Cash	0.330**	0.099	56.966	0.051	-0.038	-540.134***
	(2.855)	(0.832)	(0.143)	(1.311)	(-1.660)	(-5.387)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,290	5,334	7,290	41,907	40,237	41,907
R-squared	0.146	0.143	0.096	0.171	0.198	0.170

Table 9: Idiosyncratic Firm-Level Shocks and Retirement Savings: the Role of Financial Constraints

This table reports the coefficient estimates and t-statistics from regressions of equation (3) analyzing the role of financial constraints on the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*), uncertainty (*Uncertainty Shock*), and interactions between firm shocks and measures of firm's financial constraints, all measured over the previous year. Panel A reports results based on the Distant to Default (DD) of the Merton (1974) Model, estimated following the iterative procedure developed by Bharath and Shumway (2008). Panel B reports results based on the High Leverage ($Hleverage$), which is defined a dummy that equals 1 for firms in the top quartile based on the leverage ratio. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Distance to Default

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.012	0.020	39.749	0.335***	0.139**	127.736*
	(0.480)	(1.152)	(0.557)	(3.882)	(2.100)	(1.934)
Uncertainty Shock	-0.011***	-0.009***	-37.397**	-0.082***	-0.029***	-27.576**
	(-3.528)	(-4.034)	(-2.495)	(-3.462)	(-3.232)	(-2.598)
Performance x DD	0.002	0.002	11.463	-0.019	-0.002	-3.572
	(0.488)	(0.861)	(1.164)	(-1.361)	(-0.342)	(-0.434)
Uncertainty x DD	0.002***	0.002***	7.557***	0.013***	0.005***	5.527***
	(3.134)	(3.337)	(4.294)	(3.907)	(3.433)	(3.629)
DD	-0.003**	-0.002***	-10.241***	-0.020***	-0.009***	-6.788**
	(-2.379)	(-3.085)	(-3.258)	(-2.961)	(-4.790)	(-2.589)
AccountSize	-0.095***	-0.149***	-283.750***	-0.107***	-0.172***	-124.299***
	(-10.343)	(-11.474)	(-9.932)	(-7.314)	(-9.511)	(-10.704)
ActPart	0.124***	0.064***	218.418***	0.105***	0.060***	95.568***
	(8.851)	(7.512)	(9.703)	(6.498)	(4.700)	(11.699)
Size	-0.040***	-0.013**	43.113*	-0.089***	-0.060***	-31.578**
	(-4.420)	(-2.805)	(1.790)	(-5.003)	(-6.315)	(-2.748)
BM	-0.033*	-0.006	-19.770	-0.033*	-0.010	-20.841
	(-1.769)	(-1.437)	(-1.131)	(-1.954)	(-1.163)	(-1.304)
Cash	0.062	-0.048	-566.484***	0.141	-0.020	-150.835**
	(1.500)	(-1.603)	(-5.094)	(1.540)	(-0.267)	(-2.659)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,118	38,678	42,118	42,207	38,715	42,207
R-squared	0.133	0.178	0.149	0.086	0.123	0.092

Table 9: continued

Panel B: High Leverage Ratio

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.017	0.024	114.244	0.337***	0.138***	164.562***
	(0.891)	(1.535)	(1.666)	(3.814)	(3.294)	(4.408)
Uncertainty Shock	-0.007	-0.006**	-25.055	-0.063***	-0.017*	-20.527**
	(-1.726)	(-2.366)	(-1.386)	(-3.563)	(-1.987)	(-2.706)
Performance x Hleverage	0.059	0.050**	44.357	0.025	0.090	-12.672
	(1.353)	(2.121)	(0.433)	(0.211)	(1.302)	(-0.238)
Uncertainty x Hleverage	-0.015**	-0.011**	-39.573**	-0.014	-0.017	-21.686**
	(-2.571)	(-2.573)	(-2.500)	(-0.923)	(-1.724)	(-2.475)
Hleverage	0.029*	0.026**	71.339*	0.038	0.052**	46.471*
	(1.756)	(2.124)	(1.767)	(1.213)	(2.207)	(2.035)
AccountSize	-0.104***	-0.153***	-320.484***	-0.125***	-0.183***	-134.043***
	(-11.047)	(-13.114)	(-10.563)	(-8.455)	(-11.431)	(-11.365)
ActPart	0.129***	0.066***	239.828***	0.107***	0.062***	98.425***
	(8.940)	(7.723)	(10.089)	(6.440)	(4.739)	(12.010)
Size	-0.038***	-0.016***	44.601	-0.075***	-0.059***	-26.963**
	(-4.433)	(-4.513)	(1.511)	(-4.636)	(-6.044)	(-2.520)
BM	-0.038*	-0.005	-22.466	-0.038***	-0.009	-19.852
	(-2.040)	(-1.038)	(-1.517)	(-3.099)	(-1.037)	(-1.328)
Cash	0.074**	-0.036	-524.089***	0.242***	0.023	-80.965*
	(2.103)	(-1.475)	(-5.010)	(3.242)	(0.391)	(-1.826)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	49,274	45,631	49,274	49,411	44,931	49,411
R-squared	0.139	0.179	0.152	0.082	0.119	0.089

Table 10: Idiosyncratic Firm-Level Shocks and Retirement Savings: State and Industry Shocks

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. State-level and Industry-level Shocks are defined as value-weighted averages of firm shocks by state and by Fama-French 48 industry, excluding the shock by the firm itself. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: State-level Shocks

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.028*	0.036***	130.794**	0.340***	0.156***	158.865***
	(1.945)	(2.882)	(2.216)	(4.574)	(3.306)	(3.758)
Uncertainty Shock	-0.011***	-0.009***	-42.128***	-0.067***	-0.022**	-26.915***
	(-3.090)	(-4.271)	(-3.016)	(-3.825)	(-2.749)	(-3.537)
State Performance Shock	0.175**	0.080**	246.978	0.432**	0.410***	406.814**
	(2.857)	(2.809)	(1.348)	(2.380)	(3.132)	(2.709)
State Uncertainty Shock	0.002	-0.002	84.681***	-0.038	-0.013	13.109
	(0.141)	(-0.180)	(2.898)	(-0.744)	(-0.440)	(0.411)
AccountSize	-0.103***	-0.153***	-315.257***	-0.124***	-0.183***	-133.474***
	(-10.572)	(-12.918)	(-10.338)	(-8.375)	(-11.438)	(-11.963)
ActPart	0.129***	0.066***	240.062***	0.108***	0.064***	99.132***
	(8.884)	(7.584)	(9.907)	(6.365)	(4.613)	(11.966)
Size	-0.040***	-0.018***	34.400	-0.081***	-0.063***	-32.130***
	(-4.589)	(-4.802)	(1.454)	(-5.631)	(-7.307)	(-3.252)
BM	-0.039**	-0.005	-24.509*	-0.041***	-0.010	-21.355
	(-2.124)	(-1.168)	(-1.764)	(-3.537)	(-1.129)	(-1.467)
Leverage	-0.059	-0.025	-78.374	-0.084	-0.036	-68.337**
	(-1.667)	(-1.067)	(-1.210)	(-1.473)	(-0.682)	(-2.211)
Cash	0.059	-0.045*	-575.080***	0.222***	0.005	-105.412**
	(1.666)	(-1.843)	(-5.606)	(2.924)	(0.086)	(-2.451)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,720	45,120	48,720	48,858	44,449	48,858
R-squared	0.138	0.178	0.151	0.082	0.120	0.089

Table 10: continued

Panel B: Industry-level Shocks

VARIABLES	Worker Contribution Change			Firm Contribution Change		
	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.031*	0.038***	137.741**	0.349***	0.166***	160.909***
	(2.088)	(3.138)	(2.444)	(4.728)	(3.655)	(3.924)
Uncertainty Shock	-0.012***	-0.009***	-43.247***	-0.069***	-0.022**	-27.712***
	(-3.172)	(-4.124)	(-3.300)	(-3.680)	(-2.714)	(-3.849)
Industry Performance Shock	0.020	-0.002	6.251	-0.047	-0.093	140.986
	(0.255)	(-0.041)	(0.029)	(-0.268)	(-0.846)	(1.189)
Industry Uncertainty Shock	0.008	-0.000	43.696	0.020	0.005	11.636
	(0.725)	(-0.011)	(1.624)	(0.352)	(0.139)	(0.493)
AccountSize	-0.104***	-0.153***	-316.514***	-0.123***	-0.183***	-133.805***
	(-10.857)	(-13.048)	(-10.504)	(-8.311)	(-11.386)	(-11.682)
ActPart	0.129***	0.066***	239.310***	0.107***	0.063***	98.531***
	(8.904)	(7.596)	(10.020)	(6.417)	(4.599)	(11.932)
Size	-0.039***	-0.017***	34.576	-0.080***	-0.061***	-30.496***
	(-4.472)	(-4.779)	(1.480)	(-5.678)	(-6.914)	(-3.238)
BM	-0.039**	-0.005	-24.931*	-0.041***	-0.010	-20.800
	(-2.104)	(-1.171)	(-1.786)	(-3.437)	(-1.142)	(-1.407)
Leverage	-0.058	-0.024	-77.934	-0.086	-0.030	-67.916**
	(-1.673)	(-1.019)	(-1.209)	(-1.369)	(-0.603)	(-2.165)
Cash	0.059	-0.045*	-577.606***	0.224***	0.004	-101.558**
	(1.599)	(-1.858)	(-5.536)	(2.926)	(0.072)	(-2.194)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,929	45,303	48,929	49,067	44,655	49,067
R-squared	0.138	0.177	0.151	0.082	0.119	0.088

Table 11: Idiosyncratic Firm-Level Shocks and Employee Retirement Savings: Subperiods

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans over two subperiods. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. Panel A reports results for the sample of 2001 to 2010, while Panel B reports results for the sample of 2011 to 2020. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: 2001 - 2010

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.040**	0.048**	161.812*	0.333***	0.149**	151.143**
	(2.454)	(3.041)	(2.236)	(4.239)	(2.439)	(2.845)
Uncertainty Shock	-0.011**	-0.009**	-19.018	-0.086***	-0.024*	-24.778*
	(-2.427)	(-3.053)	(-0.917)	(-5.170)	(-2.126)	(-2.194)
AccountSize	-0.125***	-0.192***	-419.383***	-0.150***	-0.219***	-166.564***
	(-9.951)	(-11.325)	(-10.503)	(-8.209)	(-9.836)	(-9.400)
ActPart	0.185***	0.106***	341.400***	0.140***	0.106***	119.079***
	(8.296)	(7.669)	(8.947)	(4.653)	(4.325)	(9.494)
Size	-0.044**	-0.014**	136.797**	-0.033	-0.044**	-11.016
	(-3.241)	(-2.863)	(2.612)	(-0.911)	(-2.618)	(-0.675)
BM	-0.046	-0.000	9.102	-0.024	0.004	9.118
	(-1.662)	(-0.038)	(0.454)	(-1.393)	(0.175)	(0.710)
Leverage	-0.070	-0.008	-31.131	0.072	0.028	22.858
	(-1.337)	(-0.186)	(-0.251)	(0.539)	(0.270)	(0.416)
Cash	0.114*	-0.031	-554.884***	0.278*	0.078	-7.556
	(2.041)	(-1.257)	(-3.804)	(2.111)	(0.965)	(-0.124)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,333	25,018	27,333	27,421	24,436	27,421
R-squared	0.173	0.229	0.186	0.109	0.160	0.114

Table 11: continued

Panel B: 2011 - 2020

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
Performance Shock	0.032**	0.035*	115.377	0.346***	0.182***	188.395***
	(2.301)	(2.247)	(1.274)	(3.583)	(3.748)	(3.274)
Uncertainty Shock	-0.009*	-0.008	-63.418**	0.002	-0.001	-28.015
	(-2.114)	(-1.709)	(-2.935)	(0.079)	(-0.072)	(-1.694)
AccountSize	-0.090***	-0.139***	-247.312***	-0.088***	-0.160***	-116.532***
	(-5.590)	(-10.950)	(-6.778)	(-4.972)	(-7.270)	(-7.612)
ActPart	0.092***	0.047***	184.329***	0.091***	0.042***	98.865***
	(7.866)	(6.972)	(9.869)	(6.964)	(4.854)	(7.503)
Size	-0.012	-0.004	72.881*	-0.035	-0.048***	5.413
	(-0.774)	(-0.450)	(1.968)	(-1.619)	(-3.311)	(0.274)
BM	-0.020	-0.002	-0.773	-0.007	-0.013	-35.919
	(-0.542)	(-0.406)	(-0.029)	(-0.191)	(-1.788)	(-1.586)
Leverage	-0.035	-0.026	-20.176	-0.063	-0.130	14.327
	(-0.921)	(-0.853)	(-0.161)	(-0.689)	(-1.208)	(0.324)
Cash	-0.035	-0.079*	-671.626***	0.168	-0.069	-172.144*
	(-0.810)	(-2.087)	(-3.326)	(1.422)	(-0.953)	(-1.900)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,716	20,384	21,716	21,765	20,272	21,765
R-squared	0.153	0.179	0.149	0.117	0.168	0.108

Table 12: Idiosyncratic Firm-Level Shocks and Employee Retirement Savings: Subsamples

This table reports the coefficient estimates and t-statistics from regressions of equation (1) analyzing the impact of idiosyncratic firm-level shocks on both employee and employer contributions to DC retirement plans for subsample of firms. The dependent variables are the log change, percentage change and dollar change in contributions from both workers and firms. The main independent variables are the idiosyncratic firm performance (*Performance Shock*) and firm uncertainty (*Uncertainty Shock*) over the prior year. The idiosyncratic firm performance (uncertainty) is measured as the abnormal firm return (residual volatility) each quarter, estimated from running the Fama-French three factor model using daily stock returns of the firm of the quarter, averaged over the previous four quarters. Panel A reports results for small vs large firms, Panel B reports results for plans with high vs low active participants, and Panel C reports results excluding tiny plans with active participants less than 100. All regressions control for additional plan characteristics, including the logarithm of account size ($AccountSize$) and the logarithm of active participants ($ActPart$), and firm characteristics, including the logarithm of market value ($Size$), the book-to-market ratio (BM), leverage ($Leverage$) and cash holdings ($Cash$) of the firm. All control variables are measured over the prior year. Variables definitions are provided in Table IA.1 in the Internet Appendix. All specifications control for firm and year fixed effects. Standard errors are double clustered at firm and year levels. (***), (**), and (*) indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Small vs. Large Firms

	Worker Contribution Change			Firm Contribution Change		
VARIABLES	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
	Small Firms					
Performance Shock	0.019	0.033**	114.401	0.352***	0.129**	124.366**
	(0.943)	(2.200)	(1.515)	(5.165)	(2.628)	(2.715)
Uncertainty Shock	-0.013**	-0.007**	-43.369**	-0.066***	-0.016	-20.444**
	(-2.610)	(-2.698)	(-2.435)	(-3.504)	(-1.707)	(-2.212)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23,431	21,794	23,431	23,524	20,662	23,524
R-squared	0.195	0.240	0.204	0.108	0.165	0.129
	Large Firms					
Performance Shock	0.051	0.040**	166.867	0.292**	0.197***	212.278***
	(1.679)	(2.268)	(1.484)	(2.838)	(3.385)	(3.949)
Uncertainty Shock	0.004	-0.007	3.828	-0.038**	-0.018	-48.495***
	(0.449)	(-1.422)	(0.126)	(-2.102)	(-1.118)	(-3.460)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,385	23,362	25,385	25,427	23,843	25,427
R-squared	0.119	0.151	0.141	0.083	0.108	0.087

Table 12: continued

Panel A: High vs. Low Active Participants

VARIABLES	Worker Contribution Change			Firm Contribution Change		
	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Active Participants					
Performance Shock	0.028	0.039*	185.515*	0.405***	0.192***	198.129***
	(1.377)	(1.965)	(2.060)	(5.304)	(4.405)	(3.867)
Uncertainty Shock	-0.010*	-0.008**	-43.649*	-0.075***	-0.030***	-28.414***
	(-1.768)	(-2.213)	(-1.988)	(-4.763)	(-3.094)	(-3.575)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,198	20,093	22,198	22,302	19,096	22,302
R-squared	0.233	0.248	0.215	0.121	0.175	0.131
	High Active Participants					
Performance Shock	0.061**	0.049***	122.055	0.305**	0.190**	147.106***
	(2.402)	(3.485)	(1.587)	(2.760)	(2.739)	(3.554)
Uncertainty Shock	-0.004	-0.006**	0.398	-0.065**	0.006	-18.988
	(-1.021)	(-2.339)	(0.034)	(-2.445)	(0.443)	(-1.462)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,700	25,167	26,700	26,732	25,459	26,732
R-squared	0.107	0.169	0.136	0.070	0.117	0.077

Table 12: continued

Panel C: Exclude Small Plans with Active Participants < 100

VARIABLES	Worker Contribution Change			Firm Contribution Change		
	LogChg	PctChg	DollarChg	LogChg	PctChg	DollarChg
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Active Participants					
Performance Shock	0.059***	0.051***	187.687***	0.367***	0.175***	179.445***
	(3.900)	(3.668)	(3.144)	(4.828)	(3.579)	(3.927)
Uncertainty Shock	-0.008*	-0.007**	-12.811	-0.066***	-0.017*	-22.779**
	(-1.966)	(-2.572)	(-0.712)	(-3.281)	(-1.922)	(-2.451)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46,275	42,932	46,275	46,385	42,645	46,385
R-squared	0.127	0.177	0.153	0.082	0.118	0.087

Internet Appendix

Firm Shocks and Retirement Savings

Table IA.1: Variable Definitions

Variable	**Definition**
Performance Shock	the average of the idiosyncratic firm performance over the previous four quarters, where idiosyncratic firm performance is the abnormal firm return each quarter estimated from running the Fama-French three factor model using daily stock returns of the firm over the quarter
Uncertainty Shock	the average of the idiosyncratic firm volatililty over the previous four quarters, where idiosyncratic firm volatility is the residual volatility each quarter estimated from running the Fama-French three factor model using daily stock returns of the firm over the quarter
Earnings	the average of firm earnings over the previous four quarters, where earnings each quarter are defined as the earnings before interest, taxes, depreciation and amortization normalized by total assets of the firm
Earnings Uncertainty	the volatility of firm earnings over the previous four quarters, where earnings each quarter are defined as the earnings before interest, taxes, depreciation and amortization normalized by total assets of the firm
Sales Growth	the average of percentage sales growth over the previous four quarters
Sales Uncertainy	the volatility of percentage sales growth over the previous four quarters
Firm Contribution	the total annual employer contributions of a plan divided by the total number of active participant in the plan
Worker Contribution	the total annual employee contributions of a plan divided by the total number of active participant in the plan
Firm Contribution_LogChg	log change in firm contribution over a year
Firm Contribution_PctChg	percentage change in firm contribution over a year
Firm Contribution_DollarChg	dollar change in firm contribution over a year
Worker Contribution_LogChg	log change in worker contribution over a year
Worker Contribution_PctChg	percentage change in worker contribution over a year
Worker Contribution_DollarChg	dollar change in worker contribution over a year
Firm-to-Employee Ratio	the ratio of firm contribution over worker contribution
Firm Share	the ratio of firm contribution over total contribution (from both employees and the employer)
Firm-to-Employee Ratio_Chg	change in firm DC contribution matching rate, where matching rate is defined as firm contribution over worker contribution
Firm Share_Chg	change in firm DC contribution matching rate, where matching rate is defined as firm contribution over total contribution (from both employees and the employer)
Size	the market value of firm equity
BM	book-to-market ratio
Leverage	total debt divided by total assets of the firm (annual)
Cash	cash holdings divided by total assets of the firm (annual)
EBIT	the earnings before interest, taxes, depreciation and amortization divided by total assets of the firm (annual)
Sale	annual sales of the firm (annual)
PlanAsset	total assets of a DC plan
AccountSize	average account size of plan participants of a DC plan
ActPart	total active participants of a DC plan

Table IA.2: Matched Sample of Compustat/CRSP Databases and Form 5500
The table reports the numbers of firms that file Form 5500 for defined contribution pension plans, in Compustat and CRSP merged sample, and in the matched sample between these databases, respectively.

year	Form 5500	Compu/CRSP	Mapped Sponsor		Mapped Plan	
	DC Sponsor	Public Company	N	Match rate	N	Match rate
2000	70277	6875	3359	49%	4162	61%
2001	73525	6339	3430	54%	4194	66%
2002	77566	6020	3602	60%	4571	76%
2003	77345	5821	3516	60%	4357	75%
2004	77764	5845	3484	60%	4259	73%
2005	79749	5804	3495	60%	4231	73%
2006	82363	5740	3484	61%	4223	74%
2007	84920	5670	3417	60%	4113	73%
2008	87159	5404	3345	62%	3988	74%
2009	90590	5213	3227	62%	3854	74%
2010	89572	5155	3138	61%	3742	73%
2011	89069	5084	3097	61%	3694	73%
2012	90011	4986	3038	61%	3627	73%
2013	91237	5046	2972	59%	3517	70%
2014	93191	5189	2949	57%	3440	66%
2015	95158	5147	2901	56%	3376	66%
2016	97234	5011	2844	57%	3298	66%
2017	99283	5010	2784	56%	3206	64%
2018	102086	5028	2711	54%	3116	62%
2019	105232	5006	2646	53%	3031	61%
2020	106410	5052	2578	51%	2947	58%