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

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Abstract

We study the role of Payment-in-Kind (PIK) provisions in private credit markets as a substitute for bank-provided liquidity. Using novel loan-level data from U.S. Business Development Companies (BDCs), we show that borrowers without access to bank credit lines often rely on PIK features to manage liquidity shortfalls. These features allow borrowers to defer interest payments, effectively providing contingent financing during periods of distress or high interest rates. We find that PIK usage strongly predicts future credit deterioration, delinquency, and bankruptcy—especially for borrowers lacking private equity sponsors or where lenders do not hold equity claims. A simple model highlights the agency conflicts inherent in deferred interest and identifies contractual mechanisms that mitigate these risks. At the lender level, we show that increased PIK usage constrains BDCs' portfolio and dividend growth and is associated with tighter bank-imposed covenants. Our findings reveal how nonbank lenders adapt liquidity provision and the associated risks to the financial system.

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 lenders have steadily displaced traditional banks as providers of corporate financing, prompting important questions regarding the relative capabilities of these non-bank institutions to meet diverse borrower needs (Davydiuk et al., 2024b). A key concern is whether private credit firms, given their distinct funding models, can effectively replicate banks' traditional role in providing liquidity to corporate borrowers.[1]

Banks typically provide liquidity to their borrowers through credit lines. As Kashyap et al. (2002) emphasize, banks have a structural advantage in liquidity provision because their funding model—built on short-term, demandable deposits—complements the provision of revolving credit lines, which require banks to maintain substantial liquidity buffers. In contrast, private credit lenders rely predominantly on stable, long-term capital commitments from institutional investors, such as pension funds and insurance companies. This long-term, non-demandable liability structure lacks the strategic complementarity required for offering revolving, short-notice liquidity. Consequently, private lenders generally specialize in providing term loans rather than credit lines.

Consistent with this distinction, Haque et al. (2024) find that roughly half of the firms borrowing from private credit lenders also maintain financing relationships with banks, typically in the form of revolving credit lines, while the private credit lenders primarily supply term financing. Importantly, the other half of these borrowers do not have access to bank liquidity at all—a pattern also documented by Chernenko et al. (2022).[2] These observations raise a critical and unresolved question: how do firms lacking access to bank-provided liquidity manage their contingent financing needs and what alternatives to bank

[1] A large literature highlights various roles of bank credit lines in corporate liquidity management. For instance, several studies emphasize an insurance-oriented motive for firms to secure credit lines (Campbell, 1978; Boot et al., 1987; Holmström and Tirole, 1998; Gatev and Strahan, 2006). Others argue that credit lines, while similar to cash reserves, play a distinct and complementary role, especially as a liquidity backstop when firms experience cash flow disruptions (Opler et al., 1999; Almeida et al., 2004; Sufi, 2007; Lins et al., 2010; Acharya et al., 2014). Consistently, firms tend to tap into these credit lines specifically when such risks emerge or appear imminent (Jiménez et al., 2009; Campello et al., 2011, 2012).

[2] Additionally, even borrowers with bank relationships may face constraints, as credit lines are not always available precisely when needed, particularly during periods of economic distress (Chodorow-Reich et al., 2022; Greenwald et al., 2023).

credit lines can private credit lenders provide?

We document that private credit lenders include so-called "Payment-in-Kind" (PIK) provisions—which enable borrowers to defer cash interest payments by rolling them into the outstanding loan principal—to effectively serve as contingent liquidity substitutes for traditional credit lines. This provides immediate liquidity relief, but also raises concerns about accumulating debt and borrower risk, and it could mask underlying distress, potentially amplifying risk across private credit markets. Despite the rapid expansion of private credit as an important funding source for corporations, we still have limited understanding of how deferred interest payments reshape borrower risk and the stability of lenders' portfolios, especially during economic downturns or rising interest rate environments.

In this paper, we analyze the increasing use of PIK options in private debt contracts. Under what conditions do borrowers resort to deferring interest payments using PIK provisions? What are the consequences of PIK usage for borrower default risk and loan valuations? And, how does the growing reliance on PIK affect private debt lenders' funding structures and liquidity management strategies? To address these questions, we examine the use and implications of PIK financing within the U.S. market, specifically through the lens of Business Development Companies (BDCs).[3]

At the center of our analysis, which combines a simple theoretical model and extensive empirical analysis, is an equityholder-debtholder conflict that arises when a distressed firm asks for more debt. We show that PIK options are often coupled with other loan terms designed to mitigate these agency issues, and when they are ignored, higher losses and bankruptcy are more likely. Moreover, as involving a new lender to provide liquidity can dilute the value of the original lender's claim, private credit lenders may not wish to outsource the liquidity provision of all of their borrowers to banks. Similarly, unlike nonbank lenders, regulated banks are less free to hold equity stakes and other securities that may help to mitigate the debt-equityholder conflict, which could be why banks are

[3]BDCs are closed-end investment funds primarily engaged in lending to large and middle-market firms. They constitute a significant share of the U.S. private credit market, managing total assets of USD 410 billion and investments of USD 385 billion as of Q3 2024. Appendix B provides a comprehensive list of U.S. BDCs included in our analysis.

unwilling to lend to these firms in the first place.[4] Together, these factors help rationalize the observed market structure, in which some borrowers receive liquidity directly from nonbank lenders.

To understand our argument, it is useful to start with the notion that, fundamentally, allowing a firm to pay in kind is akin to providing additional financing. At best, this liquidity support can help a struggling firm remain in business by bridging a temporary liquidity shortfall, ensuring continuity of operations until financial conditions stabilize, but it can also keep already insolvent borrowers alive ("zombie lending") or induce distressed borrowers to engage in harmful risk-shifting in their fight for resurrection (Jensen and Meckling, 1976). This will consequently lower creditors' prospects of receiving a full repayment, and devalue the existing debt claim.

The emergence of this type of debt-equityholder conflict is often an unavoidable consequence of providing additional financing for distressed firms. Thus, to establish under which circumstances this provision of liquidity can improve a firm's repayment prospects—and when it might be detrimental to lenders—we introduce a simple risk-shifting model to illustrate this problem and potential contractual solutions. Our model predicts that when PIK financing is combined with equity injections (*e.g.*, from private equity sponsors), or when lenders simultaneously hold equity-like claims (such as warrants), the debt-equityholder conflict can be effectively mitigated.

To study these questions empirically, we start at the loan level, utilizing a comprehensive dataset that covers nearly 400,000 BDC loan-quarter observations. 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. While some borrowers defer interest payments immediately upon origination until maturity (so-called "PIK notes"), most borrowers with loans that include a PIK feature exercise this option at some later point during the loan's lifecycle ("PIK toggles"). We find clear differences in loan terms among these loan types: PIK notes typically have fixed interest rates and are tied to subordinated debt, while PIK

[4] Volcker's Rule in the U.S. Dodd-Frank Act requires a separation of proprietary stock market investments and traditional banking businesses. See also the Vickers Report in the U.K. and the Liikanen Report in the EU.

toggles are used with first lien senior secured and floating rate loans.[5]

We first establish that PIK usage is a reliable measure of liquidity demand, and PIK is typically used by struggling firms. Our analysis reveals that the use of PIK is largest during distressed periods, like COVID-19, or during elevated interest rates, and it is more prevalent among riskier loans. For instance, borrowers are significantly more likely to exercise PIK options when their loans are delinquent or when their valuations have deteriorated during the same period. Additionally, PIK components are predominantly found in junior debt tranches. We also observe that loans with PIK provisions tend to be larger and frequently coincide with cases where lenders hold equity stakes in the borrowing firms or if the borrower is backed by a private equity sponsor. Importantly, we show that PIK use is more prevalent among borrowers who do not have bank financing consistent with the notion that PIK is a substitute for bank provided credit lines.[6]

In the next step, we document that PIK usage predicts the likelihood of credit deterioration and heightened uncertainty about a borrower's future loan repayment capacity. 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 a higher likelihood of 1-2 percentage points (pp) that a loan becomes delinquent (or "non-accrual") over the next quarter.[7] This is a sizeable increase given the unconditional likelihood that a loan becomes non-accrual of 3%.[8]

Moreover, we test whether PIK use following loan origination predicts firm bankruptcy outcome. Our findings align with theoretical predictions: Typically, liquidity provision via PIK is associated with an increased probability of future bankruptcy. However, PIK use

[5]As our focus is on liquidity provision, we mainly focus on PIK toggles. We discuss the use of PIK notes later in this paper.

[6]We measure bank financing by tracking whether the firm has received bank debt over the preceding five years.

[7]Lenders classify loans as non-accrual when interest payments by borrowers are at least 90 days overdue, but using PIK itself does not trigger this.

[8]We include an indicator whether the loan has already been non-accrual at the time interest was deferred and document, as expected, a significant and positive correlation to the loan remaining non-accrual. Loans with low fair value (relative to a par value) and loans with shorter remaining maturity, loans of borrowers with no private equity sponsors, and loans of firms where the lender does not hold an equity stake are more likely to become non-accrual within the next period.

is less likely to be followed by bankruptcy if the borrower has a PE sponsor or if the lender holds some equity or option-like security in the borrowing firm. These findings support the interpretation that the risk-shifting problem associated with PIK use can be mitigated if a PE sponsor might inject additional equity or if the borrower allows the lender to benefit from upside potential in the risky investment.[9]

We augment these results by performing additional loan-level tests to assess how deferred interest predicts loan values. Specifically, we leverage a unique feature of BDC data—quarterly fair value assessments of loan portfolios—which typically lack market pricing. This allows us to examine unrealized valuation losses triggered by borrowers' decisions to defer interest. We find that loan fair values decline substantially after borrowers adopt the PIK option. However, again consistent with the theoretical predictions, we find that if the lender is a dual-debt and equity-holder of the company or if the borrower has PE backing, then exercising the PIK option does not lead to lower fair value assessments.

Moreover, since multiple BDCs can hold the same loan and independently report fair value estimates, we investigate whether valuation dispersion among lenders increases following borrowers' decisions to defer interest. Increased default risk and heightened agency conflicts associated with PIK usage might amplify valuation uncertainty, making accurate assessments more challenging. Our findings strongly support this hypothesis.

To further validate our findings and assess the aggregate impact of deferred interest, we extend our investigation to the BDC level. We first investigate how the deferred interest usage within a BDC portfolio correlates with different measures of BDC portfolio risk, such as portfolio delinquency, realized losses, or its distance-to-default. Consistent with our loan-level tests, we document an increase in the vulnerability of BDCs when firms defer interest payments.

Acharya et al. (2024a) and Chernenko et al. (2025), among others have documented that banks are increasingly providing credit lines to nonbank lenders like BDCs. Thus, BDCs may be just types of pass-through entities where PIK-based liquidity provision is

[9] Hotchkiss et al. (2021); Jang (2024) show that PE sponsors often inject new equity into their distressed firms, and lenders often require this.

fundamentally financed by banks. This is not necessarily an issue if this helps to expand credit to healthy but credit-constrained firms. But if BDCs keep financing fundamentally unviable firms with PIK by using their own bank funding sources, then this could potentially lead to increased spillover risks to banks.

Furthermore, while PIK-based debt does not require BDC to inject new cash into the firm, certain regulatory requirements might still force the BDC to change its liquidity management. More specifically, while deferred interest postpones BDCs' incoming cash flows, these payments made "in-kind" must still be recognized as income. Thus, excessive use of deferred interest may pose liquidity pressures for BDCs that need to distribute approximately 90% of their income as dividends to maintain their attractive tax status as registered investment companies (RICs).

Interestingly, when studying empirically this link between PIK usage share and BDCs' bank financing volume, our analysis shows that higher deferred interest payments are associated with a *lower* share of bank debt relative to total debt and *lower* utilization of bank credit lines. Despite substantial credit lines extended to BDCs and their relatively high utilization rates compared to other non-bank financial institutions, banks thus appear largely insulated from the risks posed by rising deferred interest payments.

To understand why, we use a large language model to collect data about PIK-related covenants from BDCs' SEC filings and find that banks frequently impose collateral restrictions specifically designed to constrain credit line usage when deferred interest payments increase.[10] Using this information, we confirm that the negative relationship between BDCs' bank credit line reliance and PIK usage is driven by funds that operate under such covenants. Overall, we find that banks incorporate a rigorous set of restrictions to mitigate risks inherent in providing loans to BDCs.

Finally, we show that BDCs offering PIK loans do not offset the lower bank financing by lowering their cash balances or increasing leverage. Instead, we find that higher PIK usage is associated with a lower subsequent growth in BDC portfolio size and dividend

[10]For instance, a common covenant restricts the proportion of PIK loans to no more than 10% of the total value of eligible collateral portfolios.

growth. These results suggest that greater provision of PIK options constrains asset expansion and payout capacity for BDCs.

Related literature. Our paper relates to different strands of the literature. First, our paper relates to a large literature on bank liquidity provision to non-financial firms using credit lines.[11] Liquidity provision by banks through credit lines is often viewed as complementary to their deposit-taking operations, provided that drawdowns on credit lines and deposits are not highly correlated (Kashyap et al. (2002)), or if depositors perceive banks as backed implicitly or explicitly (Gatev and Strahan (2006)). However, correlated drawdowns during market stress pose substantial risks for banks and can disrupt financial intermediation (Acharya and Mora, 2015; Ippolito, Peydró, Polo, and Sette, 2016; Kapan and Minoiu, 2021; Chodorow-Reich, Darmouni, Luck, and Plosser, 2022; Acharya, Engle, Jager, and Steffen, 2024b). In contrast to the previous work, we focus on liquidity provision made by nonbank lenders and show how PIKs can act as a viable alternative to credit lines for firms without access to bank financing.

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.[12] Many authors have studied rise of nonbank direct lending and argued that an increase 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), and lenders' dual-holdings of equity and debt (Davydiuk et al., 2024a). We highlight how the option to defer interest payments provides liquidity to distressed, and seemingly credit-constrained, borrowers, but does not prevent adverse firm outcomes unless it is coupled with adequate loan protections against borrowers' risk-shifting.

Another strand of the literature underscores the important role of non-bank financial

[11] Acharya et al. (2024c); Almeida et al. (2014) provide detailed reviews on this strand of literature.

[12] 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.

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. (2024a) 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. Kaplan and Stein (1993) document how, during the overheated 1980s buyout market, public junk bonds replaced private bank loans. 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 at the expense of worse debt-equityholder conflicts. Our paper is the first paper that investigates when firms choose to defer interest after loans have been extended and the implications. We show that PIK options are also common in senior secured and non-sponsored debt rather than in subordinated bonds and LBOs.

2 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).[13]

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.[14] 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 asset of the firm and to obtain a liquidation value θD as a result. The lender then experiences a haircut $(0 < 1 - \theta < 1)$ relative to the outstanding claim. Alternatively, the lender can invest additional debt 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 1.[15]

[13] 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.

[14] Fundamentally, PIK is simply a way to borrow more.

[15] For simplicity, we start the game from a node when the borrower has already experienced a liquidity shock and requires an addtional investment to focus on the risk-shifting motive of a *distressed* borrower. However, it would be straghtforward to add 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

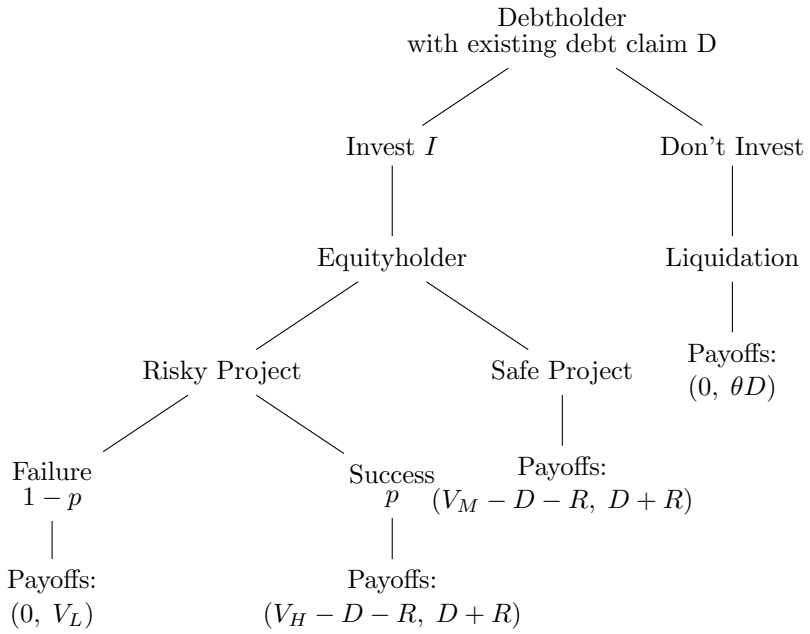

Figure 1: Decision tree of the game
Payoffs report gross payoffs first to the equityholder and then to the debtholder.

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:

- Safe project: Generates V_M with certainty. Debtholder gets $D + R - I$, equityholder gets $V_M - (D + R)$.

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.

- 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.[16]

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, while the equityholder prefers the risky project over the safe project and the safe project over liquidation.[17] The payoffs for the debtholder and the equityholder, respectively, are

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

$$\text{Equityholder's payoffs}: \quad \underbrace{p(V_H - D - R)}_{\text{Risky project}} > \underbrace{V_M - D - R}_{\text{Safe project}} \geq \underbrace{0}_{\text{Liquidation}} \tag{2}$$

Now, 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

[16] 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.

[17] 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.

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, although R can be endogenously negotiated, 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.[18]

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 $\alpha > \frac{p(V_H - D - R) - (V_M - D - R)}{p(V_H - V_M)}$.*

What immediately follows from Proposition 1 is that when the safe project is socially optimal, then equity injection and giving debtholder some warrant-like claim lowers the bankruptcy probability because the safe project is always chosen and the firm avoids the risky project where bankruptcy occurs with probability $1 - p$ and the liqudiation option where bankruptcy occurs with certainty. Furthermore, this simple model suggest that if the lenders have accurately identified the problem and its solution, we should expect that

[18] In what follows, the exact value of R along the interval $(0, V_M - D]$ is not central, but one can take it as given and think that it will be agreed on based on the relative bargaining powers of the lender and the borrower, with R increasing with the lender's bargaining power.

PIK is being used more often when these solutions to mitigate these 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. We test and find support for both of these predictions in the empirical part of the paper.

Bank credit lines or Private Debt PIKs? We also analyze in what conditions having a third-party lender, like a bank, to provide continuation financing can be beneficial and when should such an option be blocked by the original lender—the private debt (PD) lender. The following proposition summarizes in which instances the borrower firm i) does not receive continuation financing at all ii) receives it from PD-lender (or from bank), iii) receives it only from the bank.[19]

Proposition 2. *When there is an offer for continuation financing from other lender:*

- *When $pV_H + (1-p)V_L < \theta D$, there exists no situation where a new lender (a bank), borrower (the firm), and old lender (the PD-lender) agree on a continuation financing solution provided by the bank, and there occurs no continuation financing.*

- *When $pV_H + (1-p)V_L - I \geq \theta D$ (in contrast to Assumption 2) and the bank and PD-lender are equally competitive lenders, then the PD-lender would prefer to provide the continuation financing himself.*

- *When bank can profitably provide the continuation financing with investment I_B, more efficiently than the PD-lender can $I_B < I_{PD}$ so that $pR \geq I_B$ and $pR < I_{PD}$ and the risky project does not make the old PD-lender worse off $pD + (1-p)V_L \geq \theta D$, then it is socially and privately optimal for each party that bank provides the continuation financing instead of PF-lender.*

These different cases help to explain why some firms get subsequent credit line financing from banks (Haque et al., 2024), why some get it via PIK, and why some do not have this option at all—at least without solutions presented in Proposition 1.

[19]For this analysis, we abstract from the use of aforementioned solutions in Proposition 1.

3 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.

3.1 Data

BDC investments. Our main dataset is LSEG LPC's BDC Collateral. BDC Collateral contains the universe of BDCs from 2012Q3 onwards, including active as well as discontinued BDCs. It collects the information directly from Security 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.[20] BDC Collateral groups loans into three loan seniority categories: first lien, second lien (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. 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. Finally, we carefully remove any duplicates in the data and conservatively drop three (relatively small) BDCs from the

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

sample whose business model has no resemblance to direct corporate lending.[21]

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.[22]

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 2013Q1 through 2024Q4.

3.2 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 nonbank lending market with total assets of about USD 410 billion in 2024Q3 and total investments of USD 385 billion.

Portfolio composition. Figure 2 illustrates the evolution of BDC portfolio composition by loan seniority over time. BDCs primarily invest in loans of varying seniority, with equity investments comprising a relatively smaller share. At the start of our sample period, first-lien loans represented approximately 30% of the portfolio, subordinated loans about 25%, and second-lien senior secured loans around 10%. By 2024Q4, second-lien and subordinated loans have shrunk considerably, becoming nearly negligible. Most no-

[21] 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.

[22] Typically an each tuple identifies a single position but in the rare event, 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.

tably, first-lien senior secured loans now dominate, accounting for roughly 75% of the total portfolio.

[Figure 2 here]

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 3 presents the quarterly average PIK spread from 2012 to 2024 among loans that actively PIK some part of the interest. Notably, during periods of U.S. economic expansion, the PIK spread increased, which may indicate a deterioration in the average credit quality of firms that decide to defer cash interest. In contrast, during the COVID-19 pandemic, the average PIK spread declined from about 5.5% to 4.75% and has remained stable throughout the subsequent period of rising interest rates.

Panel B in Figure 3 shows the average ratio between PIK spread and all-in-yield, which we call PIK spread share. The figure shows this for both equal and par value weighted averages. The higher level of PIK spread share for value-weighted average relative to equal-weighted average suggests that PIK is used more among bigger loans.

[Figure 3 here]

Use of deferred interest in private debt contracts. PIK is utilized in private debt contracts in two primary ways. First, borrowers may defer interest payments from the outset of loan origination and do so throughout the loan's lifetime. Second, 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 A of Table 1 highlights several key differences between the two loan types. PIK-toggle loans are more common, more likely to be senior, larger in size, have floating interest

rates, and typically have longer maturities. In contrast, PIK-notes usually feature lower cash spreads, defined as the interest spread over a reference rate when borrowers pay cash interest.

[Table 1 here]

Additionally, the PIK spread can apply either to the entire interest amount or to only a portion of the total interest costs. Our key borrower-lender-loan-level variable is PIK_{bltk}, an indicator 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.[23]

Panel B of Table 1 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.[24] 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.

Using the PIK Option. To analyze trends in PIK adoption, we define the *PIK usage share* as the value-weighted proportion of loans in which borrowers exercise the PIK

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

[24] 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.

option relative to all BDC's loans outstanding in a given quarter. Panel A of Figure 4 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.

In Panel A of Figure 5, 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 see that PIK usage is much more prevalent among these "unbanked" borrowers, indicating that PIK is used as an alternative liquidity management strategy for firms that cannot rely on bank credit lines.

In contrast, Panel B of Figure 5 illustrates that over the past decade, PIK-toggle loans—in which borrowers choose when to use their PIK option—have become increasingly prominent in private credit markets. In 2013, more than 80% of outstanding loans with a PIK feature were structured as PIK notes; by 2022, this share had declined to below 30%.

[Figure 5 here]

BDC capital structure. 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.[25] 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.

[Figure 6 here]

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

Regarding liabilities and equity, nearly half (46%) of the BDC's funding comes from shareholder equity, suggesting a relatively robust capital cushion. Non-bank debt—including 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 via undrawn bank credit lines (12%), ensuring capacity for future investments and flexibility to manage 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.

Figure 7 illustrates the evolution of the funding mix for a typical BDC's balance sheet (expressed as a percentage of total assets) from 2012Q3 through 2024Q4, highlighting several notable trends.

[Figure 7 here]

First, equity remains the dominant funding source but exhibits a gradual decline. Starting at approximately 65%–70% of total assets in 2012, equity financing decreases steadily, reaching the mid-50% range by the mid-2020s. Despite this downward trend, BDCs continue to be heavily equity-funded compared to other financial intermediaries.

Second, reliance on non-bank debt increases significantly during this period. Non-bank debt rises steadily from about 15%–20% to around 25%–30% of total assets, signaling a strategic shift towards capital-market financing.

Third, drawn credit lines maintain a relatively stable presence, typically accounting for about 10%–20% of total assets, suggesting consistent use of revolving credit facilities. In contrast, traditional bank term loans remain limited—usually below 10%—and exhibit a declining trend through the mid-2010s, before modestly increasing toward 2024–2025.

Finally, although not directly reflected on the balance sheet, BDCs maintain off-balance-sheet liquidity through undrawn credit lines (generally 10%–15% of total assets). These facilities provide additional financial flexibility, enabling BDCs to quickly address liquidity needs or capitalize on investment opportunities. Overall, the changing funding mix reflects BDCs' strategic preference for diversified financing, leveraging private debt markets, and maintaining ample liquidity buffers while retaining substantial equity capitalization.

3.3 Descriptive statistics

Table 2 presents summary statistics at the BDC-level (Panel A) and loan level (Panel B) over the 2014Q1 to 2024Q4 period.

[Table 2 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 1.76 billion, though the distribution is skewed, with a median asset size of USD 0.69 billion. BDCs hold, on average, investments in 87 portfolio companies and have an average leverage ratio of 0.43. The median fund age is 6 years, but several BDCs have significantly longer operating histories.

Regarding financial performance, the median return on equity (ROE) among BDCs is 9%. Banks provide substantial funding, representing a median share of 46% 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 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.[26] Consistent with Figure 2, 84% of loans are first-lien senior secured, 11% are second-lien, and 5% are subordinated, reflecting BDCs' preference for secured lending.

Figure 7 suggests a decreasing importance of equity and more reliance on debt, specifically bank-originated debt, in the capital structures of BDCs. Panel A of Table 3 provides further evidence for the 66 BDCs matched to Capital IQ. Bank lending is the most important funding source for BDCs. While they hardly borrow by issuing term loans, they mostly rely on bank credit line commitments to fund their investments. Still, a substantial part of their balance sheet is funded through *Nonbank debt* (i.e., mainly corporate bonds). Interestingly, BDCs rely mostly on bank-provided credit lines for liquidity. While only 4% of assets are cash, about 16% of assets are credit line commitments by banks.

Lastly, in Panel B of Table 3 we study how the average BDC that has above median PIK usage at any given quarter differs from those with below median PIK usage. Based on p-values under a 5% level, BDCs that hold more of their portfolio in PIK'd assets tend to be larger, more leveraged, rely less on bank debt and drawn credit lines, and more on bonds, and hold less assets in cash.

[Table 3 here]

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

4 Deferred Interest and Firm Vulnerability

4.1 When do firms use PIKs?

We begin our analysis by examining the determinants of exercising the PIK option, estimating the following regression model via OLS:

$$PIK_{blkt} = \beta_1 \, Loan\,Terms_{blkt} + Fixed\,Effects + e_{blkt} \tag{3}$$

Our sample includes only loans with PIK toggles and loans without observable PIK components, 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.[27] The regression includes a variety of loan-specific characteristics, such as loan size, base rate, a fixed-rate loan indicator, an indicator whether the borrower has received bank financing within the past 5 years or if the lender also holds an equity stake in the borrowing firm, and loan seniority and loan type indicators.

Table 4 presents the regression results. Column (1) is a pooled regression highlighting key correlations between loan terms and the decision to defer cash interest payments. Several results are worth mentioning: A borrower is more likely to exercise the PIK option if the loan is already non-accrual, is a subordinated loan, is larger and if the base rate is higher.[28] The latter result suggests that–controlling for the loan being a fixed-rate loan–that PIKs that are tied to a floating rate are used in times of high base rates.

[Table 4 here]

Across all specifications, we find that borrowers are more likely to defer loan interest payments if loans are already classified as non-accrual, with coefficient estimates ranging from 0.15 to 0.23. This suggests that borrowers who experience distress or reduced cash flow capacity often resort to PIK structures. Similarly, loan size is positively associated with PIK usage, implying that larger loans are more likely to incorporate PIK features.

[27] Including the PIK notes has little impact on the results.
[28] Most loans are tied to LIBOR and (eventually) to SOFR.

Importantly, 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 that they are mostly used by firms that have not received a bank loan in the preceding five-year period, indicating a lack of outside financing options. These results are consistent with the theoretical predictions: PIK is likely to be used by borrowers as an alternative to bank financing, but these types of arrangements are often possible only by giving the lender some type of stake in the firm to mitigate the conflicts of interest between the debt-and equityholder.

Lastly, in columns (2) and (3) we also see that PE-sponsored firms are more likely to use their PIK option. If this is because equity injections are more frequent among PE-sponsored firms, then this provides further support for the theoretical predictions that obtaining additional debt via PIK is more likely when there are contractual terms that mitigate the associated debtholder-equityholder conflicts. While we do not observe in our data these PE sponsors equity injections prior studies suggests 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.

4.2 Deferred interest and future loan delinquency

Are loans more likely to become non-accrual if a firm defers cash interest payments? To test this, we run the following regression model.

$$NonAccrual_{blk,t+1} = \beta_1 \, PIK_{blkt} + Controls + Fixed\,Effects + e_{blkt} \tag{4}$$

where $NonAccrual_{blk,t+1}$ is an indicator variable that equals one if the loan is classified as non-accrual in *t+1*. We also include the current non-accrual status, $NonAccrual_{blkt}$, as a loan is arguably more likely to stay non-accrual when it already is. We address the potential endogeneity of firms' PIK usage by employing a stringent set of model specifi-

cations that incorporate all control variables that have been shown to have explanatory power for PIK usage (compare Table 4) as well fixed effect combinations for borrowers, year-quarter, BDC, and seniority and loan type. Borrower, Industry, and BDC fixed effects account for unobserved characteristics specific to individual firms and lenders, such as risk appetite or lending strategy. Year-quarter fixed effects control for macroeconomic conditions and market-wide credit cycles.

[Table 5 here]

Table 5 presents the regression estimates. In column (1), we regress $NonAccrual_{blk,t+4}$ only on PIK_{blkt}, and year-quarter fixed effects. We find that loans have a 12pp higher likelihood of becoming delinquent in the four quarters after the borrower has started to defer interest. In column (2), we add all control variables from Table 4 and the current non-accrual status, and in column (3), borrower and loan type, seniority, and BDC fixed effects. β_1 remains positive and significant, although the magnitude drops to about 2-3pp.

In column (4), we add the interaction of year-quarter with BDC, industry, loan type, and loan seniority. However, this has little impact on our results. Finally, in column (5), we restrict the analysis to the within-borrower-time level by adding year-quarter $\times$ borrower fixed effects and thus absorbing all the borrower (time-varying) characteristics. Our PIK estimate remains positive and strongly statistically significant suggesting that borrowers with multiple outstanding loans are likely to fail making payments on the loan for which it has used PIK to pay interest. This could be either because the borrower strategically chooses to fail payment on the PIK loans rather than non-PIK loans, or because holders of non-PIK loans have a more senior claim on any cash flows in case the firm runs into liquidity issues. Across all specifications, the effect varies between 2pp and 3pp, which is large relative to an unconditional mean of 3%.

4.3 Deferred interest and future bankruptcy

We now focus on loan originations using only the first observation when the loan appears in the sample and investigate how loan characteristics (at origination) affect the likelihood

that a firm files for bankruptcy.[29] Precisely, we run the following regression.

$$Bankruptcy_{blk,\tau+} = \beta_1 \, PIK_{blk,\tau+} + Controls + Fixed\,Effects + e_{blk,\tau} \tag{5}$$

where τ denotes the year-quarter when the loan first appears in the sample and $\tau+$ denotes any date afterwards. $Bankruptcy_{blk,\tau+}$ takes a value of one if the borrower files for bankruptcy at any date following the initial origination date, $PIK_{blk,\tau+}$ takes a value of one if the borrower uses the PIK option after loan origination. We also include a set of control variables that capture the observable loan terms and borrower characteristics at the time of the origination. In some specifications, we add interaction terms for $PIK_{blk,\tau+}$ with $PE\,Sponsored_{b,\tau}$ and $Dual\,holding_{bl,\tau}$. Table 6 shows the results.

[Table 6 here]

Columns (1) and (2) indicate that firms using the PIK option are more likely to experience bankruptcy at some point in the future compared to those who do not use the PIK option. $PE\,Sponsored$ has both a negative sign, suggesting that borrowers backed by PE sponsors are less likely to file for bankruptcy.

Focusing on Column (3), the large and positive coefficient for PIK and a large negative coefficient on the interaction term $PIK \times PE\,Sponsored$ suggests that using PIK is followed by an elevated bankruptcy probability but mostly 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 be similar deep pocketed investor that can do this, which then leads to higher debt levels and higher bankruptcy risk.

In Column (4), we observe that both interaction terms of PIK users with *Dual holding* are negative, although statistically significant at a 10% level only for PIK togglers, while

[29] The loans appear in the sample either because they have just been originated or because they have recently been bought from the secondary market and added to the portfolio. Since most BDC loans are self-originated, we call this initial date an origination date.

Dual holding estimate is zero. Thus, lenders' equity or equity-like stakes mitigate the bankruptcy risk, but only for PIK users. This is consistent with the idea that debt-equityholder conflicts and equityholder's incentives to take excessive risks to fight for resurrection can be mitigated by giving the lender option like claim on firm's profits. Column (5) includes all interaction terms and shows that these findings persists—especially for the *Dual holding* and *PE Sponsored* interaction terms.

4.4 Deferred interest and future loan valuation

We next analyze how deferred interest impacts loan values. We estimate the following regression using OLS:

$$Fair/Par_{blk,t+1} = \beta_1 \, PIK_{blkt} + Controls + Fixed\,Effects + e_{blkt} \tag{6}$$

where $Fair/Par_{blk,t+1}$ measures the fair-to-par value ratio of loan k at the end of period $t+1$. Among other controls, we also include $Fair/Par$ at time t to the specification that captures the contemporanenous loan valuation.

Table 7 presents regression results examining loan valuation in the next quarter following PIK use. A key finding where PIK toggle has been used in previous quarter experience significantly lower loan valuations. This negative impact is highly significant across all specifications, suggesting that loans that use PIK are followed by lower loan valuations compared to loans that do not use PIK. The coefficient of -0.02 indicates that using PIK at period t is associated with 2pp lower loan valuation four quarters later. These results are consistent with the interpretation that PIK use may amplify agency conflicts but with the interpretation that PIK use may just be a signal of distress that has not yet been incorporated into contemporaneous loan valuations.

To further investigate if the agency conflicts can influence the fair value assessments, in the last column, we also add interaction terms with $PIK \times PE\,Sponsored$ and $PIK \times Dual - holding$ into the specification. As both of these factors should help mitigate or

eliminate the risk-shifting incentives when using PIK, we should expect them to have positive coefficients. Indeed, what we find is that estimates on both interaction terms are positive and statistically significant, indicating that the lower credit risk that these factors bring into the lending relationship is also reflected in the fair value assessments.

4.5 Deferred interest and valuation uncertainty

In a last set of tests, we take advantage of the fact that BDCs quarterly report their own assessment of the fair value of the loan. Now we concentrate on the dispersion in these valuation estimates.

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. We construct a new measure of fair value dispersion between BDCs. More precisely, $CSD(Fair/Par_{blk,t+1})$ is the cross-sectional standard deviation of similar loans' value ($Fair/Par$-ratio) across all BDC's portfolios at the end of period $t+1$.[30] We hypothesize that the fair value dispersion increases after a borrower's decision to defer interest. We estimate the following regression using OLS:

$$CSD(Fair/Par_{blk,t+1}) = \beta_1 \, PIK_{blkt} + Controls + Fixed\,Effects + e_{blkt} \qquad (7)$$

Table 8 presents regression results examining the cross-sectional standard deviation (CSD) of loan valuations four quarters later.

[Table 8 here]

Using PIK with a loan is followed by significantly higher valuation dispersion. This positive and statistically significant relationship across all specifications suggests that PIK

[30] 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).

loans are associated with greater valuation uncertainty and greater disagreement about market pricing.

In the last column, we also add interaction terms with $PIK \times PE\,Sponsored$ and $PIK \times Dual-holding$ into the specification. As both of these factors should help nudge the equityholder towards safer projects when using PIK, then these characteristics should generally help to resolve uncertainty. Indeed, this is what we find empirically: both interaction terms are negative, indicating a lower valuation uncertainty when these factors are present in PIK use. However neither estimate is statistically significant at the conventional 5% level.

4.6 Deferred interest and vulnerability of BDCs

To further validate our findings and examine the aggregate effects of deferred interest, we extend the analysis to the BDC level. Specifically, we explore how BDC-level deferred interest usage relates to portfolio performance indicators, including delinquency and default rates.

We first investigate the effect of PIK usage on the risk of the BDC. The specification takes the following form.

$$Risk_{l,t+1} = \beta_1\, PIK\, usage\, share_{lt} + Controls_{lt} + Fixed\, Effects + e_{lt} \tag{8}$$

As defined above, $PIK\, usage\, share_{lt}$ represents the par-value-weighted proportion of loans in a BDC's portfolio where borrowers defer interest using the PIK in quarter t. To measure BDC risk ($Risk_{l,t+1}$), we use three measures: the non-accrual share (*Nonaccrual share*), net realized gains during the following four quarters relative to total assets at time t (*Realized gains*) and the Merton (1974) model's implied distance-to-default (*DtD*).[31] We include standard control variables—log fund size, leverage ratio, profitability (measured as return on equity), fund's cash holdings relative to total assets and log fund age, all lagged

[31]BDC Collateral reports the realized gains/losses as trailing 12-months rolling sums, which is why we use four-quarter horizon with this variable.

by one quarter. We also include in stepwise way BDC fixed effects, α_l, and year-quarter fixed effects, α_t, to specifications. These fixed effects capture for (also unobservable) time invariant characteristics of the BDCs and all the aggregate variation, such as changes in macroeconomic conditions, that are common to all funds.

[Table 9 here]

The results presented in Table 9 illustrate a clear relationship between a BDC's reliance on deferred interest (as measured by $PIK\,usage\,share_{lt}$) and its overall risk exposure. Specifically, a higher $PIK\,usage\,share_{lt}$ is associated with increased non-accrual costs, signaling elevated credit risk. This relationship persists after controlling for BDC fixed effects, although the magnitude of the coefficient decreases, suggesting that lender-specific characteristics explain some of the variations.

Similarly, as *Nonaccrual share* we find that high $PIK\,usage\,share_{lt}$ strongly predicts lower *Realized gains*. This result is strongly economically and statistically significant in all specifications. Finally, the observed negative correlation between $PIK\,usage\,share_{lt}$ and distance-to-default highlights that increased reliance on deferred interest reduces BDCs' overall financial resilience.

5 How Does Deferred Interest Affect BDC Funding and Investment?

Even though interest is deferred (i.e., the BDC does not receive a cash inflow), the BDC is obligated to recognize it as income. Given that regulatory requirements mandate the distribution of approximately 90% of income as dividends, this might lead to liquidity pressures. To safeguard against such liquidity risks, BDCs hold cash and secure liquidity through credit lines committed by banks, which can be drawn when needed. An important question, therefore, is whether BDCs with a higher proportion of deferred interest payments exhibit greater reliance on bank-committed lines of credit. Or, do BDCs use

alternative funding sources such as the corporate bond market? And, what are the implications for subsequent BDC asset and dividend growth? These questions are addressed in the following analysis.

5.1 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 this using the two model specifications. First, we start by running the following OLS regression

$$y_{l,t+1} = \beta_1 \, PIK \, usage \, share_{lt} + Controls_{lt} + \alpha_l + \alpha_t + e_{lt}$$

where the dependent variable $y_{l,t+1}$ captures either the utilization rate of credit lines (drawn credit relative to total committed credit) or the share of bank debt relative to total debt. If high PIK usage leads the BDC to draw down more (less) of its bank credit line and use more of bank debt rather than other types of debt, such as bonds, we would expect β_1 to be positive (negative).

[Table 10 here]

The results of this are shown in Columns (1), (2), (3), and (4) in Table 10, where Columns 1–2 present results on the relationship between PIK usage and the share of bank debt in total debt, while Columns 4–5 report analogous results for credit line utilization.

The findings indicate a statistically significant and economically meaningful *negative* relationship between PIK usage and both bank debt share and credit line usage in the subsequent period. In the specifications (Columns 1 and 4), a one percentage point increase in PIK usage is associated with a 0.69pp decrease in the share of bank debt and a 0.51pp decrease in credit line usage, both significant at the 1% level. The inclusion of BDC fixed

effects attenuates these magnitudes slightly while maintaining statistical significance at conventional levels (1% and 5%).

These results suggest that BDCs provided PIK debt is not just a pass-through from bank-provided credit lines to BDCs to end-borrowers. Instead, it seems that greater reliance on PIK structures, which allow borrowers to defer cash interest payments, may signal heightened credit risk, reducing access to bank financing and credit line drawdowns. The decline in bank debt share implies that banks may be less willing to extend credit to BDCs with higher PIK exposure, potentially due to concerns over asset quality and liquidity constraints. Similarly, the negative relationship with credit line usage suggests that BDCs with greater PIK exposure either face reduced access to credit facilities or exhibit a preference for alternative funding sources.

To evaluate this hypothesis in more detail, we delve into analyzing the contract terms among bank-provided credit lines to BDCs from SEC regulatory filings. We start by taking a sample of these documents and carefully reading the sections that discuss PIK use. This exercise suggests that banks often set limits on how much PIK can be used, and this is directly linked to how much they borrow. This is because the investment portfolio or part of it, referred to as "borrowing base", is often used as collateral for that bank debt.[32] Since the required collateral portfolio directly scales with the size of the borrowed amount, a high PIK usage share may restrict BDC's further bank borrowing or even force it to pay back existing debt.

To generalize these results for the full sample, we use a large language model to find and collect all the sections in BDCs' 8-K, 10-Q, and 10-K filings that discuss PIK jointly while referring to "borrowing base".[33] Then we use the existence of this type of clause in the filings as an indication that the bank has set a restriction on the PIK use of the borrower-BDC. These clauses seem to be very prevalent: Among the 66 BDCs for which we have information about bank borrowing, we find such restrictions among the filings of

[32]For example, terms in Ares Capital Corp's (ARCC) revolving funding facility from Wells Fargo and two other banks restrict the share of PIK loans in the eligible collateral portfolio. For details of this example, see the amendment in ARCC's 8-K filing from June 22, 2022.

[33]We allocate the details relating to this data collection methodology to Online Appendix.

60 BDCs. To use this information in a regression, we create an indicator variable, called *PIK Restriction*, that takes a value of one if BDC's regulatory filings include a restriction about how much of the borrowing base can be tied to PIK interest, and zero otherwise, and then run a following OLS regression.

$$y_{l,t+1} = \beta_1 \, PIK \, usage \, share_{lt} + \beta_2 \, PIK \, usage \, share_{lt} \times PIK \, Restriction_l + Controls_{lt} + \alpha_l + \alpha_t + e_{lt}$$

If PIK restrictions for further bank borrowing are the reason we observe the negative correlation between *PIK usage share* and bank borrowing, then we would expect that $\beta_1 > 0$ and $\beta_2 < 0$.

Columns (3) and (6) in Table 10 show the results for bank debt share and credit line usage, respectively. Consistent with the hypothesis that PIK restrictions drive the negative relationship between PIK usage and bank borrowing, we see that estimates for β_1 and β_2 are positive and negative, respectively, as expected. Furthermore, in Column (6), β_1 coefficient is also strongly statistically significant, suggesting that there is also evidence that for BDCs without any bank-imposed covenants on PIK use, the reliance on credit lines increases with PIK usage.

Overall, despite the substantial amount of credit lines extended to BDCs and their relatively high utilization rates compared to other non-bank financial institutions, the banking sector seems to remain largely insulated from the risks associated with increased deferred interest payments.

5.2 Deferred interest and BDC balance sheet and payout choices

In Table 11, 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 11 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 estimates suggest 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 Column 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 weak 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 10% level. However, when BDC fixed effects are included (Column 8), the coefficient becomes smaller (-0.03) 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 structural constraints on payout policies.

6 Conclusion

This paper provides novel insights into the implications of Payment-in-Kind (PIK) lending in the U.S. private credit market, with a specific focus on Business Development Companies (BDCs). By allowing borrowers to defer cash interest payments, PIK loans offer crucial short-term liquidity during periods of economic distress and act as an alternative to bank-based credit lines. However, our analysis highlights that these contracts should be used with care as the deferred interest structures often can amplify agency issues. Indeed, we

find that deferring interest predicts elevated credit risk, higher delinquency and bankruptcy rates, and increased realized losses at both the loan and portfolio levels. These results seem to be mostly driven by loans where PIK usage is not coupled with deal characteristics that are theoretically known to protect against borrowers' risk-shifting tendencies.

At the BDC level, extensive reliance on deferred interest not only raises portfolio credit risk but also limits funding options due to restrictive covenants imposed by banks. Banks significantly constrain BDCs' ability to draw on credit lines precisely when liquidity is most needed, compelling these lenders to scale back debt financing, investment growth, and dividend distributions. Our findings thus reveal an inherent trade-off: while PIK loans alleviate immediate liquidity constraints, they might simultaneously amplify debtholder-equityholder agency conflicts and constrain lenders' operational flexibility.

There are several avenues for future research. First, exploring the systemic implications of deferred interest practices beyond BDCs to include broader segments of the non-bank financial sector would deepen understanding of financial stability risks. Second, comparative analyses across different international jurisdictions could provide insights as to how regulation impacts PIK lending practices and outcomes. Finally, understanding how evolving market structures in private credit affect the adoption and consequences of deferred interest payments represents an important question for future research.

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Figure 2: BDC investment portfolio composition

The figure shows the composition of BDC's investment portfolios over the 2013Q1 to 2024Q3 period. Investments are decomposed into (1) Equity, (2) First Lien, (3) Second Lien, and (4) Subordinated Loans. Both First and Second Lien are senior secured loans.

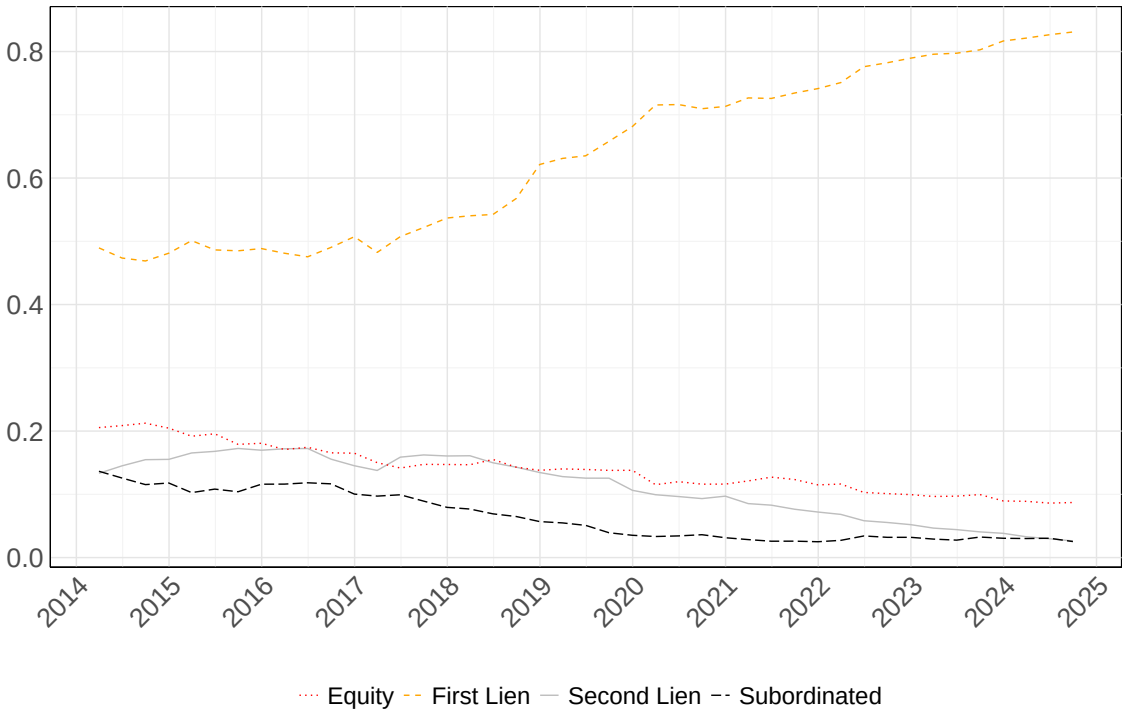
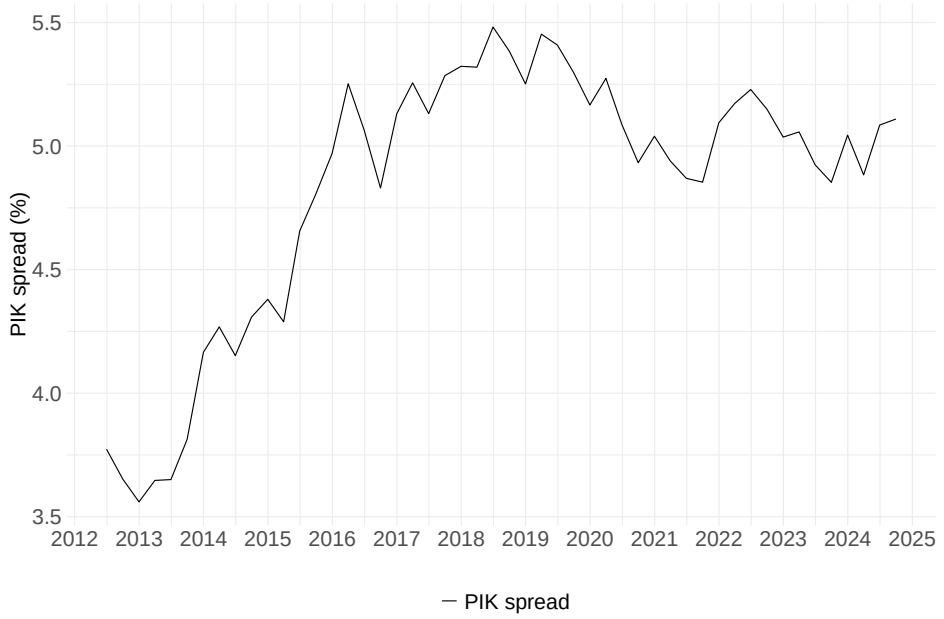


Figure 3: Average PIK spread

Panal 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

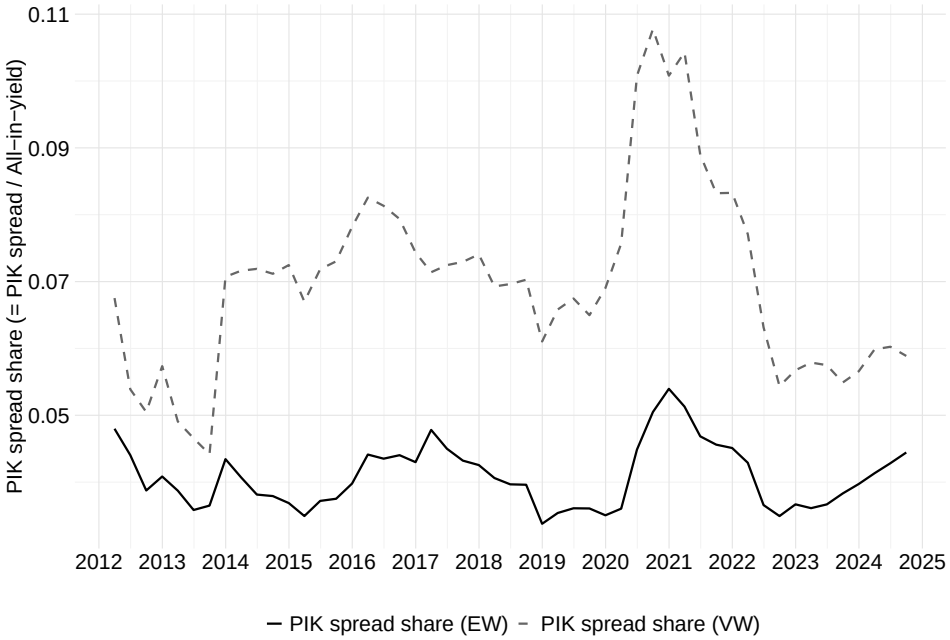


Figure 4: PIK usage and average base interest rate

The figure 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 where borrowers use the PIK option relative to all loans in a given quarter.

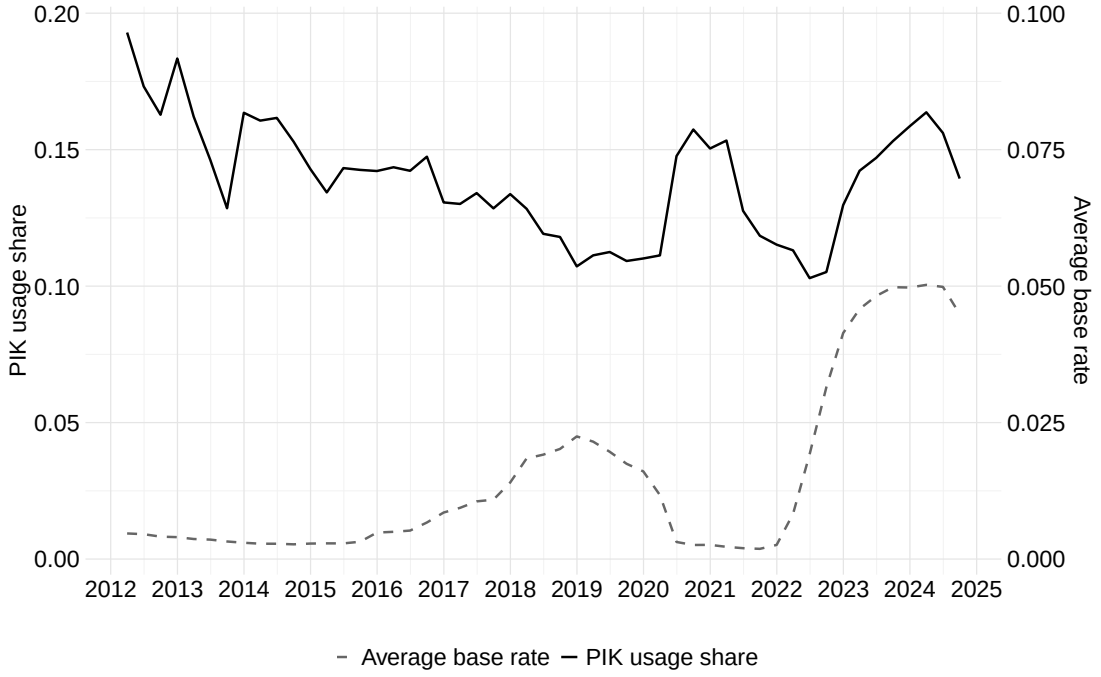
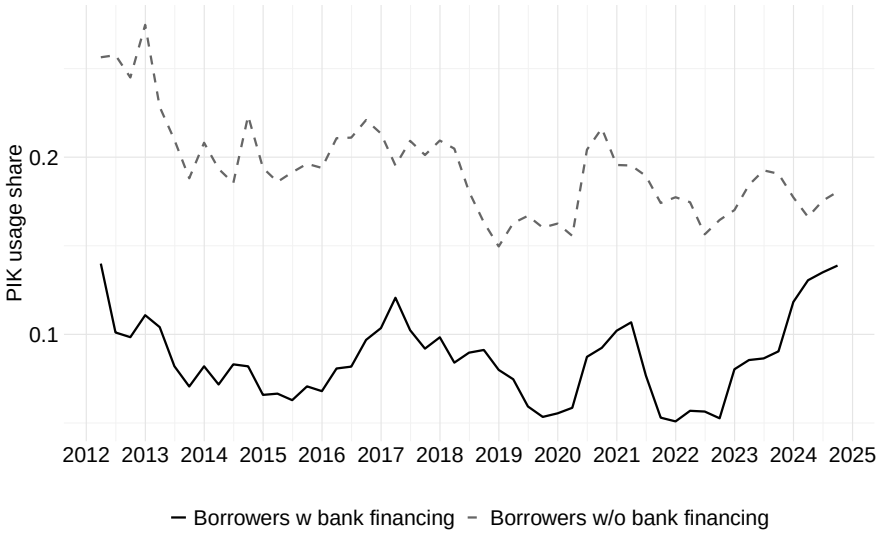


Figure 5: PIK Usage and lack of bank financing

Panel A shows the time series of the PIK usage share across all BDCs' portfolio loans during the 2012Q1 to 2024Q3 period that are categorized as loans of those borrowers that have received a bank loan within the preceding 5 years (solid line) and those that have not (dashed line) 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 share of PIK Notes (relative to all PIK loans) during the 2012Q2 to 2022Q4 period. The sample excludes loans that originated after 2023 or before 2012Q2 to accurately categorize PIK loans.

Panel A - PIK usage among different types of borrowers



Panel B - Share of PIK Notes among all outstanding PIK loans

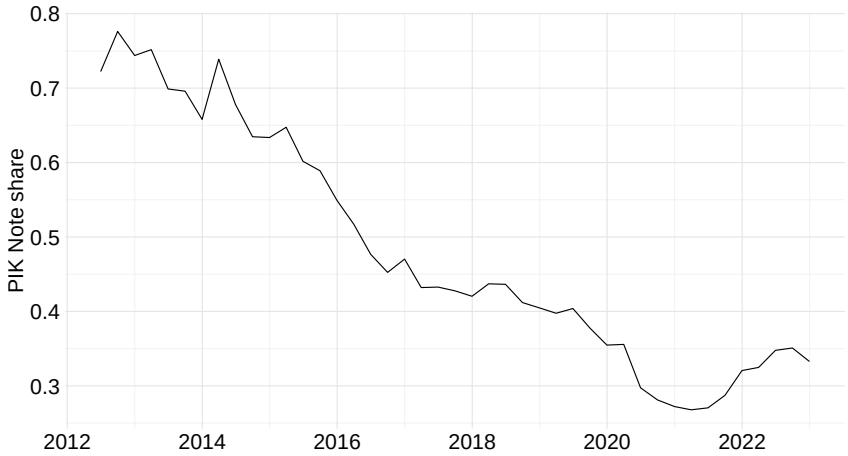


Figure 6: Balance sheet of the BDC sector in 2022Q4

This figure shows the aggregate BDC sector's balance sheet components (all relative to total assets) as of 2022Q4. Data is from Capital IQ.

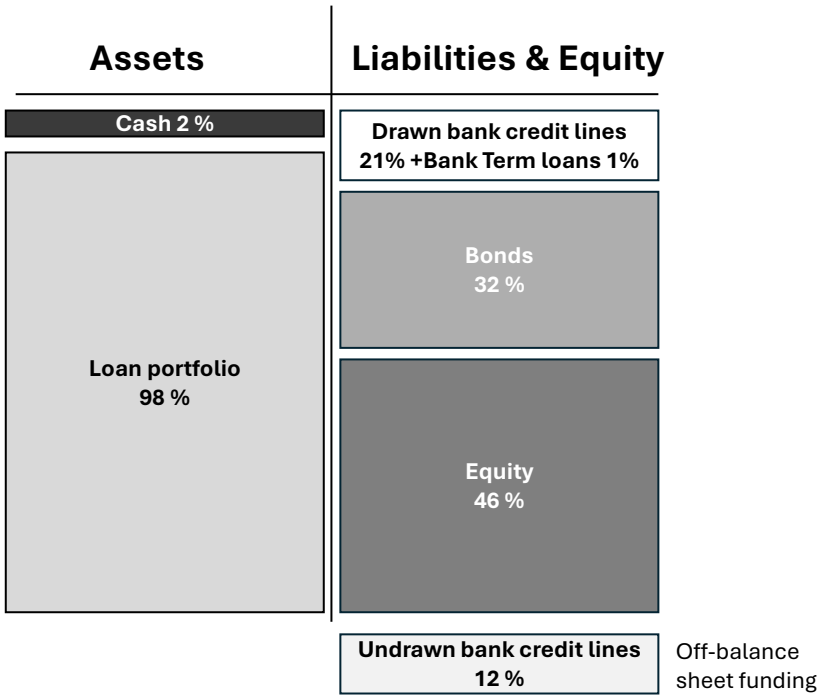


Figure 7: BDC debt capital structure

The figure shows the average share of different debt structure items relative to total assets across BDCs' balance sheets over the 2013Q1 to 2024Q3 period.

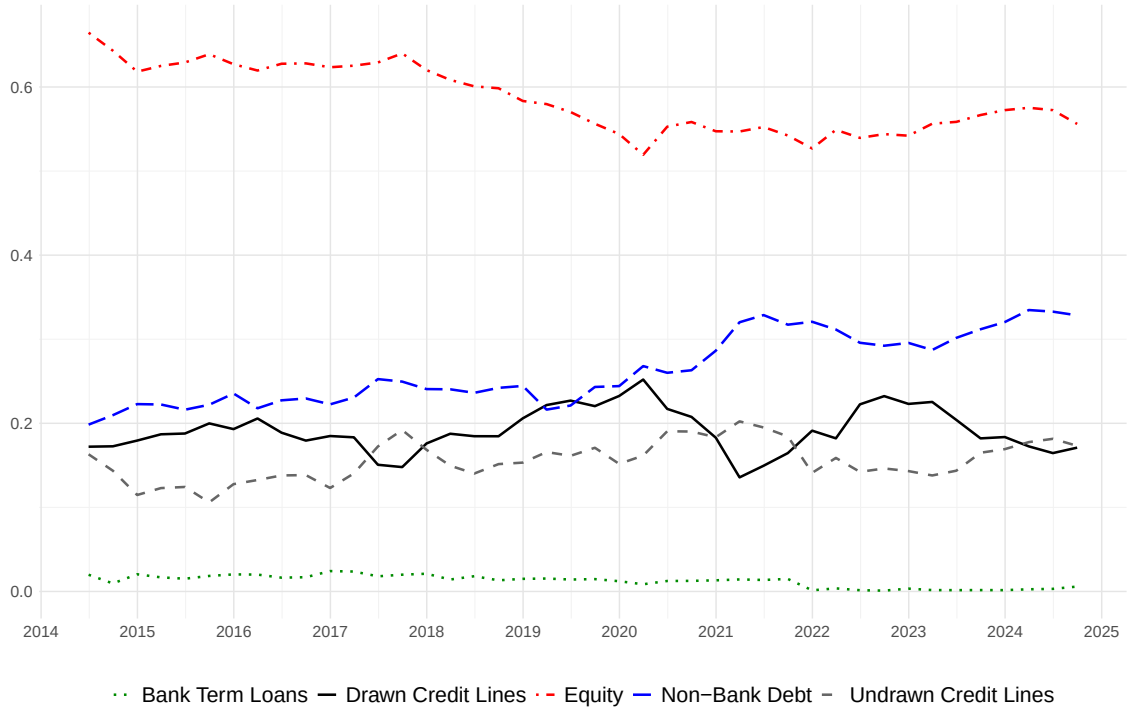
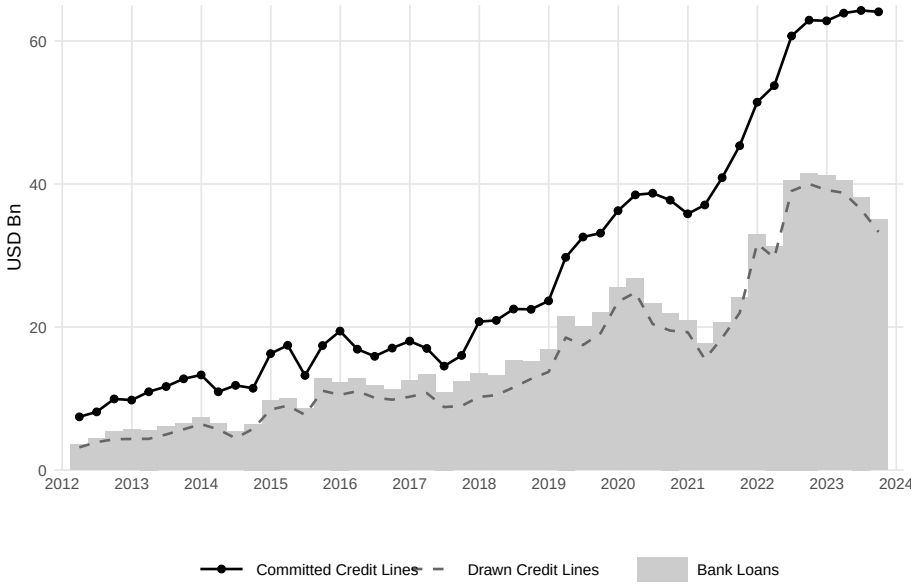


Figure 8: Bank lending to BDCs

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

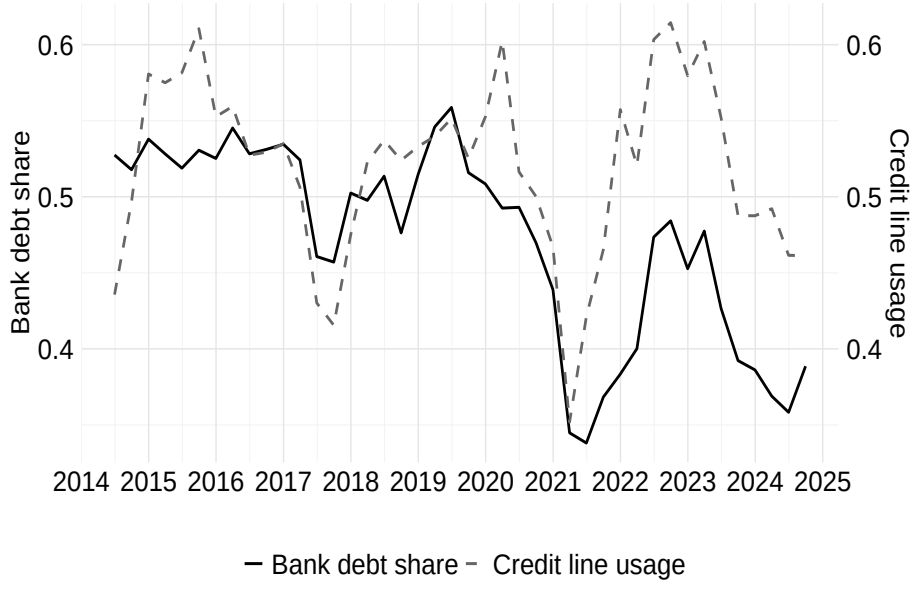
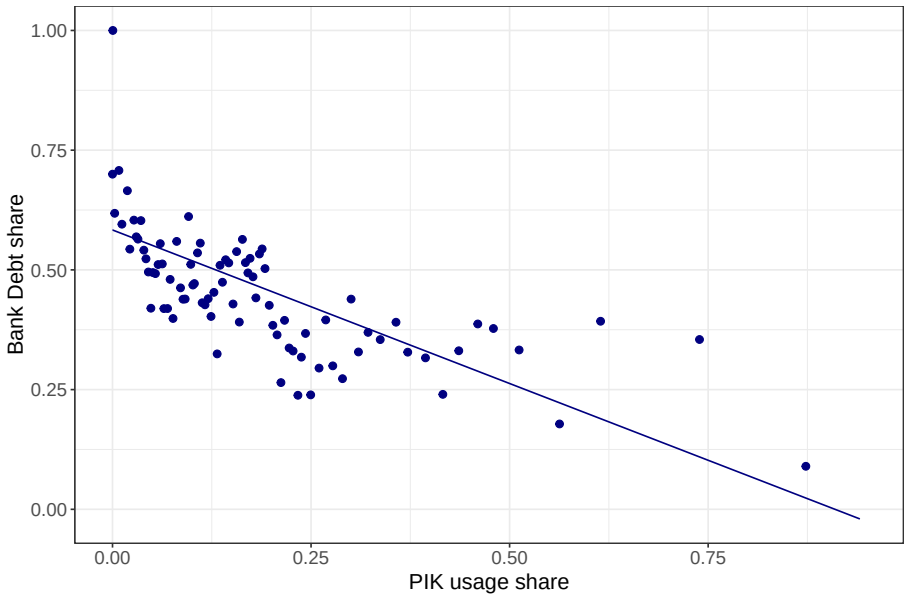


Figure 9: PIK usage and bank debt

Panel A (B) shows plots *Bank debt share* (*Credit line usage*) on *PIK usage share* using a binscatter with 100 bins.

Panel A - Bank Debt share and PIK usage share



Panel B - Credit line usage and PIK usage share

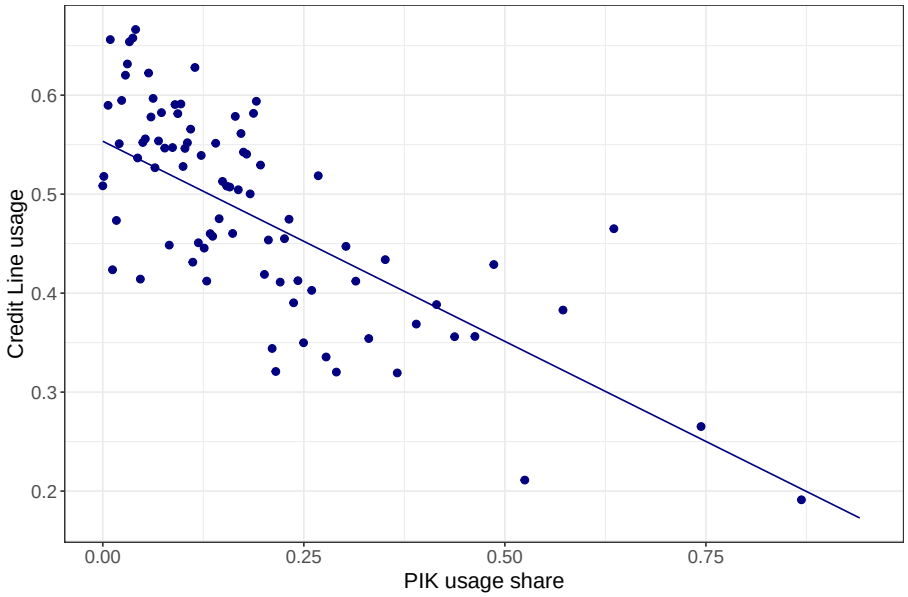


Table 1: Use of Deferred Interest (PIK) in Private Debt

Panel A shows the loan characteristics of "*PIK-Notes*" and "*PIK-Toggle*" loans at origination. 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 instead typically initially pay interest in cash but switch to PIK at some point before maturity. *PIK spread (%)* is the average PIK spread. The sample excludes loans that appear only for one period in the sample and revolvers that are mostly used for short-term bridge financing, and loans that originated after 2023, and the loans for which we do not appear in the sample at the start of the sample 2012Q1 to more accurately identify *PIK-Notes*. Panel B shows how PIK is reported, using Garrison Capital Inc. as an example. This example illustrates how PIK reporting appears in our loan-level dataset. $PIK\,spread\,(\%)$ is zero when it is not reported. PIK takes the value of one if the $PIK\,spread\,(\%)$ is reported as positive and zero otherwise. $Pav\,value(\$\,million)$, $Cash\,spread\,(\%)$, $Time-to-maturity$ and $All-in-yield\,(\%)$ are debt characteristics measured at origination date. Detailed variable definitions are found in Appendix B.

Panel A: PIK-Toggle Loans vs. PIK-Notes

	Variable	PIK-Toggle	PIK-Note
1	Observations	2887	1150
2	First Lien Senior Secured	0.85	0.49
3	Fixed rate	0.20	0.65
4	Cash Spread (%)	7.04	5.89
5	Par value ($ million)	19.70	17.51
6	Time-to-maturity	60.82	56.70
7	All-in-yield (%)	9.01	11.72
8	PIK Spread (%)	4.64	5.43

Panel B: Garrison Capital Inc. - An example of PIK reporting

YearQtr	BDC	Borrower	Seniority	All-in Yield	Cash Spread	PIK Spread	PIK	Par-value	Remaining Maturity
201302	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	12%	11%	0%	0	11.5	60
201303	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	5.75%	5.5%	0%	0	14.0	57
201304	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	12%	11%	0%	0	13.9	54
201401	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	12%	11%	0%	0	13.7	51
201402	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	12%	11%	0%	0	13.6	48
201403	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	12%	11%	0%	0	13.4	45
201404	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	13%	0%	0	13.2	42
201501	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	13%	0%	0	13.3	39
201502	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	3%	10%	1	13.7	36
201503	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	3%	10%	1	14.0	32
201504	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	3%	10%	1	14.3	29
201601	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	5%	8%	1	14.6	26
201602	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	5%	8%	1	14.9	23
201603	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	5%	8%	1	15.2	20
201604	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	11%	2%	1	15.4	17
201701	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14%	11%	2%	1	15.5	14
201702	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	14.06%	0%	13%	1	15.7	11
201703	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	15.25%	0%	14%	1	16.3	8
201704	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	15.38%	0%	14%	1	16.9	5
201801	Garrison Capital Inc.	Exel Direct Inc.	First Lien Senior Secured	15.69%	0%	14%	1	17.6	2

Table 2: Descriptive statistics

This table shows descriptive statistics for variables at the BDC level (Panel A) and at the loan level (Panel B). All variables are defined in Appendix B. The sample period for BDC-level data is from 2014Q1 to 2024Q4 and for loan-level data from 2012Q1 to 2024Q4.

Panel A: BDC-level data

Statistic	N	Mean	St. Dev.	Q1	Median	Q3
PIK usage share	3,642	0.13	0.17	0.004	0.08	0.18
Assets ($ billion)	4,211	1.62	3.75	0.26	0.61	1.66
Number of investees	2,361	83.02	67.24	34	67	117
Leverage	4,211	0.41	0.17	0.34	0.45	0.52
Fund Age (in years)	4,211	9.18	11.24	3	6	12
ROE	3,364	0.06	0.17	0.02	0.09	0.13
Bank debt share	1,938	0.48	0.30	0.25	0.46	0.70
Credit line usage	2,168	0.51	0.27	0.32	0.54	0.72
Non-accrual share	4,211	0.03	0.06	0.00	0.01	0.04
Realized gain(loss)$_{t,t+4}$	3,388	-0.03	0.22	-0.07	-0.005	0.01
Dist-to-Default(DtD)	1,500	6.01	3.08	3.85	5.96	8.10
Asset growth (CV)	3,968	0.08	0.20	-0.01	0.02	0.10
Asset growth (FV)	4,006	0.07	0.17	-0.02	0.02	0.10
Dividend growth	3,474	0.07	0.15	-0.000	0.002	0.06

Panel B: Loan-level 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 Use	380,432	0.06	0.24	0	0	0
Is 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

Table 3: BDC funding structure and its relationship with PIK usage

Panel A shows the liability structure of BDCs for that part of the sample where we observe the debt structure. Panel B shows the mean difference between BDCs grouped based on above and below median PIK usage for each period for the full sample available for each variable. Standard errors are clustered at the BDC and year-quarter level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Panel A: BDC Liability structure (% of total assets)

Statistic	N	Mean	St. Dev.	Pctl(25)	Median	Pctl(75)
Bank Loans						
Drawn credit lines	1,878	0.19	0.13	0.09	0.19	0.28
Term loans	1,878	0.01	0.04	0.00	0.00	0.00
Non bank debt	1,880	0.27	0.15	0.16	0.27	0.38
Equity	1,881	0.51	0.09	0.45	0.51	0.56
Off-balance sheet						
Undrawn credit lines	1,830	0.16	0.12	0.08	0.13	0.20
Cash	1,881	0.04	0.04	0.01	0.02	0.05

Panel B: Mean Differences in BDC characteristics by PIK Usage

	Group Means		
Variable	Low PIK	High PIK	Difference
Ln Total Assets	6.055	6.835	0.78***
			(0.166)
Leverage Ratio	0.393	0.436	0.043**
			(0.017)
Return on Equity	0.061	0.057	-0.003
			(0.012)
Bank Debt / Assets	0.239	0.185	-0.054**
			(0.023)
Cash / Assets	0.085	0.051	-0.035***
			(0.007)
Bonds / Assets	0.213	0.293	0.08***
			(0.027)
Undrawn Credit Lines / Assets	0.164	0.154	-0.01
			(0.019)
Drawn Credit Lines / Assets	0.23	0.172	-0.058**
			(0.023)

Table 4: Determinants of PIK usage

This table shows the results from OLS regression of PIK use on various loan characteristics. PIK_t is an indicator variable that takes the value of one if the loan is reported to be paid in kind for that period. The sample excludes PIK Notes. $NonAccrual_t$ is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t. $Maturity_t$ is the natural logarithm of the remaining time to maturity. $Fair/Par_t$ is the current valuation of the loan position. $Loan\,Size_t$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan$ is an indicator variable that takes the value of one if the loan has a fixed interest rate. $Base\,rate_t$ is the loan's base rate at time t and zero if there is no base rate. $Dual\,holding_t$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm. $Has\,bank\,financing_t$ 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. 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. *Seniority* refers to loan seniority. *LoanType* refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, year-quarter, and borrower level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:			PIK_t		
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
$NonAccrual_t$	0.20***	0.19***	0.15***	0.12***	0.12***
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
$Fair/Par_t$	-0.13***	-0.13***	-0.11***	-0.03	-0.02
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Loan $Size_t$	0.01***	0.01***	0.00***	0.00**	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Base $rate_t$	0.40**	-0.03	-0.18	-0.19	0.54
	(0.16)	(0.54)	(0.42)	(0.41)	(0.41)
Fixed rate loan	0.10***	0.10***	0.16***	0.08***	0.14***
	(0.02)	(0.03)	(0.04)	(0.02)	(0.03)
$Maturity_t$	-0.03***	-0.02**	-0.02***	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dual $holding_t$	0.03***	0.04***	0.02**	0.01*	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
PE $Sponsored_t$	0.04***	0.03**	0.01		
	(0.01)	(0.01)	(0.02)		
Has bank $financing_t$	-0.03***	-0.03***	-0.04***		
	(0.01)	(0.01)	(0.01)		
Fixed-effects					
YearQtr		Yes	Yes		
LoanType		Yes	Yes	Yes	
Seniority		Yes	Yes	Yes	
Borrower			Yes		
YearQtr-Borrower				Yes	Yes
BDC				Yes	
BDC-YearQtr					Yes
Seniority-YearQtr					Yes
LoanType-YearQtr					Yes
Fit statistics					
Observations	222,944	222,944	222,944	222,944	222,944
Adjusted R^2	0.08	0.09	0.45	0.79	0.79

Table 5: PIKs and Loan Delinquency

This table shows the results from OLS regressions of $NonAccrual_{t+1}$ on PIK_t and various control variables. $NonAccrual_t$ ($NonAccrual_{t+1}$)is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t ($t+1$). PIK_t is an indicator variable that takes the value of one if the loan is reported to be paid in kind for that period. $Maturity_t$ is the natural logarithm of the remaining time to maturity. $Fair/Par_t$ is the current valuation of the loan position. $Loan\,Size_t$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan$ is an indicator variable that takes the value of one if the loan has a fixed interest rate. $Base\,rate_t$ is the loan's base rate at time t and zero if there is no base rate. $Dual\,holding_t$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm. $PE\,Sponsored_t$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise. 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. *Seniority* refers to loan seniority. *LoanType* refers to security class e.g. Term Loan, Revolver etc. Standard errors are clustered at the BDC, year-quarter and borrower level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:	NonAccrual$_{t+1}$				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
PIK$_t$	0.12***	0.02***	0.03***	0.03***	0.02***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
NonAccrual$_t$		0.82***	0.71***	0.71***	0.59***
		(0.01)	(0.01)	(0.01)	(0.02)
Fair/Par$_t$		-0.15***	-0.16***	-0.16***	-0.06***
		(0.02)	(0.02)	(0.02)	(0.01)
Loan Size$_t$		0.00***	0.00*	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
Base rate$_t$		-0.10	-0.17	-0.03	0.06
		(0.09)	(0.11)	(0.08)	(0.10)
Fixed rate loan		0.00*	0.00	0.01*	0.01*
		(0.00)	(0.00)	(0.00)	(0.01)
Maturity$_t$		-0.01***	-0.01***	-0.01***	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
Dual holding$_t$		0.00***	-0.01***	-0.01***	0.00
		(0.00)	(0.00)	(0.00)	(0.01)
PE Sponsored$_t$		-0.01***	0.00	0.00	1.00
		(0.00)	(0.00)	(0.00)	(5.46)
Fixed-effects					
YearQtr	Yes	Yes	Yes		
Borrower			Yes	Yes	
Seniority			Yes		
LoanType			Yes		
BDC			Yes		
YearQtr-Industry				Yes	
Seniority-YearQtr				Yes	Yes
BDC-YearQtr				Yes	Yes
LoanType-YearQtr				Yes	Yes
YearQtr-Borrower					Yes
BDC-Borrower					Yes
Fit statistics					
Observations	351,187	270,119	270,119	269,906	270,119
Adjusted R^2	0.03	0.70	0.71	0.72	0.89

Table 6: PIKs and future bancruptcy

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 lender's portfolio. *Bankruptcy* is an indicator variable that takes a value of one if the borrower experiences a bankruptcy on any date following the origination date, and zero otherwise. PIK 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: $Has\,Had\,Bankruptcy$, an indicator variable that takes a value of one if the borrower has gone through a bankruptcy and reorganization at any date preceding the origination, and zero otherwise, $Maturity_t$, the natural logarithm of the loan's time to maturity at origination, $Fair/Par_t$, the valuation (here same as original issue discount) of the loan position, $Loan\,Size_t$, the natural logarithm of the par value of the loan amount, $Fixed\,rate\,loan$, an indicator variable that takes the value of one if the loan has a fixed interest rate. $All-in-yield$ is the loan's all-in-yield. $Dual\,holding_t$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm at origination. We drop loans, used only for bridge financing, that appear in the sample only for one period, and only focus on PIK toggles. $PE\,Sponsored_t$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise. The fixed effects: BDC refers to the identity of the BDC (Lender). $YearQtr$ refers to the calendar quarter e.g. 2022Q4 when the loan first appears in the BDC portfolio. $Industry$ 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 three-way clustered at the BDC, year-quarter and borrower levels. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:	Bankruptcy				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
PIK	0.03***	0.03***	0.09**	0.04***	0.11***
	(0.01)	(0.01)	(0.04)	(0.01)	(0.04)
PE Sponsored	-0.07***	-0.07***	-0.06***	-0.07***	-0.06***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
PIK × PE Sponsored			-0.08*		-0.08**
			(0.04)		(0.04)
Dual-holding				0.00	0.00
				(0.01)	(0.01)
PIK × Dual-holding				-0.04**	-0.05***
				(0.02)	(0.02)
Loan controls	Yes	Yes	Yes	Yes	Yes
Fixed-effects					
YearQtr	Yes				
BDC	Yes				
LoanType	Yes				
Seniority	Yes				
YearQtr-Industry		Yes	Yes	Yes	Yes
BDC-YearQtr		Yes	Yes	Yes	Yes
LoanType-YearQtr		Yes	Yes	Yes	Yes
YearQtr-Seniority		Yes	Yes	Yes	Yes
Fit statistics					
Observations	23,386	23,386	23,386	23,386	23,386
Adjusted R^2	0.11	0.16	0.16	0.16	0.17

Table 7: PIKs and future loan valuation

The results are based on loan-quarter level panel data. $Fair/Par_t$ is the current valuation of the loan position for period t. Similarly, for period $t+1$. $NonAccrual_t$ is an indicator variable that takes a value of one if the loan is reported as non-accrual. PIK_t is an indicator variable that takes the value of one if the loan is reported to be paid in kind for that period. We exclude PIK notes from the sample. $Maturity_t$ is the natural logarithm of the remaining time to maturity. $Loan\,Size_t$ is the natural logarithm of the par value of the loan amount. $Fixed\,rate\,loan$ is an indicator variable that takes the value of one if the loan has a fixed interest rate. $Base\,rate_t$ is the loan's base rate at time t and zero if there is no base rate. $PE\,Sponsored_t$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise. We exclude the intercept term from the results whenever the model has one. We additionally include different fixed effects: 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, year-quarter, and borrower level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:	Fair/Par$_{t+1}$							
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
PIK$_t$	-0.07***	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.01***	-0.02***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NonAccrual$_t$		-0.43***	-0.43***	-0.32***	-0.32***	-0.32***	-0.04***	-0.04***
		(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Maturity$_t$		0.01***	0.01***	0.01***	0.01***	0.01***	0.00***	0.00***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Loan Size$_t$		0.00***	0.00***	0.00	0.00	0.00	0.00***	0.00***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Base rate$_t$		-0.01	-0.17	-0.08	-0.04	-0.09	0.03	0.03
		(0.09)	(0.14)	(0.11)	(0.10)	(0.12)	(0.06)	(0.06)
Fixed rate loan		-0.02***	-0.02***	-0.01**	-0.01**	-0.01**	0.00	0.00
		(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
PE Sponsored$_t$		0.00	0.00	0.00	0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Dual holding$_t$		0.02***	0.03***	0.03***	0.03***	0.03***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fair/Par$_t$							0.79***	0.79***
							(0.01)	(0.01)
PIK$_t$ × PE Sponsored$_t$								0.01**
								(0.00)
PIK$_t$ × Dual holding$_t$								0.01***
								(0.00)
Fixed-effects								
YearQtr			Yes	Yes				
Borrower				Yes	Yes	Yes	Yes	Yes
LoanType				Yes	Yes			
Seniority				Yes	Yes			
BDC				Yes	Yes			
YearQtr-Industry					Yes	Yes	Yes	Yes
LoanType-YearQtr						Yes	Yes	Yes
Seniority-YearQtr						Yes	Yes	Yes
BDC-YearQtr						Yes	Yes	Yes
Fit statistics								
Observations	336,073	267,209	267,209	267,209	267,003	267,003	267,003	267,003
Adjusted R^2	0.02	0.31	0.33	0.56	0.57	0.59	0.81	0.81

Table 8: Cross-sectional standard deviation of loan valuations

The results are based on loan-quarter level panel data. $CSD(Fair/Par_{t+1})$ is the cross-sectional standard deviation of similar loans' $Fair/Par$-ratio across all BDC's portfolios at the end of period $t+1$. Two loans held by two different lenders at the same time are considered similar if they are issued by the same borrower, they have the same seniority (e.g. both are First Lien Senior Secured) and they have the same Loan Type (e.g, both are Term Loan). The dependent variables are denoted in percentages (multiplied by 100) to ease the interpretability of the results. PIK_t is an indicator variable that takes the value of one if the loan is reported to be paid in kind for that period. We exclude PIK notes from the sample. $NonAccrual_t$ is an indicator variable that takes a value of one if the loan is reported as non-accrual for period t. $Maturity_t$ is the natural logarithm of the remaining time to maturity. $Fair/Par_t$ is the current valuation of the loan position. $Loan\,Size_t$ is the natural logarithm of the cost value of the loan amount. $Fixed\,rate\,loan$ is an indicator variable that takes the value of one if the loan has a fixed interest rate. $Base\,rate_t$ is the loan's base rate at time t and zero if there is no base rate. $Dual\,holding_t$ is an indicator variable that takes the value of one if the BDC also has an equity stake in the borrowing firm. $PE\,Sponsored_t$ is a dummy variable that takes a value if the borrower is private equity sponsored in period t and zero otherwise. We exclude the intercept term from the results whenever the model has one. We include several fixed effects: 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, year-quarter, and borrower level. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

Dependent Variable:	CSD(Fair/Par$_{t+1}$)						
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
PIK$_t$	1.18***	0.34***	0.36***	0.38***	0.39***	0.39***	0.68**
	(0.26)	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.31)
CSD(Fair/Par$_t$)		0.74***	0.74***	0.62***	0.61***	0.61***	0.61***
		(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
NonAccrual$_t$		0.51**	0.51**	0.28	0.29	0.23	0.21
		(0.24)	(0.24)	(0.33)	(0.33)	(0.33)	(0.32)
Loan Size$_t$		-0.04**	-0.04***	-0.02	-0.03	-0.03	-0.03
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Base rate$_t$		0.48	4.67***	-0.09	-0.24	2.64	2.60
		(1.26)	(1.63)	(2.67)	(2.69)	(3.16)	(3.16)
Fixed rate loan		-0.10	-0.03	0.09	0.09	0.13	0.15
		(0.07)	(0.07)	(0.07)	(0.07)	(0.12)	(0.12)
Maturity$_t$		-0.09**	-0.10**	-0.02	-0.02	-0.01	-0.01
		(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
Dual holding$_t$		-0.13***	-0.14***	-0.06	-0.06	-0.08	-0.04
		(0.03)	(0.03)	(0.05)	(0.05)	(0.05)	(0.05)
PE Sponsored$_t$		0.03	0.03	0.20	0.19	0.21	0.23
		(0.05)	(0.05)	(0.30)	(0.30)	(0.29)	(0.28)
PIK$_t$ × PE Sponsored$_t$							-0.25
							(0.33)
PIK$_t$ × Dual holding$_t$							-0.39*
							(0.21)
Fixed-effects							
YearQtr			Yes	Yes			
Borrower				Yes	Yes	Yes	Yes
LoanType				Yes	Yes		
Seniority				Yes	Yes		
BDC				Yes	Yes		
YearQtr-Industry					Yes	Yes	Yes
LoanType-YearQtr						Yes	Yes
Seniority-YearQtr						Yes	Yes
BDC-YearQtr						Yes	Yes
Fit statistics							
Observations	205,822	161,922	161,922	161,922	161,781	161,781	161,781
Adjusted R^2	0.00	0.54	0.54	0.58	0.58	0.59	0.59

Table 9: PIKs and BDC risk profile

This table shows the results from OLS regressions of different variables associated with BDC risk on *PIK usage share*. *Non-accrual share* is the share of non-accrual investments to total investments at cost value. *Realized gains*$_{t,t+4}$ is the ratio between cumulative realized gains or losses of BDCs one year forward (from end of period t to end of period $t+4$) relative to total assets at time t. *DtD* is the distance-to-default for the BDC using an option-implied default-risk indicator based on Merton (1974). *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 *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:	Nonaccrual share$_{t+1}$			Realized gains$_{t+1,t+4}$			Dist-to-Default$_{t+1}$		
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PIK usage share$_t$	0.15***	0.13**	0.06***	-0.15**	-0.13*	-0.26**	-2.22**	-3.89***	-2.25**
	(0.05)	(0.06)	(0.02)	(0.07)	(0.07)	(0.10)	(1.08)	(0.84)	(1.00)
BDC controls		Yes	Yes		Yes	Yes		Yes	Yes
Fixed-effects									
YearQtr		Yes	Yes		Yes	Yes		Yes	Yes
BDC			Yes			Yes			Yes
Fit statistics									
Observations	3,508	2,868	2,868	2,904	2,516	2,516	1,584	1,290	1,290
Adjusted R^2	0.17	0.22	0.64	0.01	0.12	0.24	0.02	0.58	0.68

Table 10: 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. *PIK Restriction* is an indicator variable that takes a value of one if BDC's regulatory filings include a restriction about how much of the borrowing base can be tied to PIK interest, and zero otherwise. All columns include the following BDC level controls: lagged *ln Assets*, lagged *Leverage*, lagged profitability (*ROE*), lagged *Cash Share*, and *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$_{t+1}$			CL usage$_{t+1}$		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
PIK usage share$_t$	-0.69***	-0.49***	1.11	-0.51***	-0.39***	2.35***
	(0.17)	(0.10)	(0.69)	(0.13)	(0.13)	(0.58)
PIK usage share$_t$ × PIK Restriction			-1.60**			-2.74***
			(0.69)			(0.56)
BDC controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed-effects						
YearQtr	Yes	Yes	Yes	Yes	Yes	Yes
BDC		Yes	Yes		Yes	Yes
Fit statistics						
Observations	1,464	1,464	1,456	1,414	1,414	1,406
Adjusted R^2	0.30	0.74	0.73	0.17	0.44	0.44

Table 11: 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. $\Delta\left(Debt/Assets\right)_{t+1}$ is the change in $Debt/Assets$ between quarter t and $t+1$ and correspondingly defined for $\Delta\left(Cash/Assets\right)_{t+1}$. $\Delta lnAsset_{t+1}$ is the log change in BDC's total assets measured in cost value. $\Delta lnDiv_{t+1}$ is the log change in BDC's dividends paid to shareholders. 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 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:	$\Delta(Debt/Assets)_{t+1}$		$\Delta(Cash/Assets)_{t+1}$		$\Delta lnAsset_{t+1}$		$\Delta lnDiv_{t+1}$	
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
PIK usage share$_t$	-0.02	-0.03**	0.01	0.01	-0.09**	-0.09**	-0.06*	-0.03
	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)	(0.04)	(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	2,821	2,821	2,821	2,821	1,414	1,414	1,407	1,407
Adjusted R^2	0.07	0.17	0.22	0.30	0.16	0.33	0.05	0.21

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. The effective base rate is the larger of the base rate floor and the current value of the 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
Base rate	The level of base rate. Zero if a fixed-rate loan.	Loan-level	BDC Collateral
Cash share	Cash$_t$/Total Assets$_t$	Lender-level	BDC Collateral
Cash spread	Cash spread for the loan over the base rate.	Loan-level	BDC Collateral
CL usage	Drawn credit lines$_t$/(Drawn credit lines$_t$+ Undrawn credit lines$_t$)	Lender-level	Capital IQ
Dist-to-default	Distance-to-default for the BDC using an option-implied default-risk measure. See Saunders et al. (2025) for a detailed methodology.	Lender-level	CRSP/Compustat
$\Delta lnDiv$	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
Fair/Par	Loan's fair value to par value ratio	Loan-level	BDC Collateral
Fixed-rate loan	Indicator variable that takes the value of one if the loan is 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
Has 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
Leverage ratio	Total Liabilities$_t$/Total Assets$_t$	Lender-level	BDC Collateral
Loan size	Natural logarithm of the loan's par value	Loan-level	BDC Collateral
Maturity	Natural logarithm of the remaining time to maturity	Loan-level	BDC Collateral
Non-accrual	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
Non-accrual share	Non-accrual loan share of the total cost value of portfolio investments.	Lender-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
Is 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 Use	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
Realized gain(loss)$_{t,t+4}$	Cumulative net realized gains (losses) from end of period t to end of period $t+4$ divided by total assets at the end of period t.	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**