PIK Now and Pay Later -
How Deferred Interest Reshapes Private Credit

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Abstract

Payment-in-Kind (PIK) provisions allow borrowers to capitalize unpaid interest, providing financial flexibility but potentially enabling forbearance to insolvent firms. Using comprehensive Business Development Company (BDC) loan data, we show PIK is predominantly used by distressed borrowers. PIK activation predicts persistent credit deterioration with outcomes significantly worse when borrowers exercise PIK options ex-post versus structuring PIK at origination. We document that private equity sponsorship mitigates deterioration, while PIK predominantly enables maturity extensions rather than formal restructurings, consistent with forbearance. Despite substantial bank lending to BDCs, covenant restrictions insulate banks from PIK-related losses, redirecting constraints toward reduced BDC credit supply. Our findings reveal that PIK functions primarily as forbearance for fundamentally distressed firms rather than temporary liquidity provision, with implications for private credit financial stability.

JEL classification: G21, G32, G34
Keywords: Business Development Companies (BDC), Payment-in-Kind (PIK), liquidity, private credit, private equity, banks, credit lines, covenants

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1 Introduction

Private credit, which refers to private market lending by non-bank financial institutions (NBFIs), has experienced significant growth in recent years.[1] As private credit continues to expand, nonbank lenders are increasingly replacing traditional banks and bank-led syndicates in corporate debt markets, raising important questions about their comparative ability to address the varied financing needs of borrowers. Private credit lenders often claim to possess unique expertise and offer superior contractual flexibility that can cater to the individual needs of borrowers in various circumstances.

In this paper, we study one prominent form of financial flexibility that private credit lenders frequently include in their contracts, so-called "payment-in-kind" ("PIK") provisions.[2] Using PIK allows borrowers to defer cash interest payments by rolling them onto the outstanding loan principal, which can save cash or even prevent borrowers from defaulting on their coupon payments. However, its widespread use has generated considerable debate among practitioners and policymakers.[3]

For its proponents, PIK is a useful tool that helps to smooth out temporary cash flow shocks or to privide flexibility to fund positive net present value (NPV) projects. Under this benign view of PIK, which we term "efficient liquidity provision", PIK is typically used by borrowers and lenders as short-term bridge financing, until temporary cash flow problems have passed. Critics contend, however, that PIK provisions enable lenders to conceal or delay loss recognition by extending financing to fundamentally insolvent firms, a practice commonly termed "zombie lending". Under this view, PIK arrangements allow nonviable borrowers to defer inevitable restructurings, thereby accumulating debt to

[1] The exact market size estimates vary anywhere between $2-3 trillion global assets under management in 2024, up from approximately $300 billion since the Global Financial Crisis. See e.g. IMF (2024) and Financial Times (April, 2014).

[2] A large literature in finance has discussed the value of financial flexibility for non-finanical firms. For example, financial flexibility is valuable when external funding is costly (Gamba and Triantis, 2008; Giambona et al., 2025), during crises when capital markets funding is unavailable (Campello et al., 2010; Acharya and Steffen, 2020; Fahlenbrach et al., 2021) or fixed costs are high (Barry et al., 2022), and to avoid costly financial distress and underinvestment (Bonaimé et al., 2014).

[3] See e.g. "The rise and risks of private credit" by IMF (2024), "Why 'Payment-In-Kind' Debt Is So Appealing - and Risky" (Bloomberg, Nov 2025) or "Corporate debts mount as credit funds let borrowers defer payments" (Financial Times, Oct 2024).

unsustainable levels. This forbearance may amplify systemic risks by masking the true extent of credit deterioration within private lender portfolios and potentially transmitting stress through interconnected financial institutions.

We examine PIK usage in U.S. private credit markets using comprehensive loan-level data from Business Development Companies (BDCs).[4] We address three questions that try to distinguish between the efficient liquidity provision and zombie lending views. First, what determines PIK usage? Identifying the borrower characteristics and circumstances surrounding PIK activation reveals whether it targets temporarily distressed but viable firms (efficient provision) or fundamentally insolvent borrowers (zombie lending). Second, do PIK borrowers recover or deteriorate? The efficient liquidity view predicts temporary distress followed by recovery as financial constraints ease. The zombie lending view predicts sustained deterioration, as PIK merely delays inevitable default for permanently impaired firms. Third, how do banks respond to the use of PIK options in BDC portfolios? Given banks' growing exposure to BDCs and potential spillover risks (Acharya et al., 2024), we examine whether banks enable PIK provision through credit lines or restrict financing to PIK-heavy BDCs. Bank credit supply to PIK-active BDCs reveals whether banks view PIK as value-enhancing flexibility or problematic forbearance. To the best of our knowledge, this is the first comprehensive study of PIK provisions in private credit markets.

We build a novel and comprehensive loan-level dataset that covers the full universe of BDC lending from 2012 onwards. A significant strength of our dataset is the ability to track each loan quarterly from origination until either maturity, write-off, or sale by the BDC. Moreover, it lets us distinguish between different types of PIK loans. While some borrowers defer interest payments immediately upon origination and continue doing so until maturity (so-called "PIK notes"), we show that in recent years the market has shifted toward loans that include a "PIK toggle" that allows borrowers to exercise this option at some later point during the loan's lifecycle. We show that at origination, these

[4]BDCs are closed-end investment funds lending primarily to middle-market firms. As of Q3 2024, they manage USD 410 billion in total assets and USD 385 billion in investments, representing a substantial share of U.S. private credit. Appendix B lists all BDCs in our sample.

loans exhibit significantly different characteristics, with PIK-notes having higher interest rates, shorter maturity and being typically structured as subordinated debt with fixed interest rate (resembling bonds) and are frequently coupled with equity stakes for the lenders. In contrast, loans that use PIK Toggles are more similar to loans that do not exhibit PIK use at all. These loans are typically first lien senior secured with floating rates and have longer maturities.

We next study the timing and circumstances under which borrowers activate PIK Toggles, exploiting loan–quarter panel data.[5] We show that firms switch into PIK precisely when credit quality weakens, often after delinquency or marked-to-market declines, and that toggling concentrates late in a loan's life, consistent with short-horizon bridge financing ahead of a refinancing or workout. Loans that toggle are larger and disproportionately involve dual-holding lenders and PE-sponsored borrowers. Finally, PIK use is much more prevalent among borrowers without recent bank financing, indicating that toggles operate as a substitute for bank-provided liquidity in segments where access to revolving credit is limited. This mechanism is in line with the institutional divide whereby banks specialize in revolvers while private credit supplies contractual flexibility through features such as PIK. Overall, our results are consistent with the view that firms in distress are more likely to use the PIK Toggle option.

Our analysis of borrower and loan performance subsequent to PIK activation yields consistent findings. We first document that PIK usage exhibits statistically significant and economically meaningful predictive power for credit deterioration in the quarters following the initiation of interest payment deferral. Using a variety of control variables and tight fixed effect specifications (based on borrower, industry, year-quarter, BDC, loan type, and seniority), we find that exercising the PIK option predicts 2-3 percentage points (pp) higher likelihood that a loan becomes delinquent (or "non-accrual") over the next quarter.[6] This

[5]PIK-Notes embed deferral at origination and offer little time-series variation; we therefore focus on ex-post PIK Toggles in the main tests.

[6]Lenders classify loans as non-accrual when interest payments by borrowers are at least 90 days overdue, which constitutes a "technical default". Importantly, the usage of the PIK Toggle option does *not* constitute a default event.

is a sizeable increase given the unconditional likelihood that a loan becomes non-accrual of 3%.

Using the fact that BDCs have to provide quarterly fair value assessments of their loans allows us to strengthen these findings with complementary tests. We show that the fair value of loans (relative to the respective par value) declines following PIK usage, echoing our findings with loan delinquencies. Furthermore, as loans with similar characteristics from the same borrower can be held in several BDC portfolios, we can study how valuation disagreement changes following PIK toggle use. Interestingly, we find that the fair value dispersion significantly increases after PIK activation, highlighting elevated uncertainty among private credit lenders regarding the fundamental value of the loans.

We further employ a local-projection framework, which reveals that loan deterioration following PIK activation is persistent rather than transitory. Nonaccrual rates remain elevated, and loan values remain depressed for at least two years after PIK initiation. Cross-sectional tests corroborate these findings, demonstrating that loans utilizing PIK toggles exit the sample with significantly larger losses relative to comparable non-PIK loans. Collectively, these results are inconsistent with the hypothesis that the average PIK user firm faces temporary liquidity constraints that can be resolved through interest payment deferral. Instead, the evidence suggests more fundamental solvency concerns.

To distinguish between the efficient liquidity provision and zombie lending hypotheses, we examine heterogeneity in post-PIK outcomes across key loan and lender characteristics. We test whether PIK's effects vary by time to maturity (which would allow temporary distress to resolve), loan size (which might incentivize extend-and-pretend behavior on large exposures), dual debt-equity holdings (which reflect superior monitoring but potential conflicts of interest), and pre-existing credit quality. The evidence contradicts the benign view of PIK: loans already in nonaccrual status that use PIK experience compounding deterioration, while maturity structure and loan size show no moderating effects on PIK's negative consequences. A notable exception emerges for private equity-sponsored borrowers, where PIK activation leads to significantly less deterioration, consistent with PE sponsors' willingness to inject additional equity in exchange for PIK terms or their

superior restructuring expertise (Hotchkiss et al., 2021; Jang, 2024). Likewise, under some circumstances PIK-use by firms with equity holding lenders tend to experience less credit deterioration. This indicates that only more comprehensive workouts involving debt-to-equity swaps can make PIK a viable form of support. These cross-sectional patterns indicate that PIK activation does not selectively benefit borrowers facing temporary liquidity constraints, but rather extends financing to fundamentally distressed firms across most loan characteristics, with PE sponsorship—and dual-holding lenders—providing the only meaningful mitigating factor.

We further distinguish between PIK-Notes, where interest deferral is embedded at origination and subject to contemporaneous lender screening, and PIK-Toggles, where borrowers exercise the deferral option ex-post, typically when credit quality deteriorates. This distinction proves economically meaningful: loans activating PIK-Toggles exhibit 17-22 percentage points higher probability of future nonaccrual status compared to 4-11 percentage points for PIK-Notes, with similar patterns for exit losses (12-19 percentage points versus -3-4 percentage points). To rigorously test whether these differential outcomes merely reflect ex-ante borrower selection rather than information revelation from ex-post activation, we obtain novel firm-level data from martini.ai, an AI-powered credit intelligence platform that provides comprehensive credit ratings and financial metrics for middle-market private firms. Controlling for origination-date firm size and credit ratings, we confirm that ex-post PIK-toggle activation conveys distinctly negative information about deteriorating borrower prospects beyond what ex-ante screening captures, indicating that PIK-Toggles function primarily as forbearance mechanisms for fundamentally distressed borrowers rather than planned liquidity management tools.

Consistent with forbearance rather than efficient restructuring, PIK-toggle activation predicts a 26-29 percentage point increase in subsequent maturity extensions but only a 7-10 percentage point increase in debt-to-equity swaps, indicating lenders systematically delay loss recognition rather than implement formal workouts. This pattern of extending maturities while avoiding write-downs mirrors zombie lending and extend-and-pretend behavior documented, for example, in Acharya et al. (2022) and Crosignani and Prazad

(2024), raising concerns about hidden credit losses accumulating in private credit markets.

Our evidence suggests that PIK is predominantly used by distressed firms rather than those facing temporary liquidity shocks, raising concerns that excessive PIK-based forbearance accumulates risks in BDC portfolios that could transmit to banks through increasing exposures to NBFIs (Acharya et al., 2024; Chernenko et al., 2025; Albertus and Denes, Forthcoming). While PIK deferrals do not require immediate cash outlays, they create liquidity pressures through a regulatory mismatch: deferred interest must be recognized as taxable income, compelling BDCs to distribute at least 90% as dividends to maintain RIC tax status despite receiving no corresponding cash inflows. We therefore examine whether excessive PIK provision leads BDCs to draw down bank credit lines, potentially transmitting credit risk to the banking sector, or whether covenant-based restrictions insulate banks from PIK-related spillovers.

Despite substantial bank lending to BDCs, we find no evidence of risk transmission through credit lines: PIK-heavy BDCs experience significant reductions in bank debt share (-0.52 pp per 1 pp increase in PIK usage) and credit line utilization (-0.38 pp), reflecting covenant-based restrictions that effectively insulate banks from PIK-related losses. To document these covenant structures, we employ a web crawler to systematically extract and classify PIK-related covenant terms from BDC credit agreements filed with the SEC, revealing that over 90% of bank credit lines contain explicit restrictions on PIK collateral eligibility. These covenant-based constraints redirect the transmission channel: rather than flowing to banks, PIK-induced financing constraints manifest through reduced BDC asset growth and dividend payments, suggesting credit supply contraction to the real economy.

Related literature. Our paper relates to different strands of the literature. First, our paper relates to a growing literature highlights the increasing importance of private credit in corporate finance and BDCs as the largest group of lenders in the private credit market.[7] Many authors have studied rise of nonbank direct lending and argued that an increase

[7] Block et al. (2024) survey U.S. and European private debt investors and argue that BDCs are representative of typical private debt lenders in the U.S.

in bank regulation has been a major driving force behind this market shift (Davydiuk et al., 2024b; Irani et al., 2021). Others have analyzed BDCs' regulatory frictions and investment practices through the lens of agency conflicts (Kallenos and Nishiotis, 2020), leverage limits (Balloch and Gonzalez-Uribe, 2021), market discipline (Davydiuk et al., 2024c), regulatory arbitrage (Chernenko et al., 2025), relationship lending (Jang, 2024), fund structure (Rintamäki, 2024), lenders' dual-holdings of equity and debt (Davydiuk et al., 2024a), PE-affiliations and contractual complexity (Robinson and Wallskog, 2025) and maturity walls (Zawadowski and Albuquerque, 2025).[8]

Another strand of the literature underscores the important role of non-bank financial institutions (NBFIs) across various lending sectors, including mortgages (Buchak et al. (2018)), large corporate (Fleckenstein et al. (2025)), middle market (Chernenko et al. (2022)), and small business lending (Gopal and Schnabl (2022)). This expansion in NBFI market share is partly driven by bank financing, especially through committed credit lines and associated liquidity insurance. Acharya et al. (2024) document substantial funding relationships between unaffiliated banks and NBFIs via credit lines. Acharya et al. (2025a) highlight the risk of banks from lending to REITs via credit lines. Acharya et al. (2025b) document that banks respond to higher drawdown risk from firms financed by nonbanks by issuing fewer credit lines. Haque et al. (2024) argues that private debt serves as a substitute for long-term bank credit. Haque et al. (2025) highlight that bank lending to direct lenders is particularly attractive during monetary policy tightening. Jang and Rosen (2025) argue that losses to banks from direct lending are contained. We contribute to this literature and show that – despite the reliance on bank credit lines – BDCs with a larger share of loans with deferred interest decrease their bank funding and utilization of credit lines and the role of bank loan covenants in mitigating bank exposure to direct lenders.

Finally, our paper relates to the broader literature on leveraged loans and LBOs, in particular. Kaplan and Stein (1993) document how public junk bonds replaced private

[8]See also Haque et al. (2022); Loumioti (2022); Fritsch et al. (2021); Suhonen (2024); Erel et al. (2024); Jang et al. (2025); Aldasoro and Doerr (2025); Böni and Manigart (2022); Jang and Kim (2025); Munday et al. (2019)

bank loans for financing large LBOs during the 1980s buyout market. Demiroglu and James (2010) show the rising prevalence of deferred interest debt, with issuance increasing substantially around 2007. Guo et al. (2011) find that using deferred interest debt signals higher credit risk, with approximately 23% of LBOs from 1990–2006 featuring PIK structures. Ivashina and Vallee (2025) documents how covenants in leveraged loan contracts frequently contain carve-outs that can allow additional borrowing even when they worsening existing debt-equityholder conflicts. To the best of our knowledge, we are the first who investigate PIK in the private debt market, when firms choose to PIK interest interest expenses and the implications for firm risk and financial stability.

2 Data and Institutional Setting

To investigate the implications of deferring interest payments on firms and private debt lenders, we construct a dataset at the BDC and loan level using different data sources.

2.1 Data

Our main dataset is obtained from LSEG LPC's BDC Collateral. BDC Collateral contains the universe of BDCs from 2012Q1 onwards, including active as well as discontinued BDCs. It collects the information directly from the Securities and Exchange Commission (SEC) filings and augments the data, whenever feasible, with information from other LSEG products such as secondary loan market pricing. Importantly, it contains BDC balance-sheet data as well as the schedule of investments on a quarterly basis for private and public BDCs. BDC Collateral provides detailed loan-level information, including borrower names, industry, par amount borrowed from the BDC, interest rates (base rate, cash spread, and PIK spread), remaining loan maturity, loan seniority, and loan type.[9][10] BDC Collateral groups loans into three loan seniority categories: first lien, second lien

[9]There exist 30 industry categories. Industry information is available for 97.8% of the borrowers.

[10]BDC Collateral does not contain financial information on borrowers, as BDCs are not required to report it.

(both senior secured), and subordinated. They also provide additional information about security classes, which we group into five loan types: term loans, delay draw term loans (DDTLs), revolvers, unitranches, and others based on information provided in the security class column(s). BDC Collateral also provides quarterly performance measures, such as the fair value of the loan and the non-accrual status.

We augment BDC Collateral data with information from S&P Capital IQ and Pitchbook using Pitchbook identifiers and CIK numbers.[11] Pitchbook provides data both on the BDC level as well as for portfolio companies and investments. Pitchbook data lets us track whether the borrower is a private equity-backed backed at any given date and if a bank has also lent to it within the preceding five years.[12] Finally, we carefully remove any duplicates in the data and conservatively drop three (relatively small) BDCs from the sample whose business model has no resemblance to direct corporate lending.[13]

BDCs report their filings with the SEC on a quarterly basis. Our analyses at the BDC level are thus based on a BDC—quarter panel. BDCs are clearly identified using a CIK number. To track the same loan within a BDC over time, we aggregate the data at the BDC—Borrower—Seniority—Loan Type—Quarter level, and define our loan identifier as a combo of these factors.[14]

Lastly, we obtain information about different firm credit quality, such as rating, and firm size measures from MartiniAI, which is a financial analysis firm specializing in private markets. As this data is available only from 2017 onwards and is missing some firms, we use this data only to illustrate the robustness of the baseline results.[15]

[11]With matching, we use "Upload a list" functionality in the Pitchbook platform, which lets the user match firm names and other identifying information to corresponding Pitchbook identifiers using a sophisticated string-match algorithm. We augment the resulting automatic matches with manual matching.

[12]While Pitchbook deals do not capture all the bank loans issued in the U.S. middle market, the fact that we find that approximately 50% of the loans are associated with borrowers with past bank financing, which is a number that echoes findings of Haque et al. (2024) using confidential Fed Y-14 dataset, suggests that any incomplete information about bank reliance in our dataset is unlikely to be severe.

[13]We provide more details on data cleaning in the Online Appendix. Also, dropping the three funds has effectively no impact on any of the reported results.

[14]Typically an each tuple identifies a single position but in the events, in which the BDC holds multiple loans with the same seniority and loan type of the same borrowing firm at the same period we group these positions.

[15]MariniAI provides a mapping file that allows us to map a subset of firms to BDC Collateral identifiers.

2.2 Institutional setting and Empirical Facts

BDCs are closed-end investment funds that mainly lend to large and middle-market firms. They are among the largest lenders in the non-bank direct lending market, with total assets of approximately USD 410 billion as of 2024 Q3 and total investments of USD 385 billion. In this section, we present several key institutional details and empirical facts related to PIK loans, and introduce the main datasets we use in the empirical section.

2.2.1 Evolution of PIK landscape

PIK usage share. To analyze trends in PIK adoption, we define the *PIK usage share* as the value-weighted proportion of loans in BDC's portfolio in which a loan pays PIK interest relative to all BDC's loans outstanding in a given quarter. More formally,

$$PIK\,usage\,share_{lt} = \frac{\sum_{b,k} Par_{blkt} \times PIK_{blkt}}{\sum_{b,k} Par_{blkt}} \tag{1}$$

where PIK_{bltk} is our key borrower-lender-loan-level indicator variable that equals one if borrower b pays some part of its interest obligation to lender l in quarter t for loan k, using PIK, and zero otherwise, and Par_{blkt} is the par value of a loan k at time t issued by borrower b to lender l. The summation is over all borrowers b and their loans k within a given lender's portfolio, Thus, $PIK\,usage\,share_{lt}$ is the value weighted fraction of the lender l's loan portfolio that is using PIK at time t.

Panel A of Figure 1 shows the *PIK usage share* for the full sample of loans over the 2012 to 2024 period. We also plot the average base rate over the same time period. We observe a cyclicality in PIK usage. During periods of economic expansion, PIK usage declined (from about 15% in 2014 to 10% in 2019), but we observe a significant increase first during the COVID-19 pandemic (during the 2020 to 2021 period) and an even larger PIK usage starting in 2022 when short-term interest rates increased in the U.S. due to tighter monetary policy. As loans are largely floating-rate loans in the private debt market, a sudden and substantial interest rate hike increased the liquidity pressure on these firms.

We allocate additional details of the variable construction to Appendix **??**.

[Figure 1 here]

Panel B of Figure 1 complements this picture by showing PIK usage share with the average nonaccrual rate in the sample and share of loans that are valued below 80% at any given quarter. The most notable peaks in these distress series occurred in 2016, following the oil-price shock, and in 2020, following the COVID-19 shock. Interestingly, following the oil shock, there does not occur a corresponding increase in PIK usage share at all, while in the case of COVID-19 shock, the PIK usage does lag the distress series, but also stays elevated until 2021Q1, whereas the distress series declines very rapidly following the initial shock that occurred in March 2020.

Average PIK spread. How much interest payments are PIK'd varies across PIK loans, but on average, it has been substantial, about 5 percent of the loan balance per annum. Panel A in Figure 2 presents the quarterly average PIK spread from 2012 to 2024 among loans that actively PIK some part of the interest. We observe a distinct increase in PIK spread starting from 3.6% in 2013 and peaking at 5.5% in 2018, after declining back down to below 5% in 2021. After that spread has remained stable throughout the subsequent period of rising interest rates.

Another way of looking at things is to look at the average share of total interest that is paid using PIK among all loans (including those that do not use PIK). Panel B in Figure 2 shows the average ratio between PIK spread and all-in-yield, which we call PIK spread share. The figure illustrates this for both equal-weighted and par-value weighted averages. The higher level of PIK spread share for the value-weighted average relative to the equal-weighted average suggests that PIK is used more among bigger loans. The figure illustrates how PIK spread share increased substantially during COVID-19, up to 10.5%, suggesting that on average, about 10 cents of every interest paid at this time was capitalized in loan balances. However, recently this spread share has declined, mainly due to an increase in base rates, which mechanically increases the denominator of the PIK spread share without having a similar direct impact on the numerator.

[Figure 2 here]

Heterogeneity in PIK use. The patterns shown above, however, mask considerable heterogeneity. Figure 3 illustrates some of the most salient dimensions of heterogeneity in PIK usage. First, Panel A focuses on PIK usage share by security type, where loans are categorized as either *Senior* (first and second lien) or *Junior* (subordinated debt). Figure illustrates that junior debt exhibits higher PIK usage overall. However, the PIK usage share in senior loans exhibits a similar pattern of spiking in times of liquidity needs, such as following COVID-19 and the monetary tightening that started in 2022.[16]

Second, in Panel B, we illustrate that a big fraction of the PIK usage is mainly done by borrowers who have not received bank financing within the preceding five years. We observe that PIK usage is significantly more prevalent among these "unbanked" borrowers, suggesting that PIK serves as an alternative liquidity management strategy for firms that cannot rely on bank financing.

Third, in Panel C of Figure 3, we focus on the dimension of heterogeneity that relates to *how* PIK is used by borrowers. PIK is utilized in private debt contracts in two primary ways: Borrowers may defer interest payments from the outset of loan origination and do so throughout the loan's lifetime, or borrowers may have the option to initially pay cash interest but later switch to deferred interest payments if deemed useful. The former arrangement is typically termed "PIK Note", while the latter is referred to as a "PIK Toggle." Correspondingly, we identify a loan as a "PIK Note" if it pays PIK interest at every period during its lifetime. Panel C of Figure 3 illustrates that over the past decade, PIK-toggle loans, in which borrowers choose to use their PIK option only when necessary, have become increasingly prominent in private credit markets. The trend seen in PIK usage share reflects the overall market shift toward PIK toggles, and it is also related to the shift in BDCs' portfolio composition from junior debt to senior debt, as PIK-notes are

[16]The reason why Panel A in Figure 1 exhibits a declining trend in PIK usage from 2012 until 2019, while the series in Panel A of Figure 3 does not, is because there has been a shift in BDC's portfolio composition, from relatively PIK-heavy junior debt toward more PIK-light senior debt.

more likely to be subordinated debt. Next, we will delve into these differences in more detail.

[Figure 3 here]

2.3 Summary statistics

Our empirical exercises are conducted using three datasets, in the following order: First, we utilize a loan-level panel dataset. Second, we use a loan-origination-level cross-sectional data, which we obtain after collapsing the panel data based on each loan's first observation dates. Third, we use BDC-level panel data. We present these datasets by first focusing on key summary statistics for the two panel datasets and then exploring heterogeneity in characteristics and outcomes between PIK-notes, PIK-toggles, and non-PIK'd loans using the cross-sectional data. Panels A and B in Table 1 present summary statistics at the BDC-level (Panel A) and loan level (Panel B) over the 2012Q1 to 2024Q4 period.[17]

[Table 1 here]

The average BDC in our sample has a PIK usage share of 13%, with considerable variation across funds (standard deviation of 16%). Mean assets under management (AUM) per BDC are USD 1.62 billion, although the distribution is skewed, with a median asset size of USD 0.59 billion. BDCs hold, on average, investments in 86 portfolio companies and have an average leverage ratio of 0.4. The median fund age is 6 years, but several BDCs have significantly longer operating histories. The median return on equity (ROE) among BDCs is 9%. Banks provide substantial funding, representing a median share of 45% of BDCs' total debt. Additionally, BDCs actively utilize credit lines, with an average utilization rate of 54%.

At the loan level, PIK is used in 10% of observations. The average all-in yield is 9.56%, with higher-risk loans having average PIK spreads of around 4.96%, compared to average cash spreads of 6.49%. Most loans feature floating rates, averaging a base rate of

[17] All variables are defined in detail in the Appendix in Table B.

2.96%, although this varies significantly over time. The average loan size is approximately USD16 million, and loans typically trade at a fair-to-par ratio of 0.95, indicating moderate discounts that widen notably during downturns (Rintamäki, 2024). The median remaining maturity is 51 months (about 4 years). Approximately 19% of observations involve lenders simultaneously holding equity and debt stakes in the borrowing firm. Furthermore, 14% of the sample observations are identified as PIK toggles, while 4% are PIK notes.[18] 84% of loans are first-lien senior secured, 11% are second-lien, and 5% are subordinated, reflecting BDCs' preference for secured lending.

Panel C of Table 1 takes a snapshot of loan features at origination date, where we refer to origination date as the year-quarter when the loan first enters the sample.[19] We also employ several filters to drop loans, which we describe in detail in Appendix **??** and in the notes of Table 1. PIK-Toggle and PIK-Notes serve fundamentally different purposes. PIK-Toggle are more common, senior-secured instruments (85.8% first lien) used as optional liquidity insurance, deployed only 41.6% of their lifetime on average. PIK-Notes, in contrast, are permanent capital structure features (100% deployment) deployed by growth-focused borrowers committed to systematic profit reinvestment, featuring compressed cash spreads, higher PIK yield components (37.4% versus 16.1%), and often unsecured or subordinated positioning (48.9% unsecured).

Different lender practices might explain these structural differences. PIK-Toggle lenders rely on collateral and seniority for protection, accepting floating rates and tolerating frequent extensions (57.2%). PIK-Note lenders employ intensive monitoring and covenant discipline, preferring fixed rates to mitigate borrower rate uncertainty in volatile growth environments. The 300 basis point all-in-yield premium on PIK-Notes likely reflects compensation for subordination and monitoring burden.

[18] In practice, the proportion of PIK toggles is a lower bound, as loans with unused PIK options remain unobserved by econometricians.

[19] Note, these origination dates can also include dates when broadly syndicated loans are bought from the secondary loan markets and added to the loan portfolio. That being said, BDCs' business model primarily focuses on participating in loan issuances in primary markets rather than buying loans from secondary markets.

2.4 Example of PIK reporting

[Table 2 here]

Table 2 provides context with a specific example. "Exel Direct Inc." is a portfolio company of Garrison Capital Inc. (GARS), which provided a LIBOR-linked term loan with a five-year (60-month) maturity. According to GARS's quarterly filings, Exel Direct initially pays interest fully in cash and amortizes the loan principal over time, as evidenced by a declining par value.[20] While initial regulatory filings make no mention of payment-in-kind (PIK), starting in 2015Q2, the reports indicate a positive PIK spread. Initially, a 10% PIK spread is introduced while simultaneously reducing the cash spread from 13% to 3%. Thus, the total spread remains at 13%, but its composition shifts significantly from fully cash-based (13% cash, 0% PIK) to primarily PIK-based (3% cash, 10% PIK). The split between cash and PIK subsequently varies several times until maturity. Importantly, following the introduction of PIK payments, the loan's previously declining par value begins to rise, with periodic increases closely matching the dollar value of quarterly PIK interest. This example clearly demonstrates how the reporting of a positive PIK spread in regulatory filings can reliably indicate the use of payment-in-kind interest.

3 Why do firms use the PIK Option?

We begin our analysis by examining the determinants of exercising the PIK option, estimating a regression model via OLS where we introduce several variables that categorized into four groups called $Distress$, $Loan\,Terms$, $Ownership$, $Lending\,Relationship$. We

[20] The loan agreement appears to have special provisions; for instance, the borrower is allowed to reduce the interest rate and increase the principal in 2013Q3. Additionally, the cash spread rises from 11% to 13% after 18 months.

track each variable within a group with a superscript j. The model we run is the following:

$$PIK_{blkt} = \sum_j \beta_{1j}\, Distress^j_{blkt} + \sum_j \beta_{2j}\, Loan\,Terms^j_{blkt} + \sum_j \beta_{3j}\, Ownership^j_{blt} + \sum_j \beta_{4j}\, LendingRelationship^j_{bt} + Fixed\,Effects + e_{blkt} \quad (2)$$

The *Distress* variables include: $NonAccrual_{blkt}$, which is an indicator variable that takes a value of one if the loan k from lender l to borrower b is marked as nonaccrual at quarter t, and zero otherwise, $I(Fair/Par_{blkt} < 0.8)$ which takes a value of one if the loan k is valued at below 80% at time t, and zero otherwise.

The *Loan Terms* variables include: *Ln(Loan size)*, *Effective base rate* (a maximum of the current base rate and the interest rate floor), *Fixed-rate loan* -indicator, the loan's *All-in-spread* at the time of the origination.[21] Loan seniority and loan type indicators are controlled with corresponding fixed effects.

The *Ownership* variables include: $Dual\,holding_{blt}$ is an indicator variable that takes a value of one if the lender l also holds an equity stake in the borrowing firm b at time t, while $PE\,Sponsored_{bt}$ is an indicator if the borrower is PE-backed.

The *Lending Relationship* variables include: $Ln(Number\,of\,BDCs)$ that lend to that borrower b in time t. $Bank\,financing_{bt}$ is an indicator variable that takes a value of one if the borrower b has received bank financing within the preceding five years from t.

We include only loans with PIK toggles and loans without observable PIK components in the sample, explicitly excluding all PIK notes. We impose this restriction because our primary interest is the borrower's active decision to exercise the PIK toggle after loan origination.[22] We cluster the standard errors at $Borrower$, BDC, and $YearQtr$ level. Our sample period for all loan-level tests is 2012Q1-2024Q1, with the end date being determined by our loss in data coverage for some variables.

[21] We control for the all-in-spread at origination date τ rather than at date t since using PIK often mechanically increases the all-in-spread, as there is often a some type of drawdown fee. This makes the two variables highly co-linear, and running *All-in-spread* a bad control.

[22] Including the PIK notes has little impact on the results, although there also exists some important heterogeneity, which we analyze below.

[Table 3 here]

Table 3 presents the regression results. We find evidence that each of these categories has some influence on PIK use. First, across all specifications, we find that borrowers are more likely to defer loan interest payments if loans are classified as non-accrual, or are valued at a significant discount. This suggests that borrowers who experience distress or reduced cash flow capacity often resort to PIK interest. Second, some loan terms are strongly associated with PIK use. Larger loan balances are more likely to increase PIK use; similarly, PIK use itself increases loan balances with the capitalized interest. Loans with shorter maturity are also more likely to be PIK'd, and we find a strong persistent association with PIK use and fixed interest rate. This is because, although most of these loans are tied to a floating rate, like LIBOR (later SOFR) at origination, firms often temporarily shift to fixed interest payments when using PIK. Third, ownership structure also seemingly plays a role. We find that PIK loans are typically associated with the lender having some equity-like stake in the borrowing firm (i.e. *Dual-holding*), and PE-sponsored firms are more likely to use PIK. Fourth, we find that firms that have not received a bank loan in the preceding five-year period are much more likely to use PIK, indicating that firms that lack outside financing options are most likely to benefit from PIK use.

The different fixed effects also reveal interesting facts about PIK use. For example, when we move from Column (3) to Column (4) by adding $Industry \times YearQtr$ fixed effects, we see that the Adjusted R^2 increases only by 1%. This is interesting because it reveals something about the nature of the shocks that trigger firms to use PIK provisions. Under the liquidity provision view, the users of liquidity typically face temporary cash flow shocks but do not face permanent economic distress. So, under this view, it can also be a value-enhancing for lenders to offer liquidity when borrowers face temporary industry-wide shocks, as this type of distress is not a result of poor economic performance relative to peers, but rather an adverse consequence of a macroeconomic shock. A case in point is the service industry that faced temporary liquidity problems due to the COVID-19 lockdown restrictions. As lockdowns had heterogeneous impact across industries but more

homogeneous impact within industries, and this shock was expected to be temporary to the extent lockdowns were expected to be temporary, then PIK could be a good response for these industry-wide shocks that are temporary, not a result of borrower underperforming. However, the low incremental R^2 suggests most of the PIK use is instead driven by idiosyncratic, within-industry, firm-specific factors rather than industry-wide shocks.

Another piece of evidence that speaks in favor of forbearance view is the relatively large increase of 4 pp in Adjusted R^2 when we move from Column (6) to Column (7) and replace $Borrower + BDC$ with $Borrower \times BDC$ fixed effects. The 4 pp increase suggests that time-invariant, relationship-specific factors between the lender and borrower explain a significant portion of the total variation in PIK use. These relationship-specific factors should not matter much under the efficient liquidity provision view; however, they are often viewed as a significant determinant of zombie lending (Hu and Varas, 2021). In the next section, we corroborate these facts by showing that the distress associated with PIK use is also more likely to be permanent than temporary.

4 Implications of PIK Usage for Loan Performance

4.1 Panel tests: PIK and future loan outcomes

In the previous section, we learned that distressed firms and firms with lack of access to bank financing are typical users of PIK. This suggests PIK may be useful for the borrower by providing some immediate relief. If this view is shared by the lender, we would expect the loan value to increase following PIK use and the likelihood of nonaccrual status to decrease. In this section, we test this by studying what happens to the loan following the borrower's decision to defer cash interest payment. We run the following OLS regression model

$$y_{blk,t+1} = \beta_1 PIK_{blkt} + Controls + Fixed\,Effects + e_{blkt} \tag{3}$$

where the dependent variable $y_{blk,t+1}$ takes three forms. First, $NonAccrual_{blk,t+1}$ is an indicator variable that equals one if the loan is classified as non-accrual in *t+1*. Second, $Fair/Par_{blk,t+1}$ is the loan value measured as $Fair/Par$-ratio at *t+1*. Third, $CSD(Fair/Par)_{bk,t+1}$ is the cross-sectional standard deviation of similar loans' $Fair/Par$-ratio across all BDC's portfolios at the end of period $t+1$. Thus, it is a measure of valuation disagreement among different lenders regarding the loan.[23]

The motivation for the first two variables is that using PIK contains valuable information and may signal future distress that is not incorporated in the current price. The motivation for the third variable is that a loan is frequently held by different BDCs that have their own fair value assessment. Since using PIK may increase both default risk and agency costs of debt, this might make it more difficult for lenders to assess the fair value of a loan.[24]

In each specification, we also include the current time t value of the dependent variable, as these series are highly autocorrelated, and we want to test if PIK contains information that is not already captured in these variables. We employ a stringent set of model specifications that incorporate all control variables shown to have explanatory power for PIK usage (compare Table 3), as well as fixed effect combinations for borrower, industry, year-quarter, BDC, loan seniority, and loan type. $Industry \times YearQtr$ fixed effects capture any time-varying differences between industries and thus ensure that the association is not simply driven by the fact that firms in specific industries that are more likely to use PIK, subsequently underperform. This also relates to our discussion about these fixed effects in the previous section. Borrower fixed effects address persistent time-invariant differences between borrowers that, up to a first-order approximation, allow us to control for factors such as firm management, corporate culture, and firm size. If some BDC characteristics correlate with BDC's PIK provision activity, then this creates a concern that these same

[23]For example, two loans held by two different lenders at the same period are considered similar if they are issued by the same borrower, have the same seniority (e.g. both are First Lien Senior Secured), and have the same Loan Type (e.g both are Term Loans).

[24]This view is shared by many BDCs themselves. For example, Kennedly Lewis Capital Corp writes in their 2024 annual report: "*[...]PIK instruments may have unreliable valuations because the accruals require judgments about collectability of the deferred payments and the value of any associated collateral*".

characteristics might systematically influence lenders' valuation practices or risk-taking tendencies. Thus, including $BDC \times YearQtr$ fixed effects accounts for these time-varying observable and unobservable characteristics, such as risk appetite, lending strategy, and funding costs, and ensures that these factors do not explain the results. Finally, $LoanType$ and $Seniority$ control for differences in default risk between different types of loans. We use three-way clustering of the standard errors by $Borrower$, BDC, and $YearQtr$.

[Table 4 here]

In Columns (1)-(2), the positive and strongly statistically significant coefficient on PIK suggests that when the firm exercises the PIK toggle for the loan in period t it predicts a heightened probability that the loan will be assigned as nonaccrual in the next period $t+1$, even above what we can infer from the time t nonaccrual status of the loan. Similarly, Columns (3)-(4) show a similar story when we use $Fair/Par$ at $t+1$ as the dependent variable. Columns (3) and (4) indicate that a single-period use of PIK is followed by 100bps decline in valuation in the next period. The fact that we control for period t loan value, which is reported while knowing that PIK has been used in that same period t suggests that not all negative information about PIK use is incorporated in the loan prices in a timely manner. Extrapolating from these local linear estimates, we can conclude that a more persistent use of PIK—by for example, 10 quarters—is associated with a 10 pp cumulative decline in loan value.

These results suggest that PIK use is generally not followed by reversal in a firm's financial situation but instead is actually followed by statistically significantly worse outcomes for the loan relative to an observably similar loan that does not use PIK. This indicates that lenders, or the third-party analysts who are valuing the loans, do not see PIK as a remedy to the borrower's economic problems, and the firm's need to use PIK typically is a signal that current loan value or (non)accrual status is too optimistic since default risk is likely to increase.

Lastly, in Columns (5)-(6), we focus on valuation dispersion. The results show that PIK use is generally followed by higher valuation dispersion among the lenders. This

indicates that PIK also adds uncertainty about different future paths, with some analysts viewing PIK use as a more positive or negative signal than others.

4.1.1 Impulse response functions

To evaluate the persistence of the predictive power of PIK for $NonAccrual$, $Fair/Par$ and $CSD(Fair/Par)$. We run the following local-projection regressions

$$y_{blk,t+h} = \beta_h PIK_{blkt} + \gamma_h\, y_{blkt} + Controls + FixedEffects + e_{blk,t+h}$$

where h runs from 1 to 8 and $y_{blk,t+h}$ is either $NonAccrual$, $Fair/Par$ or $CSD(Fair/Par)$ at time $t+h$ for loan k of borrower b held by lender l. We include the following fixed effects: $YearQtr \times Industry + Borrower \times BDC + Seniority \times YearQtr + LoanType \times YearQtr$. We include the following controls $Ln(Loan\,Size)$, $Effect.\,Base\,rate$, $Fixed\,rate\,loan$, $Ln(Time\text{-}to\text{-}Maturity)$, $Dual\,holding$, $PE\,Sponsored$, $Bank\,financing$ with all measured at time t. Then we collect the β_h coefficients and plot them in a graph with the 95% confidence based on three-way clustered standard errors by $Borrower$, BDC, and $YearQtr$.

Figure 4 shows that the persistence of predictive results for $NonAccrual$, $Fair/Par$, and $CSD(Fair/Par)$ extends beyond just over the next quarter. The predictive power of PIK usage persists even after 2 years for $NonAccrual$ and $Fair/Par$. These results corroborate the view that users of PIK are generally experiencing persistent difficulties rather than temporary problems, and PIK use is generally followed by further distress rather than a swift recovery. With $CSD(Fair/Par)$, the effect is a bit more short-lived as the β_h coefficient converges back to zero between quarter $h = 5$ and $h = 6$. This means that valuation disagreement between lenders following PIK use seems to fully self-correct over time, probably because these valuations are public information and lenders may learn from each other's valuations.

[Figure 4 here]

4.1.2 Heterogeneity

Next, we investigate whether the use of PIK toggle as a signal of a firm's repayment prospect masks heterogeneity between borrowers. To do so, we run the following OLS regression

$$y_{blk,t+1} = \beta_1 PIK_{blkt} + \beta_2 y_{blkt} + \beta_3 X_{blkt} + \beta_4 PIK_{blkt} \times y_{blkt} + \beta_5 PIK_{blkt} \times X_{blkt} + Controls + Fixed\,Effects + e_{blk,t+1} \quad (4)$$

We now add the interaction terms between PIK and lagged dependent variable y_{blkt} as well as several other characteristics, stacked in vector X_{blkt}. As our focus is primarily on the interaction terms, when analyzing the results, we restrict our attention to estimates for β_1, β_4, and β_5.

[Table 5 here]

Table 5 presents the results. Let us first focus on Columns (1)-(3) that show the results for $NonAccrual$. In Column (1), we include only the $PIK \times PE\,Sponsored$ interaction, loan controls that we also used in Table 3 and $YearQtr$, $Borrower$, $LoanType$, $Seniority$ fixed effects. Interestingly, the positive sign for PIK and the negative sign for $PIK \times PE\,Sponsored$, but smaller in absolute terms, suggest that the negative signal of PIK gets dampened when the borrower has a PE sponsor. This suggests that PE sponsored firms are special as they are able to avoid delinquency with better success when using PIK compared to non-PE sponsored firms. We also study other sources of heterogeneity in Column (2). While $PIK \times PE\,Sponsored$ remains economically and statistically significant in these Columns, most other interaction terms are zero. There are exceptions, though. PIK use by firms with equity-holding lenders tends to experience less credit deterioration, which could indicate that only more comprehensive workouts involving debt-to-equity swaps can

make PIK a viable form of support. Similarly, in Column (2), the positive coefficient PIK (while controlling for $PIK \times NonAcctual$) indicates that even if the loan is not nonaccrual this period, using PIK indicates that the chances grow that it will be nonaccrual the next period. Moreover, the positive coefficient on the interaction $PIK \times NonAccrual$ indicates that if a loan is nonaccrual *and* uses PIK, there are higher chances that it will continue to be assigned as nonaccrual in the next period relative to the case when it is nonaccrual but does not rely on PIK. However, in Column (3) when we add $YearQtr \times BDC$, $BDC \times Borrower$ and $YearQtr \times Borrower$ fixed effects—the last, which automatically restricts the sample to firms that have multiple loans outstanding—we find that only the PIK variable and $PIK \times PE\,Sponsored$ interaction term remain statistically significant. This suggest that PIK is likely to lead to higher delinquencies for the loans that is tied to PIK interest even when conditioning on the borrower's overall financial situation with $Borrower \times YearQtr$ fixed effects. Thus, PIK can be a bad signal not just about the borrower's overall prospects but also about the prospects of the very loan that is using PIK. Similarl,y the presence of PE sponsor helps to prevent future loan delinquencies for these very same loans, suggesting that asymmetric loan outcomes for PIK users are less likely to occur when PE sponsor is involved.

We find similar results when we use the $Fair/Par$ as the dependent variable in Columns (4)-(6). First, the coefficient for the interaction term $Fair/Par \times PIK$ suggests that the starting value of $Fair/Par$ also matters to the loan response following PIK use. For example, the estimates in Column (2) suggest that when the loan is valued at 80 cents on the dollar and loan uses PIK, then the expected next period fair/par ratio is $(-0.09 + 0.09 \times 0.8 = -0.018)$ 78.2 cents on the dollar, while if the starting point is that loan is valued on par, then the expected decline in loan value is zero $(-0.09+0.09\times 1 = 0)$. Said differently, the negative signal of the PIK gets amplified if the existing value of the loan is low. Second, similarly, as we saw with $NonAccrual$, we observe that in every Column, PE-backing of the firm has a positive impact on PIK users, and PE-backed firms do not expect as big declines in loan values following PIK use.

To check visually if these results for PE-sponsored borrowers make sense, we plot in

Figure 5 the average value of the loan (on the left) and non-accrual probability (on the right) 3 years before and after the first time PIK toggle is used. What the figure clearly illustrates is that deterioration of credit conditions, measured by declining average loan value and increasing non-accrual rate, starts typically already slightly before the PIK is first used, suggesting that PIK is more likely to be a symptom rather than a cause of a firm's difficulties. However, based on the visual inspection, it looks like using PIK also does little to help this deteriorating trend since credit continues to deteriorate following firs time PIK is used all the way until the end of the observation window.

Interestingly, however, the different lines for PE-sponsored and non-sponsored firms suggest that there exists some heterogeneity in these trends. After the introduction of PIK, the sharp decline in loan value seems to moderate slightly for PE-sponsored firms, while similar moderation is not observable among the loans of non-PE-sponsored firms. This widening gap can also be observed among the average non-accrual rate on the right side of the figure, although here the "kink" among PE-sponsored loans is less distinct.

[Figure 5 here]

4.2 Cross-sectional test: PIK and future loan outcomes

4.2.1 Heterogeneity from PE sponsorship

The panel tests above are useful to understand the short-term dynamics around PIK use, but they do not reveal what are the definite outcomes for loans that end up using PIK and how these outcomes compare against loans that do not defer interest payments. Similarly, based on the previous test, we cannot judge if the PE-sponsored ownership is helpful in permanently preventing worse loan outcomes or if this is simply a short-term effect.

Thus, we now focus on cross-sectional data, using initial loan characteristics at the time of loan origination, and how these characteristics explain the likelihood that a loan will later become nonaccrual and exit the sample with a significant discount at the termination date. As explained in more detail in Section 2, we define origination quarter as the year-quarter of the first observation when the loan appears in the sample.

Precisely, we start with the following cross-sectional regression.

$$y_{blk,\tau} = \beta_1 \, PIK\,Toggle_{blk,\tau+n} + Controls + Fixed\,Effects + e_{blk,\tau} \tag{5}$$

where τ denotes the year-quarter when the loan first appears in the sample, which we call the origination period and the loan outcome, $y_{blk,\tau}$, is either $Future\,NonAccrual_{blk,\tau+m}$, which takes a value of one if the loan becomes nonaccrual at any date $\tau + m$ after origination date τ, or $I(Fair/Par_{blk,T} < 0.8)$, which takes a value of one if the loan has a valuation below 0.8 at the loan termination quarter T. The main explanatory variable of interest, $PIK\,Toggle_{blk,\tau+n}$, takes a value of one if the borrower uses the PIK option at some date $\tau + n \geq \tau$ following loan origination. Although we study PIK toggles above in previous sections, we use this more explicit reference $PIK\,Toggle_{blk,\tau+n}$ to separate this cross-sectional variable from the panel data variable PIK_{blkt} used above, and because we introduce comparative results between PIK notes and PIK toggles further below in this section. We also include a set of control variables that capture the observable loan terms and borrower characteristics measured primarily at the time of origination. We also standardize the continuous variables (but not the binary variables) to ease the interpretation of some of the results.

In addition to the baseline model, we are also interested in studying the heterogeneity in these outcomes, we augment this baseline specification by adding an interaction term $PIK\,Toggle_{blk,\tau+n} \times PE\,Sponsored_{b,\tau}$ and interaction terms with $PIK\,Toggle_{blk,\tau+n}$ and several other origination dated characteristics. These characteristics relate to loan terms, such as loan size, maturity, and dual-holding, similarly to the previous section, but we also include $Pre\text{-}PIK\,Amend_{blk,\tau+s}$, which takes a value of one if the loan has experienced an amendment before the first time PIK is used for that loan.[25] While we cannot observe amendments directly. We use instances of maturity extension or a loan becoming non-

[25]In other words, we require that $\tau + s \leq \tau + n$ and if there is no PIK used at all, but there is an amendment, then this is automatically satisfied.

accrual as proxies of an amendment occurring. This is because becoming non-accrual automatically triggers a renegotiation or an amendment, while maturity extensions are also a type of amendment. With $I(Fair/Par_{blk,T} < 0.8)$ as the dependent variable, the sample is further restricted to loans that have already exited the sample since we need this to observe each loan's termination date T. Table 6 shows the results.

[Table 6 here]

Columns (1) and (2) indicate that firms using the PIK option are 22-23pp more likely to experience delinquency at some point in the future compared to those loans that do not use the PIK option. Focusing then on Column (3), we observe a large and positive coefficient for $PIK\,Toggle_{blk,\tau+n}$ and a large negative coefficient on the interaction term $PIK\,Toggle_{blk,\tau+n} \times PE\,Sponsored_{b\tau}$, which suggests that using PIK toggle is followed by an elevated nonaccrual probability, but more so for non-PE-sponsored firms. This is consistent with the hypothesis that lenders typically require PE sponsors to inject additional equity in exchange for debt amendments that increase debt burden, such as PIKs. With non-sponsored firms, there may not exist similar deep-pocketed financial backers that can do this, which then leads to a higher delinquency probability.[26]

Interestingly the interaction term $PIK\,Toggle_{blk,\tau+n} \times Dual\,holding_{b\tau}$ is positive and not statistically different from zero, contrasting the result shown in Table 5 where $Dual\,holding$ is measured at time t and not at origination τ. These contrasting findings may indicate that the mitigating effect which is presented above in the panel data tests seems to arise from dual-holding measured at the time of PIK use, which can arise e.g., following a post-origination workout and debt-to-equity swap, but not from at-origination-equity-stakes.

Another finding worth pointing out is that the interaction term $PIK\,Toggle_{blk,\tau+n} \times Pre\text{-}PIK\,Amend_{blk,\tau+s}$ is positive but only statistically signficant from zero only at at 10% level, which suggest that we find no strong statistical evidence that PIK toggles activated

[26]While we do not observe in our data these PE sponsors' equity injections, prior studies suggest that they are frequently used in distress situations. For example, Hotchkiss et al. (2021) finds that PE owners are more likely to inject new equity into firms in distress situations, while Jang (2024) finds similar evidence from the COVID period and also shows that equity injection clauses are regularly included in the contracts between private debt lenders and private equity sponsors.

after a loan amendments, rather than before them are associated with significantly different probability of nonaccrual during the loan's lifetime.

Columns (4)-(6) complement these results by instead looking at the outcome that the loan exits the sample with a significant discount. The results are analogous: First, using PIK toggle post-origination is followed by a 20 pp higher probability that the loan will also exit the sample with a significant discount—a finding which is also statistically significantly different from zero at 1% critical level. Second, these adverse outcomes seem to be only slightly mitigated by the presence of a PE sponsor for the borrowing firm.

4.2.2 Heterogeneity between PIK-Notes and PIK-Toggles

Next, we draw attention to the heterogeneity in loan outcomes between PIK-Notes and PIK-Toggles. As described earlier, firms might use PIK in two different ways, either as a permanent component of interest payment right from the loan origination ("PIK-Note") or switch to PIK at some point before loan maturity ("PIK-Toggle"). In the previous section, we have focused on PIK-Toggles as they are more similar to contingent liquidity provision through bank credit lines, whereas PIK-Notes are similar to bonds (often subordinated and fixed-rate), and are often designed as a permanent way for borrowers to save cash to finance a strategy of aggressive growth.

A crucial difference between PIK-Notes and PIK-Toggles lies in the timing and informational environment of their use. PIK components in PIK-Notes are exclusively put in place at origination, when lenders can evaluate the borrower's contemporaneous creditworthiness and calibrate loan terms to the observed risk profile. This aligns with recent evidence that private debt funds rely heavily on ex ante screening and sponsor relationships to manage credit risk (Block et al., 2024; Jang, 2024). In contrast, PIK-Toggles are exercised ex-post, typically when borrower quality deteriorates or refinancing options be-

come prohibitively costly.[27] [28] As PIK-Notes are extended under conditions of active risk assessment, we hypothesize that such borrowers are less likely to enter distress. By contrast, toggling into PIK reflects deteriorating fundamentals and is more likely to precede severe loan outcomes

To test this, we construct two variables: $PIK - Note_{blk}$ takes the value of one if a lender has issued a PIK-Note to a borrower at origination (but the borrower has not toggled afterwards); $PIK - Toggle_{blk}$ takes the value of one if the borrower has activated the PIK-Toggle at some point before loan maturity (but did not have a PIK-Note). We estimate equation (3) using OLS cross-sectional regression, while—in addition to future bankruptcy status—using also the future non-accrual status as an alternative dependent variable. We include all standard control variables measured at origination using OLS and, as before, restrict the sample period to loan originations that occur between 2012Q2-2021Q4.

[Table 7 here]

Table 7 documents results consistent with this hypothesis. For example, the point estimate in Column (1)-(3) suggests that firms that use PIK-Toggle have a 18- 21pp higher likelihood that a loan becomes non-accrual compared to non-PIK users, while for PIK note users, the difference to non-PIK users is only 6-11pp. PIK toggle users are also 10-19pp more likely to exit the sample with a significant discount (Column (4)-(6)) relative to those that do not use PIK, while PIK-Notes these effects vary between 6-7pp.[29]

[27] The activation of a toggle therefore resembles the "covenant-lite" dynamic in direct lending, where the absence of binding early-warning triggers shifts recognition of credit stress to later stages (Chernenko et al., 2022). Toggle usage signals that the original loan was mispriced relative to true risk, implying that lenders do not earn break-even returns on these contracts.

[28] There exists a small fraction (<10%) of PIK toggles that use PIK at origination but do not continue using PIK interest throughout the whole lifetime of the loan, which is why we classify them as PIK-toggles rather than PIK-notes. In the undocumented results, we study the loan characteristics of these "hybrid" PIK loans and find that the loan performance for these loans is less severe than for PIK toggles that are exercised post-origination. Allocating these hybrid cases as PIK-notes or as a fully separate category does not qualitatively impact any of the main results.

[29] In unreported results, we verify that the difference between the PIK notes and PIK toggles is also statistically significant at the 1 percent level in all specifications.

4.2.3 Maturity extensions and debt-to-equity swaps

The evidence thus far indicates that PIK users experience persistent deterioration rather than recovery. A natural question follows: How do lenders ultimately resolve these distressed loans? Specifically, do lenders implement comprehensive restructurings that restore borrower solvency, or do they engage in forbearance by extending maturities to delay loss recognition?

Financial distress can be addressed through two distinct mechanisms. Debt-to-equity swaps reduce the borrower's outstanding debt in exchange for equity stakes, improving leverage ratios and aligning lender-borrower incentives through shared ownership. This approach acknowledges credit losses immediately but positions both parties to benefit from recovery. Alternatively, maturity extensions provide borrowers with additional repayment time without reducing debt obligations. While extensions can be appropriate when borrowers face temporary liquidity constraints, they constitute forbearance when used to avoid recognizing losses on fundamentally insolvent credits, a practice commonly termed "extend-and-pretend."

The institutional features of PIK financing create natural linkages to both mechanisms. On one hand, PIK combined with debt-to-equity swaps could represent legitimate restructuring: lenders defer cash interest to preserve borrower liquidity while injecting fresh equity (or converting debt) to improve solvency. On the other hand, PIK combined with maturity extensions may signal forbearance: lenders capitalize unpaid interest into growing principal balances and extend maturity dates to postpone default recognition, all while maintaining the pretense that debt will be repaid at par.

We test this empirically by examining whether loans experiencing PIK activation are subsequently more likely to receive (1) maturity extensions or (2) debt-to-equity swaps. We construct two outcome variables: *Maturity Extension* equals one if the loan's remaining maturity increases quarter-over-quarter, and *Debt-to-Equity Swap* equals one if a BDC's debt claim on a borrower decreases while simultaneously its equity stake increases. We

run the following OLS regression:

$$y_{blk,\tau+m} = \beta_1 \, PIK\,Toggle_{blk,\tau+n} + \beta_2 \, PIK\,Note_{blk,\tau} + Controls + FEs + e_{blk,\tau}$$

and report the results in Table 8.

[Table 8 here]

Loans activated with PIK Toggles are 26–29pp more likely to receive maturity extensions compared to non-PIK loans (Columns (1) to (3)), whereas PIK Notes show no significant association with maturity extensions and even a statistically significant negative relationship in Column (2). This finding is striking because it reveals a fundamental structural difference: discretionary PIK provisions (Toggles) predict forbearance-style maturity extensions, while predetermined PIK provisions (Notes) do not.

Columns (4)–(6) reveal a secondary but less pronounced response: PIK Toggle activation associates with a 7–10pp increase in debt-to-equity swaps. PIK Notes again show the opposite pattern, with a lower likelihood of debt-to-equity conversions in the baseline specifications (Columns (4) to (5)), though this effect attenuates with the addition of borrower and BDC-year-quarter fixed effects (Column (6)).

The differential magnitudes are economically significant and important. The point estimate for maturity extensions (26–29pp) exceeds that for debt-to-equity swaps (7–10pp) by a factor of approximately 3.5, indicating that maturity extensions are the dominant resolution mechanism when PIK Toggles are exercised. While both outcomes occur with elevated frequency, the even higher likelihood of maturity extensions strongly supports the forbearance hypothesis: discretionary PIK largely enables lenders to postpone recognition of credit losses through repeated maturity deferrals rather than to facilitate fundamental restructurings that recapitalize distressed borrowers. This pattern is inconsistent with PIK functioning as efficient bridge financing for temporarily distressed, viable firms. Instead, it aligns with zombie lending dynamics wherein lenders extend obligations to avoid recognizing losses on inherently insolvent loans.

5 How Does Deferred Interest Affect BDC Funding and Investment?

PIK provisions create a distinctive institutional friction for BDCs: interest income must be recognized for tax purposes even though no cash is received. This creates a critical funding challenge. Given RIC requirements mandating distribution of at least 90% of net investment income as dividends, a BDC with high interest deferrals must fund distributions to shareholders from existing liquidity reserves: they can draw on bank credit lines, issue bonds, liquidate portfolio positions, or reduce dividend payments. The structure of these choices has important implications for financial stability. If PIK-heavy BDCs systematically increase reliance on bank credit lines to manage the liquidity gap, risk could spillover from private credit to the banking sector. Conversely, if banks contractually restrict their exposure through PIK covenants, the financing pressure manifests instead as reduced asset growth, constrained credit supply to borrowers, and potentially reduces shareholder returns.

We investigate this mechanism empirically by examining three central questions: (1) Do BDCs with high PIK usage increase their reliance on bank credit lines, or do bank covenants contractually limit such reliance? (2) What contractual protections do banks employ to insulate themselves from PIK-driven financing pressure? And, (3) when banks constrain credit access to high-PIK BDCs, how do this constraints manifest in BDC balance sheet decisions—reduced asset growth, reduced lending, dividend cuts, or increased bond issuance?

5.1 BDC capital structure

BDC Collateral provides broad details on BDC capital structures, including total debt and total assets, but does not distinguish between different debt types. To obtain comprehensive information on the structure of debt, we merge BDC Collateral with CapitalIQ and the combined CRSP/Compustat database. Following Colla et al. (2013), we exclude

BDC-quarter observations for which total debt reported in BDC Collateral deviates by more than 10% from the total debt reported in CapitalIQ. This process yields a matched sample of 66 unique BDCs, for which we obtain detailed quarterly data on drawn and undrawn credit lines, term loans, bonds, and commercial paper issuances from 2012Q1 through 2024Q4.

BDC capital structure. Panel A of Figure 6 shows the composition of the aggregate BDC sector's balance sheet as of the fourth quarter of 2022, providing insights into both asset holdings and funding sources.[30] On the asset side, direct lending positions comprise the vast majority (98%) of total assets, emphasizing BDCs' primary role as specialized loan providers. Only a small fraction (2%) is held in cash or cash-equivalent reserves, reflecting their strategic focus on lending rather than liquidity accumulation. Regarding liabilities and equity, nearly half (46%) of the BDCs' funding comes from shareholder equity, suggesting a relatively robust capital cushion. Other debt—such as bonds, and similar capital-market instruments—accounts for another significant portion (32%) of their funding structure. Bank financing, primarily through drawn credit lines (21%) and bank term loans (1%), represents approximately one-fifth of their funding. Additionally, BDCs maintain off-balance-sheet liquidity through undrawn bank credit lines (12%), ensuring capacity for future investments and flexibility in managing short-term liquidity requirements. Overall, BDCs are highly lending-focused entities with minimal cash holdings, funded through a balanced mix of equity and diversified debt instruments. Their substantial equity base reflects regulatory and market-driven capitalization requirements, while undrawn credit lines provide critical contingent liquidity to support lending activities.

Panel B illustrates the evolution of the funding mix for a typical BDC's balance sheet (expressed as a percentage of total assets) from 2012Q1 through 2024Q4, highlighting notable trends, such as a decline in equity funding replaced by bank and nonbank debt financing.

[Figure 6 here]

[30] This excludes the BDCs that do not report the detailed funding mix.

Bank Lending to BDCs. Figure 7 illustrates trends in bank lending to Business Development Companies (BDCs) from 2013Q1 to 2024Q3. Panel A presents the evolution of outstanding bank debt, decomposed into *Committed Credit Lines*, *Drawn Credit Lines*, and *Bank Loans*. The data show a steady increase in total committed credit over the sample period, with pronounced growth beginning around 2018 and peaking in 2023 at over USD 60 billion. Drawn credit lines and bank loans followed similar upward trends, though with greater cyclicality and a recent moderation in 2024.

Panel B depicts the share of bank debt relative to total BDC debt and the utilization rate of credit lines. Bank debt share fluctuated between 0.35 and 0.55, peaking during mid-cycle expansions and declining sharply in 2020–2021. Credit line usage exhibited similar cyclical variation, with high utilization preceding declines in bank debt share. Notice also, how the decline in bank loan and credit line usage coincided with an increase in PIK usage in 2020-2021, documented in Section 2.

[Figure 7 here]

5.2 Deferred interest and BDC financing choices

As documented above, BDCs rely more on credit lines than cash in their liquidity management. An important question, therefore, is whether BDCs with a higher proportion of deferred interest payments exhibit greater reliance on bank-committed lines of credit, and bank debt overall as a share of total debt funding, or whether collateral restrictions and covenants imposed by banks effectively limit such reliance.

We investigate these questions using the following OLS model:

$$y_{l,t} = \beta_1 \, PIK\, usage\, share_{l,t} + Controls_{l,t} + Fixed\, Effects + e_{lt}$$

where the dependent variable $y_{l,t}$ is either *Bank Debt Share* or *Credit Line Usage*. If higher PIK usage leads the BDC to draw down more of its bank credit line and rely more on bank debt (rather than other forms such as bonds), we would expect β_1 to be positive.

Conversely, if greater PIK usage results in reduced reliance on bank debt and increased use of alternative funding sources, we would expect β_1 to be negative.

[Table 9 here]

Results for Table 9 are presented in columns (1) to (3), which evaluate the relationship between PIK usage and the share of bank debt in total debt, and columns (4) to (6), which address credit line utilization.

The analysis demonstrates a statistically significant and economically substantial negative association between PIK usage and both the bank debt share and credit line usage in subsequent quarters. Specifically, the most conservative specifications in columns (3) and (6) indicate that a one percentage point increase in PIK usage leads to a 0.52 percentage point reduction in the proportion of bank debt and a 0.38 percentage point decrease in credit line utilization, both significant at the 1% threshold.

These results indicate that BDCs do not utilize bank-provided credit lines to finance PIK private credit structures. Instead, the evidence suggests that a greater reliance on PIK features serves as an indicator of heightened credit risk, leading to reduced access to bank financing and credit line drawdowns. The observed decrease in bank debt share suggests that banks are hesitant to extend credit to BDCs with substantial PIK exposure, likely due to concerns about underlying asset quality and liquidity risks. Likewise, the significant negative correlation with credit line usage signals that BDCs with increased reliance on PIK face tighter constraints in accessing bank credit facilities at times when PIK is employed.

To assess this mechanism, we systematically analyze the contract terms of bank-provided credit lines to BDCs as disclosed in SEC regulatory filings. Our approach involves identifying all relevant 8-K and 8-K/A documents pertaining to bank financing and closely reviewing sections that address PIK provisions. This review reveals that banks almost universally impose explicit limits on permissible PIK exposure, directly tying these constraints to the amount a BDC may borrow.[31] The underlying reason is that BDC

[31]For the subset of BDCs with credit line outstanding, we find language restricting PIK appears in over 90% of credit line agreements.

investment portfolios, or discrete portions thereof, often designated as the "borrowing base", serve as collateral for bank debt. Since this collateral coverage must scale with the magnitude of outstanding borrowings, an elevated PIK usage share can restrict further bank borrowing or trigger a requirement to repay existing debt.

In summary, while BDCs receive substantial bank credit lines and exhibit higher utilization rates relative to other nonbank financial intermediaries, these contractual protections and borrowing base mechanics effectively insulate the banking sector from the risks associated with increased deferred interest payments.

5.3 Deferred interest and BDC balance sheet and payout choices

In Table 10, we expand our analysis to future changes in leverage ratio (columns (1) to (2)), and cash holdings (columns (3) to (4)), log change in asset growth (columns (5) to (6)) and log change in paid dividends (columns (7) to (8)). The asset growth is based on the cost value of asset, but using the fair value would generate very similar results. The one-quarter lagged *PIK usage share* is again our key explanatory variable.

[Table 10 here]

Columns (1)-(2) show that we do not find evidence that lower cash flows from high PIK usage are financed with BDCs tilting toward more leveraged capital structure. Quite the contrary, the estimate in column (2) suggests that BDCs lower their leverage ratio in the next period following high PIK usage. In columns (3) and (4), we also show that their cash share relative to total assets does not change following changes in the level of PIK usage.

In contrast, the findings in columns 5 and 6 reveal a statistically significant and negative association between PIK usage and asset growth. A one percentage point increase in PIK usage is associated with approximately 0.09 percentage point reduction in asset growth, at the 1% significance level. These results suggest that greater reliance on PIK structures constrains asset expansion, likely reflecting a deterioration in loan performance and reduced reinvestment capacity for BDCs.

Similarly, there is some evidence that PIK usage is negatively associated with dividend growth. In the baseline specification (column 7), a one percentage point increase in PIK usage is linked to approximately 0.06 percentage point reduction in dividend growth, significant at the 5% level. However, when BDC fixed effects are included (column 8), the coefficient becomes smaller (-0.02) and loses statistical significance. This attenuation suggests that the observed relationship between PIK usage and dividends may be partially explained by time-invariant BDC-specific characteristics, such as risk appetite or different approaches to payout policies.

6 Conclusion

This paper examines whether Payment-in-Kind (PIK) provisions function as efficient liquidity management or forbearance mechanisms in private credit markets. Using a new and comprehensive BDC loan data, we show PIK predominantly enables forbearance rather than temporary bridge financing.

PIK users are distressed firms lacking bank financing. PIK activation predicts persistent deterioration lasting at least two years, with loans exercising PIK Toggles ex-post exhibiting higher nonaccrual rates compared to PIK-Notes structured at origination. This pattern indicates ex-post activation reveals negative information about deteriorating creditworthiness. Cross-sectional tests show adverse effects persist regardless of maturity or size, with private equity sponsorship providing the only meaningful mitigation.

PIK-Toggle activation predicts maturity extensions far more than formal restructurings, mirroring extend-and-pretend behavior in other credit markets. Despite substantial bank lending to BDCs, covenant-based restrictions insulate banks from PIK losses—we find that over 90% of credit lines restrict PIK collateral eligibility. PIK-heavy BDCs consequently experience reduced bank financing and respond by constraining asset growth and dividends, suggesting credit supply contraction rather than banking sector transmission.

In conclusion, while PIK provisions offer legitimate financial flexibility in narrow circumstances, our empirical analysis indicates they function primarily as forbearance

mechanisms that delay recognition of fundamental distress. The sophisticated covenant structures we document suggest banks have effectively protected themselves through contractual design, but the accumulation of hidden losses in private credit portfolios and the transmission of financing constraints through credit supply channels raise important questions about systemic risks in the rapidly expanding, yet opaque, private credit market.

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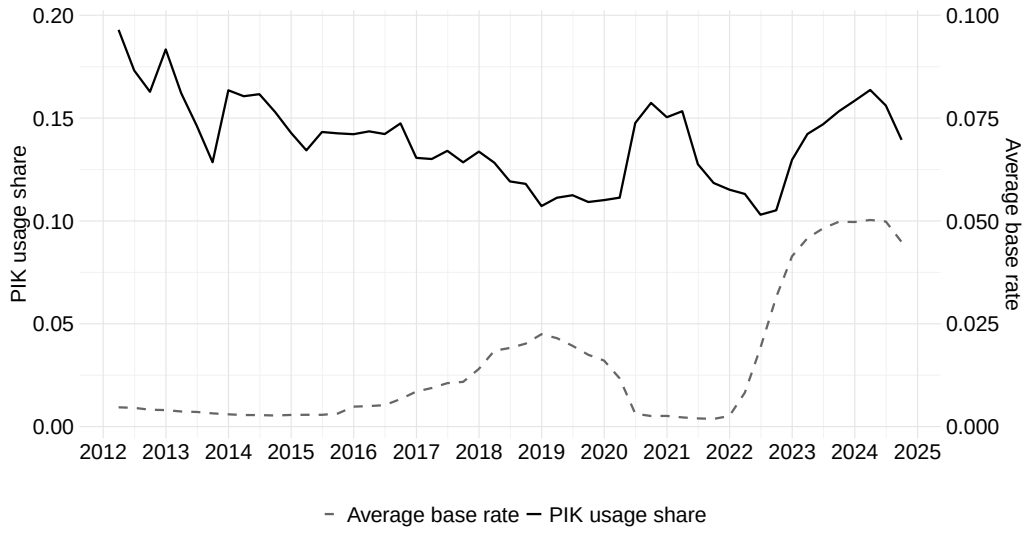
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Figure 1: PIK usage across the financial cycle

Panel A shows the time-series of the PIK usage share across all BDCs' portfolio loans over the 2012Q1 to 2024Q3 period (solid line) as well as the average base rate (dashed line). PIK usage share is the value-weighted number of loans in which borrowers use PIK, relative to all loans in a given quarter. Panel B shows the PIK usage share, calculated using a value-weighted number of loans with non-accrual status or a valuation below 80%.

Panel A - PIK usage share and average base interest rate



Panel B - PIK usage share and loan distress

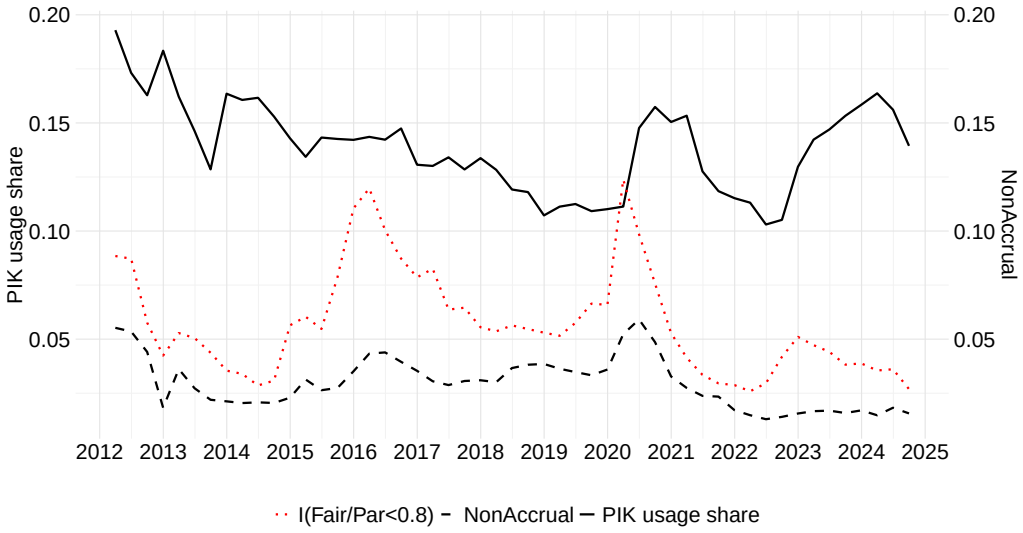
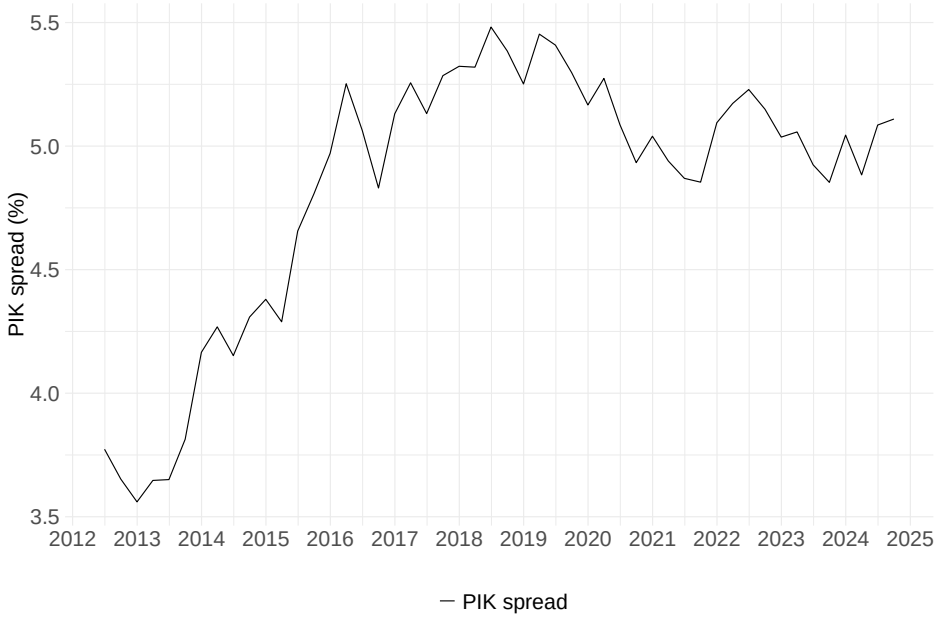


Figure 2: PIK loan characteristics

Panel A shows the equal-weighted average PIK spread among loans that use PIK.
Panel B shows the equal-weighted (EW) and par-value weighted (VW) average PIK spread relative to all-in-yield across all loans in the sample.

Panel A - Average PIK spread among active PIK loans



Panel B - Average PIK spread share relative to all-in-yield among all loans

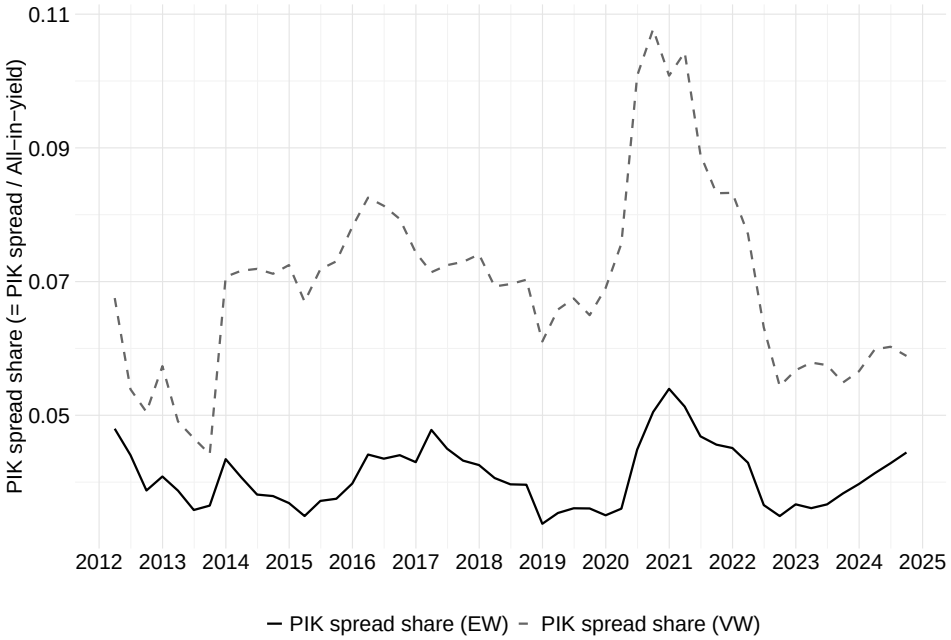
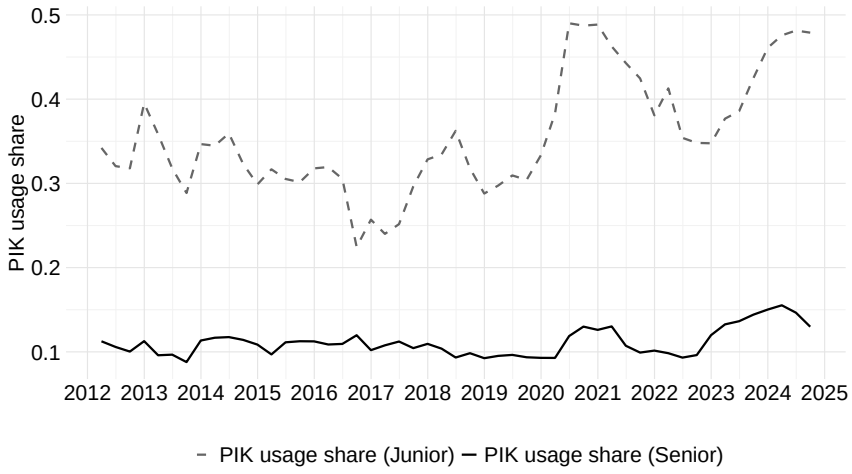


Figure 3: Heterogeneity in PIK users

Panel A decomposes the PIK usage share to senior loans, which include First Lien and Second Lien Senior Secured loans, and junior loans, which include Subordinated Debt across all BDCs' portfolio loans during the 2012Q1 to 2024Q3 period. PIK usage share is the value-weighted number of loans where borrowers use the PIK relative to all loans in a given quarter. Panel B shows the time series of the PIK usage share decomposed to loans of those borrowers who have received a bank loan within the preceding 5 years (solid line) and those who have not (dashed line). Panel C shows the PIK usage share for PIK Notes and PIK Toggle, respectively. PIK usage share for PIK toggles is the value-weighted number of loans in which borrowers use the PIK option, relative to all loans in a given quarter, while excluding PIK notes, while PIK usage share for PIK notes is the value-weighted number of loans in which borrowers use the PIK, relative to all loans in a given quarter, while excluding PIK toggles.

Panel A - PIK usage share based on loan seniority



Panel B - PIK usage among different types of borrowers

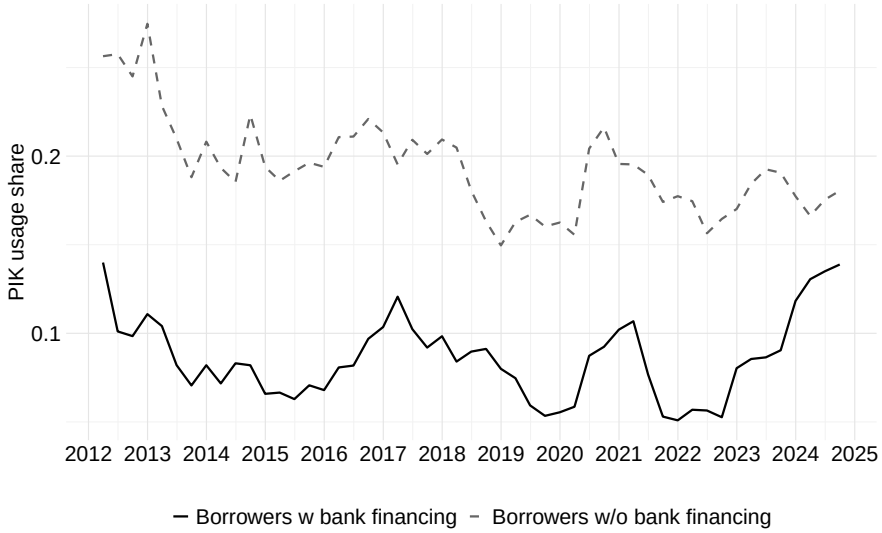


Figure 3: Heterogeneity in PIK users (continued)

Panel C - PIK usage share among PIK Notes and PIK Toggles

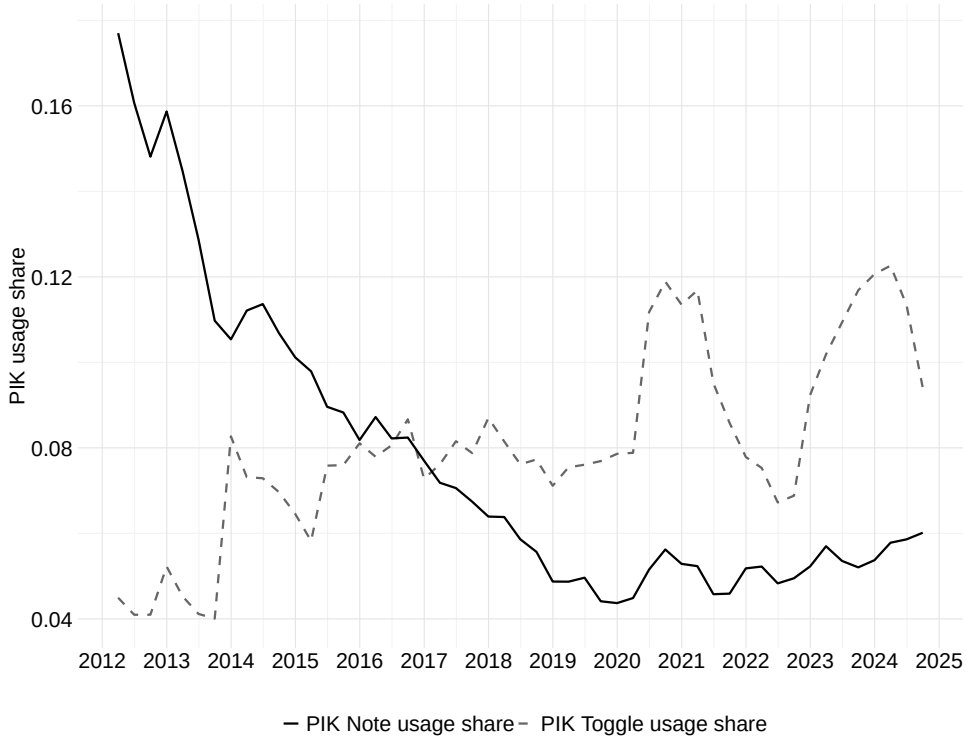


Figure 4: Impulse response functions

The figure plots the impulse response functions based on the following local-projection regression

$$y_{blk,t+h} = \beta_h PIK_{blkt} + \gamma_h\, y_{blkt} + Controls + FixedEffects + e_{blk,t+h}$$

where h runs from 1 to 8 and $y_{blk,t+h}$ is either $NonAccrual$, $Fair/Par$ or $CSD(Fair/Par)$ at time $t+h$ for loan k of borrower b held by lender l. We include the following fixed effects: $YearQtr \times Industry + YearQtr \times BDC + Borrower \times BDC + Seniority + LoanType$. We include following controls $Ln(Loan\,Size)$ $Effective\,Base\,rate$, $Fixed\,rate\,loan$, $Ln(Time\text{-}to\text{-}Maturity)$, $Dual\,holding$, $PE\,Sponsored$, $Bank\,financing$ with all measured at time t. The y-axis shows the level of the β_h coefficient, while the x-axis denotes the horizon h. The blue line represents the mean estimates, while the shaded area illustrates the 95% confidence intervals based on three-way clustered standard errors by BDC, Borrower, and year-quarter.

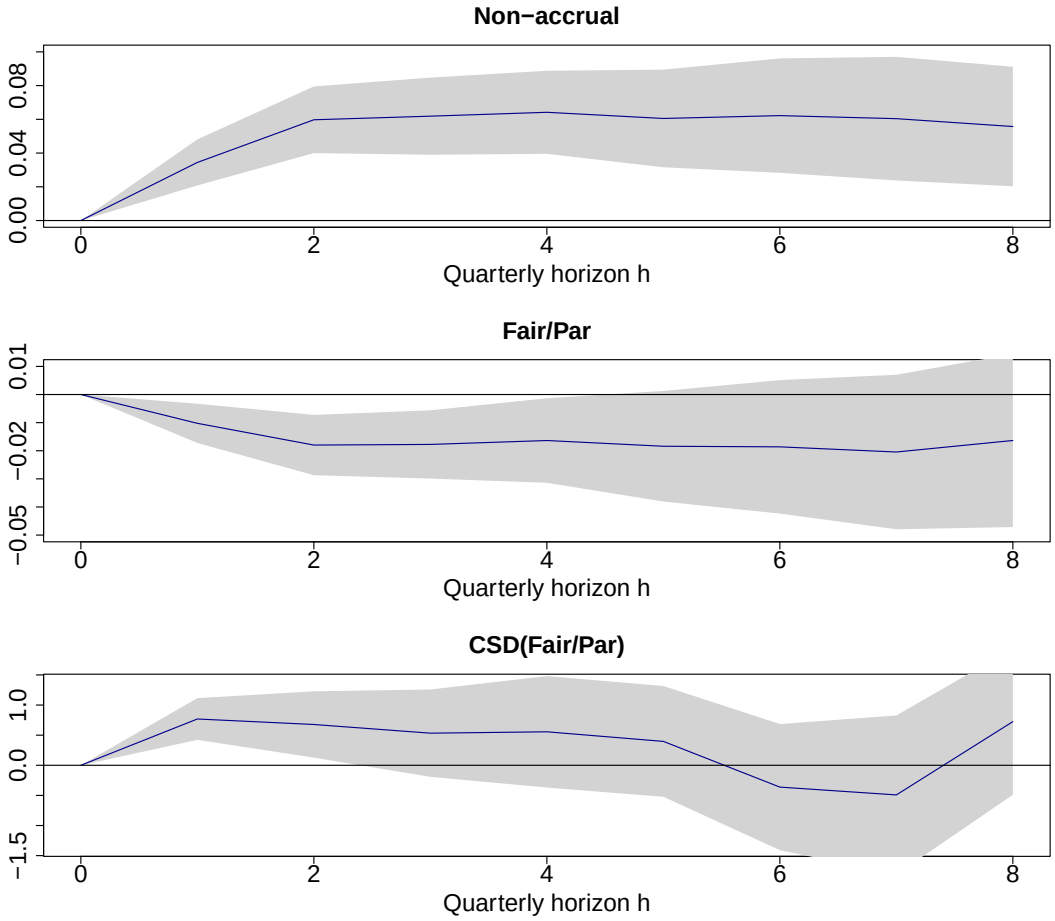
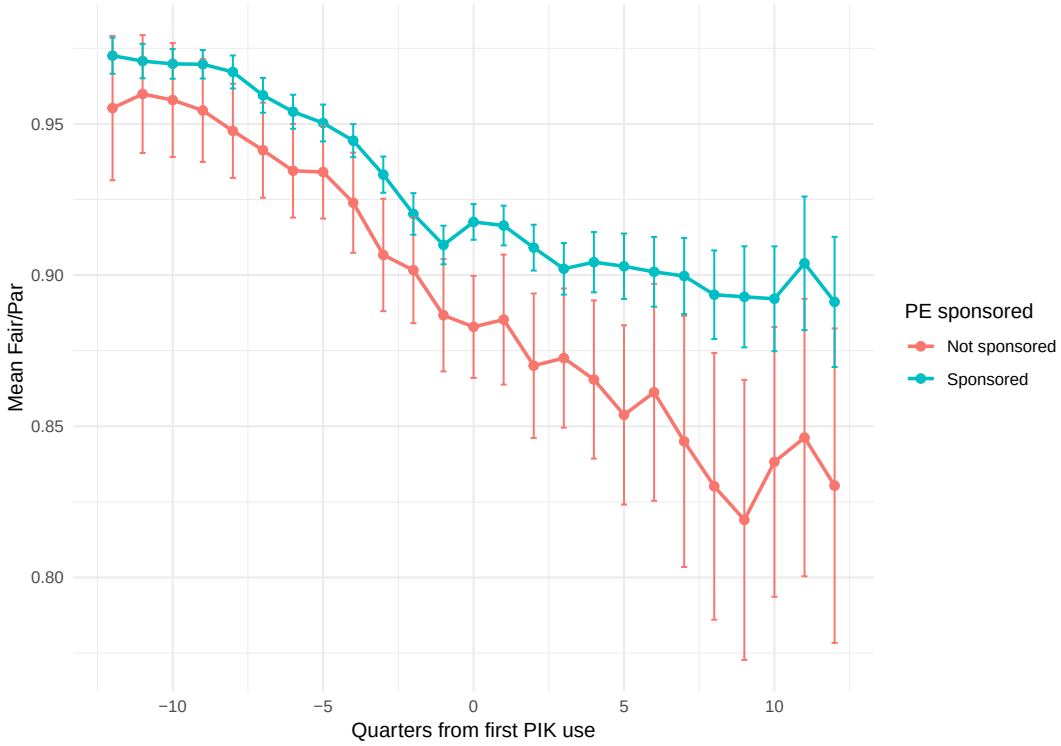


Figure 5: PE Sponsors and PIK use

Panel A - Average Fair/Par-ratio around first time of PIK use



Panel B - NonAccrual rate around first time of PIK use

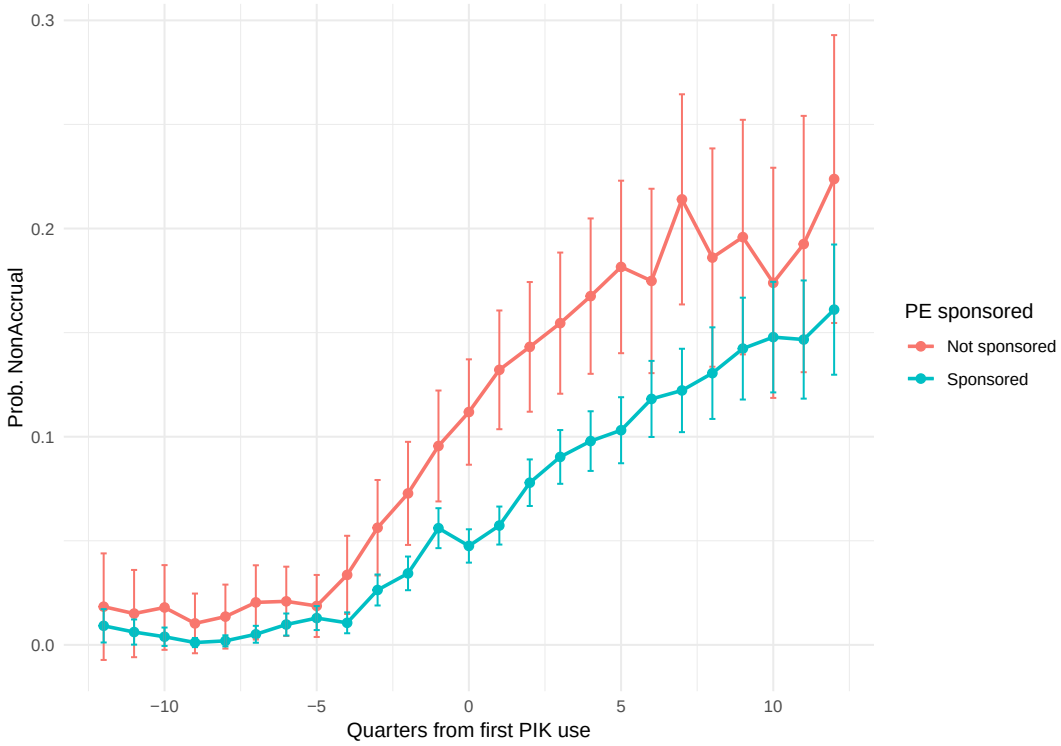
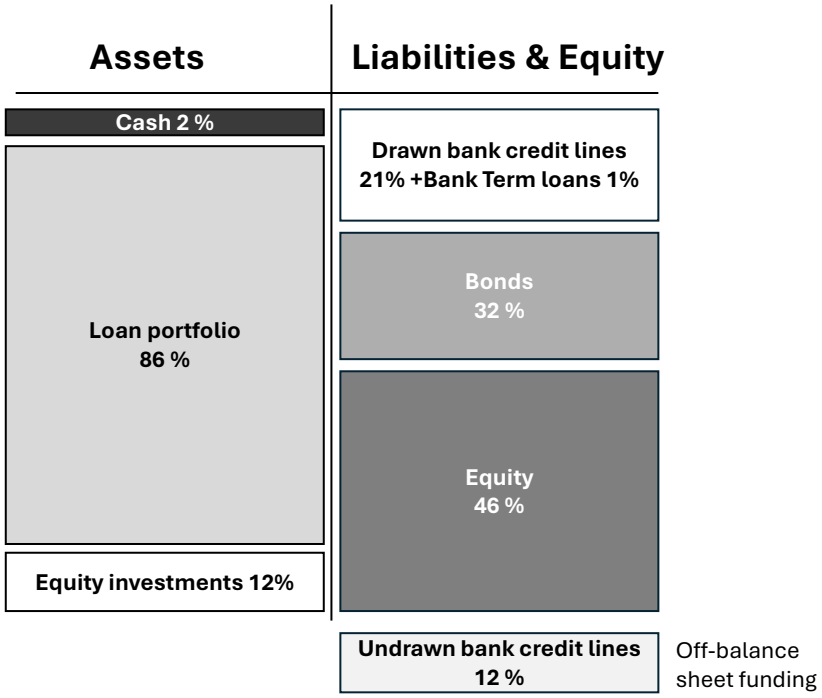


Figure 6: BDC capital structure

Panel A shows the aggregated BDC sector's balance sheet components (all relative to total assets) as of 2022Q4 for a subset of BDCs with all balance sheet data available. Panel B shows the average share of different debt structure items relative to total assets across all BDCs' balance sheets over the 2012Q1 to 2024Q3 period.

Panel B - Balance sheet of the BDC sector in 2022Q4



Panel B - BDC debt capital structure

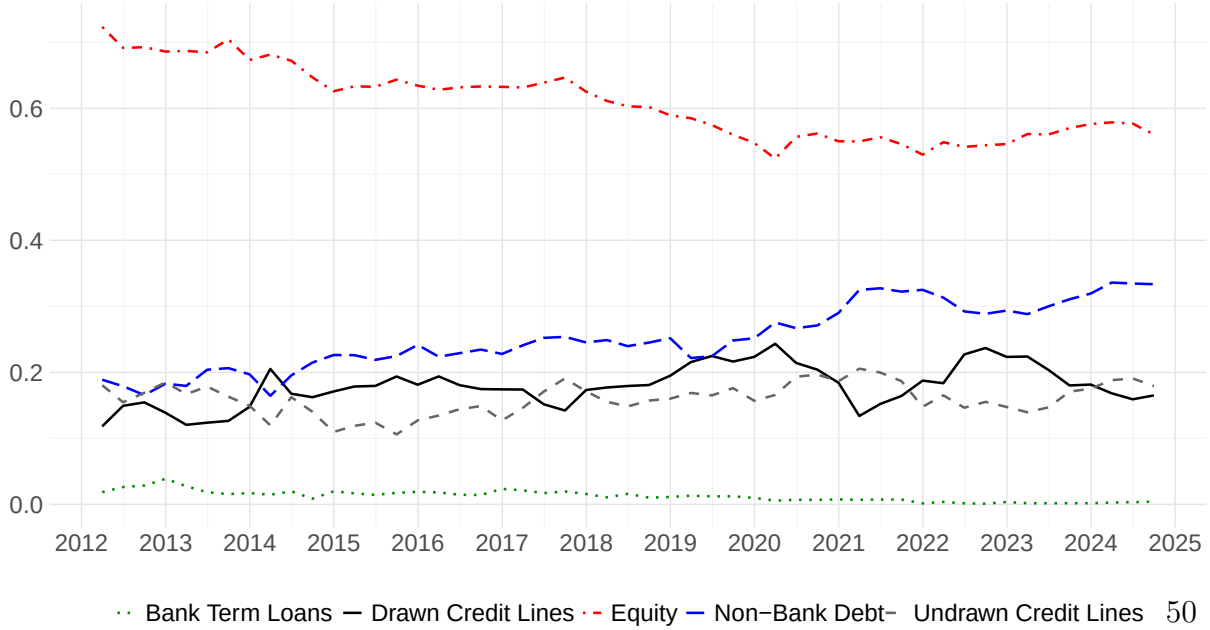
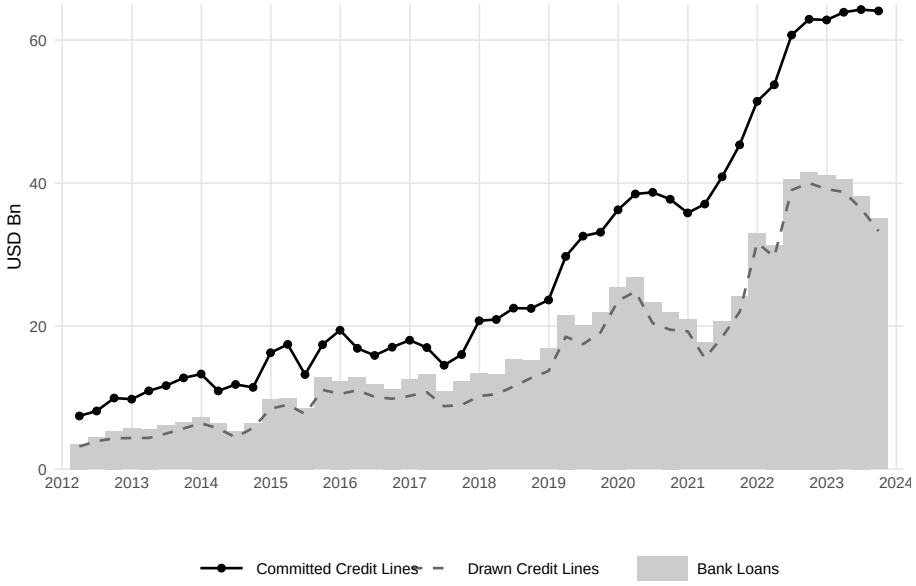


Figure 7: Bank lending to BDCs

Panel A shows outstanding bank debt of BDCs over the 2013Q1 to 2024Q3 period: *Committed Credit Lines* (the sum of drawn and undrawn credit lines), *Drawn Credit Lines* and *Bank Loans* (the sum of drawn credit lines and term loans). Panel B shows the time-series of bank debt as a percentage of total debt (*Bank debt share*) and *Credit line usage*.

Panel A - Outstanding bank debt



Panel B - Credit line usage and bank share

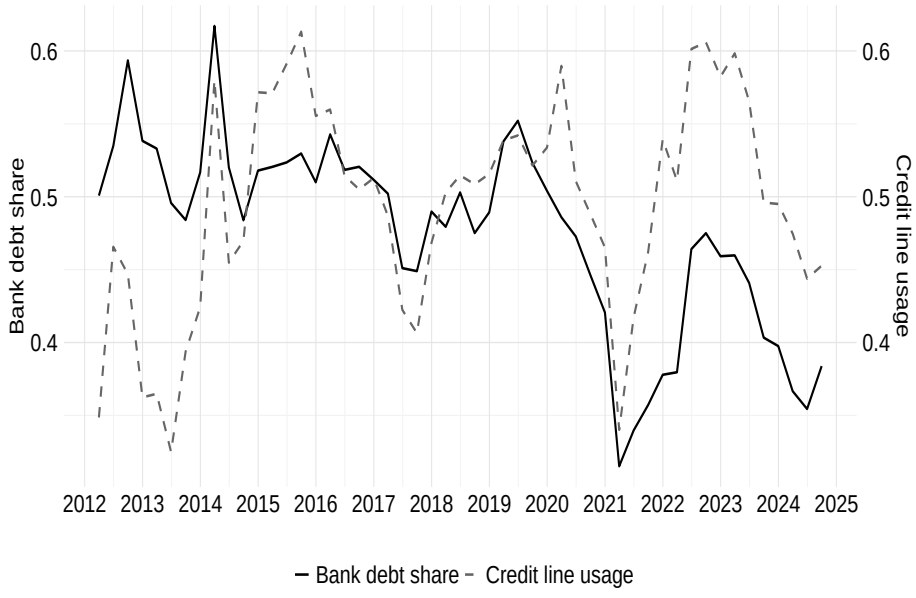


Table 1: Descriptive statistics

This table shows descriptive statistics for variables at the BDC level (Panel A) and at the loan level (Panel B). Loan is defined as a Borrower-Lender-Seniority-Loan Type -tuple. For Panels A and B, the sample period is from 2012Q1 to 2024Q4. Panel C shows the share of loans with a given loan characteristic at the origination date for "*PIK-notes*", "*PIK-toggle*" loans, and loans with "*No PIK used*". The origination date is defined as the first date on which the loan enters the sample. *PIK-notes* are defined as loans with deferred (instead of cash interest payments) over the entire duration of the loan. *PIK-toggle* loans are loans for which borrowers do not defer interest in every period but only in some periods. *Non PIK'd loans*" refers to loans that never use PIK. For Panel C, all variables are measured at origination, except $Avg\,Cash\,Spread\,share$, $Avg\,PIK\,Spread\,share$, $Avg\,Cash\,Spread$, $Avg\,PIK\,Spread$, $Months\,in\,sample$, $Maturity\,extension$, $Share\,of\,time\,using PIK$, which are measured based on the loan's subsequent lifetime, and $I(Fair/Par < 80\%)\,(at\,termin.)$, which is measured at loan termination date, and $Future\,NonAccrual$ that is calculated from the post-origination sample. *Avg PIK spread* (*Avg Cash spread*) is the average PIK (Cash) spread during the loan's subsequent life. $Avg\,PIK\,Spread\,Share = mean(PIK\,Spread/All-in-yield)$ and $Avg\,Cash\,Spread\,Share = mean(Cash\,Spread/All-in-yield)$, with the mean calculated across the loan's subsequent life. Panel C sample excludes loans that appear in the sample for less than 4 periods, loans that originate after 2021Q4, or before 2012Q2, loans that have $Fair/Par < 0.97$ or have nonaccrual status at the implied origination date, and loans that cannot be matched to Pitchbook. For variables with missing observations, the mean is calculated by excluding these observations. Detailed variable definitions are provided in Appendix B. Column "Diff No-Toggle" ("Diff No-Note") calculates the pairwise mean-difference and associated Welch standard errors in the parentheses between loans with no PIK used and PIK toggles (respectively with no PIK used and PIK-notes).

Panel A: BDC-level panel data

Statistic	N	Mean	St. Dev.	Q1	Median	Q3
PIK usage share	3,998	0.14	0.18	0.003	0.08	0.18
Assets ($ billion)	4,494	1.62	3.85	0.25	0.59	1.63
Number of investees	4,494	85.52	75.67	32	63	120
Leverage	4,494	0.40	0.17	0.33	0.44	0.51
Fund Age (in years)	4,494	9.05	11.51	3	6	11
ROE	3,513	0.06	0.17	0.02	0.09	0.14
Bank debt share	1,989	0.47	0.31	0.23	0.45	0.68
Credit line usage	1,893	0.51	0.27	0.32	0.54	0.71
Non-accrual share	4,494	0.03	0.06	0.00	0.005	0.03
Δ ln Assets	4,252	0.09	0.21	-0.01	0.03	0.11
Δ ln Dividends	3,747	0.08	0.16	-0.000	0.002	0.08

Table 1: Descriptive statistics (continued)

Panel B: Loan-level panel data

Statistic	N	Mean	St. Dev.	Q1	Median	Q3
PIK	380,432	0.10	0.30	0	0	0
All-in-yield (%)	380,432	9.56	2.74	7.71	9.75	11.30
PIK spread (%)	37,738	4.96	4.24	2.00	3.38	7.10
Cash spread (%)	380,432	6.49	2.59	5.00	6.00	7.75
PIK+Cash spread (%)	380,432	6.99	2.69	5.25	6.25	8.00
Base rate (%)	316,555	2.96	2.12	0.65	2.80	5.09
Fixed rate loan	380,432	0.17	0.37	0	0	0
Non-accrual loan	380,432	0.03	0.16	0	0	0
Fair value ($ million)	380,432	16.04	38.87	2.20	6.70	16.51
Par value ($ million)	380,432	16.66	39.59	2.44	7.01	17.30
Cost value ($ million)	380,432	16.39	39.09	2.37	6.93	17.00
Fair/Par	380,432	0.95	0.12	0.97	0.99	1.00
Time to maturity (Months)	378,902	50.13	22.12	35.34	51.00	65.00
Dual holding	380,432	0.19	0.39	0	0	0
PIK-Toggle	380,432	0.15	0.35	0	0	0
PIK Toggle Use	380,432	0.06	0.24	0	0	0
PIK note	380,432	0.04	0.20	0	0	0
Has bank financing	224,854	0.49	0.50	0	0	1
PE Sponsored	308,428	0.81	0.39	1	1	1
Seniority classes						
First Lien Senior Secured	380,432	0.84	0.36	1	1	1
Second Lien Senior Secured	380,432	0.10	0.31	0	0	0
Subordinated Debt	380,432	0.05	0.22	0	0	0
Loan Type classes						
Revolver	380,432	0.05	0.23	0	0	0
Delay Draw Term Loan	380,432	0.07	0.26	0	0	0
Term Loan	380,432	0.80	0.40	1	1	1
Unitranche	380,432	0.06	0.24	0	0	0
Other	380,432	0.01	0.12	0	0	0

Panel C: Sample differences

Variable	No PIK used	PIK-toggle	PIK-note	Diff No-Toggle	Diff No-Note
Observations	8730	1196	413		
First Lien Senior Secured (%)	80.3	85.8	51.1	-5.5 (1.1)	29.2 (2.5)
Fixed rate (%)	13.6	19.9	67.6	-6.3 (1.2)	-54.0 (2.3)
Par value ($ million)	14.43	19.52	18.44	-5.09 (1.28)	-4.01 (2.31)
Time-to-maturity (Months)	67.25	61.48	57.34	5.77 (0.54)	9.91 (1.03)
All-in-yield (%)	7.8	8.9	11.9	-1.1 (0.1)	-4.2 (0.2)
Avg Cash Spread (%)	6.6	6.5	6.8	0.1 (0.1)	-0.2 (0.2)
Avg PIK Spread (%)	0.0	1.9	4.5	-1.9 (0.1)	-4.5 (0.2)
Avg Cash Spread share (%)	78.9	64.8	54.3	14.2 (0.6)	24.6 (1.6)
Avg PIK Spread share (%)	0.0	16.1	37.4	-16.1 (0.5)	-37.4 (1.6)
Revolver (%)	3.4	3.6	1.0	-0.2 (0.6)	2.5 (0.5)
DDTL (%)	2.7	3.2	3.6	-0.5 (0.5)	-0.9 (0.9)
Term Loan (%)	87.3	83.9	86.7	3.4 (1.1)	0.6 (1.7)
Unitranche (%)	6.5	9.3	8.7	-2.8 (0.9)	-2.2 (1.4)
Number of BDCs	3.04	3.06	1.98	-0.02 (0.09)	1.06 (0.09)
Multiple BDCs (%)	68.9	65.1	40.7	3.7 (1.5)	28.2 (2.5)
Bank financing (%)	55.5	39.7	28.3	15.8 (1.5)	27.2 (2.3)
PE Sponsored (%)	87.6	88.5	76.3	-0.8 (1.0)	11.3 (2.1)
Dual Holding (%)	15.2	28.2	56.2	-13.0 (1.4)	-41.0 (2.5)
I(Fair/Par<80%) (at termin.) (%)	5.3	25.2	12.6	-20.0 (1.8)	-7.3 (1.9)
Future nonaccrual (%)	3.0	26.2	11.4	-23.1 (1.3)	-8.3 (1.6)
Months in sample	34.78	53.96	33.07	-19.18 (0.72)	1.72 (0.94)
Maturity extension (%)	26.4	57.2	26.9	-30.8 (1.5)	-0.4 (2.2)
Share of time using PIK (%)	0.0	41.6	100.0	-41.6 (0.8)	-100.0 (0.0)

Table 2: Use of Deferred Interest (PIK) in Private Debt

This table shows an example of loan reporting in BDC Collateral in the form of First Lien Senior Secured Term Loan to Exel Direct Inc. from Garrison Capital Inc.

YearQtr	Effective Base	All-in-Yield	Cash Spread	PIK Spread	PIK	ParV	Fair/Par	NonAccrual	Time-to-Maturity
201302	1 %	12 %	11 %	0 %	0	11.50	0.98	0	60
201303	0.2 %	5.8 %	5.5 %	0 %	0	14.00	0.98	0	57
201304	1 %	12 %	11 %	0 %	0	13.90	0.98	0	54
201401	1 %	12 %	11 %	0 %	0	13.70	1.00	0	51
201402	1 %	12 %	11 %	0 %	0	13.60	1.00	0	48
201403	1 %	12 %	11 %	0 %	0	13.40	1.00	0	45
201404	1 %	14 %	13 %	0 %	0	13.20	0.92	0	42
201501	1 %	14 %	13 %	0 %	0	13.30	0.92	0	39
201502	1 %	14 %	3 %	10 %	1	13.70	0.95	0	36
201503	1 %	14 %	3 %	10 %	1	14.00	0.95	0	32
201504	1 %	14 %	3 %	10 %	1	14.30	0.95	0	29
201601	1 %	14 %	5 %	8 %	1	14.60	0.95	0	26
201602	1 %	14 %	5 %	8 %	1	14.90	0.95	0	23
201603	1 %	14 %	5 %	8 %	1	15.20	0.95	0	20
201604	1 %	14 %	11 %	2 %	1	15.40	0.95	0	17
201701	1 %	14 %	11 %	2 %	1	15.50	0.94	0	14
201702	1.1 %	14.1 %	0 %	13 %	1	15.70	0.94	0	11
201703	1.2 %	15.2 %	0 %	14 %	1	16.30	0.94	0	8
201704	1.4 %	15.4 %	0 %	14 %	1	16.90	1.01	0	5
201801	1.7 %	15.7 %	0 %	14 %	1	17.60	1.01	0	2

Table 3: Determinants of PIK usage

This table shows the results from OLS regression of PIK use on various loan characteristics. The sample period is 2012Q1-2024Q1. PIK_{blkt} is an indicator variable that takes the value of one if the loan k from lender l to borrower b is reported to be paid in kind for period t. The sample excludes PIK Notes. $NonAccrual_{blkt}$ is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t. $Ln(Time\text{-}to\text{-}Maturity_{blkt})$ is the natural logarithm of the remaining time to maturity. $I(Fair/Par_{blkt} < 0.8)$ is an indicator variable that takes a value of one if the loan's fair/par ratio is below 0.8, and zero otherwise. $Ln(Loan\,Size_{blkt})$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan_{blkt}$ is an indicator variable that takes the value of one if the loan has a fixed interest rate at time t and zero otherwise. $Effec.\,Base\,rate_{blkt}$ is the maximum value between the loan k's base rate and the interest rate floor (if one exists) at time t and zero if the loan has no base rate. $All\text{-}in\text{-}spread_{blk\tau}$ is the all-in-spread at time of the origination τ. $Dual\,holding_{blt}$ is an indicator variable that takes the value of one if the BDC l also has an equity stake in the borrowing firm b. $PE\,Sponsored_{bt}$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise. $Bank\,financing_{bt}$ is an indicator variable that takes the value of one if the borrower has received a bank loan during the preceding five years. We exclude the intercept term from the results whenever the model has one. The last column restricts the sample to firms with multiple loans outstanding in that period. We include different fixed effect combinations. *BDC* refers to the identity of the BDC (Lender). *YearQtr* refers to the calendar quarter e.g. 2022Q4. *Borrower* refers to the identity of the borrower. *Industry* refers to the industry of the borrower. *Seniority* refers to loan seniority. *LoanType* refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, borrower, and year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:	$PIK_{blk,t+1}$							
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Distress								
$NonAccrual_{blkt}$	0.31***	0.22***	0.22***	0.21***	0.15***	0.15***	0.12***	0.16***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)
$I(Fair/Par_{blkt} < 0.8)$		0.05***	0.05***	0.04***	0.04***	0.04***	0.03***	0.00
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Loan Terms								
$Ln(Loan\,Size_{blkt})$		0.01***	0.01***	0.01***	0.00***	0.00***	0.01**	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$Ln(Time\text{-}to\text{-}Maturity_{blkt})$		-0.03***	-0.02***	-0.02***	-0.02***	-0.02***	-0.01	-0.01
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
$Effec.\ Base\ rate_{blkt}$		0.33*	-0.04	0.07	-0.07	0.07	0.12	0.55
		(0.19)	(0.45)	(0.48)	(0.38)	(0.37)	(0.41)	(0.51)
$Fixed\ rate\ loan_{blkt}$		0.09***	0.09***	0.10***	0.14***	0.17***	0.22***	0.13***
		(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
$All\text{-}in\text{-}spread_{blk\tau}$		0.30	0.43	0.43	0.35	0.37	0.90	1.44*
		(0.24)	(0.28)	(0.26)	(0.26)	(0.27)	(0.77)	(0.73)
Ownership								
$Dual\ holding_{blt}$		0.03***	0.03***	0.03***	0.01	0.01	0.01	0.04**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
$PE\ Sponsored_{bt}$		0.04***	0.04**	0.04***	0.01	0.00	-0.01	
		(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.03)	
Lending Relationship								
$Ln(Number\ of\ BDCs)_{bt}$		0.00	0.00	0.00	-0.01***	-0.01***	-0.02***	
		(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	
$Bank\ financing_{bt}$		-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.04***	
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	
Fixed-effects								
YearQtr			Yes					
LoanType			Yes	Yes	Yes	Yes	Yes	Yes
Seniority			Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Industry				Yes	Yes	Yes	Yes	
Borrower					Yes	Yes		
BDC						Yes		
Borrower-BDC							Yes	Yes
YearQtr-Borrower								Yes
BDC-YearQtr								Yes
Fit statistics								
Observations	230,941	162,670	162,670	162,628	162,628	162,628	162,628	161,189
Adjusted R^2	0.03	0.08	0.09	0.10	0.50	0.51	0.55	0.81
Dependent variable mean	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06

Table 4: Predictive regressions: PIK and loan outcomes

This table shows the results from OLS regressions of $NonAccrual_{blk,t+1}$, $Fair/Par_{blk,t+1}$ and $CSD(Fair/Par)_{bk,t+1}$ on PIK_{blkt} and various control variables. The sample period is 2012Q1-2024Q1. $NonAccrual_{blkt}$ ($NonAccrual_{blk,t+1}$)is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t ($t+1$). $Fair/Par_{blkt}$ is the valuation of the loan k at time t. $CSD(Fair/Par)_{bk,t+1}$ is the cross-sectional standard deviation of similar loans' $Fair/Par$-ratio across all BDC's portfolios at the end of period t multiplied by 100. Two loans held by two different lenders at the same time are considered similar if they are issued by the same borrower, have the same seniority, and have the same loan type. PIK_{blkt} is an indicator variable that takes the value of one if the loan k from lender l to borrower b is reported to be paid in kind for period t. The sample excludes PIK Notes. We include control variables: $Ln(Time\text{-}to\text{-}Maturity_{blkt})$ is the natural logarithm of the remaining time to maturity. $Ln(Loan\,Size_{blkt})$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan_{blkt}$ is an indicator variable that takes the value of one if the loan is tied to a fixed interest rate at time t. $Base\,rate_{blkt}$ is the loan's base rate at time t and zero if there is no base rate. $All\text{-}in\text{-}spread_{blk\tau}$ is the all-in-spread at time when the loan k first appears in the sample at time τ. $Dual\,holding_{blt}$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm. $PE\,Sponsored_{bt}$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise, an indicator for borrower b that has received $Bank\,financing_{bt}$ in preceding 5-year period to t. We include different fixed effect combinations. BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter e.g. 2022Q4. $Borrower$ refers to the identity of the borrower. $Industry$ refers to the borrower's industry. $Seniority$ refers to loan seniority. $LoanType$ refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, borrower, and year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	NonAccrual$_{blk,t+1}$		Fair/Par$_{blk,t+1}$		CSD(Fair/Par)$_{bk,t+1}$	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK$_{blkt}$	0.02***	0.03***	-0.01***	-0.01***	0.62***	0.66***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.17)	(0.14)
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects						
YearQtr	Yes		Yes		Yes	
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Industry		Yes		Yes		Yes
YearQtr-BDC		Yes		Yes		Yes
Borrower-BDC		Yes		Yes		Yes
Fit statistics						
Observations	167,524	167,477	166,211	166,164	103,467	103,460
Adjusted R^2	0.71	0.72	0.79	0.81	0.40	0.47
Dependent variable mean	0.03	0.03	0.95	0.95	1.35	1.35

Table 5: Predictive regressions: Heterogeneity in PIK'd loan outcomes

This table shows the results from OLS regressions of $NonAccrual_{blk,t+1}$ and $Fair/Par_{blk,t+1}$ on PIK_{blkt} and various control variables. The sample period is 2012Q1-2024Q1. $NonAccrual_{blkt}$ ($NonAccrual_{blk,t+1}$)is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t $(t+1)$. $Fair/Par_{blkt}$ is the valuation of the loan k at time t. PIK_{blkt} is an indicator variable that takes the value of one if the loan k from lender l to borrower b is reported to be paid in kind for period t. The sample excludes PIK Notes. We include control variables: $Ln(Maturity_{blkt})$ is the natural logarithm of the remaining time to maturity. $Ln(Loan\,Size_{blkt})$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan_{blkt}$ is an indicator variable that takes the value of one if the loan is tied to a fixed interest rate at time t. $Base\,rate_{blkt}$ is the loan's base rate at time t and zero if there is no base rate. $All\text{-}in\text{-}spread_{blk\tau}$ is the all-in-spread at time when the loan k first appears in the sample at time τ. $Dual\,holding_{blt}$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm. $PE\,Sponsored_{bt}$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise, an indicator for borrower b that has received $Bank\,financing_{bt}$ in the preceding 5-year period to t. We also include one-period lags of each dependent variable. The lower interaction terms and other controls are included but not shown. We include different fixed effect combinations. BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter e.g. 2022Q4. $Borrower$ refers to the identity of the borrower. $Industry$ refers to the borrower's industry. $Seniority$ refers to loan seniority. $LoanType$ refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, borrower, and year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	NonAccrual$_{blk,t+1}$			Fair/Par$_{blk,t+1}$		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK$_{blkt}$	0.05***	0.04**	0.13***	-0.03***	-0.09***	-0.16**
	(0.01)	(0.02)	(0.04)	(0.01)	(0.02)	(0.07)
PIK$_{blkt}$ × PE Sponsored$_{bt}$	-0.03**	-0.02**	-0.07***	0.02***	0.02***	0.03*
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
PIK$_{blkt}$ × Ln(Time-to-Maturity$_{blkt}$)		0.00	-0.02		0.00	0.00
		(0.00)	(0.01)		(0.00)	(0.01)
PIK$_{blkt}$ × Dual holding$_{blt}$		-0.02***	0.00		0.01	0.00
		(0.01)	(0.01)		(0.00)	(0.01)
PIK$_{blkt}$ × Ln(Loan Size$_{blkt}$)		0.00	0.00		0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
PIK$_{blkt}$ × NonAccrual$_{blkt}$		0.05***	0.05			
		(0.02)	(0.04)			
PIK$_{blkt}$ × Fair/Par$_{blkt}$					0.09***	0.15*
					(0.02)	(0.09)
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects						
YearQtr	Yes	Yes		Yes	Yes	
Borrower	Yes	Yes		Yes	Yes	
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Borrower			Yes			Yes
YearQtr-BDC			Yes			Yes
Borrower-BDC			Yes			Yes
Fit statistics						
Observations	167,524	167,524	167,524	166,211	166,211	166,211
Adjusted R^2	0.72	0.72	0.90	0.81	0.81	0.89
Dependent variable mean	0.03	0.03	0.03	0.95	0.95	0.95

Table 6: PIK Toggles and future loan outcomes

The results are based on a lender-loan-origination level data, where origination date is defined as the date when the loan first appears in the sample in the lender's portfolio. The sample period is restricted to loan originations occurring between 2012Q2-2021Q4. $Future\,NonAccrual_{blk\tau+m}$ is an indicator variable that takes a value of one if the loan becomes nonaccrual at any date $\tau + m$ following the origination date τ, and zero otherwise. $I(Fair/Par_{blk,T} < 0.8)$ is an indicator variable that takes a value of one if the loan has a value below 80% at the last observation date T before exiting the sample and zero otherwise. $PIK\,Toggle_{blk,\tau+n}$ is an indicator variable that takes a value of one if the borrower uses its PIK toggle during the subsequent lifetime of the loan, and zero otherwise. We exclude PIK notes from the sample. Loan controls include $Ln(Time\text{-}to\text{-}Maturity)$, loan $Fair/Par$ value, $Ln(Loan\,Size)$, indicator for $Fixed\,rate\,loan$, loan's *All-in-yield*, indicator for presence of $Dual\,holding$, indicator for borrower's $PE\,Sponsored$ status, indicator for firm that has received $Bank\,financing$ in preceeding 5-years with all control variables measured at origination date τ and *Pre-PIK* $Amend_{bl,\tau+s}$ that is an indicator variable that takes a value of one if the loan experiences a maturity extension or becomes nonaccrual at any date $\tau + s$ following the origination date τ but preceding the earliest PIK use date $\tau + n$ (if any), and zero otherwise. All except the indicator variables are standardized (std) with a mean of zero and a variance of one. The lower interaction terms and other controls are included but not shown. The fixed effects: BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter of the origination e.g. 2022Q4. $Industry$ refers to the borrower's industry. $Seniority$ refers to loan seniority. $LoanType$ refers to security class e.g. Term Loan, Revolver etc. Standard errors are two-way clustered at the BDC and borrower levels. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	Future NonAccrual$_{blk,\tau+m}$			I(Fair/Par$_{blk,T}$ <0.8)		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK Toggle$_{blk,\tau+n}$	0.23***	0.22***	0.28***	0.20***	0.24***	0.33***
	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)	(0.07)
PIK Toggle$_{blk,\tau+n}$ × PE Sponsored$_{b\tau}$			-0.11*			-0.16**
			(0.06)			(0.06)
PIK Toggle$_{blk,\tau+n}$ × Ln(Time-to-Mat.$_{blk,\tau}$)(std)			0.00			0.02
			(0.01)			(0.02)
PIK Toggle$_{blk,\tau+n}$ × Ln(Loan Size)$_{blk,\tau}$(std)			0.01			0.02
			(0.02)			(0.02)
PIK Toggle$_{blk,\tau+n}$ × Dual-holding$_{bl\tau}$			0.06			0.08
			(0.05)			(0.06)
PIK Toggle$_{blk,\tau+n}$ × Pre-PIK Amend$_{blk,\tau+s}$			0.08*			0.09
			(0.05)			(0.06)
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects						
YearQtr	Yes			Yes		
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Industry		Yes	Yes		Yes	Yes
YearQtr-BDC		Yes	Yes		Yes	Yes
Fit statistics						
Observations	10,014	10,003	10,003	6,783	6,773	6,773
Adjusted R^2	0.17	0.27	0.28	0.10	0.18	0.18
Dependent variable mean	0.06	0.06	0.06	0.07	0.07	0.07

Table 7: Difference in loan outcomes between PIK-Notes and PIK-Toggles

The results are based on a lender-loan-origination level data, where origination date is defined as the date when the loan first appears in the sample in the lender's portfolio. The sample period is restricted to loan originations occurring between 2012Q2-2021Q4. $Future\,NonAccrual_{blk,\tau+m}$ is an indicator variable that takes a value of one if the loan becomes nonaccrual at any $\tau + m$ following the origination date τ, and zero otherwise. $I(Fair/Par_{blk,T} < 0.8)$ is an indicator variable that takes a value of one if the loan has a value below 80% at the last observation date T before exiting the sample and zero otherwise. $PIK\text{-}Toggle_{blk}$ is an indicator variable that takes a value of one if the borrower uses its PIK toggle during the subsequent lifetime of the loan, and zero otherwise, while also not being a PIK note. $PIK\text{-}Note_{blk}$ takes a value of one if the loan is classified as a PIK note, and zero otherwise. Loan controls include $Ln(Time\text{-}to\text{-}Maturity)$, loan $Fair/Par$ value, $Ln(Loan\,Size)$, indicator for $Fixed\,rate\,loan$, loan's *All-in-yield*, indicator for presence of $Dual\,holding$, indicator for borrower's $PE\,Sponsored$ status, indicator for firm that has received $Bank\,financing$ in preceeding 5-years with all control variables measured at origination date τ. All except the indicator variables are standardized (*std*) with mean zero and variance of one. The fixed effects: BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter of the origination e.g. 2022Q4. $Industry$ refers to the borrower's industry. $Seniority$ refers to loan seniority. $LoanType$ refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, borrower, and year-quarter levels. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Panel A: Full sample

Dependent Variables:	Future NonAccrual$_{blk,\tau+m}$			I(Fair/Par$_{blk,T} < 0.8$)		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK Note$_{blk,\tau}$	0.07***	0.04*	0.11***	0.04**	0.03	-0.03
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.05)
PIK Toggle$_{blk,\tau+n}$	0.21***	0.22***	0.17***	0.19***	0.19***	0.12**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
Loan controls		Yes	Yes		Yes	Yes
Fixed-effects						
YearQtr	Yes	Yes		Yes	Yes	
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Industry			Yes			Yes
YearQtr-BDC			Yes			Yes
Borrower			Yes			Yes
Fit statistics						
Observations	16,713	10,428	10,417	11,311	7,110	7,100
Adjusted R^2	0.10	0.12	0.63	0.06	0.07	0.46
Dependent variable mean	0.06	0.06	0.06	0.07	0.07	0.07

Table 7: Difference in loan outcomes between PIK-Notes and PIK-Toggles (continued)

Panel B: Post-2017 sample with Martini-AI firm size and rating fixed effects

Dependent Variables:	Future NonAccrual$_{blk,\tau+m}$			I(Fair/Par$_{blk,T} < 0.8$)		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK Note$_{blk,\tau}$	0.06**	0.07***	0.07**	0.01	0.03	0.01
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
PIK Toggle$_{blk,\tau+n}$	0.21***	0.19***	0.19***	0.14***	0.17***	0.14***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)
Loan controls		Yes	Yes		Yes	Yes
Fixed-effects						
YearQtr	Yes			Yes		
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
YearQtr-Industry		Yes	Yes		Yes	Yes
YearQtr-BDC		Yes	Yes		Yes	Yes
YearQtr-Firm Size			Yes			Yes
YearQtr-Rating			Yes			Yes
Fit statistics						
Observations	5,490	5,172	5,146	3,126	2,697	2,667
Adjusted R^2	0.11	0.18	0.19	0.05	0.10	0.09
Dependent variable mean	0.05	0.05	0.05	0.06	0.05	0.06

Table 8: PIKs, Maturity Extensions and Debt-to-Equity Swaps

The results are based on a lender-loan-origination level data, where origination date is defined as the date when the loan first appears in the sample in the lender's portfolio. The sample period is restricted to loan originations occurring between 2012Q2-2021Q4. $Maturity\,Extension_{blk,\tau+m}$ is an indicator variable that takes a value of one if the loan receives maturity extension at any date $\tau + m$ following the origination date τ, and zero otherwise. $Debt\text{-}to\text{-}Equity\,Swap_{blk,\tau+m}$ is an indicator variable that takes a value of one if the borrower receives debt to equity swap at any date $\tau + m$ following the origination date τ, and zero otherwise. $PIK\text{-}Toggle_{blk,\tau+n}$ is an indicator variable that takes a value of one if the borrower uses its PIK toggle during the subsequent lifetime of the loan, and zero otherwise, while also not being a PIK note. $PIK\text{-}Note_{blk}$ takes a value of one if the loan is classified as a PIK note, and zero otherwise. Loan controls include $Ln(Maturity)$, loan $Fair/Par$ value, $Ln(Loan\,Size)$, indicator for $Fixed\,rate\,loan$, loan's *All-in-yield*, indicator for presence of $Dual\,holding$, indicator for borrower's $PE\,Sponsored$ status, indicator for firm that has received $Bank\,financing$ in preceeding 5-years with all control variables measured at origination date τ. All except the indicator variables are standardized (*std*) with mean zero and variance of one. The fixed effects: *BDC* refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter of the origination e.g. 2022Q4. *Industry* refers to the borrower's industry. *Seniority* refers to loan seniority. *LoanType* refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, borrower, and year-quarter levels. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	Maturity Extension$_{blk,\tau+m}$			Debt-to-Equity Swap$_{blk,\tau+m}$		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK Toggle$_{blk,\tau+n}$	0.26***	0.26***	0.29***	0.07***	0.07***	0.10***
	(0.03)	(0.03)	(0.05)	(0.02)	(0.02)	(0.03)
PIK Note$_{blk,\tau}$	-0.04	-0.04**	0.11	-0.10***	-0.10***	0.01
	(0.02)	(0.02)	(0.08)	(0.02)	(0.02)	(0.05)
Loan controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects						
YearQtr	Yes			Yes		
LoanType	Yes	Yes	Yes	Yes	Yes	Yes
Seniority	Yes	Yes	Yes	Yes	Yes	Yes
BDC	Yes	Yes		Yes	Yes	
YearQtr-Industry		Yes	Yes		Yes	Yes
YearQtr-BDC			Yes			Yes
Borrower			Yes			Yes
Fit statistics						
Observations	10,428	10,417	10,417	10,428	10,417	10,417
Adjusted R^2	0.14	0.16	0.39	0.45	0.46	0.74
Dependent variable mean	0.30	0.30	0.30	0.15	0.14	0.14

Table 9: PIK Usage and Bank Debt Availability

This table shows the results from OLS regressions of proxies for bank debt on *PIK usage share*. *Bank debt share* is the BDC's bank debt share of total debt. *CL usage* is the BDC's share of drawn credit lines relative to total credit lines. *PIK usage share* is the par-value weighted share of portfolio companies currently paying some proportion of interest rate in-kind. All columns include the following BDC level controls: lagged *Ln(Assets)*, lagged *Leverage*, lagged profitability (*ROE*), lagged *Cash Share*, and *Ln(Fund Age)*. We exclude the intercept term from the results whenever the model has one. We include different fixed effects. *BDC* refers to the identity of the BDC (Lender). *YearQtr* refers to the calendar quarter e.g. 2022Q4. Standard errors are clustered at the BDC and year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	Bank debt share$_{lt}$			CL usage$_{lt}$		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK usage share$_{lt}$	-0.66***	-0.58***	-0.52***	-0.50***	-0.44***	-0.38***
	(0.15)	(0.14)	(0.10)	(0.09)	(0.10)	(0.09)
BDC controls		Yes	Yes		Yes	Yes
Fixed-effects						
YearQtr		Yes	Yes		Yes	Yes
BDC			Yes			Yes
Fit statistics						
Observations	1,782	1,621	1,621	1,713	1,562	1,562
Adjusted R^2	0.12	0.29	0.71	0.09	0.19	0.42
Dependent variable mean	0.47	0.44	0.44	0.50	0.50	0.50

Table 10: PIKs and subsequent balance sheet and payout changes

This table shows the results from OLS regressions of BDC's asset, balance sheet, and payout changes on PIK usage share and other control variables. The results are based on BDC-quarter-level panel data. $Debt/Assets$ is the ratio between BDC's total liabilities and total assets. $\Delta\left(Debt/Assets\right)_{l,t+1}$ is the change in $Debt/Assets$ between quarter t and $t+1$ and correspondingly defined for $\Delta\left(Cash/Assets\right)_{l,t+1}$. $\Delta lnAsset_{l,t+1}$ is the log change in BDC's total assets measured in cost value. $\Delta lnDiv_{l,t+1}$ is the log change in BDC's dividends paid to shareholders. $PIK\,usage\,share_{l,t}$ is the par-value weighted share of portfolio companies currently paying some proportion of interest rate in-kind. All columns include the following BDC level attributes as controls: lagged BDC size, lagged leverage, lagged profitability (ROE), lagged cash share, and fund age. We additionally include different fixed effects: BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter e.g. 2022Q4. Standard errors are clustered at the BDC, year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variables:	$\Delta(Debt/Assets)_{l,t+1}$		$\Delta(Cash/Assets)_{l,t+1}$		$\Delta lnAsset_{l,t+1}$		$\Delta lnDiv_{l,t+1}$	
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
PIK usage share$_{lt}$	-0.01	-0.03**	0.00	0.01	-0.07**	-0.10***	-0.06**	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)
BDC controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects								
YearQtr	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BDC		Yes		Yes		Yes		Yes
Fit statistics								
Observations	3,102	3,102	3,102	3,102	3,102	3,102	2,821	2,821
Adjusted R^2	0.07	0.16	0.02	0.02	0.21	0.46	0.19	0.45
Dependent variable mean	0.00	0.00	0.00	0.00	0.06	0.06	0.05	0.05

A Variable definitions

Variable	Definition	Level	Source
All-in-yield	The sum of effective base rate, cash spread, and PIK spread or the total interest rate if only that is reported.	Loan-level	BDC Collateral
All-in-spread	All-in-yield - effective base rate	Loan-level	BDC Collateral
$\Delta lnAsset$	Log change in BDC's total assets in cost value terms	Lender-level	BDC Collateral
Assets	BDC's total assets (millions USD)	Lender-level	BDC Collateral
Bank debt share	Bank debt_t/Total Liabilities_t	Lender-level	Capital IQ
Bank financing	An indicator variable that takes a value of one if the borrower has obtained a bank loan within the past 5 years and zero otherwise.	Borrower-level	Pitchbook
Base rate	The level of base rate. Zero if a fixed-rate loan.	Loan-level	BDC Collateral
Cash share	Cash/Total Assets	Lender-level	BDC Collateral
Cash spread	Cash spread for the loan over the base rate.	Loan-level	BDC Collateral
CSD(Fair/Par)	Cross-sectional standard deviation of $Fair/Par$ at time t across lenders of loans sharing the same borrower, seniority, and loan type.	Loan-level	BDC Collateral
CL usage	Drawn credit lines/(Drawn+Undrawn credit lines)	Lender-level	Capital IQ
$\Delta lnDiv$	Log change in BDC's dividends paid to shareholders	Lender-level	BDC Collateral
Dual holding	Indicator variable that takes the value of one if the lender has equity/pref.share/warrant stake in the borrowing firm and zero otherwise	Borrower-lender-level	BDC Collateral
Debt-to-Equity Swap	Indicator variable that takes a value of one if the face value of borrower b's debt held by lender-BDC l decreases in a quarter t, while simultaneously the fair value of lender l's equity/pref.share/warrant holdings of borrower b increases, and zero otherwise. I.e. equals 1 if $debt_{t-1} > debt_t$ and $equity_{t-1} < equity_t$, else 0. In the cross-sectional test, the variable takes the value of one if the borrower received a debt-to-equity swap during the loan lifetime, and zero otherwise.	Loan-level	BDC Collateral
Effective base rate	max{Base rate, Interest rate floor}	Loan-level	BDC Collateral
Fair/Par	Loan's fair value to par value ratio	Loan-level	BDC Collateral
$I(Fair/Par < 0.8)$	Indicator variable that takes a value of one if the loan's fair/par ratio is below 0.8, and zero otherwise. In cross-sectional data, this is measured at the last observation date for that loan.	Loan-level	BDC Collateral
Fixed-rate loan	Indicator variable that takes the value of one if the loan is tied to a fixed rate and zero otherwise	Loan-level	BDC Collateral
Fund Age	Age of the fund in years. We use ln(1+Age) as a control variable.	Lender-level	Pitchbook/Capital IQ/SEC Edgar
Future NonAccrual	An indicator variable that takes a value of one if the loan is reported as non-accrual at any date following the loan origination date, and zero otherwise.	Borrower-level	Pitchbook
Leverage ratio	Total Liabilities/Total Assets	Lender-level	BDC Collateral
Ln(Loan size)	Natural logarithm of the loan's par value	Loan-level	BDC Collateral
Ln(Time-to-Maturity)	Natural logarithm of the remaining time to maturity	Loan-level	BDC Collateral
Maturity Extension	Indicator variable that takes a value of one if the loan's remaining $\textit{time-to-maturity}_{t-1} > \textit{time-to-maturity}_t$, and zero otherwise. In the cross-sectional test, the variable takes the value of one if maturity is extended during the loan lifetime, and zero otherwise.	Loan-level	BDC Collateral
Non-accrual	An indicator variable that takes a value of one if the loan is reported to be full or partially non-accrual, and zero otherwise.	Loan-level	BDC Collateral
PE Sponsored	An indicator variable that takes a value of one if the borrower is PE-sponsored in a given quarter and zero otherwise.	Borrower-level	Pitchbook
PIK	Indicator variable that takes the value of one if the loan is reported to be paid in kind for that period and zero otherwise	Loan-level	BDC Collateral
PIK-Note	Indicator variable that takes a value of one for all the loan's observations if the loan is reported to be paid in kind in every period of the lifetime of the loan, and zero otherwise.	Loan-level	BDC Collateral

PIK spread	PIK spread for the loans that use PIK, zero otherwise.	Loan-level	BDC Collateral
PIK-Toggle	Same as PIK for loans other than PIK notes.	Loan-level	BDC Collateral
PIK usage share	Par-value weighted share of portfolio companies that are paying some proportion of the interest rate "in-kind".	Lender-level	BDC Collateral
ROE	Return on equity=Net income$_t$/Book Equity$_{t-1}$	Lender-level	BDC Collateral /CapitalIQ

B BDCs in the sample as of 2024Q3

Table B2: BDCs in Sample

BDC Name	Ticker	CIK	Status	Assets (USD mn)
Blackstone Private Credit Fund	P-BCRED	1803498	Private	64 674,45
Ares Capital Corporation	ARCC	1287750	Public	27 100,00
Blue Owl Credit Income Corp. f.k.a Owl Rock Core Income Corp.	P-OLRCIC	1812554	Private	25 834,05
FS KKR Capital Corp f.k.a FS Investment Corporation	FSK	1422183	Public	15 149,00
Blue Owl Capital Corporation f.k.a Owl Rock Capital Corporation (ORCC)	OBDC	1655888	Public	14 090,78
HPS Corporate Lending Fund	P-HPSCLF	1838126	Private	13 773,40
Apollo Debt Solutions BDC	P-ADSBDC	1837532	Private	13 673,77
Blackstone Secured Lending Fund	BXSL	1736035	Public	12 371,57
Golub Capital BDC, Inc	GBDC	1476765	Public	8 705,98
Ares Strategic Income Fund	P-ARSTIF	1918712	Private	7 691,45
Prospect Capital Corporation	PSEC	1287032	Public	7 592,71
Sixth Street Lending Partners	P-SIXSLP	1925309	Private	6 731,61
Blue Owl Technology Finance Corp. f.k.a Owl Rock Technology Finance Corp.	P-ORTFIC	1747777	Private	6 685,02
North Haven Private Income Fund LLC	P-NHPIFL	1851322	Private	6 017,37
Goldman Sachs Private Credit Corp.	P-GSPCCP	1920145	Private	5 624,54
Blue Owl Technology Finance Corp. II f.k.a Owl Rock Technology Finance Corp. II	P-ORTFII	1889668	Private	5 370,75
Oaktree Strategic Credit Fund	P-OAKSCF	1872371	Private	5 223,37
Blue Owl Technology Income Corp. f.k.a Owl Rock Technology Income Corp.	P-OWLRTI	1869453	Private	5 189,14
Main Street Capital Corporation	MAIN	1396440	Public	5 094,78
Blue Owl Capital Corporation III f.k.a Owl Rock Capital Corporation III	OBDE	1807427	Public	4 464,33
MSD Investment Corp	P-MSDINC	1849894	Private	4 445,24
Franklin BSP Capital Corporation f.k.a Franklin BSP Capital L.L.C.	P-FBSPCC	1825248	Private	4 035,43
Monroe Capital Income Plus Corporation	P-MCIPCO	1742313	Private	3 817,46
Morgan Stanley Direct Lending Fund	MSDL	1782524	Public	3 793,37
Hercules Capital, Inc.	HTGC	1280784	Public	3 656,36
Goldman Sachs BDC, Inc.	GSBD	1572694	Public	3 545,49
Sixth Street Specialty Lending, Inc. f.k.a TPG Specialty Lending, Inc.	TSLX	1508655	Public	3 529,86
Golub Capital Private Credit Fund	P-GBCPCF	1930087	Private	3 513,52
New Mountain Finance Corporation	NMFC	1496099	Public	3 414,26
MidCap Financial Investment Corporation f.k.a Apollo Investment Corporation	MFIC	1278752	Public	3 216,03
Oaktree Specialty Lending Corp f.k.a Fifth Street Finance Corp.	OCSL	1414932	Public	3 198,34
Barings Private Credit Corporation	P-BARPCC	1859919	Private	3 055,14
TPG Twin Brook Capital Income Fund f.k.a AG Twin Brook Capital Income Fund	P-ATBCIF	1913724	Private	2 926,31
Barings BDC, Inc. f.k.a. Triangle Capital Corporation	BBDC	1379785	Public	2 605,08
Stone Point Credit Corporation f.k.a Stone Point Capital Credit LLC	P-STPTCC	1825384	Private	2 582,53
Bain Capital Specialty Finance, Inc	BCSF	1655050	Public	2 543,68
SLR Investment Corp. f.k.a Solar Capital Ltd.	SLRC	1418076	Public	2 442,91
Goldman Sachs Private Middle Market Credit II LLC	P-GPMMII	1772704	Private	2 397,77
Nuveen Churchill Direct Lending Corp. f.k.a Nuveen Churchill BDC Inc.	NCDL	1737924	Public	2 140,11
Blue Owl Capital Corporation II f.k.a Owl Rock Capital Corporation II	P-OWLRII	1655887	Private	2 136,67
PennantPark Floating Rate Capital Ltd.	PFLT	1504619	Public	2 108,85
T Series Middle Market Loan Fund LLC	P-TSMMLF	1885968	Private	2 083,00
Blackrock TCP Capital Corp. f.k.a TCP Capital Corp.	TCPC	1370755	Public	2 047,70
T. Rowe Price OHA Select Private Credit Fund	P-TRPOSF	1901164	Private	2 035,07
Kayne Anderson BDC, Inc.	KBDC	1747172	Public	2 028,25
FS Specialty Lending Fund f.k.a FS Energy and Power Fund	P-FSEN	1501729	Private	1 986,32
CION Investment Corporation	CION	1534254	Public	1 915,62
Carlyle Secured Lending, Inc. f.k.a TCG BDC, Inc	CGBD	1544206	Public	1 816,93
Carlyle Credit Solutions, Inc. f.k.a TCG BDC II, Inc.	P-TCGIII	1702510	Private	1 778,41
Trinity Capital Inc	TRIN	1786108	Public	1 734,76
AB Private Credit Investors Corporation	P-ABPCIC	1634452	Private	1 662,55
Crescent Capital BDC, Inc	CCAP	1633336	Public	1 645,05
Antares Strategic Credit Fund	P-ANSCRF	1993402	Private	1 632,63
New Mountain Guardian III BDC, L.L.C.	P-NMGIII	1781870	Private	1 607,88
Capital Southwest Corporation	CSWC	17313	Public	1 604,50
NMF SLF I, Inc.	P-NMFSLI	1766037	Private	1 507,90
Fidelity Private Credit Co LLC f.k.a Fidelity Private Credit Central Fund LLC	P-FPCRCF	1899996	Private	1 493,64
New Mountain Guardian IV BDC, L.L.C.	P-NMGBIV	1925531	Private	1 450,29
Barings Capital Investment Corporation	P-BARCIC	1811972	Private	1 436,57
Palmer Square Capital BDC Inc	PSBD	1794776	Public	1 413,55
PennantPark Investment Corp	PNNT	1383414	Public	1 389,09
Golub Capital BDC 4, Inc.	P-GCBLIV	1901612	Private	1 367,68
StepStone Private Credit Fund LLC	P-SSPCFL	1950803	Private	1 242,35
MSC Income Fund, Inc. f.k.a HMS Income Fund, Inc.	MSIF	1535778	Public	1 227,28
Saratoga Investment Corp.	SAR	1377936	Public	1 214,70
Fidelity Private Credit Fund	P-FIPRCF	1920453	Private	1 169,28
Nuveen Churchill Private Capital Income Fund	P-NCPCIF	1911066	Private	1 168,57
Fidus Investment Corporation	FDUS	1513363	Public	1 161,05
TCW Direct Lending VII LLC	P-TCWVII	1715933	Private	1 135,20
Runway Growth Finance Corp.	RWAY	1653384	Public	1 075,58
Silver Point Specialty Lending Fund	P-SRPSLF	1646614	Private	1 010,47
TCW Direct Lending VIII LLC	P-TDVIII	1825265	Private	957,51
Stellus Capital Investment Corp	SCM	1551901	Public	957,07
Middle Market Apollo Institutional Private Lending	P-MMAIPL	2006758	Private	926,28
KKR FS Income Trust	P-KKRFSI	1930679	Private	877,47
Gladstone Investment Corporation	GAIN	1321741	Public	868,78
Goldman Sachs Middle Market Lending Corp. II	P-GSMMII	1865174	Private	867,72

Continued on next page

Table B2 (Continued)

BDC Name	Ticker	CIK	Status	Assets (USD mn)
Diameter Credit Co	P-DIACRC	1916099	Private	843,06
BlackRock Private Credit Fund	P-BRPCRF	1902649	Private	813,78
Gladstone Capital Corporation	GLAD	1143513	Public	812,47
Varagon Capital Corp	P-VARCCP	1784700	Private	802,72
Horizon Technology Finance Corporation	HRZN	1487428	Public	793,07
TCW Direct Lending LLC	P-TCWD	1603480	Private	792,02
Oaktree Gardens OLP, LLC	P-OGOLPL	1974793	Private	787,07
Brightwood Capital Corp I	P-BRCCRPI	1895316	Private	781,59
TriplePoint Venture Growth BDC Corp.	TPVG	1580345	Public	778,35
HPS Corporate Capital Solutions Fund	P-HPSCSF	1989817	Private	730,33
Golub Capital Direct Lending Corporation	P-GCDLCP	1868878	Private	719,51
Kennedy Lewis Capital Company	P-KLCCOM	1911321	Private	714,62
KKR Enhanced US Direct Lending Fund-L Inc.	P-KKREDL	2012839	Private	710,53
Lafayette Square USA, Inc. f.k.a Lafayette Square Empire BDC, Inc.	P-LSEBDC	1849089	Private	688,41
WhiteHorse Finance, Inc.	WHF	1552198	Public	683,58
Jefferies Credit Partners BDC Inc.	P-JCPBDC	1959604	Private	663,75
Commonwealth Credit Partners BDC I, Inc.	P-CCPBDC	1841514	Private	653,96
First Eagle Private Credit Fund	P-FEPCRF	1890107	Private	571,10
Nuveen Churchill Private Credit Fund	P-NCPCRF	2022625	Private	555,58
26North BDC, Inc.	P-26NBDC	1950976	Private	555,29
Onex Direct Lending BDC Fund f.k.a Onex Falcon Direct Lending BDC Fund	P-OFDLBF	1860424	Private	554,05
Franklin BSP Real Estate Debt BDC	P-FBSPRE	2018545	Private	538,56
Bain Capital Private Credit	P-BACPCR	1899017	Private	533,95
Overland Advantage	P-OLDADT	1965934	Private	532,71
Monroe Capital Corporation	MRCC	1512931	Public	501,86
Phillip Street Middle Market Lending Fund LLC	P-PSMMLF	1948368	Private	491,55
OHA Senior Private Lending Fund (U) LLC	P-OSPLFL	1955010	Private	486,94
WTI Fund X, Inc.	P-WTIFXI	1850938	Private	468,42
Portman Ridge Finance Corporation f.k.a KCAP Financial, Inc.	PTMN	1372807	Public	463,67
TriplePoint Private Venture Credit Inc.	P-TPGVCL	1792509	Private	444,99
Redwood Enhanced Income Corp.	P-REDEIC	1870267	Private	433,00
Great Elm Capital Corp.	GECC	1675033	Public	427,03
Audax Credit BDC Inc.	P-ACBDCI	1633858	Private	422,26
SCP Private Credit Income BDC LLC	P-SCPPCI	1743415	Private	422,16
OFS Capital Corporation	OFS	1487918	Public	418,54
Carlyle Secured Lending III	P-CSLIII	1851277	Private	412,44
Vista Credit Strategic Lending Corp	P-VCRSLC	1919369	Private	397,35
Ares Core Infrastructure Fund	P-ARCINF	2031750	Private	364,43
Star Mountain Lower Middle-Market Capital Corp.	P-SMLMMC	1786835	Private	358,70
Silver Capital Holdings LLC	P-GSPMMC	1674760	Private	326,50
Lord Abbett Private Credit Fund	P-LAPCRF	2008748	Private	320,24
Golub Capital Direct Lending Unlevered Corp	P-GCDLUC	1901606	Private	314,08
Oxford Square Capital Corp. f.k.a TICC Capital Corp.	OXSQ	1259429	Public	312,92
New Mountain Guardian IV Income Fund, L.L.C.	P-NMGIVI	1976719	Private	311,21
KKR FS Income Trust Select	P-KKRITS	1975736	Private	310,18
PhenixFIN Corp f.k.a Medley Capital Corporation	PFX	1490349	Public	302,75
AB Private Lending Fund	P-ABPRLF	1982701	Private	289,99
Senior Credit Investments, LLC	P-SNCRIL	1959568	Private	282,04
Crescent Private Credit Income Corp.	P-CPCRIC	1954360	Private	281,83
BlackRock Direct Lending Corp	P-BRDLCO	1834543	Private	274,94
Muzinich BDC, Inc.	P-MUNBDC	1779523	Private	263,57
Stellus Private Credit BDC	P-SPCBDC	1901037	Private	262,52
Kayne DL 2021, Inc.	P-KAYDLI	1850787	Private	254,85
North Haven Private Income Fund A LLC	P-NHPIFA	1973476	Private	244,04
LGAM Private Credit LLC	P-LGAMPC	1983514	Private	237,72
SuRo Capital Corp. f.k.a Sutter Rock Capital Corp.	SSSS	1509470	Public	233,78
PIMCO Capital Solutions BDC Corp.	P-PCSBDC	1905824	Private	213,06
Investcorp Credit Management BDC, Inc. f.k.a CM Finance Inc	ICMB	1578348	Public	203,02
Venture Lending & Leasing IX, Inc.	P-VLLIXI	1717310	Private	191,85
PGIM Private Credit Fund	P-PGIMPC	1923622	Private	188,40
Logan Ridge Finance Corporation f.k.a Capitala Finance Corp	LRFC	1571329	Public	186,71
Steele Creek Capital Corporation f.k.a MSC Capital LLC	P-STCRCC	1817825	Private	172,95
AMG Comvest Senior Lending Fund	P-AMGCSL	1987221	Private	170,77
TCW Star Direct Lending LLC	P-TCWSDL	1916608	Private	147,87
BC Partners Lending Corporation	P-BCPLCO	1726548	Private	147,18
Manulife Private Credit Fund	P-MLPCRF	1988280	Private	131,44
Prospect Floating Rate & Alternative Income Fund, Inc.	P-PSIFIN	1521945	Private	106,32
Andalusian Credit Company, LLC	P-ADLCRC	1979306	Private	101,26
Equus Total Return, Inc.	EQS	878932	Public	95,51
Chicago Atlantic BDC, Inc. f.k.a Silver Spike Investment Corp.	LIEN	1843162	Public	89,28
BIP Ventures Evergreen BDC	P-BIPVRE	1950572	Private	87,97
Rand Capital Corporation	RAND	81955	Public	79,80
Muzinich Corporate Lending Income Fund, Inc	P-MCLIFI	1985375	Private	78,39
SLR HC BDC LLC	P-SLRHBL	1832148	Private	75,84
Wellings Real Estate Income Fund	P-WLREIF	1922947	Private	73,27
NexPoint Capital, Inc.	P-NXPTCP	1588272	Private	51,42
Hancock Park Corporate Income, Inc.	P-HPCPIN	1661306	Private	40,92
SLR Private Credit BDC II LLC	P-SLRPCB	1932591	Private	39,69
WTI Fund XI, Inc.	P-WTIXII	1987731	Private	27,60
Princeton Capital Corporation	PIAC	845385	Public	23,39
Guggenheim Credit Income Fund f.k.a Carey Credit Income Fund	P-GGCINF	1618697	Private	12,14
West Bay BDC LLC	P-WBBDCL	2020354	Private	8,24
Firsthand Technology Value Fund, Inc.	SVVC	1495584	Public	2,21
			Total Assets:	**408 352,22**

C A Simple Model of Risk Shifting

To illustrate the key mechanisms, we start by presenting a simple two-period model of equity- and debtholder conflict with inefficient risk shifting using the classic framework of Green (1984); Jensen and Meckling (1976).[32]

There exists a struggling firm with existing debt D. To keep the firm running, the equityholder (i.e. the firm-borrower/she) asks for an additional debt investment I from the debtholder (i.e. the lender/he). A convenient way to think about this debt investment I is to consider the equityholder having insufficient cash to pay the debt interest payment, and requests to pay the maturing coupon payment in-kind.[33] Both, lender and borrower are risk-neutral and discount time with a zero risk-free rate.

The lender moves first. He has two options. If the lender declines to deepen the current investment, this would trigger the borrower's default, making the debtholder the sole stakeholder and allowing the debtholder to liquidate the firm's assets and obtain a liquidation value θD as a result. When liquidating, the lender experiences a haircut $(0 < 1 - \theta < 1)$ relative to the outstanding claim. Alternatively, the lender can invest additional debt I to keep the firm running. Depending on the equityholder's action, this may let her recover the original investment D in full and a gross payoff R as compensation for the additional investment.

After receiving the additional debt investment I, the equityholder decides how to proceed. The equityholder can choose between two projects: She can either choose to invest in a safe project that generates asset value V_M with certainty that also fully covers repayment for the existing debt investment D. Alternatively, she can invest in a risky project that generates high asset value V_H with probability p or low asset value V_L with probability $1 - p$. This structure is visualized in Figure C1.[34]

We make the following assumptions:

Assumption 1. *$V_L < D < V_M < V_H$: The debtholder does not receive full repayment in the low state (L) of the risky project, but does in the high state (H) of the risky project, and in the medium state (M) of the riskless project.*

Assumption 2. *$pV_H + (1-p)V_L - I < \theta D < V_M - I$: This implies that the expected value of the firm is higher as a going concern entity than at liquidation if the safe project is chosen, but it is lower if the risky project is chosen.*

To summarize, the three options and the associated payoffs available for the parties are:

[32] Other early works include Smith and Warner (1979), Barnea et al. (1980), Haugen and Senbet (1981), who show how bond covenants, callable debt, and stock options can mitigate the risk-shifting problem.

[33] Fundamentally, PIK is simply a way to borrow more. If a full coupon rate c is PIK'd, then $I = cD$.

[34] For simplicity, we start the game from a node when the borrower has already experienced a liquidity shock and requires an additional investment to focus on the risk-shifting motive of a *distressed* borrower. However, it would be straightforward to add a first stage to the game where the debtholder sets D, nature draws a liquidity shock with some probability q, leading to a proposed sub-game or continues into a high state where the project succeeds and payoffs are realized. Adding this initial stage would not fundamentally change the key friction we want to document.

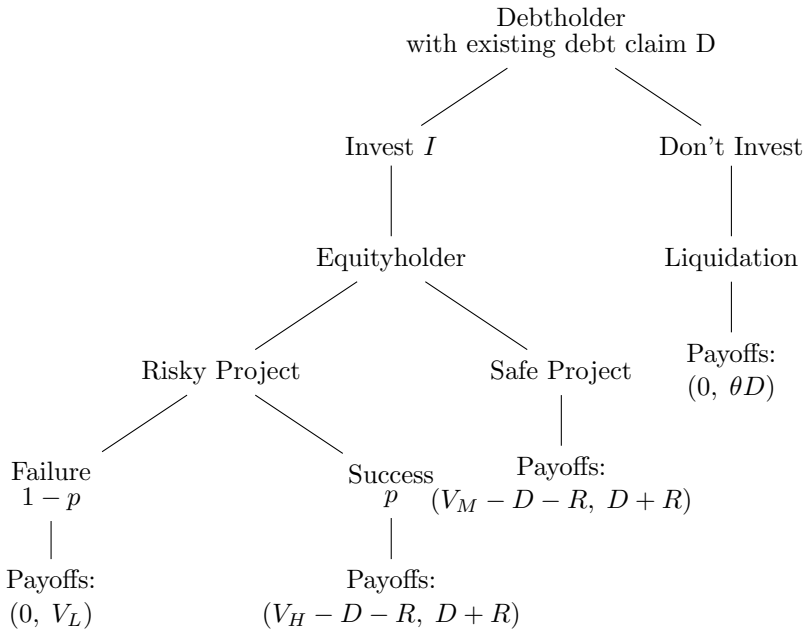


Figure C1: Decision tree of the game

Payoffs report gross payoffs first to the equityholder and then to the debtholder.

- Safe project: Generates V_M with certainty. Debtholder gets $D+R-I$, equityholder gets $V_M-(D+R)$.
- Risky project: Generates V_H with probablity p and V_L with probablity $1-p$, where $V_H > V_M > V_L$. Debtholder gets $\mathbb{E}[\min\{D+R, V\}] - I = p(D+R) + (1-p)V_L - I$, equityholder gets $\mathbb{E}[\max\{V-(D+R), 0\}] = p(V_H - D - R)$.
- Liquidation: The firm liquidates. Debtholder gets θD, where $0 < \theta < 1$, and equityholder gets 0.

Lastly, we assume the following regularity conditions

Assumption 3. $(1-p)D > V_M - pV_H$ *and* $\theta D = D - I$.

This assumption ensures that the equityholder prefers the risky project over the safe project when the repayment payoff $R \geq 0$ and that the repayment payoff R, even when treated as endogenous, will never be negotiated to be negative, as it would become unattractive for the debtholder.[35][36]

From these assumptions, it immediately follows that when $R \in (0, V_M - D]$ the debtholder prefers a safe project over liquidation and liquidation over the risky project,

[35] A negative R would correspond to the debtholder giving up some of its existing debt claim. When liquidation is sufficiently attractive ($\theta D \geq D - I$) this type of restructuring route is not viable.

[36] For simplicity, we treat R as exogenous in this baseline example, but we show in the Online Appendix how it can be endogenized based on the bargaining power of the contracting parties.

while the equityholder prefers the risky project over the safe project and the safe project over liquidation.[37] The payoffs for the debtholder and the equityholder, respectively, are

$$\text{Debtholder's payoffs}: \quad \underbrace{D+R-I}_{\text{Safe project}} > \underbrace{\theta D}_{\text{Liquidation}} > \underbrace{p(D+R)+(1-p)V_L-I}_{\text{Risky project}} \tag{6}$$

$$\text{Equityholder's payoffs}: \quad \underbrace{p(V_H-D-R)}_{\text{Risky project}} > \underbrace{V_M-D-R}_{\text{Safe project}} \geq \underbrace{0}_{\text{Liquidation}} \tag{7}$$

Using backward induction, one can verify that the liquidation state is the subgame perfect equilibrium of the game. Thus, the main problem is that the debtholder would like the equityholder to take on a safe project after providing continuation funding, but the equityholder cannot commit to taking on this project, since she strictly prefers the risky project. Because the equityholder cannot commit from abstaining from the risky project after receiving continuation funding, the debtholder prefers liquidation, which is a suboptimal outcome for both parties. We allocate the details and extensions of the model to the Online Appendix and simply describe here the main takeaways relevant for our empirical tests.

Solutions to risk-shifting: How do the borrower and lender solve their agency conflict to escape the inefficient liquidation equilibrium? First, the repayment rate is an ineffective tool to tackle risk shifting: under Assumptions 1, 2, and 3, there exists no repayment rate R that solves the agency conflict. This is because, just as with existing debt D, the borrower suffers from higher repayment R equally much in M and H states but not in L state, tilting its preferences toward the risky project. Instead, the borrower needs to commit to the safe project via a credible action. We discuss two of these in Proposition 1 below.

Proposition 1. *Under Assumptions 1, 2, and 3, potential solutions to agency conflict:*

- *Equity injection with amount J from the equityholder can solve the agency conflict if $J > \frac{p(V_H-D-R)-(V_M-D-R)}{1-p}$.*
- *Giving the debtholder the option to α fraction of firm's equity when $V_H > V_M$ via an option like claim, like a warrant, can solve the agency conflict if $\alpha > \frac{p(V_H-D-R)-(V_M-D-R)}{p(V_H-V_M)}$.*

See Appendix C.2 for the Proof.

What immediately follows from Proposition 1 is that when the safe project is socially optimal, then equity injection and giving debtholder some option-like claim lowers the bankruptcy probability because the safe project is always chosen and thus the firm avoids the risky project where bankruptcy occurs with probability $1-p$ and the liqudiation

[37] When R is outside this interval, the reordering will change, making the liquidation option even more attractive to either party. For example, when $R \leq 0$ debtholder always prefers liquidation, whereas when $R > V_M - D$, the equityholder always prefers liquidation over the safe project. Since the inefficiency arises from an early liquidation, focusing on an interval with $R \notin (0, V_M - D]$ does not solve the issue.

option where bankruptcy occurs with certainty. Furthermore, the model suggest that if the lenders have accurately identified the inefficiency arising from early liquidation, we should expect that PIK is used more often when these contractual solutions to agency conflicts are in place; that is when lenders hold some equity-like stake of the firm and when borrowers are backed by equityholders that have the will and the power to inject additional equity when required.[38] We test and find support for both of these predictions in the empirical part of the paper.

C.1 Proofs

Proof of Proposition 1 (Equity injection). We need to show that there exists a level of equity injection J at which the equityholder prefers the safe project over the risky one. When asked to inject additional equity, the equityholder prefers the safe project over the risky one if and only if

$$\begin{aligned} V_M - D - R + J - J &> p(V_H + J - D - R) + (1-p)\min\{V_L + J - D - R, 0\} - J \\ \Rightarrow J &> \frac{p(V_H - D - R) - (V_M - D - R)}{1-p} \end{aligned}$$

The second line follows when $J \leq D + R - V_L$, which implies $\min\{V_L + J - D - R, 0\} = 0$. In contrast, when $J \geq D + R - V_L$, the equation always holds since then the equityholder fully insures the debtholder, making the risky project safe for the lender, and ensuring that a safe project is always preferred as $V_M > pV_H + (1-p)V_L$ by Assumption 2. However, fully insuring the debtholder is an excessively costly way for the equityholder to commit to the safe project because $D + R - V_L > \frac{p(V_H - D - R) - (V_M - D - R)}{1-p}$ that follows from Assumption 2. □

Proof of Proposition 1 (Warrant). Let the debtholder receive a warrant that gives the debtholder the right to purchase α fraction of the firm's equity at price $V_M - D - R$, where the total number of firm shares is normalized to one. We need to show that there exists a level of α at which the equityholder prefers the safe project over the risky one. In practice, a warrant is a call option with value $W = \alpha\mathbb{E}[\max\{V - D - R - (V_M - D - R), 0\}]$ with V being a random variable. The warrant gives the debtholder access to profits if the risky project is chosen and V exceeds V_M. Thus, the debtholder will exercise the warrant only in the high state when $V_H > V_M$ while in the low state the warrant expires worthless and subsequently the value of the warrant is $W = \alpha p(V_H - V_M)$. After giving the debtholder a warrant, the equityholder prefers the safe project over the risky one if and only if

[38] We show in the Online Appendix that the presence of a large enough private reputation cost for the equityholder can also act as a way to commit to the safe project. We show that this cost operates equivalently to an equity injection.

$$V_M - D - R > p(V_H - D - R) - \alpha p(V_H - V_M)$$
$$\Rightarrow \alpha > \frac{p(V_H - D - R) - (V_M - D - R)}{p(V_H - V_M)} > 0$$

The reason that the value of the warrant does not appear in the top row in the left hand side of the equation is because when the equityholder chooses the safe project, the warrant will expire worthless. □

C.2 Proofs

Proof of Proposition 1 (Equity injection). We need to show that there exists a level of equity injection J at which the equityholder prefers the safe project over the risky one. When asked to inject additional equity, the equityholder prefers the safe project over the risky one if and only if

$$V_M - D - R + J - J > p(V_H + J - D - R) + (1-p)\min\{V_L + J - D - R, 0\} - J$$
$$\Rightarrow J > \frac{p(V_H - D - R) - (V_M - D - R)}{1-p}$$

The second line follows when $J \leq D + R - V_L$, which implies $\min\{V_L + J - D - R, 0\} = 0$. In contrast, when $J \geq D + R - V_L$, the equation always holds since then the equityholder fully insures the debtholder, making the risky project safe for the lender, and ensuring that a safe project is always preferred as $V_M > pV_H + (1-p)V_L$ by Assumption 2. However, fully insuring the debtholder is an excessively costly way for the equityholder to commit to the safe project because $D + R - V_L > \frac{p(V_H - D - R) - (V_M - D - R)}{1-p}$ that follows from Assumption 2. □

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$$V_M - D - R > p(V_H - D - R) - \alpha p(V_H - V_M)$$
$$\Rightarrow \alpha > \frac{p(V_H - D - R) - (V_M - D - R)}{p(V_H - V_M)} > 0$$

The reason that the value of the warrant does not appear in the top row in the left hand side of the equation is because when the equityholder chooses the safe project, the warrant will expire worthless. □