



De-risking pension plans: the impact on firm value from lump-sum buyouts

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Abstract

Firms have attempted to de-risk their pension obligations by offering its pension beneficiaries a lump-sum distribution instead of the guaranteed payments to be paid to retirees in a defined benefit pension plan. We examine the stock market reaction to the announcement of these offerings using event study methodologies. We find a statistically significant positive cumulative abnormal returns for the 20-day period prior to the event, the 20-day period after the event, and for the entire 41-day event period surrounding the announcement. We also find that the cumulative abnormal returns are higher the more liabilities a firm has and increases with the level of funding of the pension plan. Our results contribute to the literature on pensions by finding that firms that buy out their pensioners' defined benefit payments via a lump-sum distribution experience an increase in firm value. There is a significant amount of analysis of such buyouts in the literature and in the press, but our results are the first to examine and document the increase in value derived from such pension changes. We also more fully develop the motivations for such events from a cost/benefit perspective.

Keywords De-risking pension plans · Lump-sum buyouts · Event study · Employee benefits

JEL Classification J32 · G32

Introduction

Over the last two decades, a growing number of US corporations have actively taken measures to de-risk their pension obligations. Many firms that offered defined benefit (DB) pension plans to their employees have either frozen or closed (terminated)

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these plans and switched to alternatives such as defined contribution (DC) pension plans or altogether transferred their pension obligations to insurance companies, replacing them with commercial annuities. The current relevance of these switches is seen in the recent de-risking of very large US DB pension plans that occurred at International Paper (2018), General Electric (2019), International Business Machines (2022), and Alcoa (2022). This renewed de-risking activity by defined benefit plan sponsors should result in full-year 2022 activity reaching a new all-time record of \$180 billion in risk transfers, surpassing the previous record high of \$164 billion in 2012 (Zawacki 2022).

A recent study by Willis Towers Watson found that the fraction of Fortune 500 companies that offered a DB pension plan declined from 59% in 1998 to only 14% in 2019 (McFarland 2020). The study also shows that over the same time frame, the percentage of Fortune 500 employers offering a traditional DB pension plan to newly hired employees fell from close to half (49%) to just 3%. The number of Fortune 500 employers offering only defined contribution pension plans increased from roughly 40% to 86% over the same period. Data from the Center for Retirement Research (CRR) at Boston College further show that the percentage of all workers who had only a DB pension plan fell from 22% in 1989 to 8% in 2016,¹ while those with only a defined contribution plan increased from 15 to 34%. However, defined benefit plans continue to be material liabilities for UK and US companies. Thomas (2022) reports that 5000-plus defined benefit pension schemes have sufficient assets to strike a ‘buyout’ deal” in the UK. She cites JPMorgan’s forecast that 600 billion British pounds of DB pensions could be bought out over the next decade, over double the run rate of the past 10 years. Wilson (2020) notes that in the US there is currently approximately \$6.6 trillion in public and private DB pension plan assets. He points specifically to a lump-sum buyout offer as an option to reduce DB liabilities. These trends in pensions and their resultant impact on corporate behavior and firm value have received considerable attention in the academic literature.²

Zeng and Kara (2022), in a recent article on pension plan de-risking in the UK, state that soft and hard freezing are traditional methods of transferring pension obligations, while innovative strategies, such as pension buy-ins and buyouts “allow firms to transfer some pension obligation risks to third parties (i.e., insurers) by paying a premium up-front.” One of the methods that firms have adopted in de-risking their pension obligations is to offer pension beneficiaries a lump-sum distribution (a buyout) instead of the guaranteed payments that would be due to retirees from a defined benefit pension plan. According to the Pension Rights Center, “[a] lump-sum distribution is a method of paying benefits from a pension plan in which a participant’s entire benefit is paid out in a one-time payment.” In the US, the

¹ The percentage of all workers with a defined benefit pension plan only declined from 11 to 8% (CRR) from 1998 to 2016 (roughly the same period as the Willis Towers Watson study). <http://crr.bc.edu/wp-content/uploads/2015/10/Pension-coverage.pdf>.

² See for example Choy et al. (2014) for effects of freezing defined benefit plans on firm risk, and McFarland et al. (2009) and Milevsky and Song (2010) for effects of freezing defined benefit plans on firm value.



current rapid increase in overall interest rates makes the present value of the future DB cash flows much lower; thus, resulting in a lower cost for firms to buy out their DB pension plans with lump-sums. This recent increase in US interest rates, as well as recent change in Internal Revenue Service (IRS) policy, has greatly rekindled corporate interest in lump-sum payouts of DB pension plans. In March 2019, the IRS issued Notice 2019–18 that lump-sum “windows for retirees” were okay for buyouts (Slott 2019). This change has “opened the door for defined-benefit plans to offer lump-sum payouts to retirees who are currently receiving pension payments.” (Laise 2019).

The literature on lump-sum distributions from pension plans has largely focused on the distributions from the perspective of the beneficiaries. These include the reasons behind such distributions, their tax consequences, and how recipients should or do reinvest the distributions.³ The impact of such lump-sum distributions on firms has, however, remained largely unexplored by research studies on recent trends in pensions. The impact PBGC premiums have on the costs related to DB plans has also been largely ignored in the academic literature. These oversights provide the focus of this study.

We use data from the Pension Rights Center and employ standard event study methodology to test the stock market reaction to the announcement by firms of a lump-sum buyout of existing pension obligations. The Pension Rights Center is a non-profit consumer organization that has tracked companies that make changes to their pension benefits to retirees since 2005. We examine an initial sample of 30 firms that reported lump-sum cash outs from 2012 through 2016 and find a statistically significant negative abnormal return on the event day, followed by statistically significant positive cumulative abnormal returns for the 20-day post and prior event day intervals. This statistically significant positive cumulative abnormal return is present in the 51-day interval from 20 days before the event day, including the event day to 20 days after the event day. Adding firm-specific accounting data results in a sample of 27 companies that finds a significant positive relationship between firm leverage and their CAR, as well as a significant negative relationship between a firm’s pension funding shortfall and its CAR. We also collect a sample of 148 companies and find that firms with large amounts of cash flow are significantly more likely to use a lump-sum buyout strategy to de-risk their pension plan than simply freezing their pension plan. This study contributes to the literature on pensions by finding that firms that buy out their pensioners’ defined benefit plans with a lump-sum payment experience an increase in firm value.

³ See for example Poterba et al. (1998), Sabelhaus and Weiner (1999), Burman et al. (1999), Engelhardt (2003).



Background

There are numerous professional surveys dealing with modifications to DB pension plans in the United States (e.g., Mercer 2006; Vanguard Group 2016). According to these surveys there are three broad de-risking strategies available to firms that have defined benefit plans. The first involves changing the design of the plan, usually by freezing the pension plan and closing it to new entrants. Second, plans can also step up contributions to close the funding gap and adopt liability-driven asset strategies to reduce risk. The third approach involves risk transfer and settlement programs that include offering lump sums to participants, purchasing annuities or ultimately terminating the plan. In this paper, we focus on the payment of lump sums to participants.

Among the reasons that firms give for closing or freezing DB plans are cost reduction and risk reduction.⁴ Researchers have estimated the required employer contributions to a DB plan to be 7 to 8% of payroll, compared to a 3% employer match to a 401(k) plan (direct contribution plan).⁵ Additionally, rising healthcare costs make it costly for firms to provide health insurance and post-retirement health benefits for retirees, thus pushing firms to sacrifice other employee benefits such as pensions. Firms offering DB plans promise to pay a specific amount of benefits to the plan beneficiaries upon retirement and are therefore exposed to significant risks from the provision of those payouts. Some of these risks arise from changes in economic, demographic, and regulatory conditions and are all borne by the employers. Economic conditions resulting in low interest rates pose a risk because firms offering DB plans experience an increase in pension liabilities relative to pension assets and would be expected to increase their contributions to fund the deficit. By promising guaranteed future payouts, the employer must ensure that the DB plan has enough assets to make the payouts and bears the risk associated with investing the assets of the plan over the employee's working life and post-retirement period. The guaranteed future payouts are based on actuarial estimates of life expectancy and plan sponsors (employers) are exposed to longevity risk if retirees live longer than projected. The earnings on the income statement of the firm offering a DB pension plan are also more volatile because the firm is required to fund any shortfalls in the value of the pension assets relative to the pension liability (Munnell et al. 2006).

The activity in de-risking during the period covered by this study was driven by a number of factors. The year 2012 marked a significant change in the way firms were required to compute the present value of pension liabilities.⁶ Prior to the passage of the Pension Protection Act (PPA), the lump sums that could be offered to buy out defined benefit obligations were calculated using the interest rate on 30-year Treasuries. Under the PPA, beginning in 2012, lump sums are calculated based on the corporate bond yield curve. Since rates from the corporate bond yield curve are

⁴ For a summary of explanations why employers are shutting down their pension plans see Munnell et al. (2006), Rauh and Stefanescu (2009), and Munnell and Soto (2007).

⁵ See, Rauh et al. (2017), Munnell et al. (2006), Munnell and Soto (2004), Munnell and Sunden (2004).

⁶ See Pratt (2018) or Wadia (2015) for a good description of the various legal and rule changes that increased the motivations for lump-sum distributions.



typically higher than rates on 30-year Treasuries the switch to using only the corporate yield curve increased the discount rate used to determine the present value of a DB plan's liabilities, thereby decreasing the future pension obligation. A second factor that resulted in firms pursuing de-risking strategies was the bull-market in equities which increased the value of plan assets for many sponsors. The two effects combined to reduce the funding deficit for many plans making it more feasible to offer a lump-sum distribution to some participants. A third factor cited by firms executing de-risking activities is the increasing burden of the Pension Benefit Guaranty Corporation premiums.

The Pension Benefit Guaranty Corporation (PBGC) is a United States federally chartered corporation created by the Employee Retirement Income Security Act of 1974 (ERISA) to insure the vested benefits of failed DB pension plans.⁷ PBGC premiums consist of a flat rate charge per person covered in a defined benefit plan coupled with a variable rate charge that is based on the amount a plan is underfunded. Beginning after 2012, the PBGC premiums charged increased dramatically.⁸ From 2006 to 2012, the variable rate premium remained unchanged, while the fixed rate premium showed a total increase of about 17%. From 2012 to the end of 2016, the fixed rate premium increased by 83% and the variable rate premium increased by 222%. The increase on PBGC premiums over this period was codified in the Moving Ahead for Progress in the 21st Century Act (MAP-21) enacted by Congress in July 2012. The variable rate premium has been capped at a growing dollar amount per participant starting in 2013. While the increase in PBGC premiums was not the sole reason for de-risking pension plans, it is frequently cited as a driving force. The two ways a firm can decrease the burden of the variable rate PBGC premiums are to shrink the funding shortfall or to reduce the headcount covered by the plan.

A study on de-risking activity prepared by Mercer and the Office of the PBGC Participant and Planned Sponsor Advocate (2018) notes that evaluating de-risking strategies often comes down to a cost-benefit analysis. Increasing administrative costs, specifically rising PBGC premiums, has made the economics of de-risking more favorable. A common theme that emerges from the articles related to this topic during this period is that escalating PBGC premiums was frequently cited as a reason why they executed risk transfer transactions instead of in-plan de-risking solutions. The primary source of economic savings in such exercises is lower PBGC premiums. Willis Towers Watson tracks the aggregate funded ratio for 300 large companies (Willis Towers Watson 2020). Their results show the aggregate funding ratio status for these companies rose from 76.7% at year-end 2012 to 91.1 percent by September 30, 2013. This trend made lump-sum settlements more attractive for many plans as it becomes more feasible to execute this strategy.

⁷ Kilgour (2014) provides a good description of the PBGC along with a description of the related legal and rule changes.

⁸ Our focus is on premiums related to single-payer plans. Multi-payer plans exist when a plan is created for a group of participants who work at a variety of different employers such as when they are represented by a national union.



Payment of a lump-sum distribution should—at least on paper—be able to accomplish some of the objectives cited by firms in de-risking their pension obligations. Similar to de-risking by switching to a defined contribution plan or transferring the pension obligations to an insurance company, offering a lump-sum payment to retirees instead of the guaranteed payouts rids the firm of investment and longevity risks. The responsibility of investing the pension assets such that they last the beneficiary's lifetime is transferred from the firm to the retiree. With the employer (firm) no longer carrying the pension liability on its balance sheet, it is not exposed to changes in the value of this liability due to economic conditions and the resulting volatility of earnings that this causes on the income statement. Additionally, the firm is able to reduce at least a part of the required PBGC premium payments. The use of lump-sum buyouts reached record highs in 2012 primarily due to a change in Internal Revenue Service (IRS) opinion. In 2012, Ford and General Motors received private letter rulings from the IRS okaying the use of lump-sum pension payouts for specific DB participants. With this tool, many DB pension plans executed lump-sum buyouts. However, this specific de-risking tool was clamped down on by the Treasury Department when it issued Notice 2015-49 which stopped allowing firms to offer certain employees the option to take their pensions in a lump-sum (Ebeling 2015). Companies continued making lump-sum offers to former employees who qualified for a DB pension, but had not yet started to receive payments, a practice that was not affected by the 2015 announcement (Laise 2019). In 2019, the IRS said it would continue to study the issue and its response “is widely seen as a green light for pension plan sponsors...The policy shift is ‘a windfall to companies and a loss to retirees,’ says Karen Friedman, executive vice president of the Pension Rights Center.” (Laise 2019).

The use of a lump-sum distribution also has costs to the firm. Lump-sum distributions are unpopular among unions and hostile responses from unions and employees to such a switch can impose indirect costs to the firm. The 2012 regulatory changes by the Department of the Treasury that reversed prohibitions to pension plans from offering a lump-sum to retirees already receiving pensions was met with sharp criticism from some unions and the Pension Rights Center. The Pension Rights Center along with AARP, Alliance for Retired Americans and National Retiree Legislative Network that claim to represent the interests of millions of retirees covered by defined benefit pension plans wrote to the Secretary of the Treasury urging him to rescind the recent notice because “participants incur substantial economic, money-management and legal costs when they elect a lump sum.” The letter further argues that: “Employers typically offer lump-sum payments with the expectation that many participants will imprudently select a lump-sum payout because they underestimate the economic value and legal protections of the annuity and overestimate their ability to invest and manage the lump sum.”⁹ These responses by unions suggest that the perceived benefits from pension management and distributions being handled by entities that have a comparative advantage accrue entirely to the firms de-risking their pension obligations and do not trickle down to the pension beneficiaries.

⁹ http://www.pensionrights.org/sites/default/files/docs/f_letter_to_secretary_mnuchin_april_2_2019.pdf.



Kapinos (2009) and Comprix and Muller (2011) find a negative association between the decision to freeze, terminate, or convert from a DB plan and the presence of a union at the firm. We therefore conjecture that the announcement to de-risk pension obligations by offering a lump-sum payout would elicit a market response and that the response could be different from firms that employ alternative ways to de-risk their obligations such as switching to direct contribution plans or transferring the pension obligations to insurance firms.

Literature review

Changes in pension plans and reasons for changes

There exists a body of literature that examines the changes in pension plans over the last two decades and how pensions inform corporate behavior. There has been an apparent trend by US corporations to de-risk their pension obligations by freezing or altogether terminating their DB pension plans and instead offering alternative forms of pension plans. As pointed out in the introduction, Willis Towers Watson studied *Fortune 500* companies and found that the fraction of firms that offered a DB pension plan declined from 59% in 1998 to only 14% in 2019, while the percentage of these employers offering a traditional DB pension plan to newly hired employees fell from close to half to just 3% over the same time period (McFarland 2020). Data from the Center for Retirement Research (CRR) at Boston College corroborate this trend by showing a dramatic decline in the percentage of workers who had only a DB pension plan over the period 1989 to 2016 and an increase in those with only a defined contribution plan over this period.

Munnell et al. (2006) explore reasons behind these trends. Their study suggests that the major explanations revolve around costs faced by companies, reducing risk that companies are exposed to and differences between pensions for upper level managers and the rank-and-file employees. Switching away from DB plans reduces costs because the employer match in a direct contribution plan is estimated to be less than half the required employer contribution to a DB plan (Munnell and Soto 2004; Munnell and Sunden 2004). Rauh et al. (2017) find that freezing a DB plan saves firms 3 percent of total payroll in the first year. Huestead (1998) estimates that in 1996, the administrative costs for DB plans ranged from 3.1% of pay for the smallest plan to 0.23% of pay for the largest plan, while the corresponding costs of defined contribution ranged from 1.44% of payroll to 0.16% of payroll. Additionally, with increasing costs associated with healthcare benefits to employees, employers are being forced to reduce other benefits such as pensions that they offer their employees.

In DB plans, employers promise to make guaranteed payouts to retirees and therefore employers bear several risks associated with providing these payouts. These include the risk of the pension liability increasing due to economic conditions, risks associated with investing the plan assets, longevity risks from increased life expectancy of plan beneficiaries and volatility in their financial statements due to regulatory requirements to fund any shortfalls in the size of the pension assets relative to the pension liability. Klumpes et al. (2009) study reasons behind curtailment of DB



pensions plans in the UK and find support for a risk management-based explanation behind the trend. Zezeng and Kara (2022) examine the determinants of UK firms in the FTSE 350 index that implement a de-risking strategy from 2009 to 2017. They find that implementing pension de-risking strategies reduces firm risk. However, they do not examine lump-sum buyouts, such as investigated here due to lack of data ($N=2$). Munnell et al. (2006) also discuss the divergence between the pension interests of upper level managers and those of rank-and-file employees as another reason that leads firms to have a lower appetite for the risks and costs associated with DB plans. Firms also argue that there are other entities or organizations specializing in managing pension benefits and the comparative advantage and economies of scale that such entities have leads to more efficient management and distribution of pension benefits. Freezing or terminating DB pension plans benefits the firms by enabling firms to reduce these costs and transfer some of the risks to the beneficiaries of the pension plans.

Cost of making changes to pension plans

Employers also face mostly indirect costs from the decision to freeze or terminate DB plans. Freezing DB plans is unpopular among unions and anecdotal evidence suggests that firms encounter costs because announcements of changes to DB pension plans elicit hostile responses and resistance from unions. The Pension Rights Center (PRC) has criticized the decision by firms to de-risk their pension plans by offering a lump-sum payout or by transferring the pension obligations to insurance companies, even referring to the practice as “pension risk-dumping.” The PRC asserts that employees are worse off when firms transfer investment and longevity risks to them. Even when these are presented as choices to the employees, the PRC argues that conflicts of interest between financial advisers and beneficiaries of such plans leaves the beneficiaries vulnerable to making choices that are less than ideal. This is further compounded by the fact that it is costly for employees to individually access advice on how to manage the pension assets due to the high fees charged by investment management firms.¹⁰ These arguments suggest that from the pension beneficiaries’ standpoint the costs incurred from transferring the pension plans to other entities outweigh any benefits from the comparative advantage that these entities have in managing their pensions.

There is evidence that these concerns raised by unions are not entirely unfounded. Atkins (1986) related lump-sum distributions to individual characteristics and concluded that most lump-sum distributions were spent by the recipients, and that only older, better educated, and recipients of larger distributions were more likely to save. Burman et al. (1999) estimate that cash outs reduce annual retirement income by up to \$1,000 to \$3,000. Similarly, Poterba et al. (1998) and Sabelhaus and Weiner

¹⁰ See Statement by Karen Friedman, Executive Vice President and Policy Director of the Pension Rights Center before the Employee Retirement Income Security Act (ERISA) council in August 2013, available through this link: http://www.pensionrights.org/sites/default/files/docs/130829_derisking_statement_for_erisa_advisory_council_final_k2.pdf.



(1999) demonstrate that most of the lump-sum distributions are not rolled over into qualified retirement savings accounts unless they are large distributions and the recipients are more educated, older and have higher income.¹¹ Given the position of unions, it is therefore not surprising that, empirically, Kapinos (2009) and Comprix and Muller (2011) find a negative association between the decision to freeze, terminate, or convert from a DB plan and the presence of a union suggesting that the decision to freeze a plan is constrained by resistance from employees or their representatives. These are indications that employers encounter costs in the decision to de-risk their pension plans and would presumably make the decision to freeze or terminate their DB pension plans if the benefits of doing so exceed the costs.

Market reactions to changes in pension plans

Researchers have studied the cost and benefits of the decisions by firms to de-risk their pension obligations by investigating the market reaction to such announcements. McFarland et al. (2009) study market reactions to announcements of freezing or closing DB pension plans and find that the announcement has little impact on firm value. On the other hand, Milevsky and Song (2010) find a positive announcement effect when a publicly traded company announces the freeze or closure of a DB pension plan and replaces it with or enhances a 401(k) defined contribution plan. These studies have, however, not fully distinguished between the different ways of de-risking adopted by firms. Specifically, the impact on firm value of de-risking a pension plan through the use of a lump-sum payout has been ignored in the literature.

Data, methodology, and hypothesis

We test the conjecture that the announcement to de-risk pension plans by offering a lump-sum payout to retirees will elicit a market reaction. We assume firms will analyze de-risking using lump-sum payments using a cost–benefit analysis. While there are potential indirect costs that come with pension de-risking strategies, there are tangible cost reductions that exist as well. Zezeng and Kara (2022) state that empirical evidence shows that freezing pension plans decreases a firm’s overall risks, as it reduces the growth rate of pension benefits and costs as well as employee compensation. “Similarly, firms with lower pension risks are found to have lower cost of debt (Gallagher and McKillop 2010) and have higher credit ratings, signaling decreasing in credit risk (McKillop and Pogue 2009)”. Another aspect of pension risk transfer was the conclusion by Zezeng and Kara (2022) that “implementing pension de-risking strategies reduce firm risk.” The reduction of the firm’s discount rate, all other things equal, leads to higher net present values, thus, increasing firm value.

¹¹ Sabelhaus and Weiner (1999) also find that the lower-income families that are less likely to roll over any distribution are less likely to receive significant lump sums to begin with and therefore the amount of leakage from the pension system is not significant relative to income. Hurd and Panis (2006) find only limited leakage that is concentrated among individuals vulnerable to poverty in old age.



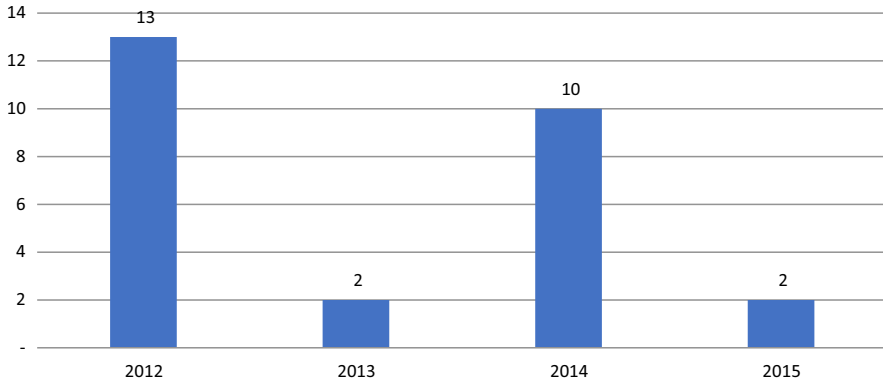


Fig. 1 Number of companies offering lump-sum payments to retirees

Assuming the benefits outweigh the costs, the direction of the market reaction to the announcement should be positive and our subsequent empirical analyses investigate this.

We obtain data on announcements of firms making changes to their DB pension plans from the Pension Rights Center (PRC). Since 2012, the PRC has maintained a list of companies that have offered lump-sum payouts to retirees in lieu of their pension benefits. The PRC website states that they obtain these data from a combination of corporate press releases, news reports, and SEC filings. In addition to the name of the firm, the PC also gives the date of announcement and the number of retirees or employees affected by the change and in some cases have an active link to the actual press release. Data on stock prices used to calculate abnormal returns are from the Center for Research in Security Prices (CRSP). Financial data for firms are obtained from Compustat.

We collect the data on the companies that have announced that they are offering lump-sum pension buyouts to certain groups of employees, former employees, or retirees. For specifics, go to <https://www.pensionrights.org/resource/companies-that-are-offering-lump-sum-pension-buyouts/> and click on the employer's name to see the company's press release, SEC filing, or news story announcing the change. This list was started in 2012 after Ford and General Motors announced that they were offering lump sums to thousands of retirees and former workers. Our initial sample includes 48 events involving reported lump-sum cash payments from 2012 through 2016. The list continues to be maintained today by the Pension Rights Center (PRC); however, no event has been added to the list since 2016. The event study methodology we employ uses an estimation period that begins 275 trading days before the event and ends 26 days before it. These dates are the same as those used by Park et al. (2014). The data requirement eliminates several companies from our sample. Of the 47 firm events included in the Pension Rights Center list, 30 events have the required returns on the Center for Research in Security Prices (CRSP) database necessary for running the event study. The firm-specific data for subsequent regression analysis eliminates an additional 3 firm events. The final sample for the exploratory



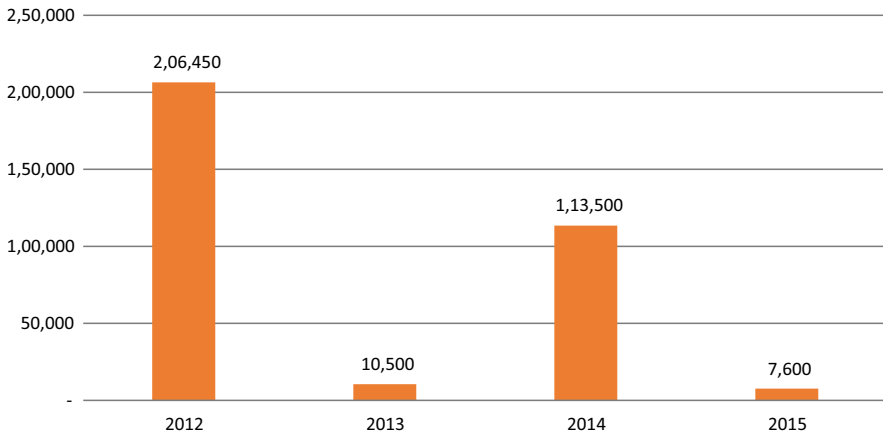


Fig. 2 Number of retirees per year offered lump-sum payments for their pension plans

analysis includes 27 events from 24 companies.¹² Figures 1 and 2 display some of the characteristics of these events. According to Fig. 1, the announcements of lump-sum buyouts of retirees were concentrated in 2012 and 2014, mainly due to the IRS rulings for Ford and General Motors in 2012. According to Fig. 2, a total of 319,950 retirees were expected to be affected by these companies' pension lump-sum buyouts of their DB plans.¹³

We employ standard event study methodology to calculate abnormal returns and cumulative abnormal returns (CARs) over various event windows around the announcement to the firm's de-risking of its pension plans with a lump-sum payment to measure the magnitude of the impact on firm value. Statistical tests determine the level of significance of the results. Campbell et al. (1997) discuss the historical development of event study research, and abnormal returns experienced in the event window can be interpreted as a measure of the impact of the event on the value of the firm. Therefore, we test the following hypothesis:

$H_{1,0}$ The null hypothesis is that there is no effect on firm value from the de-risking of a firm's pension plan with a lump-sum payment.

¹² Great effort was spent trying to increase the sample. Over 10,000 references were searched on Nexis Uni indicating "lump-sum" DB pension plan buyouts. Google searches for various key terms fail to find additional announcements with clear dates, public traded companies, and number of retirees affected, as in the PRC database. For a comparison, Zezeng and Kara (2022) only found two examples in the UK in the sample of the FTSE 350 companies for the same period. The sample in this research is very unique.

¹³ Of the 27 event announcements, 23 included details regarding how many employees would be affected. Thus, the results presented in Fig. 2 are for those 23 firm events.



Table 1 The event study results using the market model with the CRSP equally weighted index

Days	<i>N</i>	Mean CA <i>R</i> (%)	Pos:Neg	Z Stat	Cross-sect. error <i>T</i> stat	Gen sign Z
(-20,-1)	30	1.87	19:11**	1.927**	2.001**	1.673**
(-10,-1)	30	0.71	15:15	0.933	1.041	0.169
(-5,-1)	30	0.11	15:15	0.426	0.224	0.169
(-1,0)	30	-0.21	14:16	-0.765	-0.416	-0.196
(0)	30	-0.45	14:16	-2.104**	-0.990	-0.196
(0,+1)	30	-0.20	13:17	-0.533	-0.332	-0.562
(-1,+1)	30	0.05	16:14	0.181	0.072	0.534
(+1,+5)	30	-0.64	11:19*	-0.041	-0.964	-1.292*
(+1,+10)	30	0.15	14:16	1.110	0.195	-0.196
(+1,+20)	30	1.28	17:13	1.326*	0.972	0.900
(-5,+5)	30	-0.99	12:18	-0.372	-1.015	-0.927
(-10,+10)	30	0.41	17:13	0.928	0.393	0.900
(-15,+15)	30	0.83	19:11*	1.307*	0.495	1.630*
(-20,+20)	30	2.44	19:11*	1.427*	1.661**	1.630*

The Symbols *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 or better levels, respectively, using a generic one-tail test. The symbols (< or), > etc. correspond to *, ** and show the direction and significance of the generalized sign test

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

$H_{1,A}$ The alternative hypothesis is that the de-risking of a firm's pension plan with a lump-sum payment results in savings for the firm and a decrease in risk resulting in significant positive abnormal returns.

In our event study methodology, we use the market model and test the results for significance with the standard residual method with the equally weighted CRSP index for the model's market returns. We also employ a generalized sign test, which differs from the simple sign test in that the fractions of positive and negative returns under the null hypothesis are determined by the fractions observed in the estimation period, rather than fixed at 0.5. Betas in the market model are estimated using the method of Scholes and Williams (1977). To statistically test the data, the null hypothesis that the introduction of the event has no effect on the returns of the underlying security will be rejected if the Z statistic or the cross-sectional error t statistic is significant at the 0.10 level or lower with a one-sided test. The generalized sign test is used as a nonparametric test of the impact of the announcement. Cowan (1992) reports that the generalized sign test is well specified for an event date variance increase and more powerful than the cross-sectional test.



Results

The results for the event study on impact on firm value from a company offering a lump-sum distribution to retirees are listed in Table 1 for various event periods.¹⁴ Four of the event periods reported resulted in a statistically significant outcome: AR (0), CARs $(-20, -1)$, $(+1, +20)$, and $(-20, +20)$. The event day (Day 0) average Abnormal Return is -0.45% , which is statistically different than zero at the 5% level of significance. Of the 30 observations, 14 had positive abnormal returns on Day 0 versus 16 with negative observations. The results for the announcement date alone do not support our $H_{1,A}$ that there is a statistically significant positive impact on firm value from companies attempting to de-risk their defined pension plan benefits with lump-sum payments. The results for the longer periods, however, provide strong support of our hypothesis.

The negative result for the announcement day is perhaps not surprising. First, events of this type require a firm to communicate the offer to the affected retirees. It is possible those communication dates differ from the event-announcement date. In other words, the announcement might not be time-unique. Second, the offers are optional and not required. Even if a firm offers to buy out retirees, retirees are not under any obligation to accept the offer. Third, defined benefit pension accounting is complicated. Any buyout would affect potential future obligations of the firm but would also affect the balance sheet and income statement in sometimes uncertain ways both in the present and in the future. The most immediate effect would be to reduce a balance sheet liability if a plan is underfunded and a balance sheet asset if a plan is overfunded. All of the 30 events included in our analysis derive from underfunded plans. It is reasonable to assume that it could take investors some time to analyze the overall effects of an announcement. These factors should be mitigated by exploring a longer event window.

During the event interval of 20 trading days (~ 4 weeks, Days $[-20, -1]$) prior to the event date, there is a significant positive Cumulative Abnormal Return of 1.87% , statistically significantly different from zero at the 5% level (the Patell Z statistic equals 1.927). Nineteen of the events resulted in positive CARs, eleven resulted in negative CARs. A similar result obtains from the 20-trading day period after the event (Days $[+1, +20]$). The CAR is 1.28% , statistically significantly different from zero at the 10% level (the Patell Z statistic equals 1.326). Seventeen CARs were positive and 13 were negative CARs. The interval of 20 trading days corresponds to a one-month period. The average monthly change in market value is \$207 million, which annualizes to a \$2.5 billion increase in firm value from de-risking with buyouts of defined benefit pension plans with lump-sum payouts. This result supports our $H_{1,A}$ that there is a statistically significant positive impact on firm value from companies attempting to de-risk their defined pension plan benefits with lump-sum payments.

¹⁴ The abnormal returns, ARs, and CARs are tested for normality and none of the results per period violates the assumption of a normal distribution. Thus, the parametric tests are appropriate.



The result of evaluating the findings for a longer period is very positive in this experiment. The CAR $(-20, +20)$ is a very large and positive 2.44%, significant at the 5% level or better with all cross-sectional t test. The number of firms with positive CARs is 19 with only 11 negative. This result is a strong indication that de-risking the firm by offering lump-sum payments to DB retirees has a significantly positive impact on firm value. It also supports our belief that the announcement dates are not necessarily time-specifically unique in terms of revealing the information. Information could have leaked prior to the overall announcement.¹⁵ The magnitude and significance of the longer window also support the idea that evaluating the announced changes can be time-consuming. We next test whether event or firm-specific information can explain the magnitude of the CARs.

Explanatory variables

We hypothesize that the CAR for a firm-event is affected by variables immediately evident when a firm makes a buyout announcement. First, as noted above, when a firm makes a lump-sum payment to retirees, liabilities are reduced when the plan is underfunded. The relative level of funding can be determined from a firm's 10-K or 10-Q. Second, we hypothesize the CAR will be related to the amount of liabilities that a firm reports on its financial statements. The data requirements lowered the sample from 30 to 27 for this phase of our research.

Our hypotheses are as follows:

- $H_{2,0}$ The null hypothesis is that there is no effect on an event CAR related to the magnitude of the liabilities on a firm's balance sheet or the magnitude of the liability reported based on a firm's defined benefit funding level.
- $H_{2,A}$ The alternative hypothesis is that the magnitude of the CAR related to the de-risking of a firm's pension plan with a lump-sum payment is affected by the size of the liability reported based on a firm's defined benefit funding level and by the firm's overall level of liabilities.

The model is as follows:

$$CAR_i = a_i + b_1 \text{FundShort}_i + b_2 \text{Liab}/\text{Assets}_i + b_3 \text{LTD}/\text{Assets}_i + e_i$$

where a_i is the intercept of an ordinary least squares regression and b_i is the slope coefficient for the explanatory variables:

¹⁵ Morse (1984) shows that when the exact date of the event is not necessarily the day of the announcement (the revelation of the material information to the financial markets occurs at a different date), a monthly event study is more appropriate than a daily model. The events in the study have been redone with a monthly event study. The results are very similar to the daily CARs for $[+1, +20]$ and $[-20, +20]$ intervals.



Table 2 Regression analysis of CARs

Dependent variable: CAR	Model 1 $t=[+1, +20]$	Model 2 $t=[-20, +20]$
Constant	-0.1183** [-2.602]	-0.1245** [-2.121]
FundShort	-5.1E-6** [-2.600]	-5.3E-6** [-2.068]
Liab/assets	0.1622** [2.210]	0.2776*** [2.931]
LTD/assets	0.1245 [1.451]	-0.1588 [-1.431]
<i>N</i>	27	27
<i>R</i> ²	0.50	0.31

Dependent variables are event study outputs. Coefficients are regression output. FundShort is the funding shortfall measured in millions of dollars as Accumulated Benefit Obligation minus plan assets. Liab/Assets is total liabilities divided by total assets. LTD/Assets is long-term-debt divided by total assets. All are measured as of fiscal year-end prior to event date

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels

FundShort the defined benefit's Accumulated Benefit Obligation minus the plan assets;

Liab/assets total liabilities divided by total assets;

LTD/assets long-term debt divided by total assets.

Each balance sheet value is derived from a firm's 10-K for the fiscal year-ending immediately prior to the announcement. FundShort is a measure of underfunding and represents the total liability reported relative to the defined benefit plan. The regression results are presented in Table 2.

We examine the effect on CARs using the variables above in two models. In Model 1, the dependent variable is CAR[+1, +20] and in Model 2 the dependent variable is CAR[-20, +20]. Prior to discussing the expected signs on the independent variables, it is useful to review a few notable aspects of pension funding and accounting. The more underfunded a pension plan is the (1) higher the likelihood the firm will have to make future contributions to the plan, (2) the higher the liability the firm must report on the balance sheet, and (3) the more the firm must pay in PBGC premiums. An exception in the third point is that there is a cap on the amount of PBGC variable premiums so any reduction in pensioners must be large enough to reduce PBGC premiums below the cap.

A priori we expect FundShort to have a negative impact on CAR. The larger the funding shortfall, the less likely it is a buyout of some of the participants will have a material impact on future cash flows related to the plan either via future



Table 3 Choice of de-risking method

Choice of De-risking method:	Logit model	Probit model
dependent variable 1 = lump sum		
Constant	-1.3491 [1.1861]	-0.7892 [0.6759]
FundShort	4.1E-5 [5.3E-5]	2.5E-5 [3.2E-5]
Log total assets	-0.0110 [0.1160]	-0.0087 [0.0659]
Liab/assets	-1.3544 [1.2073]	-0.8238 [0.6730]
LTD/assets	1.9490 [1.4909]	1.1739 [0.8377]
Cash/assets	5.6289** [2.6109]	3.3899** [1.5347]
<i>N</i>	148	148
Pseudo R^2	0.047	0.049

The dependent variable is a dummy equal to 1 if the firm de-risks its pension plan by using a lump-sum distribution and 0 otherwise (if it freezes the plan). FundShort is the funding shortfall measured in millions of dollars as Accumulated Benefit Obligation minus plan assets. Log Total Assets is the natural logarithm of the firm's assets. Liab/Assets is total liabilities divided by total assets. LTD/Assets is long-term-debt divided by total assets. Cash/Assets is cash and cash equivalents divided by total assets. All are measured as of fiscal year-end prior to event date

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels

contributions or via lowered PBGC premiums. We expect Liab/Assets to have a positive sign because the larger the amount of liabilities greater the perceived benefit from lowering those liabilities. In other words, the firm will appear to be less leveraged. We expect LTD/Assets to have a positive sign for similar reasons.

The results in Table 2 are largely consistent with expectations. In Model 1, the coefficients all have the expected sign. Only LTD/Assets is not statistically significant. The resulting r-squared of the regression is 0.50 which strikes us as relatively large.¹⁶ In Model 2, FundShort and Liab/Assets both have the expected sign and are strongly statistically significant. The sign on LTD/Assets is negative instead of positive which is unexpected; however, it is not statistically meaningful. The R-squared of this model is 0.31. The estimated coefficients for FundShort are very small in either model which makes sense since this is measured in millions of dollars, whereas the other values are all percentages measured in decimal points.

The results in Table 2 suggest the value a firm derives from reducing its pension liabilities decreases as the shortfall in pension funding level increases and increases

¹⁶ We test for multicollinearity between Liab/Assets and LTD/Assets using variance inflation factors (VIF) and find it to be extremely low and therefore not of concern from an econometric standpoint.



with higher levels of liabilities. Taken together, these results suggest firms with pension plans that are less underfunded, but which have higher liabilities, would benefit the most from a lump-sum buyout of some of the plan participants.¹⁷

In Table 3, we report the results of a logit and probit model that explain the choice of a lump-sum payout by the firm to de-risk its pension plan. The dependent variable is a dummy variable equal to 1 if the firm uses a lump-sum to de-risk its pension plan, and 0 if it simply freezes its pension plan. We find some evidence that firms with a large amount of cash are more likely to elect to use a lump-sum payout to de-risk its pension plan. The coefficient on the cash variable is positive and significant, but the choice is not affected by the amount of long-term debt or firm size.

Conclusion

We find a statistically significant positive cumulative abnormal return surrounding the event day for firms attempting to de-risk their pension obligations by offering its pension beneficiaries a lump-sum distribution instead of the promised future payments. The statistically significant positive cumulative abnormal returns occur in the 20 trading days prior to and the 20 trading days after the event day. The combined period, including the event day, is positive and statistically significant as well. The abnormal return for the event day is negative but not statistically meaningful. Our results also show that firms with DB plans that are underfunded by a smaller amount experience a higher gain. This could be explained, in part, by the ability to reduce future PBGC premiums which are assessed based on participant headcount. We also find that firms with higher liabilities experience higher returns, most likely because eliminating some participants from the plan reduces the DB liability the firm must report on its balance sheet.

Our results contribute to the literature on pensions by finding that firms that offer to buy out their pensioners' defined benefit payments with a lump-sum experience an increase in firm value. That value is higher for firms whose plans are less underfunded and for firms who have higher levels of total liabilities. There also appears to be a link to the restructuring of PBGC premiums starting in 2012. These results have not been documented in the literature to date. We also find some evidence that cash-rich firms are more likely to use the lump-sum payout option to de-risk their pension plans, compared to simply terminating or freezing their defined benefit pension plans.

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¹⁷ In this exploratory research, we tested many firm-specific variables obtained from Compustat per company, similar to those variables used by Zezeng and Kara (2022). Important characteristics, such as the number of pensioners affected by the buyouts, industry and presence of unions, were statistically insignificant. The models reported here are the most parsimonious ones with the highest explanatory power of those runs.



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