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The role of institutional investors in pension risk transfers

Mary McCarthy[1] · Elisabeta Pana[2] · Andrew Weinberger[1]

Abstract
Risk transfers represent a preferred method for removing pension liabilities from corporate balance sheet. We examine the role of institutional shareholders on firm's decision to offload pension liabilities to professional risk managers. We find that the likelihood of pension risk transfers is higher for firms with higher level of institutional ownership and independent institutional owners. Firms with higher concentration of institutional ownership adopting a passive investment strategy are less likely to complete pension risk transfers. We also document the plan and sponsor-level factors affecting firms' decision to undertake pension risk transfers.

1 Introduction

A growing number of companies use an array of de-risking strategies to mitigate their pension risk exposure. Market volatility, regulatory changes, actuarial changes, and competitive pressures increase incentives for companies to engage in de-risking

✉ Mary McCarthy
mary.mccarthy@ccsu.edu

Elisabeta Pana
epana@ccsu.edu

Andrew Weinberger
andrew.weinberger@ccsu.edu

1 Department of Accounting, Central Connecticut State University, 1615 Stanley Street, New Britain, CT 06050, USA

2 Department of Finance, Central Connecticut State University, 1615 Stanley Street, New Britain, CT 06050, USA

strategies ranging from plan design to liability-driven investments and ultimately risk transfers (Geddes et al. 2014). Pension risk transfers allow sponsoring companies to offload some or all their defined benefit pension liabilities through lump-sum payments to participants and/or annuity buyouts with an insurance company. Despite their complexity, risk transfers are becoming the preferred de-risking activity to remove an estimated $3 trillion in pension liabilities from corporate balance sheet by the end of the decade (Metlife 2019).

Pension risk transfers have the potential to improve the overall financial position of the sponsors by reducing the pension liability and related expenses. However, they are also costly transactions that need to be carefully assessed by all parties – plan participants, plan sponsors, regulators, and fiduciaries. It is therefore important to identify factors that affect a firm's decision to undertake pension risk transfers. We build our analysis on previous evidence that firms view their pension plan assets and obligations as an extension of their balance sheet and, as a result, the financial condition of the plan sponsor has an influence on pension plan management (Bartram 2018). We investigate firm's management of its extended balance sheet and focus on the relationship between a firm's decision to undertake pension risk transfers and plan and sponsor-level characteristics. We use the methodology developed by Ranade, Saavedra, and Rhodes (Ranade et al. 2015) to identify the risk transfer events completed by plan sponsors between 2010 and 2017.

Defined benefit plans through their mandatory contributions' requirement have a negative effect on liquidity, financial leverage, and market value of the company sponsor (Phan and Hegde 2013). Aside from being important tools in managing pension risk, risk transfers have the potential for widening the gap between shareholders, employees, and management interests. Whereas shareholders benefit from cost and risk reduction for the firm, employees, including top managers, may have their future retirement benefits significantly altered by de-risking strategies (Vafeas and Vlittis 2018). Like other shareholder-friendly actions, such as dividend increases, share buybacks, and spinoffs, pension risk transfers may stem from institutional investors' influence on management to maximize the value of their investment. Numerous studies examined the impact of institutional ownership on highly visible managerial decisions such as executive compensation (Hartzell and Starks 2003; Almazan et al. 2005), CEO turnover (Parrino et al. 2003), anti-takeover amendments (Agrawal and Mandelker 1990) and governance proxy proposals (Gillan and Starks 2000). In contrast, the impact of institutional ownership on relatively less visible managerial decisions, such as pension plan management, has received only limited attention (Eaton et al. 2014).

Our study makes several important contributions. This is the first study to examine the impact of external corporate governance on corporate de-risking strategies through pension risk transfers. While there is limited evidence that institutional ownership is negatively associated with opportunistic pension accounting assumptions and pension underfunding, the role played by institutional investors on pension de-risking strategies is yet to be documented. We recognize that institutional investors are heterogeneous and their incentives, resources, and ability to monitor corporate strategic decisions vary greatly and thus, we focus our analysis on institutional owners that serve as external monitors of management (Bushee 1998; Hartzell and Starks 2003; Krupa and Utke 2020). Our results indicate that plan sponsors with higher percentage of institutional ownership and independent institutional investors are more likely to complete pension

risk transfers. Thus, we posit that monitoring institutional investors fulfill their role as a governance mechanism during the implementation stage of risk transfers. The results hold after we control for endogeneity.

We also provide evidence that firms consider their plan- and sponsor-level characteristics, as well as shareholders' characteristics, when designing their de-risking strategy through pension risk transfers. The literature on the determinants of de-risking strategies is relatively sparse (Rauh et al. 2020), and is especially deficient in analyses that examine pension risk transfers. While plan and sponsor characteristics influence firms' decision to de-risk using pension freezes (Yu 2014; Choy et al. 2014), we provide the first evidence on the role of these determinants for pension risk transfers, a dominant de-risking strategy. We find that employee bargaining power and plan-level characteristics, such as plan funding level, discount rate, and investment horizon explain firm's decisions to complete pension risk transfers, but we garner only limited evidence of pension plan integration. Our results are in line with the Bartram's (2018) findings of partial plan integration when pension investment risk is related to characteristics of sponsor's assets and liabilities. In summary, this paper links two branches of literature examining the external corporate governance mechanisms and managerial actions to provide insight required by firm stakeholders, market participants, and policymakers to make informed choices and evidence-based decisions.

The reminder of the paper is organized as follows. Section 2 reviews the background and introduces our hypotheses. Section 3 describes the data selection. Section 4 presents our findings and Section 5 provides our robustness check results. Section 6 presents our conclusions.

2 Background, related literature and testable hypotheses

2.1 Risk transfers

Risk reduction strategies are broadly classified as "in-plan" and "out-of-plan" de-risking. The adoption of the optimal strategy requires an evaluation of near-term costs and long-term savings while taking into consideration the capital market performance, regulatory requirements, and the interest rate environment (Lin et al. 2015). Developments, such as the steep increase in Pension Benefit Guaranty Corporation (PBGC) premiums, market volatility, economic climate and competitive pressure increased the attractiveness of the "out-of-plan" de-risking, primarily through lump-sum offerings and group annuity purchases. These risk transfer events allow sponsors to simultaneously reduce their pension-plan risk and capitalize on savings, but they may have sweeping unfavorable consequences for plan participants and regulatory bodies. More specifically, risk transfers leave plan participants exposed to inadequate retirement income risk and longevity risk and increase the overall risk to PBGC, as healthier plans exit the defined benefit system.

As opposed to "in-plan" de-risking, such as liability driven investment strategies, plan design, or plan freeze, the "out-of-plan" strategies eliminate the participant headcount and benefit obligations. The most common "out-of-plan" strategies are lump sum offerings and group annuity purchases. Lump sum offerings occur when a group of plan participants are allowed a one-time, limited opportunity to receive their benefits in the form of a lump sum

distribution, while group annuity purchases occur when the remaining pension obligations for some or all plan's participants are transferred to an insurer.

2.2 Related literature and hypotheses development

Implemented in response to growing deficits, pension plan regulations in the twenty-first century contributed to a wave of de-risking activities. Under the rules established by the Pension Protection Act (PPA) of 2006, moderately funded pension plans experienced a significant increase in funding requirements, while severely underfunded plans became subject to tighter amortization rates and higher PBGC premiums. Although the Relief Act of 2010 and the Moving Ahead for Progress in the twenty-first Century Act of 2012 (MAP-21) eased some of the burden brought on by the funding requirements of the PPA, the steep increase of PBGC premiums reinforced pension plan de-risking, particularly through risk transfers.

Notwithstanding their legal status as separate entities from a sponsor, pension plans offer benefits that are an integral part of firm's total liabilities (Treynor 1977). Since firms commit to using their resources to fulfill pension obligations, the analysis of pension plan management should be done in the context of sponsor's consolidated balance sheet (An et al. 2013). Against this backdrop, we investigate the likelihood of a firm to undertake pension risk transfers as a function of firm and pension plan characteristics. At firm level, we control for growth opportunities, proxied by Research &Development (R&D), as risk transfers benefit high-growth firms more (Bartram 2018). Like pension plan freezes, risk transfers may ease the volatility of a firm's cash flow induced by the mandatory contributions to defined benefit plans and premiums to PBGC. The required annual outlays made by sponsors with underfunded pension obligations are based on an arbitrary non-linear formula based on funding status and have a significant impact on firm's capital expenditures (Rauh 2006). We control for profitability using the five-year average of return on assets (ROA) and for leverage, as defined benefit plans are more valuable to leveraged firms due to a higher tax shield benefit (Shivdasani and Stefanescu 2010).

The next set of factors in our analysis includes plan characteristics, such as funding status, current plan asset return, investment horizon, discount rate, expected rate of return, and plan asset beta We add the discount rate to our set of controls, as firms under distress manipulate the actuarial assumptions to improve the reported plan funding. Similarly, firms can improve their earnings by increasing the expected rate of return assumption on pension assets. In a contemporaneous study, Silverstein (2019) shows that firms de-risk in the presence of growth prospects and when pension plans are better funded and large relative to the size of the firm. We follow Beaudoin et al. (2010) and control for the employee bargaining power, as firms with strong unions are less likely to have the leeway to modify its employee contracts for risk transfers.

Against this background, we state our first hypothesis as follows:

> **H1:** Firm's decision to undertake pension risk transfers is affected by factors both at the plan and sponsor-level.

Agency problems may adversely affect firm sponsors' pension risk management, which in turn weakens firm's performance and competitiveness. Shareholders should have a

strong incentive to monitor and influence managements' decisions, including those related to pension risk transfers. Since individual investors often lack the resources and expertise required to monitor complex decisions related to pension management, institutional investors may assume a meaningful role of influencing managerial behavior to mitigate the agency costs (Kim and Nofsinger 2005; Agnes Cheng et al. 2010, Eaton et al. 2014). Empirical evidence provides mixed results on the benefits of institutional investors in a firm. Faced with a choice between exerting monitoring efforts for shared gain and trading for private gain, only certain institutional investors choose to influence corporate strategic decisions (e.g., Hartzell and Starks 2003; Aghion et al. 2013), while others focus on short-term developments and act more as "traders" rather than "owners" (Bushee 1998; Chen et al. 2007). Since the benefits of monitoring must outweigh the costs, institutional investors with larger stakes in a firm are more likely to provide better monitoring.

Monitoring incentives are also affected by the strength of institutional investors' ties with their portfolio firms. For example, banks and insurance companies are non-monitoring institutional investors because they tend to have close business ties with firms in their portfolio. In order to preserve these business ties, non-monitoring institutional investors are less likely to challenge the management of the firm (Brickley et al.,1998). Following Bushee (2001) we classify investment companies (type 3 institutions), independent investment advisors (type 4), and others (type 5) as independent institutions. Banks (type 1) and insurance companies (type 2) are classified as grey (non-monitoring) investors.

The level of monitoring incentives is also determined by institutional investors' portfolio turnover, diversification, and momentum trading (Bushee 1998; Bushee and Noe 2000). Based on these characteristics, Bushee (1998) classifies institutional investors into three distinct groups: dedicated, transient, and quasi-indexers, respectively. Dedicated investors have large and long-term holdings in a few firms, while transient investors have small and short-term holdings in many firms. Quasi-indexers follow a passive investment strategy and thus, have the lowest level of monitoring incentives. Against this background, we state our next hypotheses as follows:

> **H2.1**: Firms with a higher concentration of independent institutional ownership are more likely to complete risk-transfers.
> **H2.2**: Firms with a higher concentration of quasi-institutional ownership are less likely to engage in risk transfers.

We supplement our analysis of the monitoring role of institutional investors in pension risk transfer using two additional measures. First, we examine the fraction of ownership by institutions with a highly concentrated holding in the firm. It is generally accepted that institutional investors with a greater stake in a firm use their resources to derive benefits that outweigh the cost of monitoring (Burns et al. 2010; Connelly et al. 2010). Contrary to this argument, there is evidence that dominant shareholders extract rents at the expense of small shareholders (Shleifer and Vishny 1997; Johnson et al. 2000). We define *Top 5* institutional ownership as the cumulative percentage shareholdings held by the top five investors at the beginning of the year. Second, we examine the fraction of ownership by domestic investors. We define *Domestic* institutional ownership as the cumulative percentage shareholdings held by the domestic investors at the beginning of the year. Dvorak (2005)

argues that domestic investors have an informational advantage over foreign investors, while Chen et al. (2009) and Andriosopoulos and Yang (2015) posit that foreign investors have higher ability in processing information than domestic investors.

3 Data

Our first dataset comes from the Form 5500 fillings, available from the Department of Labor (DoL) website.[1] Since the 2006 Pension Protection Act (PPA) mandated significant changes to form 5500, we use the annual fillings reported by sponsors from year 2009 to year 2018. Thus, we take advantage of these recent improvements in the availability of pension data to examine the role played by institutional investors in firms' decisions to undertake risk transfers. We obtain the data on analyst coverage from the Thompson Reuters I/B/E/S (Institutional Brokers' Estimate System) database and use an instrumental variable (IV) approach to handle endogeneity.

We follow Ranade et al. (2015) to identify pension risk transfers defined as events satisfying at least one of three criteria. The first criterion, designed to exclude routine lump sum payments in cash balance plans, is satisfied for a given year if either the lump sum percentage (number of lump sums divided by sum of active and terminated vested (TV) counts is at least 25% or the lump sum percentage is at least 10% and it is at least five times the median lump sum percentage for the plan.[2] The second criterion, the terminated vested count, is satisfied if the decrease in terminated vested count during a certain year is at least 30%, while the third criterion, the retiree count criterion, is satisfied for a given year if the decrease in retiree count during the year is at least 10%. Terminated vested and retiree decrease are measured by using the TV and retiree count from Form 5500, Schedule SB. The exceptions are for a plan's final year filing where we use the end-of-year TV and retiree counts from Form 5500.

Final Form 5500 filing may be due to plan termination or spin-off to an ongoing plan and in each case the final filing shows all participant counts as zero at the end of the year. In order to avoid counting a spin-off to an ongoing plan as a risk transfer, we eliminate all instances where "Final Filing" box on the Form 5500 was checked and Schedule H indicated that assets were transferred to another plan and the event did not qualify as a risk transfer under the lump sum criterion. In addition, final filings that did not have asset transfer and that satisfied risk transfer criteria represent plan terminations and were counted as risk transfers. We eliminate all events that represent partial transfer to another plan with no 'Final Filing' check but non-zero transfer of assets, as such events could represent partial spin-offs. For cases where a spin-off is followed by a risk transfer (for example, a termination) of the receiving plan, the events that represented spin-offs alone were excluded entirely, while for events that represented a combination of a spin-off and risk transfer, only the drop associated with the risk transfer was counted.

We match the dataset of Form 5500 firms with the aggregate accounting and pension data from Compustat annual files and the institutional owner's data from Thomson

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[1] https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/public-disclosure/foia/form-5500-datasets
[2] We obtain the number of lump sums from Form 5500, Schedule R, line 3 and active and TV counts from Form 5500, Schedule Sb. The median lump sum percentage is obtained by looking at the plan's lump sum percentage in each of the available 5500 filings.

Financial Institutional Ownership. Table 1 lists the dependent and independent variables and their definition.

Institutional investors are divided into several groups: (i) bank trust departments; (ii) insurance companies; (iii) investment companies (open-end or closed-end mutual funds); (iv) independent investment advisors; (v) "others", such as foundations, Employee Stock

Table 1 Description of variables

Variable	Definition
Risk transfer	
RTE	Binary variable taking the value of 1 for a risk transfer event and 0 otherwise
RTE_Prct_Liabilities	Liability of plans involved in a risk transfer event/Total pension liability of the firm
Institutional Ownership	
Percent institutional ownership	Institutional investors ownership/ Total ownership
Independent institutions	Independent institutional investors/Total ownership
Top 5	Cumulative percentage shareholdings held by the top five institutional investors at the year-end prior to the risk transfer
Domestic	Cumulative percentage shareholdings held by US institutional investors in the firm at the year-end prior to the risk transfer
Firm (Sponsor) Characteristics	
R&D	Research & Development Expenses/Total Assets, with missing values set at zero
Debt Maturity	Long Term Debt/Total Debt
Log (Size Market Value)	Natural Logarithm of Market Value of Size (Market Capitalization + Total Debt + Preferred Stock)
Tangible assets/Total assets	(Total Assets-Total Intangible Assets)/Total Assets
Net PPE/Total assets	Net PPE/Total Assets
Gross Profit Margin	Average of up to 3 year of Operating Income/Sales
Log (Volatility of ROA)	Natural logarithm of prior 5-year standard deviation of Return on Assets
Quick Ratio	(Cash and ST Investments + Total Receivables)/Current Liabilities
Leverage (Market Value)	Total Debt (Market Capitalization +Total Debt)
Plan-level Characteristics	
Discount rate	Weighted average assumed discount rate, used to determine the present value at which the projected benefit obligation could be effectively settled.
Long-term Expected Return	Anticipated long-term rate of return on plan assets
Actual return on plan assets	Actual return on plan assets/Lagged fair value of plan assets
Log (PBO)	Natural logarithm of Projected Benefit Pension Obligations (POB)
PBO/Total assets	Projected Plan Obligations /Total Assets
Funding Level/PBO	(Fair Value of Plan Assets-Projected Benefit Obligations)/Projected Benefits
Pension Asset Beta	1*pension asset allocation equity+0.175*pension allocation debt+0.150*pension asset allocation real estate+1.2*pension asset allocation other

Ownership Plans (ESOPs), university endowments, and internally managed private and public pension funds. Following Brickley et al. (1988) and Chen et al. (2007), we separate institutional investors into grey investors (e.g., insurance companies and banks through their trust departments) and independent investors (e.g., pension funds, investment companies, and investment advisors). We also obtain data on institutional investor classification from Brian Bushee's website.[3] Bushee (1998) classifies institutional investors into three groups: 1) dedicated, 2) transient, and 3) quasi-indexers. Dedicated investors are significant owners with a low portfolio turnover and hence, a long-term investment horizon. Transient investors have a short-term investment horizon reflected by their high portfolio turnover and diversification, while quasi-indexers are passive investors.

We report summary statistics on firm and pension characteristics in Table 2, comparing the years immediately before a pension risk transfer with all other firm years. Risk transfer firms tend to be larger, more profitable, and more liquid than control firms. The defined benefit pension plans of risk transfer firms have larger projected benefit obligation and investment horizon but lower discount rate and pension asset beta. The results also indicate that first-order autocorrelation is present in the data. We follow Heckman (1981) and recognize that firms may have specific characteristics which make them more likely to transfer pension risk. The choice of the model for panel data analysis becomes particularly important when these characteristics persist over time, as they induce persistence in risk transfers.[4]

4 Results

We examine the firm's decision to transfer pension risk by using a pooled sample of 418 risk transfers and 2022 non risk-transfers and the following probit regression specification:

$$RTE_t = \alpha + \gamma_0 \text{Inst\_Own}_{t-1} + \sum_{n=1}^{N} \beta_n \text{Sponsor Factors}_{n,t-1}$$

$$+ \sum_{n=1}^{N} \beta_n \text{Pension Plan Factors}_{n,t-1},$$

where RTE_t represents a binary variable coded as 1 for pension risk transfers and 0 otherwise.

The variable *Inst_Own* is a placeholder for the two proxies for institutional ownership, including the percent of total ownership by institutional investors and the concentration of independent institutional owners. The sponsor-level factors include the sum of Cash, Short Term Investments and Total Receivables divided by Current Liabilities (Quick Ratio), the natural logarithm of prior 5-year standard deviation of Return on Assets (Log(Volatility of ROA)), property plant & equipment divided by total assets (Net PPE / Total Assets), research & development expenses divided by total assets (R&D / Total Assets), the natural

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[3] http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html
[4] When variables are highly persistent, both Fama-MacBeth and OLS yield biased standard errors (Petersen 2009).

Table 2 Descriptive statistics

	Control (2022)				Risk Transfer Firms (418)				t-Stat	Wilcoxon Z
	Mean	Median	Std. dev.	1st order autocorr	Mean	Median	Std. dev.	1st order autocorr		
Institutional Ownership										
Percent Institutional Ownership	0.7867	0.8250	0.1882	0.693	0.8207	0.8540	0.1657	0.356	-3.72***	3.5474***
Independent Institutions	0.6820	0.7044	0.1737	0.697	0.7151	0.7445	0.1583	0.410	-3.82***	3.8882****
Top 5	0.3115	0.3055	0.0907	0.603	0.3524	0.3386	0.0989	0.426	-7.80***	1.1126
Domestic	0.3890	0.3631	0.1032	0.633	0.3344	0.3694	0.1825	0.604	-4.92***	3.9356
Firm (Sponsor)										
Quick Ratio	1.2474	1.1082	0.7020	0.570	1.1619	1.0299	0.5947	0.400	2.59***	-2.3086**
Log (Volatility of ROA)	-3.6033	-3.6757	0.9704	0.643	-3.6119	-3.7132	0.9489	0.318	0.17	-0.4207
Gross Profit Margin	0.1613	0.1457	0.0972	0.742	0.1510	0.1391	0.0853	0.468	2.20*	-2.0769**
Net PPE/Total assets	0.2757	0.2135	0.2016	0.779	0.2537	0.2023	0.1832	0.436	2.20**	-1.6562*
R&D/Total Assets	0.0166	0.0092	0.0240	0.774	0.0164	0.0098	0.0203	0.510	0.43	1.1512
Log (Size Market Value)	8.3928	8.4204	1.8351	0.787	8.6754	8.5873	1.5622	0.499	-3.26***	2.6241***
Leverage (Market Value)	0.2278	0.1881	0.1729	0.666	0.2187	0.1797	0.1615	0.351	1.000	-0.5897
Debt Maturity	0.9177	0.9793	0.1480	0.379	0.9300	0.9782	0.1251	0.174	-1.780*	-0.1801
Pension Plan										
Funding Level/PBO	-0.2322	-0.2341	0.1454	0.632	-0.1982	-0.1977	0.1581	0.397	-4.06***	4.9247***
Log (PBO)	6.3357	6.3077	1.8786	0.796	6.8524	6.7292	1.7408	0.510	-5.18***	4.9357***
Long-term Expected Return	7.5447	7.7500	0.8772	0.575	7.2074	7.4850	0.9163	0.466	7.10***	-7.6305****
Discount Rate	4.7430	4.6000	0.8390	0.210	4.4069	4.3300	0.6049	0.029	9.61***	-7.0326****
Actual Return on Plan Assets	0.0725	0.0918	0.0908	-0.130	0.0748	0.0846	0.0571	-0.152	-0.69	-1.8395*
Pension Asset Beta	0.6875	0.6947	0.1365	0.626	0.6408	0.6642	0.1617	0.353	5.52***	-5.7410***
Log (Investment Horizon)	4.3052	4.1053	1.0522	0.710	4.5846	4.3671	1.0240	0.310	-4.97***	5.6098****

Descriptive statistics for firms that completed a pension risk transfer between 2010 and 2017 and all firms without a pension risk transfer (controls). All firms have institutional ownership data available. All variables are measured at the end of the year prior to the pension risk transfer and are defined in Table 1.
***, **, * indicate levels of significance at 1%, 5%, and 10%, respectively.

log of the market value of common and preferred stock (Log(Size Market Value)), total debt divided by total debt and common stock (Leverage(Market Value)), and current portion of long-term debt divided by total long-term debt (Debt Maturity).

Pension plan factors include the natural logarithm of the projected benefit pension obligations (Log(PBO)), the fair value of plan assets less projected benefit obligations (Funding_LVL_PBO), the anticipated long-term return on plan assets (Long-term Expected Return on Plan Assets), the weighted average assumed discount rate (Discount_Rate), the actual return on plan assets divided by pension plan assets (Actual Return on Plan Assets), the actual return on plan assets divided by pension plan assets (Actual_RT_PA), the pension asset beta (Pension Asset Beta), and the natural log of the investment horizon defined as the pension projected benefit obligation divided by the pension service cost (Log (Investment Horizon)).

Table 3 specifications [1] and [3], where institutional ownership is measured as *Percent Institutional Ownership* and *Independent Institutions* respectively, demonstrate that the coefficients are positive and significant (p value <.1) and (p value <.05). The results are in line with the evidence presented by Eaton et al. (2014) that institutional investors fulfill their monitoring role and facilitate the transfer of pension risk. Specifications [2] and [4] indicate that institutional investors' horizon does not explain plan sponsor's choice to transfer pension risk. Across all specifications we find evidence that plan sponsors with a higher leverage are less likely to complete a transfer of pension risk. Whereas the result indicates only limited evidence of pension plan integration, we provide support to the argument advanced by Shivdasani and Stefanescu (2010) that defined benefit plans are more valuable to leveraged firms.

Several plan-level characteristics, including projected benefit obligations, the actual return on plan assets, plan asset beta and investment horizon explain the de-risking transfer. We calculate the investment horizon as the ratio of pension projected benefit obligations to pension service cost and thus, a longer investment horizon is indicative of a younger workforce (Amir et al. 2010. We follow Jin et al. (2006), Mohan and Zhang (2012), and Bartram (2018) in using plan asset beta as a measure of pension risk. Pension plan managers of de-risking firms may have less of an incentive to assume more risk with the intention of passing underfunded current pension obligations on to future taxpayers. Our results indicate that firms with pension plans having a higher actual return on plan assets and younger workforce but lower pension risk are-more likely to complete a risk transfer.

Table 4 shows further evidence of institutional ownership impact on risk transfer strategies based on regressions with the risk transfer percentage liabilities in total plan liabilities as the dependent variable. We utilize the following specification, cluster by firm level, and include firm and time fixed effects:

$$RTE\ Prct\ Liabilities_t = \alpha + \gamma_0 \text{Inst\_Own}_{t-1} + \sum_{n=1}^{N} \beta_n \text{Sponsor Factors}_{n,t-1} + \sum_{n=1}^{N} \beta_n \text{Pension Factors}_{n,t-1},$$

where *RTE Prct Liabilities$_t$* is defined as the total liabilities in the transferred pension plan divided by the total liabilities of all pension plans for the given sponsor-year observation. The variable *Inst_Own* is a placeholder for the two proxies for institutional ownership, including the percent of total ownership by institutional investors and the

Table 3 Probit regressions

Placeholder Text	(1)		(2)		(3)		(4)	
	Coef.	S.E	Coef.	S.E	Coef.	S.E.	Coef.	S.E.
Institutional Ownership								
Percent Institutional Ownership	0.9213*	0.48	0.8712*	0.48				
Independent Institutions					0.9632**	0.48	0.9156*	0.51
Quasi			−0.1387	0.19			−0.1408	0.19
Dedicated			−0.2626	0.20			−0.2662	0.20
Transient			0.0140	0.23			−0.0026	0.23
Pension Plan								
Collective Bargain	−0.2436	0.19	−0.2589	0.19	−0.2504	0.19	−0.2660	0.19
Funding Level / PBO	−0.3818	0.70	−0.3457	0.70	−0.3792	0.70	−0.3432	0.70
Log (PBO)	0.2386***	0.09	0.2580***	0.09	0.2517***	0.09	0.2616***	0.09
Long-term Expected Return	−0.1065	0.09	−0.1017	0.09	−0.1058	0.09	−0.1011	0.09
Discount Rate	0.2918	0.19	0.2776	0.19	0.2918	0.19	0.2773	0.19
Actual Return on Plan Assets	2.4269**	0.96	2.3970**	0.96	2.4325**	0.96	2.4017**	0.96
Pension Asset Beta	−1.3539**	0.66	−1.3306**	0.66	−1.3567**	0.66	−1.3344**	0.66
Log (Investment Horizon)	0.0878	0.08	0.0849	0.08	0.0826	0.08	0.0799	0.08
Firm (Sponsor)								
Quick Ratio	−0.2015	0.13	−0.1918	0.13	−0.2026	0.13	−0.1928	0.13
Log (Volatility of ROA)	0.0614	0.08	0.0557	0.08	0.0572	0.08	0.0524	0.09
Gross Profit Margin	−1.5179	1.31	−1.5029	1.31	−1.5108	1.31	−1.4978	1.46
Net PPE/Total assets	−0.1121	0.63	−0.0817	0.63	−0.1022	0.64	−0.0717	0.66
R&D/Total Assets	−2.1805	3.95	−1.9195	3.95	−2.3537	3.95	−2.0921	4.03
Log (Size Market Value)	−0.1223	0.09	−0.1358	0.09	−0.1120	0.09	−0.1269	0.10
Leverage (Market Value)	−1.0605*	0.56	−1.0412*	0.56	−1.0876*	0.56	−1.0645*	0.59
Debt Maturity	0.3518	0.49	.3242	0.49	0.3535	0.49	0.3257	0.49
Intercept	−3.8632**	1.51	−3.6857**	1.51	−3.8978***	1.50	−3.7107**	1.50
R-square	0.13		0.15		0.13		0.13	
N (Pension Risk Transfers)	2440 (418)		2440 (418)		2440 (418)		2440 (418)	

This table shows the results of probit regressions on the probability of a pension risk transfer. The independent variables capture firms' pension plan characteristics, sponsor and institutional ownership characteristics. Industry and year fixed effects are included. All variables are measured at the end of the year prior to the risk transfer and defined in Table 1. Robust standard errors are clustered at the firm level.

***, **, * indicate levels of significance at 1%, 5%, and 10%, respectively.

concentration of independent institutional owners. We also include *Dedicated, Transient, and Quasi* as measures of institutional investors' investment horizon (Bushee and Noe 2000).

The results presented in Panel A of Table 4, specifications [1] and [2] with institutional ownership measured as *Percent Institutional Ownership* and *Independent Institutions* respectively, demonstrate that the coefficients are positive and significant (p value <.01). This implies that a higher presence of institutional ownership increases is

Table 4 This table shows the results of the regression on the magnitude of a pension risk transfer

Panel A

	(1) Coef.	S.E	(2) Coef.	S.E
Institutional Ownership				
Percent Institutional Ownership	0.1068***	0.04		
Independent Institutions			0.1208***	0.04
Pension Plan				
Collective Bargain	−0.0404**	0.02	−0.0415**	0.02
Funding Level / PBO	−0.0602	0.06	−0.0592	0.06
Log (PBO)	0.0128	0.01	0.0134	0.01
Long-term Expected Return	−0.0135	0.01	−0.0134	0.01
Discount Rate	0.0307*	0.02	0.0306*	0.02
Actual Return on Plan Assets	0.1335**	0.05	0.1327**	0.05
Pension Asset Beta	−0.1412**	0.07	−0.1405**	0.07
Log (Investment Horizon)	0.0191**	0.01	0.0184**	0.01
Firm (Sponsor)				
Quick Ratio	−0.0086	0.01	−0.0088	0.01
Log (Volatility of ROA)	0.0083	0.01	0.0076	0.01
Gross Profit Margin	−0.1156	0.12	−0.1172	0.12
Net PPE/Total assets	−0.0349	0.05	−0.0322	0.05
R&D	−0.1446	0.36	−0.1575	0.36
Log (Size Market Value)	−0.0096	0.01	−0.0087	0.01
Leverage (Market Value)	−0.1372***	0.05	−0.1392***	0.05
Debt Maturity	0.0297	0.05	0.0281	0.05
Intercept	0.3507	0.20	0.3396*	0.20
Fixed effects	Yes		Yes	
R-square	0.36		0.36	
N	2440		2440	

Panel B

	(1) Coef.	S.E	(2) Coef.	S.E	(3) Coef.	S.E
Institutional Ownership						
Percent Institutional Ownership	0.1010**	0.04				
Independent Institutions			0.1142***	0.04		
Quasi	−0.0404**	0.02	−0.0401**	0.02	−0.0426**	0.02
Dedicated	−0.0041	0.02	−0.0043	0.02	−0.0062	0.02
Transient	−0.0004	0.03	−0.0009	0.03	−0.0016	0.02
Top5					−0.0340	0.04
Domestic					−0.0646	0.06
Pension Plan						
Collective Bargain	−0.0428**	0.02	−0.0437**	0.02	−0.0350*	0.02
Funding Level / PBO	−0.0634	0.06	−0.0624	0.06	−0.0638	0.05
Log (PBO)	0.0124	0.01	0.0130	0.01	0.0122	0.01

Table 4 (continued)

Long-term Expected Return	−0.0136	0.01	−0.0135	0.01	−0.0147	0.01
Discount Rate	0.0315*	0.02	0.0313*	0.02	0.0339*	0.01
Actual Return on Plan Assets	0.1379**	0.05	0.1370**	0.05	0.1468***	0.05
Pension Asset Beta	−0.1430**	0.07	−0.1425**	0.07	−0.1475*	0.07
Log (Investment Horizon)	0.0177**	0.01	0.0171**	0.01	0.0165**	0.01
Firm (Sponsor)						
Quick Ratio	−0.0099	0.01	−0.0101	0.01	−0.0087	0.01
Log (Volatility of ROA)	0.0072	0.01	0.0066	0.01	0.0088	0.01
Gross Profit Margin	−0.1108	0.12	−0.1125	0.11	−0.0999	0.11
Net PPE/Total assets	−0.0383	0.06	−0.0356	0.05	−0.0550	0.05
R&D	−0.1360	0.36	−0.1487	0.36	−0.2189	0.36
Log (Size Market Value)	−0.0098	0.01	−0.0090	0.01	−0.0061	0.01
Leverage (Market Value)	−0.1420***	0.05	−0.1436***	0.05	−0.1382**	0.05
Debt Maturity	0.0291	0.05	0.0276	0.05	0.0451	0.04
Intercept	0.3970	0.20	0.3866*	0.20	0.4128**	0.19
Fixed effects	Yes		Yes		Yes	
R-square	0.36		0.36		0.37	
N	2440		2440		2440	

The dependent variable is the percentage of pension plan liabilities affected by the risk transfer in total pension liabilities. The independent variables capture firms' pension plan characteristics, sponsor and institutional ownership characteristics. Industry and year fixed effects are included. All variables are measured at the end of the year prior to the risk transfer and defined in Table 1. Robust standard errors are clustered at the firm level. ***, **, * indicate levels of significance at 1%, 5%, and 10%, respectively.

associated with a larger percentage of plan liabilities that are included in the risk transfer. Thus, we find evidence to support H2.1. Specifications [1] and [2] in Panel B of Table 4 indicate that the coefficient of Quasi is both negative and significant (p value <.05), demonstrating that firms with a higher concentration of quasi institutional ownership or passive investors are less likely to engage in risk transfers. Thus, we find evidence to support H2.2. The results in Table 4 reinforce prior findings that firms with lower leverage and plans with a higher actual return on plan assets and younger workforce but lower pension risk are more likely to complete a risk transfer. We also find evidence that as firms with strong unions are less likely to complete risk transfers affecting a higher proportion of plan liabilities. Specification [3] in Panel B of Table 4 shows that the fraction of ownership by institutions with a highly concentrated holding in the firm and the country of origin of institutional investors have no significant role in firms' decisions to transfer pension risk.

5 Robustness checks

Our baseline model follows Petersen's (2009) guidance to correct for correlation inherent in panel data by clustering by firm and using fixed time dummies (Eaton et al. 2014). Since correlations in panel data are more likely to appear in two dimensions with both firm effects and time effect, we conduct robustness checks that allow

for clustering along two dimensions, by firm and year (Cameron and Miller 2011; Thompson 2011).[5] The results, listed in Table 5, reinforce our initial findings that institutional investors fulfill their monitoring role and independent investors play a significant role in pension risk management through risk transfers. We find that sponsors of plans that complete risk transfers make less optimistic assumptions about the returns on the pension plan assets and choose more aggressive discount rate assumptions, in part to reduce consolidated leverage. We also find evidence in support of recent reports that better funded plans are more likely candidates for pension risk transfers.[6]

Another potential problem with our results is selection bias. The standard errors in the estimated models could be understated or overstated because institutional investors self-select in being invested in de-risking active firms. The results indicate that risk-transfers are related to firm and pension-plan characteristics. These distinctive characteristics between risk-transfer and non-risk transfer firms could represent potential self-selection bias. Following Antia et al. (2013) and Rauh et al. (2020), we employ propensity score matching to eliminate the confounding factors of unobserved industry-level trends, year-level correlations, and control for selection bias. We first run a logistic model with observable firm and plan characteristics that affect the likelihood of completing risk transfers. We then use the estimated propensity score to match the risk-transfer and non-risk transfer firms.

The results for the model based on the one-to-one matched sample of 762 firms are presented in Table 5. The coefficients of institutional investors ownership and independence remain significant, while all other coefficients are insignificant. We conclude that self-selection bias does not drive our main findings. One limitation of this procedure is that we cannot obtain best matched firms for every risk transfer firm. Of 418 risk transfer firms, we identify only 381counetrparties.

To address endogeneity concerns, we follow Cornett et al. (2007) and Eaton et al. (2014) by employing a 2SLS-IV model with the number of analysts covering the firm as an instrument for institutional share ownership. While analyst coverage is correlated with institutional share ownership, is not subject to reverse feedback due to pension risk transfers. In Table 6, Model (3), we report the second stage results of the analysis. In line with Cornett's (2007) findings, our results indicate that endogeneity problems surrounding share ownership are not severe.

6 Conclusion

The implementation of the Pension Protection Act has been followed by an increase in the number of pension risk transfers. We investigate the factors explaining the firms'

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[5] To obtain unbiased estimates, the clustered standard errors are adjusted by (N-1)/ (N-P) × G/(G-1), where N is the sample size, P is the number of independent variables, and G is the number of clusters.
[6] "Companies with newly flush pensions see chance to unload the risk" The Wall Street Journal, 2018.

Table 5 This table shows the results using a two-way dimensional cluster at the firm and year level

	(1)		(2)		(3)		(4)	
	Coef.	S.E	Coef.	S.E	Coef.	S.E	Coef.	S.E
Institutional Ownership								
Percent Institutional Ownership	0.1359***	0.05	0.1310**	0.05				
Independent Institutions					0.1603***	0.06	0.1550***	0.06
Quasi			−0.0302**	0.02			−0.0296**	0.01
Dedicated			−0.0120	0.02			−0.0120	0.02
Transient			0.0002	0.02			−0.0013	0.03
Pension Plan								
Collective Bargain	−0.0406**	0.02	−0.0429**	0.02	−0.0421**	0.02	−0.0444**	0.02
Funding Level / PBO	0.0967**	0.06	0.0972**	0.06	0.0961**	0.05	0.0966**	0.06
Log (PBO)	0.0159*	0.01	0.0160	0.01	0.0134	0.01	0.0168	0.01
Long-term Expected Return	−0.0313**	0.01	−0.0314**	0.01	−0.0308**	0.01	−0.0309**	0.01
Discount Rate	0.0521**	0.02	0.0526**	0.02	0.0510**	0.02	0.0516**	0.02
Actual Return on Plan Assets	0.0570	0.10	0.0563	0.10	0.0555	0.10	0.0550	0.10
Pension Asset Beta	−0.1094	0.08	−0.1096	0.07	−0.1086	0.08	−0.1090	0.07
Log (Investment Horizon)	0.0208**	0.01	0.0198**	0.01	0.0200**	0.01	0.0191**	0.01
Firm (Sponsor)								
Quick Ratio	−0.0103	0.01	−0.0107	0.01	−0.0106	0.01	−0.0110	0.01
Log (Volatility of ROA)	0.0023	0.01	0.0013	0.01	0.0013	0.01	0.0004	0.01
Gross Profit Margin	−0.1443*	0.09	−0.1405*	0.09	−0.1469*	0.09	−0.1434*	0.09
Net PPE/Total assets	−0.0160	0.06	−0.0175	0.05	−0.0118	0.06	−0.0129	0.05
R&D	−0.1886	0.40	−0.1824	0.40	−0.2024	0.40	−0.1963	0.40
Log (Size Market Value)	−0.0098	0.01	−0.0104	0.01	−0.0087	0.01	−0.0095	0.01
Leverage (Market Value)	−0.1481**	0.07	−0.1503**	0.05	−0.1508**	0.07	−0.1434**	0.07
Debt Maturity	0.0571*	0.04	0.0561	0.05	0.0538	0.04	0.0529	0.05
Intercept	0.7296	0.20	0.7681	0.21	0.7074	0.20	0.7462	0.21
Fixed effects	Yes		Yes		Yes		Yes	
R-square	0.30		0.30		0.30		0.31	
N	2440		2440		2440		2440	

The dependent variable is the percentage of pension plan liabilities affected by the risk transfer in total pension liabilities. The independent variables capture firms' pension plan characteristics, sponsor and institutional ownership characteristics. All variables are measured at the end of the year prior to the risk transfer and defined in Table 1.

***, **, * indicate levels of significance at 1%, 5%, and 10%, respectively

decision to transfer pension risk and the role played by institutional investors in this process.

We investigate the characteristics of institutional investors that play a role in influencing firms' decision to engage in de-risking activities. We find that the presence of institutional investors with a higher stake in total ownership is associated with a higher likelihood of risk transfers. Our results emphasize the power of the monitoring

Table 6 This table shows the results from alternative model specifications

	(1)		(2)		(3)	
	Coef.	S.E	Coef.	S.E	Coef.	S.E
Institutional Ownership						
Percent Institutional Ownership	0.2475**	0.12			0.0954**	0.03
Independent Institutions			0.2619**	0.13		
Quasi	−0.0490	0.05	−0.0495	0.05	−0.0162	0.02
Dedicated	0.0127	0.05	0.0120	0.05	0.0096	0.02
Transient	0.0269	0.06	0.0221	0.06	0.0067	0.02
Pension Plan						
Collective Bargain	−0.0489	0.05	−0.0513	0.05	−0.0691**	0.02
Funding Level / PBO	−0.1919	0.15	−0.1918	0.15	−0.0771	0.06
Log (PBO)	−0.0211	0.02	−0.0194	0.02	0.021**	0.01
Long-term Exp. Return on Plan Assets	−0.0042	0.03	−0.0039	0.03	−0.0049	0.01
Discount Rate	−0.0081	0.05	−0.0080	0.05	0.0157	0.02
Actual Return on Plan Assets	0.2902	0.31	0.2888	0.31	0.0775	0.06
Pension Asset Beta	0.1511	0.16	0.1490	0.16	−0.1164	0.07
Log (Investment Horizon)	0.0217	0.02	0.0200	0.02	0.0217**	0.01
Firm (Sponsor)						
Quick Ratio	0.0497	0.04	0.0502	0.04	−0.0146	0.01
Log (Volatility of ROA)	−0.0234	0.02	−0.0242	0.02	−0.0044	0.01
Gross Profit Margin (3-year average)	−0.1911	0.34	−0.1857	0.34	−0.1950	0.13
Net PPE/Total assets	−0.1309	0.16	−0.1299	0.16	0.068	0.09
R&D	0.9448	1.17	0.8842	1.17	0.1553	0.41
Log (Size Market Value)	0.0092	0.03	0.0110	0.03	−0.0293	0.01
Leverage (Market Value)	−0.1064	0.15	−0.149	0.15	−0.1395***	0.05
Debt Maturity	−0.0423	0.13	−0.0382	0.13	−0.0638	0.08
Intercept	0.2813	0.54	0.2607	0.54	0.2390	0.22
Resid: First Stage					0.6797	0.46
Fixed effects	Yes		Yes		Yes	
R-square	0.30		0.30		0.30	
N (Pension Risk Transfers)	762		762		2440	

Models (1) and (2) are results from propensity matching score and model (3) are results from the second stage results of 2SLS-IV. The dependent variable is the percentage of pension plan liabilities affected by the risk transfer in total pension liabilities. The independent variables capture firms' pension plan characteristics, sponsor and institutional ownership characteristics. Industry and year fixed effects are included. All variables are measured at the end of the year prior to the risk transfer and defined in Table 1. Robust standard errors are clustered at the firm level.

***, **, * indicate levels of significance at 1%, 5%, and 10%, respectively

role of institutional investors. We also recognize that institutional investors are not a homogenous group and use different classifications to investigate the monitoring role for different type of institutions. We consider ownership by institutional investors with lower ties with the firm, which represents the group with higher incentive to monitor

firms. We find strong evidence that independent institutional investors play an effective governance role with respect to risk transfers. We also use Bushee's (1998) classification of institutional investors into three groups to examine their preferences for pension risk transfers. Our results indicate that a higher ownership stake by quasi-indexers or passive institutional investors is associated with a lower likelihood of risk transfers.

We also find evidence that plan- and sponsor-level characteristics influence firm's decision to complete risk transfers. Firms with higher employee bargaining power and firm leverage are less likely to complete risk transfers. Plan-level characteristics such as the plan funding level, discount rate, and investment horizon explain firm's decisions to complete pension risk transfers.

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