Poison Bonds*

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Abstract

This paper documents the rise of "poison bonds"—corporate bonds that allow bondholders to demand immediate repayment in a change-of-control event. The share of poison bonds among new issues has grown substantially in recent years, from below 20% in the 1990s to over 60% since the mid-2000s, predominantly driven by investment-grade issues. We show that a key factor behind this rise is the pervasive shareholder aversion to poison pills, leading firms to issue poison bonds as an alternative. Moreover, our analysis suggests that this practice potentially entrenches incumbent managers and destroys shareholder value. Holding a portfolio of firms that remove poison pills but promptly issue poison bonds results in negative abnormal returns of −7.3% per year. Our findings have important implications for the agency theory of debt: (i) more debt may not discipline the management; and (ii) even without financial distress, managerial entrenchment can lead to agency conflicts between shareholders and creditors.

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"In some cases, managers can sign complete explicit contracts that entrench them, [...] Recently, several bonds have been issued with covenants requiring full repayment if the firm is acquired. Such covenants are likely to entrench incumbent managers."

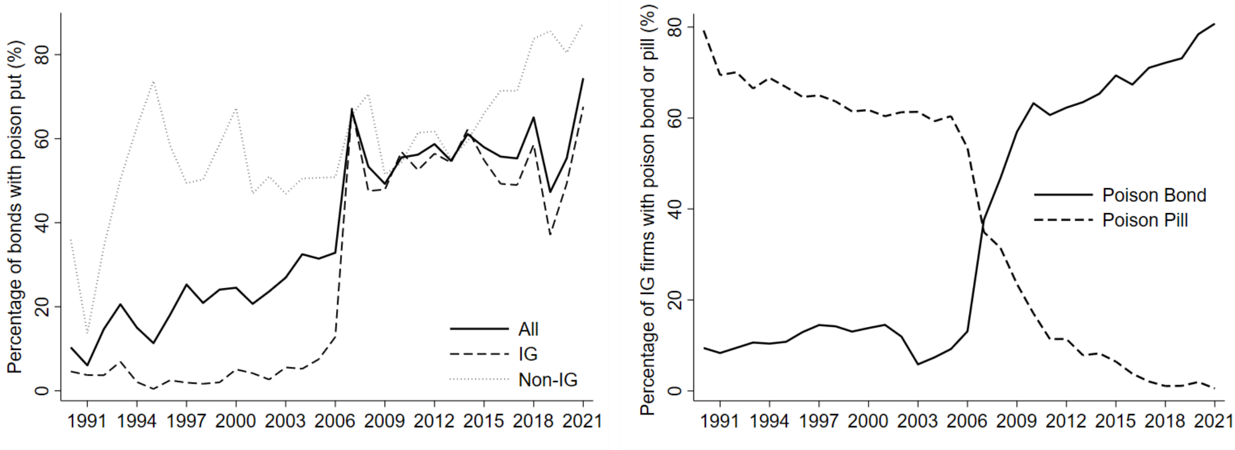
Shleifer and Vishny (1989, p. 132)

1 Introduction

Corporate bonds with a poison put covenant, which we refer to as "poison bonds", first appeared during the hostile takeover wave in the 1980s. A poison put grants bondholders the right to demand *immediate* repayment of the bond in a change-of-control event. While originally designed to protect bondholders from potential wealth loss following leveraged buyouts, this covenant soon became an effective takeover defense strategy, primarily used by high-yield issuers in the 1980s and 1990s (Billett, Jiang, and Lie, 2010). However, a significant shift occurred in the mid-2000s. As shown in panel (a) of Figure 1, the fraction of poison bonds among new issues increased substantially around 2005, predominantly driven by investment-grade (IG) issues. Before 2005, poison bonds accounted for less than 10% of new IG issues, but after 2005, they represented over 60% of new issues. This paper aims to investigate the causes behind this trend and examine its impact on shareholder value.

Figure 1: The rise of poison bonds and the fall of poison pills

This figure highlights our main findings. Panel (a) plots the percentage of new bond issues with poison put covenants from 1990 to 2021, using all CRSP-Compustat-Mergent matched issuers (excluding financials and utilities). We differentiate between IG bonds (dashed) and non-IG (high-yield or not rated) bonds (dotted). Panel (b) plots the percentage of firms with poison bonds outstanding and the percentage with poison pills (dashed) from 1990 to 2021, using all IG firms with ISS governance data.



(a) Popularity of poison bonds **(b)** IG firms with poison bonds or poison pills

We show that this recent rise of poison bonds is largely driven by the persistent pressure on firms to eliminate poison pills over the last two decades. Poison pills are widely acknowledged as one of the most effective strategies to deter unsolicited takeover bids (Coates, 2000). A large body of literature suggests that managers adopt poison pills to entrench themselves and engage in actions that destroy shareholder value (e.g., Bebchuk, Cohen, and Ferrell, 2008; Cremers and Ferrell, 2014). This view has fueled a longstanding aversion to poison pills among institutional investors, leading to increasing pressure on large public companies to remove them since the mid-2000s. In particular, on December 8th 2004, one of the most influential proxy advisory firms, Institutional Investor Service (ISS), announced that it would recommend its clients to "withhold" or vote "against" the entire board of directors at companies that adopt or renew a poison pill plan without shareholder approval. Following these governance efforts by proxy advisors, shareholders, and other stakeholders, the use of poison pills among large firms decreased significantly from 55% in 2004 to just 2% in 2021 (Karpoff and Wittry, 2023).

We link the rise of poison bonds to the fall of poison pills. In panel (b) of Figure 1, we plot the trends in the percentage of IG firms with poison bonds and poison pills from 1990 to 2021. A striking mirror-image pattern emerges from these two trends, indicating a strong negative correlation between the use of poison bonds and poison pills. Especially during the timeframe of 2004-2010, when the percentage of IG firms with poison pills plummeted from 59% to 17%, the percentage of IG firms with at least one outstanding poison bond rose sharply from 7% in 2004 to 63% in 2010. This pattern is also evident, though less pronounced, among non-IG firms (see Section 3).

Our formal empirical analysis confirms the patterns observed in Figure 1, showing a significant negative association between poison bonds and poison pills. Our tests control for a rich set of firm characteristics, industry × year fixed effects, and firm fixed effects. We also explicitly control for the presence of the other five anti-takeover provisions from Bebchuk et al. (2008), as well as whether the company is incorporated in a state that permits the adoption of poison pills, commonly known as "shadow pills" (Karpoff and Wittry, 2018; Cain, McKeon, and Solomon, 2017). As such, our finding cannot be explained by macroeconomic or industry-wide shocks (e.g., LBO waves), observable firm characteristics, or unobserved time-invariant firm-specific factors that might influence poison bond issuance decisions.

To further sharpen the causal interpretation of the link between poison bonds and poison pills, we employ a regression discontinuity design (RDD) that exploits voting outcomes in the narrow interval around the majority threshold, which generates a plausibly exogenous variation in poison pill adoption and removal. Using 506 proposals related to poison pills from ISS Voting Analytics and Factset between 2005 and 2021, we find that voting against poison pills significantly increases the likelihood of poison bond issuance. At the majority threshold, passing a proposal to remove a poison pill (or stop a pill adoption) increases the likelihood of the firm issuing a poison bond in the following year from 0% to 12.5%. Further robustness analysis shows that the effect is mostly driven by IG firms and becomes even larger when we narrow the bandwidth.

It is worth clarifying that we are not arguing that firms with poison bonds will *never* use poison pills again, especially given the prevalence of "shadow pills". However, the strong aversion among shareholders makes the adoption of poison pills very costly. For example, there is evidence of directors facing worse labor market outcomes following pill adoptions (Johnson, Karpoff, and Wittry, 2023). Our findings support the notion that firms avoid using poison pills by exploring alternative takeover defenses, leading to the growing popularity of poison bonds.

Having established the link between poison pills and poison bonds, we proceed to investigate who push for the use of poison puts. While the common belief is that poison puts are *exclusively* demanded by bondholders to protect their interests, our analysis supports a more mixed view by showing the complementary influence of managerial incentives. Specifically, we observe that the likelihood of new bond issues using poison put is lower when the CEO approaches retirement at age 64 or 65, but higher when the CEO is younger than 50 or older than 70. This challenges the "bondholder-only" view, as bondholders would demand poison puts more if the CEO approaches retirement, given the higher likelihood of being acquired for retirement-age CEOs (Jenter and Lewellen, 2015). The evidence rather suggests that retirement-age CEOs are less incentivized to use poison puts as a takeover defense, while young CEOs are more incentivized to do so. Moreover, we find that firms replacing poison pills with poison bonds incur higher financing costs, with a 33 basis points higher offering yield. The higher yields stand in sharp contrast to the lower yields typically associated with issues featuring poison puts, suggesting that managers who issue poison bonds to replace poison pills may try to entrench themselves. Consequently, they need to compensate bondholders for the increased managerial agency costs.

How does this practice of issuing poison bonds to replace poison pills affect shareholder value? In the short-term, we find that poison bonds are associated with 0.26% lower stock returns than non-poison bonds over the 7-day event window around the issuance date. If the firm has recently removed a poison pill, shareholders lose an additional 0.62%. Notably, this negative shareholder reaction only shows up for issues after 2005. In the long-term, a portfolio strategy that holds firms issuing poison bonds after removing poison pills earns negative abnormal returns ranging from -5.1% to -7.3% per year, suggesting a significant destruction of shareholder value.

Finally, we show that the likelihood of firms announcing large and diversified takeovers increases significantly with poison bond issues. These takeovers often result in negative announcement returns, implying that they may serve the self-interests of managers rather than being optimal investment decisions for shareholders. Moreover, our results also become much more significant if we focus on firms that replace their poison pills with poison bonds. These findings are consistent with the notion that poison bonds enable entrenched managers to engage in empire building.

Overall, we provide evidence that the pressure to eliminate poison pills had led firms to issue poison bonds as an alternative. This practice has the potential to entrench incumbent managers and destroy shareholder value.

To our knowledge, we are the first to document this rise of poison bonds since mid-2000s and study the underlying causes and consequences. This paper differs from the limited body of literature on poison bonds that has primarily focused on issues before 2000 and on aspects such as pricing, wealth effects, and the effectiveness of deterring takeovers. Moreover, in contrast to prior research, which mainly supports the view that poison put covenants result from efficient contracting between shareholders and bondholders, our findings suggest that managers have incentives to use poison puts for entrenchment (Shleifer and Vishny, 1989). A more detailed discussion of the existing literature can be found in Section 2.

More importantly, we shed some new light on the agency costs and benefits associated with debt. The existing literature tends to study agency conflicts between shareholders and managers independently of those between shareholders and creditors. Regarding the shareholder-manager agency problems, the main view is that more debt can help discipline the managers by mitigating the free cash flow problems. However, our findings suggest that this agency benefit may be limited if managers can use debt covenants to entrench themselves.

Regarding the shareholder-creditor agency conflicts, excessive leverage increases the likelihood of financial distress, leading to problems such as debt overhang and risk-shifting. However, we show that a debt covenant such as poison put, initially designed to mitigate shareholder-creditor agency conflicts, could be used by managers for entrenchment, thereby exacerbating shareholder-manager agency problems and destroying shareholder value. Thus, even when firms are not financially distressed, agency conflicts between shareholders and creditors can still arise due to entrenched managers.

Our paper further contributes to the long-dated debate surrounding the impact of anti-takeover provisions on shareholder value (e.g., Catan, 2019; Cremers and Ferrell, 2014; Cremers et al., 2016). Existing literature in this area has largely overlooked the possibility that managers can employ debt covenants as a means of entrenchment, effectively compensating for the absence of other anti-takeover provisions. More specifically, our findings highlight the importance of controlling for the use of poison bonds when examining the relationship between poison pills and shareholder value. Not accounting for poison bonds may lead to biased conclusions. This is also related to the literature on interactions of governance mechanisms (e.g., Cremers and Nair, 2005; Cremers et al., 2007). In contrast to previous studies documenting that event risk covenants can substitute for other governance mechanisms and thereby reduce shareholder-creditor conflicts, we show that the substitution of poison bonds for poison pills may exacerbate the shareholder-manager conflicts.

The remainder of the paper is organized as follows. Section 2 provides the institutional background of poison bonds and surveys the related literature. Section 3 describes the data and time trends in poison bonds. Section 4 presents empirical evidence of the strong link between poison bonds and poison pills. Section 5 examines the value impacts of replacing poison pills with poison bonds. Section 6 shows the effects of poison bonds on empire building. Section 7 concludes.

2 Institutional background and literature review

2.1 The origin of poison bond

Corporate bonds with poison put covenants, which we term as poison bonds, first emerged from the wave of leveraged buyouts (LBOs) in the 1980s. From 1977 to 1986, the estimated gains during M&As for target firms' shareholders was $ 923 billion (in 2022 dollars) (Jensen, 1988), while bondholders often suffer significant losses (McDaniel, 1988; Asquith and Wizman, 1990). For example, in the famous LBO of RJR Nabisco, the loss of bondholders is estimated to be $1 billion. One innovation to protect bondholders against wealth transfer risk during LBOs is to include a so-called "poison put" covenant, which allows bondholders to "put" the bonds back to the issuers at face value or a slight premium (usually 1%) in case of change-of-control events (Wall Street Journal, 1986; Clemens, 1987). Change-of-control (CoC) events are typically those causing significant ownership changes, typically including scenarios such as (hostile) takeovers, bankruptcies, liquidations, and proxy contest where shareholders gain control of the board of directors.

Since 1986, bondholders started to demand "poison put" covenants in new bond issues, which became popular very quickly. While only 2.6% of the 198 new corporate bond issues in 1986 included poison puts, 32.1% of the 327 corporate bonds issued in 1989 were poison bonds. Note that this trend was mostly driven by non-investment-grade (IG) bonds, with more than 71% of the new non-IG issues being poison bonds (Lehn and Poulsen, 1991). This trend continued into the '90s. As shown by Nash, Netter, and Poulsen (2003), in a sample of around 500 corporate bond issues in 1996, 66.2% of the non-IG issues were poison bonds (only 6.3% of the IG bonds).

2.2 Why do firms use poison put covenants?

The existing literature offers two rationales for the use of poison put covenants. The first rationale follows from the agency theory of debt covenant (e.g., Jensen and Meckling, 1976; Myers, 1977; Smith and Warner, 1979). According to this view, poison put covenants result from efficient contracting between shareholders and bondholders. Their purpose is to limit the potential wealth transfer from creditors to shareholders in CoC events, reducing agency costs of debt ex-ante.[1]

The second rationale is related to managerial entrenchment and proposed by Shleifer and Vishny (1989). This view suggests that managers issue poison bonds to entrench themselves. By granting bondholders the right to demand full repayment in CoC events through poison put covenants, the cost of acquiring a firm significantly increases. This makes firms with poison bonds less attractive as takeover targets, protecting incompetent managers from potential turnovers in CoC events. As the takeover market is a crucial external governance mechanism to discipline managers, the lower takeover probability reduces the pressure on managers to act in the best interest of shareholders. Therefore, while poison put covenants protect bondholders, they are detrimental to shareholders.

The limited empirical literature on poison bonds almost exclusively supports the "efficient contracting" view. The first studies on poison bonds are Crabbe (1991) and Lehn and Poulsen (1991). Using a sample of 72 long-term bond issuance from November 1988 to December 1989, with 40% being poison bonds, Crabbe (1991) finds that, on average, poison bonds have 20 to 30 basis points (bps) lower interest rates than regular bonds. Lehn and Poulsen (1991) find that over 30% of corporate bonds issued in 1989 included event-risk covenants, particularly poison put, especially for firms expected to be takeover targets. These findings suggest that poison puts protect bondholders from potential event risk associated with LBOs and consequently reduces the cost of debt.

Bae, Klein, and Padmaraj (1994) examine a sample of 226 bonds issued between 1982

[1]In particular, the increased leverage following LBOs can exacerbate the shareholder-creditor agency conflicts. This higher leverage may lead shareholders to engage in risk-shifting. Bondholders may also suffer from debt overhang, when highly leveraged firms underinvest in positive NPV projects.

and 1990, of which 37% are poison bonds. They show that poison bond issuers earn a more positive abnormal stock return upon announcement compared to regular bond issuers, and the result is mainly driven by firms with higher agency costs of debt. Nanda and Yun (1996), focusing on convertible bond issuance between 1987 to 1992, find that convertible poison bonds benefit shareholders more than regular convertible bonds, especially for firms facing takeover threats. Further research by Nash, Netter, and Poulsen (2003) analyze a sample of 496 bonds issued by 310 firms between 1989 and 1996, and show evidence that the purpose of issuing poison puts in the 90's is to protect bondholders from the takeover-caused distress event without blocking a takeover transaction that benefits shareholders. More recently, Bereskin and Bowers (2015) study a sample of bond issues from 1990 to 2012 and reach a similar conclusion that poison bonds are the result of efficient contracting practices.

The only empirical study that provides some evidence supporting the "managerial entrenchment" view is Cook and Easterwood (1994). Using a small sample of bond issues of public firms between 1988 and 1989, they find that the issuance of poison bonds is associated with negative returns for shareholders but positive returns for existing bondholders. The authors interpret this finding as evidence that poison put protects both managers and bondholders at the expense of shareholders. However, one can argue that their finding may solely result from bondholders demanding poison puts for protection, which costs shareholders but is unrelated to managerial decisions. In contrast, our paper provides direct evidence showing that the recent use of poison bonds is not only driven by bondholders, but also influenced by managerial entrenchment incentives.

2.3 Anti-takeover effects of poison bonds

Some more recent studies have investigated whether poison bonds can effectively deter M&A attempts. Hege and Hennessy (2010) propose that poison bonds serve as an optimal strategy for incumbent firms aiming to discourage entry-driven M&As while maintaining lower leverage. Billett et al. (2010) use a sample of M&A activities spanning from 1991 to 2006, and find compelling evidence that poison bonds are not only effective in deterring LBO attempts but also effective in deterring non-LBO takeover attempts. These findings gain further support from the work of Akdogu, Paukowits, and Celikyurt (2023), who extend the sample up to 2015 and still find that poison put covenants reduce the likelihood of a firm becoming a takeover target.[2] We corroborate the results of these prior studies using our sample. As shown in Appendix Table A1, firms with more outstanding poison bonds are indeed less likely

[2] Akdogu et al. (2023) also document that all other restrictive covenants actually increase the probability of a company becoming a takeover target.

to become a takeover target.

2.4 The fall of poison pills since the mid-2000s

Why do poison pills start to disappear around 2005, which led firms to issue poison bonds as an alternative? Poison pills, arguably the most powerful anti-takeover provision (Catan and Kahan, 2016), have been widely adopted since the 1980s to help target firms to deter hostile takeovers or negotiate better deals for target firms' shareholders. However, one side effect is that it also entrenches incumbent directors and managers and makes them hard to replace when needed. Nevertheless, since early 2000s, public firms have started to get rid of poison pills. As shown in Bab and Neenan (2011), more than 2,200 firms had poison pills in effect in 2001, whereas less than 900 had them in 2011. Similarly, in the Davis Polk 2011 survey of the top 50 IPOs from 2009 to 2011 in the US, no firm had a poison pill plan.

One important reason for the decline of poison pills is the pressure from institutional investors that follow the voting recommendation of proxy advisory firms. On December 8th 2004, one of the most influential proxy advisory firms, the Institutional Investor Service (ISS), currently RiskMetrics Group, announced that it would recommend its clients to "withhold" or vote "against" the entire board of directors (except for new directors) at companies that adopt or renew a poison pill plan that was not subject to a shareholder vote (Choi et al., 2010; Catan, 2019). [3]

Since 2005, the number of firms dropping (or stop renewing) poison pills has increased significantly (Catan, 2019). Following the proxy advisors' continued push for governance reforms (Cremers et al., 2016), the percentage of IRRC-covered firms with poison pill provisions decreased from 55% in 2004 to 1.8% in 2021 (Karpoff and Wittry, 2023).

2.5 Debt contracting

Most of the existing literature focuses on how debt contracts are designed to mitigate the conflict of interest between shareholders and creditors, where managers are considered to be perfect agents for shareholders. However, when managers are self-interested, there could exist a three-way conflict of interest between bondholders, shareholders, and managers (Chava et al., 2009). One scenario could be that the interests of managers and bondholders are

[3]Long-term Vice Chancellor and Delaware Court of Chancery Strine (2005) describe the power of the ISS as "powerful CEOs come on bended knee to Rockville, Maryland, where ISS resides, to persuade the managers of ISS of the merits of their views about issues like proposed mergers, executive compensation, and poison pills. They do so because the CEOs recognize that some institutional investors will simply follow ISS's advice rather than do any thinking of their own." For other empirical analyses on the proxy advisor's influence, see, for example, (Cremers et al., 2016; Malenko and Shen, 2016; Brav et al., forthcoming).

aligned, collectively against shareholders. To our knowledge, our paper is the first to provide causal evidence of how incumbent managers can use a debt contract for entrenchment, which coincidentally protect bondholders but destroy shareholder value. The study closest to ours is Akins et al. (2020), which examines the change of management restriction (CMR) clauses in private loans. This clause could potentially entrench managers. However, their finding shows that the seemly manager-friendly contract only protects lenders instead of entrenching managers. Our paper differs from theirs in two other aspects: First, poison bonds are now much more widely held among US-listed firms than firms with CMR loans. Second, the poison bond has the potential to entrench the whole board of directors and all senior managers, rather than just the CEO.

3 Data and trends

3.1 Sample construction

We obtain data from various sources. First, we obtain data on corporate bond issues between January 1990 and August 2021 from the Mergent FISD database. We follow Choi, Hoseinzade, Shin, and Tehranian (2020) to exclude convertible, foreign currency, and variable rate bonds, and include bonds when their Mergent FISD bond type code is CCOV, CDEB, CLOC, CMTN, CMTZ, CP, CPAS, CPIK, or CS. We further drop bonds issued by firms from the financial industry (SIC code between 6000 to 6999) or the utility industry (SIC code between 4900 to 4999). We identify poison bonds as bonds with a Change Control Put provision. These filters yield 18,040 corporate bond issues, of which 10,937 (60.6%) are poison bonds. Panel (a) of Figure 1 is based on this sample.

Next, we match this bond sample with issuing firms' characteristics from the CRSP-Compustat merged database. We follow Manconi, Massa, and Zhang (2015) to first create a unique matchbook of 6-digit NCUSIP-PERMCO-StartDate-EndDate from the CRSP's dsenames dataset. We match bonds to corresponding Compustat firms using the NCUSIP-PERMCO links. From all matched bonds, we can use their Mergent FISD Parent_id to create a Parent_id-PERMCO-StartDate-EndDate matchbook with unique Parent_id-PERMCO pairs. We then assign the same PERMCO to bonds with the same Parent_id and match again to include bonds issued by subsidiaries.

For all matched bonds, we further merge them with corporate governance data. For the governance data, we first follow Coles et al. (2014) to match the ISS Governance data with CRSP-Compustat merged data, and then follow Giroud and Mueller (2011) to fill in the missing governance legacy data before 2007 using the latest available year.[4] This matching restricts our sample to S&P 1500 firms and leaves us with a final bond sample of 13,534 corporate bond issues, of which 5,046 (37.3%) are poison bonds.

Finally, we aggregate the bond issues and construct a firm-year panel dataset of 22,309 observations from 1,484 unique firms. Our sample essentially includes S&P 1500 firms that have ISS Governance data and have ever issued a bond between 1990 and 2021. Panel (b) of Figure 1 is based on the investment-grade (IG) firms in this sample.

[Table 1 about here.]

Table I reports the summary statistics of the main variables used in our analyses. Detailed variable definitions are given in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Overall, the distribution of bond and firm characteristics in our sample is similar to that in previous studies using the same data sources.

3.2 Trends of poison bonds

Recall Figure 1 in Section 1. Panel (a) depicts the percentage of new corporate bond issues with poison put covenant over time. The high percentage of non-IG issues with poison put throughout our sample period is in line with the existing literature on poison bonds as bondholders of non-IG issues use poison put to protect themselves from potential wealth transfer during a leveraged takeover. Before 2005, poison put provisions were rarely used among IG issues. However, their popularity rose sharply during 2006-07, from below 10% to over 60%. Likewise, panel (b) of Figure 1 shows a substantial increase in the percentage of IG firms with poison bonds after 2005. By the end of our sample period in 2021, 81% of IG firms have at least one poison bond outstanding. We find a similar but less pronounced pattern for non-IG firms, as shown in panel (a) of Figure 2.

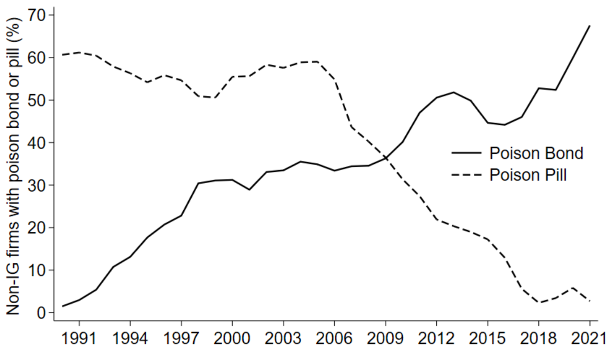
Panel (b)-(d) of Figure 2 illustrate the increase in both the average number and size of outstanding poison bonds across firms over time. In Panel (b), it is evident that the average number of poison bonds per firm remains below 1 until 2008 but reaches almost 3 in 2021. This upward trend is even more pronounced for IG firms, starting from nearly 0 until 2006 and growing sharply to almost 5 in 2021.

Moving to Panel (c), we observe a similar growth in the total amount of poison bonds relative to all bonds across firms. Initially, this ratio was below 20%, mostly driven by non-IG firms. However, it has surged to nearly 80% in 2021. When we scale the total amount

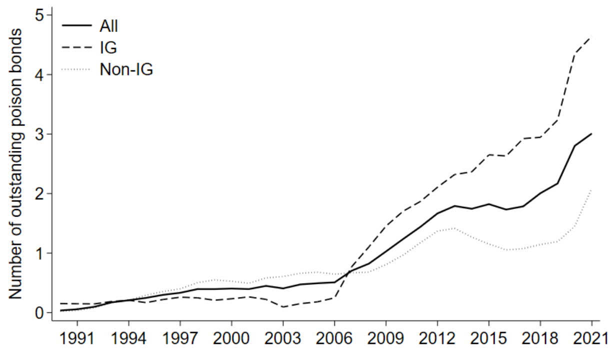
[4] Some recent studies suggest that the ISS data on anti-takeover provisions may contain certain data errors. Nevertheless, the data on poion pills exhibit minimal errors. For example, Karthaus, Meyerinck, and Schmid (2021) report a correlation of 98% between the ISS data and their corrected data for poison pills.

Figure 2: Trends of poison bonds

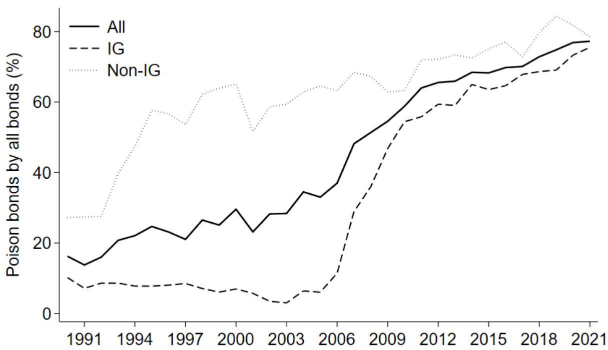
This figure depicts time trends of poison bonds between 1990 and 2021. Panel (a) plots the percentage of firms with poison bond outstanding and the percentage with poison pills (dashed), using all non-investment-grade firms with ISS governance data. Panel (b) plots the average number of outstanding poison bonds among our sample firms. Panel (c) plots the average total amount of outstanding poison bonds (scaled by the total amount of all outstanding bonds), and panel (d) plots the average total amount of outstanding poison bonds (scaled by total assets). In panels (b)-(d), we also differentiate between investment-grade bonds (dashed) and non-IG (high-yield or not rated) bonds (dotted).



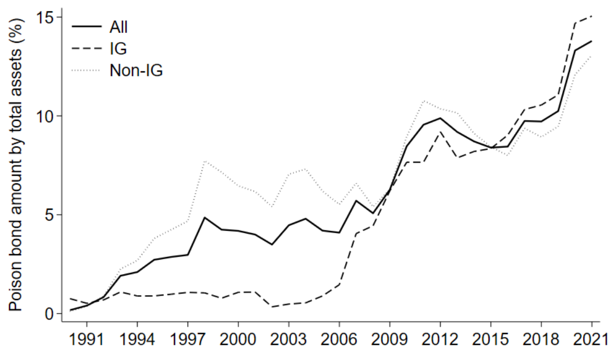
(a) Non-IG firms with poison bonds or pills



(b) Number of poison bonds



(c) Size of poison bonds (by all bonds)

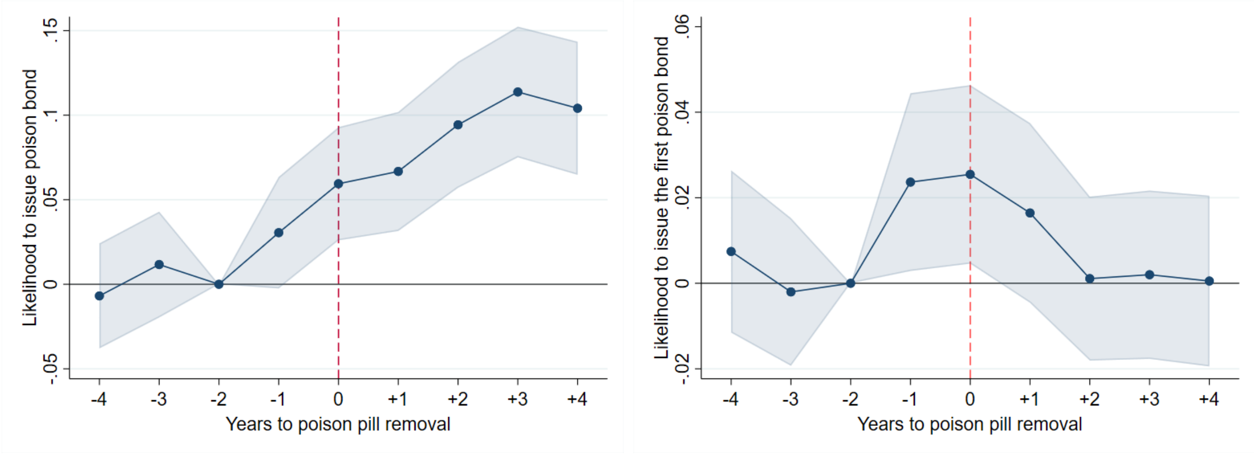


(d) Size of poison bonds (by total assets)

of poison bonds outstanding by firm's total assets in panel (d), we find that poison bonds accounted for less than 5% of total assets before 2005. This ratio also experienced a rapid increase after 2006 and exceeded 13% in 2021.

Figure 3: Likelihood of poison bond issuance around poison pill removal

This figure focuses on firms that have removed their poison pill between 1990 and 2021. Panel (a) plots the changes in likelihood of firms issuing a poison bond in the 9 years around the poison pill removal. Panel (b) plots the changes in likelihood of firms issuing a poison bond for the first time in the 9 years around the poison pill removal. Event year 0 is the year of pill removal when the poison pill is present in the previous year but no longer in the current year for a given firm. All values represent changes relative to event year -2 and the shaded areas represent the 90% confidence intervals based on standard errors clustered by firm.



(a) All poison bond issuance

(b) First-time poison bond issuance

4 Poison bond and poison pill

4.1 Univariate analysis

We start by presenting the univariate analysis of the relationship between poison bonds and poison pills. Figure 3 plots the changes in the likelihood of poison bond issuance during the years surrounding the removal of poison pills. Event year 0 is the year of pill removal when the poison pill is present in the previous year but no longer in the current year for a given firm. Panel (a) presents the likelihood of all poison bond issues and shows a pronounced and statistically significant increase in poison bond issuance starting from one year prior to the removal of poison pills (event year -1) to continuing up to four years after the removal. Compared to event year -2 and earlier years, we observe a 6% increase in the likelihood of firms issuing a poison bond in the same year when firms remove poison pills. This increase becomes even larger, reaching a 10 pp by the fourth year following the removal. Panel (b) additionally examines the likelihood of firms' first-time poison bond issue and also shows a significant increase by about 2.5% during the three years surrounding the poison pill removal year. These patterns suggest a clear association between poison pill removal and poison bond issuance.

Nevertheless, we have also found significant differences between poison bonds and regular bonds across various firm and bond characteristics (see Appendix Table A2). Issuers of poison bonds tend to be smaller in size and have higher market-to-market and leverage ratios, but lower industry-adjusted ROA and tangibility. In addition, poison bond issues on average are larger in size and have shorter maturities and lower coupon rates. Notably, almost all poison bonds are callable (96%), allowing the firm to call back the bonds, for example, in case of a favorable takeover bid. These differences underscore the importance of controlling for firm and bond characteristics when analyzing the relationship between poison bonds and poison pills.

4.2 Panel regression analyses

To provide further insights into the determinants of poison bond issuance, we estimate firm-year panel regressions where the dependent variable is a poison bond issuance indicator. We use linear probability models that include both industry $\times$ year and firm fixed effects, which allow us to compare firms within the same industry at the same time and control for unobserved heterogeneity across firms. As such, any time-varying industry-wide shocks or time-invariant firm-specific factors cannot drive our results. Our models additionally control for firm size, market-to-book, leverage, industry-adjusted ROA, and tangibility. Standard errors are double clustered by firm and year.

[Table 2 about here.]

In Table II, we begin by examining whether the trend observed in Figure 1 persists after accounting for fixed effects and other relevant firm characteristics. In column (1), we regress the poison bond issuance indicator on a dummy variable indicating investment-grade (IG) firms and its interaction with another dummy variable indicating observations after 2005. The coefficient estimate for the interaction term is 0.233 ($t = 9.5$), whereas that for the IG dummy variable is -0.055 ($t = 4.2$). These estimates imply that, while IG firms are generally less likely to issue poison bonds compared to non-IG firms, the probability of IG firms issuing poison bonds has increased nearly ninefold since 2005, from 2% before 2005 to about 18% ($= 0.233 - 0.055$).

One potential concern is that this result is driven by the risky firms just above the IG cutoff who are prospective fallen angels and therefore need to include poison put covenants just like non-IG firms. We address this concern by further dividing IG firms into BBB, A, and AAA-AA rated firms in column (2) and interact the corresponding dummy variables with the post 2005 indicator. As is shown, the interaction terms with A and BBB rating dummies are statistically highly significant ($t > 6.5$) and similar in economic magnitude. This shows that the increase in poison bond issuance is not only due to BBB-rated firms, but also to A-rated firms. However, this trend does not extend to AAA- or AA-rated firms, as indicated by the small and insignificant coefficients associated with the AAA-AA dummy variables. This finding is not surprising, given that these firms are typically in excellent financial conditions and run by competent managers, making them less attractive as potential takeover targets.

In column (3), we formally test the link between poison pills and poison bond issuance. We find that the coefficient on the poison pill dummy variable is significantly negative ($t = -2.8$), implying that firms are less likely to issue a poison bond when they have a poison pill in effect. In column (4), we additionally interact the poison pill dummy with the IG dummy and find that the negative relationship between poison pill adoption and poison bond issuance is predominately driven by IG firms. Importantly, the coefficient estimates imply that if an IG firm has a poison pill in place, the likelihood of issuing poison bonds would not increase at all ($0.001 = 0.018 - 0.122 + 0.105$).

It is worth noting that in both columns, we account for the presence of the other five anti-takeover provisions from Bebchuk et al. (2008), as well as whether the company is incorporated in a state that permits the adoption of poison pills, commonly known as "shadow pills". As such, we control for the potential impact of other anti-takeover provisions and the presence of shadow pills on our findings.

Finally, in columns (5) and (6), we reestimate the specification from column (1) and column (4) respectively, but with a different dependent variable which is one if a firm issues any bond in a given year. Unlike the findings for poison bond issuance, we find no significant effect on the interaction term between the post 2005 dummy and the IG dummy in column (5), nor any significant impact of poison pills on bond issuance. These results imply that the patterns we have observed and the influence of poison pills are not attributable to firms' likelihood of issuing bonds or their financing requirements. Instead, it suggests that the observed effects are exclusively driven by poison bond issues.

4.3 Regression discontinuity design

Our results in Table II provide strong evidence supporting the notion that firms issue poison bonds as a means to replace poison pills. Nevertheless, we acknowledge that the decision of firms to adopt or remove poison pills is not random. Therefore, one may still have endogeneity concerns about the potential influence of *unobserved time-varying* factors that could simultaneously affect firms' decisions on poison pill adoption and poison bond issuance.

To sharpen the causal interpretation of the link between poison pills and poison bonds, we employ a regression discontinuity design (RDD) using the proposals related to poison pills voted at annual meetings of S&P 1500 firms between 2005 and 2021. We exploit the vote outcomes in a narrow interval around the majority threshold, which creates a discontinuity in the likelihood of removing poison pills (e.g., Cuñat et al., 2020). From ISS Voting Analytics and Factset, we obtain 506 poison pill related proposals sponsored by either shareholders or management in 330 firms, with 393 proposals to either remove existing poison pills or to make the adoption of a future poison pill more difficult. The remaining 113 proposals in 97 firms are to adopt a new poison pill or to ease a future adoption, for which we use the vote share against these proposals. We define the % vote against poison pill as $Votes\ For/(Votes\ For + Votes\ Against)$ for the proposals against poison pills and $Votes\ Against/(Votes\ For + Votes\ Against)$ for the proposals supporting poison pills.[5]

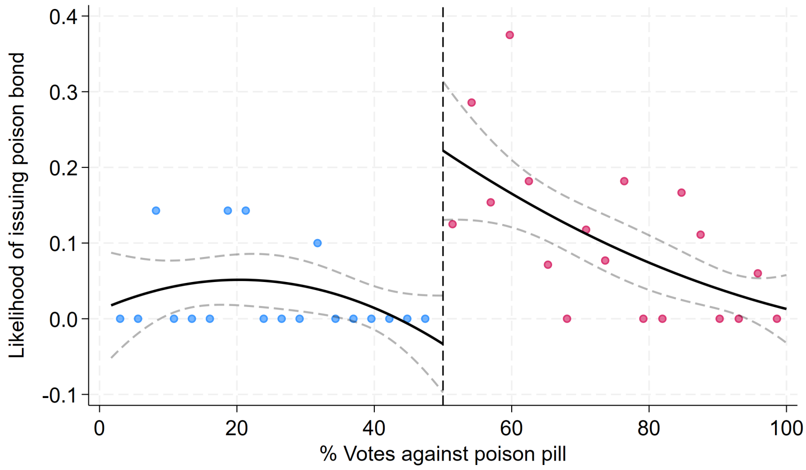
Before presenting the RDD results, we run a series of tests to confirm the validity of this setting. First, we show that the distribution of the frequency of votes is continuous around the discontinuity. A significant jump in density to either side of the majority threshold would indicate a strategic voting behavior, and the continuity assumption would be violated (Bach and Metzger, 2018). Panel (a) of Figure A1 in the Appendix shows an overall smooth distribution of votes, especially around the majority threshold. The left-skewed distribution of votes suggests that the majority of shareholders vote against poison pill adoption after 2005. Second, we follow McCrary (2008) to check if there is evidence of systematic manipulation of the vote outcomes around the majority threshold. The test result (t–statistic is -0.357 with a p-value of 0.721) shows no statistical evidence of systematic manipulation of the running variable. Third, we implement the manipulation testing procedures using the local polynomial density estimators proposed in Cattaneo et al. (2020) and plot the graphical results with valid confidence bands in panel (b) of Figure A1. Again, we find no statistical difference at the threshold.

We now present the estimated effect of passing a proposal against poison pills at the annual meeting on the likelihood of issuing a poison bond during the the subsequent year. We begin by presenting the graphical evidence in Figure 4, where we plot the poison bond issuance likelihood in each vote share bin together with local quadratic fitted lines and corresponding 90% confidence intervals on both sides of the majority threshold. The plot shows a sharp jump in poison bond issuance around the majority threshold. The likelihood of firms issuing a poison bond increases from 0% to 12.5% as soon as the votes against poison pill adoption passes the majority threshold. This increase around the threshold is also

[5]For example, if a proposal supporting poison pill does not pass as 49% voted "For" and 51% voted "Against" to adopt a new poison pill, we treat this vote outcome as "Pass" by 51% against the poison pill. We have also removed few proposals where the requirement is above 50%.

Figure 4: Regression discontinuity design of voting outcomes

This figure plots the average likelihood of poison bond issuance around the vote share cutoff. The x-axis plots the forcing variable, the vote shares against poison pill adoption. For the proposals to remove existing poison pills or to make the adoption of a future poison pill more difficult, we use the vote share in support of these proposals. For the proposals to adopt a new poison pill, we use the vote share against these proposals. The y-axis shows the likelihood that the firm issues a poison bond in the year following the voting day within each vote share bin. The black lines represents local quadratic fit on both sides of the cutoff, and the dashed lines represent the corresponding 90% confidence intervals.



statistically significant.

Table III presents regression estimates of the effect at the discontinuity shown in panel (b) of Figure 4 using three different estimation methods. Columns (1) to (4) report results for the nonparametric test, which is essentially a means test of the poison bond issuance likelihood, estimated on an increasingly narrow interval of votes around the majority threshold. Columns (5) and (6) report the regression discontinuity estimates using polynomial controls of order two and three, respectively. Columns (7) report the estimate based on Calonico et al. (2014) where we run local regressions on an optimal bandwidth around the discontinuity. Columns (8) replicates the specification of column (7) using votes adjusted for abstentions. We follow Cuñat et al. (2020) to compute $Votes\ For/(Votes\ For + Votes\ Against + Abstentions)$ in cases in which the firm or state rules determine that the cast votes include abstentions. In all columns, we control for year fixed effects and cluster the standard errors by firm.

[Table 3 about here.]

In column (1), the differential likelihood of poison bond issuance of the vote is 13.1 percentage points (pp) using the optimal bandwidth following Imbens and Kalyanaraman (2012). This effect increases to 19.3-25.6 pp in the narrower intervals of votes and is substantially larger for IG firms. Using the specifications in columns (5) and (7), this effect ranges from 18.2 pp to 24.2 pp. The effect remains similar when we use votes adjusted for abstentions in column (8). These effects are all statistically significant and sizable in economic magnitude when compared with the average yearly poison bond issuance likelihood of 21.1% between 2005 and 2021 in our baseline sample.

In summary, the RDD results indicate that the pressure from shareholders to remove poison pills since mid-2000s has a significant impact on poison bond issuance even after addressing concerns regarding the endogeneity of poison pill adoptions.

4.4 Does managerial incentive affect the use of poison put?

After establishing the causal link between poison pills and poison bonds, we now investigate whether managerial incentives affect the use of poison put in bond issues.

With the removal of poison pills increasing the likelihood of firms becoming takeover targets, bondholders are incentivized to use poison put covenants. While takeovers generally enhance value for target shareholders, target bondholders may be concerned about the priority of their claims in such events, as takeovers often involve debt restructuring and acquirers may prioritize the repayment of their own debt. Consequently, when firms remove poison pills, bondholders may demand poison puts to secure better protection against potential change-of-control events. This view is widely acknowledged and supported by numerous anecdotes in the media.[6]

On the other hand, managers may also be incentivized to use poison puts. As shareholders push for the termination of poison pills, managers exploring alternatives to entrench themselves may turn to poison puts as a defense against hostile takeovers. It is important to note that this channel does not conflict with the bondholder demand channel; instead, both channels can complement each other and jointly drive the recent rise of poison bonds. However, the key question is: do managers actually play a role, or is the rise of poison bonds *exclusively* driven by bondholders seeking protection? We now provide evidence supporting the role of managerial incentives.

[Table 4 about here.]

Other ATPs First, when firms still have other effective takeover deterrents besides poison pills, bondholders may be less concerned about potential takeovers and therefore less likely to

[6] See, for instance, "Bondholders seek protection from LBOs" in the Financial Times (https://www.ft.com/content/ab1410bc-b9dd-11da-9d02-0000779e2340) and "Investors demand LBO protection in US bonds" on Reuters (https://www.reuters.com/article/idUSL1N0BM4G8).

demand poison put covenants. On the contrary, the presence of other anti-takeover provisions often suggests poor governance practices that facilitate managerial entrenchment. These entrenched managers may be incentivized to use poison puts as an alternative to poison pills. Therefore, if only bondholders demand poison puts for protection, we would observe a negative association between the use of poison put and the presence of other anti-takeover provisions. If entrenched managers use poison puts, we would observe a positive association.

We test this prediction in columns (1) and (2) of Table IV. We use bond issue level data and a linear probability model where we regress a dummy variable indicating whether a bond issue includes a poison put on the presence of the five provisions other than the poison pill in the "E-index" from Bebchuk et al. (2008). We also interact the other E-provisions with a post-2005 dummy in column (1) and with an IG issue dummy in column (2). In all specifications, we control for bond characteristics such as maturity, coupon, issue size, callable dummy, and all other bond covenants available in Mergent, and the same set of firm characteristics as in Table II but with a one-year lag. We include industry and year fixed effects, and cluster the standard errors by firm.

The estimates in column (1) show a significant positive relationship between the other E-provisions and the likelihood of including a poison put after 2005, which is entirely absent before 2005. Each additional anti-takeover provision increases the likelihood of including a poison put in a bond issue by 5.4 pp. In column (2), we again observe that this positive correlation is exclusively driven by IG firms. These results do not align with an exclusive bondholder demand channel but rather support the managerial entrenchment channel.

CEO Age Second, we test whether the CEO's age affects the use of poison puts. Jenter and Lewellen (2015) show a sharp increase in the likelihood of a firm being acquired as its CEO approaches retirement at age 65.[7] For younger CEOs, being acquired usually implies an (involuntary) early retirement, motivating them to block deals. This implies that young CEOs are more incentivized to use poison puts as a takeover defense, while retirement-age CEOs are less incentivized to do so. On the contrary, bondholders are more likely to demand poison puts when the CEO approaches retirement (higher takeover risk) than when the CEO is younger (lower takeover risk). Therefore, the "bondholder-only" channel predicts a positive association between the use of poison put and retiring CEOs, while the managerial entrenchment channel predicts a negative association.

In columns (3) and (4) of Table IV, we estimate the same models from columns (1)-(2) and

[7] In Appendix E, we find a very similar pattern as shown by Jenter and Lewellen (2015). The CEO departure rates during the period 1992-2021 are the lowest among young CEOs, spike at the age 64 and 65, and then decreases again thereafter.

use a dummy variable that equals one if the issuing firm's CEO is close to retirement (with age 64 or 65). This retirement-age dummy is interacted with the post-2005 dummy in column (3) and with the IG dummy in column (4). We also explicitly control for CEO age and its quadratic term. The estimates in column (3) show a significant negative relationship between the retirement-age and the use of poison put after 2005, which is insignificant positive before 2005. This negative effect is again entirely driven by IG firms, as shown in column (4). The estimates imply that retirement-age CEOs reduce the likelihood of using poison put by 8.8 pp after 2005 and by 9.5 pp for IG issues, consistent with the notion that near-retirement CEOs have less entrenchment incentives to defend takeovers.

Moreover, in columns (5) and (6) of Table IV, we replace the retirement-age dummy variable by another dummy variable that equals one if the CEO's age is below 51 or above 69. Such CEOs have a lower departure probability and may have more entrenchment incentives. Correspondingly, the estimates in column (5) show a significant positive relationship between this age dummy and the use of poison put post-2005, in contrast to an insignificant negative correlation before 2005. This positive effect is again primarily observed among IG firms, as shown in column (6). The estimates suggest that CEOs younger than 50 and older than 70 increase the likelihood of using poison put by 8.3 pp after 2005 and by 5.4 pp for IG issues, consistent with the idea that such CEOs tend to use poison puts for entrenchment.

Thus, the evidence from CEO age once again challenges the "bondholder-only" view and supports the notion of managerial entrenchment as an important factor behind the rise of poison bonds.

Offering Yield Third, the "bondholder-only" view predicts a lower offering yield for poison bonds, as bondholders trade-off returns for additional protection from poison put covenants. On the contrary, the managerial entrenchment channel predicts a higher offering yield for poison bonds, as managers need to compensate bondholders for potential losses due to increased agency risks such as empire-building.

In Table V, we report the regression results where the dependent variable is the yield-to-maturity at the time of bond issuance. The main explanatory variables of interest are the two dummy variables respectively indicating whether a bond is issued with a poison put covenant and whether the issuing firm has removed a poison pill during the year prior to the bond issue. To account for the yield differences across rating categories, we control for rating × year fixed effects. We also control for industry fixed effects and other bond and firm characteristics as in previous analyses. The standard errors are clustered by bond.

[Table 5 about here.]

Column (1) shows that a poison put covenant is associated with a 11 bps ($t = 2.9$) reduction in offering yield, in comparison to a similar bond within the same rating category. This suggests that issuers of poison bonds enjoy lower financing costs, as bondholders are willing to accept lower yields in exchange for the protection against potential future change of control event. However, according to the estimates in column (2), this cost advantage completely disappears if the poison bond issuers have recently removed their poison pill. In fact, their financing costs increase significantly, with their bonds carrying a 33 bps ($= -0.12+0.45$) higher yield. These results remain consistent in column (3) when we additionally control for all other bond covenants.

Furthermore, we observe clear differential effects when we divide the bond issues into two subperiode, before and after 2005, in columns (4) and (5), respectively. Before 2005, when the majority of firms still have poison pills in place, poison bonds enjoy a substantial yield advantage of 81 bps ($t = -5$). After 2005, when firms tend to issue poison bonds after removing poison pills, the yield advantage of poison bonds goes down to a modest 14 bps and even turns into a 41 bps ($= -0.14 + 0.55$) disadvantage when associated with a pill removal.[8]

These findings suggest that poison puts add value to bondholders and thereby lower firms' financing costs. However, when firms use poison bonds as a substitute for poison pills, they do not enjoy this benefit. Instead, they actually face higher financing costs. This higher cost is evidence that managers use poison bonds as a substitute for poison pills to entrench themselves and need to compensate bondholders for the increased managerial agency costs.

Take together, the results in this section lend support to the idea that the recent rise of poison bonds is *not only* driven by bondholders seeking protection from change-of-control events, *but also* influenced by managerial incentives, likely for entrenchment.

5 Impact on shareholder value

In the previous section, we have documented that the pressure from shareholders to eliminate poison pills has led firms to issue poison bonds as a substitute. In this section, we examine how this practice affects shareholder value.

[8] In Appendix F, we examine the reaction of existing bondholders to new bond issues with and without poison puts. Our findings suggest that, while bondholders dislike new issues in general, their reaction is more negative to issues with poison puts, especially among those already holding poison bonds. Our interpretation is that, for those bondholders, the new poison bond issues do not provide any additional protection against leveraged takeovers but rather increase managerial agency costs.

5.1 Abnormal stock returns around poison bond issuance

Table VI presents results for short-term effects around the bond issuance date. In all columns, the dependent variable is the cumulative abnormal returns (CARs) calculated using the Fama-French and Carhart four-factor model and measured over a $[-3, +3]$ event window around the bond issuance dates. The main explanatory variables of interest are two dummy variables respectively indicating whether a bond is issued with a poison put covenant and whether the issuing firm has removed a poison pill during the year prior to the bond issue. We control for industry and year fixed effects and the same set of bond and firm characteristics as in Table IV. The standard errors are clustered by bond.

[Table 6 about here.]

Column (1) of Table VI shows that the issuance of bonds with poison put covenants is associated with a 0.26 percentage points (pp) lower abnormal stock return. Column (2) highlights that shareholders lose an additional 0.62 pp ($= 1.27 - 0.65$) if the poison bond issuer has just recently removed its poison pill. When we further control for all other bond covenants in column (3), we find a slightly diminished coefficient estimate for the standalone poison put indicator, which falls just short of statistical significance. Nevertheless, the estimate of its interaction term with the pill removal dummy remains large and statistically significant.

Moreover, since the likelihood of poison bond issuance changes significantly after 2005, we divide the bond issues into two subperiods in columns (4) and (5) of Table VI, before and after 2005, respectively. We find that the interaction effect between poison put issuance and poison pill removal is negligible before 2005 and only highly significant after 2005. The estimates in column (5) suggest that while pill removal increases shareholder value, issuing a poison bond completely erases this benefit and further destroys value.

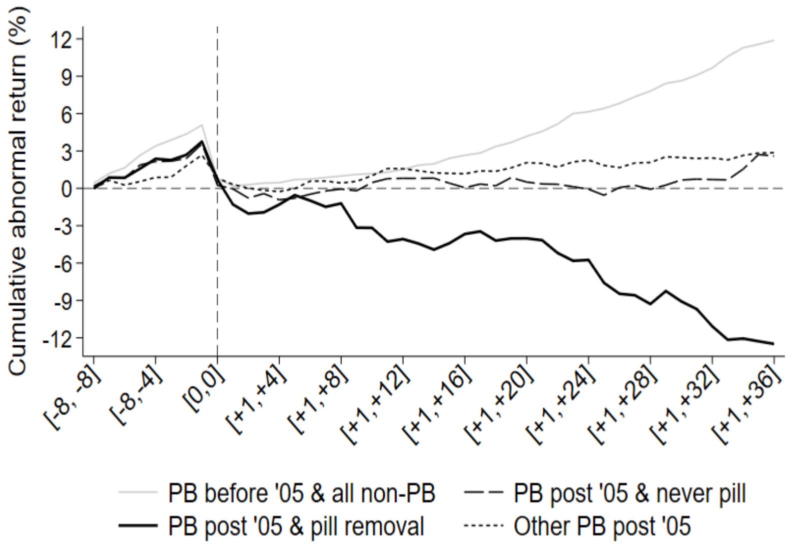
5.2 Long-run effects

If not all information is yet incorporated in the stock price around the bond issue date, or if more shareholders learn to know the adverse effects of poison bonds only gradually, we might expect negative long-run abnormal returns for firms that issue poison bonds just to replace poison pills.

Following prior work such as Peyer and Vermaelen (2009) and Kempf, Manconi, and Spalt (2017), we analyze long-run returns by using the Fama and French (1993) and Carhart (1997) four-factor model combined with Ibbotson's (1975) returns across time and security (IRATS) methodology. We first split the bond issues into four samples: (i) poison bonds issued before

Figure 5: Stock performance after bond issuance

This figure plots the cumulative abnormal returns of bond issuers' stocks over different event windows for four subgroups: (i) poison bonds issued before 2005 and all bond without poison put covenants; (ii) poison bonds issued after 2005 by firms that have never had any poison pills; (iii) poison bonds issued after 2005 and within one year after a poison pill removal; and (iv) all other poison bonds issued after 2005. Monthly abnormal returns are estimated using Ibbotson's (1975) returns across time and security (IRATS) method combined with the Fama-French and Carhart four-factor model for each event month (0 is the month of bond issue).



2005 and all bond without poison put covenants issued between 1990 and 2021[9]; (ii) poison bonds issued after 2005 by firms that have never had any poison pills; (iii) poison bonds issued after 2005 and within one year after the issuer has removed a poison pill; and (iv) all other poison bonds issued after 2005. We consider long-run abnormal returns from 8 months before and 36 months after each bond issue date. We then run the following cross-sectional regression for each subsample j ($j = 1, 2, 3$) and each event month τ ($\tau = -8, \ldots, 36$):

$$(R^j_{i,t} - RF_t) = \alpha^j_\tau + \beta^j_{1,\tau}(MKT_t - RF_t) + \beta^j_{2,\tau}SMB_t + \beta^j_{3,\tau}HML_t + \beta^j_{4,\tau}MOM_t + \varepsilon_{i,t},$$

where $R^j_{i,t}$ is the monthly return on stock i of subsample j in the calendar month t corresponding to event month τ. RF_t, MKT_t, SMB_t, HML_t, and MOM_t are the risk-free rate, market returns, size, book-to-market, and momentum factors in the calendar month t corresponding to event month τ, respectively. The cumulative returns are sums of the intercept estimates $\widehat{\alpha}^j_\tau$ over the relevant event-time window for each subsample j.

Figure 5 presents the results. While all four groups exhibit a downward trend right

[9]We group them together as they trend very similarly in the data.

after the bond issuance, it is clear that only the post-2005 poison bond issuers who had recently rescinded their poison pills experience substantially negative abnormal returns over the subsequent 36 months. Over this 3-year period, the cumulative abnormal risk-adjusted return for this particular group is -12.8%, which is a sizable value loss for their shareholders. In contrast, the other groups, especially the non-poison bond issuers and poison bonds issuers before 2005, recover swiftly within a year and start to trend upwards. The difference is also statistically highly significant for most event months after the first year. Moreover, the figure also shows that there is little sign of a difference before the bond issue. This pre-trend reinforces a causal interpretation of our findings.

5.3 Portfolio approach

An alternative approach to examine the long-run value impacts of poison bond issues is by constructing a portfolio with the following strategy. At the end of June of each year t from 2007 to 2021, we identify firms among all S&P 1500 firms (excluding financials and utilities) that have issued a poison bond and removed their poison pills during the past year, i.e., between June of year $t-1$ and June of year t. If the stocks of these firms are not yet in our portfolio, we include them and hold them for two years, i.e., from July of year t to June of year $t+2$. The cumulative equally-weighted monthly returns of this portfolio are plotted in panel (b) of Figure 6, along with the cumulative returns of the S&P 500 index. The significant underperformance of this portfolio relative to the market is very clear. Holding this portfolio from July 2007 to December 2021 yields a cumulative return of 78.8%, whereas holding the market over the same period generates a cumulative return of 275.5%, a difference in returns of nearly 200 pp.

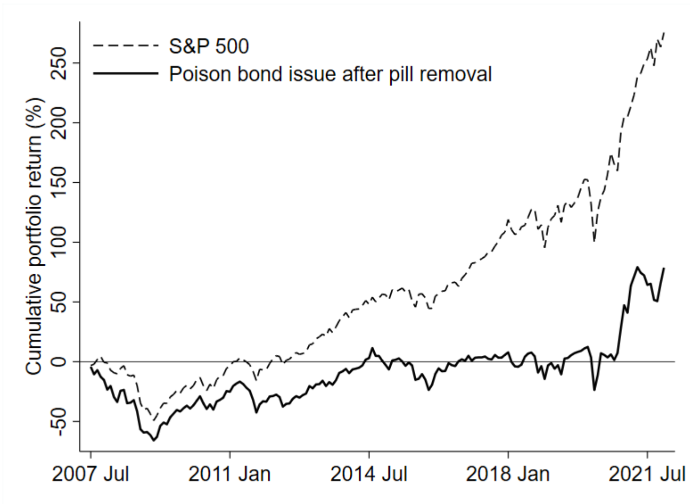
Table VII presents the portfolio alpha estimated using different risk factor models: CAPM, Fama and French (1993) three-factor model, Carhart (1997) four-factor model, and Fama and French (2015) five-factor model (FF3 + profitability factor (RMW) + investment factor (CMA)). As is shown, across different risk models, the alphas are all negative and statistically significant. The monthly abnormal returns range from -0.43% (t = 2.5) to -0.61% (t = 3) per month, or roughly -5.1% to -7.3% abnormal returns per year.

[Table 7 about here.]

As our holding period includes two of the largest crsis periods in our time, the 2008-09 financial crisis and the 2020 COVID-19 pandamic, a natural concern is whether these crises drive the underperformance of our portfolio. To mitigate this concern, we reestimate the alpha using each factor model where we exclude the crisis periods by focusing on 2010 July

Figure 6: Impact on long-term shareholder value: portfolio approach

This figure plots the cumulative monthly returns of a portfolio that holds stocks of firms that issue poison bond soon after removing their poison pills. This portfolio is rebalanced every year and each stock is held for two years. We also plot the cumulative monthly returns of the S&P 500 index alongside as a benchmark.



to 2020 February. Our results only become stronger. Across all risk models, the monthly alphas are more negative and statistically more significant, ranging from -0.57% ($t = 3.1$) to -0.75% ($t = 3.8$) per month, or -6.8% to -9% per year.

Overall, we find strong evidence that when firms issue poison bonds to replace poison pills, their stocks underperform significantly. It is important to emphasize that we do not attribute these value losses to a one-time substitution of poison pills with poison bonds. Instead, we use such substitution patterns to identify firms with entrenched managers who resort to poison bonds to protect themselves. These entrenched managers can destroy shareholder value in different ways, which leads to the persistent long-run stock underperformance.

6 Poison bonds and managerial entrenchment

Our results in the previous two sections provide compelling evidence that pressure to eliminate poison pills leads entrenched managers to issue poison bonds as an alternative, which ultimately destroys shareholder value. In this section, we investigate the specific actions taken by the management that lead to this value-destruction.

[Table 8 about here.]

In Table VIII, we test the relationship between firms' acquisition decisions and their poison bond issuance. We focus on acquisitions because they provide a relatively clean setting to evaluate the quality of firm investment. As some of the largest and most visible investment decisions made by firms, acquisitions have been studied extensively to evaluate agency conflicts. Previous studies also often associate merger deals with empire building and value destruction (e.g. Moeller et al., 2005; Masulis et al., 2007; Gantchev et al., 2020).

In panel A of Table VIII, we use the same sample and regression specification from column (3) of Table II. The dependent variable is a dummy variable indicating whether a firm announces at least one acquisition (of a particular type) in a given year. The key explanatory variable is the total amount of poison bonds outstanding scaled by firms' total assets. We control for the same set of controls and fixed effects, and double cluster the standard errors by firm and year, as in Table II.

In column (1), we consider all deal types and find that as firms have more outstanding poison bonds, the probability of announcing an acquisition increases significantly. An increase of 1% in poison bonds relative to total assets is associated with a 2% (= 1% × 0.265/0.132) higher acquisition probability relative to the sample mean. In columns (2) to (4), we follow Gantchev et al. (2020) to examine three specific deal types, which are commonly associated with value-reducing and empire-building in the literature. The dependent variable is an indicator for large acquisitions defined as those with above median transaction value of all deals in a given year in column (2); an indicator for a diversifying acquisition where the acquirer and target operate in two different Fama-French 48 industries in column (3); and an indicator for an acquisition with a negative acquirer cumulative abnormal returns (adjusted for Fama-French and Carhart four factors) in column (4). The estimates in these columns imply that a 1% increase in poison bonds relative to total assets is associated with a 2.1% (= 1% × 0.239/0.114) higher probability of announcing a large acquisition, a 1.7% (= 1% × 0.093/0.054) higher probability of announcing a diversifying acquisition; and a 2.4% (= 1% × 0.150/0.063) higher probability of announcing a value-destroying acquisition.

While the above estimates suggest that firms issuing poison bonds are more likely to engage in value-reducing acquisitions, they do not consider the interaction between poison bonds and poison pills. To address this, we turn to panel B of Table VIII, where we focus on a sample of firms that have removed their poison pills in a given year.[10] We compare firms with at least one poison bond issue with those without any poison bond issue over the following three years and track their acquisition activities during that period.

We find in column (1) that among the firms removing their poison pills, those who subsequently issue poison bonds are 63.7% (= 0.186/0.292) more likely to announce an acquisition, relative to those who do not issue any poison bond. The estimates in columns (2) to (4) imply

[10]We take the first time of pill removal if firms have repeatedly adopted and dropped their pills.

that this relative difference in acquisition likelihood is 93.1% (= 0.215/0.231) for large deals, 50.7% (= 0.079/.156) for diversifying deals, and 63% (= 0.092/.146) for deals with negative acquirer returns.

In sum, the results in this section show clear evidence that the use of poison bonds, especially after removing poison pills, allows firms to allocate their capital towards large, diversifying, and value-reducing acquisitions. These types of acquisitions are more likely to serve managers' self-interests rather than being optimal investment decisions for the shareholders. These findings further support the notion that poison bonds allow managers to entrench themselves and engage in empire building.

7 Conclusion

Poison bonds, originated in the late 1980s, have become increasingly popular over the last three decades. A recent sharp rise occurred around 2005 and was mainly driven by investment-grade issues. We provide strong evidence that the rise of poison bonds is driven (to a large extent) by the disappearance of poison pills. When firms are under pressure to remove poison pills, they turn to poison bonds as an alternative. However, this practice destroys shareholder value both in the short- and long-term. Our analysis shows that poison bonds allow managers to entrench themselves and pursue privately optimal investment projects.

Our findings offer new insights into the agency costs and benefits associated with debt. The existing literature tends to focus on analyzing agency conflicts between shareholders and managers independently of those between shareholders and creditors. As for the former, the prevailing view is that higher leverage can mitigate shareholder-manager agency conflicts by reducing free cash flow problems. Our paper raises a critical question: Does this agency benefit persist when managers can exploit debt covenants to entrench themselves?

On the other hand, excess leverage increases the likelihood of financial distress, leading to agency problems such as debt overhang and risk-shifting. However, our study shows that a debt covenant, such as the poison put, initially designed to mitigate shareholder-creditor agency conflicts, could be used by managers to entrench themselves, thereby exacerbating shareholder-manager agency problems and destroying shareholder value. This suggests that even in non-distressed scenarios, conflicts of interest can arise between shareholders and creditors due to entrenched managers. Future research on poison bonds has the potential to advance our understanding of the three-way agency conflicts involving shareholders, creditors, and managers.

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Table I: Summary statistics

This table reports summary statistics of the variables used in this paper, for both the firm-year panel data and the bond-level data. All continuous variables are winsorized at 1% and 99% levels. Appendix A provides a complete list of detailed variable definitions.

				Percentile				
	N	Mean	St. Dev.	10th	25th	50th	75th	90th
Firm-Year Panel								
Poison Bond Issuance	22,309	0.14	0.35	0	0	0	0	1
Bond Issuance	22,309	0.27	0.44	0	0	0	1	1
IG	22,309	0.38	0.48	0	0	0	1	1
AAA-AA	22,309	0.03	0.18	0	0	0	0	0
A	22,309	0.14	0.34	0	0	0	0	1
BBB	22,309	0.21	0.40	0	0	0	0	1
Total assets ($M)	21,721	7,735	11,408	561	1,192	2,897	8,252	23,353
MB	21,714	1.55	1.21	0.65	0.84	1.19	1.81	2.79
Leverage	21,721	0.30	0.19	0.07	0.17	0.28	0.39	0.53
ROA	21,721	0.04	0.10	-0.05	-0.01	0.03	0.08	0.16
Tangibility	21,721	0.32	0.23	0.07	0.13	0.26	0.46	0.68
Poison Pill	22,309	0.40	0.49	0	0	0	1	1
Other E-Index	22,255	2.16	1.28	1	1	2	3	4
Shadow Pill	22,309	0.28	0.45	0	0	0	1	1
Acquisition:								
All	22,309	0.13	0.34	0	0	0	0	1
Large	22,309	0.11	0.32	0	0	0	0	1
Diversifying	22,309	0.05	0.23	0	0	0	0	0
FFC4-CAR < 0	22,309	0.06	0.24	0	0	0	0	0
Number of Poison Bonds	22,309	0.99	2.29	0	0	0	1	3
Number of Bonds	22,309	3.00	6.95	0	0	1	3	7
Poison Bond Amount (Scaled)	21,721	0.06	0.11	0	0	0	0.07	0.22
Bond Amount (Scaled)	21,721	0.05	0.09	0	0	0	0.06	0.16
Bond Level								
Poison Put	13,502	0.37	0.48	0	0	0	1	1
CAR [-3, +3] (%)	12,253	0.07	4.70	-5.28	-2.36	0.00	2.38	5.72
Offering Yield (%)	13,502	5.89	2.38	2.66	4.07	6.06	7.49	8.88
Remove Pill	13,502	0.02	0.15	0	0	0	0	0
Maturity	13,502	11.70	9.92	4.73	6.01	9.99	10.22	30.02
Coupon (%)	13,502	5.88	2.39	2.65	4.05	6.00	7.48	8.88
Issue Size	13,502	551	644	33	200	400	700	1,200
Callable	13,502	0.74	0.44	0	0	1	1	1

Table II: Regression analysis of poison bond issuance

This table shows the regression results for the likelihood of poison bond issuance. The dependent variable in columns (1)-(4) is a dummy variable that equals one if a firm issues at least one bond with poison put covenants in a given year. The dependent variable in columns (5) and (6) is a dummy variable that equals one if a firm issues any bond in a given year. *Post* 2005 is a dummy variable indicating observations after 2005. *IG*, $AAA - AA$, *A*, and *BBB* are dummy variables indicating firms with investment-grade, AAA-AA, A, and BBB credit ratings, respectively. *Poison Pill* is a dummy variable indicating the use of a poison pill. *Other E-index* is the "Entrenchment Index" from Bebchuk et al. (2008), excluding the poison pill. *Shadow Pill* is a dummy variable that equals one if a firm is incorporated in a state that has passed a law validating the use of the poison pill. Other controls of firm characteristics are defined in Appendix A, measured at the previous fiscal year-end, and suppressed for brevity. All columns include industry × year and firm fixed effects. Standard errors are double clustered by firm and year, and the corresponding *t*-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	Poison Bond Issuance				Bond Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)
Post 2005 × IG	0.223***				-0.010	
	(9.477)				(-0.264)	
Poison Pill			-0.027***	0.018		0.003
			(-2.812)	(1.590)		(0.192)
Poison Pill × IG				-0.122***		-0.015
				(-5.642)		(-0.600)
Post 2005 × AAA-AA		0.052				
		(1.531)				
Post 2005 × A		0.231***				
		(6.460)				
Post 2005 × BBB		0.237***				
		(9.869)				
AAA-AA		-0.047*				
		(-1.698)				
A		-0.056***				
		(-3.550)				
BBB		-0.059***				
		(-3.975)				
IG	-0.055***		0.053**	0.105***	0.250***	0.252***
	(-4.194)		(2.508)	(5.244)	(7.338)	(12.243)
Other E-Index			0.004	0.005		-0.000
			(0.664)	(0.983)		(-0.050)
Shadow Pill			0.016	0.013		0.016
			(0.586)	(0.474)		(0.472)
Observations	21,714	21,714	21,661	21,661	21,714	21,661
Adjusted R-squared	0.223	0.225	0.208	0.212	0.227	0.227
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Log(Assets), MB, Leverage, ROA, Tangibility					

Table III: Regression discontinuity design of voting against poison pill

This table presents the effect of passing a proposal against poison pill on the probability of a poison bond issuance in the year following the voting day. We use all poison pill related proposal after 2005. For the proposals to remove existing poison pills or to make the adoption of a future poison pill more difficult, we use the vote share in support of these proposals. For the proposals to adopt a new poison pill, we use the vote share against these proposals. *Pass* is a dummy variable that equals one if a proposal against poison pill is passed (vote share exceeds 50%). *IG* is dummy variables indicating firms with investment-grade credit ratings. Column (1) and (2) use the optimal bandwidth following Imbens and Kalyanaraman (2012). Column (3) restricts the sample to observations with a vote share within 10 points of the threshold, and column (4) to 7.5 points. Column (5) and (6) use the full sample and introduce a polynomial in the vote share of order 2 and 3 (Lee and Lemieux, 2010), respectively. Column (7) and (8) use the non-parametric approach proposed by Calonico et al. (2014). Columns (7) uses an alternative vote measure that adjusts for abstentions. All columns control for year fixed effects. Standard errors are clustered by firm, and the corresponding t- or z-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	Poison Bond Issuance							
	Optimal		+/-10%	+/-7.5%	Poly. 2	Poly. 3	CCT	CCT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pass	0.131***	0.070	0.256***	0.193**	0.182***	0.239***	0.242***	0.133**
	(2.956)	(1.362)	(2.932)	(2.175)	(3.394)	(2.726)	(2.754)	(2.517)
Pass × IG		0.445***						
		(2.634)						
IG		-0.014						
		(-0.258)						
Observations	164	117	72	56	501	501	501	471
Adjusted R-squared	0.050	0.167	0.097	0.136	0.034	0.036		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vote Adjusted for Abstentions	No	No	No	No	No	No	No	Yes

Table IV: Regression analysis of the use of poison put covenants

This table shows the bond-level regression results for the likelihood of including poison put covenants. The dependent variable is a dummy variable that equals one if the bond includes a change of control poison put covenant. *Other E-index* is the "Entrenchment Index" from Bebchuk et al. (2008), excluding the poison pill. *Post* 2005 is a dummy variable indicating observations after 2006. *IG*, is a dummy variable indicating bonds with investment-grade credit ratings. $CEO\ Age_{64,65}$ is a dummy variable that equals one if the CEO's age is 64 or 65. $CEO\ Age_{50,70}$ is a dummy variable that equals one if the CEO's age is below 51 or above 69. Other controls of bond characteristics, all other bond covenants available in Mergent, and firm characteristics (measured at the previous fiscal year-end are defined in Appendix A and suppressed for brevity. All columns control for year and industry fixed effects. Standard errors are clustered by firm, and the corresponding *t*-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	Poison Put					
	(1)	(2)	(3)	(4)	(5)	(6)
Other E-Index	-0.005	-0.007				
	(-0.642)	(-0.893)				
Other E-Index × Post 2005	0.054***					
	(3.501)					
Other E-Index × IG		0.052***				
		(4.746)				
CEO $Age_{64,65}$			0.024	0.048		
			(0.978)	(1.381)		
CEO $Age_{64,65}$ × Post 2005			-0.088*			
			(-1.906)			
CEO $Age_{64,65}$ × IG				-0.095**		
				(-2.129)		
CEO $Age_{50,70}$					-0.042	-0.022
					(-1.476)	(-0.735)
CEO $Age_{50,70}$ × Post 2005					0.083**	
					(2.301)	
CEO $Age_{50,70}$ × IG						0.054*
						(1.716)
CEO Age			-0.010	-0.010	-0.008	-0.005
			(-0.841)	(-0.877)	(-0.574)	(-0.348)
CEO Age^2			0.000	0.000	0.000	0.000
			(0.838)	(0.871)	(0.580)	(0.366)
Observations	13,466	13,466	12,341	12,341	12,341	12,341
Adjusted R-squared	0.584	0.584	0.573	0.573	0.573	0.573
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Other Covenants	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Poison Pill, IG, Maturity, Coupon, Issue Size, Callable, Log(Assets), MB, Leverage, ROA, Tangibility, Shadow Pill					

Table V: Regression analysis of bond offering yield

This table presents the effect of including poison put covenants on the offering yield of bond issues. The dependent variable is the yield-to-maturity in percentage point at issuance. *Poison Put* is a dummy variable that equals one if the bond includes a change of control poison put covenant. *Remove Pill* is a dummy variable that equals one if the issuing firm has removed a poison pill during the year prior to the bond issuance date. *Maturity* is the time-of-maturity in years. *Log(Issue Size)* is the logarithm of the offering amount. *Callable* is a dummy variable indicating whether the bond is callable by the issuer. Other firm-level controls are the same as in Table II with a one-year lag and suppressed for brevity. All columns control for rating × year and industry fixed effects. Standard errors are clustered by bond, and the corresponding t-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	Offering Yield (%)				
	All			≤ 2005	> 2005
	(1)	(2)	(3)	(4)	(5)
Poison Put	-0.107***	-0.120***	-0.370***	-0.811***	-0.144***
	(-2.949)	(-3.284)	(-8.257)	(-5.031)	(-2.891)
Poison Put × Remove Pill		0.451***	0.443***	-0.232	0.551***
		(2.890)	(2.858)	(-0.398)	(2.674)
Remove Pill		-0.078	-0.074	-0.029	-0.148
		(-0.679)	(-0.642)	(-0.218)	(-0.839)
Maturity	0.038***	0.038***	0.038***	0.023***	0.050***
	(26.496)	(26.482)	(27.204)	(13.367)	(27.865)
Log(Issue Size)	-0.059***	-0.058***	-0.048***	0.099***	-0.205***
	(-3.743)	(-3.739)	(-2.817)	(5.193)	(-5.929)
Callable	0.046	0.046	0.032	0.341***	-0.329**
	(0.868)	(0.858)	(0.626)	(7.571)	(-2.405)
Observations	13,466	13,466	13,466	6,028	7,438
Adjusted R-squared	0.730	0.730	0.737	0.605	0.694
Rating × Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Other Covenants	No	No	Yes	Yes	Yes
Firm Controls	Log(Assets), MB, Leverage, ROA, Tangibility, Other E-Index, Shadow Pill				

Table VI: Regression analysis of issuers' stock returns around bond issuance

This table presents the effect of including poison put covenants on the stock returns around bond issuance. The dependent variable is the cumulative abnormal returns (CARs) calculated using the Fama-French-Carhart four-factor model estimated over trading days $[-280, -31]$ and measured over a $[-3, +3]$ event window around the bond issuance dates. *Poison Put* is a dummy variable that equals one if the bond includes a change of control poison put covenant. *Remove Pill* is a dummy variable that equals one if the issuing firm has removed a poison pill during the year prior to the bond issuance date. *IG* is dummy variables indicating bonds with investment-grade credit ratings. *Maturity* is the time-of-maturity in years. *Coupon* is the coupon rate in percentages. *Log*(*Issue Size*) is the logarithm of the offering amount. *Callable* is a dummy variable indicating whether the bond is callable by the issuer. Other firm-level controls are the same as in Table II with a one-year lag and suppressed for brevity. All columns control for year and industry fixed effects. Standard errors are clustered by bond, and the corresponding t-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	CAR [-3, +3] (%)				
	All			≤ 2005	> 2005
	(1)	(2)	(3)	(4)	(5)
Poison Put	-0.259**	-0.225*	-0.171	-0.093	-0.053
	(-2.146)	(-1.854)	(-1.228)	(-0.214)	(-0.318)
Poison Put × Remove Pill		-1.273**	-1.195**	0.441	-2.261***
		(-2.197)	(-2.075)	(0.142)	(-2.997)
Remove Pill		0.651	0.623	-0.022	1.652**
		(1.484)	(1.419)	(-0.038)	(2.507)
IG	0.215	0.229	0.103	0.176	0.027
	(1.386)	(1.473)	(0.600)	(0.722)	(0.108)
Maturity	-0.007	-0.007	-0.007*	-0.008	-0.007
	(-1.559)	(-1.558)	(-1.668)	(-1.265)	(-1.166)
Coupon	-0.043	-0.041	-0.033	-0.096	-0.015
	(-1.082)	(-1.038)	(-0.829)	(-1.374)	(-0.290)
Log(Issue Size)	0.084*	0.083*	0.081	0.074	0.101
	(1.839)	(1.824)	(1.637)	(1.090)	(1.200)
Callable	0.263*	0.267*	0.245	0.126	0.920***
	(1.675)	(1.697)	(1.543)	(0.647)	(3.059)
Observations	12,222	12,222	12,222	5,975	6,247
Adjusted R-squared	0.010	0.010	0.014	0.017	0.018
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes
Other Covenants	No	No	Yes	Yes	Yes
Firm Controls	Log(Assets), MB, Leverage, ROA, Tangibility, Other E-Index, Shadow Pill				

Table VII: Portfolio approach

This table reports the risk-adjusted monthly returns to a long-only equal-weighted portfolio that holds stocks of firms that issue poison bonds to replace poison pills. Specifically, in June of each year, we rebalance our portfolio by including new stocks of firms that have issued a poison bond and removed their poison pills during the previous year, and we hold these stocks for two years. We report the portfolio alpha estimated using different risk factor models: CAPM, Fama and French (1993) three-factor model, Carhart (1997) four-factor model, and Fama and French (2015) five-factor model. The *t*-statistics with Newey-West standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

	Portfolio Alpha (%)			
	CAPM	FF3	FFC4	FF5
Sample: 2007 Jul - 2021 Dec	-0.609***	-0.477**	-0.428**	-0.581**
	(-3.037)	(-2.519)	(-2.468)	(-2.559)
Sample: 2010 Jul - 2020 Feb	-0.746***	-0.632***	-0.565***	-0.640***
(Excl. financial crisis & COVID-19)	(-3.781)	(-3.187)	(-3.146)	(-3.646)

Table VIII: Poison bond and acquisition frequency

This table shows the relationship between poison bonds and firms' acquisition frequency. In panel A, we use our baseline firm-years sample and estimate the fixed effects regressions where the dependent variable is a dummy variable that equals one if the firm announces at least one acquisition bid in a given year. We consider all types of acquisition bids in column (1), large bids (with above-median deal value) in column (2), diversifying bids (based on Fama-French 48 industries) in column (3), and value-destroying bids (negative Fama-French and Carhart four-factor adjusted CARs) in column (4). Other controls of firm characteristics are defined in Appendix A, measured at the previous fiscal year-end, and suppressed for brevity. All columns include industry × year and firm fixed effects. Standard errors are double clustered by firm and year. In panel B, we focus on the sample of firms who have removed their poison pills in a given year and track their acquisition activities in the subsequent three years. The dependent variable is a dummy variable that equals one if the firm announces at least one acquisition bid within the same year of pill removal or the following three years. PB is a dummy variable that equals one if the firm issues a poison bond within the same year of pill removal or the following three years. All columns include industry and year fixed effects, and standard errors are clustered by firm. The t-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Panel A: Firm-Year Panel Regressions

Dep. Variable	Acquisition			
	All (1)	Large (2)	Diversifying (3)	FFC4-CAR < 0 (4)
Poison Bond Amount (Scaled)	0.265*** (8.106)	0.239*** (7.353)	0.093*** (3.914)	0.150*** (5.732)
Observations	21,661	21,661	21,661	21,661
Adjusted R-squared	0.080	0.068	0.083	0.045
Industry × Year FE & Firm FE	Yes	Yes	Yes	Yes
Other Controls	Log(Assets), MB, Leverage, ROA, Tangibility, IG, Poison Pill, Other E-Index, Shadow Pill			

Panel B: Cross-Sectional Analysis of Poison Pill Removers

Dep. Variable	Acquisition over the next three years			
	All (1)	Large (2)	Diversifying (3)	FFC4-CAR < 0 (4)
PB	0.186*** (3.940)	0.215*** (4.638)	0.079** (2.109)	0.092** (2.451)
Observations	540	540	540	540
Adjusted R-squared	0.064	0.072	0.103	0.051
Industry FE & Year FE	Yes	Yes	Yes	Yes
Other Controls	Log(Assets), MB, Leverage, ROA, Tangibility, IG Other E-Index, Shadow Pill			

Appendix

A Variable Descriptions

Firm-level Data

- $Log(Assets)$: natural logarithm of the total book asset (AT).
- MB: market to book ratio, calculated using (PRCC_F * CSHPRI+ DLC+DLTT+PSTKL - TXDITC)/AT.
- $Leverage$: book leverage, calculated using (DLTT + DLC)/AT.
- ROA: return-on-asset, calculated using OIADP/AT.
- $Tangibility$: firm tangible asset relative to total asset ratio, calculated using PPENT/AT.
- $Bond\_Issuance$: a dummy variable equals 1 if a firm issued a bond in a given year
- $Poison\_Bond\_Issuance$: a dummy variable equals 1 if a firm issued a bond that includes change-of-control poison put covenant in a given year.
- $Remove\_Pill$: a dummy variable equals 1 if a firm removes its poison pill from its corporate charter in a given year.
- $Poison\_Pill$: a dummy variable equals 1 if a firm has a poison pill plan in its corporate charter in a given year.
- IG: a dummy variable equals 1 if a firm's credit rating is classified as investment grade.
- $AAA - A$: a dummy variable equals 1 if a firm's credit rating is between AAA to AA.
- A: a dummy variable equals 1 if a firm's credit rating is A.
- BBB: a dummy variable equals 1 if a firm's credit rating is BBB.
- $Other\_E - Index$: The summation of the other five E-index provisions other than poison pill, including staggered boards, limits to shareholder bylaw amendments, golden parachutes, and supermajority requirements for mergers and charter amendments.
- $Shadow\_Pill$: a dummy variable equals 1 if the firm is incorporated in a state with effective shadow pill law. States' shadow pill laws' effective dates are from Cain et al. (2017) and Karpoff and Wittry (2018).

- *Number_of_Poison_Bonds*: the number of poison bonds outstanding.
- *Number_of_Bonds*: the number of bonds outstanding.
- *Poison_Bond_Amount_(Scaled)*: the total amount of outstanding poison bonds divided by total assets (AT).
- *Bond_Amount_(Scaled)*: the total amount of outstanding bonds divided by total assets (AT).

Bond-level Data

- *Poison_Put*: a dummy variable equals 1 if the bond includes a change-of-control put covenant.
- $CAR\_[-3, +3]$: cumulative abnormal stock returns of the acquirer, calculated using the Carhart 4 factor model estimated over trading days (-280, -31) and are measured over a (-3, +3) event window around the bond issuance date.
- *Offering_Yield*: yield-to-maturity.
- *Maturity*: time-to-maturity in years.
- *Coupon*: coupon rate in percentage terms.
- *Issue_Size*: natural logarithm of the total value of a corporate bond issue.
- *Callable*: a dummy variable equals 1 if the corporate bond includes a call option.
- *IG*: a dummy variable equals 1 if a firm's credit rating is classified as investment grade.

B Poison bonds and takeover likelihood

Table A1: Regression analysis of the likelihood of becoming a takeover target

This table presents the effect of outstanding poison bonds on firms' likelihood of become a takeover target. We use the whole universe of CRSP-Compustat merged firms between 1989 and 2020. We use Mergent FISD to identify the number and amount of poison bonds outstanding for each firm in a given year. The dependent variable is a dummy variable that equals one if a firm is announced to become a takeover target in the following year. In the odd-numbered columns, we focus on observations after 2005. Columns (5) and (6) show that bonds other than poison bonds do not reduce takeover likelihood. All columns include firm and year fixed effects. Standard errors are double clustered by firm and year, and the corresponding t-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dep. Variable	Takeover					
	All	> 2005	All	> 2005	All	> 2005
	(1)	(2)	(3)	(4)	(5)	(6)
Poison Bond Amount (Scaled)	-0.017**	-0.032**				
	(-2.238)	(-2.209)				
Number of Poison Bonds			-0.002**	-0.002*		
			(-2.657)	(-1.959)		
Non-Poison Bond Amount (Scaled)					0.017**	0.032**
					(2.238)	(2.209)
All Bond Amount (Scaled)	0.020***	0.021***	0.016***	0.018**	0.002	-0.010
	(3.903)	(4.674)	(2.824)	(2.921)	(0.404)	(-0.714)
Log(Assets)	-0.001	-0.002	-0.001	-0.001	-0.001	-0.002
	(-0.940)	(-0.765)	(-0.856)	(-0.678)	(-0.940)	(-0.765)
Market-to-Book	-0.004***	-0.003***	-0.004***	-0.003***	-0.004***	-0.003***
	(-8.570)	(-4.583)	(-8.535)	(-4.607)	(-8.570)	(-4.583)
Leverage	0.022***	0.025***	0.021***	0.024***	0.022***	0.025***
	(4.668)	(4.085)	(4.635)	(3.699)	(4.668)	(4.085)
ROA	0.007**	0.008	0.007**	0.008	0.007**	0.008
	(2.599)	(1.575)	(2.558)	(1.554)	(2.599)	(1.575)
Tangibility	0.019***	-0.003	0.018***	-0.003	0.019***	-0.003
	(2.979)	(-0.374)	(2.953)	(-0.377)	(2.979)	(-0.374)
IG	-0.018***	-0.002	-0.017***	-0.002	-0.018***	-0.002
	(-4.778)	(-0.510)	(-4.578)	(-0.436)	(-4.778)	(-0.510)
Observations	140,755	56,315	140,755	56,315	140,755	56,315
Adjusted R-squared	0.084	0.109	0.084	0.109	0.084	0.109
Firm FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

C Univariate tests between poison bonds and regular bonds

Table A2: Differences between bond issues with and without poison put covenants

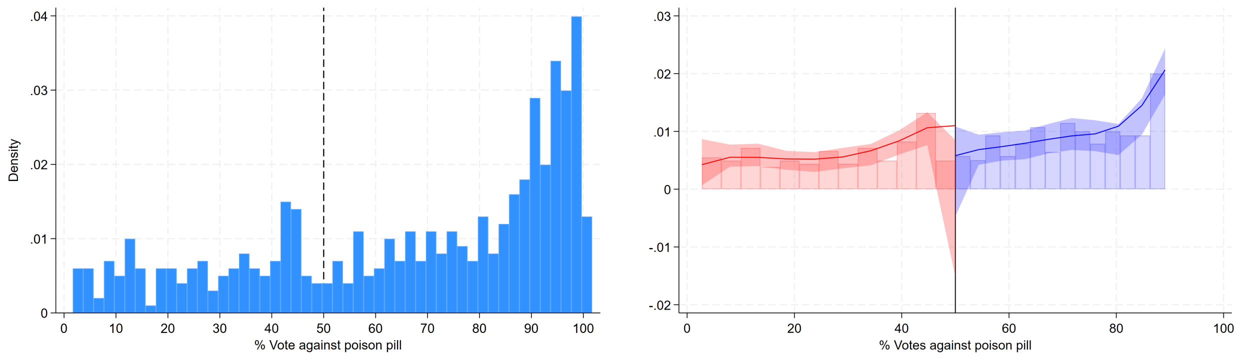
This table presents a univariate analysis of the differences in the firm and bond characteristics between issues with and without poison put covenants. The firm characteristics are with a one-year lag. Appendix A provides a complete list of detailed variable definitions. The final column reports the difference of means t–statistics. All differences are significant at the 1% level, except for Shadow Pill and issuance CAR.

	Poison Put			
	No	Yes	Difference	t-statistic
Post 2005	38%	84%	-46%	-57.71
Firm characteristics				
Poison Pill	42%	23%	20%	23.57
Log(Assets)	9.47	9.01	0.46	17.07
MB	1.45	1.57	-0.12	-6.09
Leverage	0.33	0.36	-0.03	-10.73
ROA	0.39	0.32	0.07	16.23
Tangibility	0.05	0.05	0.01	3.00
Other E-Index	1.83	2.58	-0.74	-35.60
Shadow Pill	0.32	0.31	0.01	1.67
Bond characteristics				
CAR [-3, +3] (%)	0.12	-0.02	0.14	1.56
Offering Yield (%)	6.13	5.49	0.63	15.10
IG	80%	57%	22%	28.81
Log(Issue Size)	12.25	13.05	-0.80	-30.88
Maturity	12.27	10.75	1.51	8.61
Coupon (%)	6.12	5.48	0.64	15.14
Callable	62%	96%	-34%	-47.44

D Validation of the regression discontinuity design

Figure A1: RDD validation

This figure illustrates the validation test of our regression discontinuity design using poison pill related voting outcomes from 2005 to 2021. Panel (a) plots the histogram of the percentage of votes around the 50% cutoff using 2 percentage point bins. Panel (b) shows the continuity test in the density of percentage of votes around the 50% cutoff. For the proposals to remove existing poison pills or to make the adoption of a future poison pill more difficult, we use the vote share in support of these proposals. For the proposals to adopt a new poison pill, we use the vote share against these proposals.



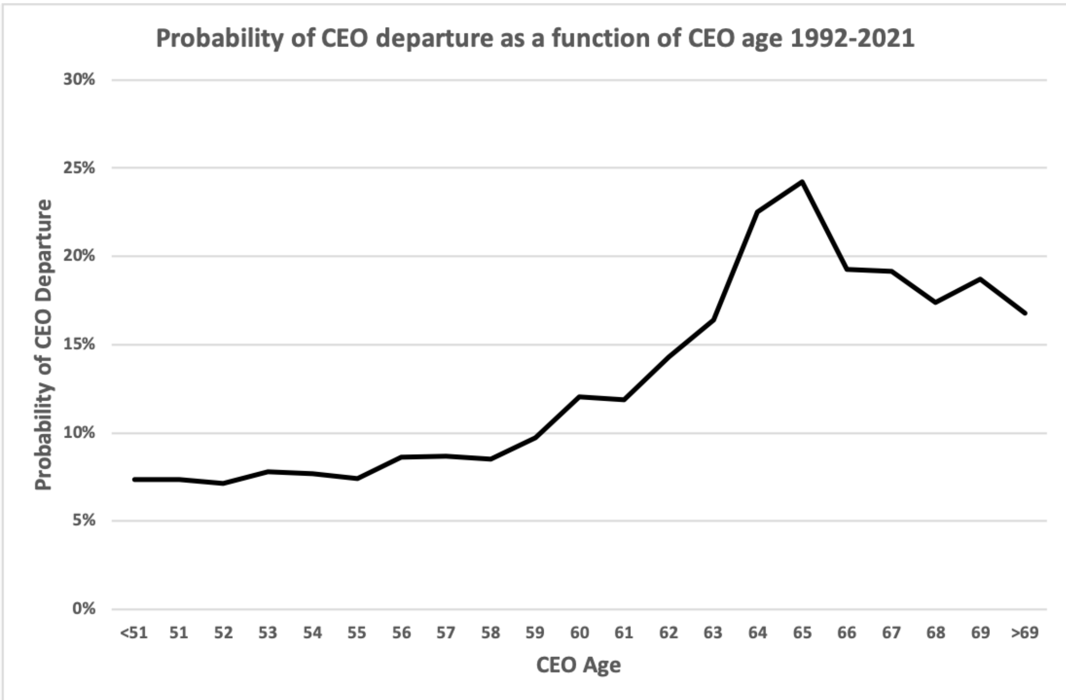
(a) Distribution of votes

(b) Manipulation test

E Probability of CEO departure as a function of CEO age

Figure A2: CEO departure rate

This figure shows the probability that a CEO of a given age departs at that age. We follow Jenter and Lewellen (2015) to compute the probability as the number of firm-years in which a CEO of a given age leaves office divided by the number of firm-years with CEOs of that age at the start of the year. The sample consists of 58,064 firm-years from 1992 to 2021, which is essentially the entire universe of ExecuComp data. As illustrated, the turnover rate spikes at age 64 and 65, followed by a downward trend.



F Existing bondholders' reaction to new poison bond issuance

For each new bond issue, we compute the abnormal returns of the other outstanding bonds previously issued by the same firm. We obtain bond price data from the enhanced Trade Reporting and Compliance Engine (TRACE) over the period of July 2002 to December 2021. After cleaning the data following Dick-Nielsen (2014), we first compute daily volume-weighted average prices using all institutional size trades (≥$100,000) as in Bessembinder, Kahle, Maxwell, and Xu (2009), and then compute weekly returns as

$$Ret_{i,w} = \frac{Price_{i,w} + Coupon_i \times (1/52)}{Price_{i,w-1}} - 1,$$

where $Price_{i,w}$ is the most recent daily price available for bond i within week w. If no price is available in week $w-1$, we use stale prices. If the bond lacks price information in both week $w-1$ and w, we consider the weekly return to be missing and exclude week w from further analysis. We exclude bonds that are redeemed or retired by the end of the calender year.

We obtain weekly abnormal bond returns by subtracting average bond returns on a portfolio of bonds with similar bond ratings and maturity. We construct six rating categories: AAA, AA, A, BBB, BB, and B-D, and three maturity bins: 0-5, 5-10, and >10 year. Specifically, we sort TRACE bonds with available weekly prices into each rating-maturity group and compute the benchmark bond returns by forming par-value outstanding weighted-average portfolios. We use a three-week event window [-1w, +1w] around each new bond issue and include all bonds previously issued by the same firm that are traded in the event window. We are able to construct abnormal returns for 29,883 traded bonds around 4,464 new issues.

As shown in panel A of Table A3, the average cumulative abnormal return (CAR) for bonds is -10 basis points (bps), indicating a general dislike among existing bondholders towards any new bond issues. In this sample, 2,447 of the new issues are poison bonds, for which we are able to compute the CAR of 13,424 traded bonds. The reaction of bondholders is *less* negative when the new issue includes a poison put, as the mean (median) CAR for poison bond issues is -7 bps (-9 bps), which is consistent with the findings in Cook and Easterwood (1994). The univariate difference in bond CARs between new issues with and without poison put (-7 vs -11 bps) is statistically significant at the margin ($t = 1.7$). However, after carefully controlling for other factors, we find a more mixed relationship.

In panel B of Table A3, we estimate the difference in bond CARs between new issues with and without poison puts, controlling for industry fixed effects, rating × year fixed effects, and other issue and firm characteristics as in Table VI and V. In addition, we control for

Table A3: Cumulative abnormal returns of existing bonds around new bond issuance

Panel A reports summary statistics of the three-week cumulative abnormal returns (CAR) of the other outstanding bonds previously issued by the same firm. In panel B, the dependent variable is the three-week bond CAR. *Poison Put* is a dummy variable that equals one if the bond includes a change of control poison put covenant. *Remove Pill* is a dummy variable that equals one if the issuing firm has removed a poison pill during the year prior to the bond issuance date. *Bond Age* (*TTM*) is the difference in years between traded date and issue date (maturity date). *Log*(*Trading Volume*) is the log of the total trading volume of a given bond within the event window. Other issue- and firm-level controls are the same as in Table VI and suppressed for brevity. All columns control for other available bond covenants, rating × year fixed effects, and industry fixed effects. We focus on CARs from traded poison bonds (PB) in columns (2)-(4), and from traded non-poison bonds (Non-PB) in columns (5)-(7). Standard errors are clustered by issue-event, and the corresponding t-statistics are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Panel A: Summary Statistics of Bond CARs [-1w, +1w] (%)

	Mean	Median	St. Dev.
All New Issues (4,464 new issues, 29,883 traded bonds)	-0.10	-0.10	1.98
With Poison Put (2,447 new issues, 13,424 traded bonds)	-0.07	-0.09	2.04
W/O Poison Put (2,017 new issues, 16,459 traded bonds)	-0.11	-0.11	1.93

Panel B: Regression Analysis

Dep. Variable	Bond CAR [-1w, +1w] (%)						
	All	PB			Non-PB		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poison Put	-0.076	-0.273**	-0.061	-0.267**	0.095	0.118	0.096
	(-1.075)	(-2.156)	(-0.375)	(-2.086)	(1.004)	(0.489)	(1.002)
Poison Put × IG			-0.379*			-0.028	
			(-1.856)			(-0.109)	
Poison Put × Remove Pill				-0.270			-0.084
				(-0.711)			(-0.297)
Remove Pill				0.224			0.205
				(0.675)			(1.098)
Bond Age	0.018***	0.015	0.015	0.015	0.016***	0.016***	0.016***
	(4.220)	(1.453)	(1.436)	(1.461)	(2.986)	(2.988)	(3.008)
TTM	-0.004**	-0.010***	-0.010***	-0.010***	-0.002	-0.002	-0.002
	(-2.104)	(-3.203)	(-3.213)	(-3.202)	(-0.666)	(-0.671)	(-0.672)
Log(Trading Volume)	-0.001	-0.008	-0.007	-0.008	0.011	0.011	0.011
	(-0.087)	(-0.610)	(-0.546)	(-0.606)	(1.057)	(1.056)	(1.065)
Observations	29,861	11,902	11,902	11,902	17,959	17,959	17,959
Adjusted R-squared	0.037	0.055	0.056	0.055	0.044	0.044	0.044
Rating × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Covenants	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Issue Controls	Maturity, Coupon, Log(Issue Size), Callable						
Firm Controls	Log(Assets), MB, Leverage, ROA, Tangibility, Other E-Index, Shadow Pill						

the age, time to maturity, and the log of trading volume of the traded bonds. The standard errors are clustered by issue-event.

In column (1), our analysis includes all traded bonds and shows a negative albeit insignificant coefficient on the *Poison Put* dummy. In column (2) when we focus on traded poison bonds (i.e., those issued with a poison put), we find a significant negative coefficient on the *Poison Put* dummy, implying that bond prices drop by an additional 27 bps when the new issue includes a poison put. This suggests that investors holding existing poison bonds react more negatively to new issues with poison puts compared to those without. Column (3) further shows that this negative reaction is primarily driven by investment grade issues. In columns (5) to (7), we focus on traded bonds without poison puts and find a generally more positive but statistically insignificant reaction to new poison bond issues.

These findings demonstrate the mixed impact of new poison bond issues on existing bondholders. On the one hand, new poison bond issues reduce the likelihood of leveraged takeovers and protect bondholders, especially those holding bonds without poison puts. On the other hand, new poison bonds can potentially entrench incumbent managers and increase agency costs, which hurt bondholder value. This latter effect tends to dominate, especially when existing bondholders are already protected by poison puts. In this case, the additional poison bonds do not add protection but only increase agency costs. As for existing bondholders of non-poison bonds, the protection and agency costs seem to offset each other, resulting in an insignificant change in prices.