Buying from the Family: Private Equity-Owned Insurers and Their Affiliated Investments*

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Abstract

We show that the growth in private equity (PE) ownership of insurers is associated with insurers paying higher prices for affiliated investments and increasing downside risk. We document a seven-fold expansion in PE ownership over the past decade, along with a pronounced shift in portfolio composition. PE-owned insurers invest more in structured securities such as collateralized loan obligations (CLOs) and conduct a higher share of affiliated transactions. We find that PE-owned insurers pay systematically higher prices for the same securities when the issuer is an affiliate, implying direct transfers to related PE entities. We further show that affiliated CLOs purchased by PE-owned insurers exhibit significantly higher expected losses under adverse scenarios. Our model demonstrates that affiliated overpayment dominates dividend payouts as a means of equity extraction for moderately capitalized insurers. The empirical distribution of affiliated investments across capital positions is consistent with this mechanism.

Keywords: Insurance, Private equity, Capital regulation, Informed trading, Agency frictions

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1 Introduction

In recent years, a growing share of U.S. insurers has come under private equity (PE) ownership. The PE model features concentrated control and complex group structures that facilitate transactions with affiliated entities. These features raise concerns about the role of PE ownership in affecting agency conflicts between controlling shareholders and other stakeholders. Such conflicts are particularly prominent in insurance, where liabilities are not traded and widely dispersed across policyholders, limiting the effectiveness of traditional market discipline and leaving prudential capital regulation as the primary mechanism safeguarding policyholders (NAIC, 2025; EIOPA, 2026).

Prior research shows that intra-group arrangements, most prominently affiliated reinsurance, can be used to arbitrage risk-weighted capital requirements (e.g., Koijen and Yogo, 2016). Under PE ownership, affiliated activity extends beyond reinsurance to include investments in securities issued within the group, increasing the potential for self-dealing and weakening arm's-length discipline. The expansion of PE ownership may thus widen the gap between reported regulatory capital and underlying economic risk. We test this hypothesis and examine its implications for prudential regulation.

Leveraging a novel dataset of insurers' portfolio holdings and transactions, we examine the pricing and performance of investments made by PE-owned insurers. Our focus is on structured securities such as collateralized loan obligations (CLOs), whose valuation relies on models and judgment, making them susceptible to pricing distortions. We document two main findings. First, comparing purchases of the same security on the same day, PE-owned insurers systematically overpay when the issuer is an affiliate. These price differentials imply direct transfers to related entities that reduce economic net worth without a commensurate reduction in reported regulatory capital. Second, we examine investment performance using the National Association of Insurance Commissioners' (NAIC's) 2023 CLO stress tests. CLOs held by affiliated PE-owned insurers exhibit significantly higher expected losses, especially under adverse scenarios. This underperformance is absent for CLOs purchased by unaffiliated PE-owned insurers. Taken together, these results indicate that affiliated investments serve as a channel for equity extraction. We develop a model demonstrating that, under risk-based capital regulation, moderately capitalized insurers would prefer affiliate overpayments to dividend payouts. The observed concentration of affiliated investment in moderate capital positions is consistent with this prediction.

We begin by constructing a comprehensive panel that links PE ownership of insurers, detailed data on insurers' transactions, and the subsequent performance of those transactions. We create a novel dataset of PE ownership of U.S. insurers by combining the universe of PE investment and M&A transactions in the insurance industry with extensive manual research on ownership structures. We then use insurers' statutory NAIC filings (Schedules D and BA) to obtain detailed data on their transactions and holdings. These data include information on affiliation status, purchase prices, and impairments for all investments. Finally, we exploit the NAIC's CLO Stress Tests, which provide standardized, regulator-generated loss projections under multiple adverse scenarios. Our data allow us to systematically compare investment pricing and performance along two dimensions of the insurer: its ownership structure (PE-owned versus non-PE-owned) and its affiliation with the security (affiliated versus arm's-length).

We document three stylized facts about the rise of PE ownership in U.S. insurance and the associated shift in portfolio composition.[1] First, in the 15 years following the Great Financial Crisis of 2007-2009, the number of PE-owned insurers increased fifteen-fold, and the share of aggregate insurance assets managed by such insurers rose from near zero in 2009 to 7% in 2024. Notably, most of this growth occurred after 2020, when the share stood at just 2%. Second, PE-owned insurers invest in different types of assets. We focus on structured securities, which are non-mortgage loan-backed products such as CLOs and auto loan-backed ABS. These products account for 19.8% of all insurers' acquisitions in

[1] We define PE-owned insurers as those with more than 50% of equity held by a PE group.

2024 but for 35.9% of acquisitions by PE-owned insurers. Third, affiliated investments are highly concentrated among PE-owned insurers: approximately 54% of their 2024 structured security acquisitions are issued by affiliated entities, whereas such transactions account for only 1.7% among non-PE-owned insurers.[2]

Motivated by these stylized facts, we examine whether affiliated investments are associated with pricing distortions. The concentration of affiliated investments in structured securities, whose valuation involves substantial discretion, creates opportunities for self-dealing. We test for this by comparing the prices paid to a benchmark defined as the value-weighted purchase price paid by non-PE-owned insurers for the same security on the same date. Relative to this benchmark, PE-owned insurers on average pay 8 basis points more when transacting with affiliated issuers. Moreover, we show that this result holds within an insurer: overpayment emerges only after an insurer becomes PE-owned. In contrast, we do not find evidence of overpayment in affiliated investments by non-PE-owned insurers, and PE-owned insurers, if anything, pay lower prices in arm's length (unaffiliated) transactions.

Next, we examine whether investment performance varies with PE ownership and affiliation status. This analysis provides complementary evidence that helps rule out alternative explanations for our pricing results. One such explanation is that paying a premium helps secure larger allocations of high-quality assets. In this view, PE-owned insurers may be willing accept lower percentage returns if doing so allows them to secure larger allocations and, ultimately, higher total dollar payoffs. Under this explanation, affiliated securities more heavily allocated to PE-owned insurers should exhibit superior performance. Because these structured securities are illiquid and typically held to maturity, we assess performance using downside risk, measured by expected loss given default. A key empirical challenge, however, is that the realized-loss history of structured securities in insurers' portfolios is limited, making it difficult to evaluate performance across different economic states. We address this challenge by exploiting the NAIC's CLO stress test, which provides tranche-level loss-

[2]Under NAIC definitions, an investment is classified as affiliated if the insurer's holding company controls more than 10% of the issuer's voting rights.

projections for all CLOs held by insurers as of 2023 under ten standardized macroeconomic scenarios. Comparing performance across CLOs within the same tranche (i.e., seniority), we estimate both the probability of loss and the magnitude of the expected loss as a function of level of PE ownership and transaction affiliation. We find that CLOs held by PE-owned insurers do not underperform on average and, if anything, exhibit lower losses overall. However, affiliated CLO investments made by PE-owned insurers perform significantly worse, particularly in adverse scenarios. Importantly, underperformance increases with the share of a security held by PE-owned insurers, inconsistent with an allocation-based explanation for the observed overpayment.

Finally, we interpret our pricing and performance results together in a model of insurance regulation under risk-based capital constraints. In the model, equity owners can extract equity either through dividend payouts or through affiliate overpayments. While dividends directly reduce equity and thus the capital ratio, affiliate overpayments inflate the asset base used to assess regulatory capital. As a result, the relative attractiveness of these two channels depends on the insurer's capital position. We show that affiliated investments become the preferred mode of equity extraction within a range of moderately capitalized states, where dividend payouts would reduce the capital ratio more than affiliate overpayments. Consistent with the model, we find that affiliated investments concentrate among insurers with relatively modest capital buffers.

We emphasize that our results pertain to agency frictions associated with affiliated investments and should not be interpreted as a broad assessment of PE ownership in insurance. In fact, we find that PE-owned insurers' investments in unaffiliated issuers are purchased at lower prices and sometimes exhibit lower expected losses, suggesting potential benefits from sophisticated ownership. A comprehensive evaluation of the welfare effects for policyholders is beyond the scope of this study.[3] Rather, our findings highlight when and why existing

[3] Kirti and Sarin (2024) analyzes the welfare consequences of PE ownership, highlighting the balance between increased short-run returns and reduced capital buffers. In contrast, we focus on a distinct mechanism through which PE ownership can intensify agency conflicts, expanding the welfare trade-off beyond portfolio risk-taking alone.

capital rules may not fully discipline agency conflicts arising from affiliated investments.

Our paper contributes to three strands of literature. First, we contribute to the literature on agency frictions in financial intermediaries, particularly agency conflicts between equity owners and liability holders. A large body of work studies risk-shifting and governance distortions in intermediaries with limited liability (e.g., Jensen and Meckling, 2019; Hellmann, Murdock, and Stiglitz, 2000). Within insurance, prior research documents how affiliated reinsurance arrangements can weaken effective capital discipline and shift risk toward policyholders or industry backstops (e.g., Koijen and Yogo, 2016; Lee, Mayers, and Smith Jr, 1997). We extend this literature by showing that PE ownership increases the scope for equity extraction through affiliated asset investments, and by quantifying the magnitude of such transfers at the security level. Unlike prior work that focuses on risk-taking incentives broadly, we isolate affiliated investments as a distinct channel through which agency frictions are amplified.

Second, our paper relates to the literature on risk-based capital regulation and regulatory arbitrage. Risk-based capital requirements are intended to align asset risk with capital buffers, yet a growing literature shows that coarse risk weights can induce distortions and regulatory gaming (e.g., Acharya, Engle, and Pierret, 2014; Van den Heuvel, 2008; Begenau and Landvoigt, 2022 in banking, and Chen, Higgins, Xia, and Zou, 2020; Becker, Opp, and Saidi, 2022; Foley-Fisher, Heinrich, and Verani, 2023 in insurance). In insurance, capital requirements are based on statutory book values and broad asset classifications, which may not fully capture economic risk. We provide evidence that affiliate overpayment widens the gap between reported regulatory capital and underlying economic solvency, revealing a regulatory blind spot that standard risk weights do not address. By modeling the trade-off between affiliate overpayments and dividend payouts as alternative channels of equity extraction, we identify the capital positions at which regulatory constraints alter the form of valuation diversion without changing its overall level.

Finally, we contribute to the literature on portfolio management under long-duration liabilities. Institutions with long-dated obligations, including insurance companies and pension funds, face trade-offs between yield, liquidity, and downside protection (e.g., Rauh, 2009; Koijen and Yogo, 2015; Becker and Ivashina, 2015). Insurers have increasingly shifted toward structured credit and private assets in search of yield (Meisenzahl, Overpeck, and Polacek, 2025), raising questions about how liability structure shapes asset allocation. We add to this literature by showing that ownership structure interacts with liability duration and regulatory constraints to influence portfolio composition and performance. Our findings suggest that governance frictions, not only liability matching considerations, play a central role in shaping insurers' structured asset investments.

The remainder of the paper is organized as follows. Section 2 describes how we construct the panel of insurers' investments and PE ownership of insurers. Section 4 investigates the pricing and performance of PE-owned insurers' investments in affiliated securities. Section 5 develops a model of an insurance company's portfolio allocation subject to risk-weighted capital requirements and uses the model to estimate the surcharge equivalence of affiliate-overpayment. Section 6 concludes.

2 Data Construction

In this section, we describe how we construct the panel of PE ownership in insurance, the sample of transactions used in the pricing analysis, and the sample of holdings employed in the performance analysis.

2.1 Data on PE Ownership

We identify PE ownership of the insurers in our sample through a multi-step, manual process that combines several data sources.

First, we obtain a comprehensive list of PE firms from Preqin and match these entities to the Ultimate Parent of each insurance company as reported in S&P.

We then manually verify ownership structures, and changes in these structures, by reviewing multiple sources: holding company relationships from the NAIC's Schedule Y statutory filings, state insurance company regulators' examination reports, and various other online sources (e.g., media articles). Using these sources, we augment and manually correct the Preqin PE firm matches.

To determine the timing of PE ownership, we use S&P transaction data to track the effective dates of mergers and acquisitions in the insurance industry, as well as PE investments in insurance companies.

2.2 Sample of Transactions for the Pricing Analysis

We construct our sample using insurers' Schedule D and Schedule BA statutory filings from the NAIC. These schedules provide detailed transaction-level information on insurers' fixed-income purchases and sales. We focus on Part II of each schedule, which reports individual purchase transactions. The data are accessed through the S&P Capital IQ Pro platform.

To analyze pricing, we focus on purchases of structured securities. In particular, we retain transactions classified as "Other Loan-Backed Structured Securities" in Schedule D. This category excludes traditional mortgage-backed securities (MBS) but includes CLOs and other structured credit products.

We apply several data-cleaning filters to ensure accurate identification of transactions. First, we drop observations with missing acquisition dates. Second, we exclude transactions with missing or invalid security identifiers. Finally, we retain only observations with non-missing information on par value and transaction price, which are necessary to construct our price measures. Applying these filters yields a transaction-level dataset of structured security purchases.

Our objective is to assess the prices paid by PE-owned insurers for affiliated securities when acquiring these securities and to compare them to contemporaneous benchmark prices constructed from other transactions in the same security.

Using our hand-collected data on PE ownership described above, we determine whether each transaction occurred before or after an insurer became PE-owned, allowing us to distinguish trades executed under PE ownership from those conducted prior to PE ownership.

We identify affiliated transactions using the affiliated flag reported in Schedules D and BA. This field requires insurers to indicate whether the issuer of a security is a related party to the reporting insurer and, if so, to specify the nature of the relationship. For example, a CLO transaction is classified as affiliated when a related party serves as its sponsor, originator, or manager, as in the case of a CLO managed by Apollo's credit platform and purchased by Athene, Apollo's insurance subsidiary.

2.3 Sample of Holdings for the Performance Analysis

To analyze performance, we use the NAIC's 2023 CLO stress test and insurer holdings from Schedule D statutory filings as of year-end 2023. The stress test provides standardized, regulator-generated loss projections for every tranche of each broadly syndicated CLO held by U.S. insurers. For each CLO, the NAIC models the underlying loan portfolio's cash flows through the CLO waterfall under ten distinct scenarios that vary both the default rate and the recovery rate on collateral. The ten scenarios are summarized in Figure 4.

Scenarios 1 through 5 hold recovery rates at historical levels while varying defaults from two standard deviations below the historical mean (Scenario 1) to two standard deviations above (Scenario 5); Scenario 3 represents the historical baseline. Scenarios 6 through 8 introduce stressed recovery assumptions (in which recoveries on defaulted loans are significantly lower than historical norms) paired with default rates ranging from the historical mean (Scenario 6) to two standard deviations above (Scenario 8). Scenarios 9 and 10 are tail events that combine the highest default rate with severely impaired recoveries, scaled to 75% and 50% of the stressed recovery rate, respectively.

The scenario calibration leverages existing regulatory work on corporate credit risk. Rather than simulating defaults and recoveries on the underlying loan pool directly, the NAIC calibrates the scenario distribution so that the resulting risk-based capital (RBC) charge on a CLO is comparable to the RBC charge on an equivalent pool of individual corporate credits. This approach maintains consistency with the 96th-percentile loss level implicit in the existing RBC framework for corporate bonds, while generating a tractable set of scenario-specific loss projections that can be compared across CLOs. For each scenario, the model projects the principal and interest loss at the tranche level, accounting for the CLO waterfall structure, reinvestment assumptions, and the interest rate environment (SOFR plus spread). Recovery is defined as principal recovered within six months after default.

From Schedule D, we obtain the face value of each insurer's reported CLO positions and match these holdings to the corresponding standardized CLO deal and tranche identifiers in the NAIC stress test.

A key challenge is reconciling the inconsistent and often messy security descriptions in Schedule D with the standardized deal and tranche names used in the 2023 stress test. For example, Schedule D descriptions frequently combine abbreviated deal and tranche names into a single string. We address this challenge by programmatically parsing and standardizing descriptions where possible. For more complex cases, we use an LLM-based method to interpret abbreviated deal and class names. All matches generated with the LLM-assisted approach are subsequently manually reviewed and corrected as needed to ensure accuracy.

Both the stress test data and the Schedule D filings report holdings at the granular tranche class level (e.g., A1R, A1S1R, A2RB2). However, the number and granularity of tranche designations vary across CLOs, and Schedule D filings sometimes use coarser designations than the stress test data. To ensure comparability across CLOs, we aggregate the matched data to a coarser class-bucket level. Specifically, we map each detailed tranche class into one of six standardized seniority class-buckets (A through F) based on its position in the CLO waterfall. A CLO deal–class-bucket pair refers to all tranches within the same CLO that fall into the same seniority bucket. For example, all A-rated tranches of Apollo CLO XII, regardless of their detailed designations (A1R, A1S1R, etc.), form a single observation. This aggregation ensures that each CLO contributes one observation per seniority level, so that CLOs with more granular tranche structures do not receive mechanically greater weight in the estimation. We then compute all variables at this class-bucket level. The projected loss rate for each CLO–class bucket pair is aggregated from the underlying detailed tranches. Ownership shares, including the shares held by PE-owned insurers that are affiliated and unaffiliated holdings, are calculated as the fraction of total par value within each CLO–class-bucket. The resulting matched sample contains 1,520 CLO–class-bucket observations with both stress test loss projections and insurer holding information.

Similar to our transaction-level classification described above, we use our hand-collected PE ownership data to identify holdings under PE ownership and we use the related-party disclosure in insurers' Schedule D filings to classify each security holding as affiliated or unaffiliated.

3 The Rise of Private Equity in Insurance: Stylized Facts

We document three stylized facts about the growth of private equity (PE) ownership in insurance and the associated shift in portfolio composition. These facts motivate our subsequent analysis of pricing and performance.

Stylized Fact 1: Rapid Growth of PE Ownership

Figure 1 shows the increase in PE ownership among U.S. insurance companies. In the 15 years following the Great Financial Crisis of 2007-2009, the number of PE-owned insurers increased from 14 in 2009 to 211 by 2024, representing a fifteen-fold increase. This expansion was accompanied by a sharp increase in the share of aggregate insurer assets managed by PE-owned firms, rising from near zero in 2009 to over 7% in 2024, with most of the growth concentrated in the life insurance sector. Notably, the majority of this expansion occurred after 2020, when the asset share stood at just 2%.

The rise of PE ownership in life insurers was already visible in data that ended in 2014, as documented by Kirti and Sarin (2024). Our updated evidence shows that the trend has not only continued but accelerated substantially over the past decade. The post-2020 surge in both the number of PE-owned insurers and their asset share suggests that PE ownership is an economically significant feature of the insurance industry. Moreover, the pattern underscores the importance of understanding the implications of PE ownership on insurers' behaviors and on systemic risk.

Stylized Fact 2: Portfolio Tilt Toward Structured Securities

PE-owned insurers exhibit systematically different portfolio allocations. Figure 2 shows that their portfolios are heavily tilting toward structured securities such as CLOs and auto-loan asset-backed securities (ABS).

Structured products have grown in importance across the insurance sector, rising from under 10% of new acquisitions in 2009 to nearly 20% in 2024. In addition, this trend is substantially more pronounced among PE-owned insurers, for whom structured securities account for over 35% of new acquisitions in 2024. This tilt toward structured credit is central to our empirical setting, as these securities are typically illiquid and, given the discretion involved in valuing these securities, their prices could be sensitive to affiliation.

Stylized Fact 3: Concentration of Affiliated Investments

Affiliated investments are highly concentrated among PE-owned insurers. Figure 3 shows that approximately 35% of the structured securities acquired by PE-owned insurers are issued by affiliated entities, whereas affiliated investments are virtually absent among non-PE-owned insurers.

This difference suggests that PE ownership is associated not only with different portfolio allocation, but also with a greater prevalence of related-party transactions. The concentration of PE ownership in structured products issued by affiliated entities raises natural questions about pricing, valuation, and potential conflicts of interest.

Taken together, these stylized facts document a structural shift in ownership, a distinct portfolio tilt toward structured assets, and a concentration of affiliated investments among PE-owned insurers. The remainder of the paper examines whether these patterns reflect superior skill or amplified agency frictions.

4 Pricing and Performance of Affiliated Investments

4.1 Analysis of Pricing of Affiliated Investments

4.1.1 Empirical Design

To examine whether PE-owned insurance companies systematically pay different prices for affiliated securities, we compare transaction prices across insurance companies while tightly controlling for time-varying fundamentals.

A simple comparison of prices across investors would be confounded by (i) cross-sectional differences across securities, (ii) market-wide shocks, and (iii) idiosyncratic shocks to individual securities. To address these concerns, our identification strategy exploits variation in transaction prices *within the same security and on the same day.*

For each focal purchase transaction of insurer i in security s at time t, we construct a benchmark equal to the average transaction price of the same security purchased by other investors on day t. Restricting comparisons to trades in the same security and on the same day ensures that transactions are subject to identical time-varying market- and security-level conditions.

This approach is conceptually similar to examining prices while including security $\times$ day fixed effects, but constructing an explicit benchmark offers two advantages. First, it allows the benchmark to be value-weighted rather than implicitly equal-weighting transactions. Second, it enables us to exclude transactions by PE-owned insurers in the benchmark so that it is not mechanically influenced by the trading activity we study. This approach is related to transaction-cost measures used in OTC markets, such as the *Ask–Dealer Ratio*, which compares customer transaction prices to the prices at which dealers trade among themselves over the same horizon (e.g., Schestag, Schuster, and Uhrig-Homburg, 2016).

Formally, we define the relative price measure as

$$\text{RelativePrice}_{i,s,t}^{Benchmark} = P_{i,s,t} - \overline{P}_{s,t}^{Benchmark},$$

where $P_{i,s,t}$ is the price of the focal transaction, expressed as a percentage of par value, and $\overline{P}_{s,t}^{Benchmark}$ is the value-weighted average price of other purchases of the same security on the same day, excluding transactions involving PE-owned insurers:

$$\overline{P}_{s,t}^{\text{Benchmark}} = \frac{\sum_{j \in \mathcal{W}_s^{(-i,\text{NoPE})}(t)} P_{j,s}\, Q_{j,s}}{\sum_{j \in \mathcal{W}_s^{(-i,\text{NoPE})}(t)} Q_{j,s}}, \tag{1}$$

where $Q_{j,s}$ is the par value traded in transaction j. Let $\mathcal{W}_s^{(-i)}(t)$ denote the set of trades in security s on day t other than the focal trade by insurer i, and let $\mathcal{W}_s^{(-i,\text{NoPE})}(t) \subseteq \mathcal{W}_s^{(-i)}(t)$ denote those not executed by PE-owned insurers.[4]

The construction of this benchmark allows us to test whether certain investor groups systematically pay higher or lower prices than other investors trading the same security under nearly identical conditions.

We do so by estimating the following regression specification:

$$\begin{aligned} RelativePrice_{i,s,t}^{Benchmark} = \beta_1 PE\ Owned_{i,t} \times Affiliated_{s,t} + \beta_2 PE\ Owned_{i,t} + \beta_3 Affiliated_{s,t} \\ + \delta_t + \gamma_i + \epsilon_{i,s,t}, \end{aligned} \tag{2}$$

where $RelativePrice_{i,s,t}^{Benchmark}$ corresponds to the relative price that insurer i paid to acquire security s at time t, measured as the price paid less the benchmark price, expressed in percentage of par value. $PE\ Owned_{i,t}$ is an indicator variable equal to 1 if the insurer i is

[4]In untabulated robustness tests, we use benchmarks that are equal-weighted and/or that include transactions by PE-owned insurers and find qualitatively similar results.

owned by a PE firm at time t. *Affiliated*$_{s,t}$ is an indicator variable equal to 1 if the acquired security s is issued by an entity affiliated with insurer i. We control for insurer and year fixed effects. We cluster standard errors by insurer.

4.1.2 Results

The results are reported in Table 1. Panel A reports the results using all purchase transactions of all insurers. Across all four specifications, which employ alternative fixed effect structures, we find a positive and statistically significant coefficient on the interaction between *PE Owned* and *Affiliated*. This pattern indicates that PE-owned insurers pay higher prices when purchasing securities issued by affiliated entities, relative to other investors trading the same security on the same day. Importantly, the result is robust to including insurer fixed effects in columns 3 and 4, highlighting that the effect persists within an insurer and is not solely attributable to cross-sectional differences between PE-owned and non-PE-owned insurers. Instead, the results suggest that insurers are paying more for investments in affiliated structured securities after becoming PE-owned.

The magnitude of the effect is economically meaningful. Across all specifications, the coefficient on the interaction term ranges from 0.075 to 0.079, implying a premium paid of approximately 8 basis points for affiliated investments. For the year 2024, the results would imply an aggregate overpayment of \$ 40 million for affiliated investments by PE-owned insurers.[5]

In contrast to the coefficient on the interaction term, the significantly negative coefficient on PE_owned suggests that PE-owned insurers pay lower prices for securities relative to other investors when the securities are not issued by an affiliated entity. However, the magnitude is economically small. The coefficient on $Affiliated$ is negative but insignificant, implying no significant difference between the prices paid by non-PE insurers for affiliated securities compared to unaffiliated securities.

[5] Affiliated investments by PE-owned insurers were approximately \$50bn. The overpayment is \$50bn $\times$ 0.079% = \$39.5m.

Since Figure 1 Panel (b) highlights that PE ownership is concentrated in life insurance companies, we also estimate Equation (2) in the subsample of life insurers. The results, which are reported in Table 1 Panel B, are qualitatively similar to the results in the complete sample. These results confirm that the effect is also present within the insurer segment with the most economically significant PE ownership stakes—namely, life insurers.

Importantly, the empirical design compares trades in the same security on the same day, effectively approximating a security × time fixed-effects framework. This structure absorbs common market-wide conditions as well as time-varying security-specific shocks, so identification comes from cross-investor variation in prices paid for the same security under identical market conditions. Accordingly, the results document a robust and systematic pricing differential.

4.2 Analysis of Performance of Affiliated Investments

Our pricing analysis establishes that PE-owned insurers systematically overpay for affiliated securities. A follow-up question is whether affiliated investments expose the insurer to greater downside risk, thereby weakening long-term solvency. We investigate this question by examining investment performance as a function of PE ownership and transaction affiliation. This analysis also helps to rule out alternative explanations for our finding of affiliate overpayment. For example, if paying a premium helps secure larger allocations of high-quality assets, then we should expect to find that PE-owned affiliated investments have lower downside risk.

A key empirical challenge in assessing performance is the limited realized-loss history of structured securities in insurer portfolios, which makes it difficult to evaluate outcomes across different economic states. We address this challenge by exploiting the NAIC's 2023 CLO stress test, which provides standardized, regulator-generated loss projections under ten macroeconomic scenarios for every broadly syndicated CLO tranche held by U.S. insurers as of year-end 2023. Section 2.3 describes the stress test design, our procedure for matching stress test projections to Schedule D holdings, the aggregation of granular tranche class designations to a uniform class-bucket level, and the classification of holdings as affiliated or unaffiliated. The unit of observation in the regressions below is a CLO deal–class-bucket pair, which groups all tranches within the same CLO that fall into the same seniority class-bucket. For example, all A-rated tranches of Apollo CLO XII, regardless of their detailed designations (A1R, A1S1R, etc.), form a single observation. The resulting sample contains 1,520 CLO–class-bucket observations.

4.2.1 CLO Performance and PE Ownership

We begin by examining whether PE ownership of a CLO–class-bucket is associated with higher expected losses overall. Treating each CLO deal–class-bucket pair as the unit of observation, we estimate the following specification separately for each scenario $k \in \{1, \dots, 10\}$:

$$Loss_{b,k} = \beta \cdot \textit{PE Ownership}_b + \alpha_c + \delta_v + \varepsilon_{b,k}, \tag{3}$$

where $Loss_{b,k}$ is one of multiple measures of the projected loss outcome for CLO–class-bucket b under scenario k. $\textit{PE Ownership}_b$ is one of multiple measures of the extent of PE ownership in the CLO–class-bucket, α_c denotes class-bucket fixed effects that absorb variation that is constant within a seniority level, and δ_v denotes CLO issuance year fixed effects that absorb time-varying differences in collateral quality and market conditions at origination. Standard errors are clustered at the CLO deal level to account for correlation across tranches within the same CLO.

We examine two $Loss_{b,k}$ outcomes: *Pr(Loss > 0)* is an indicator equal to one if the CLO–class bucket experiences any positive loss for that scenario, and *Loss Rate* is the projected principal and interest loss as a share of par value under that scenario. We measure $\textit{PE Ownership}_b$ in two ways: a binary indicator (*PE Owned*) equal to one if any PE-owned insurer holds any tranche within that CLO–class bucket, and sum of the continuous share of each tranche's par value held by PE-owned insurers across all tranches in the CLO–class bucket (*PE Share*).

Table 2 reports the results. Across all ten scenarios, we find no evidence that greater PE ownership is associated with higher expected losses. The coefficients on PE ownership are even negative and statistically significant in some moderate stress scenarios for the expected loss. These results suggest that, if anything, CLOs held by PE-owned insurers perform somewhat better than those held by other insurers, consistent with the possibility that PE ownership brings investment sophistication to structured credit markets.

4.2.2 CLO Performance: Affiliated versus Unaffiliated Investments

To test whether affiliated investments by PE-owned insurers are associated with higher expected losses, we decompose PE ownership of each CLO–class-bucket into two components: (i) the share held by PE-owned insurers that are affiliated with the CLO (e.g., when its PE parent serves as the CLO's manager) and (ii) the share held by PE-owned insurers with no such affiliation. We enter both components simultaneously in the same regression:

$$Loss_{b,k} = \beta_1 \cdot PE\ Ownership_b^{Aff} + \beta_2 \cdot PE\ Ownership_b^{Unaff} + \alpha_c + \delta_v + \varepsilon_{b,k}, \tag{4}$$

where $PE\ Ownership_i^{Aff}$ denotes the share of CLO–class-bucket b held by PE-owned insurers for whom the CLO is a related-party investment, and $PE\ Ownership_b^{Unaff}$ denotes the share held by PE-owned insurers with no affiliation to the CLO. The coefficients β_1 and β_2 capture the differential association of affiliated and unaffiliated PE-owned insurers' holdings with projected losses, after controlling for class-bucket and CLO issuance year fixed effects.

Table 3 reports the results. The decomposition reveals a pronounced divergence between losses for affiliated and unaffiliated PE-owned insurers' holdings. Under benign and moderate stress scenarios (Scenarios 1–5), which vary default rates from two standard deviations below to two standard deviations above the historical mean while maintaining historical recovery rates, neither affiliated nor unaffiliated PE ownership exhibits a statistically significant association with higher projected losses. Unaffiliated PE ownership is associated with lower expected losses in the moderate stress scenarios, consistent with the investment sophistication interpretation documented in Table 2. Affiliated PE ownership coefficients are generally small and statistically insignificant in these scenarios.

The pattern changes markedly once recovery rates are stressed. Scenarios 6 through 10 pair elevated default rates with severely impaired recoveries, representing the adverse and tail conditions most relevant for policyholder protection. In these scenarios, affiliated PE ownership is significantly associated with worse performance, while unaffiliated PE ownership either remains associated with lower expected losses or is statistically insignificant. In Scenario 7, a ten percentage point increase in the affiliated PE share is associated with a 2.4 percentage point increase in the probability of experiencing any loss ($p = 0.003$), whereas the same increase in unaffiliated PE share is associated with a 0.6 percentage point decrease ($p = 0.013$). The divergence widens further in the most severe scenarios. In Scenario 8, a ten percentage point increase in affiliated PE ownership is associated with an additional 4.1 percentage points of expected principal and interest losses as a share of par. Under Scenarios 9 and 10—tail events that combine the highest default rate with the most severely impaired recoveries, the magnitudes grow larger still. The affiliated *PE Share* coefficients on the loss rate reach 0.578 ($p < 0.001$) and 0.636 ($p < 0.001$), implying approximately 58 and 64 basis points of additional expected loss per 100 basis points increase in affiliated PE ownership.

Importantly, affiliated CLOs do not outperform in any scenario. Even under the most benign conditions (Scenarios 1–3), where cross-sectional dispersion in losses is minimal, affiliated PE ownership carries no performance advantage. This absence of outperformance in favorable states is difficult to reconcile with an allocation-based explanation for the pricing premium documented in Section 4.1. If PE-owned insurers overpaid for affiliated securities to secure greater allocations in high-quality tranches, one would expect affiliated CLOs to exhibit superior performance. Instead, affiliated CLOs perform no better in good times and significantly worse in bad times, with the underperformance intensifying monotonically with scenario severity and in the share of the tranche held by affiliated PE owned insurers.

Taken together with the pricing evidence, these results point to self-dealing as the mechanism through which PE ownership amplifies agency frictions in affiliated investment. The solvency implications are particularly concerning, because the underperformance of affiliated CLOs is concentrated in precisely the adverse and tail scenarios. In these scenarios, due to high defaults combined with impaired recoveries, policyholder claims are most at risk. In these states, the loss-absorbing capacity of the insurer is diminished both by the initial overpayment and by the inferior performance of affiliated holdings, compounding the threat to long-term solvency.

4.2.3 CLO Performance in Investment-Grade Tranches (NAIC 1 and 2)

Our performance analysis relies on projected losses from the NAIC stress test as a measure of downside risk. Higher expected losses reduce a security's value regardless of whether it is held or sold, since secondary market prices reflect expected credit risk. However, the stress test provides the cleanest measure of economic exposure when securities are held to maturity. For securities that are traded, the mapping between projected losses and realized outcomes also depends on liquidity conditions and transaction prices at the time of sale, introducing measurement noise.

To address this concern, we restrict the sample to CLO–class-buckets with NAIC designations of 1 or 2, corresponding to investment-grade tranches (Huber, Watts, and Zhu, 2026). Secondary market trading in investment-grade CLO tranches is consistently low, typically ranging between 5 and 15 percent annually, reflecting a buy-and-hold investor base (Guggenheim Investments, 2025). The low trading volume in these tranches supports the assumption that projected stress test losses closely approximate the actual risk exposure borne by insurers holding these securities.

Tables 4 and 5 replicate the analysis from Tables 2 and 3 on this restricted sample of 1,369 CLO–class-bucket observations. The results are consistent with our main findings. In

Table 4, PE ownership is not associated with higher expected losses overall, and coefficients are negative and significant in moderate stress scenarios. In Table 5, the decomposition into affiliate and unaffiliated PE holdings reveals the same divergence documented in the full sample. CLO–class-buckets with a higher share held by affiliated PE-owned insurers exhibit significantly worse performance under adverse and tail scenarios. In contrast, a higher share held by unaffiliated PE-owned insurers is either associated with lower expected losses or is statistically insignificant. These results confirm that our main findings are not driven by securities that are likely to be traded prior to maturity.

4.3 Discussion of Findings

Taken together, the evidence documents two related empirical patterns. First, PE-owned insurers pay higher prices when purchasing securities issued by affiliated entities, relative to other investors trading the same security in close temporal proximity. Second, structured products with greater affiliated PE ownership concentration subsequently perform worse in regulatory stress tests. These findings indicate systematic differences in affiliated activity under PE ownership.

Affiliated investments may benefit PE owners, yet overpaying for affiliated assets inflates their book values and thereby increases required regulatory capital. The patterns we document naturally raise the question of why insurers would choose to extract equity through affiliated investments rather than through dividends. To clarify this tradeoff, we develop a simple model of affiliated investment under risk-based capital regulation.

5 A Model of Affiliated Investments and Capital Regulation

This section develops a simple model illustrating how affiliated investments interact with risk-based capital regulation. The model highlights a central tradeoff: overpaying for affiliated assets inflates book value and increases required capital, whereas dividend payouts directly reduce equity and the capital ratio. The relative attractiveness of these two channels therefore depends on the insurer's capital position. We show that affiliated investments become the preferred mode of value extraction when insurers are sufficiently capitalized to avoid immediate intervention, yet close enough to regulatory thresholds that dividends would make capital constraints binding. Consistent with this mechanism, affiliated activity in the data is concentrated among insurers whose capital ratios cluster just above the company action threshold.

Stylized Model

Consider an insurance company with initial equity E_0. The insurer invests in affiliated securities with market value A. The insurer may overpay for these securities by an amount $\Theta \geq 0$, so that their book value of investments equals

$$B = A + \Theta.$$

Any overpayment Θ directly benefits the owner of the insurer, who is affiliated with the security issuer. In addition, the insurer can distribute dividends $D \geq 0$ to its owner.

The insurer is subject to a risk-based capital (RBC) requirement mandating that equity relative to risk-weighted investment assets satisfies:

$$\frac{E}{\omega B} \geq \bar{\kappa} > \underline{\kappa},$$

where the insurer's equity E is equal to beginning equity less any dividend, i.e., $E = E_0 - D$; ω is the regulatory risk weight applied to the *book value* of investments; and $\bar{\kappa}$ is the insurer's internal target capital ratio, which insurers in practice almost always choose to be higher than the regulatory minimum $\underline{\kappa}$ (i.e., $\bar{\kappa} > \underline{\kappa}$).

The owner receives two transfers: the overpayment Θ and dividends D. Although the owner receives $A + \Theta$ for securities, they have to procure the securities at cost A in the first place. Thus, the owner's net surplus, π, is

$$\pi = \Theta + D,$$

where the owner chooses (Θ, D) to maximize surplus subject to the capital constraint.

The two transfers affect the RBC differently:

$$\frac{E}{\omega B} = \begin{cases} \dfrac{E_0}{\omega(A+\Theta)} & \text{if } \Theta > 0 \text{ and } D = 0, \\ \dfrac{E_0 - D}{\omega A} & \text{if } \Theta = 0 \text{ and } D > 0. \end{cases} \tag{5}$$

Equation (5) highlights the trade-off between the two types of transfers. Overpayment in affiliated transactions doesn't affect equity but inflates the book value of investments and leads to higher risk-weighted investment assets. In contrast, dividends don't change risk-weighted investment assets but reduce equity one for one.

The optimal allocation of surplus between dividends and overpayment depends on the marginal capital cost of each channel, as formalized in the following proposition.

PROPOSITION 1. *Suppose the owner solves*

$$\max_{\Theta, D \geq 0} \; \Theta + D \quad s.t. \quad \frac{E_0 - D}{\omega(A+\Theta)} \geq \bar{\kappa}.$$

Then the optimal policy is described as

$$(\Theta^*, D^*) = \begin{cases} (0, 0) & \text{if } \dfrac{E_0}{\omega A} \leq \bar{\kappa}, \\ \left(\dfrac{E_0}{\omega\bar{\kappa}} - A,\, 0\right) & \text{if } \dfrac{E_0}{\omega A} > \bar{\kappa} \text{ and } \bar{\kappa}\omega < 1, \\ (0,\, E_0 - \bar{\kappa}\omega A) & \text{if } \dfrac{E_0}{\omega A} > \bar{\kappa} \text{ and } \bar{\kappa}\omega \geq 1. \end{cases}$$

Proof. The problem is a linear program. □

Thus, when the effective marginal cost of overpayment in terms of capital consumption is low ($\bar{\kappa}\omega < 1$), the owner prefers to extract surplus by overpaying for affiliated securities. When it is high ($\bar{\kappa}\omega \geq 1$), surplus is distributed through dividends instead. If the insurer is initially capital constrained, no payout is feasible.

Empirical Evidence

The model implies that affiliate overpayment is a channel of value extraction only when insurers have intermediate levels of capital slack. Their capital ratios must be sufficiently above regulatory intervention thresholds to avoid immediate discipline, yet close enough that dividend payouts would make capital constraints binding. We examine whether affiliated investments in the data are concentrated among insurers with such capital positions.

We find that affiliated investments are disproportionately undertaken by PE-owned insurers with relatively low RBC ratios. As shown in Figure 5, approximately 90% of affiliated investments in our sample are made by insurers in the second-lowest quartile of the RBC distribution. A RBC ratio below 200% triggers company action requirements under statutory regulation. In our sample, insurers in the second quartile cluster just above this threshold, at about 350% of RBC.

6 Conclusion

This paper studies how PE ownership in insurance reshapes agency conflicts through the use of affiliated transactions. We document a sharp rise in PE ownership and a parallel shift toward structured securities, with affiliated investments highly concentrated among PE-owned insurers. We show that these affiliated transactions are associated with systematic overpayment and worse downside performance, consistent with equity extraction.

We develop a model demonstrating that risk-based capital regulation can alter the channel of equity extraction. When dividends are constrained by regulatory capital, affiliate overpayments become the preferred mechanism for extracting equity. This framework rationalizes the concentration of affiliated activity among insurers with relatively modest capital buffers.

Our findings highlight that ownership structure and regulatory design interact in shaping insurer behavior. Capital rules intended to protect policyholders may create scope for affiliated transactions to widen the gap between reported capital and economic solvency. Understanding this interaction is essential not only for evaluating PE ownership in insurance, but also for assessing how governance and regulation jointly determine risk-taking in financial intermediaries more broadly.

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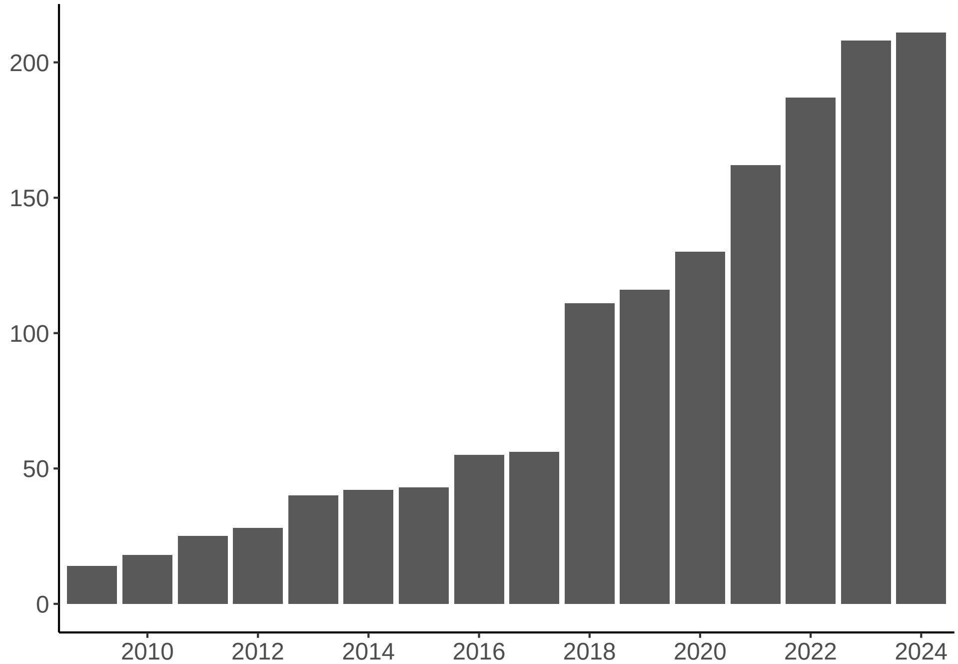
Figure 1: Private Equity Ownership in the Insurance Sector

(a) Number of Insurers



(b) Percent of Total Insurance Assets

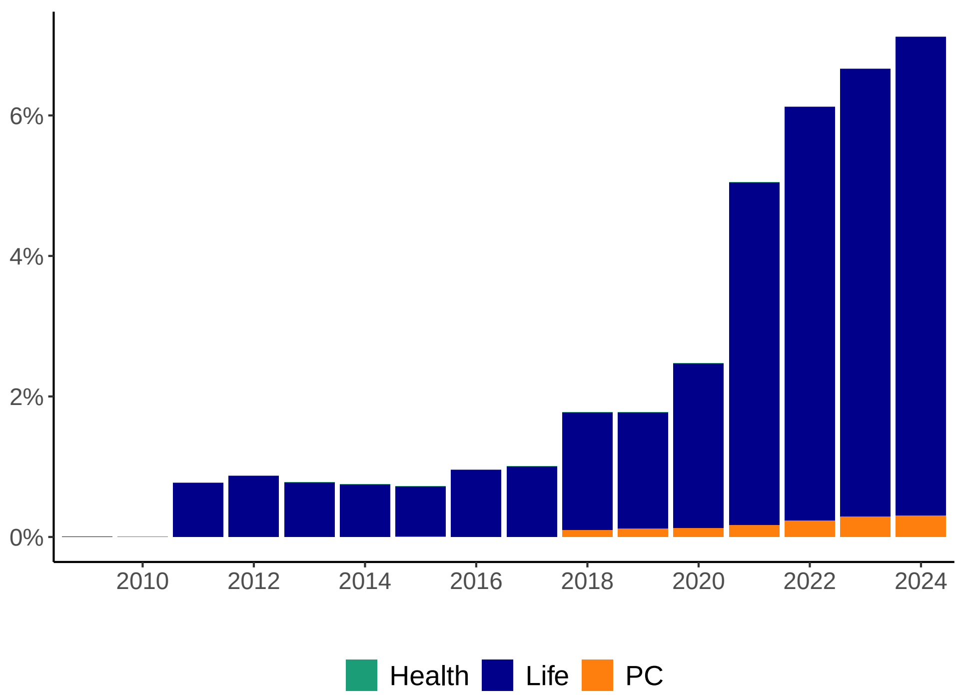


Figure 2: Acquisitions of Structured Security Assets

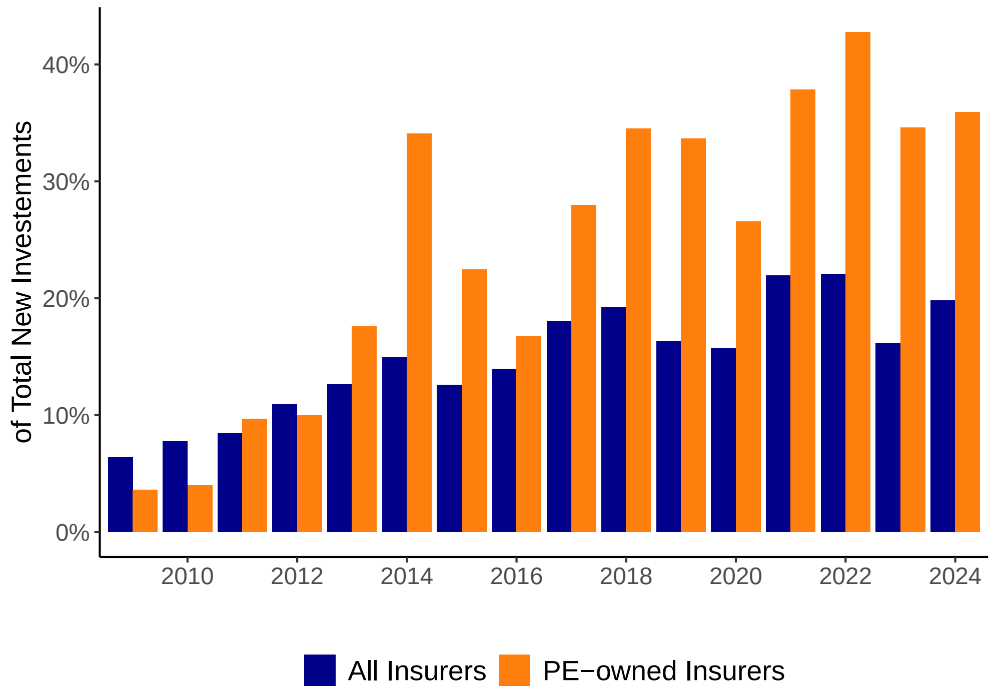


Figure 3: Affiliated Portion of Structured Security Acquisitions

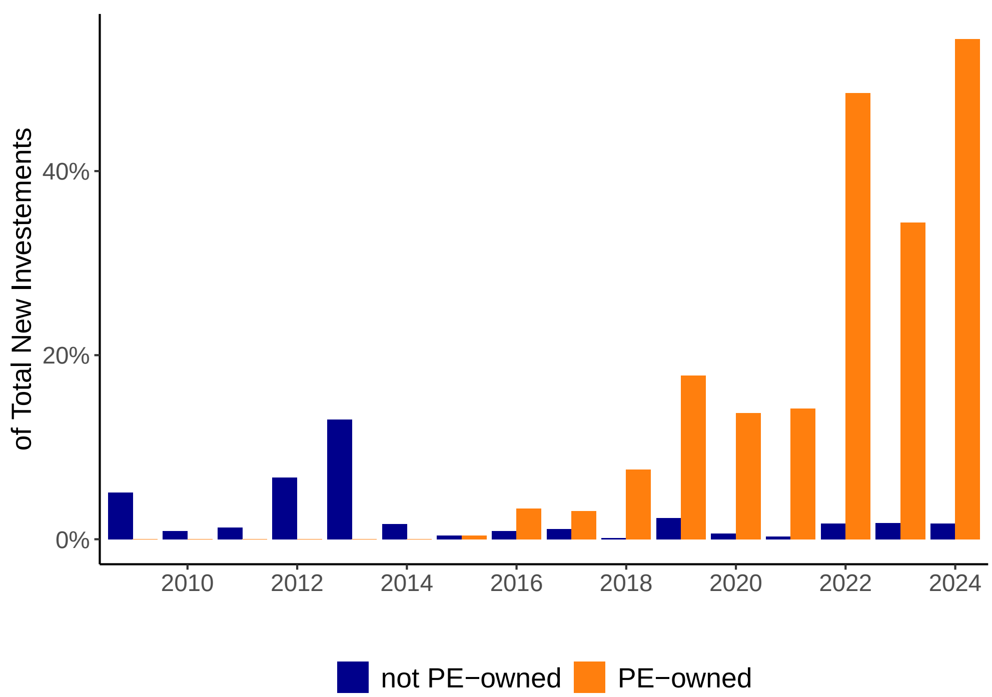


Figure 4: NAIC CLO Stress Test Scenarios

Proposed Scenarios

Scenario	Default	Recovery	Notes	
1	Hist – 2 σ	Hist		
2	Hist – 1 σ	Hist		
3	Hist	Hist		
4	Hist + 1 σ	Hist		
5	Hist + 2 σ	Hist		
6	Hist	Stress		
7	Hist + 1 σ	Stress		The probability for these tail scenarios is expected to be ≤ **2%**
8	Hist + 2 σ	Stress		
9	Hist + 2 σ	[0.75] Stress	Prob ≤ 25 bps	
10	Hist + 2 σ	[0.5] Stress	Prob ≤ 10 bps	

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Figure 5: Distribution of Affiliated Investment by Insurer Capitalization

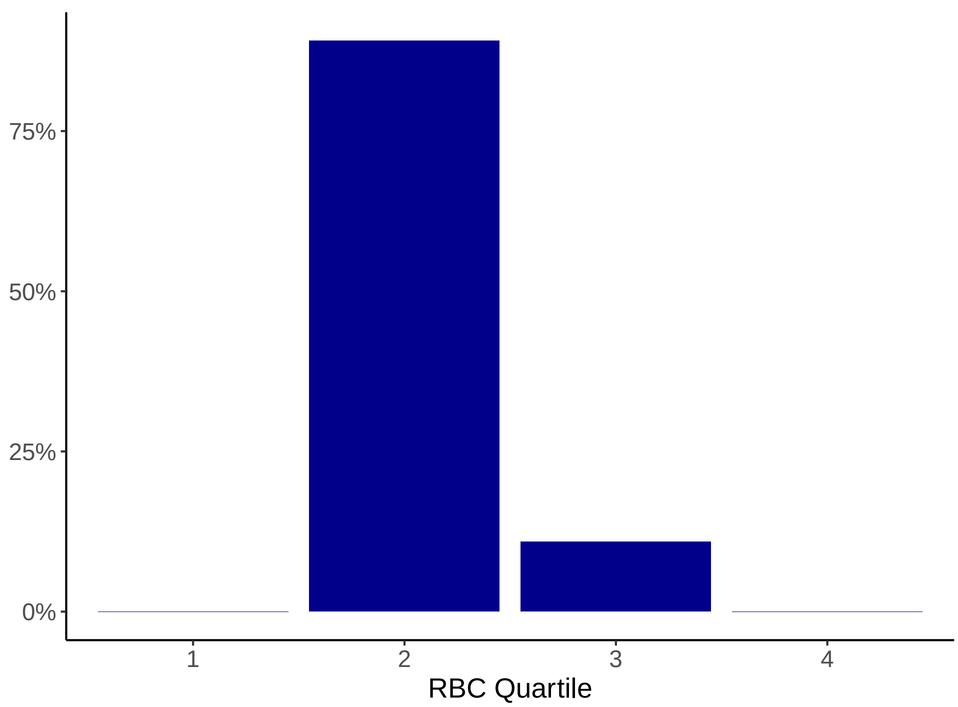

Table 1: Same-day Pricing of Affiliated Investments

Panel A: All Insurers

	Relative Price			
	(1)	(2)	(3)	(4)
Affiliated × PE Owned	0.058***	0.059***	0.060***	0.061***
	(3.679)	(3.726)	(3.934)	(3.973)
Affiliated	-0.009	-0.009	-0.009	-0.009
	(-1.504)	(-1.459)	(-1.466)	(-1.423)
PE Owned	-0.005**	-0.005**	-0.005**	-0.004**
	(-2.366)	(-2.288)	(-2.537)	(-2.468)
Year fixed effects	No	Yes	No	Yes
Insurer fixed effects	No	No	Yes	Yes
Observations	338,986	338,986	338,986	338,986
R^2	0.000	0.000	0.012	0.012

Panel B: Only Life Insurers

	Relative Price			
	(1)	(2)	(3)	(4)
Affiliated × PE Owned	0.059***	0.058***	0.062***	0.061***
	(3.705)	(3.676)	(4.036)	(3.990)
Affiliated	-0.010	-0.009	-0.010	-0.009
	(-1.523)	(-1.460)	(-1.478)	(-1.418)
PE Owned	-0.005**	-0.006**	-0.005**	-0.005**
	(-2.023)	(-2.257)	(-2.178)	(-2.452)
Year fixed effects	No	Yes	No	Yes
Insurer fixed effects	No	No	Yes	Yes
Observations	134,688	134,688	134,688	134,688
R^2	0.000	0.001	0.026	0.026

This table presents regressions examining the relation between the price paid for a structured security relative to the price paid by other insurers for the same security on the same day and whether the transacting insurer is private equity (PE) owned and whether the security is affiliated with the insurer. *Relative Price* is defined as the difference between the focal transaction price and the benchmark price, measured in percentage points of par value. The benchmark price is the par value weighted average price paid on the same day for the same security in transactions by insurers that are not PE-owned. The construction of the benchmark prices is described in Equation (1). *PE Owned* is an indicator variable equal to one if the transacting insurer is owned by a private equity firm at the time of the transaction. *Affiliated* is an indicator variable equal to one if the security is issued by an entity affiliated with the transacting insurer. Panel A reports results for all insurance companies. Panel B restricts the sample to only life insurance companies. We estimate several versions of Equation (2) that differ in the fixed effects specifications used. The transaction sample is described in Section 2. t-statistics based on standard errors clustered by insurer are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 2: CLO Stress Test Losses and PE Ownership

Scenario	PE Measure	Pr(Loss > 0)			Loss Rate		
		β	p	R^2	β	p	R^2
1	PE Owned	−0.004	0.301	0.025	−0.001	0.301	0.025
	PE Share	−0.002	0.309	0.022	−0.000	0.309	0.022
2	PE Owned	0.002	0.695	0.029	0.000	0.795	0.026
	PE Share	−0.002	0.435	0.028	−0.000	0.384	0.026
3	PE Owned	−0.001	0.934	0.289	−0.003	0.651	0.072
	PE Share	−0.002	0.601	0.289	−0.002	0.599	0.072
4	PE Owned	−0.026*	0.091	0.435	−0.006	0.717	0.411
	PE Share	−0.026**	0.027	0.435	−0.022***	0.008	0.412
5	PE Owned	−0.038**	0.045	0.549	−0.037	0.195	0.632
	PE Share	−0.042*	0.052	0.549	−0.059***	0.009	0.632
6	PE Owned	−0.022	0.130	0.467	−0.001	0.936	0.452
	PE Share	−0.019*	0.073	0.466	−0.015**	0.034	0.452
7	PE Owned	−0.043**	0.041	0.556	−0.042	0.146	0.667
	PE Share	−0.039	0.100	0.555	−0.067***	0.009	0.667
8	PE Owned	−0.022	0.195	0.678	−0.079**	0.030	0.722
	PE Share	0.005	0.872	0.678	−0.078*	0.071	0.721
9	PE Owned	0.022	0.180	0.706	−0.023	0.514	0.763
	PE Share	0.033	0.200	0.706	−0.031	0.505	0.764
10	PE Owned	−0.001	0.956	0.701	0.036	0.274	0.784
	PE Share	0.006	0.803	0.701	0.012	0.790	0.784
Class-bucket fixed effects			Yes			Yes	
Issuance year fixed effects			Yes			Yes	
Observations			1,520			1,520	

This table presents regressions examining the relation between projected CLO stress test losses and PE ownership. Each row reports the coefficient from a separate OLS regression of the indicated loss measure on the indicated PE ownership measure for a given stress test scenario. *Pr(Loss > 0)* is an indicator equal to one if the CLO–class-bucket experiences any positive projected loss under that scenario. *Loss Rate* is the projected principal and interest loss as a share of par value under that scenario. *PE Owned* is an indicator variable equal to one if any PE-owned insurer holds the CLO–class-bucket. *PE Share* is the fraction of par value in the CLO–class-bucket held by PE-owned insurers. All specifications include class-bucket and issuance-year fixed effects, as described in Equation (3). The stress test scenarios are summarized in Figure 4. The performance sample is described in Section 2.3. Standard errors are clustered at the CLO deal level. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 3: CLO Stress Test Losses: Affiliate vs. Unaffiliated PE Holdings

		Pr(Loss > 0)					Loss Rate				
		Affiliated		Unaffiliated			Affiliated		Unaffiliated		
Scenario	PE Measure	β	p	β	p	R^2	β	p	β	p	R^2
1	PE Owned	−0.004	0.331	−0.003	0.301	0.024	−0.001	0.331	−0.001	0.301	0.024
	PE Share	−0.005	0.347	−0.002	0.309	0.022	−0.001	0.347	−0.000	0.309	0.022
2	PE Owned	−0.000	0.974	0.002	0.676	0.029	−0.000	0.911	0.000	0.777	0.026
	PE Share	−0.003	0.615	−0.002	0.413	0.028	−0.001	0.594	−0.000	0.358	0.026
3	PE Owned	−0.004	0.550	−0.000	0.956	0.289	−0.001	0.696	−0.003	0.654	0.072
	PE Share	−0.006	0.440	−0.002	0.658	0.289	−0.001	0.712	−0.002	0.604	0.072
4	PE Owned	−0.019	0.109	−0.024	0.103	0.435	−0.004	0.741	−0.005	0.748	0.411
	PE Share	−0.024*	0.064	−0.026**	0.033	0.435	−0.009	0.414	−0.022***	0.008	0.412
5	PE Owned	0.071	0.232	−0.037**	0.048	0.550	−0.015	0.633	−0.035	0.212	0.632
	PE Share	0.148*	0.079	−0.056***	0.010	0.552	0.007	0.860	−0.064***	0.007	0.632
6	PE Owned	−0.020*	0.077	−0.021	0.147	0.467	−0.003	0.790	−0.001	0.969	0.452
	PE Share	−0.023**	0.043	−0.019*	0.092	0.466	−0.007	0.446	−0.015**	0.035	0.452
7	PE Owned	0.135**	0.047	−0.046**	0.030	0.559	0.033	0.446	−0.041	0.150	0.667
	PE Share	0.235***	0.003	−0.060**	0.013	0.560	0.085	0.124	−0.078***	0.003	0.668
8	PE Owned	0.324***	0.000	−0.021	0.228	0.688	0.289**	0.010	−0.081**	0.024	0.725
	PE Share	0.523***	0.000	−0.034	0.208	0.691	0.413***	0.004	−0.115***	0.008	0.725
9	PE Owned	0.267***	0.001	0.020	0.225	0.711	0.406***	0.004	−0.024	0.489	0.768
	PE Share	0.426***	0.000	0.004	0.886	0.713	0.578***	0.000	−0.077*	0.096	0.768
10	PE Owned	0.181***	0.002	−0.001	0.938	0.704	0.428***	0.002	0.034	0.295	0.788
	PE Share	0.242***	0.006	−0.012	0.615	0.704	0.636***	0.000	−0.035	0.436	0.789
Class-bucket fixed effects				Yes					Yes		
Issuance year fixed effects				Yes					Yes		
Observations				1,520					1,520		

This table presents regressions examining whether projected CLO stress test losses differ for holdings by PE-owned insurers that are affiliated with the CLO versus those that are not. Each row reports the coefficients from a separate OLS regression of the indicated loss measure on both affiliated and unaffiliated PE ownership measures simultaneously for a given stress test scenario. *Pr(Loss > 0)* is an indicator equal to one if the CLO–class-bucket experiences any positive projected loss under that scenario. *Loss Rate* is the projected principal and interest loss as a share of par value under that scenario. *Affiliated PE* measures are based on holdings by PE-owned insurers for whom the CLO is a related-party investment (e.g., when the PE parent serves as the CLO's manager). *Unaffiliated PE* measures are based on holdings by PE-owned insurers with no such affiliation to the CLO. Both *PE Owned* (indicator) and *PE Share* (continuous) are defined as in Table 2. All specifications include CLO class-bucket and CLO issuance-year fixed effects, as described in Equation (4). The stress test scenarios are summarized in Figure 4. The performance sample is described in Section 2.3. Standard errors are clustered at the CLO deal level. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 4: CLO Stress Test Losses and PE Ownership (NAIC 1 & 2)

		Pr(Loss > 0)			Loss Rate		
Scenario	PE Measure	β	p	R^2	β	p	R^2
1	PE Owned						
	PE Share						
2	PE Owned						
	PE Share						
3	PE Owned	−0.002	0.511	0.017	−0.001	0.339	0.013
	PE Share	−0.000	0.887	0.016	−0.001	0.381	0.012
4	PE Owned	−0.005	0.465	0.037	−0.009	0.220	0.030
	PE Share	−0.003	0.623	0.036	−0.006	0.173	0.028
5	PE Owned	−0.023	0.225	0.284	−0.025	0.148	0.257
	PE Share	−0.033*	0.092	0.285	−0.033**	0.026	0.257
6	PE Owned	−0.005	0.491	0.057	−0.004	0.215	0.042
	PE Share	−0.005	0.383	0.057	−0.004*	0.083	0.041
7	PE Owned	−0.037	0.104	0.375	−0.031	0.129	0.332
	PE Share	−0.032	0.170	0.374	−0.044**	0.020	0.333
8	PE Owned	−0.015	0.426	0.631	−0.078**	0.034	0.624
	PE Share	0.010	0.734	0.631	−0.058	0.159	0.623
9	PE Owned	0.031	0.100	0.680	−0.017	0.646	0.714
	PE Share	0.036	0.180	0.680	−0.014	0.773	0.714
10	PE Owned	0.002	0.937	0.683	0.042	0.214	0.756
	PE Share	0.008	0.762	0.683	0.024	0.607	0.756
Class-bucket fixed effects			Yes			Yes	
Issuance year fixed effects			Yes			Yes	
Observations			1,369			1,369	

This table presents regressions examining the relation between projected CLO stress test losses and PE ownership, restricting the sample to CLO–class-buckets with NAIC designations of 1 or 2. Each row reports the coefficient from a separate OLS regression of the indicated loss measure on the indicated PE ownership measure for a given stress test scenario. *Pr(Loss > 0)* is an indicator equal to one if the CLO–class-bucket experiences any positive projected loss under that scenario. *Loss Rate* is the projected principal and interest loss as a share of par value under that scenario. *PE Owned* is an indicator variable equal to one if any PE-owned insurer holds the CLO–class-bucket. *PE Share* is the fraction of par value in the CLO–class-bucket held by PE-owned insurers. All specifications include class-bucket and issuance-year fixed effects, as described in Equation (3). The stress test scenarios are summarized in Figure 4. The performance sample is described in Section 2.3. Standard errors are clustered at the CLO deal level. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01. Scenarios 1 and 2 exhibit zero projected losses for all investment-grade tranches; hence, no estimates are reported for these scenarios.

Table 5: CLO Stress Test Losses: Affiliate vs. Unaffiliated PE Holdings (NAIC 1 & 2)

		Pr(Loss > 0)					Loss Rate				
		Affiliated		Unaffiliated			Affiliated		Unaffiliated		
Scenario	PE Measure	β	p	β	p	R^2	β	p	β	p	R^2
1	PE Owned										
	PE Share										
2	PE Owned										
	PE Share										
3	PE Owned	−0.004	0.217	−0.002	0.558	0.017	−0.001	0.285	−0.001	0.344	0.013
	PE Share	−0.005	0.309	−0.000	0.998	0.016	−0.001	0.290	−0.001	0.396	0.012
4	PE Owned	−0.009	0.100	−0.005	0.510	0.037	−0.006	0.171	−0.008	0.228	0.030
	PE Share	−0.008	0.225	−0.003	0.691	0.036	−0.004	0.227	−0.006	0.186	0.028
5	PE Owned	0.068	0.251	−0.023	0.234	0.286	−0.010	0.705	−0.023	0.162	0.257
	PE Share	0.143*	0.088	−0.047**	0.015	0.290	0.019	0.614	−0.037**	0.016	0.258
6	PE Owned	−0.008	0.164	−0.004	0.545	0.057	−0.004	0.114	−0.004	0.234	0.042
	PE Share	−0.007	0.294	−0.005	0.432	0.057	−0.003	0.189	−0.004	0.101	0.041
7	PE Owned	0.129*	0.060	−0.040*	0.078	0.380	0.034	0.411	−0.030	0.129	0.333
	PE Share	0.230***	0.004	−0.053**	0.022	0.382	0.092*	0.093	−0.055***	0.004	0.336
8	PE Owned	0.328***	0.000	−0.014	0.478	0.642	0.279**	0.014	−0.080**	0.028	0.628
	PE Share	0.528***	0.000	−0.032	0.264	0.646	0.408***	0.005	−0.096**	0.020	0.628
9	PE Owned	0.269***	0.001	0.029	0.130	0.686	0.402***	0.004	−0.018	0.621	0.719
	PE Share	0.425***	0.000	0.005	0.850	0.688	0.575***	0.001	−0.061	0.184	0.720
10	PE Owned	0.179***	0.002	0.001	0.946	0.686	0.424***	0.002	0.040	0.236	0.761
	PE Share	0.239***	0.006	−0.011	0.648	0.686	0.632***	0.000	−0.025	0.569	0.762
Class-bucket fixed effects				Yes					Yes		
Issuance year fixed effects				Yes					Yes		
Observations				1,369					1,369		

This table presents regressions examining whether projected CLO stress test losses differ for holdings by PE-owned insurers that are affiliated with the CLO versus those that are not, restricting the sample to CLO–class-buckets with NAIC designations of 1 or 2. Each row reports the coefficients from a separate OLS regression that includes both affiliate and unaffiliated PE ownership measures as explanatory variables, estimated separately for each stress test scenario. *Pr(Loss > 0)* is an indicator equal to one if the CLO–class-bucket experiences any positive projected loss under that scenario. *Loss Rate* is the projected principal and interest loss as a share of par value under that scenario. *Affiliated PE* measures are based on holdings by PE-owned insurers for whom the CLO is a related-party investment (e.g., when the PE parent serves as the CLO's manager). *Unaffiliated PE* measures are based on holdings by PE-owned insurers with no such affiliation to the CLO. Both *PE Owned* (indicator) and *PE Share* (continuous) are defined as in Table 2. All specifications include CLO class-bucket and CLO issuance-year fixed effects, as described in Equation (4). The stress test scenarios are summarized in Figure 4. The performance sample is described in Section 2.3. Standard errors are clustered at the CLO deal level. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01. Scenarios 1 and 2 exhibit zero projected losses for all investment-grade tranches; hence, no estimates are reported for these scenarios.