How Does Private Equity Impact Insurer Asset Management?

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Keywords: Private Equity, Private Bond, Asset Management, Life Insurance, Regulation, Structured Bond

JEL: G22, G23, G24, G28, G32, G34

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1. Introduction

U.S. life insurers—with nearly $7 trillion in assets —play a significant role in the U.S. financial sector, particularly in the U.S. corporate bond market (Koijen and Yogo, 2023). Management of their investment portfolios, therefore, has a significant effect on the economy. Recently, there has been increasing concern about the rising number of life insurers owned by private equity firms (PE) and their effect on life insurer assets (NAIC 2024). From 2011 through 2020, we find that the percentage of life insurer assets owned by PE increased from 2.5 percent to 8 percent. In this paper, we explore the relationship between PE ownership and life insurers' asset management.

We use PE acquisitions of life insurers to study how PE ownership affects asset management. Studying the effect of PE ownership in the U.S. life insurance industry has several advantages. First, life insurance companies are financial intermediaries whose profits come primarily from holding money between the time they receive life/annuity premiums and the time they pay insurance/annuity claims, which can take decades. Policyholders value safe, financially strong insurers that have a greater likelihood of meeting the long-term promises made in the insurance contracts they buy. This long-term perspective, however, differs from the traditional short-term horizon of PE firms. The timing mismatch exacerbates potential conflicts, with PE owners potentially increasing the insurer's risk for their own gain to the detriment of policyholders. Second, private equity (PE) firms have a reputation for exploiting regulatory discrepancies (e.g., Spindler 2009; Magnuson 2018; Morris and Phalippou 2020; Kirti and Sarin 2024; Cortes, Diaby, and Windsor 2023), and the regulatory environment of the U.S. life insurance industry provides a compelling laboratory. In the U.S., life insurer capital requirements are prescribed by risk-based capital standards. Recent evidence documents life insurers take advantage of these rules (e.g., Becker and Ivashina 2015; Becker, Opp, and Saidi 2022; Ellul, Jotikasthira, and Lundblad 2011;

Ellul et al. 2015; Hanley and Nikolova 2021; Kim, Leverty, and Schmit 2023; Kirti and Sarin 2024; Koijen and Yogo 2016), but these studies do not discuss whether ownership structure, such as PE-ownership, is associated with these practices except for Kirti and Sarin (2024). Third, most of the extant academic literature on PE ownership investigates publicly traded companies.[1] Because all U.S. insurers must disclose detailed financial information to regulators, we can examine the consequences of PE ownership for all life insurers, including private companies.

Our primary focus is whether PE-owned life insurers exploit a discrepancy in how bond investments are regulated. Specifically, we investigate whether PE-owned life insurers tilt life insurer bond portfolios toward privately placed bonds. Life insurers are large investors of privately placed bonds (Pottier 2007) and increasingly invest in bonds issued by financial intermediaries (Fournier, Meisenzahl, and Polacek 2024a; Fournier, Meisenzahl, and Polacek 2024b; NAIC 2022). Regulators monitor the asset risk of U.S. life insurers using the risk-based capital (RBC) framework. In general, the amount of regulatory capital that insurers are required to hold increases with asset risk. Asset risk, however, is judged primarily by credit risk. Thus, privately placed bonds and public bonds with similar credit ratings (including privately placed structured bonds with opaque credit qualities) require insurers to hold the same amount of regulatory capital, even though privately placed bonds are more opaque and less liquid (Chaplinsky and Ramchand 2004; Hanley, Jagolinzer, and Nikolova 2018).[2]

We begin our analysis by estimating differences in the bond investments of life insurers acquired by PE firms compared with life insurers "never owned" (during our sample period) by a

[1] A few exceptions are recent work by Davis et al. (2021) exploiting a large sample of private equity deals, including private target firms, in the U.S., and Antoni, Maug, and Obernberger (2019) studying the German market.

[2] One exception is the privately placed mortgage-backed securities (MBS), whose regulatory capital charges, during our sample period, are determined by modeled losses (Becker, Opp, and Saidi 2022; Hanley and Nikolova 2021). Multiple industry reports suggest that life insurers are increasingly investing in non-MBS privately placed bonds and those issued by financial intermediaries (Fournier, Meisenzahl, and Polacek 2024a; Fournier, Meisenzahl, and Polacek 2024b; NAIC 2022).

PE firm. We estimate the differences during the three years pre- and post-acquisition, using a stacked differences-in-differences model (Cenzig, et al., 2019; Deshpande and Li, 2019).[3] We create a novel dataset that identifies life insurers acquired by a PE firm using the detailed regulatory disclosures reported by all U.S. insurers. We cross-validate PE ownership using the Mergers and Acquisitions Databases from the credit rating agencies (A.M.Best and S&P Global Capital IQ).

We measure the bond investments of life insurers in several ways.[4] To begin, we focus on privately placed bonds. We explore life insurers' holdings of privately placed bonds in total and by type: credit quality, liquidity, and opaqueness. We proxy privately placed bonds' credit quality using the percent of privately placed bonds below investment grade, liquidity using the percent of privately placed bonds whose trading prices are unobservable due to infrequent market activity (i.e., least liquid bonds), and opaqueness using the percent of privately placed bonds that are structured (e.g., asset-backed securities such as collateralized loan obligations as well as mortgage-backed securities).[5] We also use insurers' holdings of privately placed corporate bonds, which we perceive as less opaque in terms of credit quality than privately placed structured bonds. We then assess the overall credit risk of life insurer bond portfolios (inclusive of publicly traded and privately placed bonds) using the book-value weighted average of the RBC charges on bond investments, and the holdings of speculative bonds (below investment grade). All bond holdings are measured as a percent of total invested assets.

We find that life insurers acquired by PE tilt their bond portfolios towards privately placed bonds. Relative to insurers not owned by PE, life insurers acquired by PEs increase their holdings

[3] Our main models are based on a stack of balanced panels for a six year window, i.e., three years before and since the acquisition. We also perform analysis where we change the study window to five or seven year windows.
[4] We follow the regulatory definition of bond investments in the life insurance industry, which includes all fixed-income assets but excludes real estate lending activities such as mortgage loans (NAIC 1998a; NAIC 1998b).
[5] We note that most of the privately placed structured bonds held by life insurers are privately placed asset-backed securities (Appendix Table A.1).

of privately placed bonds by 6.4 percentage points. Given that the holdings of privately placed bonds for the average life insurer in our sample is 10.4 percent, the estimated increase is commensurate with a 61% increase in the holdings of privately placed bonds. Among the different types of privately placed bonds, the average insurer has holdings of speculative, corporate, and structured private bonds of 0.71, 3.31, and 0.25 percent, respectively. Post-acquisition, PE-owned insurers increase their holdings in privately placed speculative, corporate, and structured bonds by 75%, 54%, and 117%, respectively. The increase in the holdings of privately placed structured bonds (117%) is larger than the overall increase in privately placed corporate bond holdings (54%), suggesting that the overall increase in private bonds is slanted toward privately placed structured bonds with a great potential for opaque credit quality. We do not find evidence that PE acquisition leads to increased holdings of the least liquid privately placed bonds.

We also find that PE-owned life insurers increase the credit risk of the overall bond portfolios, both in terms of the weighted average regulatory capital charges and in the holdings of speculative bonds. After the acquisition, PE-owned insurers increase their holdings in speculative bonds by 0.87 percentage points relative to insurers never owned by PE. Since the unconditional average holdings of speculative bonds in our sample is 2.4 percent, the results imply that PE-owned insurers increase their speculative bond holdings by approximately 36 percent.

We perform two key robustness tests. First, we follow Kirti and Sarin (2024) and perform a propensity score-matched analysis to match PE-owned life insurers with similar non-PE counterparts (in terms of size, regulatory capital ratios, and business mix). We find consistent results for privately placed bond holdings, including privately placed speculative and structured bonds. We do not find statistically significant results for privately placed corporate bond holdings or the credit risk of the overall bond portfolios. The results suggest that the increase in the credit

risk of the overall bond portfolio is likely driven by other differences between PE-owned and non-PE-owned life insurers. Yet, the tilt toward privately placed speculative bonds and structured bonds is robust to such a concern. Second, we are concerned that the stacked differences-in-differences models suffer from repeated control and that the event year in our panels is defined by the year of a PE acquisition. We, therefore, use life insurers acquired by a non-PE parent from another non-PE parent, as the control group. We also require that within each panel, we include only insurers that are acquired by a non-PE in the same year that the treated insurers are acquired by a PE. In contrast to the propensity scores matched analysis, we find consistent and stronger results for privately placed bond holdings (total, speculative, corporate, and structured) and the credit risk of the overall bond portfolios. Both robustness tests confirm that the tilt toward privately placed bonds, especially for structured bonds, is statistically significant and robust to concerns about heterogeneity in underlying firm characteristics or the PE acquisition timing.

Next, we explore the mechanism behind the tilt toward privately placed bonds. The extant literature documents that PEs restructure target firms to enhance efficiency (Kaplan and Strömberg 2009; Obernberger 2023). A unique feature of life insurers is asset management. Life insurers organize their asset management differently. Some insurers manage their assets internally, others outsource them to external asset managers, and others use a combination of these approaches (NAIC 2023). Building on the PE organizational efficiency literature, we explore whether the management of the investment function within life insurers shifts from internal employees to external asset managers owned and controlled by PE firms. We exploit life insurers' detailed reporting of asset manager usage and employee staffing costs, separately reported for investment and general business functions.

We find that insurers acquired by PE firms reduce the salaries of their internal investment teams by 0.02 percentage points (as a percent of total invested assets). For the average life insurer in our sample, which has total invested assets of $7.83 billion, the estimated drop in internal staff salaries is equivalent to $1.57 million. Approximately one-third of the insurers acquired by PEs completely eliminate their internal investment team. Pre-acquisition, these insurers had an average internal investment team salary of $4.8 million. Yet, we do not find that insurers acquired by PE reduce the overall costs associated with the investment function. In addition, we do not find a similar reduction in general insurance business employee staffing costs. We do not find a statistically significant shift of the investment function to the PE post-acquisition, which suggests that the internal investment employee salary reduction is not always followed by a shift of the asset management to the PE.

Lastly, we endeavor to understand the consequences of investment governance changes brought by PE, by exploring differences between life insurers acquired by PE that use PE's asset managers to those that do not. We find that post-acquisition, PE-owned life insurers using PE's asset managers increase their privately placed bond investments more than those that do not. In some cases (for privately placed bond holdings in total and speculative bonds), the shift is only observed for PE-owned life insurers that use PE's asset managers; in other cases (privately placed corporate bonds and structured bonds), we find that the holdings increase is greater for PE-owned life insurers that use PE's asset managers than those that do not use PE's asset managers. Consequentially, only life insurers using PE's asset managers post-acquisition report statistically significant increases in the weighted average regulatory capital charges of the bond portfolios. These results are robust to the propensity score matching method and the non-PE acquisition control test.

We contribute to at least three strands of literature. First, we contribute to the literature on PE owners' operational engineering (Kaplan and Strömberg 2009). A growing literature documents heterogeneity in PE restructuring that depends on the job profiles of the employees (Antoni, Maug, and Obernberger 2019; Garcia-Gomez, Maug, and Obernberger 2020).[6] Using the detailed regulatory reportings of life insurers, we find additional engineering brought by PE firms when the portfolio companies are financial intermediaries. Specifically, we find that PE streamlines operations by reducing the core function (investment) of the target firm, of which a PE is considered to have a comparative advantage over the target (life insurers). In contrast to the literature documenting improved operational efficiency, however, we do not find evidence that the costs of the investment function is reduced after the PE acquisition. The PE may be gaining the advantage through fees paid to the PE asset managers

Second, we contribute to the literature on internal capital markets in the insurance sector. A growing body of literature examines various resource allocation channels within insurance groups: Niehaus (2018) provides evidence that life insurance groups allocate capital to maintain franchise value; Chiang (2019) finds bancassurance models lead to higher growth during the financial crisis; Ge (2022) suggests that life insurer pricing is affected by sibling property insurers' losses; and Fier and Liebenberg (2023) shows property and liability insurance groups allocate capital to manage regulatory risks. Our research identifies a new allocation model where PE parents significantly reduce the core function of life insurers. While we don't find clear efficiency gains, there may be unobserved benefits to this structure that are beyond the scope of our study.

Lastly, we contribute to the literature that examines life insurer systemic risk. The literature documents that life insurers strategically manage assets while taking into account the regulatory

[6] See a review of the literature in Obernberger (2023).

risks associated with credit ratings (e.g., Ellul, Jotikasthira, and Lundblad 2011; Becker and Ivashina 2015; Becker, Opp, and Saidi 2022; Hanley and Nikolova 2021). However, the literature has focused less on privately placed bonds despite the systemic risk concern. In addition, life insurers can self-report the credit risk of privately placed structured bonds, which may result in opaque credit quality (Investment Analysis Office 2022).[7] Both Foley-Fisher, Heinrich, and Verani (2023) and Liu, Mukherjee, and Srinivasan (2024) study insurers' collateralized loan obligations, but do not focus on the overall privately placed bond investments.

The study closest to ours is Kirti and Sarin (2024), which documents that PE-owned life insurers strategically increase their investments in private label structured bonds following the regulatory reform on MBS capital requirements (Becker, Opp, and Saidi 2022; Hanley and Nikolova 2021). In contrast to Kirti and Sarin (2024), we find that PE-owned life insurers tilt their investments to privately placed structured bonds, despite our sample period superseding the regulatory reform on MBS[8]; in addition, we also find that PE's tilt life insurer portfolios to privately placed corporate bonds, which are bigger in terms of investment size than privately placed structured bonds[9] and are not subject to the regulatory capital requirement reform. Our findings suggest that PE owners of life insurers leverage the regulatory advantage of privately placed structured bonds due to the opaqueness of the credit quality. We also shed light on the

[7] The regulators have amended the rule to limit the potential regulatory arbitrage of all structured bonds, effective 2024 (Investment Analysis Office 2023).

[8] The regulatory capital treatment of MBS differs from ABS during our study period. Regulatory capital treatment of MBS follows the modeled loss estimates (by Blackrock and/or PIMCO) and does not rely on the credit rating (Hanley and Nikolova 2021). Until 2024, the regulatory capital treatment of ABS was the same as corporate bonds (Investment Analysis Office 2022, 2024; Liu, Mukherjee, and Srinivasan 2024), and did not follow the modeled loss framework as in MBS.

[9] As shown in Appendix Table A.1, on average, life insurers hold approximately 0.23% of their assets in privately placed ABS and 0.26% in privately placed structured bonds; most of the privately placed structured bonds, therefore, are ABS rather than MBS. Meanwhile, on average, life insurers hold 3.24% of their assets in privately placed corporate bonds and 10.4% in all types of privately placed fixed income.

operational changes brought by PE, that are linked to the tilt towards privately placed bond investments, which are not documented by Kirti and Sarin (2024).

2. Data

We create a panel of U.S life insurance companies (and their asset managers) from 2011 to 2020.[10] The primary data source is the life insurer's annual statutory financial statements filed with the National Association of Insurance Commissioners (NAIC). From the annual statement data, we collect the insurance company's name, the NAIC identification number (at the reporting entity and the insurance group level), and the organizational form. We also collect the company's financial information (e.g., balance sheet, income statement, RBC ratios, bond holdings) and its premiums/reserves by line of business.

We use information reported on the Asset Valuation Reserves page (following Kim, Leverty, and Schmit, 2018) to calculate the average RBC charges of life insurers' investments. We also collect the company's organizational structure and within-group activity (including affiliated asset managers) from the annual statement Schedule Y Part 1A. Data on privately placed bond holdings come from Schedule D Part 1A Section 1 – the schedule includes information on the privately placed bond holdings by maturity structure and credit quality (NAIC designations). We use securities-level reporting in Schedule D Part 1 to identify privately placed bonds issued by corporations, MBS, and ABS.[11] In the following subsections, we discuss the collection of the asset manager and private equity (PE) ownership data.

[10] Our sample begins in 2011, when detailed information on life insurer ownership structures (Schedule Y Part 1A) was first reported.

[11] Privately placed bonds in Schedule D Part 1 are identified by the presence of special characters (#, *, or @) in the sixth, seventh, or eighth position of the CUSIP following the NAIC Securities Valuation Office Manual (2020). We do not include bonds with missing CUSIP entries as privately placed bonds. We find consistent results if these bonds are categorized as privately placed bonds. We follow Schedule D Part 1 guidelines to identify corporate bonds (i.e., industrial and miscellaneous issuer obligations for unaffiliated corporate bonds and parents/subsidiaries/affiliates issuer obligations for affiliated corporate bonds), MBS (residential mortgage-backed securities or commercial mortgage-backed securities), and ABS (i.e., other loan-backed and structured securities).

2.1 Sample insurers

Our sample includes 649 unique insurers and 5,804 insurer-year observations (out of 7,497 insurer-year observations that report to the NAIC from 2011 to 2020). The sample does not include inactive life insurers, insurers with non-positive RBC ratios, insurers with non-positive capital levels, insurers not organized as a stock or mutual, and insurers with non-positive values of gross reserves in life and annuity businesses. Because small insurers likely have different investment portfolios (Ellul et al. 2015; NAIC 2015), we require insurers to be larger than $10 million in total invested assets. Total invested assets exclude separate account assets.[12] Insurers observed only once during the sample period are also excluded. In terms of total invested assets, our final sample represents 94% of those reporting to the NAIC in 2011 and 96% in 2020.[13]

2.2 Asset manager use of life insurers

Life insurers are required to list all the asset managers they use in the General Interrogatories section of their statutory annual statements. The asset manager data, however, is unstructured and, thereby, requires substantial cleaning. We discuss the data cleaning process in detail in Appendix B. We then use Schedule Y Part 1A and the 2016 disclosure update on the asset manager data (NAIC 2018; NAIC 2023) to identify whether or not the asset manager is affiliated with the insurer or PE.

2.3 PE-owned life insurers

We utilize multiple data sources to identify the life insurers owned by PE firms: A.M.Best, S&P Global Capital IQ Pro, and NAIC statutory annual statements (in particular, the Notes to

[12] For variable annuities and variable life products, the consumers (policyholders) make the investment decisions and the performance of these products is passed on to consumers. The assets supporting these products are recorded as "Separate Account" assets; a life insurer does not make investment decisions on separate account assets and they are not co-mingled with the insurer's invested assets (i.e., "General Account" assets).
[13] We report summary statistics of our sample insurers in Appendix Table A.1.

Financial Statements, Schedule Y Part 1A, and Form A). Starting in 2011, insurers are required to file Schedule Y Part 1A, which documents the names of the direct controlling parents, the ultimate controlling parents, and whether the controlling parents are publicly traded. We use Schedule Y part 1A to identify insurers that are potentially controlled by PEs, i.e., insurers with parents that are not publicly traded or with parents that are formed as LPs or LLCs. Among these firms, we then identify which insurers have parents that issue private equity funds.[14] We manually cross-reference the characteristics of these parents by searching the web. Using the NAIC annual statements "Notes to Financial Statements," we then look up the year that ownership changes to the PE parent. Our focus is on life insurers directly controlled by PE firms. However, some life insurers affiliated with PE firms are only indirectly controlled by a PE firm. To validate we have correctly identified life insurers that a PE firm directly controls, we cross-check the ownership of the insurer using two sources: the Notes to Financial Statements (in particular, question 10, "Information Concerning Parent, Subsidiaries, Affiliates and Other Related Parties" sections A, B, & C) and the organizational chart reported in Schedule Y.

Next, we verify our identification of PE-owned life insurers and their acquisition years using A.M.Best's publications. We begin with the list of life insurers/groups owned by PE firms, as published by A.M.Best (A.M.Best, 2022). A.M.Best is a credible source of insurers' ownership structure, given that they produce credit ratings of insurers in the U.S. They also analyze insurer-specific M&A activity as part of their rating process.[15] We then use the A.M.Best's BestLink database to identify all M&A deals to create a history of PE ownership during our sample period.

[14] We identify private equity funds from Schedule Y Part 1A. PE funds are listed as non-insurance affiliates of insurance companies.

[15] Given that our data ends in 2020, we exclude life insurers that are affiliated with private equity firm in the A.M. Best report as of September 2022 due to M&A deals performed during 2021 – 2022: Fortitude Re, Allstate Life insurance, Talcott Resolution, and Corebridge (former AIG's Life and Retirement business).

We searched for all M&A deals where the target was a U.S. life insurance company. Our search yields M&A deals from 2013 to 2020 in the A.M.Best data. We utilize S&P Global Capital IQ Pro's "M&A Transactions" database to account for potentially missed deals. Lastly, we verify information on the target life insurer, and the acquiring owners using Form A. Form A is a statutory filing required for all new owners of insurance companies to be filed with the state regulators. Both Notes to Financial Statements and Form A documents are downloaded from the S&P Global Capital IQ Pro.

These steps allow us to create an insurer-year panel data set that tracks whether a life insurer was acquired by a PE firm (both during and before our sample period). Figure 1 Panel A shows the number of life insurers acquired by PE firms during the sample period, while Panel B shows the number of life insurers sold off by PE firms.[16] The PEs that sold life insurers between 2017 and 2020 owned them for an average of 15.25 years (with a minimum of 11 years and a maximum of 20 years).[17] During our sample period, PEs made more acquisitions than dispositions, leading to an increasing share of life insurer assets held by PE firms.

In Figure 2, we plot the share of total life insurance industry assets held by three categories of ownership[18]: (1) PE (denoted by circles), (2) private (non-PE, triangles), and (3) publicly-traded (non-PE, squares). PE ownership of life insurer assets grew from 2.5 percent in 2011 to 8 percent ($382 billion) in 2020.[19] Some PE acquisitions are by serial acquirers, e.g., Apollo and Blackstone,

[16] Often, sub-groups of life insurers are acquired or sold by parents at the same time. We count each reporting life insurer in the same group as a separate deal.
[17] Four PEs sold six life insurers between 2017 and 2020. A PE acquired a life insurer in 1998 and sold it to a publicly traded firm in 2017. Another PE sold two life insurance subsidiaries in 2019 to a publicly traded firm, which the PE acquired in 2005. The third PE acquired two life insurance subsidiaries in 2009 and sold them to a publicly traded firm in 2020. The fourth PE acquired a life insurer in 2004 and then sold it to a private company in 2020.
[18] We also show the number of sample life insurers in each of the ownership category in Appendix Figure A.1.
[19] Using a broader definition of PE-ownership, an industry analysis (NAIC 2021) finds that a total of $471 billion of U.S. life insurers' assets were owned by PEs at the end of 2020. Their recent update (NAIC 2024) reports that a total of $578 billion of U.S. life insurers' assets were owned by a PE by the end of 2023, which reflects recent acquisitions by PE post-2020.

who also acquired life insurers before 2011. The ownership structure of the target life insurer varies: most were private stock insurers, but some were public and others were owned by a different PE. Some PEs acquired multiple subsidiaries within the same group, while other PEs acquired a single life insurer.

3. Investment Management of PE Owned Life Insurers

3.1 Privately Placed Bond Investments

Institutional investors, including private equity (PE) firms and life insurers, may prefer privately placed bonds for several reasons. The literature suggests that privately placed bonds differ from publicly traded bonds in that i) they are placed directly between borrowers and lenders (investors) and ii) they offer higher yields (Carey, 1993; Zwick, 1980). The higher yield results from a liquidity premium and enhanced information sharing between borrowers and lenders, driven by regulations such as SEC Rule 144A, which increases the coordination premium (Chaplinsky and Ramchand 2004; Plantin, 2009). Issuers often place complex structured bonds privately (i.e., directly with the investor), which can provide high yields while helping life insurers manage regulatory credit risks (Investment Analysis Office 2022). Industry reports document that life insurers have increasingly invested in private-label structured bonds, such as collateralized loan obligations (Fournier, Meisenzahl, and Polacek, 2024a). Pottier (2007) finds that the majority of life insurer assets are invested in privately placed bonds.

In terms of the supply of privately placed bonds, some firms only issue private bonds and some firms issue both private and public bonds. Because some firms exclusively issue private bonds, investing in both privately placed and publicly traded bonds allows investors to achieve greater bond issuer diversification within their bond portfolios. This diversification can reduce credit risk and enhance risk-adjusted returns (Liu, 2016). Anecdotal evidence suggests that insurers prioritize

credit diversification (Insurance Asset Risk 2022), and regulations further encourage reduced bond issuer concentration.[20]

These benefits come with costs, especially from the perspectives of regulators and life insurance policyholders. The opaqueness of privately placed structured bonds can lead to regulatory arbitrage (Investment Analysis Office 2022) and complicate regulators' ability to assess the true risks of these assets. Effective in 2024, regulators amended the rule to limit regulatory arbitrage opportunities with respect to credit quality (Investment Analysis Office 2023). Our sample period precedes this rule change. Additionally, firms with lower credit quality are more likely to issue bonds privately and offer higher yields (Denis & Mohav, 2003; Kwan & Carleton, 2010). This can increase credit risk if the bond portfolio lacks sufficient diversification. Investors also have an incentive to focus on a concentrated set of corporate bonds relying on private information for better yields.[21] Qin and Wang (2021) find that concentrated corporate bond mutual funds, on average, deliver higher abnormal returns. The tendency to focus on a set of corporate bonds can differ by investor types, due to access to private information. Pintér, Wang, and Zou (2024) find that sophisticated investors such as PE/hedge funds may trade bonds in larger sizes after receiving an informative signal compared to less sophisticated investors such as life insurers/pension funds (not owned by PEs). Czech and Pintér (2022) also show that sophisticated investors' profits from high-yield corporate bond investments are large due to their information advantage. Pottier (2007) finds there is heterogeneity in the prevalence of privately placed bond investments across life insurers.

[20] The regulatory capital metrics of life insurers, the risk-based capital ratios, assess additional capital requirements for high concentration in an issuer (Asset Concentration Factor). In simple terms, the bond and stock issuances of the 10 largest asset exposures face twice the risk-based capital charges; the 10 largest asset exposures are defined as the assets issued by the top ten issuers of the asset portfolio at the insurance group level.

[21] For example, see Chen, Ferson, and Peters (2010), Czech et al. (2021), Huang and Wang (2014), and Lu, Chen, and Liao (2010) for discussions of informed bond trading.

Given these dynamics, we investigate: (i) whether PE firms shift life insurer investments toward privately placed bonds, and (ii) if such a shift contributes to the formation of lower credit quality of their bond portfolios. In examining privately placed bond investments, we first examine total private bond holdings, *Private Bonds*, which is the percent of invested assets in privately placed bonds. We further explore credit quality, liquidity, and opaqueness. We proxy the credit quality by calculating the percent of investments in privately placed bonds below-investment-grade (*Private Speculative)*.[22] We are interested in identifying privately placed bonds that are less liquid and, thereby, difficult for insurers to find buyers in the market when they choose to sell. Insurers are required to report to the regulators on such bonds, i.e., bonds with few market transactions, and thereby, the insurer does not observe the market value of these bonds.[23] We use this information to proxy for insurers' holdings of the least liquid private bonds (*Private MinMarket)*. We proxy opaqueness by insurers' holdings of privately placed structured bonds (*Private structured)*[24], and contrast with insurers' holdings of privately placed corporate bond issues whose credit quality is directly tied to the issuing firm (*Private Corporate).*[25]

[22] We include junk bonds (NAIC designation of 6) in *Private Speculative*. We, however, note that the statutory accounting treatment differs for junk bonds compared to other types of bonds for life insurers. Junk bonds are marked to market, whereas all other bonds are held and book-adjusted carrying value.

[23] We identify level "3d" bonds from the hierarchy and method used to obtain fair value code in Schedule D. The market price of these bonds is reported as "unobservable" by the insurer (level 3) and the insurer uses discretion in reporting the fair value of the bond (method d). The level "3d" bonds are, therefore, a proxy for the scant market transaction of the bond. Insurers are not required to disclose the hierarchy level until 2012, although they report the method (d); using the hierarchy level of the bond held by the same insurer in 2012, we impute the hierarchy level (and method) of the bonds to identify "3d" bonds in 2011.

[24] Private structured bonds include privately placed ABS and MBS (CMBS and RMBS). We include privately placed ABS and MBS affiliated and not affiliated with the insurer, yet note that affiliated privately placed ABS or MBS investments are significantly smaller in size than unaffiliated privately placed ABS or MBS investments. We also include ABS or MBS guaranteed by the government and government agencies, but the size of these guaranteed ABS or MBS investments is significantly smaller than those that are not guaranteed.

[25] We identify privately placed corporate bonds using the Private Placement Number system assigned by Standard & Poor's CUSIP Service Bureau. The CUSIP system identifies North American bond issues. As a result, our measure of privately placed corporate bonds includes those issued in North America and may omit foreign securities. We include privately placed corporate bonds affiliated and not affiliated with the insurer, yet note that affiliated privately placed corporate bond investments are significantly smaller in size than unaffiliated privately placed corporate bond investments.

We measure the overall bond portfolio credit risk from a regulatory capital perspective. Our first measure is the average RBC bond investment risk charge, *Bond RBC Risk*. Each bond is assigned to one of six RBC buckets whose capital requirements increase as credit risk rises in a non-linear fashion (Becker and Ivashina 2015). Using the capital risk charges for these six buckets, we calculate the weighted average RBC charges. We follow Kim, Leverty, and Schmit (2018) and use the detailed asset-class-level regulatory capital charge and the book value disclosed in the Asset Valuation Reserve pages of annual statements. We calculate the weights of the RBC charges using the book value of bonds. Our second measure is the percent of total invested assets that are held in below investment grade bonds, *Speculative Bonds*. The regulatory capital charges of bonds are based on the bonds' credit ratings, and capital charges increase sharply for bonds below investment grade.

Following statutory accounting principles, we measure all investments using the year-end book-adjusted value. To facilitate comparisons, we measure all investments as a percent of total invested assets. To limit the influence of outliers, all continuous variables are winsorized at 1st and 99th percentile values.

To estimate differences in the investments of PE-owned and non-PE-owned life insurers, we employ a stacked differences-in-differences method following Cengiz et al. (2019) and Deshpande and Li (2019). In contrast to the two-way fixed effects model where heterogenous treatment event timing can bias the estimates (e.g., Athey and Imbens 2022; Callaway and Sant'Anna 2021; Goodman-Bacon 2021), the stacked differences-in-differences enable researchers to create cleaner control groups when units are treated at different points of time (Wing, Freedman, and Hollingsworth 2024). The treatment group includes 25 unique insurers acquired by PEs during the 2014 - 2018 period. Specifically, these are life insurers not previously owned by a PE, i.e., publicly

held or owned by a private non-PE parent. The control group includes 496 unique insurers that are not owned by a PE throughout the 2011 – 2020 period. We stack the panel of treated insurers with the control group insurers in the year of switching to PE (switch-year panel). We include three years before the switching and three years after the switching for each panel (six-year balanced panel). Specifically, we estimate the model:

$$Outcome_{itk} = \beta \cdot Switch_{ik} \times Post_k + \theta_{ik} + \delta_{tk} + \epsilon_{itk} \quad (1)$$

where *Switch* is an insurer-specific indicator that equals one if the insurer is acquired by a PE during 2014 – 2018 and zero for insurers not owned by a PE. *Post* is an indicator that is equal to one for the years since the switch to PE for each panel, *k*, and zero otherwise. We include switch year-by-insurer fixed effects and switch year-by-year fixed effects to account for unobservable insurer characteristics within each panel and differences in the time trend for each panel. Standard errors are clustered at the treatment level, i.e., insurers (to allow dependence for repeated insurers across panels following Wing, Freedman, and Hollingsworth (2024)).[26]

Before estimating the stacked differences-in-differences model, we plot the unconditional mean values (and the 95% confidence interval) of each outcome variable around the PE acquisition event in Appendix Figure A.2. Only the insurers that switched to PE during 2014-2018 are included. Across all six bond outcomes, we find an upward trend except for *Private NonMarket* after the acquisition event, suggesting that PE acquisition leads to increased bond risk in many dimensions.

[26] Insurers that are acquired by PE owners go through insurance group affiliation changes as well. In some cases, only some insurers that belong to the same group (but not PE) are acquired by PE but not the others. In other cases, all insurers that belong to the same group are acquired by PE. We, therefore, consider the treatment of switching to PE as an event that happens at the individual reporting insurer level. Nevertheless, as a robustness check, we estimate the models where we cluster standard errors at the insurance group level to allow for correlations within groups, where the insurance group is identified at the year of the PE event; for insurers that do not belong to an insurance group (i.e., no NAIC group code), we use the insurer's NAIC company code. Most of our findings are consitent to allowing for within group correlations and the results are shown in Appendix Table A.4.

The results of the stacked differences-in-differences estimates are shown in Table 1.[27] We explore differences in privately placed bond investments in columns (1) to (5). The coefficients on *Switch x Post* are positive and statistically significant in all columns except for column (3) (at the 1 percent level in columns (1), (4), and (5) and at the 5 percent level in columns (2)). The coefficient in column (1) implies that life insurers acquired by PEs increase their holdings of privately placed bonds by 6.37 percentage points, which is 61 percent of the unconditional mean (6.3691/10.387). PE-acquired life insurers increase their holdings of privately placed speculative bonds by 0.53 percentage points (75 percent of the unconditional mean). Life insurers acquired by PEs increase their holdings of privately placed corporate bonds and structured bonds by 1.8 percentage points (54 percent of the unconditional mean) and 0.30 percentage points (117 percent of the unconditional mean), respectively.[28] The economic magnitude of the estimated PE acquisition effect on privately placed structured bonds is the highest, suggesting that PE acquisition leads to a significantly higher increase in privately placed structured bonds.

We do not find statistically significant differences in the least liquid private bonds, *Private NonMarket*, after the PE acquisition compared to those that are not owned by PE. Given that measuring the liquidity of privately placed bonds is difficult and that they are less liquid than publicly traded bonds (Chaplinsky and Ramchand 2004; Plantin, 2009), we refrain from making further implications from the result.

In column (6), we find that the regulatory capital costs associated with bond investments increase by 0.1137 (*p-value* = 0.03*)* for insurers acquired by PE relative to those never acquired by PE. The economic magnitude of the estimated difference is approximately 17 percent of the

[27] Univariate differences between the control and the treatment are shown in Appendix Table A.3.
[28] Descriptively, we find that life insurers that are always owned by a PE report a larger share of privately placed bond holdings, especially structured bonds, than those never owned by a PE (Appendix Table A.2).

unconditional mean (0.1137/0.645). In column (7), the results indicate that insurers acquired by PEs increase their speculative bond holdings by 0.88 percentage points (*p-value* = 0.08). The unconditional average speculative bond holdings is 2.4 percent, suggesting that the estimated increase in speculative bond holdings is approximately 37 percent of the unconditional mean. While the coefficient estimate is larger for *Speculative Bond* than for *Private Speculative*, the economic magnitude for *Private Speculative* (75 percent of the unconditional mean) is larger than that for *Speculative Bond* (37 percent of the unconditional mean).[29]

We investigate whether pre-trends are a concern by plotting the estimates of the effect of PE acquisition on each bond risk outcome in the event years before and after the acquisition. The estimates, in Figure 3, are produced by expanding equation (1) to include event year indicators instead of the *Post* indicator variable. We find that the average differences in the outcomes are not statistically different from zero during the pre-periods, while we observe statistically significant and positive differences during the post-periods. The one exception is for privately placed corporate bonds, where the estimate for "-2" year since the acquisition is borderline statistically significant. We further evaluate the sensitivity of the pretrends following Rambachan and Roth (2023). Specifically, we are concerned about potentially monotonic trends in outcomes that differ by treatment. We find that privately placed corporate bond holdings may experience violations of parallel trends. [30]

[29] Since insurers have discretion over reporting the credit quality of some privately placed bonds, it is possible that some privately placed bonds that are below investment grade are reported as investment grade (Investment Analysis Office 2022). Therefore, our estimate on *Private Speculative* is a conservative lower bound.

[30] We assess the sensitivity of the average effects of PE acquisition during the post-period by calculating robust confidence sets of non-linear differences in trends. The results for each outcome are shown in Appendix Figure A.4. The red confidence intervals show the original OLS estimates on the average treatment effects, the first blue bar represents robust confidence intervals evaluated under linear trends (with x-axis = 0), and the other blue bars represent robust confidence intervals evaluated under deviation from linearity with larger values, indicating larger non-linear violations. We find that all outcomes are robust to linear and non-linear trend violations, except for *Private Speculative* and *Private Corporate*.

3.2 Investment Management by PE

In this section, we explore whether the increase in bond risks after PE acquisitions is facilitated by changes to life insurers' investment governance practices, which we define as life insurers' management of internal investment employees as well as their use of asset managers (either affiliated and or unaffiliated with the life insurer). PE owners can more directly influence the investment decisions of the acquired life insurer if the control of the investment function is outsourced to an asset manager owned by the PE. Such a strategy is in line with the vast literature that documents organizational changes made by PEs to acquired firms (Kaplan and Strömberg 2009; Obernberger 2023). On the one hand, using the PE's asset manager to manage the assets of the life insurer is an efficient investment management strategy for the PE parent. For example, PE asset managers may be better suited to execute complex investment management strategies than the investment staff of life insurers. Such efficiency gains should result in a reduction in the investment management expenses of the acquired insurers. On the other hand, PE owners may charge asset management fees to their life insurance companies as a means to pay themselves or invest in areas of importance to the PE parent not necessarily to the insurer. These actions might not improve the investment efficiency of life insurers.

Anecdotal evidence suggests that the asset management fees collected by PEs from acquired life insurers are additional perks. For example, Athene Annuity and Life Company (formerly Aviva Life & Annuity), which was acquired by Apollo in 2013, reports 30 basis points per annum paid to Apollo Insurance Solutions Group during the 2013-2022 period under its investment management agreement. Other insurers acquired by PE firms (e.g., Ability Insurance by Advantage Capital in 2014 and Guaranty Income Life Insurance by Kuvare in 2015) also report

investment management agreements with subsidiaries of their PE parent, although they do not stipulate the asset management fees.[31]

In Figure 4 Panel A, we document, by organizational form, the number of life insurers using at least one asset manager as a percent of the sample insurers. In general, more than 60% of life insurers in each organizational form use at least one asset manager. Since 2016, nearly all life insurers with a PE or a publicly-traded parent use an asset manager, while it is around 80% for private non-PE owned insurers. Starting in 2016 (marked with a green vertical line), life insurers were required to enhance their disclosure of asset managers, including identifying whether the asset manager is affiliated with the life insurer. In Figure 4 Panel B, we show the number of life insurers using at least one affiliated asset manager as a percent of sample insurers. To be consistent with our hypothesis on PE as asset managers, we define affiliated asset managers to be those owned by the PE if the life insurer is owned by a PE. There is an upward trend in PE-owned life insurers using PE's asset managers from 2011 to 2015, but it remains stable from 2016 to 2020.

We empirically test whether PE-owned life insurers shift the management of life insurer assets to their own asset managers by examining differences in affiliated asset manager use between life insurers acquired by PE and other insurers. We also test for differences in investment expenses using the same model specification. If PE owners switch their investment management to their asset managers, the costs associated with internal investment staff may be reduced. It is also possible that PEs bring operational changes to human resources, regardless of their use of affiliated asset managers. Accordingly, we also test for differences in the salaries of internal insurance staff to determine whether the differences in internal investment staff salary, if any, are due to a general

[31] The information on affiliated asset management fees is collected from the life insurers' notes to the statutory annual statements. We refrain from performing a statistical analysis of these fees because they are not disclosed by insurers in a consistent manner.

organizational restructuring or are isolated to the investment function. Further, we explore whether there are differences in total investment expenses to determine whether the use of affiliated asset managers is an efficient way to manage investments.

Life insurers report operational expenses separately for their insurance and investment businesses in the General Expenses Exhibit. Insurers also break down expenses by salary, rent, marketing, equipment, etc.[32] Using this rich data, we test whether PE parents achieve investment efficiency by appointing affiliated asset managers and reducing salaries paid to internal investment staff salary (including employee benefits). We also explore insurance staff salary (including employee benefits) and total investment management costs, including internal investment staff costs and other expenses, such as asset management fees (for affiliated and unaffiliated asset managers) and securities transaction costs, as the outcome variables.[33] All continuous variables are winsorized at the 1st and 99th percentile values.

Before reporting the results of the stacked differences-in-differences models, we perform an event-study analysis to estimate the changes brought by PE parents in their asset management operations. In Appendix Figure A.3, we plot the estimated unconditional means of the outcomes before and after the PE acquisition along with their 95% confidence intervals, using only the insurers that are acquired by PEs during 2014 – 2018. Panel A shows a slight increase in the average likelihood of using at least one *affiliated* asset manager one year after the PE acquisition. On average, 10 – 20 percent of life insurers use affiliated asset managers before being acquired by PE. It increases to over 25 percent one year after the acquisition. Panel B shows that the average

[32] While insurers do not report asset management fees paid to their asset managers, they are required to report other investment management expenses not included elsewhere, which includes asset management fees, custodian fees, or any securities transaction costs.

[33] While not reported, we also explore investment performance. We do not find statistically significant effects of PE acquisition on investment performance (including a measure that separates investment income from capital gains). Nevertheless, we acknowledge that estimating the investment performance of institutional investors is difficult, especially in the short-term.

internal investment staff salary, as a percentage of total invested assets, is approximately 0.04% before the PE acquisition, but after the acquisition, it declines to approximately 0.01%. There are no discernable differences between the pre- and the post-period for both internal insurance staff salary and total investment expenses (Panel C and D).

We report the results of the stacked differences-in-differences models in Table 2. We do not find statistically significant shift of asset management to PE's asset managers (column (1)). In contrast, in column (2), we find that insurer spending on internal investment staff decreases by 0.02 (p-value < 0.01) for the insurers acquired by PEs relative to those never acquired by PE. The economic magnitude of the estimated difference is large - roughly half of the unconditional average internal investment staff salary (0.04 percent of total invested assets). Given that the average life insurer in our sample has total invested assets of $7.83 billion, the estimated drop in internal staff salaries is equivalent to $1.57 million. About one-third of the insurers acquired by PEs completely eliminate their internal investment team post-acquisition. The average internal investment team salary of these insurers was $4.8 million before the PE acquisition.

We find no statistically significant effect of PE acquisitions on internal insurance staff salaries (column (3)). This result suggests that the shift from internal to external employees is concentrated within the investment arm of life insurers. In column (4), where the outcome variable is total investment-related expenses as a percentage of total invested assets, we do not find statistically significant differences in expenses after the PE acquisition. The combined results in Table 2 suggest that PE firms streamline the insurer's internal investment management function by reducing investment employee salaries; however, these changes do not translate into reductions in the cost of overall investments (inclusive of employee salary, these include trading costs, external/affiliated asset manager fees, compliance costs, etc.).

We again investigate whether there are pre-trends. Figure 5 is structured similarly to Figure 3, but the outcome variables are those from Table 2 instead of Table 1. We find that the average differences in all four investment governance outcomes are not statistically different from zero during the pre-period, except for *Affiliated Asset Manager*. We observe statistically significant differences during the post-period for investment staff salary. We also assess the sensitivity of the parallel trends assumption following Rambachan and Roth (2023), as shown in Appendix Figure A.4. The result for internal investment staff salary (Panel B) is robust to linear violations of parallel trends.

3.3 Propensity Score Matching

It is possible that PE owners have reasons to target specific types of life insurers and that our estimated differences between those not acquired by PE and those acquired by PE are biased due to this potential selection. We, therefore, perform additional analysis to match control and treatment insurers following Kirti and Sarin (2024). Specifically, we calculate propensity scores of life insurers in the year before the PE acquisition for the treatment insurers (and the commensurate calendar year for the control insurers) using assets (log normalized total invested assets), RBC ratios (log normalized RBC ratios), annuity business (share of annuity reserves to total reserves), and separate account business (share of separate account assets to total invested assets). We then identify the nearest neighbor insurer in the control group for each insurer in the treatment group, resulting in a total of 50 insurers. We report the performance of the propensity score matching in Table 3. In Panel A, we report the univariate mean differences between the control and treatment insurers prior to propensity score matching. On average, insurers acquired by PE firms have more annuity business and separate account assets. In Panel B, we report the univariate mean differences (in the year before the PE acquisition for each panel of the stacked

sample) between the control and treatment insurers after the propensity score matching procedure. After matching, we do not find statistically significant differences.

We then estimate stacked differences-in-differences models as in equation (1) using the matched sample. The results are reported in Table 4. Panel A reports the results for the bond risk outcomes and Panel B the results for the investment governance outcomes. We find consistent (and, for some, stronger) results in the propensity score matched analysis for privately placed bonds, privately placed speculative bonds, privately placed non marketable bonds, privately placed structured bonds, and internal investment staff salary. We do not find consistent results for the privately placed corporate bonds (columns (4) in Panel A) or the credit risk of the bond portfolios (columns (6) and (7) in Panel A).

We also test the sensitivity of our results to wider or narrower event windows. We re-estimate the models in Table 4 (using the propensity score matched sample) using five- and seven-year event periods. The results are reported in Appendix Tables A.5 and A.6. We find consistent results with the five-year event period in comparison to our propensity scores matched results in Table 4. In addition, we find a statistically significant and positive coefficient on privately placed corporate bond holdings (*Private Corp.*) and *Bond RBC.* Using the seven-year period, we find statistically significant and positive effects for all of the bond risk outcomes, except *Private NonMarket*, consistent with the results using the full sample in Table 1. We do not find a statistically significant effect on internal investment employee staff salary. In summary, we find robust increases in privately placed bond holdings, privately placed speculative bond holdings, privately placed structured bond holdings, and affiliated asset manager use across various tests.

3.4. New Acquisitions as Control

There are two concerns with the stacked differences-in-differences outlined in equation (1). First, the event year is based on the PE acquisition, and not a random event. Given that we are measuring investment holdings that can be sensitive to the underlying economic condition, making sure that the control group and the treatment group are compared in the same calendar year period is critical in interpreting the results. Second, some insurers in the control group are repeated over different panels; this concern is partially alleviated with the propensity scores matching method but not indirectly alleviated through the matching process. We, therefore, compare the PE acquisition to the non-PE acquisition in the same year. We identify 20 insurers acquired by a non-PE parent between 2014 and 2018 using the A.M.Best's M&A database, verified with statutory statements of life insurers (acquire or target or both): these 20 non-PE target life insurers include the transition from a non-PE parent to another non-PE parent (i.e., PE exits are not included). We do not find any non-PE acquisition in 2017, so we omit year 2017 panel from our stacked differences-in-differences estimate. As a result, we contrast 20 non-PE acquisition insurers (120 insurer-year observations) to 22 PE acquisition insurers (132 insurer-year observations). We note that the PE targets and non-PE targets do not differ in terms of their annuity business, RBC ratio, size, or separate account businesses in the year before the acquisition, on average, as shown in Appendix Table A.7.[34]

We estimate equation (1) using the non-PE acquisitions as the control group, where non-PE acquisition years are matched with the PE-acquisition. We report the results in Table 5. Panel A reports the results for the bond risk outcomes, where we find consistent results as our main results in Table 1. The economic magnitude of the coefficient estimates on *Private Structured* and

[34] We show univariate differences between the PE and the non-PE acquisitions across the study period in Appendix Table A.8.

Speculative (all bonds below investment grade) are much larger than those reported in Table 1. Panel B reports the results for the investment governance outcomes, where we do not find consistent results as in Table 1. We, however, find that total investment expenses are statistically significant and larger for PE acquisitions than non-PE acquisitions (0.085 percentage points, *p-value* = 0.036) corroborating that PE acquisition does not reduce the overall costs associated with the investment management.

4. Affiliated Asset Manager Use by PE-owned Life Insurers

Next, we explore whether the outcomes differ between the PE-owned insurers using and not using PE's asset managers. Our data and results in section 3.2 show that not all PE-owned insurers use PE's asset managers, and that they sometimes change whether or not they use PE's asset managers. In particular, this section explores whether or not life insurers' investment management differ due to the PE's use of their asset managers post-acquition to shed light on the consequences of investment governance changes brought by PE.

We expand the stacked differences-in-differences model and fully interact the *Switch X Post* variable with the time-varying indicator variable of affiliated asset manager use (*I(Aff. AM)*).

We estimate a triple differences-in-differences model using the stacked panel as outlined in our discussion of equation (1). Our model takes the form of:

$$\begin{aligned} Outcome_{itk} = {} & \lambda \cdot Post_k \times I(Aff.AM)_{it} \\ & + \rho \cdot Switch_{ik} \times I(Aff.AM)_{it} + \beta_1 \cdot Switch_{ik} \times Post_k \\ & + \beta_2 \cdot Switch_{ik} \times Post_k \times I(Aff.AM)_{it} + \theta_{ik} + \delta_{tk} + \epsilon_{itk} \end{aligned} \quad (2)$$

where $I(Aff.\ AM)_{it}$ is a time-varying indicator variable that equals one for insurers using an affiliated asset manager.[35] We fully interact the variable with the insurer treatment ($Switch_i$) and the post-event indicator ($Post_t$). To abstract away from the potential differences between the control and the treatment, we estimate the model using the propensity score matched sample. The rest of the equation is the same as that in equation (1).

Our main interests are the coefficient estimates on *Switch X Post* and *Switch X Post X I(Aff. AM)*. The coefficient on *Switch X Post* (β_1) captures the estimated difference for insurers not using affiliated asset managers. The coefficient on *Switch X Post X I(Aff. AM)* (β_2) measures whether the estimated difference in the bond outcome variables differs by whether the insurer uses an affiliated asset manager. The combined coefficient $\beta_1 + \beta_2$ captures the estimated difference for insurers using an affiliated asset manager.

Table 6 reports the results for the bond risk outcomes. Across all the columns, the coefficients on *Switch X Post* are not statistically different than zero, suggesting that there are no bond risk differences for insurers acquired by PE and not using PE's asset managers after the acquisition. The coefficient on *Switch X Post X I(Aff. AM*), however, is positive and statistically significant for the privately placed bond outcomes (in total (column (1) and for speculative (column (2)) and overall bond RBC risk (column (6)). The combined coefficients $\beta_1 + \beta_2$ for these outcomes as well as the privately placed corporate bonds (column (4)) and for privately placed structured bond holdings are also positive and statistically significant. In totality, the results suggest that the observed increase in privately placed bond holdings is greater for PE-owned insurers that use PE's asset managers. The magnitudes of the combined coefficients, in columns (1), (2), (4) to (6), are also larger than the coefficients on *Switch X Post* in Table 4.

[35] Specifically, the variable captures PE's asset managers for PE-owned insurers. For non-PE owned insurers, the variable captures the asset manager affiliated with the insurance company (or the parent).

Table 7 reports the results of the investment governance outcomes. The results for internal investment staff salary, column (1), indicate that the PE-owned life insurers reduce their internal investment staff salary and the reduction does not statistically significantly differ across PEs using and not using their asset managers. The full effects of PEs using their asset managers on internal investment staff salary, however, is statistically significant and negative (-0.045, *p-value* = 0.036) with an effect size that is greater than those reported in Table 4. In summary, results of column (1) imply that PE-acquisition lead to a reduction in life insurers' internal investment staff salary and the reduction is more dire for life insurers whose asset management function is shifted to the PE's asset managers. None of the other individual coefficients in Table 7 are statistically different from zero. Together, the results in Table 7 suggest that PE-owned life insurers are reducing their internal investment staff costs, yet not reducing their total investment expenses.[36]

We find consistent results of Tables 6 and 7 using the Non-PE acquisitions as control groups (see Appendix Table A.9 and A.10), except for *Private Corporate, Private Structured*, and *Investment Salary.* We find that compared to non-PE acquisitions, PE acquisitions lead to higher privately placed corporate bonds and privately placed structured bond holdings, regardless of the PE's use of asset managers. The full effects of privately placed corporate bonds and privately placed structured bond holdings for PEs using their asset managers are larger than PEs not using their asset managers, which is consistent with the results of Table 6. We do not find that the usage of PE's asset managers lead to statistically significant differences in internal investment staff salary when using non-PE acquisitions as the control group: the full effects of PEs using their asset managers on internal investment staff salary, however, is statistically significant and negative, which is consistent with the result of Table 7.

[36] For all the outcome variables (in Tables 6 and 7), we perform sensitivity tests of the event windows, using five-year or seven-year periods. We find similar results and conclude that the results are not driven by the event windows.

5. Conclusion

The U.S. life insurance industry provides a unique setting to explore the effects of PE buyouts on portfolio companies. The industry has significant assets under management (over $7 trillion) and is heavily regulated. We compile extensive information on life insurer operations and regulatory environments to explore the effect of PE acquisitions on life insurer assets. We find that life insurers owned by PEs tilt their investments toward privately placed bonds more than comparable life insurers not owned by PEs. Privately placed bonds and public bonds with similar credit ratings have equivalent regulatory capital costs; however, privately placed bonds are more opaque and less liquid and often have higher yields. The tilt to privately placed bonds is largely driven by laterally shifting the management of life insurer assets to the PE's asset management arm. Our findings support the developing view that regulatory frictions meaningfully impact financial institutions. We provide novel evidence that a relatively new organizational form in the life insurance industry, PE-owned life insurers, takes advantage of regulatory discrepancies more than other life insurers.

Another potential explanation for the changes made by PE-owned life insurers is that PEs are attempting to improve their life insurers' operational efficiency. While we find that PE insurers do not significantly improve the cost efficiency of the investment function, that is only one type of efficiency. Future research can explore other aspects of operational efficiency, such as investment performance, profitability, or capital ratios.

It is crucial to clarify that our research does not imply regulatory shortcomings in the U.S. insurance industry relative to other sectors. Instead, the industry's unique regulatory environment provides a fertile ground for researchers to investigate how financial institutions, like PEs, manage regulations. Exploring the role of regulation in other sectors is more challenging because

regulation is applied nationally. While our findings arise from the U.S. life insurance industry, the insights and implications pertain to other financial intermediaries, such as insurance brokerages or financial advisory firms, that are susceptible to becoming PEs' buyout targets due to relatively light regulatory oversight.

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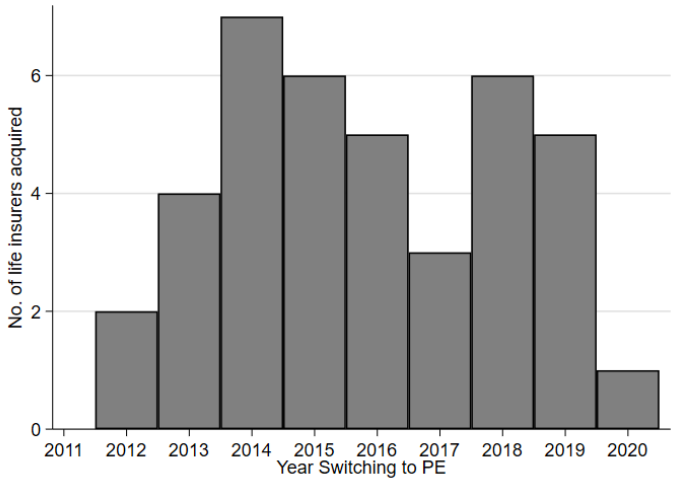
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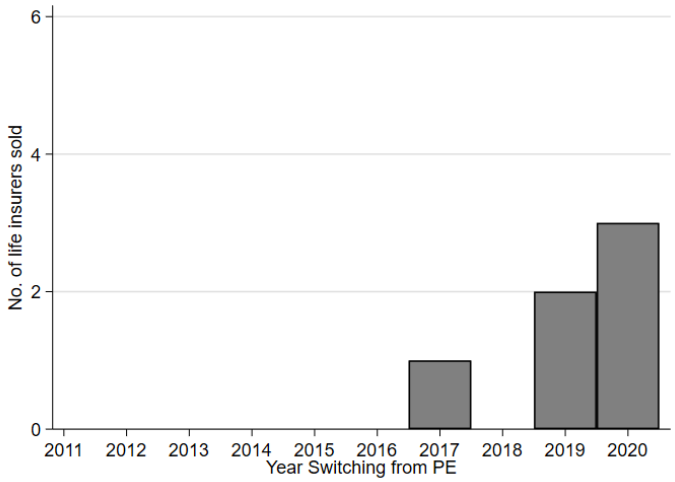
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Figure 1: PE Deals in The Life Insurance Industry

A. Acquired by PE

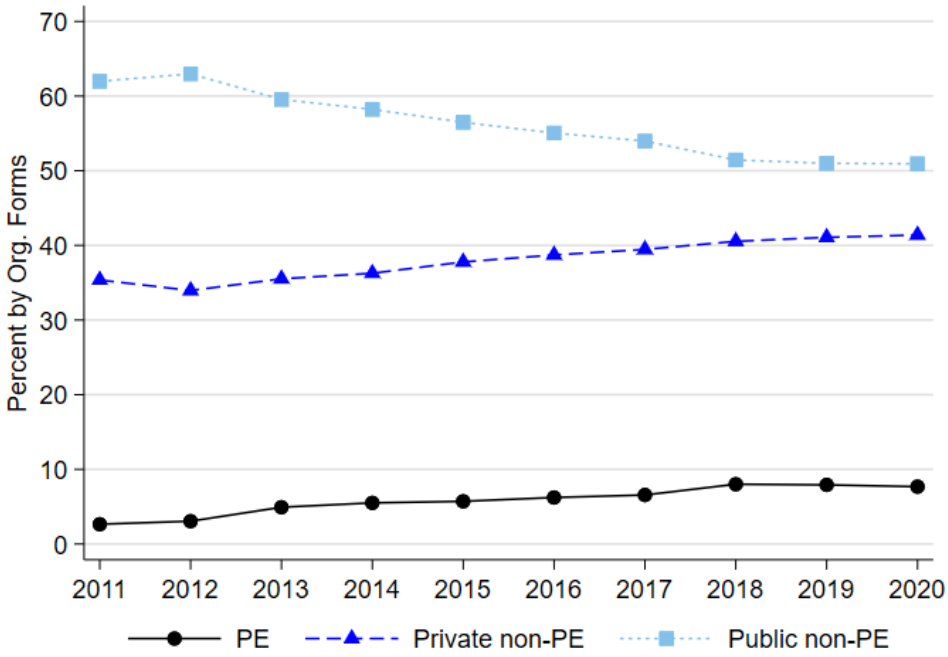


B. Sold off by PE



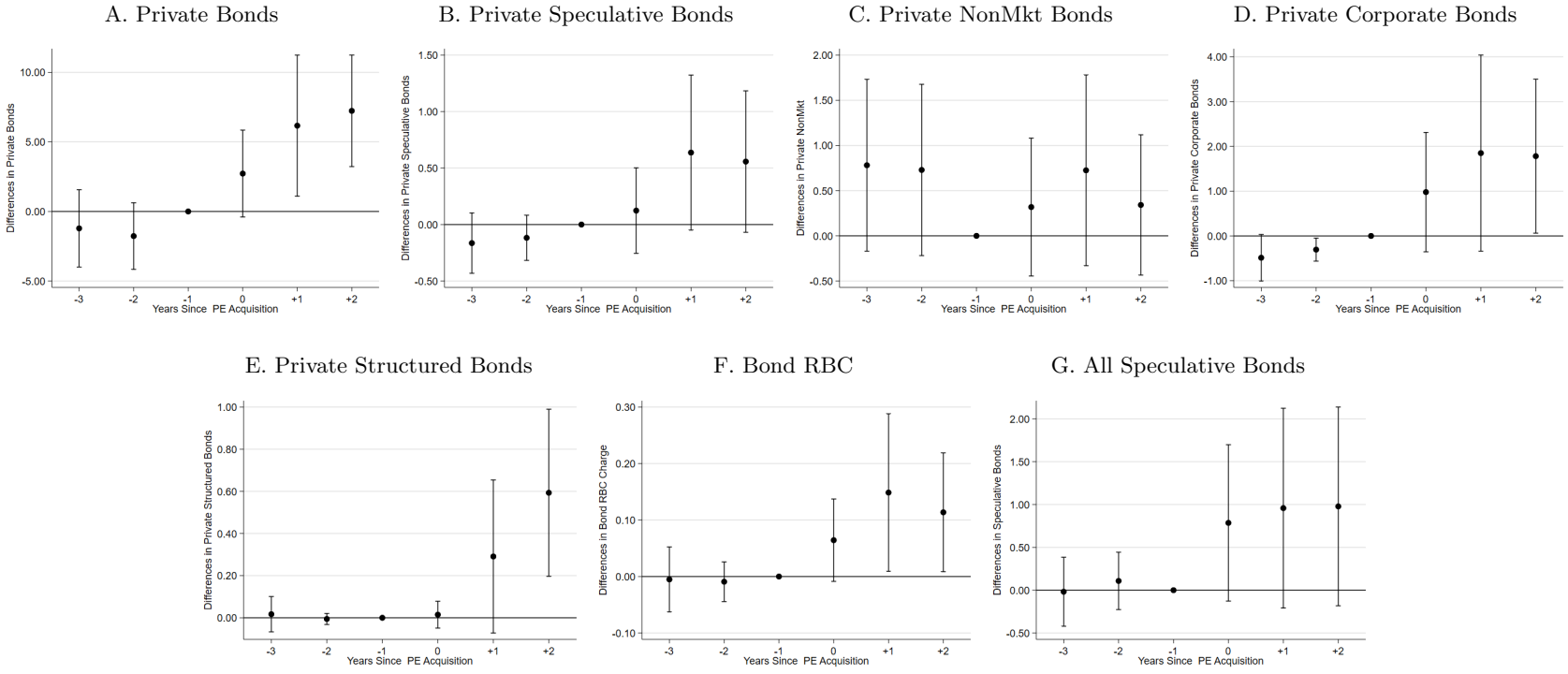
Note: Panel A shows the number of life insurers acquired by a private equity (PE) firm, by year. Panel B shows the number of life insurers sold off by a PE.

Figure 2: Life Insurer Assets by Organizational Form



Note: The figure shows the percent of life insurer assets by organizational form. *PE* refers to private equity owned life insurers. *Private non-PE* refers to private life insurers, including mutual life insurers and private stock life insurers not owned by PE. *Public non-PE* refers to publicly traded life insurers not owned by PE.

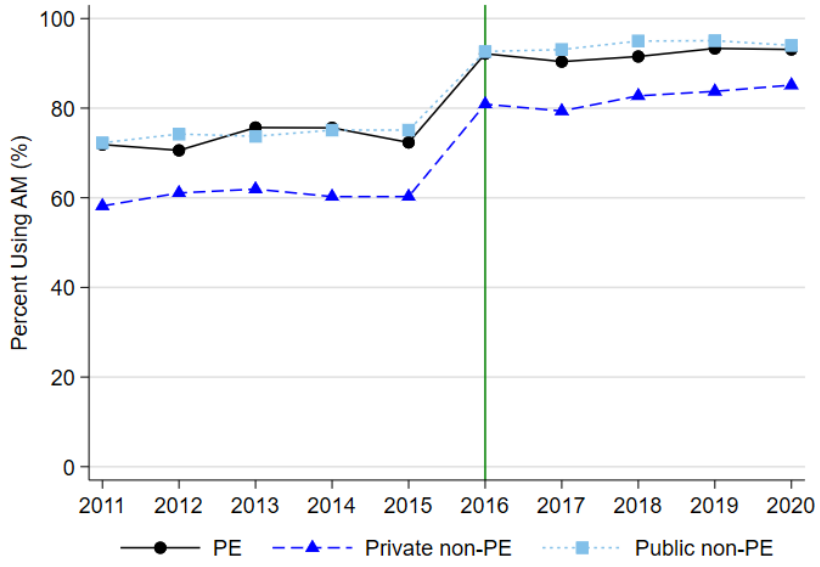
Figure 3: Impact of PE Acquisition - Investment Risk



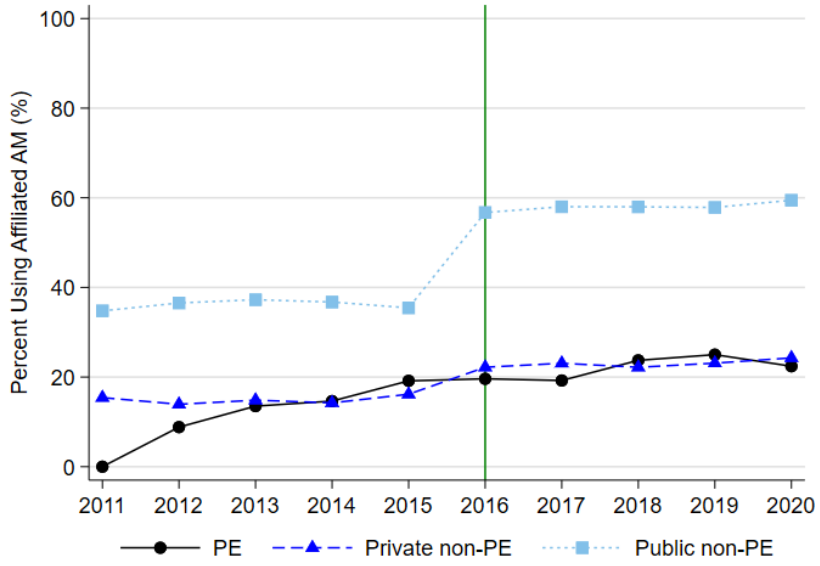
Note: The figures plot the coefficients from estimating a stacked differences-in-differences model. The circles represent the estimated coefficient, while the lines represent the 95% confidence intervals of the coefficient estimates. The dependent variable differs in each panel. In Panel A, the dependent variable is is the percent of privately placed bond holdings. In Panel B, it is the percent of privately placed speculative bond holdings. In Panel C, it is the percent of privately placed bonds deemed not marketable (fair price is not observed by the insurer). In Panel D, it is the percent of privately placed corporate bonds. In Panel E, it is the percent of privately placed structured bonds (ABS or MBS). In Panel F, it is the size-weighted average bond RBC charges. In Panel G, it is the percent of invested assets that are below investment grade bonds (including privately placed and publicly traded). The y-axis differs across the panels. The regression includes a PE acquisition indicator, insurer fixed effects, year fixed effects, and interactions of the PE acquisition indicator and the year indicators. The PE acquisition indicator equals one if the insurer switched to PE ownership, and zero otherwise. The PE acquisitions occur from 2014 to 2018. The control group includes insurers that are never owned by a PE from 2011 to 2020. Robust standard errors are clustered at the insurer level.

Figure 4: Life Insurers' Use of Asset Managers, by Organizational Form

A. Any Asset Manager

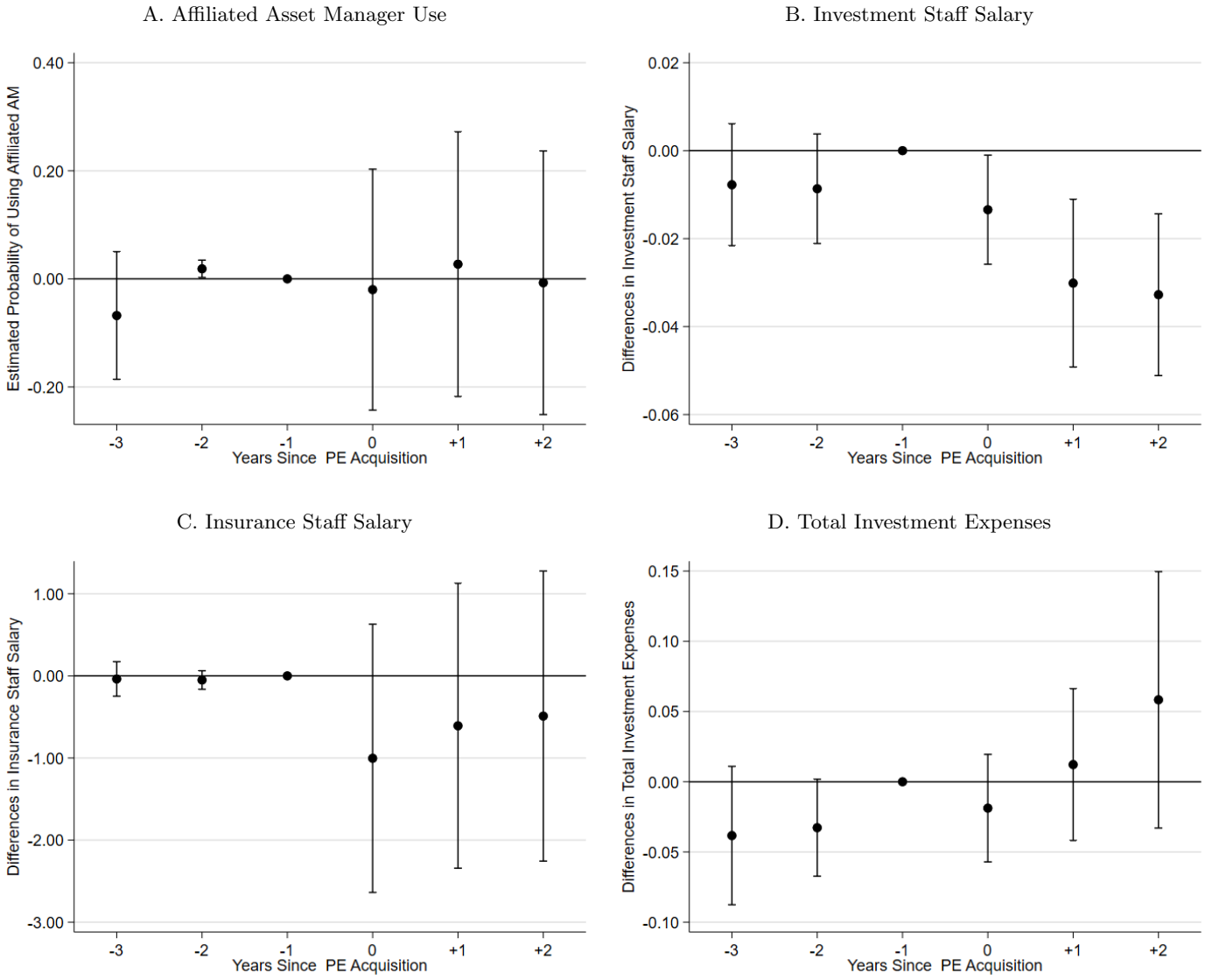


B. Affiliated Asset Manager



Note: The figure shows the percent of life insurers, within an organizational form, that use at least one asset manager (Panel A) or use at least one affiliated asset manager (Panel B). We define affiliated asset manager as the asset manager owned and affiliated with the insurer; for PE-owned life insurers, we only identify PE owned asset managers as affiliated asset managers. The green vertical line denotes 2016, when the asset manager disclosure requirement was updated.

Figure 5: Impact of PE Acquisition - Investment Governance



Note: The figures plot the coefficients from estimating a stacked differences-in-differences model. The circles represent the estimated coefficient, while the lines represent the 95% confidence intervals of the coefficient estimates. The dependent variable differs in each panel. In Panel A, the dependent variable is an indicator that equals one for insurers using at least one affiliated asset manager in a given year and zero otherwise. We define affiliated asset manager as the asset manager owned and affiliated with the insurer; for PE-owned life insurers, we only identify PE owned asset managers as affiliated asset managers. In Panel B, it is the internal investment employee salary as a percent of total investments. In Panel C, it is the internal insurance employee salary as a percent of total investments. In Panel D, it is the total investment expenses as a percent of total investments. The y-axis differs across the panels. The regression includes a PE acquisition indicator, insurer fixed effects, year fixed effects, and interactions of the PE acquisition treatment indicator and the year indicators. The PE acquisition indicator equals one if the insurer switched to PE ownership, and zero otherwise. The PE acquisitions occur from 2014 to 2018. The control group includes insurers that are never owned by a PE from 2011 to 2020. Robust standard errors are clustered at the insurer level.

Table 1: Effect of PE Acquisition on Investment Risk

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Switch X Post	6.3691***	0.5331**	-0.0416	1.8011***	0.2959***	0.1137**	0.8771*
	(2.0683)	(0.2552)	(0.4932)	(0.6649)	(0.1112)	(0.0469)	(0.4848)
Dep.Var. Mean	10.387	0.711	0.523	3.317	0.253	0.645	2.401
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.013	0.004	0.000	0.007	0.006	0.002	0.002
N	14,376	14,376	14,376	14,376	14,376	14,376	14,376

Notes: The table reports the results from stacked differences-in-differences estimates of equation (1). *Switch* is equal to one if the insurer was acquired by a PE from 2014 to 2018. *Switch* is equal to zero if the insurer was never owned by a PE from 2011 to 2020. *Post* is equal to one in the year of and after the acquisition. We stack the panels using the year of acquisition (e.g., t=0 for year 2014 for all insurers acquired by a PE in 2014). Each panel includes the three years before the acquisition event (t= −3) to two years after (t=+2). The dependent variable differs in each column. It is the percent of privately placed bond holdings in column (1), it is the percent of privately placed speculative bond holdings in column (2), it is the percent of privately placed bonds deemed not marketable in column (3), it is the percent of privately placed corporate bonds in column (4), and it is the percent of privately placed structured bonds in column (5). It is the size-weighted average bond RBC charges in column (6), it is the percent of invested assets that are below investment grade bonds in column (7), See Table A.1 for definitions of the variables. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 2: Effect of PE Acquisition on Investment Governance

Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post	0.0164	-0.0200***	-0.6712	0.0409
	(0.1065)	(0.0065)	(0.8635)	(0.0271)
Dep.Var. Mean	0.320	0.040	2.334	0.194
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.000	0.004	0.001	0.001
N	14,376	14,376	14,376	14,376

Notes: The table reports the results from stacked differences-in-differences estimates of equation (1). *Switch* is equal to one if the insurer was acquired by a PE from 2014 to 2018. *Switch* is equal to zero if the insurer was never owned by a PE from 2011 to 2020. *Post* is equal to one in the year of and after the acquisition. We stack the panels using the year of acquisition (e.g., t=0 for year 2014 for all insurers acquired by a PE in 2014). Each panel includes the three years before the acquisition event (t= −3) to two years after (t=+2). The dependent variable is an indicator that equals one for insurers using at least one affiliated asset manager in a given year and zero otherwise in column (1), it is the internal investment employee salary as a percent of total investments in column (2), it is the internal insurance employee salary as a percent of total investments in column (3), and it is the total investment expenses as a percent of total investments in column (4). See Table A.1 for definitions of the variables. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 3: Covariate Balance before and after Matching

	Control (1)		Switch to PE (2)		Diff (2)-(1)
	Mean	SD	Mean	SD	*diff.*
Panel A: Full Sample					
ln(Size)	20.21	2.37	20.25	2.07	0.03
Annuity business (%)	27.17	31.33	40.53	36.48	13.36***
S/A (%)	13.43	30.58	20.21	37.85	6.78**
RBC Ratio (%)	890.87	1,637.53	1,122.95	2,841.73	232.08
ln(RBC Ratio)	6.33	0.77	6.27	0.88	-0.06
Observations	14,226		150		14,376
Panel B: Matched Sample					
ln(Size)	19.34	2.03	20.12	2.08	0.78
Annuity business (%)	44.38	39.39	38.64	37.90	-5.75
S/A (%)	18.75	37.97	21.95	40.27	3.20
RBC Ratio (%)	777.70	1,128.13	1,086.31	2,902.87	308.61
ln(RBC Ratio)	6.20	0.81	6.20	0.89	-0.00
Observations	25		25		50

Notes: Panel A and B report univariate mean differences between insurers by their PE acquisition treatment before and after propensity score matching; we compare differences in the year prior to PE acquisition using the propensity scores matched sample in Panel B. Similar to Kirti and Sarin (2024), we identify a control group insurer (never PE) with the closest estimated propensity of the observed characteristics with a treatment group insurer in terms of log of asset size (general account), RBC ratio in percentage points, annuity share of total reserves (in percentage points), and separate account share of total assets (in percentage points). We use the data in the year prior to PE acquisition (the corresponding calendar year for the control group insurers) to calculate the propensity scores. We perform tests of the mean difference assuming unequal variance structures between the control and the treatment. See Table A.1 for definitions of the variables. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4: Effect of PE Acquisition on Investment - Matched Sample

Panel A: Investment Risk

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Switch X Post	4.4847*	0.5729**	-0.0194	1.0618	0.3063**	0.0232	0.1434
	(2.2971)	(0.2782)	(0.5567)	(0.8124)	(0.1197)	(0.0659)	(0.6266)
Dep.Var. Mean	11.661	0.766	0.458	3.333	0.161	0.664	2.377
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.044	0.045	0.000	0.017	0.047	0.001	0.001
N	300	300	300	300	300	300	300

Panel B: Investment Governance

Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post	-0.0133	-0.0223***	-1.2856	0.0286
	(0.1309)	(0.0065)	(0.9400)	(0.0304)
Dep.Var. Mean	0.217	0.027	1.768	0.222
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.000	0.108	0.038	0.009
N	300	300	300	300

Notes: The table reports the results from stacked differences-in-differences estimates of equation (1) on the propensity score matched samples, excluding time-varying control variables. *Switch* is equal to one if the insurer was acquired by a PE from 2014 to 2018. *Switch* is equal to zero if the insurer was never owned by a PE from 2011 to 2020. *Post* is equal to one in the year of and after the acquisition. We stack the panels using the year of acquisition (e.g., t=0 for year 2014 for all insurers acquired by a PE in 2014). Each panel includes the three years before the acquisition event (t= −3) to two years after (t=+2). All models include switch year by insurer fixed effects and switch year by year fixed effects. In Panel A, the dependent variable differs in each column. It is the percent of privately placed bond holdings in column (1), it is the percent of privately placed speculative bond holdings in column (2), it is the percent of privately placed bonds deemed not marketable in column (3), it is the percent of privately placed corporate bonds in column (4), it is the percent of privately placed structured bonds in column (5), is the size-weighted average bond RBC charges in column (6), and it is the percent of invested assets that are below investment grade bonds in column (7). In Panel B, the dependent variable is an indicator that equals one for insurers using at least one affiliated asset manager in a given year and zero otherwise in column (1), it is the internal investment employee salary as a percent of total investments in column (2), it is the internal insurance employee salary as a percent of total investments in column (3), and it is the total investment expenses as a percent of total investments in column (4). See Table A.1 for definitions of the variables. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 5: Effect of PE Acquisition on Investment - Non-PE Acquisitions as Controls

Panel A: Risk

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Switch X Post	5.5135**	0.6574*	-0.6721	1.5317***	0.4764**	0.1206*	1.2034*	0
	(2.4211)	(0.3276)	(0.6792)	(0.5607)	(0.2102)	(0.0627)	(0.6191)	(0
Dep.Var. Mean	14.379	0.848	0.485	3.774	0.200	0.641	2.363	0
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Within R^2	0.058	0.049	0.015	0.033	0.077	0.042	0.046	0
N	252	252	252	252	252	252	252	24

Panel B: Governance

Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post	0.0308	-0.0088	-0.9123	0.0850**
	(0.1524)	(0.0133)	(0.6728)	(0.0391)
Dep.Var. Mean	0.290	0.036	1.506	0.202
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.001	0.007	0.017	0.036
N	252	252	252	252

Notes: The table reports the stacked difference-in-differences results from estimating models in Tables 1 and 2 using life insurers acquired by a non-PE owner in the same year as the treatment insurers' PE acquisition year. Robust standard errors are reported in the parenthesis, clustered at the insurer and the calendar year level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6: Effect of PE Acquisition on Investment Risk, by Affiliated Asset Manager Use - Matched Sample

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post X I(Affil. AM)	0.2856	0.0350	-1.5749	-0.6707	-0.1748	-0.0136	-0.2176
	(1.5793)	(0.1698)	(0.9602)	(0.7828)	(0.1567)	(0.0938)	(0.5677)
Switch X I(Affil. AM)	-3.0211	0.2736	-2.2024	-1.1741	-0.1700	-0.0313	-0.1707
	(4.8514)	(0.6004)	(1.3882)	(1.6731)	(0.2455)	(0.1220)	(1.2018)
Switch X Post ($\gamma 1$)	0.5450	0.0281	-0.4406	0.5133	0.2401	-0.0574	-0.4676
	(1.4772)	(0.1947)	(0.6806)	(0.9393)	(0.1502)	(0.0784)	(0.7901)
X I(Affil. AM) ($\gamma 2$)	16.8898***	2.0510**	2.3921	2.5305	0.3078	0.3267**	2.4465
	(5.8278)	(0.9007)	(1.6730)	(1.8746)	(0.3805)	(0.1589)	(1.6671)
Dep.Var. Mean	11.661	0.766	0.458	3.333	0.161	0.664	2.377
Affil. AM: $\gamma 1 + \gamma 2$	17.435***	2.079**	1.952	3.044*	0.548*	0.269**	1.979
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.315	0.322	0.028	0.027	0.055	0.067	0.043
N	300	300	300	300	300	300	300

Notes: The table reports the stacked difference-in-differences results from estimating equation (2). The sample is the propensity score matched sample. *I(Affil. AM)* is an indicator variable that equals one for insurers that use an affiliated asset manager in year t, and zero otherwise. The rest of the table is structured similar to Table 1. See the notes to Table 3 for the details on the propensity score matching procedure. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 7: Effect of PE Acquisition on Investment Governance, by Affiliated Asset Manager Use - Matched Sample

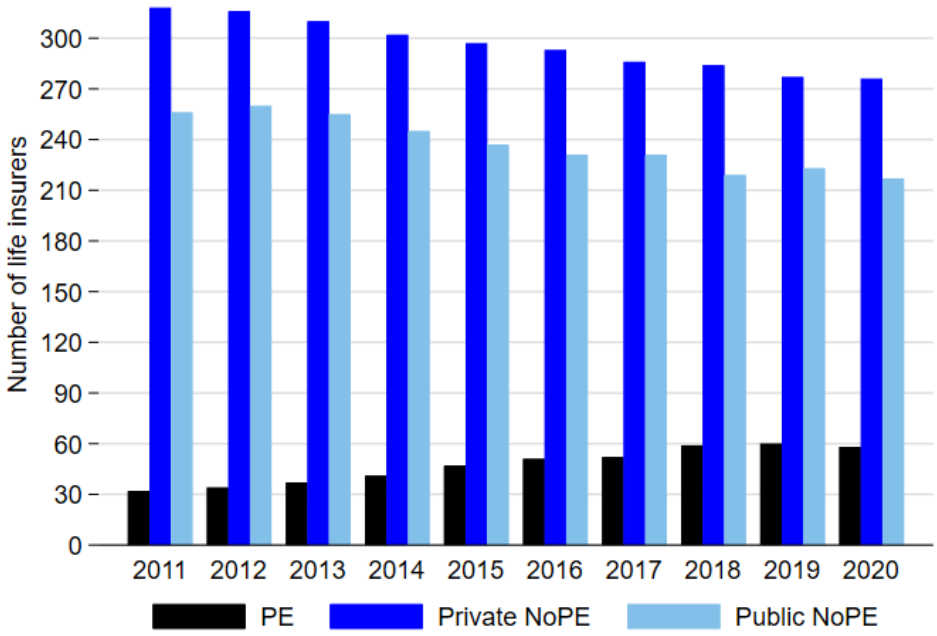
Dependent variable:	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)
Post X I(Affil. AM)	0.0027	-0.1792	0.0077
	(0.0046)	(0.7851)	(0.0203)
Switch X I(Affil. AM)	0.0432***	4.6436	0.0638
	(0.0156)	(4.3207)	(0.0656)
Switch X Post ($\gamma 1$)	-0.0199***	-0.6848	-0.0040
	(0.0066)	(0.5200)	(0.0250)
X I(Affil. AM) ($\gamma 2$)	-0.0254	-4.0777	0.1067
	(0.0249)	(3.9956)	(0.0915)
Dep.Var. Mean	0.027	1.768	0.222
Affil. AM: $\gamma 1 + \gamma 2$	-0.045**	-4.762	0.103
Switch Year X Insurer FE	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes
Within R^2	0.223	0.199	0.196
N	300	300	300

Notes: The table reports the stacked difference-in-differences results from estimating equation (2). The sample is the propensity score matched sample. *I(Affil. AM)* is an indicator variable that equals one for insurers that use an affiliated asset manager in year t, and zero otherwise. The rest of the table is structured similar to Table 2. See the notes to Table 3 for the details on the propensity score matching procedure. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Appendix

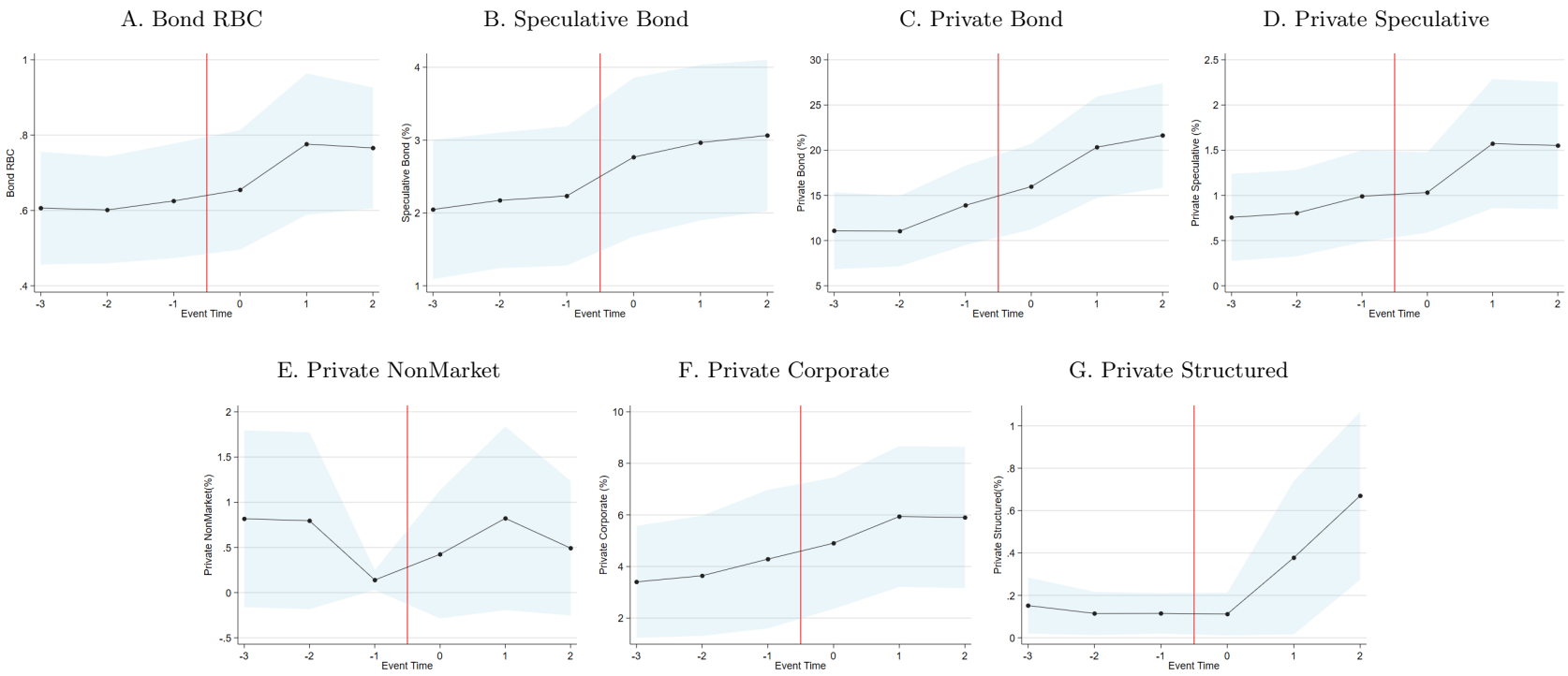
Appendix A Supplementary Figures and Tables

Figure A.1: Number of Life Insurers by Organizational Form



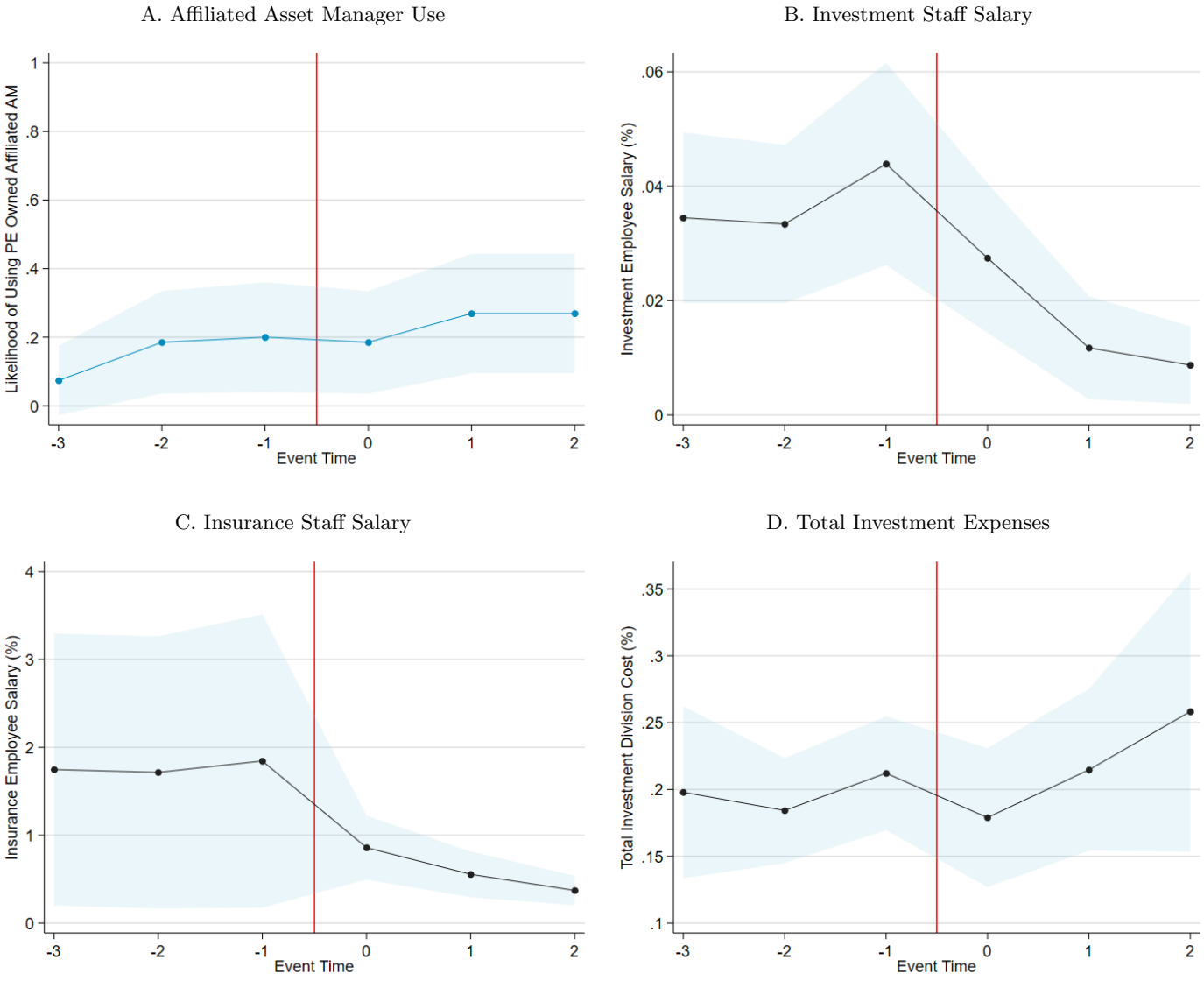
Note: The figure shows the number of sample life insurers by organizational form. *PE* refers to private equity owned life insurers. *Private non-PE* refers to private life insurers, including mutual life insurers and private stock life insurers not owned by PE. *Public non-PE* refers to publicly traded life insurers not owned by PE.

Figure A.2: Investment Risks Around PE Acquisition



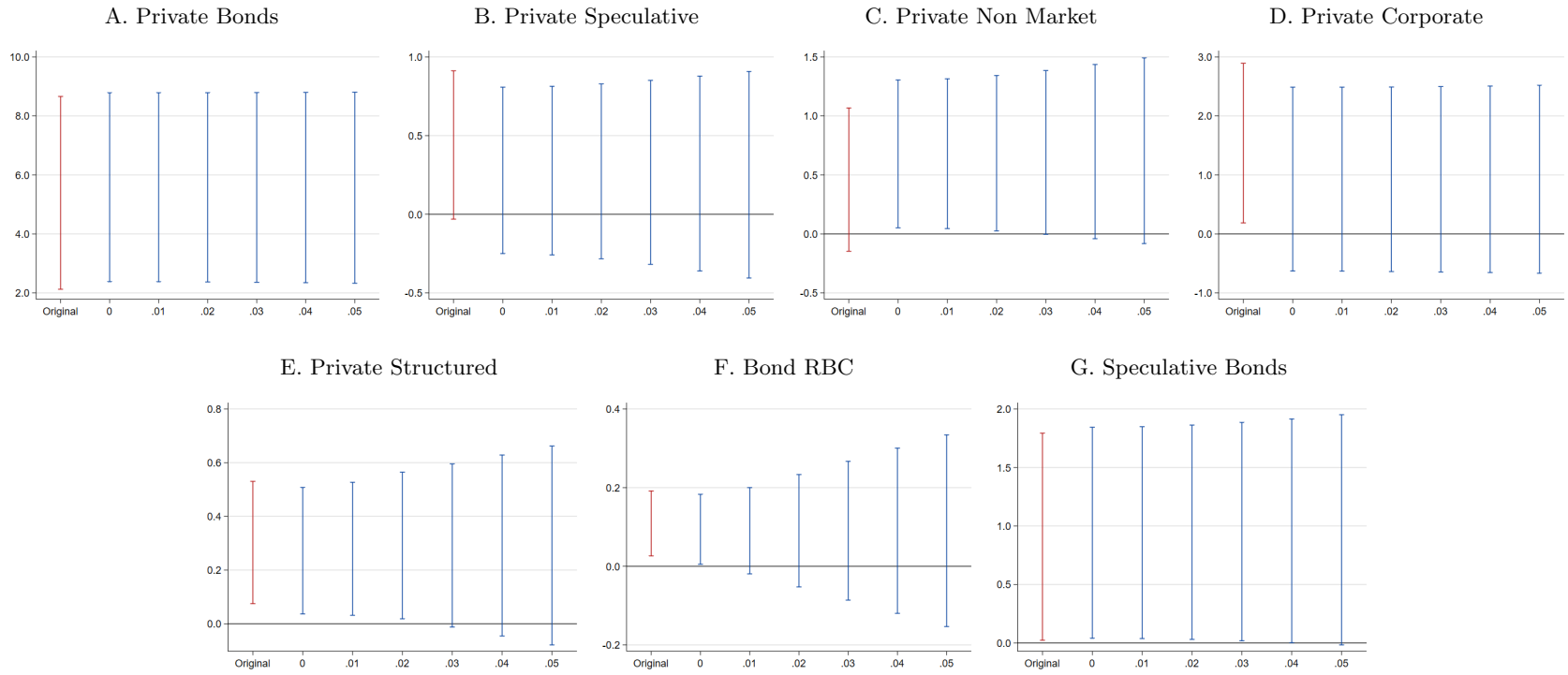
Note: The figure shows the bond risks of life insurers acquired by a PE, in the three years before and after the acquisition. The sample includes life insurers acquired by a PE from 2014 to 2018. All investments are measured as a percent of total invested assets using end-of-year book values. The y-axis differs across the panels.

Figure A.3: Investment Governance Around PE Acquisition



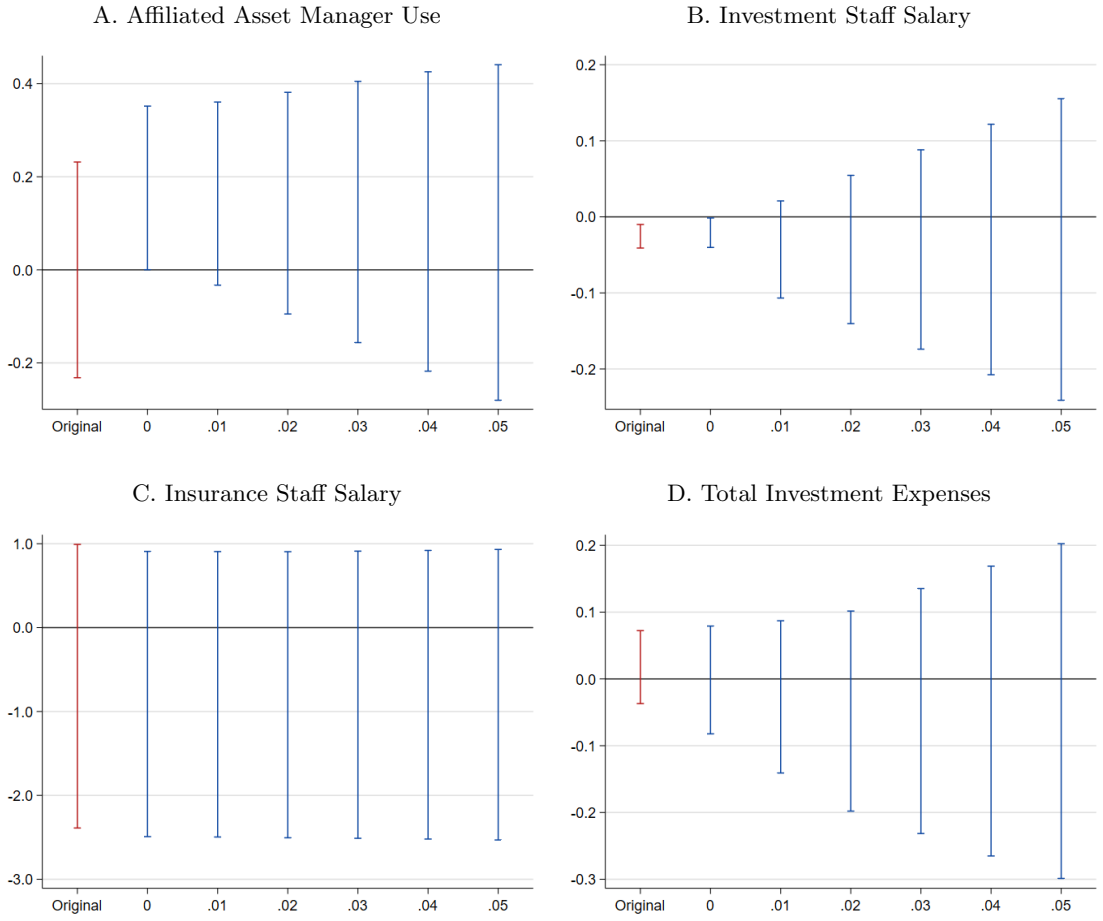
Note: The figure shows the investment governance of life insurers acquired by a PE, in the three years before and after the acquisition. The sample includes life insurers acquired by a PE from 2014 to 2018. The y-axis differs across the panels.

Figure A.4: Sensitivity Analysis of Parallel Trends - Investment Risk



Note: The figure shows credible 95% confidence interval sets following Rambachan and Roth (2023). The confidence intervals for the original OLS estimates of the average effects during the post period are shown in red. The other confidence intervals impose slope differences in trend changes. The confidence intervals when the x-axis is 0 correspond to a linear violation of parallel trends. The remaining confidence intervals (x=0.01 to 0.05) allow for nonlinear violations of parallel trends. The y-axis differs across the panels.

Figure A.5: Sensitivity Analysis of Parallel Trends - Investment Governance



Note: The figure shows credible 95% confidence interval sets following Rambachan and Roth (2023). The confidence intervals for the original OLS estimates of the average effects during the post period are shown in red. The other confidence intervals impose slope differences in trend changes. The confidence intervals when the x-axis is 0 correspond to a linear violation of parallel trends. The remaining confidence intervals (x=0.01 to 0.05) allow for nonlinear violations of parallel trends. The y-axis differs across the panels.

Table A.1: Summary Statistics

	Mean	SD	1st	25th	50th	75th	99th
Size (Bil.)	7.08	24.43	0.01	0.07	0.45	2.90	124.38
I(Mutual)	0.05	0.23	0.00	0.00	0.00	0.00	1.00
I(Financial)	0.41	0.49	0.00	0.00	0.00	1.00	1.00
I(AMBest A or better)	0.45	0.50	0.00	0.00	0.00	1.00	1.00
ROA (%)	1.85	6.09	-12.73	0.15	1.05	2.75	21.53
Life business (%)	49.56	34.14	0.00	16.39	50.99	81.88	100.00
Annuity business (%)	28.47	32.68	0.00	0.14	13.45	51.67	100.00
Health business (%)	17.07	28.32	0.00	0.00	1.09	22.08	98.42
S/A (%)	13.05	30.31	0.00	0.00	0.00	1.38	100.00
RBC Ratio (%)	963.82	1900.96	137.90	350.98	482.13	732.51	14866.75
RBC Burden (%)	2.57	2.70	0.20	0.99	1.48	2.91	14.03
Capital Level (%)	27.51	24.85	2.73	8.90	16.60	41.01	97.89
Bond RBC Charges	0.65	0.36	0.00	0.41	0.63	0.83	2.16
Speculative Bonds (%)	2.33	2.59	0.00	0.02	1.60	3.62	11.98
Private Bonds (%)	10.41	10.23	0.00	0.46	7.99	17.46	42.03
Private Speculative (%)	0.70	1.16	0.00	0.00	0.05	1.01	5.90
Private NonMkt (%)	0.50	1.52	0.00	0.00	0.00	0.02	9.76
Private Corporate Bonds (%)	3.12	5.34	0.00	0.00	0.00	4.36	23.26
Private Structured Bonds (%)	0.26	0.62	0.00	0.00	0.00	0.15	3.49
Private ABS (%)	0.23	0.58	0.00	0.00	0.00	0.12	3.35
Corp. Bond Concentration	0.71	0.36	0.45	0.51	0.58	0.76	2.84
I(Affil. AssetMgr)	0.30	0.46	0.00	0.00	0.00	1.00	1.00
Inv't Salary (%)	0.04	0.07	0.00	0.00	0.01	0.06	0.40
Insurance Salary (%)	2.12	3.83	-0.16	0.05	0.73	2.02	21.76
Total Inv't Expense (%)	0.20	0.24	0.00	0.07	0.13	0.23	1.64
Observations	5,804						

Notes: The table reports summary statistics for insurer-year observations from 2011 to 2020. *Size* is total invested assets in billions of dollars. *I(Mutual)* is an indicator equal to 1 for mutual insurers and 0 for stock insurers. *I(Financial)* is an indicator that equals one for insurers affiliated with at least one financial institution (e.g., banks, brokerages) and zero otherwise. *I(AMBest A)* is an indicator that the insurer's A.M.Best financial strength rating is A or higher in a given year. *ROA* is return on assets (net income to total invested assets) measured in percent. *Life business* is gross reserves in life insurance as a percent of total gross reserves. *Annuity business* is gross reserves in annuities as a percent of total gross reserves. *Health business* is gross reserves in health related products (i.e., long-term care or disability income insurance) as a percent of total gross reserves. *Other business* is gross reserves in all other business (e.g., credit life) as a percent of total gross reserves. *S/A (%)* is the ratio between separate account assets to total assets (inclusive of general and separate account assets), in percent. *RBC Ratio (%)* is the ratio of total adjusted capital to required regulatory capital, in percent. *RBC Burden (%)* is the required regulatory capital as a percent of total investments. *Capital level* is total capital and surplus as a percent of total invested assets. *Risky Bonds (%)* is the percent of bonds below investment grade. *Bond RBC Charges* is the asset-weighted average bond RBC charges. *Speculative Bonds (%)* is the percent of total invested assets held in below investment grade bonds. *Private Bonds (%)* is the percent of total invested assets held in privately placed bonds. *Private Speculative (%)* is the percent of total invested assets held in below investment grade privately placed bonds. *Private Short-term Bonds (%)* is the percent of total invested assets held in short-term (1 to 5 years remaining years till maturity) privately placed bonds. *Private Corporate Bonds (%)* is the percent of total invested assets held in privately placed bonds issued by corporations. *Private Structured Bonds (%)* is the percent of total invested assets held in privately placed structured bonds, i.e., asset-backed securities (ABS) or mortgage-backed securities. *Private ABS (%)* is the percent of total invested assets held in privately placed ABS. *I(Affil. AssetMgr)* is an indicator equal to 1 for insurers with at least one affiliated asset manager and 0 otherwise. *Inv't Salary (%)* is total investment staffing related expenses (salary and employee benefits) divided by total invested assets, in percent. *Insurance Salary (%)* is total insurance staffing related expenses (salary and employee benefits) divided by total invested assets, in percent. *Total Inv't Expense (%)* is total investment related expenses divided by total invested assets, in percent.

Table A.2: Summary Statistics by PE Ownership

	Never PE		Always PE		Switch to PE		Switch from PE	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Size (Bil.)	7.37	25.69	5.87	11.36	4.40	9.86	3.60	7.82
I(Mutual)	0.06	0.23	0.00	0.00	0.04	0.20	0.00	0.00
I(Financial)	0.40	0.49	0.56	0.50	0.46	0.50	0.17	0.38
I(AMBest A or better)	0.49	0.50	0.17	0.38	0.12	0.33	0.02	0.13
ROA (%)	1.91	6.19	1.78	4.88	0.99	5.37	2.56	5.93
Life business (%)	50.95	34.13	26.38	25.20	45.29	33.86	47.37	33.44
Annuity business (%)	26.44	31.31	49.22	42.33	42.07	35.78	37.46	35.65
Health business (%)	17.49	28.72	23.18	28.27	8.35	21.77	11.11	16.93
S/A (%)	12.84	30.07	11.39	26.14	18.88	36.80	1.11	2.03
RBC Ratio (%)	974.59	1,876.44	818.17	1,734.93	973.73	2,411.79	545.71	2703
RBC Burden (%)	2.62	2.75	2.05	1.78	2.06	2.35	3.58	3.02
Capital Level (%)	28.27	25.15	18.67	15.27	21.95	24.39	31.26	20.86
Bond RBC Charges	0.64	0.35	0.69	0.38	0.72	0.41	0.62	0.39
Speculative Bonds (%)	2.30	2.56	2.32	2.76	2.72	2.78	2.56	3.13
Private Bonds (%)	9.88	9.57	14.11	14.21	15.33	13.25	11.35	13.22
Private Speculative (%)	0.68	1.13	0.90	1.26	0.96	1.37	0.67	1.47
Private NonMkt (%)	0.50	1.48	0.40	1.22	0.65	2.18	0.03	0.11
Private Corporate Bonds (%)	3.09	5.29	1.98	4.48	4.60	6.33	1.41	4.38
Private Structured Bonds (%)	0.25	0.60	0.39	0.82	0.39	0.79	0.11	0.44
Private ABS (%)	0.22	0.56	0.34	0.77	0.32	0.70	0.09	0.44
Corp. Bond Concentration	0.71	0.38	0.75	0.30	0.70	0.26	0.58	0.11
I(Affil. AssetMgr)	0.32	0.46	0.10	0.30	0.26	0.44	0.05	0.22
Inv't Salary (%)	0.04	0.07	0.03	0.06	0.05	0.06	0.01	0.03
Insurance Salary (%)	2.14	3.82	1.93	3.42	1.45	3.38	5.00	6.16
Total Inv't Expense (%)	0.20	0.25	0.22	0.21	0.21	0.18	0.13	0.20
Observations	5,138		233		373		60	

Notes: The table reports means and standard deviations for insurer-year observations from 2011 to 2020, by ownership structure: $NeverPE$ include insurers that are never owned by a PE during the period; $AlwaysPE$ include insurers that have always been owned by a PE during the period; $SwitchtoPE$ include insurers that were acquired by a PE during the period; $SwitchfromPE$ include insurers that were disposed of by a PE during the period. See Table A.1 for definitions of the variables.

Table A.3: Univariate Differences by PE acquisition Treatment (Stacked Panel Data)

	Total (1)		Control (2)		Switch to PE (3)		Diff (3)-(2)
	Mean	SD	Mean	SD	Mean	SD	*diff.*
Size (Bil.)	7.83	26.39	7.88	26.51	3.36	6.44	-4.52***
I(Mutual)	0.06	0.23	0.06	0.24	0.02	0.14	-0.04***
I(Financial)	0.40	0.49	0.41	0.49	0.38	0.49	-0.03
I(AMBest A or better)	0.50	0.50	0.51	0.50	0.08	0.27	-0.43***
ROA (%)	1.86	5.64	1.87	5.66	0.71	2.57	-1.17***
Life business (%)	50.62	33.89	50.67	33.86	45.74	36.49	-4.93
Annuity business (%)	27.31	31.41	27.17	31.33	40.53	36.48	13.36***
Health business (%)	17.01	28.25	17.08	28.27	10.26	25.94	-6.82***
S/A (%)	13.50	30.67	13.43	30.58	20.21	37.85	6.78**
RBC Ratio (%)	893.30	1,654.63	890.87	1,637.53	1,122.95	2,841.73	232.08
RBC Burden (%)	2.55	2.67	2.56	2.68	1.80	2.18	-0.76***
Capital Level (%)	26.93	24.08	27.00	24.08	20.88	23.58	-6.12***
Bond RBC Charges	0.64	0.34	0.64	0.33	0.69	0.42	0.05
Speculative Bonds (%)	2.40	2.55	2.40	2.55	2.68	2.63	0.28
Private Bonds (%)	10.39	9.62	10.32	9.56	16.35	13.02	6.03***
Private Speculative (%)	0.71	1.14	0.71	1.13	1.17	1.50	0.47***
Private NonMkt (%)	0.52	1.52	0.52	1.51	0.62	2.20	0.10
Private Corporate Bonds (%)	3.32	5.45	3.30	5.43	4.92	6.69	1.62***
Private Structured Bonds (%)	0.25	0.60	0.25	0.60	0.27	0.65	0.02
Private ABS (%)	0.23	0.56	0.23	0.56	0.24	0.62	0.01
I(Affil. AssetMgr)	0.32	0.47	0.32	0.47	0.21	0.41	-0.11***
Inv't Staff Salary (%)	0.04	0.07	0.04	0.07	0.03	0.04	-0.01***
Insurance Staff Salary (%)	2.33	3.88	2.35	3.89	1.22	3.06	-1.13***
Total Inv't Expense (%)	0.19	0.24	0.19	0.24	0.21	0.16	0.01
Observations	14,376		14,226		150		14,376

Notes: The table reports univariate mean differences between the control group (insurers never owned by a PE from 2011 to 2020) and the treatment group (insurers acquired by a PE from 2014 to 2018). The sample is the stacked panels as defined in equation (1). Tests of the mean difference assume unequal variance structures between the control and the treatment. See Table A.1 for definitions of the variables. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.4: Robustness Test, SE Group Cluster

Panel A: Risk							
Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Switch X Post	6.3691**	0.5331	-0.0416	1.8011***	0.2959*	0.1137**	0.8771
	(3.0255)	(0.3329)	(0.6673)	(0.6509)	(0.1517)	(0.0444)	(0.5503)
Dep.Var. Mean	10.387	0.711	0.523	3.317	0.253	0.645	2.401
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.013	0.004	0.000	0.007	0.006	0.002	0.002
N	14,376	14,376	14,376	14,376	14,376	14,376	14,376

Panel B: Governance				
Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post	0.0164	-0.0200**	-0.6712	0.0409
	(0.1501)	(0.0094)	(0.8909)	(0.0391)
Dep.Var. Mean	0.320	0.040	2.334	0.194
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.000	0.004	0.001	0.001
N	14,376	14,376	14,376	14,376

Notes: The table reports the stacked difference-in-differences results from estimating models in Tables 1 and 2 after clustering standard errors at the insurance group-level. Insurance group organization can change over time. For consistency, we we use the insurance group in the year of the event, i.e., the year of PE acquisition for the treatment and the same calendar year for the control. We use the NAIC group code. For insurers without NAIC group codes, i.e., single life insurers, we use the insurer's NAIC code. Robust standard errors are reported in the parenthesis, clustered at the insurer and the calendar year level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.5: Propensity Score Matching Estimates, Five Year Period (-2/+2)

Panel A: Risk							
Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Switch X Post (γ1)	5.5914***	0.5253**	0.4296	1.4746*	0.3249**	0.1005*	0.7616
	(2.0728)	(0.2605)	(0.5150)	(0.8132)	(0.1227)	(0.0571)	(0.6533)
Dep.Var. Mean	12.857	0.877	0.400	4.025	0.230	0.693	2.563
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.067	0.038	0.007	0.030	0.045	0.031	0.017
N	250	250	250	250	250	250	250

Panel B: Governance				
Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post (γ1)	0.0067	-0.0208***	-1.1240	0.0289
	(0.1276)	(0.0069)	(0.9176)	(0.0287)
Dep.Var. Mean	0.260	0.031	2.040	0.218
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.000	0.074	0.029	0.010
N	250	250	250	250

Notes: The table reports the stacked difference-in-differences results from estimating equation (1) with different event-study periods. The sample is the propensity score matched sample insurers for the five-year event period. The treatment group includes insurers acquired by a PE from 2014 to 2018. All models include switch year by insurer fixed effects and switch year by year fixed effects. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.6: Propensity Score Matching Estimates, Seven Year Period (-3/+3)

Panel A: Risk

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Switch X Post	5.9542**	0.5825*	-0.0850	2.1619*	0.3593**	0.1665**	1.3853*
	(2.5953)	(0.3158)	(0.7419)	(1.1957)	(0.1655)	(0.0759)	(0.7635)
Dep.Var. Mean	12.445	0.841	0.698	3.627	0.164	0.668	2.413
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.055	0.034	0.000	0.045	0.053	0.056	0.044
N	252	252	252	252	252	252	252

Panel B: Governance

Dependent variable:	I(Aff. AM)	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)	(4)
Switch X Post	0.0463	-0.0036	-1.4680	0.0368
	(0.1251)	(0.0091)	(1.3410)	(0.0339)
Dep.Var. Mean	0.187	0.029	2.900	0.211
Switch Year X Insurer FE	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes
Within R^2	0.002	0.001	0.028	0.010
N	252	252	252	252

Notes: The table reports the stacked difference-in-differences results from estimating equation (1) with different event-study periods. The sample is the propensity score matched sample insurers for the seven year period. The treatment group includes insurers acquired by a PE from 2014 to 2017. All models include switch year by insurer fixed effects and switch year by year fixed effects. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.7: Covariate Balance Compared to Non-PE Acquisitions

	Non-PE Switch (1)		Switch to PE (2)		Diff (2)-(1)
	Mean	SD	Mean	SD	*diff.*
ln(Size)	20.83	2.23	20.02	2.17	-0.81
Annuity business (%)	35.35	37.72	36.71	37.00	1.36
S/A (%)	8.81	18.31	24.94	42.14	16.13
RBC Ratio (%)	1,058.11	1,449.52	1,187.01	3,088.64	128.89
ln(RBC Ratio)	6.51	0.83	6.25	0.92	-0.26
Observations	20		22		42

Notes: The table reports univariate mean differences between insurers acquired by PE and non-PE in the year prior to acquisition. We perform tests of the mean difference assuming unequal variance structures between the control and the treatment. See Table A.1 for definitions of the variables. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.8: Univariate Differences by PE acquisition Treatment, with Non-PE Acquisitions as Controls (Stacked Panel Data)

	Total (1)		Non-PE Switch (2)		Switch to PE (3)		Diff (3)-(2)
	Mean	SD	Mean	SD	Mean	SD	*diff.*
Size (Bil.)	4.32	7.64	5.18	8.41	3.55	6.81	-1.63*
I(Mutual)	0.01	0.11	0.00	0.00	0.02	0.15	0.02*
I(Financial)	0.52	0.50	0.63	0.48	0.42	0.50	-0.21***
I(AMBest A or better)	0.38	0.49	0.69	0.46	0.09	0.29	-0.60***
ROA (%)	0.64	2.41	0.66	2.20	0.62	2.59	-0.05
Life business (%)	51.16	36.96	52.46	37.70	49.98	36.39	-2.49
Annuity business (%)	37.01	36.25	35.30	37.00	38.57	35.63	3.27
Health business (%)	7.76	21.26	7.33	18.96	8.15	23.21	0.83
S/A (%)	16.15	31.79	8.64	17.31	22.97	39.57	14.32***
RBC Ratio (%)	1,143.30	2,469.62	1,052.52	1,684.70	1,225.82	3,015.51	173.30
RBC Burden (%)	1.58	1.92	1.40	1.38	1.75	2.30	0.36
Capital Level (%)	19.78	21.34	17.61	16.42	21.75	24.89	4.15
Bond RBC Charges	0.64	0.26	0.65	0.21	0.63	0.30	-0.02
Speculative Bonds (%)	2.36	2.04	2.27	1.88	2.45	2.17	0.19
Private Bonds (%)	14.38	11.35	12.56	8.08	16.04	13.48	3.48**
Private Speculative (%)	0.85	1.02	0.66	0.66	1.02	1.24	0.36***
Private NonMkt (%)	0.48	1.69	0.33	0.85	0.63	2.19	0.30
Private Corporate Bonds (%)	3.77	5.81	2.14	3.70	5.26	6.89	3.13***
Private Structured Bonds (%)	0.20	0.57	0.09	0.39	0.30	0.69	0.21***
Private ABS (%)	0.16	0.49	0.04	0.13	0.26	0.65	0.22***
Corp. Bond Concentration	0.68	0.22	0.68	0.25	0.67	0.18	-0.01
I(Affil. AssetMgr)	0.29	0.45	0.35	0.48	0.23	0.43	-0.12**
Inv't Staff Salary (%)	0.04	0.04	0.04	0.05	0.03	0.04	-0.01*
Insurance Staff Salary (%)	1.51	3.39	1.83	3.56	1.21	3.21	-0.61
Total Inv't Expense (%)	0.20	0.18	0.19	0.20	0.21	0.17	0.03
Observations	252		120		132		252

Notes: The table reports univariate mean differences between the control group (insurers newly acquired by a non-PE parent from 2014 to 2018) and the treatment group (insurers acquired by a PE from 2014 to 2018). The sample is the stacked panels as defined in equation (1). Tests of the mean difference assume unequal variance structures between the control and the treatment. See Table A.1 for definitions of the variables. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.9: Affiliated Asset Manager Robustness Test with Non-PE Acquisitions as Controls

Dependent variable:	Private Bonds	Private Speculative	Private NonMkt	Private Corp.	Private Struct.	Bond RBC Risk	Speculative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post X I(Affil. AM)	-0.1368	0.3096	-0.2736	0.3490	-0.2850	-0.0273	0.1126
	(1.3565)	(0.2552)	(0.6163)	(0.8604)	(0.2098)	(0.0762)	(0.6175)
Switch X I(Affil. AM)	1.7490	0.0648	-0.5464	0.1036	-0.5208	-0.1911	-1.5453
	(3.5126)	(0.6963)	(1.0039)	(1.8851)	(0.5015)	(0.1438)	(1.2808)
Switch X Post ($\gamma 1$)	1.2654	0.2718	-0.8471	1.1291*	0.3921**	0.0424	0.7381
	(1.7635)	(0.2499)	(0.8327)	(0.6292)	(0.1854)	(0.0687)	(0.6830)
X I(Affil. AM) ($\gamma 2$)	15.8669***	1.6106*	0.7218	1.8606	0.3418	0.3541**	2.3604
	(5.1706)	(0.9272)	(1.0393)	(1.9215)	(0.3930)	(0.1535)	(1.6244)
Dep.Var. Mean	14.379	0.848	0.485	3.774	0.200	0.641	2.363
Affil. AM: $\gamma 1 + \gamma 2$	17.132***	1.882**	-0.125	2.990*	0.734*	0.396***	3.098**
Switch Year X Insurer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.327	0.337	0.018	0.053	0.099	0.149	0.137
N	252	252	252	252	252	252	252

Notes: The table reports the stacked difference-in-differences results from estimating models in Tables 7 using life insurers acquired by a non-PE owner in the same year as the treatment insurers' PE acquisition year. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table A.10: Affiliated Asset Manager Robustness Test with Non-PE Acquisitions as Controls, Continued

Dependent variable:	Inv't Salary	Insur. Salary	Tot. Inv't Exp.
	(1)	(2)	(3)
Post X I(Affil. AM)	0.0115	-0.3851	0.0088
	(0.0203)	(0.8309)	(0.0552)
Switch X I(Affil. AM)	0.0490**	5.9352	0.2259***
	(0.0197)	(4.6483)	(0.0809)
Switch X Post ($\gamma 1$)	-0.0026	-0.5273	0.0461
	(0.0187)	(0.7517)	(0.0456)
X I(Affil. AM) ($\gamma 2$)	-0.0379	-4.0558	0.0806
	(0.0326)	(4.1448)	(0.1144)
Dep.Var. Mean	0.036	1.506	0.202
Affil. AM: $\gamma 1 + \gamma 2$	-0.040*	-4.583	0.127
Switch Year X Insurer FE	Yes	Yes	Yes
Switch Year X Year FE	Yes	Yes	Yes
Within R^2	0.091	0.224	0.181
N	252	252	252

Notes: The table reports the stacked difference-in-differences results from estimating models in Tables 7 using life insurers acquired by a non-PE owner in the same year as the treatment insurers' PE acquisition year. Robust standard errors are reported in the parenthesis, clustered at the insurer level. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Appendix B Asset Manager Data Creation

To track asset managers employed by a life insurance company, we utilize General Interrogatories in the statutory annual statement (question #28.05). We consider a life insurer as not using any asset manager if a life insurer does not respond to #28.05 question, responds with a "blank" name, or responds that they are not using an asset management company. Approximately 3% of responses were blank. An additional 1% of responses indicated that they are not using asset managers but rather employees of the insurer. Examples of these responses are: N/A, None, Internally Managed, Managed Internally, Internal GA (general account) Investment Team, Internal Global Atlantic Investment Team, Anthem Internal, Internal Investment Team, Investment Committee (with member names), Investment Division of American Family Life Assurance, Investment Professionals Employed by Pacific Life, The individuals listed are employees of ..., Asset managed internally by employees of ..., Employees of the company ..., Employee, CIO, CFO, Vice President, VP, President, and We have no advisors that have all three rights.

We next identify the affiliated asset managers. We match reported asset manager names with the list of affiliated financial firms in other parts of the statutory statement. Specifically, we utilize the detailed reporting of all affiliated entities (including insurance and non-insurance companies) in Schedule Y. In addition, we also verify the names of the affiliated securities or financial services company using a separate question on the General Interrogatories, questions #8.3 and #8.4. If an asset manager name matches with the names in either Schedule Y or the General Interrogatories, we consider the asset manager as an affiliated asset manager. We clean the asset management company names and affiliated entity names before the matching process. For example, all letters are capitalized, symbols that can be omitted are erased (/ , . & — ( ) ? – ‘ “ space), and typos are corrected.

Starting in 2016, the NAIC updated the general interrogatories question on asset managers to include more detailed information. The key advantage of the 2016 revision is information on whether the asset manager is affiliated with the life insurer or not and whether the asset manager is an individual or not. Appendix Figure B.1 shows the relevant questions, using Allstate as an example. Using the information, we are better able to identify affiliated asset managers for the period of 2016 - 2020. However, we find that internal investment teams/employees are reported as affiliated asset managers in some cases. We, therefore, require that the asset manager reported as affiliated asset managers are also matching in either Schedule Y or General Interrogatories. Lastly, for asset managers reported as affiliated asset managers but do not match with Schedule Y or General Interrogatories, we consider them as affiliated asset managers only if they are identified as an asset management firm from the SEC's Investment Adviser Public Disclosure Database.

Figure B.1: Insurers' Asset Manager Reporting: Allstate Life Insurance Example

A. # 28.05 Asset Manager Reporting (2011)

ANNUAL STATEMENT FOR THE YEAR 2011 OF THE ALLSTATE LIFE INSURANCE COMPANY

GENERAL INTERROGATORIES

28.05 Identify all investment advisors, brokers/dealers or individuals acting on behalf of brokers/dealers that have access to the investment accounts, handle securities and have authority to make investments on behalf of the reporting entity:

1 Central Registration Depository Number(s)	2 Name	3 Address
N/A	ALLSTATE INVESTMENTS, LLC	3075 SANDERS ROAD, NORTHBROOK, IL 60062

B. # 28.05 Asset Manager Reporting Update (2016)

ANNUAL STATEMENT FOR THE YEAR 2016 OF THE ALLSTATE LIFE INSURANCE COMPANY

GENERAL INTERROGATORIES

28.05 Investment management – Identify all investment advisors, investment managers, broker/dealers, including individuals that have the authority to make investment decisions on behalf of the reporting entity. For assets that are managed internally by employees of the reporting entity, note as such. ["…that have access to the investment accounts"; "…handle securities"]

1 Name of Firm or Individual	2 Affiliation
ALLSTATE INVESTMENTS, LLC	A
BLACKROCK FINANCIAL MANAGEMENT, INC	U
MILLIMAN FINANCIAL RISK MANAGEMENT, LLC	U

28.0597 For those firms/individuals listed in the table for Question 28.05, do any firms/individuals unaffiliated with the reporting entity (i.e. designated with a "U") manage more than 10% of the reporting entity's assets? Yes [ ] No [X]

28.0598 For firms/individuals unaffiliated with the reporting entity (i.e. designated with a "U") listed in the table for Question 28.05, does the total assets under management aggregate to more than 50% of the reporting entity's assets? Yes [ ] No [X]

28.06 For those firms or individuals listed in the table for 28.05 with an affiliation code of "A" (affiliated) or "U" (unaffiliated), provide the information for the table below.

1 Central Registration Depository Number	2 Name of Firm or Individual	3 Legal Entity Identifier (LEI)	4 Registered With	5 Investment Management Agreement (IMA) Filed
N/A	ALLSTATE INVESTMENTS, LLC	QOVOKOEYTYOWZE36RV47	IL DOI	DS
107105	BLACKROCK FINANCIAL MANAGEMENT, INC	549300LVXYIVJKE13M84	SEC	DS
159377	MILLIMAN FINANCIAL RISK MANAGEMENT, LLC	5493002H8STET494T224	SEC	DS

Figure B.2: Insurers' Financial Affiliation Reporting: Allstate Life Insurance Example

ANNUAL STATEMENT FOR THE YEAR 2016 OF THE ALLSTATE LIFE INSURANCE COMPANY

GENERAL INTERROGATORIES

8.1 Is the company a subsidiary of a bank holding company regulated by the Federal Reserve Board? ..... Yes [ ] No [X]

8.2 If response to 8.1 is yes, please identify the name of the bank holding company.

8.3 Is the company affiliated with one or more banks, thrifts or securities firms? ..... Yes [X] No [ ]

8.4 If response to 8.3 is yes, please provide below the names and location (city and state of the main office) of any affiliates regulated by a federal regulatory services agency [i.e. the Federal Reserve Board (FRB), the Office of the Comptroller of the Currency (OCC), the Federal Deposit Insurance Corporation (FDIC) and the Securities Exchange Commission (SEC)] and identify the affiliate's primary federal regulator.

1 Affiliate Name	2 Location (City, State)	3 FRB	4 OCC	5 FDIC	6 SEC
ALLSTATE DISTRIBUTORS, LLC	3075 SANDERS ROAD, NORTHBROOK, IL 60062				YES
ALLSTATE FINANCIAL ADVISORS, LLC	3075 SANDERS ROAD, NORTHBROOK, IL 60062				YES
ALLSTATE FINANCIAL SERVICES, LLC	2920 SOUTH 84TH STREET, LINCOLN, NE 68506				YES
ALLSTATE INVESTMENT MANAGEMENT COMPANY	2775 SANDERS ROAD, NORTHBROOK, IL 60062				YES