Is Pension Plan Information Risk Relevant to Credit Ratings? Level 3 Fair Value Pension Assets and Pension Plan Audit Quality

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Abstract

The purpose of this study is to investigate whether Level 3 fair value assets held by a company's defined benefit pension plan(s) are relevant to credit ratings, and whether the perceived quality of the pension plan's audit affects this relevance. Using a sample of 1,717 firm years from fiscal years 2011 to 2015, we find that Level 3 fair value pension plan assets are negatively associated with credit ratings. We further find a significant positive relationship between Big 4 pension plan auditors and credit ratings, suggesting that audit quality of the pension plan is associated with credit ratings. Furthermore, moderation tests indicate that Big 4 pension plan auditors completely moderate the negative association between Level 3 fair value pension plan assets and credit ratings. Finally, we find a significant positive relationship between full-scope audits and credit ratings. Moreover, the moderation tests find that full-scope pension plan audits completely moderate the negative association between Level 3 fair value pension plan assets and credit ratings. Our findings suggest that credit rating agencies consider the riskiness of a firm's pension plan assets in assigning credit ratings. We further provide evidence that quality pension plan audits add value for creditors.

Data Availability: All data are publicly available from sources identified in the text.

Keywords: defined benefit pension plan; fair value accounting; audit quality; auditor industry specialization

Is Pension Plan Information Risk Relevant to Credit Ratings? A Study of Level 3 Fair Value Pension Assets and Pension Plan Audit Quality

I. INTRODUCTION

The purpose of this study is to investigate (a) whether Level 3 fair value assets held by a company's defined benefit pension plan(s) (hereafter, pension plan) are relevant to credit ratings, and (b) whether the perceived quality of the pension plan's audit affects this relevance. Beginning for fiscal years ending after 2009, FASB Staff Position No. FAS 132(R)-1 (FSP FAS 132(R)-1)[1] requires companies to include FAS 157 fair value hierarchy disclosure[2] for assets held by their pension plan at each annual reporting date (FASB 2008). The purpose of requiring such disclosures is to decrease information asymmetry and risks surrounding the assets held by a company's pension plan.

Our study is relevant because comment letters received by the FASB during the drafting of FSP FAS 132(R)-1 reveal stark differences of opinion regarding FAS 157 disclosures for pension plan assets. Many commenters representing investors, opined that these disclosures would be relevant and decision useful by aiding investors in assessing the information risk in pension plan assets.[3] However, many companies sponsoring pension plans argued that such disclosures would not be relevant to investors.

Pension plan assets are akin to corporate assets, and any related appreciation or depreciation in pension plan assets affects the amount of cash contributions required to the pension plan (Shivdasani and Stefanescu 2010). Prior studies support this view and provide evidence that

[1] FASB Staff Position No. 132(R)-1 is codified in FASB ASC paragraph 715-20-50-1.
[2] As an asset moves higher on the fair value hierarchy from Level 1 to Level 3, asset liquidity and financial reporting quality decrease (i.e., estimation error, uncertainty, and information asymmetry [information risk] increase) because valuation inputs become less observable.
[3] Refer to the FASB's repository of comment letters at https://www.fasb.org/jsp/FASB/CommentLetter_C/CommentLetterPage&cid=1218220137090&project_id=FSP132RA.

investors integrate *pension plan* assets and liabilities with the *company's* assets and liabilities from a quantitative standpoint (Barth 1991; Barth, Beaver, and Landsman 1993; Dhaliwal 1986; Landsman 1986; Yu 2013). Yet, no prior study has evaluated whether the qualatative attributes (i.e., information risk) of pension plan assets are integrated at the company-level—a gap we seek to fill. Moreover, certain industry experts argue pension plan audits are a commodity that only benefit companies by fulfilling their compliance obligations under federal law (Croce 2019; ERISA Advisory Council 2010); however, we argue pension plan audits provide value to creditors because they integrate pension plan financial information at the company-level.

Our study is timely because little is known about credit analysts' use of off-balance sheet information to establish credit ratings, and such understanding is important because credit ratings are vital to capital allocation, financial regulation, and contracting decisions (Ayers, Laplante, and McGuire 2010; Frost 2007; Maydew 2005). Moreover, this study is pertinent because of the proliferation of alternative investments,[4] which are typically classified as Level 3 fair value assets, held by pension plans. For example, alternative investments held by pension plans worldwide at the end of 2018 rose to $11.6 trillion, up from $9.2 trillion at the end of 2013, and North American pension plans had the largest allocation to alternative investments with an average of 31% (Winterton 2020). These Level 3 fair value assets are riddled with information risk and agency costs because they typically involve investments in opaquely valued (or marked-to-model) securities that contain larger amounts of estimation error and uncertainty (Aspinall 2012; ERISA Advisory Council 2008). Consequently, such information risks can originate from unobserved

[4] There is no clear definition of alternative investments because of the dynamic nature of financial market developments (IOPS 2010). A non-exhaustive list of commonly established alternative investments typically includes hedge funds, private equity, and securitized real estate investments. In the broadest sense, alternative investments can be anything other than stocks, bonds, and cash (McCann 2014). The AICPA suggests that alternative investments are those for which a readily determinable fair value does not exist (AICPA 2018).

valuation inputs being unreliable due to intentional induced errors (bias) and/or unintentional intrinsic errors (noise) by company executives and pension plan asset managers (Ayres 2016; Yao, Percy, and Hu 2016).

Because of information risk inherent in Level 3 fair value assets, several studies of the banking industry found that equity markets discount share prices when the *company* holds Level 3 fair value assets (Goh, Li, Ng, and Ow Young 2015; Kolev 2009; Song, Thomas, and Yi 2010). From a credit market perspective, Arora, Richardson, and Tuna (2011) found that Level 3 fair value assets held by financial institutions were positively associated with credit spreads. Likewise, Ayres (2016) found that Level 3 fair value assets held by the *company* were negatively associated with credit ratings and positively associated with credit spreads on bond issues.

While credit analysts use financial statements and disclosures as the primary source of information, they adjust for pension liabilities when establishing credit ratings (Moody's 2016; S&P 2019). However, credit analysts do not indicate whether pension liabilities are adjusted for information risk contained in the pension plan's asset values. Such values are critical in calculating a company's pension liabilities because they are subtracted dollar-for-dollar from the pension plan's projected benefit obligation. Therefore, any estimation errors, intentional or not, in Level 3 fair value pension assets can cause inflated values that improve a company's equity position and cash flows through reductions in pension liabilities and expenses reported in the company's financial statements as well as lower required cash contributions to the pension plan.

Prior research indicates that creditors deem pension plan funding levels to be credit relevant (Cardinale 2007; Carroll and Niehaus 1998; Maher 1987; Martin and Henderson 1983; Wang and Zhang 2014). Since the values of assets held directly by the company are credit relevant (Moody's 2016; S&P 2019), we expect the information risk and agency costs contained in the pension plan's

assets to be credit relevant because the pension plan's funding level and the company's required cash contributions are sensitive to Level 3 pension plan asset fair values. Moreover, integration of information risk inherent in Level 3 fair value pension plan assets may be more concerning because pension liabilities, on average, were estimated to be only 78% funded[5] at the end of June 2016 (Pensions and Investments 2016)—creating incentive for company executives and pension plan asset managers to opportunistically report pension plan asset values to curb pension costs and mask the amount of cash outflows necessary to maintain minimum pension funding levels required under law—cash flows that could be used to pay creditors.

Because of the pervasiveness of the risks and unmonitored agency relationships, we expect credit analysts to be concerned and compensate for information risk inherent in Level 3 fair value pension assets by adjusting the company's credit rating. However, such risks may be reduced by credit analysts' perceptions of pension plan audit quality that could enhance monitoring and reduce information risk as well as agency costs created by Level 3 fair value pension assets. Early auditing literature utilitzed Big N auditors as a proxy of audit quality (e.g., Beatty 1989, DeAngelo 1981; Lennox 1999). We expect this proxy of pension plan audit quality to be valued by credit analysts because the Employee Benefits Security Administration's (EBSA) most recent employee benefit plan (EBP) audit quality study found 39% of audits were deficient (DOL-EBSA 2015). However, the deficiency rate for auditors that performed 750 or more audits per year, which included all Big 4 auditors, was only 12%. These findings are not surprising because regulators continually find that auditors fail to evaluate the appropriateness of valuation methods and the reasonableness of assumptions when auditing fair value estimates (IFIAR 2018; PCAOB 2013, 2019). As such, we expect the engagement of a Big N auditor will alleviate information risks and agency costs

[5] This percentage is confirmed by our sample, which has a mean funded percentage of approximately 78%.

associated with Level 3 fair value pension plan assets and moderate their impact on credit ratings.

Another proxy of perceived audit quality, which is unique to EBPs, is the scope of the audit selected by the sponsoring company. Under federal law, companies have the option to annually elect a limited-scope pension plan audit (ERISA Advisory Council 2010). A limited scope audit allows auditors to issue a disclaimer of opinion on the pension plan's financial statements because no auditing procedures are performed on pension plan investments (including Level 3 fair value assets) or investment income certified by certain entities. Alternatively, a full-scope audit requires auditors to express an opinion on the pension plan's financial statements as well as requires auditors to substantively test investments and investment income (ERISA Advisory Council 2010).

Regulators argue limited-scope audits remove an auditor's incentive to adhere to professional audit standards because a disclaimer of opinion does not require the auditor to stand behind the pension plan's financial statements (DOL-EBSA 2015). Alternatively, when audit failure costs are high due to reputation costs and legal liability, auditors are encouraged to increase audit effort and produce quality audits (Newman, Patterson, and Smith 2005; Radhakrishnan 1999; Rothenberg 2020; Schwartz 1997). However, a limited-scope audit diminishes these incentives because the auditor is not responsible for (a) expressing an opinion on the pension plan's financial statements or (b) performing any auditing procedures on investments/investment income. As a result, we expect full-scope audits will be perceived higher quality by alleviating information risks and agency costs associated with Level 3 fair value pension plan assets.

Utilizing a sample of 1,717 annual observations from fiscal years 2011 to 2015 and controlling for a comprehensive set of other effects on credit ratings, we find that Level 3 fair value pension plan assets have a negative and statistically significant association with credit ratings. This finding suggests the information risks and agency costs inherent a pension plan's Level 3 fair value

assets are credit relevant and integrated at the company-level. Moreover, this finding is consistent with Ayres (2016) findings that Level 3 fair value assets held directly by the *company* negatively impact credit ratings.

Our Big 4 pension plan auditor models utilize 1,580 observations from the same period and find a significant positive relationship between Big 4 pension plan auditors and credit ratings. Similarly, our moderation tests find that Big 4 pension plan auditors completely moderate the negative association between Level 3 fair value pension plan assets and credit ratings. Finally, our full-scope models utilize 1,614 observations from the same period and find a significant positive relationship between full-scope audits and credit ratings. Moreover, the moderation tests find that full-scope pension plan audits completely moderate the negative association between Level 3 fair value pension plan assets and credit ratings. Collectively, these findings suggest that quality pension plan audits add value for creditors, which contradicts experts who argue that EBP audits are a commodity that only help companies fulfill their compliance obligations.

Overall, our study allows us to expand to the fair value accounting literature by examining Level 3 fair value assets through the lens of pension plans, which enables us to evaluate industries that have been excluded from most fair value studies because they often have limited holdings of fair value assets. Our findings highlight that the risks of holding Level 3 fair value assets permeates into non-financial industries by suggesting that they extend to a company's off-balance sheet items, of which pension plans are the most significant (Shivdasani and Stefanescu 2010). Moreover, our findings add insight to assist researchers in the developing parsimonious measures of off-balance sheet items to be utilized in credit ratings research (Wilson 2010). Next, we add to the audit quality literature by demonstrating that perceptions of audit quality extend beyond the auditor retained to examine the company's financial statements. Selection of the pension plan's

auditor can also have financial consequences through cost of debt. Finally, our findings suggest that selection of a full-scope pension plan audit versus a limited-scope audit have positive financial consequences to companies through higher credit ratings and reduced cost of debt.

Regulators should be especially interested in our results because it suggests FSP FAS 132(R)-1 disclosures are relevant to credit markets. Moreover, this is the first empirical study of pension plan auditor quality and audit scope. We add to the discussion of the importance of pension plan audit quality by showing that such audits are not merely commodities but likely provide value to creditors. Our findings are also the first to suggest that selection of a full-scope pension plan audit versus a limited-scope audit may have financial consequences to the company. Collectively, our study suggests companies may want to reassess pension plan asset allocation, auditor appointment choices, and selection of pension plan audit scope to determine if there is any impact on their cost of debt.

The remainder of the paper proceeds as follows: Section II contains the literature review and hypothesis development. In Section III, we describe the sample and research design. The results are discussed in Section IV. Additional tests and the related results are outlined in Section V, and Section VI concludes.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Pension Plan Holdings of Level 3 Fair Value Assets

FSP FAS 132(R)-1 requires companies to include FAS 157 fair value hierarchy disclosures for pension plan assets at each annual reporting date (FASB 2008). Promulgated in response to the 2008 financial crisis, the purpose of such disclosures is to decrease information asymmetry surrounding the types of assets and associated risks held by a company's pension plan. FAS 157 disclosures help decrease information asymmetry because they report fair value assets in

accordance with a three-level fair value hierarchy that is based on the observability of inputs used to estimate fair value (FASB 2006a). As an asset moves higher on the fair value hierarchy from Level 1 to Level 3, asset liquidity and financial reporting quality decrease (i.e., estimation error, uncertainty, and information asymmetry increase) because valuation inputs become less observable due to Level 3 fair value estimates being derived from proprietary valuation models that utilize subjective inputs. Because Level 3 fair value estimates are typically less verifiable by outsiders, subject to more intrinsic management errors, and prone to more induced error by company executives and pension plan asset managers (Livne, Markarian, and Milne 2011; Song et al. 2010), the regulatory motivation of FAS 157 was to provide enhanced disclosures to increase transparency, reduce information asymmetry, and improve the understanding of the reliability of fair value estimates (Riedl and Serafeim 2011).

Level 3 fair value assets create information asymmetry, a necessary condition for opportunistic financial reporting (Schipper 1989), between insiders preparing fair value estimates and the creditors relying on such estimates to make lending decisions. Information asymmetry increases potential agency costs through risk that company executives and pension plan asset managers will use Level 3 fair value pension plan asset values to opportunistically increase company earnings and reduce cash contributions to the pension plan by masking the true financial picture of the pension plan over substantial periods because unobserved valuation inputs might be unreliable due to unintentional intrinsic measurement errors and/or intentional management induced errors (Ayres 2016; Song et al. 2010; Yao et al. 2016). Consequently, such risks can be significant because Level 3 fair value estimation models may contain errors and uncertainty that can be much greater than financial statement materiality (Bell and Griffin 2012; Cannon and Bedard 2017; Christensen, Glover, and Wood 2012).

To protect their compensation and reputational capital, company executives and pension plan asset managers have incentives to generate intentional management induced errors that opportunistically report Level 3 fair value estimates for pension plan assets (Fama 1980). First, companies are required to incorporate the funded status of the pension plan on the company's balance sheet as a component of other comprehensive income (FASB 2006b). Shivdasani and Stefanescu (2010) found that companies' leverage ratios were about 35% higher when pension plan assets and liabilities where integrated with company balance sheets. This increased leverage creates debt contracting incentives for company executives to report higher Level 3 fair value estimates to increase the funding ratio of the pension plan (i.e., decrease unfunded pension liabilities), which will facilitate continued access to debt financing. Similarly, better funded pension plans increase debt covenant compliance as well as reduce volatility and downward pressure on the company's stock prices—which protect company executives' reputational capital.

Second, the *pension plan's* funding ratio affects the *company's* annual cash contributions required to the pension plan under federal law. Company contributions to U.S. pension plans increased from approximately $35 billion per year in 1980 ($1,479 per active participant) to $110 billion in 2010 ($8,592 per active participant) (DOL-EBSA 2019), and pension contributions averaged 56% of a company's interest expense (Shivdasani and Stefansecu 2010). Hence, any change in the funded ratio exposes the company to volatile cash injections to meet stringent and costly funding requirements (Kiosse and Peasnell 2009) that could have substantial implications on assessments of creditworthiness. Moreover, increased pension plan contributions affect a company's cost of capital and available cash flow for capital projects, research and development, dividends, debt repayments, and treasury stock purchases (Wang and Zhang 2014) that can have significant repercussions on the company's future competitive advantages through reduced

investment opportunities (Picconi 2006), which threaten company executives' reputational capital.

Pension plan asset managers also have incentives to opportunistically report pension plan asset values to protect their reputational capital and personal wealth because competition in the industry is fierce, jobs are being slashed, and profit margins are eroding (Waite, Massa, and Cannon 2019). When direct and indirect incentives are combined, an alternative asset manager's wealth increases approximately $0.39 for every $1.00 increase in investor wealth (Lim, Sensoy, and Weisbach 2016). Good investment performance increases asset managers' direct income through incentive fees resulting from meeting performance benchmarks and increases indirect income through higher future fees from increased capital into the investment strategy. For the average investment strategy, a one percent increase in incremental return translates into a 1.5% increase in assets under management over the next three years (Lim et al. 2016). As such, asset managers have incentives to report positive returns each month to attract new investors and increase their personal wealth (Cumming and Dai 2010).

In addition to theorectical arguments, empricial evidence also suggests company executives and asset managers use information asymmetry inherent in fair value estimates of opaquely valued assets to opportunistically report financial information. Evidence suggests that Enron executives extensively used opaquely valued assets to overstate fair values in its financial reporting scandal (Benston 2006). Similarly, executives used accounting transition provisions to opportunistically recognize losses on fair value investments directly in retained earnings versus through the income statement (Henry 2009). Furthermore, empirical evidence suggests that executives (a) use Level 3 unobservable inputs as an avenue for earnings management (Chong, Huang, and Zhang 2012; Dechow, Myers, and Shakespeare 2010; Yao et al. 2016), (b) use their discretion to overvalue goodwill (Ramanna and Watts 2012; Shalev, Zhang, and Zhang 2013), and

(c) use their discretion to underestimate the fair value of stock options and related expense (Bratten, Jennings, and Schwab 2015).

Empirical evidence also suggests asset managers engage in opportunistic financial reporting by inflating investment returns and asset values (Agarwal, Daniel, and Naik 2007; Bollen and Pool 2009; Cumming and Dai 2010), managing returns around passive benchmarks (Chandar and Bricker 2002), and inflating net asset values (Carhart, Kaniel, Musto, and Reed 2002; Jenkinson, Landsman, Roundtree, and Soonawalla 2020). Similarly, Dietrich, Harris, and Muller (2001) found that investment managers (a) use their discretion over fair value reporting to select accounting methods that report higher earnings, (b) time asset sales to smooth changes in reported earnings, and (c) increase fair values prior to raising new debt.

Company executives' and pension plan asset managers' incentives to opportunistically report estimates of Level 3 fair value pension assets are more likely to manifest into agency costs because of the extensive layers of agency relationships that exist in a pension plan's structure (Benson et al. 2011) and the lack of diligent monitoring of such relationships. The first agency layer exists between the employees due benefits from the pension plan and the company executives that oversee and manage the pension plan. While employees have a vested interest in ensuring the pension plan's financial results are accurately reported, the actions of the company's executives are typically not scrutinized because monitoring by employees is cost prohibitive (Clark 2004).

The second agency layer exists between the company's executives and the pension plan's asset managers. However, the company's executives typically do not possess the skills needed to question the asset managers' estimates of Level 3 fair values (Clark 2004). Moreover, company executives typically do not obtain independent evaluations or have any processes to determine the fair value of pension plan assets (DOL-OIG 2013), and if they do, asset managers typically restrict

access to valuation information because they deem it proprietary to their investment philosophy (Cannon and Bedard 2017; Ettredge, Xu, and Yi 2014; Griffith, Hammersley, and Kadous 2015). As a result, Level 3 fair value estimates go largely unmonitored because company executives are unaware of the precise securities held by the asset managers and/or how those holdings are valued.

Further increasing risk in the alternative investment industry (the source of many Level 3 assets), there is typically an additional agency layer because investing occurs through a feeder fund or a fund-of-funds model. This agency relationship exists between the primary asset manager hired by the company's executives and the secondary asset manager of the fund that controls the underlying investments. While the primary asset manager should possess the skills necessary to monitor the actions of the secondary asset manager, there may be little incentive to do so because higher investment returns increase fees and is a catalyst for additional investment capital (Lim et al. 2016).

Because of information risk and agency costs inherent in Level 3 fair value estimates, empirical evidence suggests creditors charge an accounting information transparency premium (Arora et al. 2014; Ayres 2016). Yu (2005) found that accounting figures with lower information risk resulted in lower cash bond spreads. Riedl and Serafeim (2011) found that implied asset betas increase as result of companies' holding more Level 3 fair value assets. Moreover, Ayres (2016) found that holdings of Level 3 fair value assets directly by the *company* were negatively associated with credit ratings and that changes in the amount of such assets were associated with changes in credit ratings.

Since credit analysts review off-balance sheet pension plan accounting numbers and make adjustments to reflect the economic reality of the *pension plan* on the *company's* financial situation (Moody's 2016; S&P 2019; Woodell, Parisi, Ganguin, Thompson, and Adelson 2014), we expect

credit analysts to integrate the information risks and agency costs of holding Level 3 fair value pension plan assets in credit ratings. Prior evidence suggests credit analysts adjust a company's credit rating for asset values that have low transparency and high information risk (Riedl and Serafeim 2011). Moreover, empirical evidence suggests *pension plan* accounting information is credit relevant and integrated at the *company*-level. Martin and Henderson (1983) increased the accuracy of bond rating predictions from 27% to 56% when ratios that incorporated pension plan information were added to the model. Maher (1987) found that unrecognized pension plan liabilities were considered a liability of the firm when assessing bond ratings, and Wang and Zhang (2014) found that unfunded pension liabilities lowered bond ratings. Similarly, Cardinale (2007) found that unfunded pension plan liabilities were a significant predictor of credit spreads, while Carroll and Niehaus (1998) found that unfunded pension liabilities lowered debt ratings. Since evidence suggests pension plan financial attributes are credit relevant, we conjecture that information risks and agency costs inherent in Level 3 fair value pension plan assets will also be integrated in credit ratings. As a result, we posit the following:

H1: There is a negative relationship between Level 3 fair value assets held by a firm's pension plan and credit ratings.

Big 4 Pension Plan Auditors

Auditors play a crucial role in verifying accounting information and reducing information asymmetry for credit analysts. While some industry experts indicate pension plan audits are a commodity and only benefit companies by fulfilling their compliance obligations under federal law (Croce 2019; ERISA Advisory Council 2010), we posit that pension plans audits provide value because credit analysts integrate *pension plan* financial information at the *company*-level. As such, credit analysts' perceptions of pension plan audit quality, especially in the presence of Level 3 fair value assets, likely become a factor in establishing credit ratings.

Since audits have been utilized to reduce agency cost for centuries (Watts and Zimmerman 1983), they can reduce information risks inherent in Level 3 fair value pension plan estimates that are generated through a myriad of unmonitored agency relationships (Clark 2004; Cumming and Dai 2010; DOL-OIG 2013). Because auditing pension plans and fair value estimates is complex, we expect credit analysts to utilize proxies of audit quality to evaluate the information risk inherent in Level 3 fair value pension assets (Mansi, Maxwell, and Miller 2004; Porter 2018; Tysiac 2015a, 2015b). Prior research shows Big 4 auditors serve as a good proxy of audit quality because they have reduced incentives to shirk on their responsibilities and more to lose from audit failures (Beatty 1989, DeAngelo 1981; Lennox 1999). Consequently, Big 4 auditors strive to improve their competence by investing heavily in training and audit technology (Boone, Khurana, and Raman 2010; Lee and Park 2013), by providing guides to facilitate audits of fair value estimates (Bratten, Gaynor, McDaniel, Montague, and Sierra 2013), and by supplementing their audit procedures with expertise from internal valuation specialists (Griffith et al. 2015).

Empirical evidence suggests bondholders perceive Big 4 auditors to enhance audit quality when companies have information asymmetry problems (Gul, Zhou, and Zhu 2013; Mansi et al. 2004). Moreover, research suggests (a) fair value estimates prepared by internal property appraisers are more accurate when audited by Big 4 auditors (Dietrich et al. 2001), (b) banks audited by Big 4 auditors are less likely to value assets using Level 3 inputs (Yao et al. 2016), and (c) banks audited by Big 4 auditors are less likely to opportunistically transfer assets into the Level 3 fair value asset classification (Kohlbeck, Smith, and Valencia 2016).

Big 4 auditors may be especially important to pension plans because audits of EBPs are unique, complex, and require specialized expertise (Porter 2018; Tysiac 2015a, 2015b). This is buttressed by the EBSA's most recent audit quality study that found 39% of EBP audits were

deficient (DOL-EBSA 2015). However, EBP auditors who performed 750 or more EBP audits, which included all Big 4 firms, per year only had a 12% deficiency rate. These findings are not surprising because other regulators have found that auditors fail to evaluate the appropriateness of valuation methods and the reasonableness of assumptions when auditing fair value estimates (IFIAR 2018; PCAOB 2013, 2019). The PCAOB found that audit deficiencies related to investment securities and derivatives increased every year from 2004 to 2009 and was double of any other deficiencies in 2009 (Church and Shefchik 2012). Furthermore, academic research indicates that auditors typically (a) lack valuation expertise (Bratten et al. 2013), (b) delegate testing of fair values to inexperienced staff (Griffith et al. 2015), (c) pass on uncertain potential fair value misstatements in the presence of supplemental fair value disclosures (Griffin 2014), and (d) fail to test the data and underlying fair value assumptions as well as not detecting inconsistencies among the data and assumptions (Griffith et al. 2015), which is concerning because Level 3 fair value estimates are very sensitive to small changes to valuation inputs (Christensen et al. 2012).[6]

Taken together, this suggests that repeated exposure to auditing EBPs with vast amounts and types of fair value assets should improve an auditor's ability to reduce information risk and agency costs inherent in Level 3 fair value estimates because they have a sophisticated repository of knowledge about the industry and the current assumptions and methods used to value Level 3 fair value assets (Martin, Rich, and Wilks 2006). Similarly, industry experience gained through auditing more EBPs could be perceived as a surrogate for audit quality because more knowledge

[6] Christensen et al. (2012) found that changes as small as 3.70 and 27.04 basis points in 2008 and 2007, respectively, to Wells Fargo's interest rate assumption to value mortgage-backed securities yielded material swings in reported values. They also spoke with valuation experts and auditors who indicated the reasonable ranges for interest rate inputs for Level 3 assets are commonly 50 basis points or higher.

of the industry and its accounting practices should increase the auditor's ability to detect and curb intentional and nonintentional intrinsic errors (Balsam, Krishnan, and Yang 2003).

As such, we expect the perceived quality of the pension plan's auditor to be relevant to credit ratings because of the myriad of agency relationships related to the pension plan conflated with lack of monitoring and pervasive incentives to report opportunistic financial results. Additionally, perceptions of pension plan audit quality are likely relevant to credit analysts due to concerns about unintentional intrinsic measurement errors inherent in Level 3 fair value estimates, which are subjective and lack complete verification. To that end, we propose the following hypotheses:

H2a: There is a positive relationship between Big 4 pension plan auditors and credit ratings.

H2b: The negative relationship between Level 3 fair value assets held by the pension plan and credit ratings will be moderated by Big 4 pension plan auditors.

Full-Scope Versus Limited-Scope Pension Plan Audits

Pension plan audits also allow us to examine a unique aspect of perceived pension plan audit quality—the provision of limited-scope audits. Under federal law, companies have the option to annually elect a limited-scope pension plan audit (ERISA Advisory Council 2010). A limited scope audit allows auditors to issue a disclaimer of opinion on the pension plan's financial statements because they perform no auditing procedures on pension plan investments (including Level 3 fair value assets) or investment income certified by certain entities. Alternatively, a full-scope audit requires auditors to express an opinion on the pension plan's financial statements as well as requires auditors to substantively test investments and investment income (ERISA Advisory Council 2010).

While limited scope audits may have made sense in 1974 because most investments had verifiable market values, the proliferation in Level 3 fair value assets held by pension plans and concerns over valuations of such assets has culminated in the AICPA and various regulators advocating for the limited-scope audit option to be repealed (DOL-OIG 2012, 2014; ERISA Advisory Council 2010). The EBSA's argument is that limited scope audits remove an auditor's incentive to adhere to professional audit standards because a disclaimer of opinion does not require the auditor to stand behind the pension plan's financial statements (DOL-EBSA 2015). However, a full-scope pension plan audit requires an auditor to adhere to professional auditing standards and exercise due care in auditing Level 3 fair value pension plan assets, which is especially important because regulators found that 82% of entities certifying the values of pension plan investments for limited-scope audits were strictly acting as recordkeepers and only passing through values of Level 3 fair value assets without any independent verification of existence or valuation of such assets (DOL-OIG 2014). Consequently, many Level 3 fair value pension plan asset values covered by the limited-scope audit option are being reported in financial statements without any independent, third-party verification.

Full-scope audits increase auditors' incentive to provide quality pension plan audits because of reputation concerns and legal liability (Hillegeist 1999). Auditors typically exert effort that increases their reputation and ability to expand market share and charge higher fees as well as to avoid legal liability (Rothenberg 2020). When audit failure costs are high, auditors are encouraged to increase audit effort and produce quality audits (Newman et al. 2005; Radhakrishnan 1999; Rothenberg 2020; Schwartz 1997). However, a limited-scope audit diminishes these incentives because the auditor is not responsible for (a) expressing an opinion on the pension plan's financial statements or (b) performing any auditing procedures on

investments/investment income. As such, pension plan auditors will have reduced reputation costs and legal liability when a limited-scope audit is performed and adjust their effort accordingly, which could spillover into other audit areas and manifest in subpar audit quality (Newman et al. 2005; Radhakrishnan 1999; Rothenberg 2020; Schwartz 1997).

Hence, we expect full-scope pension plan audits to enhance credit analysts' perceptions of audit quality because information risk and agency costs related to Level 3 fair value pension plan assets will be curtailed. In performing a full-scope audit, we expect the auditor will increase effort because he or she is responsible for issuing an audit opinion that includes responsibility for investment values and investment income, which increases reputational costs and legal liability. As such, we propose the following hypotheses:

H3a: There is a positive relationship between full scope audits and credit ratings.

H3b: The negative relationship between Level 3 fair value assets held by the pension plan and credit ratings will be moderated by full scope audits.

III. RESEARCH DESIGN

Sample Selection

Our sample selection begins by determining publicly-owned U.S. companies that have pension plan data in Compustat's Pension Annual Database and also have required financial data and credit ratings in Compustat for fiscal years 2011 to 2015. We analyze this period because it is the first complete year after the passage of the Dodd-Frank Act, which extant research suggests affected credit analysts' behavior (Dimitrov, Palia, and Tang 2015). This process yields an initial sample of 2,468 company years. We then collect stock return data from CRSP, which decreases our sample by 59 because of missing data. Next, we manually extract data to derive our company governance data from proxy statements (Form DEF 14A) and eliminate companies that have Co-

CEOs. Then, we carefully match pension plan regulatory filings[7] (Form 5500) for pension plans to the company[8] to derive fiscal year and pension plan auditor data, and we eliminate companies with no funded pension plans. After adjusting for missing data, this process reduces our sample by 692. The final sample for our Level 3 fair value pension plan asset integration model comprises 1,717 company years and 468 companies (refer to Table 1). For our Big 4 pension plan auditor models, we eliminate 90 observations because of missing credit ratings. Then, we manually extract pension plan auditor data from Form 5500 filings and reduce the sample by four because of missing auditor data and 45 because multiple pension plan auditors were engaged by the company for the year. The final sample for the Big 4 pension plan auditor models comprises 1,578 company years and 434 companies.

For our full-scope pension plan audit models, we reduce the final sample used for the asset integration model by 90 observations because of missing credit ratings. Then, we manually extract audit type from Form 5500 filings and reduce the sample by 13 because of companies with both full-scope and limited-scope pension plan audits for their plans for the year. The final sample for the full-scope pension plan audit models comprises 1,614 company years and 440 companies.

[INSERT TABLE 1 AROUND HERE]

Empirical Models and Variables

Consistent with prior credit ratings' research, we estimate our models using ordered logic regression (Alali, Anandarajan, and Jiang 2012; Ashbaugh-Skaife, Collins, and LaFond 2006; Ayres 2016). We use the model specified in Equation (1) to test our hypothesis that examines

[7] When the pension plan's fiscal year-end does not coincide with the company's fiscal year-end, we match the Form 5500 data from the pension plan's fiscal year-end that is closest to the company's fiscal year-end.

[8] This process requires a diligent review of the company's pension footnotes in the 10-K filings and detailed searches in the DOL's EFAST2 database because most companies have multiple pension plans with different EINs and names due to mergers and acquisitions.

whether Level 3 fair value pension plan assets are associated with credit ratings. To test our hypotheses that examine the association between Big 4 pension plan auditors and credit ratings, we estimate the models specified in Equations (2) and (3). Finally, to test our hypotheses that examine the association between full-scope pension plan audits and credit ratings, we estimate the models specified in Equations (4) and (5). We also include a comprehensive set of control variables representing company goverance, size, ownership, and financial attributes as well as pension plan financial attributes that have been utilized in prior research. We define all variables and source of the data in Table 2. All regressions are estimated using robust standard errors to address heteroscedasticity (Petersen 2009).

$$RATING = FVA3\_PENSION + Control\ Variables + \varepsilon \quad (1)$$

$$RATING\_5500 = BIG4\_PENSION + Control\ Variables + \varepsilon \quad (2)$$

$$RATING\_5500 = FVA3\_PENSION + BIG4\_PENSION + FVA3\_PENSION* BIG4\_PENSION + Control\ Variables + \varepsilon \quad (3)$$

$$RATING\_5500 = FULL\ SCOPE + Control\ Variables + \varepsilon \quad (4)$$

$$RATING\_5500 = FVA3\_PENSION + SCOPE + FVA3\_PENSION* FULLSCOPE + Control\ Variables + \varepsilon \quad (5)$$

Dependent Variables

Consistent with Ayres (2016), we measure our dependent variables (RATING and RATING_5500) as an ordered variable ranging from 1 to 22 depending on the company's Standard and Poor's domestic long-term issuer credit rating. Higher numbers represent better credit ratings while lower numbers represent worse credit ratings. RATING is measured four months following the company's fiscal year-end to allow time for disclosed data to be reflected in credit ratings (Ayres 2016). Using the same rationale, RATING_5500 is measured four months following the

month the company files the pension plan's annual report (Form 5500) and audited financial statements with the DOL (i.e. the date the data first becomes publicly available on the DOL's website).[9]

[INSERT TABLE 2 AROUND HERE]

Test Variables

To test H1, which evaluates the association between Level 3 fair value pension assets and credit ratings, we employ the test variable FVA3_PENSION. This variable represents total Level 3 fair value investments held by the company's *pension plan* at the *company's* fiscal year-end scaled by total pension plan investments held the company's *pension plan* at the *company's* fiscal year-end, and is similar to the proportion of Level 3 fair value assets held directly by the *company* utilized by Ayres (2016).

To test our Big 4 pension plan auditor model (H2a), we employ BIG4_PENSION, which is coded 1 if the *pension plan's* auditor is BIG 4, and 0 otherwise. H2b, which examines the moderating effect of Big 4 pension plan auditors on the association between Level 3 fair value pension plan assets and credit ratings, is tested by interacting FVA3_PENSION with BIG4_PENSION.

To test H3a, which examines the association between full-scope pension plan audits and credit ratings, we utilize FULLSCOPE, which is coded 1 if a full-scope pension plan audit was conducted, and 0 otherwise. H3b, which examines the moderating effect of a full-scope pension plan audit on the association between Level 3 fair value pension plan assets and credit ratings, is tested by interacting FVA3_PENSION with FULLSCOPE.

[9] If the company has multiple pension plans, we utilize the month the first Form 5500 is filed with the DOL. Per review of our data, most companies file Form 5500 for all pension plans on the same date.

Control Variables

Following prior research, we include control variables for company goverance, size, ownership, and financial attributes as well as pension plan financial attributes that could affect credit ratings.

Ashbaugh-Skaife et al. (2006) found credit ratings were negatively associated with CEO power and explained the relationship based on the board's reduced ability to contain the CEOs opportunistic management. However, others argue that CEOs have incentives to take less risk because their wealth and human capital are concentrated in the companies they manage (Pathan 2009; Smith and Stulz 1985), which could result in powerful CEOs having a positive influence on credit ratings. We include DUALITY as a proxy of CEO power but make no prediction of the directional association. Ashbaugh-Skaife et al. (2006) also found marginal evidence that the percentage of independent directors on the board was positively related to credit ratings. Since the board is a vital governance mechanism when opacity exists (Pathan 2009), we include BOARDIND and expect a positive relationship with credit ratings.

We include various company ownership variables utilized by Ashbaugh-Skaife et al. (2006). Consistent with the view that block holders further the interests of shareholders at the expense of creditors (the wealth distribution hypothesis), a negative relationship with the number of block holders that own 5% or more of a company's outstanding shares (BLOCK) is expected. While inside owners may use their power to extract company resources for their own benefit or resist proposals to increase monitoring (Gordon and Pound 1993), they may also make decisions that reduce company risk, which likewise reduces their own idiosyncratic risk (Capozza and Seguin 2003; Pathan 2009). We include %INSIDE to control for inside ownership but make no prediction of the directional association. Finally, under the management disciplining hypothesis,

we expect institutional owners are beneficial to creditors. As such, we include %INST and expect a positive relationship with credit ratings.

Prior research provides evidence that various company financial attributes are related to credit ratings. We control for the percentage of Level 3 fair value assets held directly by the *company* (FVA3_COMPANY) and expect a negative relationship with credit ratings (Ayres 2016). Stock returns can be positively associated with future cash flows needed to service debt; therefore, we include RETURN and expect a positive relationship with credit ratings (Alali et al. 2012; Ayres 2016). Similarly, more volatile stock returns may indicate a company's financial uncertainty (Ayres 2016). To control for this, we include STD_DEV and expect a negative relationship with credit ratings. The interest coverage ratio is a proxy of the company's ability to repay its debt (Alali et al. 2012; Ashbaugh-Skaife et al. 2006; Ayres 2016). As such, we include INT_COV and expect a positive relationship with credit ratings.

Alali et al. (2012) and Ashbaugh-Skaife et al. (2006) also control for capital intensity because they conjecture companies with higher capital intensity have lower credit risk. While utilizing a balance sheet-based proxy for capital intensity, they find mixed results. Our research indicates that credit analysts typically evaluate capital intensity by utilizing the ratio of total capital expenditures scaled by total sales (Hampstead 2019; S&P 2013). We control for capital intensity using this approach but use a dichotomous variable because capital expenditures can be so high that credit risk increases (Hampstead 2019). CAPEX_REV is coded 1 if the company's capital expenditures scaled by total revenues is 5.18% (the historical market average)[10] or higher; and 0

[10] We obtained the historical market average from data compiled by Professor Aswath Damodaran, which is located on his website at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/capex.html. Dr. Damodaran is a world-renowned finance expert and provides historical data to assist others with equity valuations. The data were updated as of January 2020.

otherwise. Because higher capital expenditures can increase credit risk, we expect a negative relationship with credit ratings.

The book-to-market ratio of the company's equity is a proxy of the company's growth prospects and credit risk (Alali et al. 2012; Ayres 2016). We include BOOK_MKT and expect a negative relationship with credit ratings because a higher ratio signals lower growth and higher credit risk. A negative relationship between a loss reported by a company (LOSS) and credit ratings as well as a positive relationship between a company's return on assets (ROA) and credit ratings should exist because both are indicators of credit risk (Ashbaugh-Skaife et al. 2006; Ayres 2016). Moreover, a company's profitability (MARGINS) should reduce credit risk and be positively associated with credit ratings (Ayres 2016). Since larger companies face lower cost of capital and risk, we include LN_AT to control for company size (Alali et al. 2012; Ashbaugh-Skaife et al. 2006; Ayres 2016) and expect a positive relationship with credit ratings.

Restatements of the company's financial statements indicate information risk. We include RESTATE and expect a negative relationship with credit ratings. Furthermore, when the fiscal year-end of the *pension plan* does not coincide with the *company's* fiscal year-end, there may be concerns that fair value estimates reported by the *pension plan* are unreliable because they will not be subjected to comprehensive audit testing by the *pension plan* auditor. As such, we include DIFF_YEAR_END and expect a negative relationship with credit ratings.

Various attributes related to a company's debt structure are generally associated with credit ratings (Alali et al. 2012; Ashbaugh-Skaife et al. 2006; Ayres 2016). More debt in a company's capital structure increases credit risk; therefore, we include LEVERAGE and expect a negative relationship with credit ratings. The company's ability to repay its short-term obligations reduces credit risk. We include LIQUIDITY and expect a positive relationship with credit ratings. Because

a debt structure that includes subordinated debt is considered riskier (Alali et al. 2012; Ashbaugh-Skaife et al. 2006), we include SUBORDINATED and expect a negative relationship with credit ratings.

We also include pension plan attributes used in prior credit market research as control variables. As a pension plan's funding ratio increases, it reduces pension plan claims to the company's cash flows and reduces credit risk (Carroll and Niehaus 1998). We include FUNDED and expect a positive relationship with credit ratings. The use of higher discount rate assumptions to calculate the pension plan's estimated liabilities can be used to improve the pension plan's funding ratio. To control for this issue, we include DISCOUNTRATE and expect a negative relationship with credit ratings. Finally, more mature pension plans likely have higher demands on company cash flows, which would increase credit risk (Cardinale 2007). We include MATURITY_PENSION and expect a negative relationship with credit ratings.

In the BIG 4 pension plan auditor and full-scope audit models, we also control for perceptions of auditor quality at the *company*-level (BIG4_COMPANY) and expect a positive relationship with credit ratings (Mansi et al. 2004). Lastly, all models include indicator variables to control for year and industry-specific attributes that may affect credit ratings.

IV. RESULTS

Univariate Descriptive Statistics

We report the descriptive statistics in Table 3. For our dependent variables, the companies in our sample have median credit ratings of 14.00 (which equates to a BBB rating) for both RATING and RATING_5500, which is similar to statistics presented in Ayers (2016). Mean values suggest 7.4% of *pension plan* investments are Level 3 fair value assets (FVA3_PENSION), much higher than the 0.05% mean of Level 3 fair value assets held directly by the *company*

reported in Ayres (2016). This difference highlights the potential increase in information risk and agency costs due to Level 3 fair value assets when the pension plan is integrated at the company-level. Moreover, approximately 35% of *pension plans* are audited by BIG 4 auditors (BIG4_PENSION) and approximately 20% of companies selected limited-scope pension plan audits, which is consistent with the percentage of full-scope audits reported by the EBSA (DOL-EBSA 2015).

[INSERT TABLE 3 AROUND HERE]

Descriptive statistics indicate that, on average, institutional ownership is approximately 82% (%INST), which is higher than the 63% mean reported by Ashbaugh-Skaife et al. (2006). A possible explanation of this difference is due to increases in both share buybacks by companies and institutional passive investing, which likely result in more institutional ownership (Fichtner 2019). Mean board independence (BOARDIND) of 83.7% is higher than the 70% reported by Ashbaugh-Skaife et al. (2006), but this difference is plausible because they utilized a pre-SOX sample. The CEO serves as the board chairperson in approximately 54% of our observations.

Level 3 fair value assets held directly by the *company* have a mean of approximately 0.20%, which is lower than the 0.50% reported by Ayres (2016). This difference is likely attributable to the percentage of financial industry observations, which typically hold more Level 3 fair value assets, included in each sample. Our sample includes approximately five percent (5%) of such observations, while Ayres (2016) included approximately 22%. This sample composition difference also likely explains disparities in ROA, MARGINS, and LN_AT.

Mean standard deviation in monthly stock returns is approximately 8% compared with approximately 11% reported by Ayers (2016). A probable explanation of this difference relates to the sample period used by Ayres (2016) including the 2008 financial crisis, which experienced

extreme market volatility (Manda 2010). Our mean book-to-market ratio (BOOK_MKT) of 4.67 is higher than Ayers (2016) mean of 2.22. However, our mean is similar to the historical market average of 3.60.[11]

Approximately seven percent (7%) of our observations have subordinated debt (SUBORDINATED), and approximately nine percent (9%) restated their financial statements (RESTATE). Moreover, approximately 29% have annual capital expenditures (CAPEX_REV) above the historical market average. The average funded percentage of pension plans (FUNDED) is approximately 78%, and the average discount rate used to calculate pension liabilities (DISCOUNTRATE) is just over four percent (4.3%). The mean maturity of pension plans is approximately 74%, and approximately 22% of pension plan fiscal year-ends do not coincide with the company's fiscal year-end. Descriptive statistics on the remainder of the control variables are reported in Table 3, which are comparable to prior studies to the extent they are measured similarly in the extant literature (e.g., Alali et al. 2012; Ashbaugh-Skaife et al. 2006; Ayres 2016; Mansi et al. 2004).

Table 4 provides the pairwise correlation matrix. The correlations are all well below 0.80, which mitigates the threat of potential multicollinearity.

[INSERT TABLE 4 AROUND HERE]

Multivariate Results for H1

Table 5 reports the results for our test of H1. Consistent with H1, the results suggest that Level 3 fair value pension plan assets are relevant to credit analysts. The significant negative coefficient on FVA3_PENSION (coef. -2.383; $p < 0.01$) suggests credit analysts rate the

[11] We obtained the historical market average from data compiled by Professor Aswath Damodaran, which is located on his website at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/pbvdata.html. The data were updated as of January 2020.

information risk (intentional management induced errors and/or unintentional intrinsic estimation errors) and agency costs related to Level 3 fair value pension plan assets at the *company*-level. In general, control variables are significant in the direction of expectations, and the explanatory value of the model is 27.9%.

This finding implies credit analysts may have concerns that company executives and pension plan asset managers will opportunistically report fair value estimates and manipulate the pension plan's funding ratio to reduce pension expense and annual cash contributions to the pension plan. Moreover, even if no company executive or pension plan asset manager malice exist, credit analysts may be concerned unintentional intrinsic estimation errors inherent in Level 3 fair value estimates could exist.

[INSERT TABLE 5 AROUND HERE]

Multivariate Results for H2a and H2b

Table 6 presents the results for H2a and H2b. Even though the time period for measurement of LTRATING_5500 is different and the sample is smaller, FVA3_PENSION continues to have a negative and significant ($p < 0.01$) relationship with credit ratings in both models. This finding highlights information risk and agency costs inherent in Level 3 fair value pension plan assets may be viewed as highly pervasive by credit analysts.

In Models 2 and 3, we evaluate the relationship between the perceived audit quality of Big 4 pension plan auditors (BIG4_PENSION) and credit ratings as well as the moderating effect of Big 4 pension plan auditors on Level 3 fair value pension plan assets (FVA3_PENSION*BIG4_PENSION). Consistent with H2a, the significant positive coefficient on BIG4_PENSION (coef. = 0.358; $p < 0.01$) suggests credit analysts perceive Big 4 pension plan auditors to possess the experience and skills to reduce information risk and agency costs associated

with complex pension plan financial reporting. Moreover, consistent with H2b, Model 3 indicates that the perceived quality of Big 4 pension plan auditors moderates the negative relationship between Level 3 fair value pension plan assets and credit ratings. The coefficient on the interaction term (FVA3_PENSION*BIG4_PENSION) is positive and statistically significant (coef. = 3.055; $p < 0.01$). However, the total effect of FVA3_PENSION on credit ratings is insignificant as indicated in Panel B of Table 6 by the sum of the coefficients on FVA3_PENSION and FVA3_PENSION*BIG4_PENSION. Consistent with H2b, this finding implies that the perceived quality of Big 4 pension plan auditors completely moderates the negative relationship between Level 3 fair value pension plan assets and credit ratings, which is consistent with the view that Big 4 pension plan auditors are perceived by credit analysts to possess the experience and skills to reduce information risk and agency costs inherent in Level 3 fair value pension plan assets. Most control variables are significant in the direction of our expectations, and the explanatory values of Models 2 and 3 are 28.6% and 28.8%, respectively.

Multivariate Results for H3a and H3b

Table 7 presents the results for H3a and H3b. Models 4 and 5 evaluate the relationship between the perceived audit quality of a full-scope audit (FULLSCOPE) and credit ratings as well as the moderating effect of full-scope audits on Level 3 fair value pension plan assets (FVA3_PENSION*FULLSCOPE). Control variables are generally significant in the expected direction, and the explanatory values of Models 4 and 5 are 28.2% and 28.3%, respectively.

In Model 4 and consistent with H3a, the positive and statistically significant coefficient on FULLSCOPE (coef. = 0.332; $p < 0.01$) suggests credit analysts perceive full-scope pension plan audits to be higher in quality because auditors are exposed to higher reputation costs and legal liability by having to express an opinion on the pension plan's financial statements. While the

positive coefficient on the interaction term FVA3_PENSION*FULLSCOPE in Model 5 is moderately significant (coef. = 2.335; $p < 0.10$), the total effect of FVA3_PENSION on credit ratings is insignificant as indicated in Panel B of Table 7 by the sum of the coefficients on FVA3_PENSION and FVA3_PENSION*FULLSCOPE. Consistent with H3b, this finding implies that the perceived quality of full-scope pension plan audits completely moderates the negative relationship between Level 3 fair value pension plan assets and credit ratings, which is consistent with the view that pension plan auditors are perceived by credit analysts to provide more effort and higher audit quality when a full-scope audit is performed. Additionally, our findings in Models (2) through (5) contradict statements made by industry experts that EBP audits are commodities (Croce 2019; ERISA Advisory Council 2010), which may be unique to pension plan audits because their financial attributes are generally integrated at the *company*-level.

Except for %INST, FVA3_COMPANY, RETURN, BOOK_MKT, MARGINS, and BIG4_COMPANY, all control variables with an a priori directional prediction had coefficients with the theoretical sign and were significant in most models. FVA3_COMPANY is likely insignificant because our sample contains fewer financial industry observations than Ayres (2016), which is not surprising because pension plans are not as prevalent in financial industries. BIG4_COMPANY is insignificant, which is likely due to lack of variation reducing statistical power—approximately 99% of our observations have a Big 4 *company* auditor.

Interestingly, the coefficients for both DUALITY and %INSIDE are positive and significant ($p < 0.01$) in all models. These results imply that credit analysts view insiders as risk reducing governance mechanisms because their wealth and human capital are concentrated in the company, which provides incentives to reduce risk company risk so their idiosyncratic risk is reduced (Capozza and Seguin 2003; Pathan 2009; Smith and Stulz 1985).

V. ADDITIONAL TESTS

To test the robustness of our findings, we re-estimate our models by measuring credit ratings using alternative methodologies employed by Alali et al. (2012) and Ashbaugh-Skaife et al. (2006). For our first robustness test, we collapse the 22 credit ratings into seven categories and re-estimate Models 1 through 5 using OLR. The explanatory power of all models is in the vicinity of 43%, which is similar to Ashbaugh-Skaife et al. (2006). The results for the coefficients on the test variables remain unchanged, and the summed coefficient results remain the same.

Second, we create an indicator variable representing 1 if the company's credit rating was AAA, AA+, AA-, A+, A, A-, BBB+, or BBB-, and 0 otherwise. All models are then re-estimated utilizing logistic regression. The explanatory power of all models is in the vicinity of 54%, which is similar to Alali et al. (2012). Except for the variable FVA3_PENSION*FULLSCOPE in Model (5), the results for the coefficients on the test variables remain unchanged. FVA3_PENSION*FULLSCOPE becomes insignificant. However, the summed coefficient results remain unchanged for all models.

Next, because the EBSA's findings suggests auditors that produce 750 or more EBP audits per year have much a lower deficiency rate (DOL-EBSA 2015), we create a variable, EBPSPECIALIST, that is coded 1 if the *pension plan's* auditor audits 750 or more EBPs during the year, and 0 otherwise.[12] Approximately 60% of our observations utilize an EBPSPECIALIST auditor. We then replace BIG4_PENSION with EBPSPECIALIST in Models 2 and 3. For Model 2, the coefficient on EBPSPECIALIST is not significant. However, for Model 3 the coefficient for FVA3_PENSION*EBPSPECIALIST is a positive and statistically significant ($p < 0.05$), and

[12] To derive EBPSPECIALIST, we utilize annual Form 5500 datasets provided by the EBSA, which includes auditor data for the entire universe of Form 5500s filed during the year. These datasets are publicly available at https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/public-disclosure/foia/form-5500-datase.

based on the summed coefficients, the total effect of FVA3_PENSION on credit ratings is partially moderated by EBPSPECIALIST.

VI. CONCLUSION

Pension plans account for a large fraction of global institutional investment holdings (Cocco 2014). A recent study by the American Benefits Council suggests that funding obligations for U.S. corporate defined benefit plans are likely to increase by more than 98% in 2021 compared with 2020 (American Benefits Council 2020). Given the importance of pension funds as an investor class, this paper investigates how SFAS 157 disclosures at the pension plan level affect investors. Specifically, this study examines whether level three assets held by a firm's pension plan affect a firm's credit ratings. The study's primary finding shows that higher quantities of level three assets are associated with lower credit ratings. Furthermore, we provide evidence that the audit function can mitigate the negative effects of level three assets held by a firm's pension plan.

Our findings contribute to the literature in several ways. Specifically, we build upon the literature examining how the valuation of level three assets affects the pricing of assets (Song et al. 2010, Riedl and Serafeim 2011, Arora et al. 2014, and Ayres 2016). This paper provides insight into how the quantity of level three assets held by a firm's pension plan is a criteria considered by ratings agencies in their assessment of a firm's level of credit risk. Understanding the determinants of credit ratings is an important area of research, given the large-scale economic effects ratings impose upon the economy.

We also add to the extensive literature on the value relevance of FV disclosures (Barth 1994; Barth, Beaver, and Landsman 1996). This literature mainly finds that FV disclosures contain information that is important and value-relevant to investors. However, findings

consistently suggest that due to their subjectivity and complexity, Level 3 FVM are considered less reliable and less value-relevant than Level 1 or 2 (Song, Thomas, and Yi 2010; Goh, Li, Ng, and Yong 2015).

Finally, we contribute to the literature about audit quality and fair value. Consistent with FV expert auditors improving the reliability of FV disclosures, our results show that the value relevance of Level 3 FV disclosures increases with the extent of auditor FV expertise (Ahn et al. 2020) and the scope of the audit performed. Given the importance of pension plans to firms' financial reporting, our study should be of interest to regulators, firm executives, and auditors.

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TABLE 1
Sample Selection Summary (fiscal years 2011 to 2015)

Panel A: Sample Summary

Description	Companies	Years
Total Companies from Compustat Pension Annual Database	2,864	14,320
Less Companies:		
Not Incorporated in the United States	(326)	(1,630)
With Missing or No Credit Rating	(1,460)	(7,360)

With Missing Compustat Data	(406)	(2,862)
With Missing CRSP Data	-	(59)
With Co-CEOs	(1)	(11)
With No Funded Defined Benefit Pension Plan	(58)	(197)
With Missing Pension Plan Disclosures	(79)	(265)
With Missing Proxy Statements	(7)	(26)
With Missing or No Form 5500 Filings	(59)	(193)
Total Sample for Integration Model (H1)	**468**	**1,717**
Sample for Integration Model (H1)	468	1,717
Less Companies:		
With Missing Credit Rating	(26)	(90)
With Missing Pension Plan Auditor Data	-	(4)
With Multiple Pension Plan Auditors	(8)	(45)
Total Sample for Big 4 Models (H2a and H2b)	**434**	**1,578**
Sample for Integration Model (H1)	468	1,717
Less Companies:		
With Missing Credit Rating	(26)	(90)
With Both Full-Scope and Limited-Scope Audits	(2)	(13)
Total Sample for Full-Scope Models (H3a and H3b)	**440**	**1,614**

Panel B: Sample Distribution by 10 Fama French Industries

Industry	Companies	Years	% of Total
Consumer Non-Durables	55	207	12.06%
Consumer Durables	25	92	5.36%
Manufacturing	141	549	31.97%
Energy	27	100	5.82%
Business Equipment	33	137	7.98%
Telephone and Telephone Transmission	24	93	5.42%
Wholesale, Retail, and Some Services	38	125	7.28%
Healthcare, Medical Equipment, and Drugs	25	97	5.65%
Utilities	4	19	1.11%
Other	96	298	17.36%
Total Sample for Integration Model (H1)	**468**	**1,717**	**100%**

TABLE 2
Variable Definitions

Variable Name	Variable Measurement (Source)
Panel A: Dependent Variable	
RATING	Company's Standard and Poor's domestic long-term issuer credit rating four months after the company's fiscal year-end (Compustat)
RATING_5500	Company's Standard and Poor's domestic long-term issuer credit rating four months after the pension plan's Form 5500 is filed; if the company has multiple pension plans

	with different filing dates, four months after the filing of the first Form 5500 (Compustat)
Panel B: Test Variables	
FVA3_PENSION	Company's total Level 3 pension plan investments held at the company's fiscal year-end scaled by the Company's total pension plan investments held at the company's fiscal year-end (10-K filings)
BIG4_PENSION	1 if the pension plan(s)' auditor is Big 4; 0 otherwise (Form 5500 filings)
FULLSCOPE	1 if a full-scope pension plan audit was conducted; 0 otherwise (Form 5500 filings)
Panel C: Control Variables	
BIG4_COMPANY	1 if the company's auditor is Big 4; 0 otherwise (Audit Analytics)
BLOCK	Number of block holders that own 5% or more of the company's outstanding shares (Capital IQ)
BOARDIND	Percent of independent board members (MSCI, Capital IQ, and proxy statements)
BOOK_MKT	Company's book value of equity scaled by the market value of equity (Compustat)
CAPEX_REV	1 if the company's total capital expenditures scaled by total revenue are equal to or above the market average; 0 otherwise (Compustat)
DIFF_YEAR_END	1 if any of the company's pension plans has a fiscal year-end that does not coincide with the company's fiscal year-end; 0 otherwise (Compustat; Form 5500 filings)
DISCOUNTRATE	Company's discount rate assumption for pension plan(s)' liabilities (10-K filings)
DUALITY	1 if the CEO is the chairperson of the board; 0 otherwise (MSCI, Capital IQ, and proxy statements)
FUNDED	Company's projected benefit obligations for pension plan(s) scaled by the fair market value of total pension plan(s)' assets (10-K filings)
FVA3_COMPANY	Total Level 3 assets held directly by the company scaled by the Company's total assets (Compustat)
INT_COV	Company's earnings before interest and taxes scaled by interest expense (Compustat)
LEVERAGE	Company's total liabilities scaled by total assets (Compustat)
LIQUIDITY	Company's operating cash flows scaled by total liabilities (Compustat)
LN_AT	Natural log of the company's total assets (Compustat)
LOSS	1 if the company reported a loss for the year; 0 otherwise (Compustat)
MARGINS	Company's earnings before interest and taxes scaled by total revenue (Compustat)
MATURITY_PENSION	Company's interest cost on pension liabilities scaled by the sum of interest cost on pension liabilities and current service cost (10-K filings)
%INSIDE	Percent of the company's common shares held by directors and officers (MSCI, Capital IQ, and proxy statements)
%INST	Percent of the company's common shares held by institutional investors (Capital IQ)
RESTATE	1 if the company reported a financial statement restatement; 0 otherwise (Audit Analytics)
RETURN	Company's buy and hold stock return from period t-1 to period t (CRSP and Compustat)
ROA	Company's net income before special items scaled by total assets (Compustat)
STD_DEV	Company's standard deviation of monthly stock returns from period t-1 to period t (CRSP and Compustat)
SUBORDINATED	1 if the company has subordinated debt; 0 otherwise (Compustat)

TABLE 3
Descriptive Statistics (n = 1717)

Variable	Mean	Median	SD	Q1	Q3
BIG4_COMPANY (n = 1,614)	0.986	1.000	0.116	1.000	1.000
BIG4_PENSION (n = 1,578)	0.352	0.000	0.478	0.000	1.000
BLOCK	3.200	3.000	1.605	2.000	4.000

BOARDIND	0.837	0.889	0.111	0.818	0.909
BOOK_MKT	4.668	2.338	51.466	1.398	3.856
CAPEX_REV	0.289	0.000	0.453	0.000	1.000
DIFF_YEAR_END	0.224	0.000	0.417	0.000	0.000
DISCOUNTRATE	0.043	0.043	0.006	0.039	0.047
DUALITY	0.541	1.000	0.498	0.000	1.000
FULLSCOPE (n = 1,614)	0.202	0.000	0.402	0.000	0.000
FUNDED	0.775	0.774	0.154	0.691	0.861
FVA3_COMPANY	0.002	0.000	0.008	0.000	0.000
FVA3_PENSION	0.074	0.027	0.109	0.000	0.109
INT_COV	9.825	6.478	0.148	3.000	11.623
LEVERAGE	0.684	0.653	0.214	0.546	0.798
LIQUIDITY	0.149	0.134	0.112	0.079	0.201
LN_AT	8.964	8.788	1.404	7.987	9.881
LOSS	0.125	0.000	0.331	0.000	0.000
MARGINS	0.121	0.114	0.139	0.068	0.173
MATURITY_PENSION	0.744	0.740	0.172	0.626	0.887
%INSIDE	0.068	0.020	0.154	0.004	0.042
%INST	0.819	0.878	0.225	0.728	0.967
RATING	13.059	14.000	3.218	11.000	15.000
RATING_5500 (n = 1,614)	13.152	14.000	3.181	11.000	15.000
RESTATE	0.090	0.000	0.286	0.000	0.000
RETURN	0.124	0.116	0.360	-0.079	0.288
ROA	0.059	0.060	0.083	0.032	0.090
STD_DEV	0.082	0.070	0.047	0.051	0.099
SUBORDINATED	0.069	0.000	0.254	0.000	0.000

Table 3 presents the summary statistics for long-term issuer credit ratings and holdings of Level 3 assets as well as auditor, governance, company, and pension plan characteristics from 2011 to 2015. All variables are defined in Table 2 and were derived from information obtained from Capital IQ, Compustat, Audit Analytics, MSCI, CRSP, 10-K filings, Form 5500 filings, and proxy statements (Form DEF 14A).

TABLE 4
Pearson Pairwise Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
RATING (1)	1.000														
RATING_5500 (2)	**0.979**	1.000													
FVA3_PENSION (3)	-0.011	-0.010	1.000												
BIG4_PENSION (4)	**0.291**	**0.292**	**0.054**	1.000											
FULLSCOPE (5)	**0.280**	**0.282**	0.023	**0.371**	1.000										
BIG4_COMPANY (6)	**0.103**	**0.058**	0.028	**0.095**	**0.065**	1.000									
DUALITY (7)	**0.231**	**0.226**	0.042	**0.077**	**0.114**	0.035	1.000								
BOARDIND (8)	**0.243**	**0.237**	**0.100**	**0.108**	**0.121**	**0.089**	**0.176**	1.000							
RESTATE (9)	**-0.077**	**-0.073**	0.030	**-0.054**	-0.024	0.033	-0.010	-0.014	1.000						
BLOCK (10)	**-0.279**	**-0.298**	**-0.049**	**-0.153**	**-0.147**	0.020	-0.026	**0.045**	0.006	1.000					
%INSIDE (11)	**-0.142**	**-0.147**	**-0.064**	-0.028	**-0.081**	-0.033	**-0.077**	**-0.443**	0.012	-0.042	1.000				
%INST (12)	-0.023	**-0.055**	-0.022	**-0.060**	**-0.103**	**0.052**	-0.001	**0.216**	0.024	**0.456**	**-0.216**	1.000			
FVA3_COMPANY (13)	0.035	0.025	**0.087**	0.032	0.025	-0.007	-0.031	-0.043	0.018	**-0.089**	-0.004	**-0.062**	1.000		
RETURN (14)	**0.115**	**0.135**	0.018	**0.058**	0.000	0.032	0.036	0.003	0.012	**-0.058**	**0.061**	**0.057**	0.017	1.000	
STD_DEV (15)	**-0.569**	**-0.568**	-0.002	**-0.095**	**-0.101**	**-0.049**	**-0.131**	**-0.110**	0.005	**0.063**	**0.142**	**-0.070**	-0.013	**-0.176**	1.000
SUBORDINATED (16)	**-0.066**	**-0.051**	0.011	-0.027	-0.025	0.016	**-0.071**	0.000	0.031	0.005	-0.015	-0.007	**0.138**	0.006	-0.003
INT_COV (17)	**0.460**	**0.459**	-0.008	**0.151**	**0.146**	**0.061**	**0.090**	**0.079**	**-0.088**	**-0.140**	**-0.088**	0.016	**-0.050**	**0.098**	**-0.234**
BOOK_MKT (18)	0.036	0.021	-0.015	-0.016	-0.028	0.008	**0.056**	**0.048**	-0.011	-0.007	-0.011	0.015	**-0.099**	0.015	-0.047
LIQUIDITY (19)	**0.444**	**0.473**	-0.009	**0.132**	**0.100**	0.041	0.040	**0.078**	**-0.084**	**-0.145**	**-0.046**	**0.052**	**-0.130**	**0.136**	**-0.251**
LOSS (20)	**-0.452**	**-0.452**	-0.007	**-0.093**	**-0.082**	**-0.054**	**-0.140**	**-0.047**	0.043	**0.133**	**0.061**	**-0.102**	-0.021	**-0.259**	**0.406**
ROA (21)	**0.382**	**0.397**	-0.015	**0.087**	**0.067**	**0.059**	**0.066**	**0.059**	**-0.047**	**-0.102**	-0.038	**0.095**	**-0.091**	**0.199**	**-0.325**
MARGINS (22)	**0.361**	**0.366**	-0.040	**0.092**	**0.053**	**-0.052**	**0.060**	0.022	0.011	**-0.167**	-0.017	**-0.049**	-0.021	**0.175**	**-0.340**
LEVERAGE (23)	**-0.346**	**-0.363**	0.017	0.007	-0.019	**0.055**	**-0.063**	**-0.096**	0.041	0.035	**0.075**	**-0.133**	**0.054**	**-0.065**	**0.231**
CAPEX_REV (24)	-0.042	-0.005	0.041	-0.015	0.013	**-0.092**	**-0.071**	0.028	0.011	-0.029	-0.034	-0.044	-0.026	**-0.074**	0.031
LN_AT (25)	**0.583**	**0.564**	**0.099**	**0.341**	**0.345**	**0.184**	**0.175**	**0.137**	0.009	**-0.322**	**-0.136**	**-0.114**	**0.194**	0.024	**-0.299**
DIFF_YEAR_END (26)	**-0.068**	**-0.076**	-0.041	0.000	-0.031	0.003	0.010	**-0.072**	-0.027	0.015	**0.092**	**0.081**	**-0.078**	0.025	0.031
FUNDED (27)	**0.202**	**0.206**	**-0.118**	**0.115**	**0.102**	0.005	**0.102**	**0.075**	0.018	**-0.051**	**-0.085**	-0.028	-0.011	**0.082**	**-0.167**
DISCOUNTRATE (28)	**-0.052**	**-0.070**	**-0.071**	0.031	0.006	0.022	0.019	-0.043	-0.029	**-0.046**	0.043	-0.023	0.004	0.030	**0.088**
MATURITY (29)	**-0.278**	**-0.341**	-0.037	**-0.124**	**-0.152**	0.039	-0.022	**-0.060**	0.026	**0.073**	**0.065**	0.042	0.001	-0.041	**0.143**

Table 4 includes the Pearson pairwise correlations between the variables utilized in the study. All variables are defined in Table 2. Correlations significant at or below the 0.05 level (two-tailed) are in bold.

TABLE 4, Continued
Pearson Pairwise Correlation Matrix

Variables	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
SUBORDINATED (16)	1.000													
INT_COV (17)	**-0.070**	1.000												
BOOK_MKT (18)	-0.015	0.009	1.000											
LIQUIDITY (19)	**-0.121**	**0.525**	0.001	1.000										
LOSS (20)	0.037	**-0.261**	-0.006	**-0.308**	1.000									
ROA (21)	**-0.067**	**0.374**	0.022	**0.384**	**-0.430**	1.000								
MARGINS (22)	0.010	**0.298**	0.007	**0.271**	**-0.387**	**0.632**	1.000							
LEVERAGE (23)	**0.053**	**-0.318**	0.046	**-0.491**	**0.231**	**-0.200**	**-0.099**	1.000						
CAPEX_REV (24)	-0.005	**-0.076**	-0.043	**0.136**	**0.070**	**-0.092**	0.018	**-0.072**	1.000					
LN_AT (25)	**0.057**	**0.171**	0.023	**0.088**	**-0.186**	**0.059**	**0.135**	**-0.053**	0.043	1.000				
DIFF_YEAR_END (26)	-0.009	**0.106**	-0.027	**0.067**	0.008	0.027	**-0.053**	**-0.079**	**-0.133**	**-0.071**	1.000			
FUNDED (27)	0.024	**0.114**	0.021	0.009	**-0.103**	**0.072**	**0.059**	**-0.063**	-0.020	**0.142**	-0.018	1.000		
DISCOUNTRATE (28)	0.040	-0.003	-0.021	**-0.085**	-0.008	-0.012	-0.033	0.015	-0.035	0.008	**0.062**	**0.202**	1.000	
MATURITY (29)	**0.083**	**-0.190**	-0.005	**-0.311**	**0.085**	**-0.096**	**-0.077**	**0.177**	**-0.154**	**-0.142**	**-0.048**	**0.095**	**0.081**	1.000

Table 4 includes the Pearson pairwise correlations between the variables utilized in the study. All variables are defined in Table 2. Correlations significant at or below the 0.05 level (two-tailed) are in bold.

TABLE 5
Results for Credit Ratings on Level 3 Fair Value Pension Plan Assets

		(DV = RATING) (1)		
Variable	**Expected Sign**	**Estimate**	**t-stat**	**p-value**
FVA3_PENSION (H1)	-	-2.383***	-6.12	0.000
DUALITY	+/-	0.274***	2.81	0.005
BOARDIND	+	3.754***	7.88	0.000
RESTATE	-	-0.404**	-2.55	0.011
BLOCK	-	-0.081**	-2.32	0.020
%INSIDE	+/-	1.266***	3.15	0.002
%INST	+	-0.142	-0.46	0.644
FVA3_COMPANY	-	-10.239*	-1.81	0.070
RETURN	+	-0.256	-1.40	0.162
STD_DEV	-	-21.697***	-10.66	0.000
SUBORDINATED	-	-0.578***	-3.12	0.002
INT_COV	+	0.033***	5.29	0.000
BOOK_MKT	-	-0.001	-0.98	0.329
LIQUIDITY	+	5.114***	5.26	0.000
LOSS	-	-0.698***	-3.37	0.001
ROA	+	7.747***	2.68	0.007
MARGINS	+	-0.975	-1.21	0.228
LEVERAGE	-	-1.675***	-4.60	0.000
CAPEX_REV	-	-0.526***	-4.33	0.000
LN_AT	+	1.155***	19.29	0.000
DIFF_YEAR_END	-	-0.547***	-4.75	0.000
FUNDED	+	1.573***	5.09	0.000
DISCOUNTRATE	-	-29.320***	-3.26	0.001
MATURITY_PENSION	-	-2.061***	-6.78	0.000
Year indicators		Yes		
Industry indicators		Yes		
Observations		1,717		
Pseudo R-squared		0.279		
Wald Chi-squared		1,425.92		
Prob. of Chi-squared		0.000		

Table 5 presents results for OLR regressions of credit ratings on Level 3 fair value pension plan assets. All variables are defined in Table 2. P-values (two-tailed) are estimated using robust standard errors.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

TABLE 6
Results for Credit Ratings on Big 4 Pension Plan Auditors

Panel A: Regression Results		***(DV = RATING_5500)***			***(DV = RATING_5500)***		
		(2)			**(3)**		
Variable	**Expected Sign**	**Estimate**	**t-stat**	**p-value**	**Estimate**	**t-stat**	**p-value**
FVA3_PENSION (H1)	-	-2.443***	-6.12	0.000	-3.758***	-7.20	0.000
BIG4_PENSION (H2a)	+	0.358***	3.32	0.001	0.359***	3.30	0.001
FVA3_PENSION*BIG4_PENSION (H2b)	+				3.055***	4.16	0.000
DUALITY	+/-	0.310***	3.04	0.002	0.363***	3.47	0.001
BOARDIND	+	3.503***	7.04	0.000	3.548***	7.09	0.000
RESTATE	-	-0.392**	-2.34	0.019	-0.387**	-2.29	0.022
BLOCK	-	-0.045	-1.21	0.224	-0.047	-1.25	0.210
%INSIDE	+/-	1.210***	2.65	0.008	1.229***	2.74	0.006
%INST	+	-0.452	-1.36	0.173	-0.453	-1.36	0.173
FVA3_COMPANY	-	-10.485*	-1.80	0.072	-9.270*	-1.65	0.099
RETURN	+	0.124	0.72	0.474	0.128	0.74	0.460
STD_DEV	-	-22.444***	-10.16	0.000	-22.413***	-10.14	0.000
SUBORDINATED	-	-0.662***	-3.34	0.001	-0.653***	-3.31	0.001
INT_COV	+	0.040***	6.09	0.000	0.041***	5.99	0.000
BOOK_MKT	-	-0.001	-1.21	0.225	-0.001	-1.21	0.224
LIQUIDITY	+	5.662***	5.30	0.000	5.737***	5.34	0.000
LOSS	-	-0.908***	-3.99	0.000	-0.900***	-3.93	0.000
ROA	+	5.522*	1.68	0.092	5.457*	1.66	0.098
MARGINS	+	-0.597	-0.69	0.492	-0.623	-0.72	0.474
LEVERAGE	-	-1.558***	-3.69	0.000	-1.590***	-3.74	0.000
CAPEX_REV	-	-0.546***	-4.12	0.000	-0.558***	-4.22	0.000
LN_AT	+	1.144***	17.55	0.000	1.156***	17.85	0.000
DIFF_YEAR_END	-	-0.307**	-2.36	0.018	-0.331**	-2.55	0.011
FUNDED	+	1.290***	3.80	0.000	1.229***	3.61	0.000
DISCOUNTRATE	-	-31.194***	-3.34	0.001	-33.021***	-3.64	0.000
MATURITY_PENSION	-	-2.021***	-6.32	0.000	-2.056***	-6.44	0.000
BIG4_COMPANY	+	-0.397	-0.52	0.603	-0.458	-0.59	0.552
Year indicators		Yes			Yes		
Industry indicators		Yes			Yes		
Observations		1,578			1,578		
Pseudo R-squared		0.286			0.288		
Wald Chi-squared		1,307.19			1,302.60		
Prob. of Chi-squared		0.000			0.000		

Panel B: Summed Coefficient Results

Chi-Square statistic for:	Sum	F-stat	p-value
FVA3_PENSION + FVA3_PENSION*BIG4_PENSION	-0.703	1.74	0.187

Table 6 presents results for OLR regressions of credit ratings on Big 4 pension plan auditors. All variables are defined in Table 2. P-values (two-tailed) are estimated using robust standard errors.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

TABLE 7
Results for Credit Ratings on Full-Scope Pension Plan Audits

Panel A: Regression Results		*(DV = RATING_5500)* **(4)**			*(DV = RATING_5500)* **(5)**		
Variable	**Expected Sign**	**Estimate**	**t-stat**	**p-value**	**Estimate**	**t-stat**	**p-value**
FVA3_PENSION (H1)	-	-2.318***	-5.76	0.000	-2.624***	-6.02	0.000
FULLSCOPE (H3a)	+	0.332***	2.70	0.007	0.350***	2.81	0.005
FVA3_PENSION*FULLSCOPE (H3b)	+				2.335*	1.75	0.081
DUALITY	+/-	0.309***	3.08	0.002	0.307***	3.05	0.002
BOARDIND	+	3.729***	7.53	0.000	3.767***	7.62	0.000
RESTATE	-	-0.404**	-2.45	0.014	-0.398**	-2.41	0.016
BLOCK	-	-0.035	-0.95	0.341	-0.033	-0.91	0.365
%INSIDE	+/-	1.185***	2.64	0.008	1.178***	2.63	0.008
%INST	+	-0.531	-1.62	0.104	-0.510	-1.57	0.117
FVA3_COMPANY	-	-9.437	-1.59	0.112	-9.035	-1.54	0.124
RETURN	+	0.134	0.79	0.429	0.132	0.78	0.435
STD_DEV	-	-22.041***	-10.34	0.000	-22.100***	-10.32	0.000
SUBORDINATED	-	-0.616***	-3.14	0.002	-0.608***	-3.10	0.002
INT_COV	+	0.034***	4.94	0.000	0.034***	4.89	0.000
BOOK_MKT	-	-0.001	-1.31	0.190	-0.001	-1.31	0.191
LIQUIDITY	+	5.906***	5.44	0.000	5.923***	5.46	0.000
LOSS	-	-0.941***	-4.13	0.000	-0.944***	-4.14	0.000
ROA	+	6.728**	1.97	0.048	6.727**	1.97	0.049
MARGINS	+	-1.060	-1.30	0.194	-1.027	-1.25	0.212
LEVERAGE	-	-1.578***	-3.73	0.000	-1.590***	-3.75	0.000
CAPEX_REV	-	-0.586***	-4.55	0.000	-0.589***	-4.59	0.000
LN_AT	+	1.139***	17.70	0.000	1.138***	17.59	0.000
DIFF_YEAR_END	-	-0.453***	-3.63	0.000	-0.459***	-3.66	0.000
FUNDED	+	1.314***	3.95	0.000	1.302***	3.91	0.000
DISCOUNTRATE	-	-30.827***	-3.35	0.001	-32.714***	-3.59	0.000
MATURITY_PENSION	-	-2.043***	-6.44	0.000	-2.042**	-6.45	0.000
BIG4_COMPANY	+	-0.393	-0.52	0.606	-0.406	-0.53	0.594
Year indicators		Yes			Yes		
Industry indicators		Yes			Yes		
Observations		1,614			1,614		
Pseudo R-squared		0.282			0.283		
Wald Chi-squared		1,320.62			1,306.57		
Prob. of Chi-squared		0.000			0.000		

Panel B: Summed Coefficient Results			
Chi-Square statistic for:	Sum	F-stat	p-value
FVA3_PENSION + FVA3_PENSION*FULLSCOPE	-0.288	0.05	0.819

Table 7 presents results for OLR regressions of credit ratings on full-scope pension plan audits. All variables are defined in Table 2. P-values (two-tailed) are estimated using robust standard errors.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.