Private Debt versus Bank Debt in Corporate Borrowing*

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Abstract

We examine the interplay between private and bank debt in corporate borrowing. Using administrative bank loan-level data matched to private debt deals, we find that many U.S. private debt borrowers also borrow from banks. For these *dual borrowers*, private debt lenders extend larger, riskier, and junior term loans at higher spreads, while banks supply credit lines. Our findings suggest that private debt substitutes for banks' term loans but complements their provision of credit lines. This complementarity reflects dual borrowers' heightened demand for liquidity insurance — driven by features specific to private debt — and increases banks' exposure to drawdown risk.

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In recent years, the global private debt (PD) market has grown substantially—from $230 billion in 2008 to nearly $1.7 trillion in 2023, according to Preqin. In the U.S., it is now comparable in size to the leveraged loan and high-yield bond markets. This rapid expansion raises important questions about its implications for banks. How do private and bank debt differ and interact? Do PD lenders compete directly with banks for the same borrowers, or do they serve a distinct segment? Does private debt displace bank lending?

This paper addresses these questions by examining the interactions of private and bank debt in corporate borrowing. We document that PD lenders serve both firms without bank debt and *dual borrowers*, who also borrow from banks. Compared to bank loans, PD loans are larger, riskier, junior in bankruptcy priority, carry higher spreads, and have longer maturities. Dual borrowers use private debt primarily for term loans — to finance growth and investment — while relying on banks for credit lines for liquidity insurance. They draw heavily on these lines during distress, imposing drawdown risk on banks. Overall, we offer a nuanced perspective on concerns that private debt displaces bank lending: private debt substitutes for banks' riskier term loans while complementing their provision of liquidity through credit lines. We argue — both theoretically and empirically — that this complementarity goes beyond the standard bundling of term loans and credit lines. It reflects dual borrowers' heightened demand for liquidity insurance, driven by features specific to private debt — such as greater contractual flexibility (Block, Jang, Kaplan and Schulze, 2024), and its tendency to be more commonly cash flow-based and junior relative to bank debt.

In this paper, private debt, or private credit, refers to corporate loans made by non-bank lenders, such as PD funds or Business Development Companies (BDCs), that extend loans primarily to non-financial firms. Combining administrative bank loan-level data from the Federal Reserve's Y-14 H.1 schedule (henceforth, Y-14 data) with PD loans from Pitchbook, we construct a novel dataset of bank and PD loans in the U.S. from January 2013 to June 2023.[1] Pitchbook reports PD deals at the loan-issuance level, covering standard loan

[1]The Y-14 data are collected as part of the Comprehensive Capital Analysis and Review (CCAR) process for bank holding companies and support Dodd-Frank Stress Tests, covering around 70-75% of the total commercial and industrial (C&I) lending in the U.S (Bidder, Krainer and Shapiro, 2021).

characteristics. We match PD borrowers in Pitchbook with bank borrowers in the Y-14 data, yielding three borrower types: (i) PD-only borrowers, (ii) bank-only borrowers, and (iii) *dual borrowers* who rely on both bank and private debt. Notably, the Y-14 data contain detailed information on bank loans and bank borrowers' financials, unavailable for PD-only borrowers outside Y-14. Our sample focuses on small and middle-market private firms with book assets below $500 million. It shows that private debt is mainly used for private equity (PE) buyouts, growth/expansion strategies, refinancing, or general corporate debt purposes.

We identify 2,917 unique dual borrowers, which, in our sample, represent approximately half of all PD borrowers and account for roughly 60% of total PD volume. Between 2013 and 2023, bank lending to dual borrowers grew substantially, accounting for approximately 15% of bank-held leveraged loans by 2023. Dual borrowers operate primarily in sectors such as software, information technology, healthcare or commercial services, and other technology-focused industries. Compared to bank-only borrowers, dual borrowers have fewer tangible, collateralizable assets, and are larger, more leveraged, and exhibit higher default probabilities. Consistent with Chernenko, Erel and Prilmeier (2022), we find that dual borrowers often exhibit negative cash flows and low cash holdings prior to accessing private debt, suggesting they turn to private debt as banks are unwilling to extend further credit. Moreover, we provide evidence that firms use private debt primarily to finance growth and investment.

In the first part of the paper, we highlight differences between bank debt and private debt by comparing PD loans and bank loans originated to the same dual borrower within the same year and quarter. We control for time-varying borrower characteristics—including credit demand and PE backing — using borrower×time or borrower×time×loan-type (credit lines, term loans, etc.) fixed effects (Khwaja and Mian, 2008). This approach ensures that our findings are not driven by differences in borrower characteristics; the results are also robust to less stringent specifications and to excluding buyout deals. Compared to same-type bank loans to the same borrowers, PD loans are larger, less likely to be first-lien senior-secured, have longer maturities, and, notably, feature spreads that are approximately 200 basis points higher; the unconditional difference in spreads is about 450 basis points. When co-financing

the same borrowers, banks typically provide credit lines, while PD lenders offer term loans. Moreover, private debt is typically junior and, therefore, riskier than the borrower's bank debt. Since the spread differences between bank and PD loans persist even after controlling for seniority, they may reflect non-price terms—such as faster execution and specific contractual provisions in PD loans that banks are less willing to offer, including payment-in-kind (PIK) features that allow for repayment flexibility.

While we do not directly observe the detailed contractual terms of PD loans, we rely on existing studies that document the presence of flexible features and payment-in-kind (PIK) provisions (Block et al., 2024; Jang, 2023; Haque, Jang and Wang, 2025). We also show that PD loans have commonly lower seniority to bank debt—which, as documented in Rintamaeki and Steffen (2025), is associated with the presence of PIK provisions. In addition, we provide suggestive evidence that features specific to private debt are priced, exploiting the onset of Covid-19 as a period of market-wide distress. Since the repayment flexibility inherent to private debt arguably becomes more valuable during such times, the spread differential between bank and private debt should widen during Covid-19. Our loan-level regressions confirm this intuition while controlling for borrower×time×loan-type fixed effects, consistent with repayment flexibility being a distinctive feature of private debt.

In the second part of the paper, we examine how the rise of private debt affects bank lending. Using an event study framework, we show that after accessing private debt, firms not only maintain their banking relationships but also increase their reliance on bank debt through new credit lines. We confirm these findings in bank loan-level regressions that compare at a given point in time: (1) loans to dual borrowers with leveraged loans to bank-only borrowers, controlling for firm and loan characteristics; and (2) loans originated by the same bank within the same bank-internal credit rating category. In all specifications — including robustness checks that omit PE buyout deals — PD access is associated with both a higher propensity to obtain new bank credit lines (extensive margin) and larger credit line sizes (intensive margin). Moreover, our firm-level analysis comparing dual borrowers to bank-only borrowers shows that PD access is associated with higher total bank debt and a greater share of credit

line commitments relative to total bank debt. Overall, our results suggest that private debt complements or even amplifies banks' liquidity provision through credit lines.

To address endogeneity concerns and to better isolate the effect of PD access, we exploit an unexpected regulatory change affecting PD supply — the Small Business Credit Availability Act (SBCAA) in March 2018, allowing BDCs to double their leverage ratio upon adoption of the SBCAA (Balloch and Gonzalez-Uribe, 2021). BDCs adopted the SBCAA leverage limit relaxation in a staggered fashion, with some BDCs not adopting at all. We restrict the sample to firms that borrow from a PD lender at some point during the sample period and, if their PD lender is a BDC, we use the lender's adoption timing as an instrument for the firm's PD access (if the lender is not a BDC or never adopts, there is no treatment). We show that the instrument is relevant: adoption of leverage limit relaxation constitutes a positive shock to PD supply, inducing firms to borrow from BDCs. We further document in an event study that SBCAA adoption is associated with increased BDC lending.

The exclusion restriction requires that the BDC leverage limit relaxation affects a firm's bank borrowing only through its impact on PD access, and is not correlated with unobserved firm characteristics (such as the treated borrower's credit demand) that also influence bank borrowing. To address this concern, we include bank×time and sector×time fixed effects. We also show that our results are robust to the inclusion of BDC fixed effects, which account for time-invariant factors influencing credit demand faced by a BDC. Crucially, the *timing* of the regulatory change was unanticipated, and BDCs encountered implementation delays in SBCAA adoption, making it unlikely that BDCs adopted it in response to a treated borrower's credit demand. Our two-stage least squares estimates indicate that greater PD access increase firms' reliance on private debt and, subsequently, on bank credit lines.

While the larger credit line commitments obtained by dual borrowers are consistent with both supply- and demand-side mechanisms, we provide two pieces of evidence that dual borrowers exhibit greater demand for bank credit lines. First, we show that PD access is associated with higher interest rates on bank loans, even after controlling for borrowers' probability of default and loss given default. Importantly, this result remains robust — and

becomes quantitatively stronger — when we instrument for PD access. That is, after accessing private debt, firms obtain additional credit line commitments despite facing higher credit line spreads. The simultaneous increase in both the price and quantity of credit lines suggests elevated demand for liquidity insurance. Second, consistent with this interpretation, we show that, relative to bank-only borrowers, dual borrowers draw down their credit lines more intensively during periods of distress. We exploit the onset of Covid-19 as a shock to firms' liquidity needs (Chodorow-Reich, Darmouni, Luck and Plosser, 2022). We show that during Covid-19, dual borrowers drew down their credit lines more significantly and experienced a larger increase in default probabilities, relative to bank-only borrowers. Our findings suggest that financing dual borrowers alongside PD lenders exposes banks to drawdown risks that primarily materialize during periods of market-wide distress.

Next, we examine the mechanisms through which access to private debt increases firms' reliance on — and demand for — bank credit lines. When a term loan is used to finance an investment, it is often accompanied by a credit line to manage liquidity needs arising from that investment. This raises the question of whether the observed complementarity between private debt (typically term loans) and bank credit lines merely reflects the standard bundling of term loans and credit lines. We address this concern by developing a theoretical framework and providing empirical evidence that the effects of private debt go beyond standard bundling. Empirically, our findings on dual borrowers' increased demand for bank credit lines remain robust when comparing them to bank-only borrowers who obtained a new bank term loan during the same year and quarter. This comparison effectively controls for the standard bundling of term loans and credit lines, allowing us to isolate effects specific to private debt. If private debt had no distinct effect, the source of term loan financing — bank or PD lender — should not influence the borrower's demand for liquidity insurance. Yet, relative to these matched bank borrowers, firms accessing private debt are more likely to secure new and larger bank credit lines. This suggests that the complementarity between credit lines and term loans is stronger when the term loan is provided by a PD lender rather than a bank.

Our theory highlights the mechanisms specific to private debt that drive dual borrowers' demand for credit lines. First, as we show empirically, PD lenders extend relatively junior, larger, and riskier loans to borrowers with lower levels of collateralizable (tangible) assets and higher leverage compared to banks. These patterns also align with the view that PD lenders rely more on cash flow-based lending—i.e., loans not explicitly backed by specific collateral but (implicitly) by the firm's going-concern value—rather than asset-based lending (Lian and Ma, 2021), as shown in Block et al. (2024).[2] By providing liquidity insurance that helps preserve going-concern value, credit lines support cash flow–based or junior lending that lacks collateral backing. Loosely speaking, credit lines insure the private debt claim against liquidity shocks. This liquidity insurance is particularly valuable for junior or cash flow–based loans, incentivizing PD lenders to "push" their borrowers to obtain credit lines.

Second and related, unlike banks, PD lenders offer flexible terms, such as payment-in-kind or equity-like features. These features are predominantly found in more junior loans, and allow for repayment deferral and partial debt write-downs during periods of financial distress, thereby enabling more efficient distress resolution through restructuring rather than liquidation. However, to avoid liquidation, firms must have access to credit lines that can absorb liquidity shocks. In essence, while PD lenders offer flexible term loans that give firms the option to manage distress more efficiently, exercising that option requires liquidity insurance through credit lines. This mechanism strengthens firms' demand for bank credit lines, as also emphasized by Hartman-Glaser, Mayer and Milbradt (2025). Third, our empirical findings suggest that PD lenders provide term debt that banks are unwilling to offer—both on the intensive margin (e.g., larger loans) and the extensive margin (e.g., to borrowers with negative earnings). In this way, private debt acts as a catalyst for liquidity insurance demand by relaxing firms' term loan financing constraints.

[2]Given a limited stock of explicit collateral, more leverage and, specifically, larger loans mechanically imply a larger share of debt that is not explicitly collateralized, i.e., cash flow-based debt. Thus, the larger loans and higher leverage in private debt are also consistent with increased use of cash flow-based debt. See, e.g., Kermani and Ma (2022). Block et al. (2024) provide survey evidence that private debt is commonly cash flow-based, rather than asset-based.

Finally, we examine competition between banks and PD lenders by studying how PD lenders respond to reduced bank competition and identifying the marginal loans over which they compete. Using the collapse of Silicon Valley Bank (SVB) in March 2023 as a negative shock to leveraged loan lending by banks, we show that SVB's failure led to a contraction in risky bank loans, reflecting tighter lending standards amid heightened uncertainty. We find that the marginal loans that shifted to PD lenders were riskier than typical bank loans but less risky than the average PD loans. Thus, as banks retreat from risky lending, PD lenders expand into loans that banks would have traditionally originated. Taken together, while PD lenders do not compete with banks in providing credit lines—likely due to banks' comparative advantage stemming from their deposit-based funding structure (Kashyap, Rajan and Stein, 2002)—they do (i) serve the market segment of "very risky" loans typically avoided by banks and (ii) compete with banks at the margin for moderately risky term loans.

Related Literature. At a broader level, we investigate how the rise of non-bank financial intermediaries—specifically, PD lenders—impacts bank lending, highlighting the extent to which banks and their functions are substitutable by non-banks. We therefore contribute to the empirical literature on non-bank lending, specifically on banks' interaction with non-banks. Early contributions include Carey, Post and Sharpe (1998); Denis and Mihov (2003), while, more recently, Benmelech, Dlugosz and Ivashina (2012); Irani, Iyer, Meisenzahl and Peydro (2021); Haque, Mayer and Wang (2023) focus on non-bank lenders that participate in syndicated loans, such as CLOs. Acharya, Gopal and Steffen (2024a) examine the interaction between non-bank lending via CLOs and bank credit lines to large U.S. publicly traded firms. In contrast, our paper focuses on private debt — primarily originated by direct lenders targeting small and middle-market *private* firms.

Different to our paper which focuses on corporate loans to small and middle market firms, Buchak, Matvos, Piskorski and Seru (2018), Gopal and Schnabl (2022), and Tang (2019) analyze the competition between banks and FinTech lenders in mortgage loans, small business lending, and consumer credit, respectively. Acharya, Gopal, Jager and Steffen (2024b), Jiang (2023), Chernenko, Ialenti and Scharfstein (2024) and Haque et al. (2025)

study banks' lending to non-bank financial intermediaries. Related studies on private debt and direct lending include Jang (2023); Block et al. (2024); Davydiuk, Marchuk and Rosen (2020a,b); Chernenko et al. (2022); Davydiuk, Erel, Jiang and Marchuk (2024); Zawadowski and Albuquerque (2025); Rintamäki (2024).

Our work departs from prior studies in key ways. First, while existing research often views private debt as a substitute for bank debt, we show it can also complement banks' liquidity provision through credit lines. Second, using regulatory data, we show this complementarity arises via common borrowers, exposing banks to drawdown risk and revealing a novel link between banks and PD lenders. Third, by focusing on dual borrowers, we examine how private and bank debt interact within the same firm, in contrast to prior work emphasizing borrower segmentation (e.g. Chernenko et al. (2022)). Fourth, we examine the circumstances under which firms use private debt, the types of firms that do so, and their underlying purposes—highlighting the role of private debt in financing growth and investment.

1 Data and Empirical Facts

In this paper, private debt (PD), or private credit, refers to corporate loans made by non-bank lenders, primarily BDCs or PD funds. Throughout, we use the term *private debt* to refer to both private debt and private credit. For our analysis, we construct a novel panel data set of firms, borrowing from PD lenders and/or from banks, as well as their bank loans and PD loans. The sample period is from January 2013 to June 2023. In particular, we combine two data sources: (i) Pitchbook, which contains information on PD borrowers and loans, and (ii) the Federal Reserve's Y-14 database (henceforth Y-14 data), which provides detailed bank loan information as well as financial and accounting information of bank borrowers from all bank holding corporations subject to the Fed's annual stress tests. Although our data includes various private debt strategies, direct lending is by far the most prevalent. This paper, therefore, focuses on the direct lending segment, specifically on loans originated by non-bank lenders, primarily BDCs and PD funds.

We provide additional discussion of the institutional details and background information in Appendix D.

1.1 Private Debt Data from Pitchbook

We obtain information about PD borrowers, their PD loans, and PD lenders from Pitchbook. Pitchbook provides broad coverage of private capital markets, including PD deals, and is generally considered one of the most comprehensive databases for private capital in the US, particularly in the last decade (Gornall, Gredil, Howell, Liu and Sockin, 2021; Garfinkel, Mayer, Strebulaev and Yimfor, 2021). Appendix B provides detailed description of our data construction, cleaning strategy and Pitchbook's sample coverage. Below we provide an overview of the data.

Pitchbook provides private debt data at the loan-issuance level and our sample includes PD loans made by PD funds and BDCs (public and private), as well as loans provided by private credit arms or BDCs that are minority-owned by large banks (e.g. Goldman Sachs BDC, Morgan Stanley Direct Lending Fund LLC, etc.) and by middle-market arms of smaller banks not subject to the stress tests.[3] Because BDCs, unlike PD funds, are subject to certain regulatory (reporting) requirements, loans made by BDCs are (likely) overrepresented in Pitchbook's private debt data, implying our sample overweights direct lending relative to other private debt strategies such as mezzanine or distressed debt (BDCs mostly participate in direct lending). Specifically, approximately 60% of the credit facilities in the sample have a BDC lender (either as single-lender or part of a club deal). Similar to Jang (2023), the loans in our sample are mostly single-lender loans that PD funds and BDCs originated directly, while some are club deals which involve a small group of lenders. For about 80% of PD loans, the borrower is owned by private equity (PE) sponsors.

Pitchbook reports standard loan-level characteristics of private debt facilities, such as origination date, maturity, spreads, loan size, deal size, loan type, private equity sponsorship

[3]When banks have minority-ownership of PD funds or BDCs, individual loans made by the PD fund or BDC are not considered bank loans because they are not consolidated on the bank's balance sheet.

status and identifying information on borrowers and lenders. Importantly, for 70% of the loans, we also observe if the PD loan is first lien senior-secured or not. We restrict our sample to PD lenders and PD borrowers located in the US.

Figure 1 reports the use of private credit. Private debt is used for new leveraged buyout activity, growth/expansion strategies, refinancing, or general corporate debt purposes. The sample contains 5,662 distinct PD borrower firms and around 16,900 unique PD loan facilities. To understand the volume of aggregate private debt in our sample, we assume each loan facility remains active until maturity, and estimate that aggregate PD loan volume in our sample was around $700 billion in July 2023 (Figure 2).[4]

Representativeness of Pitchbook. First, Jang (2023) uses a proprietary dataset of private credit facilities containing both BDCs and private debt funds, and compares loan characteristics observed in this database with private debt facilities observed in Pitchbook. Using balance tests, the paper finds that the average values for loan spread, amount, and maturity do not differ significantly between the two groups between the periods 2014-2024, although loans reported in Pitchbook are less likely to be PE-sponsored. We confirm that these same loan characteristics are also comparable to those reported in Haque et al. (2025) which focuses on direct loans by BDCs using SEC filings. Second, Figure IA1 shows the top 25 PD lenders in our dataset. We verified that 19 of these same lenders are also present in the top 25 private debt lenders listed in Preqin's Private Debt Database during the same time period. Finally, as discussed below, majority of private debt facilities in our sample are term loans, which is also consistent with Jang (2023). Overall, we find limited evidence of systematic bias in Pitchbook's sample.

[4]We acknowledge the limitations of this estimate since this figure does not take into account loan chargeoffs, renegotiations or early repayments. For instance, loan amounts could decline following covenant violations. However, this estimate is also consistent with Jang (2023) who finds that total invested private debt capital in the US is around $700 billion as of March 2023.

1.2 Bank Loan Data from the Y-14

We obtain information on bank loans and bank borrowers from the Federal Reserve's FR Y-14Q H.1 collection for commercial loans (in short, the Y-14 data).[5] The dataset includes detailed information on the universe of bilateral and syndicated loan facilities over $1 million in committed amounts held by Bank Holding Companies (BHCs) that are subject to the Federal Reserve's Stress Tests. The reporting banks comprise over 85% of the total assets in the US banking sector and cover around 70-75% of all C&I lending in the US (Bidder et al., 2021; Favara, Ivanov and Rezende, 2021). Importantly, banks report detailed financial, accounting, and balance sheet information of their borrowers, as well as bank loan information over time. Our analysis exploits both the firm-level data (reported annually) and the relatively more granular loan-level data (reported quarterly). Loan-level information includes data on loan origination dates, loan commitments, utilization, maturity, spreads, priority in bankruptcy, collateral, probability of default, banks' own internal credit risk ratings, as well as loan-type (credit lines, term loans etc.). Detailed financials are reported for roughly 60% of borrowers, with reporting positively related to firm size.

We match firms, borrowing from PD lenders, from Pitchbook to the Y-14 data quarter-by-quarter based on borrower name and industry, using a string matching algorithm following Cohen, Dice, Friedrichs, Gupta, Hayes, Kitschelt, Lee, Marsh, Mislang, Shaton et al. (2021), and followed by a manual verification of each match.[6] Eventually, we can match 2,917 (out of 5,662) private debt borrowers to bank borrowers from the Y-14 data. Thus, around 50%

[5]For details on every variable contained in schedule H.1. and how banks are required to report information to the Federal Reserve, see the Table beginning in page 170 in the publicly available reporting form. This reporting began in 2011 to support the Dodd-Frank Act Stress Tests. Although reporting began in 2011Q3, we start our sample in 2013 when coverage of banks improved significantly, and also to allow for a phase-in period for the structure of the collection and variables to stabilize.

[6]We also randomly selected 200 borrowers and verified that each match had the same address, where we proxy address with the borrower's reported local county. Further details of our data cleaning procedure are described in Appendix C. For company-level matching, the algorithm - known as 'fedmatch' uses a two-stage matching method that pairs traditional string matching techniques with probabilistic record linkage methods. We refer the interested readers to Cohen, Dice, Friedrichs, Gupta, Hayes, Kitschelt, Lee, Marsh, Mislang, Shaton et al. (2021) for further details. An example of the R package for the company-level match can be found on Github.

of PD borrowers in our sample are *dual borrowers*, in that they borrow from both banks and PD lenders around the same time.[7]

1.3 Sample Characteristics and Dual Borrowers

Our combined sample contains three types of loans and borrowers, whom we refer to as (i) dual borrowers, (ii) bank-only borrowers, and (iii) PD-only borrowers. Dual borrowers borrow from both banks and PD lenders (in the same year-quarter), bank-only borrowers only borrow from banks, and PD-only borrowers only borrow from PD lenders.

Crucially for our analysis, *dual borrowers* are captured in the Y14 data. This allows us to observe their financial and accounting information, as well as details of their individual bank loans, allowing us to formally examine the differences between bank loans and private credit facilities without being confounded by differences in borrower characteristics. However, our matched sample does not include PD borrowers who do not appear in the the Y-14 data. As a result, detailed firm financial and bank loan-level information is unavailable for these *PD-only borrowers*. Much of our formal analysis relies on this detailed financial and loan-level information, comparing *dual borrowers* to similar *bank-only borrowers*.

The Importance of Dual Borrowers. Dual borrowers represent a significant share of the private credit market in the US. In our sample, we identify around 5,700 unique PD borrowers, of which 2,917 are dual borrowers—approximately 50% of the PD borrower population. Figure 2 shows that dual borrowers hold substantial share of outstanding private debt in our benchmark sample. Figure 3 shows banks are increasingly lending to dual borrowers, with aggregate bank loan commitments more than doubling between 2016-2023. Further, aggregate bank commitments to dual borrowers as a share of all leveraged loans held by banks has risen by more than 60 percent during our sample period and is around

[7] In terms of timing, Appendix Figure IA2 shows most borrowers in our sample first obtain a bank loan before obtaining private debt, while a significant share also obtains both for the first time simultaneously.

14 percent at the end of 2023, indicating dual borrowers are increasingly shaping banks' aggregate credit provision.

1.4 Summary Statistics

Table 1 reports firm-level information for *dual borrowers* and compares them to *bank-only borrowers*. In our sample, the number of bank-only borrowers is significantly larger than the number of dual borrowers (see Table 1). The Y-14 data cover many small firms, while access to private debt is concentrated among larger firms. Since PD lenders typically serve larger firms with sizable loans, we limit the comparison group of bank-only borrowers to those with average bank loan commitments exceeding $5 million. This restriction is based on loan commitments rather than book assets, as most of our analysis is at the loan level. The remaining bank borrowers also tend to be larger in terms of book assets. Panel B of Table 1 presents the summary statistics for these borrowers.

Firm Characteristics of Bank-only and Dual Borrowers. First, we observe dual borrowers (with median book assets of $326 million) are significantly larger than bank-only borrowers (with median book assets of $80 million). Similarly, median net sales of dual borrowers are about twice as large as median net sales of bank-only borrowers. Second, dual borrowers (with median debt/asset of about 43%) have more debt and higher leverage than bank-only borrowers, which have median debt/assets of about 36%. Compared to bank-only borrowers, dual borrowers have higher Debt/EBITDA — a commonly used leverage measure — ratio and more commonly Debt/EBITDA ratio exceeding 6 which serves as an implicit limit on bank funding under the leveraged lending guidelines (Chernenko et al., 2022). Third, dual borrowers tend to have less tangible or collateralizable assets than bank-only borrowers. Consistent with lower tangible assets, Appendix Table IA5 shows that dual-borrowers primarily operate in sectors such as software, commercial services, healthcare services, insurance, information technology and other technology-focused industries. Fourth, dual borrowers exhibit on average higher bank-estimated probabilities of default. Finally, appendix Table IA5 formally tests which ex-ante firm characteristics predict a borrower's

issuance of private debt in a regression framework. We find firms that have negative cash flows are around 14 percent more likely to issue private debt as banks are heavily discouraged from lending to negative EBITDA firms by the Leveraged Lending guidance.[8] In summary, compared to bank-only borrowers, dual borrowers tend to be larger, riskier, more leveraged, and have fewer collaterizable assets.

Characteristics of Bank Loans and PD Loans to Dual Borrowers. Table 2 presents loan-level summary statistics for all PD loans (Panel A), bank loans to dual borrowers (Panel B), and bank loans to bank-only borrowers (Panel C). Interestingly, PD loans have higher spreads than bank loans. The median spread for PD loans is about 6%, while it lies between 1.2 and 1.8% for bank loans. PD loans (with a mean loan size of about $65 million) are also larger than bank loans (with a mean loan size of about $25 million). The median loan size of PD loans is about $14 million, which is larger than the median loan size of bank loans but about equal to the median loan size of bank loans to dual borrowers. Moreover, 75% of PD loans are term loans, while only 10% of PD loans are credit lines. In contrast, about 49% of bank loans are credit lines, while the share of term loans is about 24%.[9] In summary, compared to bank loans to dual borrowers, PD loans to dual borrowers are (i) larger, (ii) more often term loans, (iii) have higher spreads, and (iv) have longer maturities.[10]

[8]We also observe firms with low (ex-ante) internal stock of cash are more likely to obtain private debt, consistent with ex-ante constrained borrowers switching from banks to private debt. Several of the other variables, such as the tangibility, are not significant due to the inclusion of firm fixed effect as well as a relatively small sample since we focus only on firm-year observations *pre* private debt issuance and the year of first private debt issuance by a bank borrower and exclude all observations of the years after private debt issuance.

[9]Since Table 2 is restricted to newly originated loans, we do not report utilization rate of credit lines. However, we confirmed in the full cross-sectional data, that median bank credit line utilization is 44% for dual-borrowers, and 54% for bank-only borrowers. Finally, the maturity of PD loans (mean maturity is 5.4 and median maturity is 5.25 years) tends to be larger than of bank loans (mean maturity is 4.0 and median maturity is 5 years).

[10]Appendix Table IA5 provides a comparison of private credit loans to Dual Borrowers relative to non-dual private debt borrowers using the Pitchbook sample. We observe that the mean and median PD loan to dual borrower is larger relative to PD-only borrowers, implying Dual Borrowers are likely relatively larger borrowers in the private debt market as well. On the other hand, we observe that other loan characteristics such as loan maturity, share of term loans, share of credit lines, and - crucially - loan spreads are all quite comparable between the two borrower groups.

2 How do Bank Loans and Private Debt Loans Differ?

We note that aforementioned differences between private debt and bank debt observed in the summary statistics might simply reflect distinct borrower characteristics. Our data on bank and PD loans to dual borrowers allow us to address this issue and to analyze the differences and substitutability between bank debt and private debt for the same borrower.

Empirical Specification. To this end, we use our combined sample of newly originated bank and PD loans and run the following loan-level regressions at the quarterly level:

$$y_l = \beta_0 PD_l + \gamma_{i,t} + \eta_{i,t,type} + Controls_l + \epsilon_l, \tag{1}$$

where l denotes a loan, originated at a given issuance date, and i is the borrower firm. The key independent variable is PD_l, an indicator taking the value one if and only if loan l is a PD loan (i.e., originated by a PD lender). Some specifications control for loan characteristics, such as maturity, loan size, and loan spreads (whenever applicable), or include the interaction term $PD_l \times PE\ Buyout_d$. Here, $PE\ Buyout_d$ is an indicator equal to one if and only if the deal type for which the PD loan is used is a private equity-sponsored leveraged buyout deal. Notably, as Table IA5 illustrates, our findings are robust to excluding buyout loans from our sample, indicating that our findings are not driven by buyout loans.

Following Khwaja and Mian (2008), we include firm-time fixed effects, $\gamma_{i,t}$, to account for any time-varying borrower characteristics, such as a borrower's demand for credit or whether the borrower is backed by a private equity sponsor. Effectively, we compare bank loans and PD loans that were originated to the same borrower within the same year and quarter, differing primarily in whether they were issued by a bank or a PD lender. Some specifications replace $\gamma_{i,t}$ with even more stringent firm-time-loan type fixed effects, $\eta_{i,t,type}$ to perform this comparison within loans of the same type.

Alternative Specifications. One drawback of the firm-time fixed effect approach is that it restricts the sample to firms borrowing from multiple lenders within the same year and

quarter. While many firms in our sample have loans from more than one lender, these firms may systematically differ along certain dimensions. To address this concern, Section 6.2 demonstrates the robustness of our results using two alternative, less restrictive specifications. First, we use state×industry×time fixed effects—similar to Sachdeva, Silva, Slutzky and Xu (2023), where our industry (sector) classification is the 2-digit NAICS code. Thus, we effectively compare firms operating in the same industry and state at the same time. This approach roughly doubles the sample size relative to our baseline. Second, we omit firm-time fixed effects entirely, instead including firm fixed effects and separate time effects.

2.1 Results

PD Loans are Larger. First, our results in columns (1), (2), and (3) of Table 3 illustrate that compared to bank loans to the same borrower, PD loans are larger. In terms of economic magnitude, the size of PD loans is approximately 50-90% larger than that of comparable bank loans, both originated to the same borrower within the same year and quarter. In column (3), the coefficient on $PD_l \times Buyout_d$ is significant and negative. This suggests that in leveraged buyouts, the size difference between bank loans and PD loans diminishes, for instance, because banks provide relatively larger loans in buyout deals as compared to non-buyout debt deals (e.g. refinancing).

PD Loans Have Higher Spreads. Second, while PD lenders (are willing or able to) provide larger loans than banks, they also charge significantly higher spreads, making private debt relatively expensive for firms. Columns (4), (5), and (6) of Table 3 show that, when loan spreads are taken as the outcome variable, the coefficient on PD_l is positive and significant, and ranges from about 1.7 to 3.5. The regression estimates in column (6), which includes firm-time-loan type fixed effects, reveal that the spreads of PD loans are about 1.8 percentage points higher than those of comparable bank loans originated to the same borrower within the same year and quarter. The estimates of column (4) and (5) suggest an even larger economic magnitude, with the spreads of PD loans exceeding those of comparable bank loans by about

2 to 3.5 percentage points. Admittedly, we do not observe the loan fees that banks charge in addition to spreads (Berg, Saunders and Steffen, 2016). However, to the extent that PD lenders also charge fees, or that fees alone cannot account for the entire spread differential, our key result—that PD loans are significantly more expensive—remains valid.

In column (6), the coefficient on $PD_l \times Buyout_d$ is positive and significant, indicating that PD buyout loans, on average, carry an additional 0.7 percentage points in spreads relative to other PD loans. In Appendix Table IA5, we show that our findings are robust to excluding buyout deals. In Appendix Table IA5, we further show the result on spreads is robust to controlling for debt seniority, excluding fully undrawn bank credit lines with zero spreads, and excluding club deals. Overall, the elevated spreads of PD loans may reflect non-price terms such as faster execution and greater contractual flexibility or equity-like features provided by PD lenders, for instance, through *payment-in-kind* features, which allow borrowers to defer interest payments.[11]

Evidence Regarding Repayment Flexibility. While we do not observe detailed contractual terms of PD loans, we rely on existing studies documenting the prevalence of flexible terms and PIK (Block et al., 2024; Jang, 2023; Haque et al., 2025); in particular, Rintamaeki and Steffen (2025) document that PIK provisions are more common in junior debt. In addition, we provide suggestive evidence that such contractual (repayment) flexibility in PD loans is priced. The starting point for this analysis is the premise that the repayment flexibility inherent to private debt becomes especially valuable during periods of market-wide distress, such as the onset of the Covid-19 pandemic in March 2020. Accordingly, we expect the spread differential to widen during such times. To test this hypothesis, we restrict the estimation sample to the eight quarters before and after the onset of the COVID-19 pandemic (March 2020) and include an interaction term, $PD_l \times Covid_t$, in our loan-level regressions. Column (6) of Table IA5 confirms our intuition, showing that the coefficient on the interaction term is positive and statistically significant. Importantly, this result is not driven by differences in

[11] An equivalent interpretation is that PD lenders are able to charge higher spreads by exerting market power since they can offer unique contractual features that traditional lenders like banks cannot.

credit risk or loan type, given our stringent fixed effects, nor by differences in loan amount, maturity, or deal structure, which are accounted for through our controls. Accordingly, we interpret the widening spread differential between bank and PD loans during the Covid-19 period as reflecting the distinctive features of private debt, namely, repayment flexibility.

PD Lenders Typically Offer Term Loans. Third, we show that when PD lenders and banks extend credit to the same borrower firms, PD lenders typically provide term loans, while credit line debt is predominantly provided by banks. Specifically, we use an indicator variable, capturing whether loan l is a credit line, as the dependent variable in regression (1). Column (7) of Table 4 reports a negative and significant coefficient on PD_l with firm-time fixed effects. Analogously, employing an indicator, capturing whether loan l is a term loan, we estimate a positive coefficient on PD_l; see column (8) of Table 4.

PD Loans Have Longer Maturity. Fourth, we use loan maturity as the outcome variable in our regression specification. The results, presented in columns (1), (2), and (3) of Table 4, show that relative to bank loans originated to the same borrower within the same year and quarter, PD loans feature longer maturities. Our findings indicate that PD lenders (are willing to) extend longer-maturity debt, while banks extend shorter-maturity debt to the same borrowers. Notice that all else being equal, shorter-maturity loans are generally less risky than longer-maturity loans, as they are exposed to default risk over a shorter time span.

Private Debt is Junior Relative to Same Borrower's Bank Debt. Fifth, we show that private debt is generally junior to the same borrower's bank debt. To do so, we construct an indicator variable, capturing whether a given bank or PD loan is first lien senior-secured debt. First lien senior-secured debt has highest priority in a firm's debt structure. Our regression results, presented in columns (4), (5), and (6) of Table 4, show that the coefficient on PD_l is negative and statistically significant, notably, even with firm-time-loan type fixed effects. Compared to bank loans originated to the same borrower within the same year and quarter, PD loans are less likely to be first lien senior-secured and are, therefore, on average more junior. In column (6), the coefficient on $PD_l \times Buyout_d$ is positive, i.e., the difference in seniority (priority) between bank loans and PD loans is smaller for buyout loans.

Summary. Taken together, when co-financing the same borrowers, PD lenders generally offer longer-maturity term loans that are junior to bank debt; in contrast, banks provide shorter-maturity loans that are relatively senior, often in the form of credit lines. Because longer-maturity and relatively junior loans with lower priority in bankruptcy are, all else being equal, riskier than shorter-maturity and more senior loans, PD lenders absorb greater credit risk than banks during joint credit provision. Overall, our findings suggest that, while private debt complements relatively senior credit line debt provided by banks, it substitutes for and competes with relatively riskier and junior term loans offered by banks.

3 How Private Debt Complements Bank Credit Lines

We study how the rise of private debt shapes the nature of bank lending. In particular, we examine whether firms increase or decrease their reliance on bank debt, once they start borrowing from PD lenders, that is, access private debt. We find that following PD access, firms generally continue their borrowing relationships with banks and even increase their reliance on bank credit lines. This suggests that private debt complements or amplifies banks' liquidity provision through credit lines, even as it displaces bank term loans.

3.1 Main Empirical Analysis

Event Study. We begin our analysis with an event study examining a time window around bank borrowers' access to private debt. Specifically, we analyze the borrower's propensity to obtain a new bank credit line and a new bank term loan upon accessing private debt, respectively. We run the following dynamic difference-in-difference regression:

$$New_{l,t} = \sum_{s=-8}^{12} \beta_s PD_{i,t+s} + X_{i,l,t} + FEs + \epsilon_{l,t}, \tag{2}$$

where $New_{l,t} \in \{0, 1\}$ either captures whether bank loan l is a credit line originated in t, or analogously a newly-originated term loan. We include firm, bank×time, and sector×time

fixed effects, and firm and loan controls (such as log firm size, cash/assets, tangibility, leverage, loan maturity and spread). $PD_{i,t+s} \in \{0,1\}$ indicates whether firm i has taken out a PD loan prior to and including time $t+s$. Figure 4 graphically depicts the difference-in-differences estimates. The difference-in-difference estimates are near zero before PD access, spike in the quarter of PD access and the following quarter — especially for credit lines — and return toward zero thereafter. Thus, once firms tap private debt, they are more likely to obtain new bank loans, primarily credit lines. We next confirm this using cross-sectional variation.

Regression Specification. Using our sample of bank loans, we run the following regressions:

$$y_{l,t} = \beta PD_{i,t} + LoanControls_{l,t} + FirmControls_{i,t} + FEs + \epsilon_{l,t}, \tag{3}$$

where $y_{l,t}$ is a bank loan-specific outcome variable. Again, the variable of interest $PD_{i,t} \in \{0,1\}$ indicates whether borrower firm i has taken out a PD loan prior to and including time t — it equals one for dual borrowers and captures PD access. We include various loan and firm level controls such as loan maturity, default probability, loss given default, firm size, debt ratio, tangibility, EBITDA/Asset and Cash/Asset. We include sector×time and bank×time fixed effects. This allows us to compare, for a given bank, its loans to dual borrowers and bank-only borrowers within the same industry. Sector×time fixed effects control for time-varying unobserved demand shocks that are specific to each industry and common across all banks lending to firms in the same industry. Bank×time fixed effects account for time-varying unobserved heterogeneity across lenders (e.g., in terms of bank capital ratios or internal risk models). We restrict the control group of bank loans to bank-only borrowers to leveraged loans. This choice reflects that leveraged loans to bank-only borrowers as most comparable to bank loans to dual borrowers, who are relatively riskier among bank borrowers.[12] Appendix Table IA5, which reports firm and loan characteristics for this subset of bank-only borrowers,

[12]The Y-14 data contain many loans extended to investment-grade and high credit-quality borrowers that can also access the investment-grade bond market. Such borrowers are least likely to use private debt and thus are not comparable to dual borrowers.

confirms that leveraged-loan bank borrowers are relatively comparable to dual borrowers—for example, in terms of leverage, tangible assets, default probability, and firm and loan size.

Private Debt Access and Bank Borrowing. First, we take an indicator, which captures whether a given loan l is newly originated at observation date t — that is, if t lies in the *same* year-quarter as the year-quarter of the reported origination date — as the outcome variable in regression (3). In other specifications, we create analogously an indicator of whether a loan is a newly originated term loan or credit line, respectively. Further, we also examine the new loan amount in each of these cases, specifically, the logarithm of the loan of any newly originated loan, credit line, and term loan; these variables are set to zero for not newly-originated loans.

Table 5 shows that the coefficient on $PD_{i,t}$ is positive and statistically significant across all specifications. Naturally, the coefficient is largest when considering the borrower's propensity to take out any new loan—including both credit lines and term loans—since, mechanically, the probability of taking out any new loan is higher than that of taking out a new credit line, which is a subset. Interestingly, in columns (2) and (3), we estimate a larger positive coefficient on $PD_{i,t}$, when we examine whether a loan is a new credit line. Accordingly, while PD access is associated with a higher likelihood of obtaining a new bank loan, firms are more likely to obtain a credit line rather than a term loan.

Further, as can be seen from columns (4)-(6), PD access is associated with an increased new bank loan amount obtained by the borrower. As before, the estimates are larger for credit lines in column (5) than for term loans in column (6), while the estimate is largest when considering the new loan amount for all loans. In particular, these findings imply that, after accessing private debt, dual borrowers obtain larger credit line commitments.

Finally, in columns (7)-(8) of Table 5, we focus on the subsample of existing, outstanding bank loans, while employing loan fixed effect. Our estimates indicate that for a given bank loan, the commitment size increases, once the borrower accesses private debt.[13] Such increases

[13]Note that loan fixed effects will absorb all variation in outcomes related to new loans.

in loan commitment post-origination may reflect loan renegotiation upon access to private debt, commonly seen for credit lines (Roberts and Sufi, 2009; Denis and Wang, 2014; Roberts, 2015).

Overall, we find that PD access is associated with both a higher propensity to obtain new bank credit lines (extensive margin) and larger credit line sizes (intensive margin). We find similar, yet much weaker effects for bank term loans. We conclude that after accessing private debt, dual borrowers obtain additional credit line commitments from banks, indicating a complementarity between private debt and bank credit lines.

Robustness and Additional Evidence. We provide additional evidence for this complementarity in several ways. First, in Section 6.4 and Appendix Table IA5, we show that our key results remain robust when we lift the restriction to leveraged bank loans. In this Table, we present the regression estimates of (3) with bank×rating×time, firm, and sector×time fixed effects. This allows us, at a given observation date, to compare bank loans to dual borrowers and bank-only borrowers that were originated by the same bank and have the same bank-internal credit rating (reported by banks in the Y-14 data).

Second, we show in Section 6.3, that our result from Table 5 is robust to excluding leveraged buyouts, i.e., bank loans to dual borrowers where the purpose of the PD loans was buyout financing. See Appendix Table IA5.

Finally, in Section 6.1.1, we perform firm-level regressions. Here, we show that private debt is also associated with increased use of bank debt (measured by the logarithm of utilized bank loans) and a greater share of bank credit line commitments relative to total bank loan volume. In other words, when a borrower uses private debt, it relies more on bank credit lines rather than other types of bank loans.

3.2 Instrumenting for Private Debt Access and Supply

Our previous findings suggest that a firm's access to private debt stimulates reliance on bank credit lines. To disentangle the effects of PD access from factors driving PD access,

we employed firm-level and loan-level control, as well as tight fixed effects; in addition, we showed that our results remained robust across various specifications, ruling out alternative explanations. Nonetheless, a firm's choice whether to take out private debt is endogenous, and there could be time-varying unobserved characteristics (not accounted by our fixed effects) that affect both a firm's choice to obtain private debt and credit lines.

To better isolate the effect of PD access, we exploit an unexpected regulatory shock to PD supply in 2018, resulting in a relaxation of regulatory leverage limits for BDCs (Balloch and Gonzalez-Uribe, 2021). Specifically, we exploit the unexpected passage of the Small Business Credit Availability Act (SBCAA) in March 2018, allowing BDCs to double their Debt/Equity ratio from 1:1 (pre-shock) to 2:1 upon approval of the SBCAA. Importantly, the relaxation did not automatically apply to all BDCs: rather, in order to adopt the SBCAA, BDCs had to seek SBCAA approval from either the board of directors, or by appealing directly to shareholders, resulting in staggered adoption, with some BDCs choosing not to adopt the relaxation at all.[14] In the months after the SBCAA was passed, many BDCs revised their target leverage upwards from 1 to $1.25 - 1.40$.[15] In the two years after the regulatory approval in March 2018, more than half of all BDCs adopted the SBCAA (Balloch and Gonzalez-Uribe, 2021). Importantly, Haque et al. (2025) document that average BDC Debt/Asset ratio — of both adopting and non-adopting BDCs — rose from 0.4 to 0.5 in the two years following the SBCAA. Finally, as shown in Figure 5, we perform an event-study of BDC-level aggregate investments, and find a clear and persistent increase in lending activity by adopting BDCs, further reinforcing the relevance of the regulatory change.

[14]The new leverage limit becomes effective on the following day after shareholder approvals. However, it requires getting approval from shareholders either at an annual or special meeting at which a quorum is present, creating delay in implementation. Further, approvals by board of directors, only become effective after a one-year cooling-off period. For private BDCs, additional conditions to increase the leverage limit include certain disclosure requirements, and conducting a tender offer for at least 25 percent of the BDC's outstanding shares every quarter for four quarters. In each of these cases, we use the 'effective' adoption date. Finally, BDCs need to renegotiate loan terms with existing senior creditors before issuing new debt, which creates additional barriers to fast execution.

[15]For details see a report by Fitch Ratings https://www.fitchratings.com/research/corporate-finance/bdcs-seek-leverage-changes-in-challenging-environment-27-09-2018 or Schulte Roch https://www.srz.com/print/v2/content/195740/new-bdc-opportunities-how-the-passage-of-the-small-business.pdf.

We now restrict the sample to firms that, at some point during the sample period, borrow from a PD lender and thus become dual borrowers (we omit the control group of bank-only borrowers, as they were not directly affected by the regulatory change). Because most of these firms are not dual borrowers at the start of the sample, we observe both time-series and cross-sectional variation in PD reliance. For each borrower firm i, we identify its primary PD lender p (from which it will borrow) and, if that lender is a BDC, use its effective SBCAA adoption timing as an instrument for PD access. In more detail, for borrower firm i, we construct a dummy variable, $Treated_{i,t}$, which equals 1 if (i) borrower i takes out a private debt (PD) loan from lender p at some point during the sample period, and (ii) lender p is a BDC that adopted the SBCAA leverage limit relaxation, with the adoption becoming effective by time t. We note that even if a BDC opts to adopt the SBCAA (e.g., by obtaining board approval), the adoption may become effective only with a delay.[16]

Instrument and Relevance. We use $Treated_{i,t}$ as an instrument for borrower i's access to private debt, $PD_{i,t}$. The underlying idea is that a BDC's adoption of the leverage limit relaxation constitutes a positive supply shock to PD availability, inducing firms to begin borrowing from that BDC. In our first stage regression, we regress $PD_{i,t}$ on $Treated_{i,t}$. The coefficient on $Treated_{i,t}$ then captures the extent to which firm i's propensity to obtain private debt is driven by the expansion of PD supply due to the BDC leverage limit relaxation.

We run the two-stage least squares regression separately for our sample of credit lines and term loans, examining a borrower's propensity to obtain new credit lines and term loans, as well as the spreads on these new loans. Our first stage produces an F-Stat of more than 76 for credit lines and more than 20 for term loans, which is greater than the rule of thumb ($F \geq 10$) proposed by Staiger and Stock (1997), and the 10 percent critical value proposed in Stock and Yogo (2005). Thus, weak instrument is unlikely to be a concern. Intuitively, the adoption of leverage limit relaxation indeed induced firms to obtain private debt.

[16]For club deals, if we observe that multiple BDCs adopted, we take the earliest adoption date among them.

Moreover, Figure 5 presents an event study of BDC-level aggregate new investments around each BDC's effective SBCAA adoption date. The figure shows that new investment increases in the quarters following adoption, with the effect growing and remaining persistent over time. This pattern suggests that SBCAA adoption is associated with increased BDC lending and constitutes a positive shock to the supply of private debt by BDCs.

Exclusion Restriction. In the second stage, we examine how (instrumented) access to private debt affects bank loan–level outcomes—specifically, whether a given loan is newly originated (capturing the borrower's propensity to obtain new bank loans) and the loan amount (reflecting the borrower's demand for bank credit). The exclusion restriction holds as long as: (1) the BDC's leverage relaxation affects these bank loan outcomes solely through its impact on access to private debt and not through other channels, and (2) there are no unobserved borrower characteristics simultaneously influencing these bank loan-level outcomes and the BDCs' decisions to adopt the SBCAA leverage limit relaxation.

First, regarding (1), we argue that the BDC leverage relaxation affects firms solely through their direct borrowing relationships with BDCs, allowing us to rule out alternative channels unrelated to firms' borrowing from BDCs. For instance, one potential concern is that a BDC adopting leverage limit relaxation might compete more aggressively with banks—thereby affecting banks' credit supply—or might extend credit to competing firms. We address these possibilities by including bank×time and sector×time fixed effects.

Second, regarding (2), the regulatory change was unexpected (see, e.g., Balloch and Gonzalez-Uribe (2021) for further discussion). Congress had introduced several bills in 2012, 2013 and, 2015, all of which had ultimately failed. Similarly, the 2018 attempt to expand BDCs' regulatory leverage limit was not guaranteed to succeed. Thus, the exact timing of when SBCAA would be passed was not entirely predictable. Moreover, unless BDCs obtained shareholder approval for SBCAA, they cannot implement the higher leverage ratio immediately even after approval. Likewise, seeking shareholder approval also takes time. This creates a delay between a BDC's decision to adopt the SBCAA and the date on which the adoption becomes effective (which we use for our instrument), limiting BDCs' ability to

respond quickly to changes in a treated borrower's credit demand, an important feature of direct lenders who argue that they have an advantage in "speed of execution."[17] Overall, we regard it as unlikely that individual, unobserved borrower characteristics — such as latent credit demand — influenced the timing of BDCs' effective SBCAA adoption, particularly after controlling for sector×time fixed effects (which capture industry-specific, time-varying factors like credit demand) and bank×time fixed effects (which capture bank-specific, time-varying factors).

Two-stage Least Squares Estimation Results. We perform two-stage least squares estimation, both for the sample of bank credit lines (see columns (1)-(3) of Table 6) and the sample of bank term loans (see columns (3)-(6) of Table 6). The outcome variables employed are analogous to those in Table 5. In column (1), the dependent variable is an indicator, capturing whether the credit line is newly originated at the observation date; likewise, column (4) features as the dependent variable an indicator, capturing whether the term loan is newly originated at the origination date. In columns (2) and (5), the outcome variable is the new loan amount — that is, the loan amount of the credit line or term loan in case this loan is newly originated (0 for loans that are not new originations). In columns (3) and (6), interest rate is the outcome variable — this result will be discussed in the next Section in greater detail.

Our estimation results show that the coefficient on instrumented PD access/supply is positive and significant for the sample of credit lines (see columns (1)–(3)). These findings indicate that enhanced access to private debt induces borrowers to obtain PD financing, which in turn prompts them to also secure additional credit line commitments. Specifically, instrumented PD access is associated both with a greater likelihood of obtaining a new credit line (extensive margin; see column (1)) and with larger new credit lines (intensive margin; see column (2)). These findings aid the interpretation that private debt complements bank debt

[17]The share of SBCAA-adopting BDCs which obtained only Board approval is 30 percent in our data, which is non-trivial. For these BDCs, the new leverage limit becomes effective one year after obtaining approval, causing a significant delay between the BDC's decision to adopt SBCAA and the date at which it becomes effective.

and creates additional demand for bank credit lines, amplifying or complementing banks' role as liquidity providers.

Notably, for our sample of term loans in columns (4)-(6), the coefficients are insignificant, consistent with the notion that private debt does not stimulate the demand for bank term loans, possibly because banks and PD lenders compete in this segment (see Section 5 for additional evidence).

Robustness with BDC Fixed Effects. Finally, we show in Appendix Table IA5 that our two-stage least squares estimates are robust to the inclusion of BDC fixed effects. This addresses the concern that our results may be driven by non-random treatment assignment. Specifically, adopting BDCs may face different credit demand trends from their clients prior to adoption, which could influence the adoption decision. This would be problematic if the increased demand originates from the borrower in question, as the borrower's credit demand could drive both adoption and the subsequent increase in credit lines. BDC fixed effects controls for time-invariant factors affecting a given BDC's specific credit demand, however it limits the sample to the set of BDC lenders that adopted SBCAA.

3.3 Dual Borrowers' Higher Demand for Bank Credit Lines

We showed that, after accessing private debt, dual borrowers obtain additional bank credit line commitments—consistent with both demand- and supply-side mechanisms (i.e., dual borrowers may have greater demand for bank credit lines or may face greater supply). We now provide two pieces of evidence that dual borrowers exhibit greater demand for credit lines as liquidity insurance, relative to bank-only borrowers. To do so, we examine (1) how dual borrowers utilize and draw down credit lines and (2) how bank loan spreads respond to PD access. The second approach focuses on the pricing of additional credit line commitments obtained after PD access: higher spreads suggest greater borrower demand for liquidity insurance, while lower spreads suggest increased supply of credit lines.

First, credit lines serve as liquidity insurance—they are drawn to meet unexpected liquidity needs (Acharya, Almeida, Ippolito and Perez, 2014; Hartman-Glaser et al., 2025). Consistent with their increased demand for credit lines as liquidity insurance, we show in Section 4 that dual borrowers draw down their credit lines more intensively during periods of distress.

Second, Table 7 presents results from estimating regression (3) on bank loan interest rates. The outcome variable is the interest rate of loan l observed at time t. Columns (1) and (2) examine newly originated loans, while columns (3) and (4) examine outstanding loans. Since we include time fixed effects—which absorb the base interest rate—we effectively estimate the impact of private debt (PD) access on bank loan spreads. We find that PD access is associated with higher spreads, with a more pronounced effect for newly originated loans. Specifically, banks charge approximately 0.26–0.27 percentage points higher spreads to dual borrowers. Given a median spread of about 1.8 percentage points, this implies an increase of roughly 14%.

Notably, Column (3) of Table 6, which presents results from the two-stage least squares regression using instrumented PD access for the subsample of credit lines, shows that greater access to private debt is associated with higher spreads on credit lines.[18] Importantly, the coefficient on instrumented PD access—approximately 90 basis points — is substantially larger than that reported in Table 7, though the estimates are not directly comparable due to differences in sample composition. This suggests that PD access is associated with an increase of roughly 1.0 percentage points in credit line spreads.

To note, our analysis controls for borrower default probability, loss given default, and a rich set of firm and loan characteristics, suggesting that the higher spreads are not fully explained by increased credit risk. Overall, our results suggest that dual borrowers have a greater demand for bank credit lines, as they obtain additional commitments after accessing private debt despite facing higher spreads. The simultaneous increase in price and quantity

[18]Recall that columns (1) and (2) of Table 6 indicate that PD access is linked to increased reliance on bank credit lines.

of credit lines upon accessing private debt strongly indicates heightened demand for liquidity insurance.

3.4 Complementarity between Private and Bank Debt: Mechanism

Our findings suggest that dual borrowers exhibit greater demand for and reliance on bank credit lines, reflecting a complementarity between private debt and bank credit lines. What are the mechanisms underlying this result? Moreover, term loans are often paired with credit lines, reflecting a natural complementarity between term loans and credit lines (see, e.g., Donaldson, Koont, Piacentino and Vanasco (2024)). For instance, when a term loan is used to finance investment, the firm obtains a credit line to manage liquidity needs associated with the investment. This raises the question of whether the observed complementarity between private debt (which typically takes the form of term loans) and bank credit lines merely reflects the standard bundling of term loans and credit lines. We address this concern by developing a theoretical framework and providing empirical evidence that the effects of private debt goes beyond standard bundling.

3.4.1 Empirical Analysis

If the complementarity between private debt and bank credit lines simply reflected the standard bundling of term loans and credit lines, we should observe a similar increase in reliance on bank credit lines after firms obtain a term loan, regardless of whether the loan is provided by a bank or a PD lender. To test this, we compare, within a given year and quarter, the propensity to obtain new credit line commitments for (i) dual borrowers and (ii) bank-only borrowers who received a new bank-provided term loan in the same period. This approach effectively controls for the standard bundling effects, allowing us to isolate the effects specific to private debt (that go beyond standard bundling). If private debt had no distinct effect, the source of term loan financing — bank or PD lender — should not influence the borrower's demand for liquidity insurance. Yet, as we show below, relative to

these matched bank borrowers, firms accessing private debt are more likely to secure new and larger bank credit lines.

To do so, we re-run regression (3) at the bank loan-time level using the new credit line indicator and the new credit line amount as outcome variables. As in Table 5, we restrict the control group of bank loans to leveraged loans made to bank-only borrowers. However, unlike Table 5, we further limit this control group to bank loan-time observations in which the bank-only borrower obtained a new term loan (from any bank) within the same quarter. In Appendix Table IA5, we indeed confirm that bank-only (leveraged loan) borrowers, who obtained a new term loan in a given quarter, increase their reliance on bank credit lines thereafter, consistent with the standard bundling effect.

Table 8 presents the results where we compare dual borrowers to these bank-only borrowers that issued a new term loan from any bank. The dependent variable is an indicator for obtaining a new credit line in columns (1)–(3), and the amount of the new credit line in columns (4)–(6). Observe that $PD_{i,t}$ is positive and significant in all specifications, i.e., our previous findings remain robust to restricting the control sample to bank-only borrowers with new term loans. This result indicates that, compared to bank-only borrowers who obtain a new bank-provided term loan, dual borrowers exhibit a greater propensity to obtain additional credit line commitments, both on the extensive and intensive margin. That is, the complementarity between term loans and credit lines is more pronounced when the term loans was provided by a PD lender rather than a bank.

3.4.2 Theory

Our theoretical framework — presented in Appendix E and summarized here — highlights the economic mechanisms underlying the complementarity between private debt and credit lines. It explains why this complementarity goes beyond the traditional bundling of term loans and credit lines. We provide an intuitive overview of the theory here, and defer details to the Appendix.

Model Description. We develop a three-period model of corporate borrowing, building on Holmström and Tirole (1998). At $t = 0$, a firm finances a risky investment using internal funds, a term loan, and a credit line. At $t = 1$, the firm may face a liquidity shock of uncertain size which it can cover by drawing on the credit line; if the liquidity shock is not covered, the firm is liquidated. Drawing on the credit line prevents inefficient liquidation, making the combination of term loan (for investment) and credit line (for liquidity insurance) valuable. At $t = 2$, terminal cash flows are realized, which are risky and can take *low* or *high* values.

Different to Holmström and Tirole (1998), we introduce heterogeneous lenders, reflecting differences in regulation (e.g., capital requirements): (i) risk-averse banks, which offer both term loans and credit line, and (ii) less risk-averse PD lenders, which only offer term loans. We assume that banks are extremely risk-averse: they only extend risk-free debt and, due to the possibility of liquidation, their loans must be fully backed by the liquidation value of assets — consequently, bank debt is asset-based and senior-secured.[19] In contrast, PD lenders are willing to bear risk in exchange for higher returns. They can offer term loans that allow for repayment deferral or write-downs in distress—features akin to payment-in-kind or equity-like terms. More broadly, PD lenders offer junior loans that bear greater risk. Unlike bank loans, private debt does not need to be backed by asset liquidation values and can instead be cash flow-based (i.e., backed by the going-concern value of cash flows).

Our model is supported by our results in Section 2 — showing that PD lenders extend riskier, more junior, and larger loans to borrowers with low levels of collateralizable (tangible assets), features associated with cash flow-based debt (Lian and Ma, 2021; Kermani and Ma, 2022).[20] Furthermore, Block et al. (2024); Jang (2023) empirically show that private debt is frequently cash flow-based. Rintamaeki and Steffen (2025) document that PIK provisions and thus repayment flexibility are linked to more junior loans.

[19]This simplifying assumption of extreme risk aversion for banks does not affect the core mechanism, which holds more generally.

[20]Given a limited stock of explicit collateral, more leverage and, specifically, larger loans mechanically imply a larger share of debt that is not explicitly collateralized, i.e., cash flow-based debt. Thus, the larger loans and higher leverage in private debt are also consistent with increased use of cash flow-based deb.

Solution. We solve for the debt capacity from each lender type, and characterize under what circumstances financing with private and bank debt is feasible, subject to lenders breaking even. Central to the analysis is the endogenous credit line limit. To draw on the credit line to cover a large liquidity shock at $t = 1$, the firm must credibly commit to repay the drawn amount in all states at $t = 2$ — particularly in the low cash flow state at $t = 2$ — because banks are highly risk-averse.[21] When the liquidity shock is sufficiently large, it can only be covered by the credit line if term debt repayments are flexible—or equity-like—that is, if they can be reduced in low cash flow states (in exchange for higher payments in high cash flow states), through mechanisms such as repayment deferrals (e.g., PIK features) or debt write-downs. Crucially, only PD term loans allow for such repayment flexibility. Put differently, the credit line can cover sufficiently large liquidity shocks only if the term debt takes a hit and absorbs part of the loss, that is, if the term debt is junior.

Hence, when the term loan is private debt rather than bank debt, the firm can obtain a larger credit line in the first place and withstand larger liquidity shocks. At the same time, having private debt increases the value of obtaining bank credit lines as liquidity insurance — that is, the complementarity between term loans and credit lines is stronger when the term loan is provided by a PD lender rather than a bank. In an extension where obtaining a credit line entails a cost, we show that having a PD term loan increases a firm's propensity to obtain a new credit line. We also show that, consistent with our empirical findings, PD access allows firms to obtain larger term loans (intensive margin) and facilitates financing for firms with low asset tangibility and earnings (extensive margin).

Key Findings. The theory highlights the following, specific channels through which private debt complements bank credit lines. It emphasizes how these effects extend beyond the standard complementarity between credit lines and term loans, and why the complementarity is more pronounced for PD term loans than bank-provided term loans. We provide an intuitive explanation of these mechanisms below.

[21] Intuitively, the bank would (optimally) revoke the credit line (in which case the firm cannot draw on it), if full repayment could not be promised.

1. Unlike banks, PD lenders are willing to bear risk by providing more junior loans and offering more flexible loan terms—such as payment-in-kind or equity-like features. These features allow private debt to absorb risk through mechanisms such as repayment deferrals or debt write-downs in times of distress. As we argue, they increase both the supply of and demand for liquidity insurance.

   First, the potential to write down debt in distress increases the amount that can be promised for repayment to the credit line lenders. This, in turn, expands the firm's credit line capacity, a supply-side channel, and improves its ability to absorb larger liquidity shocks.

   Second and more importantly, there is a demand-side channel driven by the flexibility inherent to private debt. These flexible terms allow firms to navigate financial distress more efficiently — specifically, by avoiding inefficient liquidation and resolving distress through restructuring (not explicitly modelled). However, successfully managing distress without liquidation requires that the firm has sufficient liquidity to absorb cash flow shocks. In this sense, while flexible debt terms (or junior debt's ability to absorb risk) make efficient distress resolution possible in principle, access to a credit line is essential for realizing this potential. Consequently, the greater capacity for efficient distress resolution stimulates the firm's demand for liquidity insurance — a mechanism also highlighted in Hartman-Glaser et al. (2025).

2. Section 2 demonstrates that PD lenders extend riskier, more junior, and larger loans to borrowers with low levels of collateralizable (tangible assets). These features align with the view that, when compared to banks, PD lenders rely more on cash flow-based, rather than asset-based, lending (Lian and Ma, 2021; Kermani and Ma, 2022), which is also documented in Block et al. (2024). Unlike asset-based bank loans secured by specific collateral, cash flow-based loans are backed by the going-concern value of the firm's cash flows (Lian and Ma, 2021; Hartman-Glaser et al., 2025) — junior debt is considered cash flow-based, but cash flow-based loans can also be secured by blanket lien (i.e., the firm's going-concern value). Consequently, to lend against cash flows and

to ensure these cash flows indeed realize, PD lenders require their borrowers to obtain bank credit lines as liquidity insurance, thus mitigating liquidation risk and increasing the likelihood that their loans are repaid. Loosely speaking, bank credit lines insure the private debt claim against liquidity risk. This liquidity insurance is particularly valuable for junior or cash flow-based loans, which incentivizes PD lenders to push their borrowers to obtain additional credit lines upon accessing private debt.

3. Our empirical findings in Section 1.4 and Section 2 indicate that PD lenders extend (additional) term debt that banks are unwilling to provide—both on the intensive margin (PD loan amounts are larger than those of banks) and the extensive margin (PD lenders serve borrowers banks avoid, such as those with negative earnings). Because of the complementarity between term debt and credit lines, this mechanism stimulates demand for credit lines. In this way, private debt acts as a catalyst for liquidity insurance demand by relaxing firms' term loan financing constraints—that is, by improving access to term debt.

4 Private Debt and Credit Line Drawdowns

We have shown that borrowers' use of private debt is associated with greater reliance on bank credit lines. In particular, compared to bank-only borrowers, dual borrowers tend to obtain credit lines with larger limits and commitment sizes. Credit lines play a key role in managing liquidity risk and serve as a critical funding source during periods of distress (Acharya et al., 2014; Berrospide and Meisenzahl, 2015; Hartman-Glaser et al., 2025). We now show that dual borrowers also draw down their credit lines more intensively during such periods, consistent with a heightened demand for credit lines as liquidity management tool.

When extending credit lines, banks are exposed to both default risk and drawdown risk, as it is uncertain ex-ante when borrowers will demand liquidity. These drawdown risks can be costly, in that they affect banks' ability to extend other loans (Greenwald, Krainer and Paul, 2021; Acharya, Jager and Steffen, 2023). In this section, we show that credit lines to

dual borrowers exhibit increased drawdown and default risks during times of market-wide distress. For this sake, we follow Chodorow-Reich et al. (2022) and exploit the onset of the Covid-19 pandemic as an aggregate shock to firms' liquidity needs, capturing market-wide distress. As shown in Chodorow-Reich et al. (2022), firms drew intensely on credit lines to cover liquidity needs.

Empirical Specification. Our following bank loan-level regressions examine whether access to private debt, as captured by $PD_{i,t}$, is associated with increased drawdown and default risks of bank loans during times of market-wide distress:

$$y_{l,t} = \beta_1 PD_{i,t} + \beta_2 PD_{i,t} \times Covid_t + \alpha_l + \delta_t + Controls + \epsilon_{l,t}. \tag{4}$$

We employ two (time-varying) outcome variables $y_{l,t}$. First, we take the drawdown of a given bank loan l at time t, defined as the ratio of utilized to committed credit. Second, we take the bank-estimated (ex-ante) probability of default. Following Chodorow-Reich et al. (2022), $Covid_t$ takes on a value of 1 in 2020Q1 and 2020Q2 and 0 otherwise. To mitigate the effects of other macroeconomic events which may confound our results, we restrict the estimation sample from 2018Q1-2020Q2. Importantly, our specifications contain both loan (α_l) and time (δ_t) fixed effects, in addition to loan and firm controls. Thus, the coefficient β_2 represents the average difference in the outcome variable during Covid-19 between bank loans to dual borrowers and comparable bank-only borrowers (again restricted to borrowers that rely on bank-originated leveraged loans).

Private Debt is Linked to Higher Drawdown and Default Risks. Columns (1) and (2) of Table 9 show that at the onset of Covid-19, dual borrowers drew down their credit lines more heavily than comparable bank-only borrowers. In column (2), the coefficient of nearly 4 percentage points for credit lines is economically significant, given the (unconditional) mean (median) utilization rate of credit lines in the Y-14 sample of around 35% (25%). Additionally, column (4) illustrates that for credit lines, banks estimated a higher probability of default for dual-borrowers during Covid-19, relative to bank-only borrowers. That is, bank loans to dual

borrowers exhibit greater drawdown and default risks during times of market-wide distress, relative to comparable bank loans to bank-only borrowers. These results are consistent with dual borrowers being inherently riskier firms with more volatile cash flows and greater demand for credit lines as liquidity management tools.

Overall, compared to bank-only borrowers, dual borrowers rely more heavily on bank credit lines and draw them down more intensively during periods of distress. Our analysis suggests that with the rise of private debt, banks may become increasingly exposed to firms' liquidity risks and credit line drawdown risks that primarily materialize during market-wide distress. Thus, financing dual borrowers could expose banks to greater liquidity risks, relative to comparable bank borrowers.

Robustness and Paycheck Protection Program (PPP). One might be concerned that, relative to dual borrowers, bank-only borrowers drew down their credit lines less because they had significantly better access to the Paycheck Protection Program (PPP). We consider this possibility less likely. First, our firm controls and exhaustive fixed effects likely account for factors determining PPP access, allowing us to compare bank-only and dual borrowers with similar access to PPP. This makes it unlikely that systematic differences in PPP access, after including our controls and fixed effects, drive our results. Second, recall that our control group of bank-only borrowers includes only relatively large borrowers with total minimum loan commitments of $5 million. Indeed, we confirm that even the 25th percentile firm size in our control group is above $100 million, well beyond the typical SME size range defined in Chodorow-Reich et al. (2022), which was eligible for PPP financing.

For additional robustness, using publicly available data from the Small Business Administration (SBA), we confirm that our results are unchanged when excluding PPP borrowers. We identify borrowers in our sample that received PPP funding based on a string matching algorithm on firm name and location. We then exclude any borrower that used PPP funding during Covid from our sample. This leads to a very small reduction in sample size of about 2%, consistent with the arguments mentioned above. Re-estimating regression 4, we show in Appendix Table IA5 that all our results are unchanged.

5 How Do Banks and PD Lenders Compete?

Our findings so far suggest that, while PD lenders do not compete for credit lines, they do compete with banks in providing relatively riskier term loans; this competition occurs not only within the group of dual borrowers but may also apply to borrowers that decide between exclusively going with banks or PD lenders. Moreover, we note that PD lenders provide "very risky" loans that banks tend to avoid, as also highlighted in Chernenko et al. (2022).

We use the collapse of Silicon Valley Bank (SVB) in March 2023 as a negative, exogenous shock to the supply of leveraged bank lending to examine how private debt (PD) lenders respond to reduced competition from banks. In doing so, we also shed light on the nature of competition between banks and PD lenders. Our findings suggest that PD lenders (i) serve a loan market segment that banks typically avoid and (ii) compete with banks at the margin for moderately risky term loans with credit quality exceeding that of the average PD loan. Specifically, the marginal loans over which PD lenders and banks compete are of higher quality (i.e., less risky) than the average PD loan but lower quality (i.e., riskier) than the average bank loan. Moreover, we provide evidence that competition is concentrated among loans to dual borrowers. The SVB collapse further demonstrates that as banks pull back from risky lending, PD lenders expand into loans that banks would have traditionally originated, resulting in a higher-quality, less risky loan portfolio overall.

SVB Collapse Reduced Leveraged Bank Lending. To begin with, we confirm that the SVB collapse indeed represented a negative shock to leveraged (i.e., riskier) lending by banks, but not necessarily to bank lending in general. To this end, Figure IA5 plots the number of newly originated bank loans in a given month of years 2021, 2022, and 2023. The upper panel depicts leveraged loans, which are arguably riskier than other types of bank loans depicted in the lower panel. The upper panel highlights that the number of newly originated leveraged

loans in March-June 2023 is significantly lower than in the same months of the previous two years. There is no visible effect, however, for other bank loans, as shown in the lower panel.[22]

Empirical Specification. The following analysis examines how the spreads of bank loans and PD loans change following the SVB collapse, as banks retreat from risky lending and marginal loans — for which banks and PD lenders compete — migrate from banks to PD lenders. In this context, we view spreads as a measure of credit risk or quality, with lower spreads capturing lower risk and higher credit quality. Our analysis therefore sheds light on which loans migrate following a negative supply shock to risky lending, allowing us to identify the marginal loans for which PD lenders and banks compete.

In particular, we estimate the following specification regression at the loan origination level over a short time window around the SVB collapse:

$$Spread_{l,t} = \beta_0 \; Y_{i,t} + \beta_1 \; Post_t \times Y_{i,t} + FEs + Controls_{l,i,t} + \epsilon_{l,t}, \tag{5}$$

where we take the spread of (PD or bank) loan l originated at time t as the outcome variable. $Post_t$ is an indicator taking the value of zero (one) before (after) the SVB collapse. We estimate (5) either using the sample of newly originated bank loans or PD loans, but, in both cases, we do not restrict the sample to dual borrowers; this allows us to control for the effects of the SVB collapse on bank or PD loans in general. When using the sample of newly originated bank loans, $Y_{i,t}$ equals $PD_{i,t}$. When using the sample of newly originated PD loans, $Bank_{i,t} \in \{0, 1\}$ captures whether PD borrower i also borrows from banks, i.e., is a dual borrower and contained in the Y-14 data.[23] The regressions include firm controls for bank loans, but not for PD loans (since these are not available for PD loans to PD-only borrowers). We include loan type fixed effects, as well as loan controls. Certain specifications

[22] Recent market commentary also supports the view that the March 2023 banking turmoil led to a virtual 'shut-down' in leveraged loan issuance, creating scope for private credit. For details see industry commentary here.

[23] Note that $Bank_{i,t}$ is persistent over the (short) time period in consideration and its value generally remains unchanged from before to after the shock.

also include sector×week fixed effects or sector and week fixed effects; these fixed effects may absorb $Post_t$.

Bank Loan Analysis. First, we run regression (5) using our sample of newly originated bank loans. Columns (1) and (2) of Table 10 show that the coefficient on $PD_{i,t}$ is positive and significant, while the coefficient on $Post_t \times PD_{i,t}$ is negative and significant. The positive coefficient on $PD_{i,t}$ indicates that bank loans to dual borrowers generally have higher spreads and tend to be riskier. The negative coefficient on $Post_t \times PD_{i,t}$ suggests that, following the SVB collapse, the spreads of newly originated bank loans to dual borrowers decline, relative to the spreads on newly originated bank loans in general. This indicates that post-shock banks reduced riskier lending by applying tighter lending standards and focusing on less risky loans with lower spreads; these tighter lending standards disproportionately affected the more risky dual borrowers. In particular, the marginal loan to dual borrowers — which shifts to PD lenders post-shock — is of lower credit quality (i.e., more risky) than the average bank loan to dual borrowers.

PD Loan Analysis. Next, we estimate specification (5) for our sample of newly originated PD loans. Columns (3) and (4) of Table 10 show that the coefficients on $Post_t$ (column (3) only) and $Post_t \times Bank_{i,t}$ are negative and significant. Thus, the SVB collapse is associated with a decline in loan spreads (increase in credit quality) for newly originated PD loans in general. Moreover, relative to other newly originated PD loans, newly originated PD loans to dual borrowers exhibited an even larger decrease in spreads. This suggests that as banks reduce risky lending following the SVB collapse, the marginal loans— over which PD lenders and banks compete and which shift to PD lenders post-shock — are of higher credit quality (i.e., less risky) than the average PD loan originated pre-shock. The effects are even more pronounced for dual borrowers, indicating that competition between banks and PD lenders is concentrated among dual borrowers. In more detail, because our previous results suggest that PD lenders do not compete with banks in credit lines, their competition is concentrated in term loans to dual borrowers.

6 Robustness and Other Results

6.1 Firm-Level Effects

6.1.1 Private Debt and Capital Structure

In this section, we show that for bank borrowers, access to private debt is associated with (i) a lower share of bank debt in total debt, (ii) higher leverage and total debt, (iii) more bank debt (in dollar amount), and (iv) a lower interest coverage ratio. Notably, the use of private debt is also linked to a greater share of bank credit line commitment to total bank loan commitments.

Empirical Specification. To examine the effects of PD access on firm outcomes, we rely on our sample of dual borrowers contained in the Y-14 data. Firm data is reported at the firm-year level. Our following firm-level regressions effectively compare these dual borrowers to similar bank-only borrower:

$$y_{i,t} = \beta PD_{i,t} + FirmControls_{i,t-1} + FE_{i,t} + \epsilon_{i,t}, \tag{6}$$

where $y_{i,t}$ is a firm-specific outcome variable and i denotes a borrower firm, and t the observation date (in years). The key variable of interest is $PD_{i,t} \in \{0, 1\}$, which takes the value one if and only if borrower firm i has borrowed from PD lenders prior to or at time t. We include various (lagged) firm-level controls, such as the logarithm of book assets, asset tangibility, and debt, cash, and EBITDA scaled by book assets. We also include firm fixed effects to control for time-invariant firm characteristics, and borrower sector-time fixed effects to compare, at a given point in time, firms in the same industry.

Firm-Level Results. Results are reported in Table 11. First, columns (1) and (2) shows dual borrowers have greater Debt/Asset and Long-term Debt/EBITDA, i.e., a bank borrower's reliance on private debt is associated with higher leverage. Columns (2) of Table 11 use firm-level leverage (i.e., Total Debt/EBITDA) as the outcome variable. The coefficient on

$PD_{i,t}$ is positive and significant, in that a firm's leverage rises sharply once it starts borrowing from PD lenders. In particular, a bank borrower's access to private debt is associated with an increase in leverage by about 0.64 percentage points. The economic magnitude is large, given a median level of Debt/EBITDA of about 4.1 (Table 1). Next, column (3) shows that access to private debt is associated with an increase in bank debt (by about 12 percentage points), where bank debt is in dollar terms and expressed in logs. That is, once a firm starts borrowing from PD lenders, it increases its borrowing from banks too, leading to an increase in overall leverage and bank debt.

Column (4) of Table 11 illustrates that private debt access is associated with a reduction in interest coverage ratio, indicating an increase in interest expenses relative to earnings. This finding is is in line with our previous findings. Indeed, as a borrower taps into private debt, its overall borrowing (from banks and PD lenders) and loan spreads increase, raising interest expenses and reducing interest coverage ratio. Interpreted differently, our results also suggest that PD access is associated with financial distress. This is consistent with dual borrowers having higher probability of default, as shown in Table 1.

Columns (5) shows that, when the share of bank debt of total debt as the outcome variable, the coefficient on $PD_{i,t}$ is negative and significant. The coefficient on $PD_{i,t}$ is about 6.9 suggesting that access to private debt is associated with a decline in the share of bank debt by about 7.0 percentage points.

Most interestingly, Column (6) shows that when the share of total bank credit line commitment to total bank loan commitments is taken as the outcome variable, the coefficient on $PD_{i,t}$ is positive and significant. Thus, dependence on private debt is associated with more bank debt in general, but this effect is mostly driven by an increased use of bank credit lines rather than other loan types. In unreported tests, we also verify that the quantitative effect is even stronger if we restrict our estimation sample to a narrower window around a borrower's first issuance of private debt.

Event Study Evidence. We provide event study evidence showing that when a bank borrower accesses private debt, both its Debt/EBITDA ratio (a widely used measure of

leverage) and the bank-estimated probability of default increase. Figure IA3 illustrates that once a bank borrower begins borrowing from private debt (PD) lenders—marking the first instance of PD loan access in our sample—the Debt/EBITDA ratio rises sharply, from around 3 before PD access to about 4.5 afterward, and remains elevated thereafter.

Additionally, banks report estimated probabilities of default and loss given default in the Y-14 data for their borrowers. Our analysis shows that dual borrowers have higher probabilities of default and loss given default than those who only use bank loans, indicating that dual borrowers are riskier. Figure IA4 plots the median and interquartile range of bank-reported ex-ante probabilities of default on bank loans in quarters relative to a borrower's first private debt issuance in our sample. While the median default probability remains relatively stable, between 1-2%, following private debt issuance, the 75th percentile shows a sharp increase from 2.5 to 4%. This pattern suggests that the use of private debt may be associated with increased default risk on a borrower's outstanding bank loans.

6.1.2 How Do Firms Use the Proceeds from Private Debt?

We now provide evidence on how firms might use the proceeds from issuing private debt. In particular, we study the relationship between PD access and (real) firm outcomes, such as capital expenditures ("Capex"), fixed assets, sales growth, and intangible assets. To this end, we run our firm-level regression specification in (6) with each of these firm-level outcome variables. Table 12 presents the regression results. We observe that a firm's borrowing from PD lenders is associated with a decline in fixed assets and cash holdings, but a significant increase in sales growth and intangible assets. We find no evidence on changes to capital expenditure. Overall, these findings suggest that firms do not tap into private debt to increase capital expenditures (i.e., investment in tangible assets) or to invest in fixed assets. Many dual borrowers operate in technology-related sectors and rely relatively less on tangible assets, which may explain this lack of effect on capital expenditures; see Appendix Table IA5. Instead, our findings indicate that firms use the proceeds from private debt to finance growth, expansions, and investment in intangible assets, potentially boosting sales growth.

6.2 Baseline Results With Less Restrictive Sample

An important concern could be that our key results on imperfect substitutability reported in Tables 3 and 4 may be driven only by the restrictive sample that results from the inclusion of firm-time or firm-time-loan-type fixed effects. To demonstrate the generalizability of our results, we re-estimate the regressions in these tables with less restrictive samples.

First, we remove firm×time fixed effect, and introduce state×industry×time fixed effects, where industry is classified according to 2 digit NAICS codes. We retain the same controls as the most restrictive specifications of Tables 3 and 4 and re-estimate outcomes. This strategy doubles our sample size. The results are reported in Appendix Table IA5. All our results, aside from loan maturity, are still highly significant at the 1 percent level. Interestingly the coefficient on interest rate spread is much larger, underscoring the importance of borrower-level factors such as default risk in explaining the differences.

Second, we exclude firm×time fixed effect and introduce only firm and time (year-quarter) fixed effects. These results are reported in Appendix Table IA5. We find all our results are unchanged with some estimates becoming larger, such as loan spreads. While not reported, we also confirmed these estimates will be unchanged if we include loantype fixed effects in columns (1) to (4).

6.3 Results Excluding PE Buyouts

Another key concern could be that our key results on imperfect substitutability reported in Tables 3 and 4 may be driven only by private equity-sponsored leveraged buyout financing. Indeed, as reported earlier, borrowers that are owned by private equity funds comprise around 80% of PD loans in our data. Such issues raise concerns related to the generalizability of our results. To address these concerns, we re-estimate regression (3) excluding all private debt loans used for buyout financing. Appendix Table IA5 shows that our key results are largely unchanged, i.e., they remain robust, when excluding buyout deals. Our findings also suggest that many PE-backed firms are rely on private debt for financing *post-buyout*, for

instance for refinancing or general corporate purposes. This insight is consistent with patterns documented in Shive and Forster (2021) and Haque, Jang and Mayer (2022).

Second, we also exclude buyout observations and re-estimate Table 5, which estimates the response of bank loan quantities once borrowers issue private debt. Appendix Table IA5 reports these results, showing that our findings remain robust

6.4 Private Debt and Credit Lines: Robustness

In this section, we demonstrate that our findings on dual borrowers' increased reliance on bank credit lines—presented in Tables 5 and 7—are robust to an alternative control group and a different set of fixed effects. Specifically, we relax the restriction to leveraged bank loans and incorporate bank-internal credit ratings using bank×rating×time fixed effects. These credit ratings are highly granular, borrower-specific, and bank-dependent, as they are generated from each bank's internal risk assessment models. Most banks in our sample use between 10 and 15 rating buckets, with some employing even finer classifications. Since these ratings reflect borrower characteristics such as leverage and firm size—and are updated over time based on loan performance—they have been shown to be highly informative about credit risk and loan outcomes (Weitzner and Howes, 2023; Haque et al., 2023).

In our robustness tests, we re-estimate regression (3) using bank×rating×time, firm, and sector×time fixed effects. This specification enables us to compare, at a given point in time, bank loans to dual and bank-only borrowers that were originated by the same bank and assigned the same internal credit rating (as reported in the Y-14 data).

Appendix Table IA5 confirms the robustness of Table 5, while Appendix Table IA5 provides analogous robustness for Table 7. As shown, all results remain robust.

6.5 Private Debt Access and Borrower Exit from Banks

While we have shown that most firms generally continue their banking relationships upon access to private debt, we now directly examine what share of borrowers choose to end

their banking relationships. Specifically, we now analyze whether some bank borrowers systematically access private debt to repay their bank debt and then exit the banking system. That is, we study whether bank borrowers drop out of the Y-14 database after they tap into private debt.

To do so, we combine our sample with the *disposed loan schedule* within the Y-14 data, which identifies (former) loans that are no longer actively held by banks. A loan can be contained in the disposed loan schedule, because it is fully sold off, repaid at or before maturity, defaulted, liquidated, or because it is an expired commitment. We then examine if a given borrower repays outstanding bank debt within two quarters of first issuing private debt and drops out of the Y-14 sample entirely. Using this approach, we find that only 240 of approximately 2,900 dual borrowers drop out of the sample, which corresponds to about 8% of all dual borrowers.

If we relax our definition to repayment within four quarters of issuing private debt, the number rises marginally to around 9%. Table IA5 compares firm-year sample means and medians across those dual borrowers that drop out with those that do not. We barely find any systematic difference between these two groups based on observable firm characteristics. If anything, the dropouts tend to be smaller firms. That said, we acknowledge that there could be unobserved borrower-PD lender or borrower-bank factors that could be driving the decisions to exit the banking system.

7 Conclusion

We analyze the interactions and differences of private debt (PD) and traditional bank debt in corporate borrowing in the US. In our data, about half of PD borrowers rely on both bank and PD loans, i.e., they are so-called dual borrowers. When co-financing dual borrowers, PD lenders typically provide term loans, while banks provide credit lines. Compared to bank loans to the same borrower, PD loans are larger, often junior to bank loans, and have higher spreads and longer maturities. Thus, private debt is inherently riskier than bank debt.

Once a borrower accesses private debt, it obtains additional credit line commitments from banks—but at elevated spreads. We also show that dual borrowers draw heavily on their credit lines during periods of distress.

Overall, our findings indicate that private debt substitutes for riskier, long-term bank credit, but complements or even amplifies banks' role as liquidity providers through credit lines. In particular, PD lenders do not compete with banks in providing liquidity through credit lines, possibly reflecting banks' deposit-based funding structure that gives them an advantage in this area. However, because dual borrowers exhibit higher drawdown and default risks that primarily materialize during times of market-wide distress (such as the onset of the Covid-19 pandemic), financing them could impose significant liquidity risks to banks. Crucially, the complementarity between private debt and bank credit lines arises from dual borrowers' heightened demand for liquidity insurance—beyond the standard bundling of credit lines and term loans. This complementarity is driven by specific features of private debt relative to bank debt, such as greater contractual flexibility, equity-like features, as and its tendency to be more junior. As we argue theoretically, these features amplify borrowers' demand for credit lines.

Our analysis shows that banks and PD lenders are linked through dual borrowers, which is important for assessing the risks banks are exposed to. We also note that banks lend directly to PD lenders (Chernenko et al., 2024; Haque et al., 2025), creating a potential channel for risk transmission from PD borrowers to banks, similar to how banks are exposed to risks in the real estate sector by lending to REITs (Acharya et al., 2024b). Future research should comprehensively examine how the rise of private debt affects the risks and fragility of the banking sector by considering both (i) banks' lending to middle-market firms alongside PD lenders and (ii) banks' lending to PD lenders. Our paper focuses only on the first channel, leaving the combined analysis of (i) and (ii) for future research.

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A Variable Definitions

We provide definitions of our main variables below. The item numbers of the data fields refer to Schedule H1 of the Y-14Q data Schedule H1 of the Y-14Q data on the Federal Reserve's website.

- Firm Size: Natural Logarithm of book value of current year assets, i.e., the logarithm of book assets
- EBITDA: EBITDA/Book value of total assets. Also referred in main text as earnings or firm profitability.
- Capex: Capital Expenditure/ total assets
- Liquidity: Cash and Marketable Securities/ Total Assets
- Tangibility: Tangible Assets/ Total Assets
- Debt/EBITDA: Long-term Debt that matures in more than one year over EBITDA
- Interest Coverage Ratio: EBITDA/Interest Expense
- Total Debt: Total Debt/Total assets
- Log (Bank Debt): Total firm-level utilized bank loans.
- Loan Maturity: Computed as the difference between loan maturity date and loan origination date (expressed in years)
- Utilization/Drawdown rate: Total utilized exposure/Total Commitments for a given loan-time observation.
- Loan Type: Dummies for different types of loans. Specifically, it is a variable that takes value 1 for a Revolving Credit Line, 0 otherwise. Similarly, a variable which takes value 1 for Term Loans, 0 otherwise.
- Loan Purpose: Dummies for whether a loan is used for acquisition, refinancing etc. This loan purpose indicator does not capture LBOs. While this loan purpose indicator has a category for 'M&A', one cannot assume this category accurately captures Private Equity LBOs. As documented in Haque et al. (2022), which merges the universe of Pitchbook LBOs with Y14, many LBO deals are not highlighted as 'M&A', and appear with various other loan purpose categories.
- Probability of Default: Banks' internal estimates of borrower's 1-year ahead probability of default following guidelines by Basel Committee on Banking Supervision.
- Loss Given Default: Banks' internal estimates of a loan's loss conditional on default, expressed as a fraction betwee 0 and 1.

- Internal Credit Risk Ratings: Banks' internal credit risk ratings estimated using their own internal credit risk assessment models. These ratings are generally used by banks for their own credit decisions. Internal ratings are time-varying and bank-specific. Most banks' internal ratings include around 10-15 rating buckets.
- Credit Line Share: Bank Credit Line Commitment in percent of all Bank Commitment
- Newly Originated Loan: Defined at the loan-year-quarter level and takes a value of 1 if the report date year quarter is the same as the origination date year quarter.
- Dual-Borrowers: Borrowers that have issued both private debt and bank debt.

B Private Debt Data Construction and Cleaning

- We used Pitchbook's 'Debt and Lenders' screener to retrieve the data. Pitchbook provides loan-level information at the loan-origination date. We constructed the private debt sample based on whether the lender in a given loan is a non-bank private debt fund or BDC. Most private debt funds and BDCs are owned by non-bank asset managers (E.g. Ares or Blackstone), and a small share are bank-affiliated (E.g. Goldman Sachs).
- More specifically, we use the following filtration strategy:
  - Both the borrower and lender are based in the US.
  - We restricted the sample to loans (i.e. no bonds).
  - When a deal contains multiple lenders, including banks, we classify it as a private credit facility only if it has at least one direct lender (i.e. a private debt fund or a BDC)
  - We require non-missing information on loan spreads, maturity and loan size.
  - Loans were originated between Jan 1st 2013 and Jan 1st 2024.
  - The deal types were classified as 'All PE LBO/Buyout Types', 'Other Private Equity Types', 'M&A'/Control Transactions', 'Non-Control Transactions', 'Other M&A' Transactions', 'All General Debt', 'Dividend Recapitalization'and 'Debt Refinancing'.
  - Finally, we require the Lender type to be one of the following: 'Business Development Company', 'Lender', 'Miscellaneous Lenders' and 'Merchant Bank'. We excluded 'Commercial Banks' and 'Investment Banks'. 'Merchant Bank' captures bank-affiliated private credit arms. Majority of loans classified under 'Lender' and 'Miscellaneous Lenders' involved a non-bank asset manager. We exclude those observations that did not involve a non-bank asset manager or a bank-affiliated private debt fund or BDC. This filtration allows us to restrict the sample to loans made by non-bank asset managers, and a small share of bank-affiliated BDC or PD fund.
  - This filtration strategy leads to $\approx$ 17,000 loans. For our formal analysis, we exclude loans that are completely undrawn.
- Approximately 11,000 loans included a BDC, thus suggesting our sample overweights BDCs, relative to private debt funds.
- We then randomly selected 100 loans and verified that the same deals can be found in other commercial datasets. In particular, we identified the same deals in 'KBRA Direct Lending Deals' based on a match on borrower, lender and origination date. 'KBRA Direct Lending Deals' is an alternate dataset focused on direct lending.
- The raw data was then trimmed at the 1 percent and 99 percent level based on loan size.

- We then plotted the aggregated loan volume by year in our sample and compared the trend in private debt activity with aggregated private debt AUM from Preqin, and confirmed that the patterns are highly comparable. However, we acknowledge that this aggregation rests on the assumptions that loans remain active and loan amounts are unchanged until maturity and encourage readers to keep this limitation in mind. Finally, we plotted the top 25 PD lenders in our sample in Figure IA1 and verified that most lenders are standard private debt managers. We also verified that 19 out of these lenders also show up in Preqin's top 25 PD lender list.

  Pitchbook's sample coverage : We provide a simple back-of-the-envelope calculation on our sample cove. Based on origination and maturity date, we estimate that total outstanding private debt loans in our sample is around USD 700 Bn in July 2023. According to Preqin, total called (deployed) private debt capital as of July 2023 is around USD 880 Bn (assuming a conservative 20 percent dry powder estimate on committed capital in the US of USD 1.1 trillion). Since, Preqin does not cover public BDCs, we estimate total deployed capital in the US was about USD 1-1.05 trillion (the size of the public BDC market is around USD 150 Bn). Thus, our sample covers around 70 percent of all deployed private debt loans in the US as of July 2023. Of course, we acknowledge there are limitations to this estimate given the need for assumptions.

C Y-14 Data Cleaning

- The Y-14 H.1. data used in this paper was downloaded in October 2023. Following Greenwald et al. (2021) and Chodorow-Reich et al. (2022), we identify distinct firms using Taxpayer Identification Number, allowing us to link the same firm across banks and over time. This addresses the issue that the same firm can borrow from multiple banks and banks have idiosyncratic differences in how they name a particular borrower.

- A small share of borrowers have missing Tax IDs. We apply a clean naming algorithm to obtain a clean and uniform set of firm names. For observations where firm tax ID is missing, we fill in missing observations if the bank reports a consistent tax ID through any portion of the loan; for multi-bank borrowers for which one bank does not report the tax ID, we use a consistent tax ID reported by other banks.

- Unless otherwise stated, all variables are winsorized at the 2.5 and 97.5 percent levels, following Favara, Minoiu and Perez-Orive (2022), and trimmed to remove outliers and likely reporting errors. Debt/EBITDA is winsorized at the 5.0 and 95.0 percent levels to further mitigate the effect of observations with large and negative EBITDA.

- Following Brown, Gustafson and Ivanov (2021), we exclude financial statement information if the financial statement date is missing or comes later than the data report date. We also exclude likely data errors by requiring that for each firm and financial statement date: (i) EBITDA does not exceed net sales, (ii) fixed assets exceed total assets, (iii)

cash and marketable securities do not exceed total assets, (iv) long-term debt does not exceed total liabilities, (v) short-term debt does not exceed total liabilities, (vi) tangible assets do not exceed total assets, (vii) current assets do not exceed total assets, and (viii) current liabilities do not exceed total liabilities.

- Observations with negative or zero values for committed exposure, negative values for utilized exposure, and with committed exposure less than utilized exposure are excluded (there are very few such errors).

- Finally, we verify that the distribution of key variables in our full Y-14 sample is consistent with previous studies that use Y-14 such as Favara et al. (2022), Brown et al. (2021) or Greenwald et al. (2021).

D Institutional Background

In this section, we provide a brief overview of the private debt market. See also Erel, Flanagan and Weisbach (2024) and Jang (2023) for institutional details of private debt funds and direct lending, respectively. In this paper, private debt (PD), or private credit, refers to corporate loans made by non-bank lenders, primarily BDCs or PD funds. Private debt includes various forms, such as direct lending, mezzanine debt, and distressed debt or special situations. It serves as an alternative financing option to traditional bank-held loans, institutional leveveraged loans, or high-yield bonds. PD loans, particularly direct loans, are generally unrated, have a floating rate, and can be senior-secured or more junior claims. Unlike institutional bank-syndicated loans, PD loans are typically not traded in secondary markets post-origination. Direct lending, involving loans originated by non-bank lenders to predominantly non-financial businesses, is the most prevalent form of private debt.

PD Borrowers and Lenders. Typical PD borrowers are middle-market firms, generally defined as those with annual revenues between $10 million and $1 billion, though PD lenders can also finance larger companies. The two primary types of PD lenders are private debt funds (or private credit funds) and BDCs, with BDCs focusing mainly on direct lending rather than other private debt strategies. In the U.S., PD funds account for around 60% of invested capital in direct lending, with BDCs comprising most of the remainder. PD funds are closed-end pooled investment vehicles with lockup periods of up to 10 years, while BDCs are closed-end investment companies regulated by provisions of the 1940 Investment Company Act. Both types of lenders use moderate leverage and rely on bank credit lines. They are typically managed (and sponsored) by large asset managers (e.g., Blackstone, Apollo) and, more recently, occasionally by banks (e.g., Goldman Sachs, JP Morgan).

Investors in Private Debt. The Federal Reserve Board's Financial Stability Report (FSR), published in May 2023, shows that as of Q4 2021, the largest Limited Partners (LPs) in private debt were public and private pension funds, holding about 31% ($307 billion) of aggregate private credit fund assets. Other private funds constituted the second-largest

group of investors at 14% of assets, while insurance companies and individual investors each accounted for about 9% ($92 billion).[24]

Contractual Differences with Bank Loans. PD loans generally feature one lender or a small group of lenders, which may include a bank — such deals are known as "club deals." Similar to traditional bank-held loans but different from institutional term loans, nearly all PD loans feature financial covenants, as shown in, e.g., Jang (2023). Institutional term loans are marketed to large groups of non-bank investors such as CLOs or loan mutual funds in the *secondary* loan market. It is important to note that syndicated loans have evolved differently from private debt. As shown in Berlin, Nini and G. Yu (2020), nearly all leveraged loan borrowers remain subject to financial covenants and banks have retained their traditional role as monitor of borrowing firms. This is facilitated through "split control" deals, which have become more prevalent post-GFC. In split-control deals, creditors pair covenant-lite term loans, primarily held by institutional investors, with covenant-heavy revolving credit or Term Loan A, primarily held by banks. Finally, PD loans are more likely to include equity-like features such as warrants or so-called "payment-in-kind" features.

E Simple Theoretical Framework

We present a stylized model of corporate borrowing based on Holmström and Tirole (1998), which also has been adopted by Acharya et al. (2014) and Chodorow-Reich et al. (2022) to study bank liquidity provision through credit lines. Our innovation is to introduce heterogeneous investors/lenders, specifically (i) PD lenders, who may provide term loans, and (ii) banks, who may provide term loans and credit lines. We highlight a complementarity between term loans and credit lines, the mechanisms driving it, and show how this complementarity is more pronounced when the term loan is provided by PD lenders. The model is purposefully kept simple and stylized — a more sophisticated dynamic model capturing similar trade-offs in a more general context can be found in Hartman-Glaser et al. (2025).

We present the formal model and its solution here, while an intuitive discussion of the theory is provided in the main text in Section 3.4.

Cash Flows and Liquidity Shock. We consider a single firm operating over three dates, $t = 0, 1, 2$; there is no discounting. At time $t = 0$, the firm has an investment opportunity and invests $I > 0$ dollars. At time $t = 2$, the firm returns a terminal cash flow of $I(X + \varepsilon)$, where the terminal cash flow is uncertain, as, e.g., in Chodorow-Reich et al. (2022). In particular, ε is a shock with mean zero that takes values $\pm\sigma$ with equal probabilities $\frac{1}{2}$, where σ is exogenous and satisfies $X > \sigma \geq 0$. The parameter σ captures cash flow risk.

At time $t = 1$, with probability λ, the firm incurs a liquidity shock of size $I\rho$, where ρ is uniformly distributed on $[0, \rho_H]$, with $\rho_H \geq X$ (implying that in equilibrium the probability of liquidation is always non-zero). With probability $1 - \lambda$, there is no liquidity shock. If the

[24] See Cai and Haque (2024) for additional details and a comprehensive discussion on the market's evolution.

firm cannot cover the negative cash flow shock, it is liquidated, resulting in liquidation value $L = \alpha I$ (to be seized by creditors). Liquidation is inefficient in that $\alpha < 1$. Otherwise, when continued, the firm produces a cash flow at time $t = 2$ (discussed above). The firm can obtain a credit line to cover the liquidity shock; the firm has no cash or other liquidity management tools to cover the shock (i.e., the firm is cashless and cannot accumulate any savings).

Intuitively, a large liquidity shock captures a firm's financial distress. Following this liquidity shock, the firm may resolve financial distress through inefficient liquidation (when not covering the shock) or by covering the shock — corresponding to more efficient distress resolution facilitating continuation ("restructuring").

Credit Line and Term Loan Financing. At time $t = 0$, the firm has assets — e.g., cash or retained earnings — worth $A \in [0, I)$ dollars — which it invests at time $t = 0$. To cover the remaining investment cost $I - A$, the firm raises financing at time $t = 0$ in the form of a term loan provided by either banks or private debt (PD) lenders.

In addition, the firm obtains a pre-committed bank credit line with (endogenous and scaled) credit line limit $\overline{\rho}$, i.e., total credit line limit scales with I and equals $\overline{\rho}I$. The credit line is drawn to cover a liquidity shock. After observing the magnitude of the liquidity shock ρ at time $t = 1$, the firm decides whether to draw upon the credit line. Consistent with our empirical analysis, we assume that credit lines are only provided by banks, while both banks and PD lenders may provide term loans. We assume that the firm does not raise more than $I - A$ dollars in term loan financing, i.e., term loan debt is only used to finance investment.[25] Lenders have an outside option of zero and merely break even.

Banks vs. PD Lenders. We assume that banks and PD lenders differ in their risk-bearing capacity. Indeed, banks face regulatory constraints, which make them effectively risk-averse. PD lenders, on the other hand, are less regulated, making them able to bear more credit risk. Our empirical analysis validates this assumption by showing that PD lenders tend to provide riskier loans than banks.

We model lenders' risk aversion in a tractable manner in reduced form: For banks, we consider for simplicity the extreme case that banks are only willing to lend if they are repaid the lent amount with probability one (i.e., banks are infinitely risk-averse). PD lenders, on the other hand, have a higher risk-bearing capacity and are willing to lend, as long as the minimum repayment of their loan equals fraction $\gamma_P \in [0, 1]$ of the lent amount.

For credit lines, this means that the firm can only draw down amount $I\rho$ if it can ensure full repayment of this amount. This constraint may also reflect that the credit line could be revoked if the bank expects not to be repaid in full. For term loans, lenders are willing to lend $D = I - A$ dollars if and only if they are guaranteed a minimum repayment of γD dollars (with probability one). When the term loan is provided by PD lenders, we have $\gamma = \gamma_P$, while when the bank provides the term loan, we have $\gamma = 1$. To ensure the minimum payment is

[25] Specifically, it is not possible to raise excess term loan debt (i.e., more than $I - A$ dollars) and to store this amount in a cash account that can then be used to cover the liquidity shock.

feasible even after a large liquidity shock that triggers liquidation, it must be that

$$\alpha I \geq \gamma(I - A) \iff \alpha \geq \gamma(1 - a),$$

where $a \equiv \frac{A}{I}$. Recall that under our assumptions (specifically, $X \leq \rho_H$), there is always a chance of liquidation.

The constraint $\alpha I \geq \gamma(I - A)$ implies for $\gamma = 1$ that the full amount of the term loan must be backed by the liquidation value of the firm's assets. In other words, bank term loans are fully collateralized, senior-secured, and asset-based . In contrast, PD lenders are willing to provide term loans whose face value exceeds the liquidation value of assets—effectively offering cash flow–based or more junior loans.

E.1 Solution

Consider that the firm raises $D = I - A$ dollars of term loan financing from either banks ($\gamma = 1$) or PD lenders ($\gamma = \gamma_P$). We take the lender identity as given. The term loan repays RI dollars at time $t = 2$ if $\varepsilon = -\sigma$ and $(R + \Delta)I$ if $\varepsilon = \sigma$.

Credit Line Limit. We start by determining the maximum feasible credit line limit $\hat{\rho}(\gamma, a)I$. To derive the credit line limit, suppose the firm incurs a liquidity shock of size ρI which it covers by drawing on its credit line. Thus, the firm survives and makes a final payment to term loan lenders of at least γD dollars, while repaying at least ρI dollars to the credit line lenders (recall that credit line lenders are banks, requiring repayment in full). The pledgeable income $I(X + \varepsilon)$ in the worst case scenario (i.e., low cash flows at time $t = 2$ and $\varepsilon = -\sigma$) must be sufficient to make these repayments, in that

$$(X - \sigma)I \geq RI + \rho I. \tag{7}$$

The term loan lender receives a repayment of $RI \leq (X - \sigma - \rho)I$ when $\varepsilon = -\sigma$ and a payment of $(R + \Delta)I \leq (X + \sigma - \rho)I$ when $\varepsilon = +\sigma$.

Importantly, the term loan lender — whether PD lender or bank — must be better off from the drawdown, relative to forcing liquidation of the firm (and not drawing on the line) giving the term loan lender a payoff of αI. In order for a payment schedule (R, Δ) to exist that makes the term loan lender better off, it must hold that

$$\alpha I \leq \frac{I}{2}(X + \sigma - \rho) + \frac{1}{2}RI. \tag{8}$$

The right-hand-side is the term loan lender's expected payoff upon survival, conditional on a liquidity of size ρ that is covered through the credit line. The left-hand-side is the term loan lender's payoff when forcing liquidation.

Combining (7), (8), and $R \geq \gamma D$, we obtain the maximum possible drawdown — that is, the maximum feasible credit line limit the firm could obtain — of

$$\hat{\rho}(\gamma, a) = X - \max\{\sigma + \gamma(1-a), \alpha\}, \tag{9}$$

where we define the firm's assets as $a \equiv \frac{A}{I}$. In what follows, we restrict attention to parameters such that $\hat{\rho}(\gamma, a)$ is bigger than zero.

Given the credit line limit $\overline{\rho}$, the project's net present value (before investment cost) reads $v(\gamma, a)I$, where the scaled value $v(\gamma, a)$ satisfies

$$v = v(\gamma, a) = \max_{\overline{\rho} \leq \hat{\rho}(\gamma, a)} \lambda \left[\frac{\overline{\rho}}{\rho_H} \left(X - \frac{\overline{\rho}}{2} \right) + \left(1 - \frac{\overline{\rho}}{\rho_H} \right) \alpha \right] + (1-\lambda)X. \tag{10}$$

Observe that because all agents discount at the same rate, debt repayments do not affect the *project* NPV.

Note that the right-hand-side of above equation increases in $\overline{\rho}$ for $\overline{\rho} \leq X - \alpha$; further, $\hat{\rho}(\gamma, a) \leq X - \alpha$. Thus, optimizing the net present value over the credit line limit $\overline{\rho}$ subject to the feasibility constraint $\overline{\rho} \leq \hat{\rho}(\gamma, a)$, we obtain $\overline{\rho} = \overline{\rho}(\gamma, a) = \hat{\rho}(\gamma, a)$. Thus, the firm will draw on its credit line to cover liquidity shocks of size $\rho \leq \overline{\rho}$. If $\rho > \overline{\rho}$, the firm will default and liquidate, with term loan investors seizing the entire liquidity value.

Private Debt vs. Bank Debt. An investment of $I > A$ is feasible, as long as under the optimized credit line: (i) the project has positive NPV net of investment cost, $v(\gamma, a)I - I \geq 0 \iff v(\gamma, a) \geq 1$, and (ii) the collateral constraint is satisfied, $\alpha \geq \gamma(1-a)$, where $a = \frac{A}{I}$. For given A and γ, let

$$\mathcal{I}(\gamma) := \max \left\{ I \geq A : v(\gamma, A/I) \geq 1 \text{ and } \alpha \geq (1 - A/I)\gamma \right.$$

the maximum investment can be financed from PD lenders ($\gamma = \gamma_P$) and banks ($\gamma = 1$).[26]

As long as the net present value under the optimized credit line limit is positive, there exist repayment schedules such that lenders break even (assuming an outside option of zero). Thus, one could characterize the interest rate on term loan and credit line. Because the credit line is risk-free, the interest rate is (absent further assumptions) equal to the discount rate/risk-free rate, normalized to zero. Likewise, the term loan's interest equals the risk-free rate, when the term loan is provided by the bank. On the other hand, there is default on PD term loans, which, in turn, must have a higher interest rate. We omit further details, since it is not essential for the key intuition. That is, we do not further specific the repayment schedule on the term loan.

[26] In our model, private debt always dominates bank debt for term loans, if given the choice. However, one could easily introduce a cost of accessing private debt, which would then generate a trade-off between private and bank debt, provided both financing modes are available. Since we are mostly interested in showing through which mechanisms private debt complements bank credit lines, we omit such modeling.

Finally, we note that banks and PD lenders differ in the parameter γ, which affects the net present value and therefore the set of feasible projects only via the credit line limit. To reduce the number of cases to distinguish (associated with the "max" operator in (9)), we assume in what follows that $\sigma > \alpha$.

We summarize our key findings in the following Proposition.

Proposition 1. *Consider $\sigma > \alpha$. Fix I and A, and the size of the term loan $I - A$ (thus, a is also fixed). Then:*

1. *Relative to banks, PD lenders are willing to finance a wider range of projects and are willing to provide larger term loans, $\mathcal{I}(1) < \mathcal{I}(\gamma_P)$ for $\gamma_P < 1$. Thus, the model predicts that PD term loans tend to be larger than bank term loans.*

2. *Bank debt and private debt can be complementary: When $\mathcal{I}(1) < I < \mathcal{I}(\gamma_P)$, the firm borrows from banks (in the form of credit lines) only if it has access to private debt, as term bank term loan financing is not feasible. In contrast, without access to private debt, the firm does not borrow at all.*

3. *Holding the term loan size $I - A$ fixed, the credit line is larger, when the firm relies on private debt for term loans, in that $\overline{\rho}(\gamma_P, a) > \overline{\rho}(1, a)$. Further, when the firm relies on private debt, the probability that the credit line is drawn upon, i.e., $\lambda \cdot \frac{\overline{\rho}(\gamma_P, a)}{\rho_H} > \lambda \cdot \frac{\overline{\rho}(1,a)}{\rho_H}$, is larger. That is, the model predicts that PD term loans are accompanied by larger bank credit lines, which are more frequently drawn upon.*

4. *When $v(1, 0) < 1 < v(\gamma_P, 0)$, firms with low/no earnings or cash (i.e., low a) cannot obtain bank term loans; likewise firms with low levels of asset tangibility, i.e., $\alpha < 1 - a$, cannot obtain bank term loans. These firms may obtain PD term loans when γ_P is low. That is, the model predicts that firms with low cash, low earnings, or a low level of tangible assets are more likely to obtain private debt.*

Proof. The Proposition almost immediately follows from the previous arguments.

Note $\sigma > \alpha$ readily implies $\overline{\rho}(\gamma_P, a) > \overline{\rho}(1, a)$, as well as $v(\gamma_P, a) > v(1, a)$. Thus, clearly $\mathcal{I}(1) < \mathcal{I}(\gamma_P)$, proving the first and the third point.

The second and fourth point are immediate. □

An intuitive discussion of the economic mechanisms at work is provided in Section 3.4.

Credit Lines (Extensive Margin). We endogenize the choice whether to pair the term loan with a credit line. In particular, we assume that credit line access is costly, in that it entails a (deadweight) cost of $CI > 0$. The firm decides whether to take out a credit line or not, where $c = c(\gamma) \in \{0, 1\}$ indicates whether the firm takes out the credit line. For given I, it chooses

$$\max_{c \in \{0,1\}} I \left\{ c\big[v(\gamma, a) - C\big] + (1 - c)\big[(1 - \lambda)X + \lambda\alpha\big] - 1 \right. .$$

where $a = \frac{A}{I}$. Note that if the firm does not take a credit line, it is liquidated whenever a liquidity shock hits (with probability λ).

We denote the solution by $c(\gamma)$ characterized in the following Proposition.

Proposition 2. *Assume $\sigma > \alpha$, $1 - a < \alpha$, and fix A and I. The following holds:*

1. *When the liquidation value of assets is low, in that $\alpha < \frac{1-(1-\lambda)X}{\lambda}$, the term loan lender requires its loan to be accompanied by a credit line. Thus, the model predicts that when PD lenders finance borrowers with low levels of asset tangibility (and thus provide cash flow-based debt), they are only willing provide term loan financing if paired with a bank credit line.*

2. *Conditional on obtaining a term loan, the firm is more likely to take out a credit line, when the term loan was provided by PD lenders rather than banks, in that $c(\gamma_P) \geq c(1)$. In particular, when $v(\gamma_P, a) > (1-\lambda)X + \lambda\alpha + C > v(1, a)$ with $(1-\lambda)X + \lambda\alpha > 1$, the firm obtains a credit line if and only if it relies on private debt, in that $c(\gamma_P) = 1 > c(1) = 0$.*

3. *Conditional on taking out a credit line, the credit line is larger, when the term loans is private debt.*

Proof. Without a credit line ($c = 0$), term loan financing is only feasible (yields positive NPV) if $(1-\lambda)X + \lambda\alpha > 1$. Thus, when $\alpha < \frac{1-(1-\lambda)X}{\lambda}$, term loan financing is only feasible with $c = 1$, that is, when paired with a credit line. This proves the first part.

For the second and third part, we denote the objective function of the optimization by

$$F(\gamma, c) := I\left\{c\big[v(\gamma, a) - C\big] + (1-c)\big[(1-\lambda)X + \lambda\alpha\big] - 1 \quad .$$

Calculate

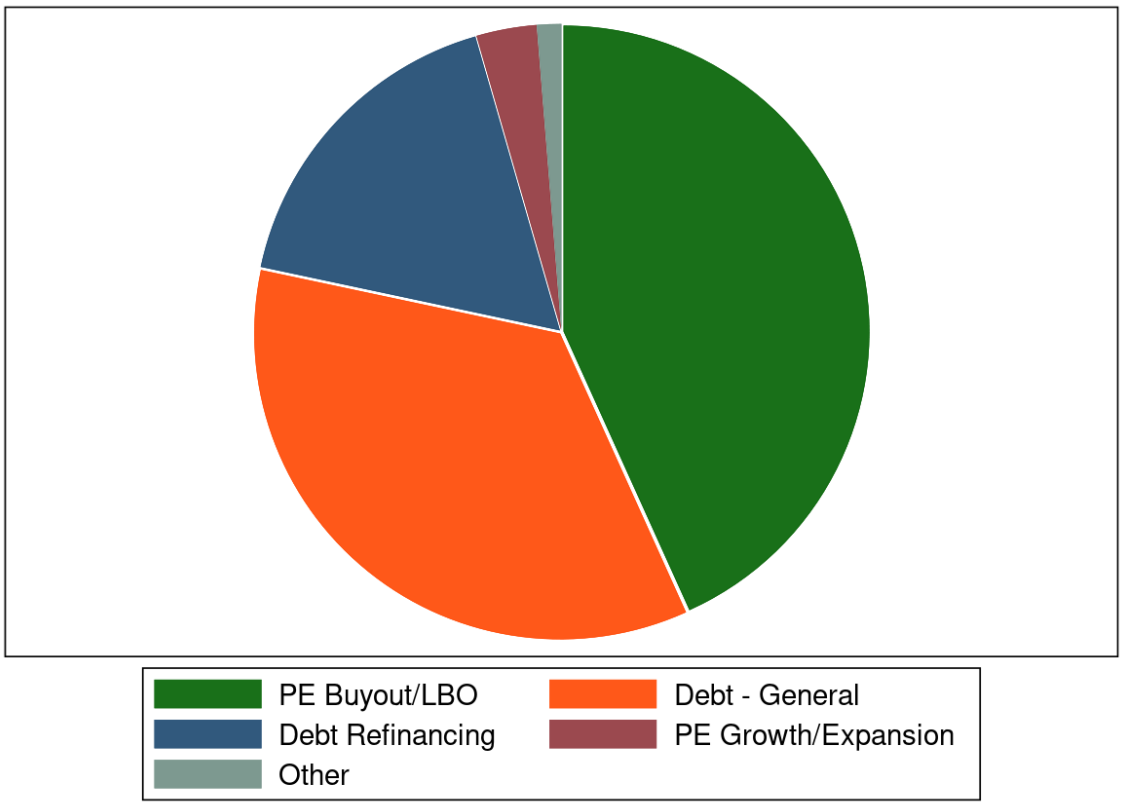
$$\frac{\partial F(\gamma, c)}{\partial c} = I\big\{v(\gamma, a) - C - [(1-\lambda)X + \lambda\alpha] \quad = F(\gamma, 1) - F(\gamma, 0).$$

Note that for given I and $a = A/I$, we have $v(\gamma_P, a) > v(1, a)$. Therefore, $\frac{\partial F(\gamma_P, c)}{\partial c} > \frac{\partial F(1, c)}{\partial c}$. This implies $c(\gamma_P) \geq c(1)$, which was to show.

When $v(\gamma_P, a) > (1-\lambda)X + \lambda\alpha + C > v(1, a)$ with $(1-\lambda)X + \lambda\alpha > 1$, we have $F(\gamma_P, 1) > F(\gamma_P, 0) > 0$, while $F(1, 0) = F(\gamma_P, 0) > F(1, 1)$. Thus, $c(\gamma_P) = 1 > 0 = c(1)$.

Finally, as shown before, $\overline{\rho}(\gamma_P, a) > \overline{\rho}(1, a)$, i.e., the credit line is larger when the term is loan is private debt (proving the third claim). □

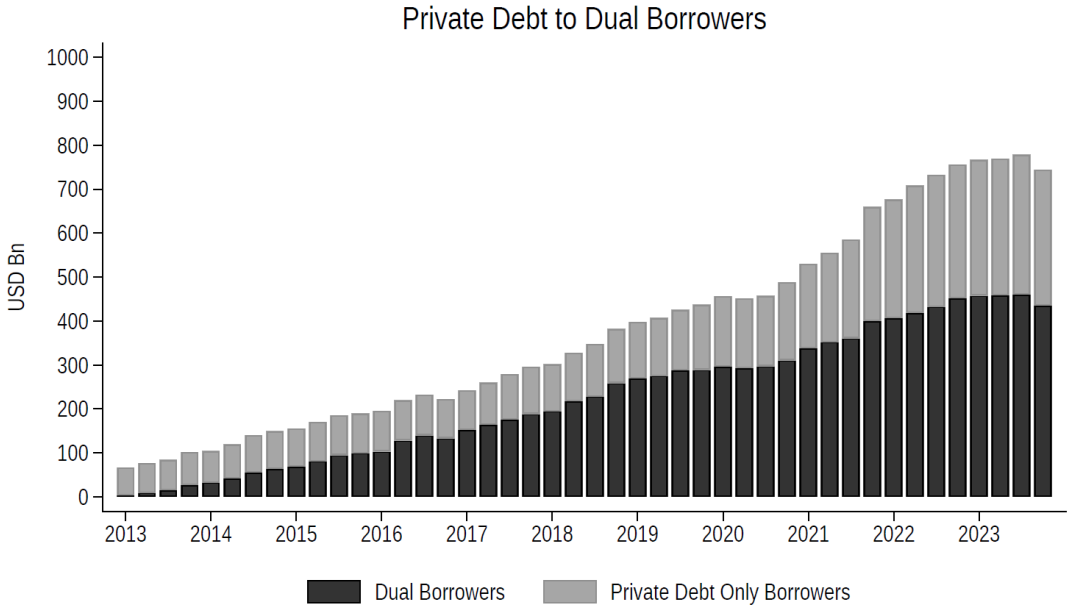
Figure 1: The Use of Private Debt and Deal Types



(a) *Notes: This figure reports the share of private debt deals by deal type, weighted by dollar amount of deal size. 'Debt - General' refers to debt raised for general corporate purposes. Source: Pitchbook.*

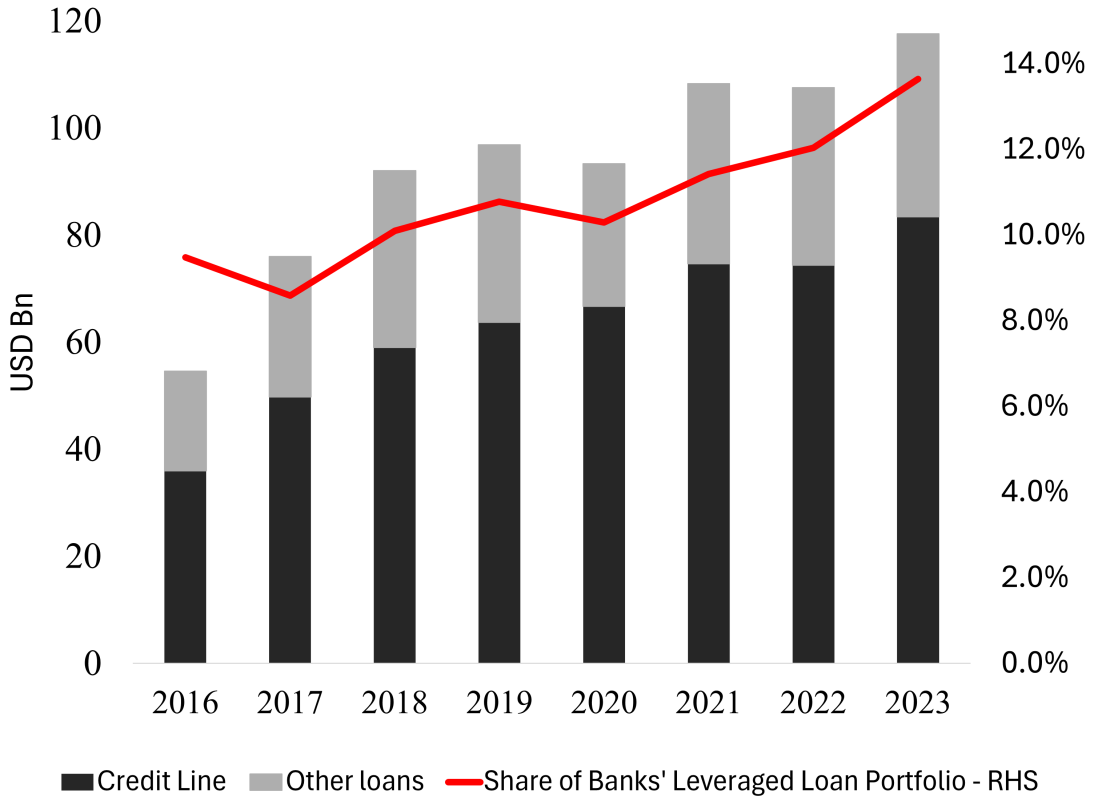
Figures and Tables

Figure 2: The Importance of Dual Borrowers in the Private Debt Market



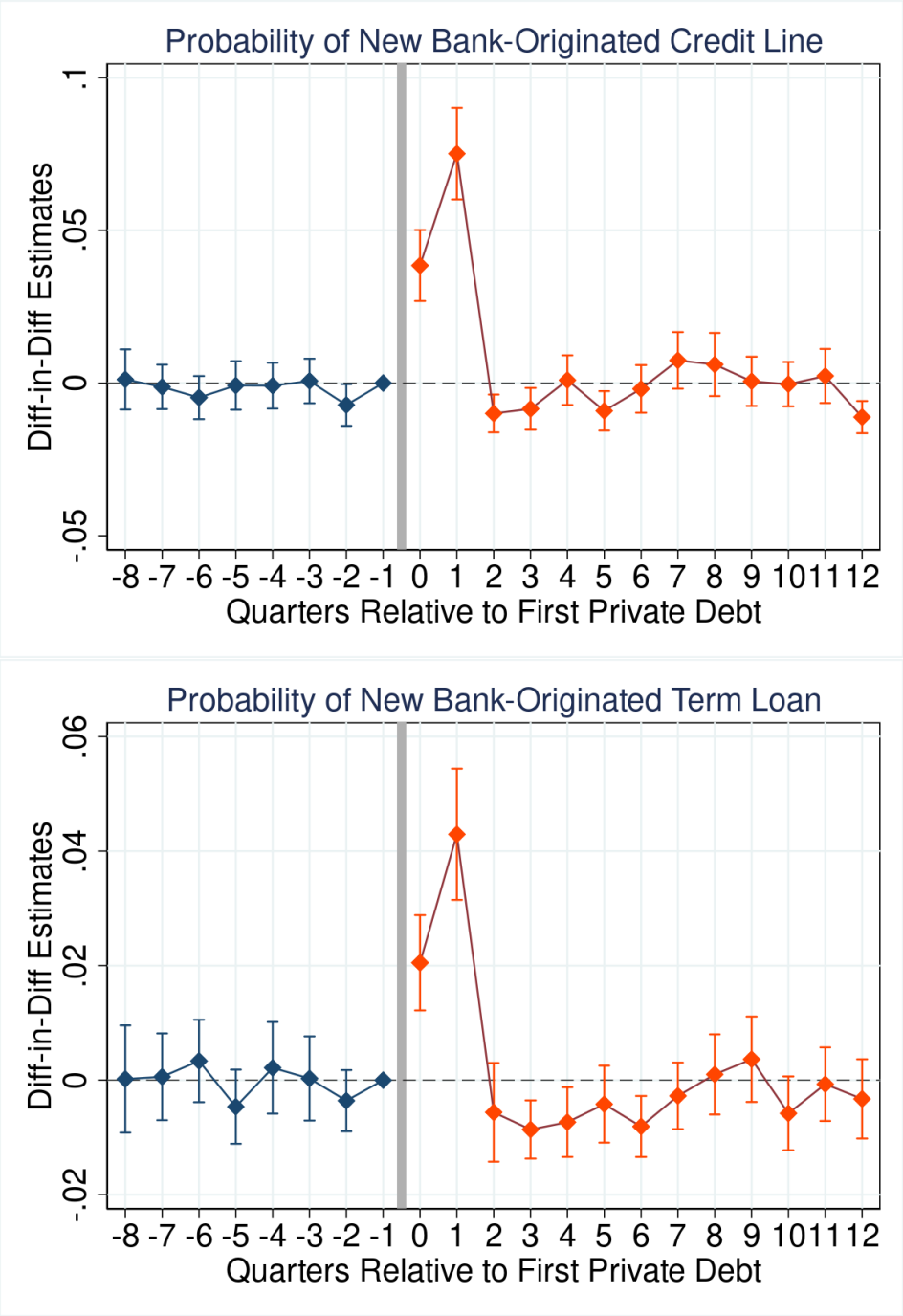
(a) *Notes: The figure plots the amount of private debt outstanding in the baseline sample, split by dual borrowers and borrowers that do not appear in the Y-14 data (referred to Private Debt Only Borrowers). The figure is constructed by aggregating observed loan amounts at origination, extrapolated forward using loan origination and maturity date, under the assumption that a loan remains active until it matures.*

Figure 3: Aggregate Bank Loan Commitments to Dual Borrowers



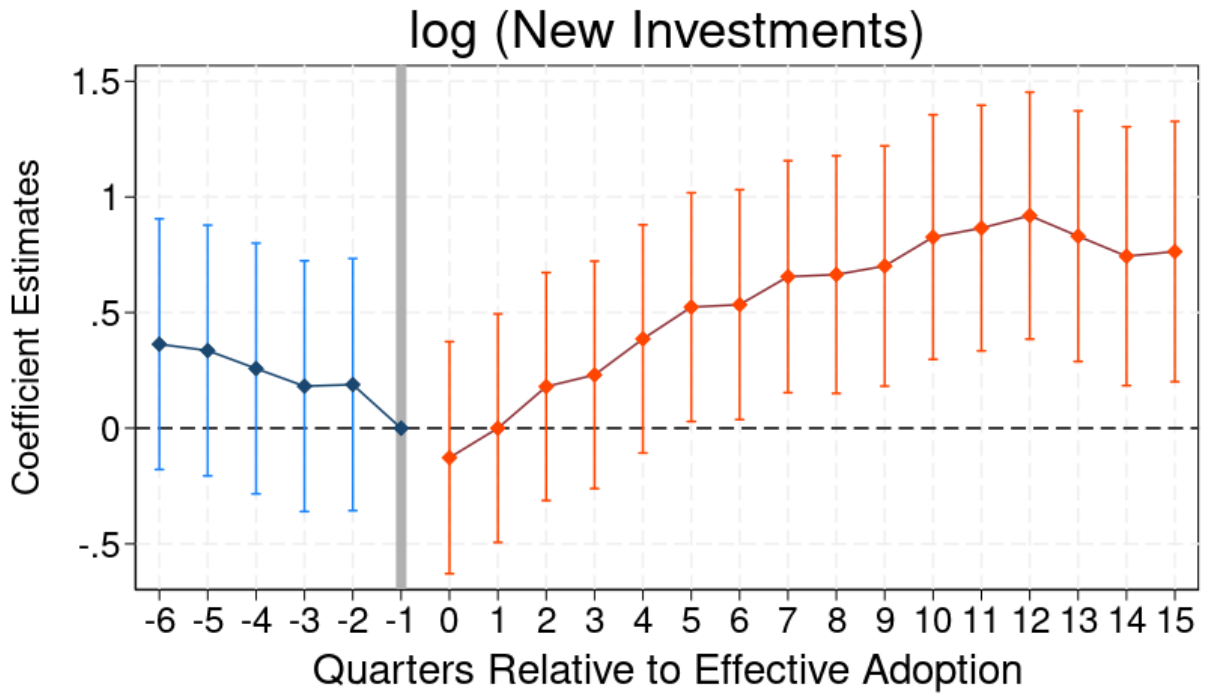
(a) *Notes: This figure reports the aggregate commitment amount from banks to dual borrowers, split by aggregate credit lines (in black) and all other loans (in grey). All other loans are primarily term loans. The red line plotted on the right-hand side (RHS) reports the share of bank loan commitments to dual borrowers in percent of total leveraged loans held by banks.*

Figure 4: Probability of Obtaining New Bank Loan Upon Private Debt Issuance



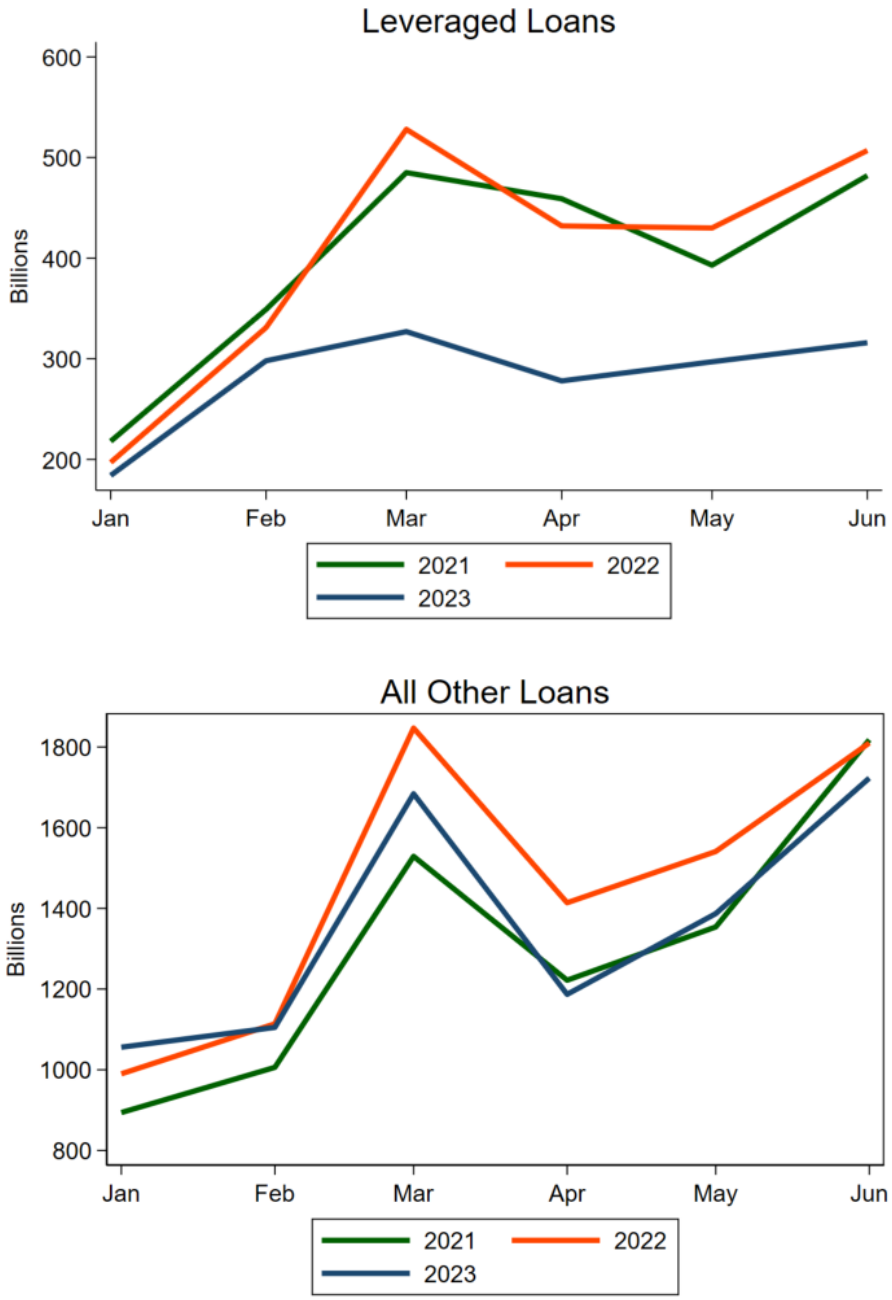
(a) *Notes: This chart examines the probability of obtaining new bank loans once a borrower first accesses private debt. It presents dynamic difference-in-difference regression estimates from Eq. 2 for each event-quarter relative to a firm's first private debt issuance. The data is at the loan-YearQtr level and the sample period is January 2013 to June 2023. All regressions include firm and sector-quarter fixed effects, as well as the following loan and firm-level controls: firm size (in logarithms), debt/asset, tangible asset/total asset, cash/asset, loan spreads, loan maturity.*

Figure 5: SBCAA Adoption and BDC Lending Activity



(a) *Notes: This chart plots an event-study of BDC-level aggregate investments (measured in US Dollars and expressed in logs) in the quarters relative to a BDC's effective SBCAA adoption date. It reports regression coefficients of each quarter dummies relative to the quarter at which a given BDC adopted the SBCAA. Data is at the BDC Year-Quarter level and sample period is restricted to 6 quarters before and 15 quarters after adoption.*

Figure 6: New Leveraged Loan Issuance and the March 2023 Banking Turmoil



(a) *Notes: Number of newly originated bank loans in different months of years 2021, 2022, and 2023. The upper panel depicts new leveraged loan originations, while the lower panel focuses on other bank loans (loans that are not classified as 'leveraged loans' by reporting banks). The upper panel highlights that the number of newly originated leveraged loans in March-June 2023 is significantly lower than in the same months of the previous two years. Lower panel shows there is no effect for other loans. New originations are identified based on Y14 reported origination date.*

Table 1: Firm-level Characteristics

Panel A: Dual Borrowers

	N	Mean	P25	P50	P75	SD
Total Assets ($ Mn)	2,917	1,700	95	326	1,140	4,950
Net Sales ($ Mn)	2,917	1,210	83	250	791	3,470
EBITDA	2,917	12.4	6.5	10.3	15.8	11.1
Total Debt	2,917	42.9	27.1	43.1	57.2	22.6
Debt/EBITDA	2,914	4.5	1.9	4.1	6.3	3.32
Tangible Assets	2,917	64.5	39.0	63.8	92.0	26.4
Liquidity	2,917	8.7	2.1	4.3	9.7	10.6
Probability of Default	2,646	3.7	1.0	2.3	4.9	3.8
Loss Given Default	2,641	32.9	23.9	35.0	41.9	13.1

Panel B: Bank-Only Borrowers

Total Assets ($ Mn)	66,838	1,190	25.7	80.1	410	3,940
Net Sales ($ Mn)	66,838	1,000	43.8	113	428	3,150
EBITDA	66,838	11.7	5.0	9.9	16.2	11.3
Total Debt	66,838	37.5	17.5	35.0	54.9	24.9
Debt/EBITDA	66,600	3.1	0.7	2.5	5.2	4.5
Tangible Assets	66,838	86.3	81.2	96.3	99.7	19.8
Liquidity	66,838	10.3	2.1	6.0	13.9	11.7
Probability of Default	66,838	2.2	0.4	0.9	2.2	3.4
Loss Given Default	66,838	29.6	19.2	30.2	39.4	14.0

(a) *Notes: This table reports firm-level summary statistics, for Dual Borrowers (Panel A) and Bank-Only Borrowers (Panel B). The data is at the borrower (firm) level and sample period is from January 2013 to June 2023. Panel B is restricted to borrowers whose average loan commitments are 5 million and greater, and available information on all reported variables. Total Assets and Sales are expressed in $ Mn, Probability of Default and Loss Given Default are expressed in percent, Debt/EBITDA as a ratio, while all other variables are expressed in percent of total assets. All variables are defined in Appendix A.*

Table 2: Loan Sample Characteristics

Panel A: Pitchbook Private Debt Loan Terms

	N	Mean	P25	P50	P75	SD
Loan Size ($ Mn)	16,894	64.8	5.16	13.5	40	235
Spread (%)	16,894	6.28	4.75	5.8	7.5	2.33
Maturity (Years)	16,894	5.4	4.75	5.25	6	2.1
Share of Credit Lines	1,688	0.1	-	-	-	-
Share of Term Loans	12,670	0.75	-	-	-	-

Panel B: Bank Loans to Dual Borrowers with Private Debt

Loan Size ($ Mn)	7,098	26.1	4.2	15.0	35.9	29.5
Spread (%)	5,903	1.8	0	1.8	3.0	1.5
Maturity (Years)	7,098	4.0	3.0	5	5	1.9
Share of Credit Lines	3,458	0.49	-	-	-	-
Share of Term Loans	1,695	0.24	-	-	-	-

Panel C: Bank Loans to Bank-Only Borrowers without Private Debt

Loan Size ($ Mn)	362,078	16.1	1.8	4.3	17.6	25.5
Spread (%)	282,114	1.3	0	1.2	2.2	1.2
Maturity (Years)	362,078	3.6	1.0	3	5	3.5
Share of Credit Lines	174,646	0.48	-	-	-	-
Share of Term Loans	104,010	0.29		-	-	-

(a) *Notes: This table reports loan-level sample characteristics. Sample period is from January 2013 to June 2023. All samples are restricted to new originations only. Panel A reports all private credit loans obtained from Pitchbook, including hybrid loans. Panel B reports bank loan characteristics of dual borrowers using Y-14. Panel C reports bank loan characteristics of bank-only borrowers. In Panels B and C, loans include capitalized lease obligation, standby letter of credit, fronting exposures etc. Newly originated credit lines that are not utilized at all in the origination year-quarter report 0 spreads. All variables are defined in Appendix A.*

Table 3: Private Debt versus Bank Debt: Amount and Spreads

	Loan Amount			Loan Spread		
	(1)	(2)	(3)	(4)	(5)	(6)
PD_l	0.426***	0.657***	0.466***	3.516***	2.037***	1.792***
	(0.071)	(0.100)	(0.118)	(0.137)	(0.129)	(0.145)
$PD_l \times PE\ Buyout_l$			-0.310*			0.731***
			(0.186)			(0.243)
R-squared	0.732	0.8	0.776	0.863	0.903	0.905
Firm×YearQtr FE	Y	N	N	Y	N	N
Firm×YearQtr×Loan Type FE	N	Y	Y	N	Y	Y
Loan Controls	N	N	Y	N	N	Y
N	126,854	100,136	74,916	95,799	74,916	74,916

(a) *Notes: This table reports the results of regression (1), examining the differences between newly originated private and bank debt. Data is at the loan issuance level and the sample period is January 2013 to June 2023. The dependent variable is Loan Amount (in log) in columns (1)-(3) and Loan Spread in percentage points in columns (4) - (6).* PD_l *is a time-invariant measure of private debt, taking value 1 if a loan is issued by a private debt lender and 0 if it is issued by a bank.* $PE\ Buyout_l$ *takes value 1 if a given private debt loans ("deal"),* l*, is classified as leveraged buyout loan by Pitchbook. In column (3) loan controls include spreads and maturity; in column (6) loan controls include loan amount (in logs) and maturity. Standard errors are clustered at the firm level.*

Table 4: Private Debt versus Bank Debt: Maturity and Debt Seniority

	Maturity			Debt Seniority			1(Term Loan)	1(Credit Line)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PD_l	0.734***	0.215***	-0.0631	-0.306***	-0.306***	-0.330***	0.561***	-0.415***
	(0.061)	(0.072)	(0.066)	(0.030)	(0.050)	(0.035)	(0.021)	(0.022)
$PD_l \times PE\ Buyout_l$			0.159			0.132**	0.088***	-0.099***
			(0.122)			(0.056)	(0.033)	(0.034)
R-squared	0.689	0.774	0.732	0.804	0.839	0.825	0.545	0.546
Firm×YearQtr FE	Y	N	Y	Y	N	N	Y	Y
Firm×YearQtr×Loan Type FE	N	Y	N	N	Y	N	N	N
Loan Controls	N	N	Y	N	N	Y	Y	Y
N	126,856	100,136	95,797	121,978	97,030	90,928	126,854	126,854

(a) *Notes: This table reports the results of regression (1), examinining the differences between newly originated private and bank debt. Data is at the loan issuance level and sample period is January 2013 to June 2023. Maturity is loan maturity defined in years. Debt Seniority takes a value of 1 if a loan facility is reported as first-lien senior secured, 0 otherwise.* $1(TermLoan)$ *takes a value of 1 if loan l is a term loan, 0 for credit lines and other types of loans.* $1(CreditLine)$ *takes a value of 1 if loan l is a credit line, 0 for term loans or other types of loans.* PD_l *is a time-invariant measure of private debt, taking value 1 if a loan is issued by a private debt lender and 0 if it is issued by a bank.* $PE\ Buyout_l$ *takes value 1 if a given PD loan l is classified as leveraged buyout loan in Pitchbook. Loan controls are maturity, loan amount (in logs), and spreads, except in column (3) where loan controls include loan amount and spreads only. Standard errors are clustered at the firm level.*

Table 5: Private Debt Access and Bank Loans

	1(New Loan)			New Loan Amount			Loan Amount	
	(1) All	(2) CL	(3) TL	(4) All	(5) CL	(6) TL	(7) Outstanding	(8) Outstanding
$PD_{i,t}$	0.038***	0.016***	0.009***	0.620***	0.275***	0.156***	0.025*	0.030**
	(0.007)	(0.003)	(0.002)	(0.105)	(0.053)	(0.039)	(0.014)	(0.014)
R-squared	0.122	0.095	0.085	0.119	0.092	0.082	0.965	0.967
Firm FE	Y	Y	Y	Y	Y	Y	N	N
Sector×Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	N
Loan & Firm Controls	Y	Y	Y	Y	Y	Y	Y	Y
N	583,737	583,737	583,737	583,737	583,737	583,737	528,343	528,352

(a) *Notes: This table reports the results of regression (3), estimating the effect of PD access on bank loan outcomes. Data is at the bank loan-time level (where the unit of time is the quarter) and sample period is January 2013 to June 2023. The dependent variable in column (1) is a dummy that takes value of 1 if a given bank loan observation is newly originated in quarter t; 0 otherwise. The dependent variable in column (2) is a dummy if the a given bank loan is newly originated in quarter t and it is a credit line; 0 otherwise. The dependent variable in column (3) is a dummy if the a given bank loan is newly originated in quarter t and it is a term loan; 0 otherwise. The dependent variable is column (4) - (6) is the new loan amount for a given loan observation. Thus, it is equal to the loan's size/amount if this loan is newly originated (set to zero for not newly originated loans). We construct the outcome variable for all loans, credit lines, and term loans, respectively. The dependent variable in columns (7)-(8) is the natural log of loan amount focusing exclusively on outstanding loans, excluding newly originated loans. Columns (7) and (8) include loan fixed effects, which have been omitted from display for brevity. $PD_{i,t}$ takes a value of 1 at or after the date a borrower first accesses private debt. Loan and firm controls include loan maturity, default probability, loss given default, firm size, debt ratio, Tangibility, EBITDA/Asset and Liquidity. The control group is restricted to bank-reported leveraged loans. Sector is defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 6: Instrumenting for Private Debt Access

	Credit Lines			Term Loans		
	(1) 1(New Loan)	(2) New Loan Amount	(3) Interest Rate	(4) 1(New Loan)	(5) New Loan Amount	(6) Interest Rate
$PD_{i,t}$	0.158***	2.578***	0.910**	-0.486	-0.023	-0.506
	(0.054)	(0.889)	(0.367)	(1.061)	(0.066)	(0.372)
First Stage F-Stat	76.59	76.59	76.59	22.11	22.11	22.11
Bank×Time FE	Y	N	Y	Y	N	Y
Sector×Time FE	N	Y	Y	Y	Y	Y
Loan & Firm Controls	Y	Y	Y	Y	Y	Y
N	52,868	52,868	52,868	21,847	21,847	21,847

(a) *Notes: This table reports the results of the second-stage regression (3) where we instrument for $PD_{i,t}$ (first stage regression). Data is at the bank loan-time level (where the unit of time is the quarter) and sample period is January 2013 to June 2023. The estimation sample in columns (1) - (3) is restricted to only credit lines (new and old) and columns (4) - (6) are restricted to only term loans (new and old). $PD_{i,t}$ is instrumented exploiting the 2018 relaxation in BDC leverage limits, which was subsequently adopted in a staggered fashion by some BDCs. For each borrower firm i, we identify its primary PD lender p (from which it will borrow) and, if that lender is a BDC, use the timing of its leverage limit relaxation adoption as an instrument for PD access. For borrower firm i, we construct the dummy variable $Treated_{i,t}$ which takes value of 1 if (i) borrower i will take out a PD loan from PD lender p at some point during our sample and (ii) PD lender p is a BDC which adopted the leverage limit relaxation and the adoption becomes effective by time t. In the first-stage regression, $Treated_{i,t}$ is used as instrument for $PD_{i,t}$. In column (1), we focus on the subsample of bank credit lines, and the dependent variable is a dummy taking value of* 1 *if a given bank credit line observation is newly originated in quarter t. In column (2), the dependent variable is the loan amount of a credit line when this credit line is newly originated in quarter t (set to zero if the loan is not newly originated at t), expressed in logs. Column (3) is the interest rate on the new credit line expressed in percent. Columns (4)-(6) focus on the subsample of term loans. Firm Controls include the natural log of firm book asset, Tangibility, Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls include probability of default and loan maturity. The sample is restricted to bank borrowers that ever issued private debt (i.e. dual borrowers before and after they issued private debt). Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 7: Private Debt and Bank Loan Spreads

Interest Rate	New loans		Outstanding Loans	
	(1)	(2)	(3)	(4)
$PD_{i,t}$	0.258***	0.272***	0.113***	0.125***
	(0.062)	(0.063)	(0.034)	(0.035)
R-squared	0.589	0.588	0.568	0.564
Firm FE	Y	Y	Y	Y
Bank x Time FE	Y	Y	Y	Y
Sector x Time FE	Y	Y	Y	Y
Loan & Firm Controls	Y	N	Y	N
N	34,623	34,623	481,791	481,791

(a) *Notes: This table reports the results of regression (3), estimating the effect of PD access on the spreads of newly originated loans (columns 1 and 2 focus on the subsample of newly originated bank loans) and outstanding loans (columns 3 and 4 focus on the subsample of outstanding bank loans). Data is at the bank loan-time level (where the unit of time is the quarter) and sample period is January 2013 to June 2023.* $PD_{i,t}$ *takes a value of 1 at or after the date a borrower first accesses private debt. The dependent variable is the bank loan interest rate. Firm Controls include the natural log of firm book asset, Tangibility, Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls (where applicable) include probability of default, loss given default, loan commitment, and loan maturity. The control group is restricted to bank-reported leveraged loans. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 8: Credit Lines: Dual Borrowers versus Bank-Only Borrowers with New Bank-provided Term Loans

	1(New Credit Line)			New Credit Line Amount		
	(1)	(2)	(3)	(4)	(5)	(6)
$PD_{i,t}$	0.0513***	0.0578***	0.0524***	0.910***	1.012***	0.953***
	(0.019)	(0.020)	(0.020)	(0.330)	(0.349)	(0.342)
R-squared	0.0667	0.0525	0.0828	0.0604	0.0467	0.0765
Bank×Time FE	Y	N	Y	Y	N	Y
Sector×Time FE	N	Y	Y	Y	Y	Y
Loan & Firm Controls	Y	Y	Y	Y	Y	Y
Control Group Obtained New (Bank) Term Loan	Y	Y	Y	Y	Y	Y
N	56,076	55,482	55,436	56,076	55,482	55,476

(a) *Notes: This table reports the results of regression (3) where the control group of bank loans is limited to bank-only (leveraged loan) borrowers that obtained a term loan (TL) in a given quarter. The setting is analogous to that of Table 5, except for the different control group. Data is at the bank loan-time level (where the unit of time is the quarter) and sample period is January 2013 to June 2023. The dependent variable in columns (1)-(3) is a dummy variable taking a value of* 1 *if a given bank loan is newly originated in quarter t;* 0 *otherwise. The dependent variable in columns (4)-(6) is the loan amount if the loan is a newly originated credit line; 0 otherwise. Loan and firm controls include loan maturity, default probability, loss given default, firm size, debt ratio, Tangibility, EBITDA/Asset and Liquidity. Standard errors are clustered at the firm level.*

Table 9: Dual Borrowers and Credit Line Drawdowns during Covid-19

	Drawdown	Drawdown	Default Probability	Default Probability
	(1)	(2)	(3)	(4)
$PD_{it} \times Covid_t$	0.0211***	0.0379***	0.228	0.367**
	(0.01)	(0.01)	(0.17)	(0.19)
PD_{it}	-0.00115	-0.00503	0.272	0.334
	(0.01)	(0.01)	(0.22)	(0.31)
R-squared	0.923	0.836	0.822	0.822
Loan FE	Y	Y	Y	Y
YearQtr FE	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y
Sample	Full	Credit Lines	Full	Credit Lines
N	206,413	125,181	196,162	120,455

(a) *Notes: This table reports the results of regression (4), estimating how PD access affects a borrower's drawdown behavior, probability of default, and propensity to obtain third-party loan guarantees during the Covid-19 pandemic. Data is at the bank loan-time level (where the unit of time is the quarter) and sample period is 2018:Q1 to 2020:Q2.* $PD_{i,t}$ *takes a value of 1 at or after the date a borrower first accesses private debt.* $Covid_t$ *takes a value of 1 in 2020:Q1 and 2020:Q2 following Chodorow-Reich et al. (2022). Drawdown is the ratio of utilized to committed credit for bank loan l at time. Default Probability is an estimate of the loan's default probabilities, reported by banks in the Y-14 data; default probabilities are time-varying over the loan's lifetime and are expressed in percent. The control group is restricted to bank-reported leveraged loans to bank-only borrowers. Loan and firm controls include loan amount, spread, maturity, tangibility, firm size, EBITDA, liquidity and leverage. Standard errors are clustered at the firm level.*

Table 10: Credit spreads around the SVB Shock

	Bank Loans		PD Loans	
	(1)	(2)	(3)	(4)
$PD_{i,t}$	1.050***	1.307***		
	(0.245)	(0.232)		
$Post_t \times PD_{i,t}$	-0.635**	-1.041***		
	(0.291)	(0.296)		
$Bank_{i,t}$			0.299	1.017
			(0.500)	(0.763)
$Post_t$			-1.298***	
			(0.380)	
$Post_t \times Bank_{i,t}$			-1.190**	-1.985**
			(0.566)	(0.846)
R-squared	0.309	0.554	0.31	0.612
Sector×Week FE	N	Y	N	Y
Sector FE	Y	N	N	N
Week FE	Y	N	N	N
Loan Type FE	Y	Y	Y	Y
Loan Controls	Y	Y	Y	Y
Firm Controls	Y	Y	N	N
N	1062	959	666	587

(a) *Notes: This table reports the estimates of regression 5, showing the differential effect of a dual-borrower's interest rate spread (on new bank and private debt loans) after the banking turmoil in March 2023, relative to bank-only borrowers. Data is at the loan-issuance level and sample period is January 2023 to June 2023.* $PD_{i,t}$ *takes a value of 1 at or after the date a borrower first accesses private debt.* $Post_t$ *takes value 1 on or after the week of the SVB Collapse and generally captures the entire banking turmoil of March 2023. Loan controls include loan amount and maturity. Firm controls are firm assets, debt/asset and EBITDA. Standard errors are clustered at the firm level.*

Table 11: Firm-level Test: Private Debt and Capital Structure

	Debt/Assets	Debt/EBITDA	Bank Debt (log)	Interest Coverage	Bank Debt/Total Debt	Credit Line (% of Bank Loans)
	(1)	(2)	(3)	(4)	(5)	(6)
PD_{it}	0.0275***	0.648**	0.123***	-2.874***	-0.0721***	0.0342***
	(0.01)	(0.27)	(0.04)	(0.57)	(0.02)	(0.01)
R-squared	0.829	0.443	0.686	0.879	0.723	0.742
Firm FE	Y	Y	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y	Y	Y
Sector×Year FE	Y	Y	Y	Y	Y	Y
N	46,620	46,596	39,582	45,955	45638	46,620

(a) *Notes: This table reports the results of regression (6), estimating the impact of issuing private debt on firm-level financial outcomes for dual borrowers, relative to bank-only borrowers. Data is at the borrower-year level and sample period is January 2013 to June 2023.* $PD_{i,t}$ *takes a value of 1 at or after the year a borrower first accesses private debt. Firm Controls include a firm's total book assets, share of tangible assets, cash/assets, EBITDA/assets.* $Debt/EBITDA$ *refers to long-term Debt over EBITDA, where long-term debt is debt that are due in more than one year. Log (Bank Debt) is defined as the natural log of utilized bank loan amounts, and drops in sample size as some firm-time observations have zero utilization. Interest Coverage Ratio is defined as EBITDA/Interest Expense. Credit Line is the share of a borrower's total bank commitments that are credit lines. Firm controls are included with one-period lags. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

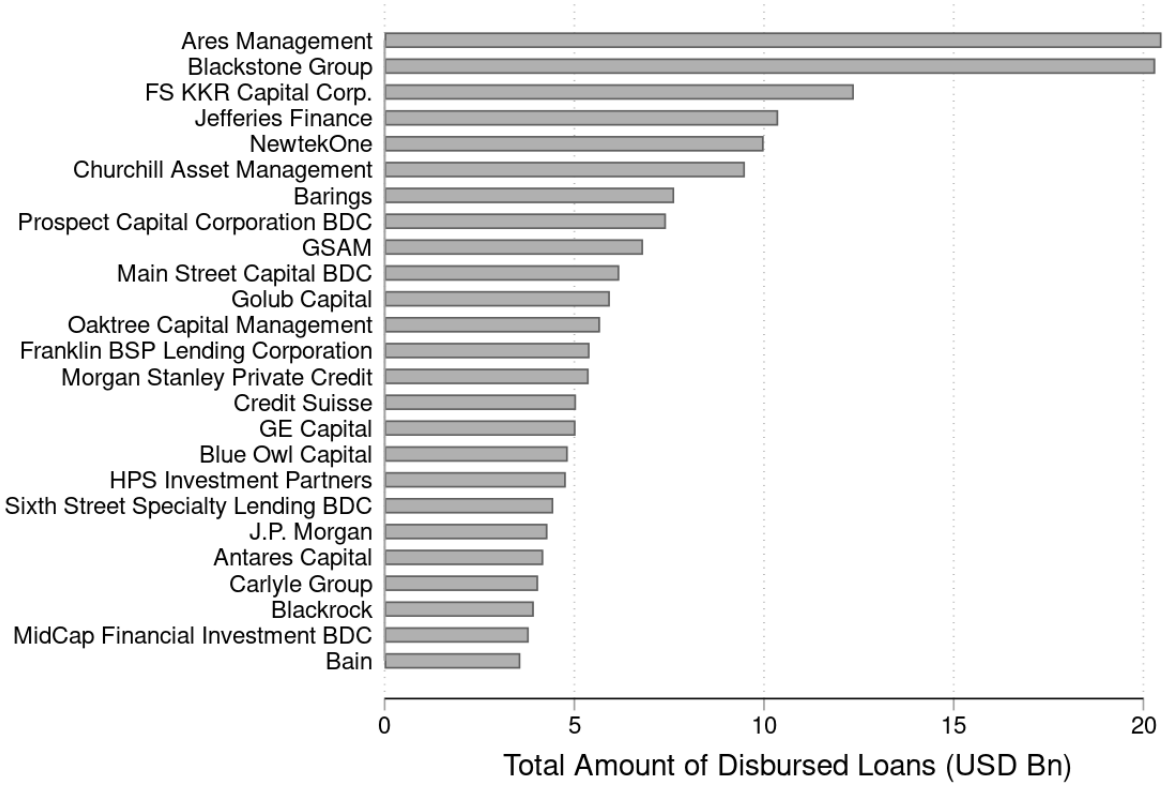
Table 12: Firm-Level Effects of Private Debt Use

	Sales Growth	Capex	Fixed Asset	Intangible Assets	EBITDA	Cash
	(1)	(2)	(3)	(4)	(5)	(6)
PD_{it}	0.0268**	0.0867	-0.0121***	0.0272***	-0.00538*	-0.0112***
	(0.012)	(0.001)	(0.003)	(0.005)	(0.003)	(0.003)
R-squared	0.451	0.619	0.943	0.936	0.756	0.826
Firm FE	Y	Y	Y	Y	Y	Y
Sector×Year FE	Y	Y	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y	Y	Y
N	46,120	45,936	46,620	46,620	46,620	46,620

(a) *Notes: This table reports the results of regression (6), estimating the impact of issuing private debt on firm-level real outcomes for dual borrowers, relative to bank-only borrowers. Data is at the borrower-year level and the sample period is January 2013 to June 2023.* $PD_{i,t}$ *takes a value of 1 at or after the year a borrower first accesses private debt. Firm controls include log (total assets), Cash/Asset, Tangible Asset/Total Asset and EBITDA/Asset in columns (1)-(4) and omits EBITDA/Asset and Cash/Asset when those are the dependent variables. All controls enter the regressions with one-period lags. Capex, Fixed Assets and Intangible Assets are all scaled by total assets. Standard errors are clustered at the firm level.*

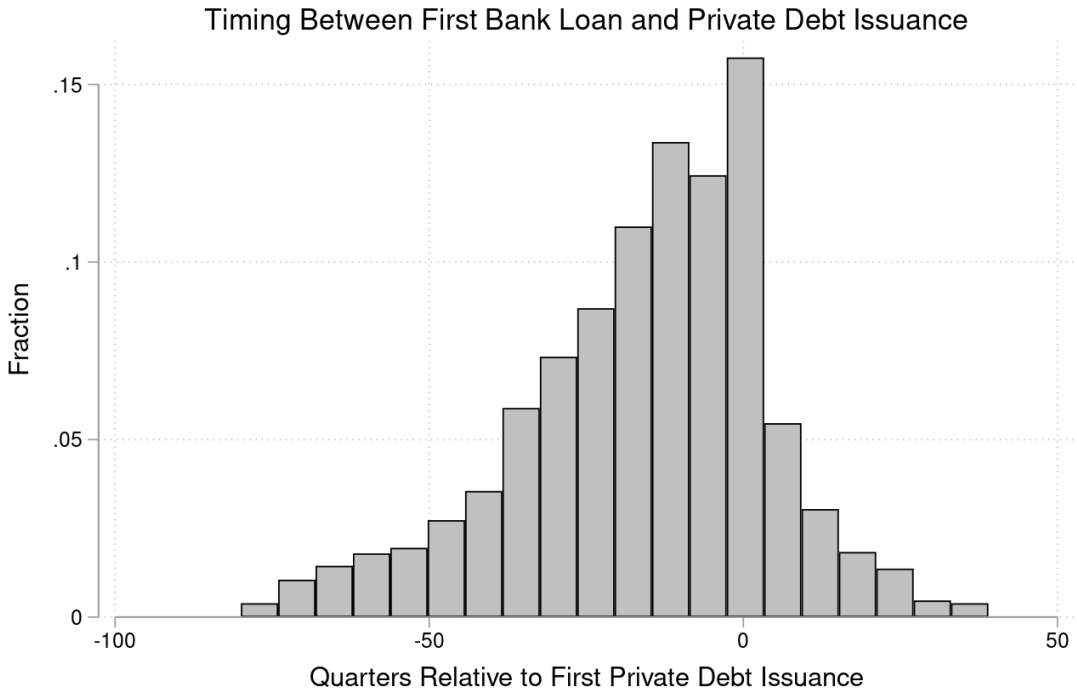
Appendix Figures and Tables

Figure IA1: Top PD Lenders in Pitchbook Sample



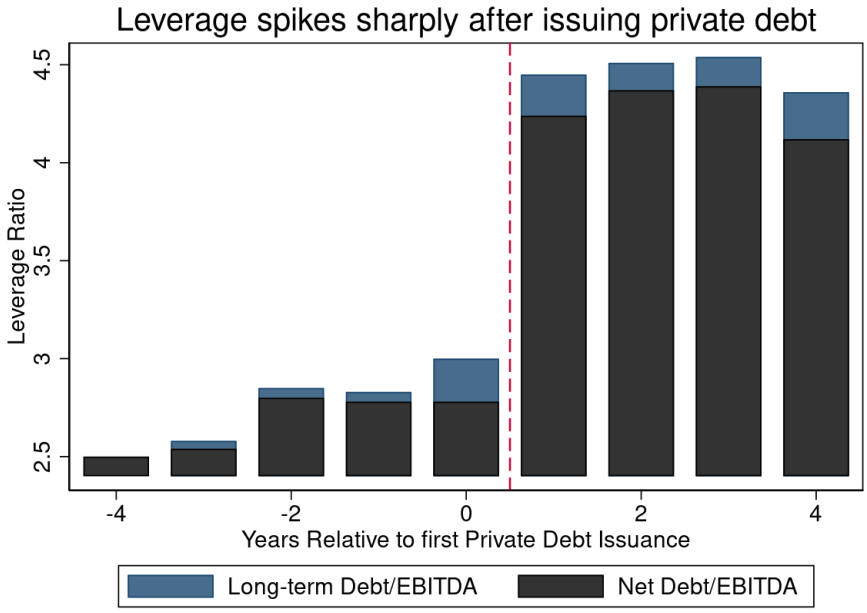
(a) *Notes: This figure reports top 25 private debt lenders in the full Pitchbook sample. The figure aggregates all PD loans in the Pitchbook sample across time. The sample period is January 2013 to July 2023. The sample is restricted to single lender loans since Pitchbook does not report loan shares in club deals. Single-lender PD loans constitute around 68 percent of all loans in the database. Loans originated by different private funds/BDCs belonging to the same asset manager have been aggregated at the manager level.*

Figure IA2: Do Borrowers First Get Bank Loans or Private Debt?



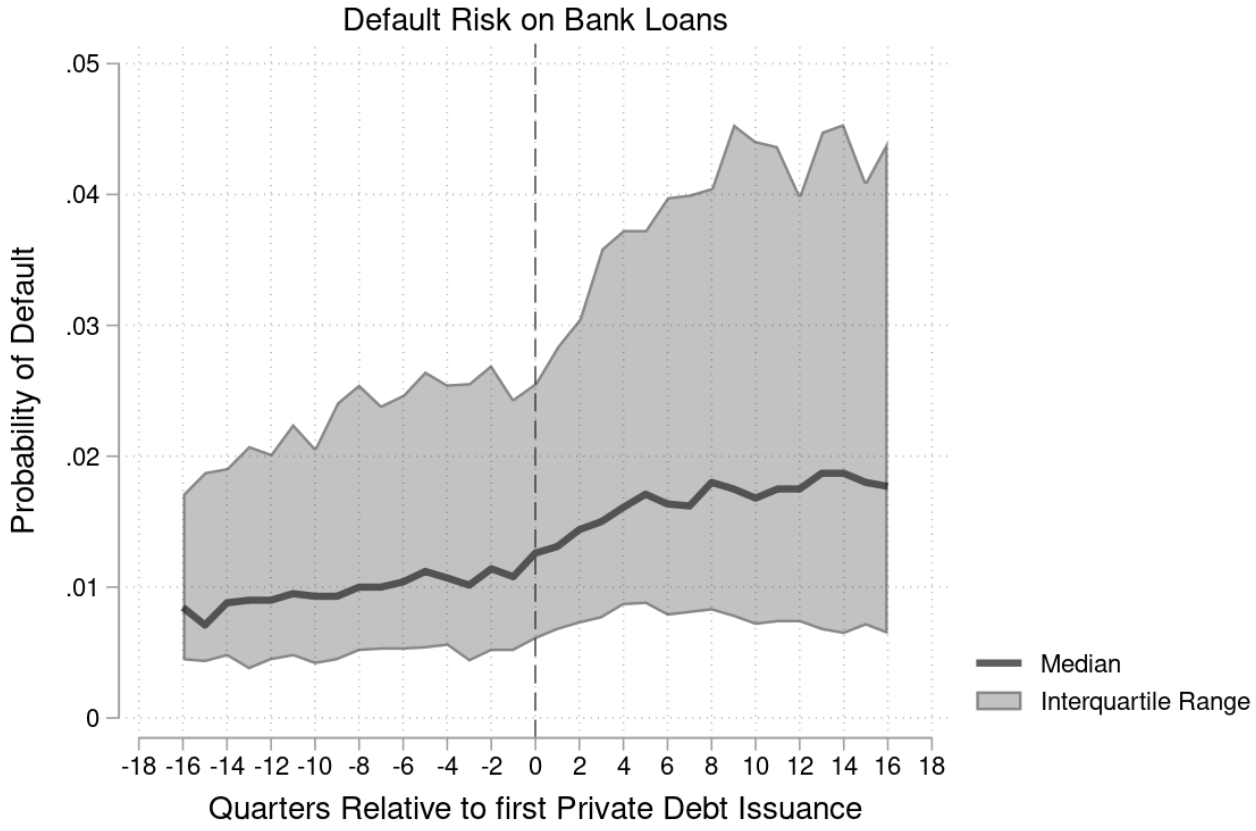
(a) *Notes: This chart shows the distribution of borrowers based on the time difference (in quarters) between their first origination of a bank loan and the their first origination of a private debt loan. The histogram shows most borrowers in the sample obtain bank loans prior to obtaining private debt.*

Figure IA3: Event Study: Leverage Ratio



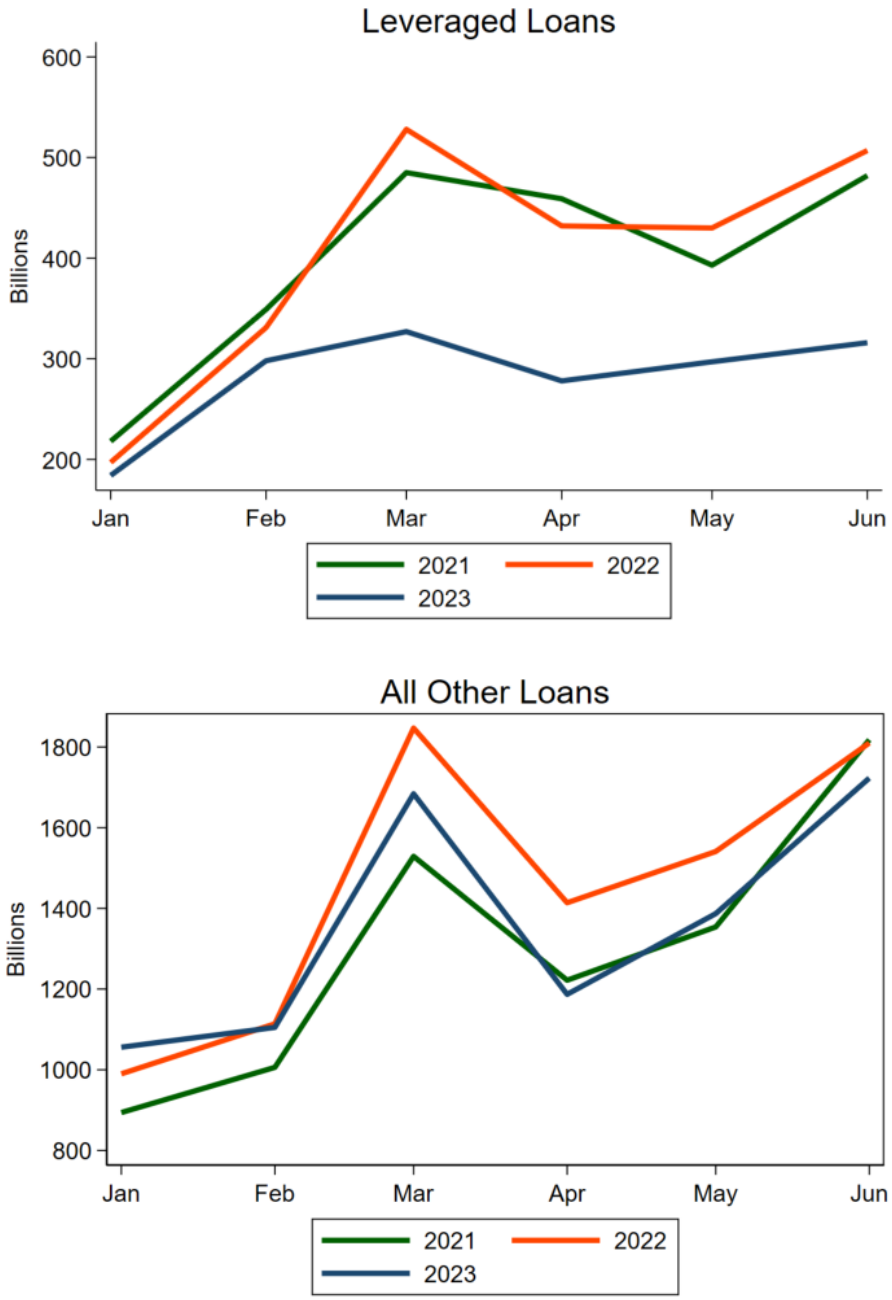
(a) *Notes: This chart reports a firm's Long-term Debt/EBITDA and Net Debt/EBITDA in the years around its first private debt issuance. The sample is restricted to dual borrowers. Data is at the borrower-year level and sample period is January 2013 to June 2023.*

Figure IA4: Event Study: Bank-Estimated Default Probability



(a) *Notes: This figure plots the evolution of bank-estimated probability of default on outstanding bank loans to borrowers that issue private debt, in each event-quarter. Data is at the loan-YearQtr level and sample is January 2013 to June 2023. The solid black line represents the sample median, while the grey shaded area represents the interquartile range.*

Figure IA5: New Leveraged Loan Issuance and the March 2023 Banking Turmoil



(a) *Notes: Number of newly originated bank loans in different months of years 2021, 2022, and 2023. The upper panel depicts new leveraged loan originations, while the lower panel focuses on other bank loans (loans that are not classified as 'leveraged loans' by reporting banks). The upper panel highlights that the number of newly originated leveraged loans in March-June 2023 is significantly lower than in the same months of the previous two years. Lower panel shows there is no effect for other loans. New originations are identified based on Y14 reported origination date.*

Table IA5: Private Credit Characteristics: Dual versus non Dual Borrowers

	N	Mean	SD	Median
Panel A: Dual Borrowers				
Loan Amount ($ Mn)	8,392	80.82	301.3	15.0
Spread (%)	8,392	6.07	2.33	5.75
Maturity (Years)	8,392	5.35	1.62	5.50
Share of Term Loans	8,392	0.83	0.37	1.00
Share of Credit Lines	8,392	0.12	0.33	0.00
Panel B: PD Only Borrowers				
Loan Amount ($ Mn)	8,502	49.1	142.9	12.1
Spread (%)	8,502	6.49	2.31	6.00
Maturity (Years)	8,502	5.44	2.44	5.25
Share of Term Loans	8,502	0.82	0.39	1.00
Share of Credit Lines	8,502	0.15	0.36	0.00

(a) *Notes: This table reports summary stats on private credit loans for dual borrowers in Panel A and PD-only borrowers in Panel B.*

Table IA5: Sectoral Distribution of Private Debt Raised by Dual Borrowers

Industry	**Share of Private Debt**
Software	16.7%
Commercial Services	14.2%
Commercial Products	10.7%
Healthcare Services	6.4%
Insurance	4.4%
IT Services	4.3%
Retail	3.5%
Restaurants, Hotels and Leisure	3.1%
Other Financial Services	3.0%
Computer Hardware	2.8%
Exploration, Production and Refining	2.7%
Containers and Packaging	2.5%
Healthcare Technology Systems	2.3%
Communications and Networking	2.2%
Services (Non-Financial)	2.1%

(a) *Notes: This table reports the share of private debt held by dual borrowers by industry, using Pitchbook data. We report only the top 15 sectors by share of private debt, where the share is computed as the total private loans extended to dual borrowers in a particular industry relative to all private debt provided to dual borrowers in aggregate.*

Table IA5: Ex-Ante Characteristics of Dual Borrowers

$Y : PD_{i,t} = 1$	(1)	(2)	(3)
$1(EBITDA < 0)_{t-1}$	0.146**	0.0845**	0.0739**
	(0.073)	(0.041)	(0.035)
$(Cash\ \&\ Marketable\ Securities)_{t-1}$	-0.672***	-0.297**	-0.273**
	(0.235)	(0.147)	(0.133)
$(Debt\ Ratio)_{t-1}$	-0.0681	-0.00137	0.0123
	(0.098)	(0.066)	(0.056)
$log\ (Total\ Assets)_{t-1}$	0.0124	0.000971	0.00310
	(0.038)	(0.021)	(0.018)
$(Tangibility)_{t-1}$	-0.162	-0.110	-0.0635
	(0.189)	(0.116)	(0.098)
$(EBITDA)_{t-1}$	0.178	0.119	0.128*
	(0.149)	(0.087)	(0.071)
$(Interest\ Coverage)_{t-1}$	0.000110	0.000241	0.000253
	(0.001)	(0.001)	(0.000)
R-squared	0.537	0.446	0.427
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
N	1,408	2,377	2,678

(a) *Notes: This table reports the estimation results of a regression where the dependent variable takes a value of a 1 if a given bank borrower issues private debt in year t, 0 otherwise. The independant variables are firm characteristics, which enter the regression with one period lags.* $PD_{i,t}$ *takes a value of 1 in the year when the borrower first issues private debt. The sample period is Jan 2013 to June 2023 and data is at the firm-year level. In column (1) the estimation sample is restricted to firm-year observations from* $t = 0$ *to* $t \geq -2$*, where* $t = 0$ *is the year when the borrower first issues private debt. Thus the estimation sample is restricted to the year of first private debt issuance and two years immediately prior to private debt issuance. In column (2) the estimation sample is restricted to firm-year observations from* $t = 0$ *to* ≥ -4*, where* $t = 0$ *is the year when the borrower first issues private debt. In column (3) the estimation sample is restricted to firm-year observations from* $t = 0$ *to* $t \geq -5$*, where* $t = 0$ *is the year when the borrower first issues private debt.* $1 \times (EBITDA) < 0$ *is a dummy taking a value of 1 if a firm's EBITDA is negative, 0 otherwise. All variables apart from log (Assets) and Interest Coverage Ratio is scaled by total assets. Interest Coverage Ratio is defined as EBITDA/Interest Expense. Standard errors are clustered at the firm level.*

Table IA5: Characteristics of Bank Borrowers Using Leveraged Loans

Panel A: Firm-level Characteristics	N	Mean	P25	P50	P75	SD
Total Assets ($ Mn)	22,557	2,570	60	255	1,410	6,960
Net Sales ($ Mn)	22,557	1,810	77	237	988	4,730
EBITDA	22,557	10.8	5.7	9.6	14.3	9.1
Total Debt	22,557	42.0	26.1	40.4	56.1	22.6
Tangible Assets	22,557	73.5	50.5	82.5	98.1	25.8
Liquidity	22,557	7.2	1.4	3.9	8.9	9.2
Probability of Default	22,557	3.4	0.6	1.5	4.0	4.6
Loss Given Default	22,557	33.7	25.2	35.0	41.8	12.2
Panel B: Loan-Level Characteristics						
Loan Size ($ Mn)	45,343	29.3	5.0	16.7	41.5	31.7
Spread	40,044	1.6	0	1.6	2.5	1.4
Maturity (Years)	45,343	4.0	3.0	5.0	5.0	2.0
Share of Credit Lines	21,624	47.6	-	-	-	-
Share of Term Loans	13,467	29.7	-	-	-	-

(a) *Notes: This table reports summary statistics of bank-only borrowers whose loans are flagged as 'Leveraged Loans' by reporting banks in Y-14. Panel A reports all firm-level characteristics. Panel B reports all loan level characteristics and it is restricted to new originations only. Probability of Default and Loss Given Default are expressed in percent, while all other variables are calculated relative to total assets. All variables are defined in Appendix A.*

Table IA5: Firm Characteristics: Which Firms Drop Out

Panel A: Characteristics of the 240 firms that drop bank loans

	N	Median	Mean
Total Assets ($ Mn)	3,090	242	1390
Net Sales ($ Mn)	3,090	213	1290
EBITDA/Asset (%)	3,090	9.7	15.2
Total Debt/Asset (%)	3,090	34.6	35.7
Tangible Assets/Asset (%)	3,090	68.1	66.5
Cash/Assets (%)	3,090	4.2	8.9
Probability of Default	3,090	1.4	3.2

Panel B: Characteristics of the 2,617 firms that do not drop bank loans

Total Assets ($ Mn)	36,229	382	1780
Net Sales ($ Mn)	36,229	320	1360
EBITDA/Asset (%)	36,229	10.3	13.3
Total Debt/Asset (%)	36,229	44.4	44.4
Tangible Assets/Asset (%)	36,229	67.5	66
Cash/Assets (%)	36,229	3.5	7.6
Probability of Default	36,229	1.8	3.6

(a) *Notes: This table reports firm characteristics of Dual-Borrowers that drop out of the Y14 sample within 2 quarters of issuing private debt. Dropouts are restricted specifically to borrowers who repaid their bank debt upon private debt issuance.*

Table IA5: Differences between Bank Debt and Private Debt: Excluding Buyouts

	Loan Amount	Loan Spread	Maturity	Debt Seniority	1(Credit Line)	1(Term Loan)
	(1)	(2)	(3)	(4)	(5)	(6)
PD_l	0.749***	1.817***	0.154*	-0.332***	-0.365***	0.504***
	(0.111)	(0.169)	(0.081)	(0.066)	(0.024)	(0.024)
R-squared	0.809	0.89	0.772	0.841	0.543	0.533
Firm×YearQtr FE	N	N	N	N	Y	Y
Firm×YearQtr×Loan Type FE	Y	Y	Y	Y	N	N
N	97,694	72,477	97,694	95,630	123,209	123,209

(a) *Notes: This table reports the baseline regression estimates reported in Table 3 and 4, excluding private debt loans used for LBO financing activity. The bank loan sample is restricted to newly originated loans. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Additional Tests on Loan Spreads

$Spreads_{l,t}$	(1)	(2)	(3)	(4)	(5)	(6)
PD_l	2.973***	4.169***	2.371***	3.044***	3.575***	1.029***
	(0.230)	(0.150)	(0.216)	(0.146)	(0.292)	(0.102)
$PD_l \times Covid_t$						0.408***
						(0.196)
R-squared	0.896	0.849	0.944	0.937	0.885	0.938
Debt Priority FE	Y	Y	Y	Y	Y	N
Firm×YearQtr FE	N	Y	N	Y	N	N
Firm×YearQtr×Loan Type FE	Y	N	Y	N	Y	Y
Loans Excluded	-	-	Undrawn Loans	Undrawn Loans	Club Deals	Undrawn Loans
N	71,819	90,928	44,900	56,995	70,478	18,134

(a) *Notes: This table provides additional robustness tests to the baseline regression estimates reported in Table 3. The dependent variable is credit spreads, in percentage points. The bank loan sample is restricted to newly originated loans. Columns (1) - (2) use all available loans. Columns (3), (4) and (6) exclude fully undrawn bank credit lines (utilization rate=0). Columns (5) excludes club deals. The sample in column (6) is restricted to 8 quarters before and after covid and also excludes fully undrawn loans, and additionally controls for buyout and refinancing PD loans.* $Covid_t$ *is a dummy taking value of 1 for 2020:Q1 to 2020:Q4, 0 otherwise. Debt Priority FE is an indicator taking value 1 if the loan is first lien senior secured, 0 otherwise. All regressions control for loan amount and loan maturity. Standard errors are clustered at the firm level in columns (1)-(5) but not in column (6) due to a considerably smaller sample size.*

Table IA5: Differences between Bank Debt and Private Debt: State×Industry×Time Fixed Effect

	Loan Amount	Loan Spread	Maturity	Debt Seniority	1(Credit Line)	1(Term Loan)
	(1)	(2)	(3)	(4)	(5)	(6)
PD_l	0.506***	4.858***	-0.0103	-0.333***	0.516***	-0.344***
	(0.031)	(0.036)	(0.043)	(0.011)	(0.006)	(0.006)
R-squared	0.304	0.588	0.288	0.341	0.273	0.264
State×Industry×YrQtr FE	Y	Y	Y	Y	Y	Y
Loan Controls	Y	Y	Y	Y	Y	Y
N	178,528	178,528	178,528	173,567	244,122	244,122

(a) *Notes: This table reports the baseline regression estimates reported in Table 3 and 4, excluding Firm x YearQtr FE and instead using State x Industry x YearQtr FE. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Differences between Bank Debt and Private Debt: Excluding Firm-Time Fixed Effects

	Loan Amount	Loan Spread	Maturity	Debt Seniority	1(Term Loan)	1(Credit Line)
	(1)	(2)	(3)	(4)	(5)	(6)
PD_l	0.373***	4.141***	1.215***	-0.212***	-0.380***	0.569***
	(0.045)	(0.070)	(0.048)	(0.015)	(0.011)	(0.011)
R-squared	0.590	0.769	0.508	0.592	0.398	0.409
Firm FE	Y	Y	Y	Y	Y	Y
YearQtr FE	Y	Y	Y	Y	Y	Y
N	204,278	147,867	204,279	198,657	204,279	204,279

(a) *Notes: This table reports the baseline regression estimates reported in Table 3 and 4, excluding firm-time fixed effects. The specifications in this table include only firm fixed effects and time fixed effects. To maximize sample size, controls are ommitted. Standard errors are clustered at the firm level.*

Table IA5: Private Debt Access and Bank Loans: Excluding Buyouts

	1(New Loan)			New Loan Amount			Loan Amount	
	(1) All	(2) CL	(3) TL	(4) All	(5) CL	(6) TL	(7) Outstanding	(8) Outstanding
$PD_{i,t}$	0.040***	0.016***	0.010***	0.641***	0.271***	0.159***	0.034**	0.040**
	(0.008)	(0.004)	(0.003)	(0.125)	(0.061)	(0.044)	(0.017)	(0.017)
R-squared	0.120	0.090	0.082	0.116	0.087	0.079	0.968	0.967
Firm FE	Y	Y	Y	Y	Y	Y	N	N
Sector x Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Bank x Time FE	Y	Y	Y	Y	Y	Y	Y	N
Loan & Firm Controls	Y	Y	Y	Y	Y	Y	Y	Y
N	562,269	562,269	562,269	562,269	562,269	562,269	508,588	505,583

(a) *Notes: This table reports regression (3) to estimate the effect of PD access on bank loan outcomes, excluding PD buyouts. Data is at the bank loan-time level (where the unit of time is the quarter) and the sample period is January 2013 to June 2023. The dependent variable in column (1) is a dummy that takes value of 1 if a given bank loan observation is newly originated in quarter t; 0 otherwise. The dependent variable in column (3) is a dummy if the a given bank loan is newly originated in quarter t and a term loan; 0 otherwise. The dependent variable is column (4) - (6) is the new loan amount for a given loan observation (set to zero for not newly originated loans), for all loans, credit lines, and term loans, respectively. The dependent variable in columns (7)-(8) is the natural log of loan amount focusing exclusively on outstanding loans, and excludes newly originated loans. Columns (7) and (8) include loan fixed effects, which have been omitted from display for brevity.* $PD_{i,t}$ *takes a value of 1 at or after the date a borrower first accesses private debt. Loan and firm controls include loan maturity, default probability, loss given default, firm size, debt ratio, Tangibility, EBITDA/Asset and Liquidity. The control group is restricted to bank-reported leveraged loans and we exclude buyout deals, i.e., bank loans to dual borrowers whose reported PD deal purpose is "buyout financing." Sector is defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Private Debt Access and Bank Loans: Bank×Rating×Time Fixed Effects

	1(New Loan)			New Loan Amount			Loan Amount	
	(1) All	(2) CL	(3) TL	(4) All	(5) CL	(6) TL	(7) Outstanding	(8) Outstanding
$PD_{i,t}$	0.017***	0.012***	0.003**	0.269***	0.189***	0.047*	0.029**	0.034**
	(0.004)	(0.002)	(0.002)	(0.060)	(0.039)	(0.026)	(0.015)	(0.014)
R-squared	0.130	0.134	0.090	0.127	0.128	0.086	0.974	0.975
Firm FE	Y	Y	Y	Y	Y	Y	N	N
Sector x Time FE	N	N	N	N	N	N	N	Y
Bank x Rating x Time FE	Y	Y	Y	Y	Y	Y	Y	N
Loan FE	N	N	N	N	N	N	Y	Y
Loan & Firm Controls	Y	Y	Y	Y	Y	Y	Y	Y
N	3,577,616	3,577,616	3,577,616	3,577,616	3,577,616	3,577,616	3,249,496	3,241,970

(a) *Notes: This table provides additional robustness tests to the regression estimates of eq. (3) looking at the impact of PD access on bank loan outcomes. Data is at the bank loan-time level (where the unit of time is quarterly) and sample period is January 2013 to June 2023. The dependent variable in column (1) is a dummy that takes value of 1 if a given bank loan observation is newly originated in quarter t; 0 otherwise. The dependent variable in column (2) is a dummy if the a given bank loan is newly originated in quarter t and a credit line; 0 otherwise. The dependent variable in column (3) is a dummy if the a given bank loan is newly originated in quarter t and a term loan; 0 otherwise. The dependent variable is column (4) - (6) is the new loan amount for a given loan observation. Thus, it is equal to the loan's size/amount if this loan is newly origination (set to zero for not newly originated loans). We construct the outcome variable for all loans, credit lines, and term loans, respectively. The dependent variable in columns (7)-(8) is the natural log of loan amount focusing exclusively on outstanding loans, and excludes newly originated loans. Columns (7) and (8) include loan fixed effects, which have been omitted from display for brevity. $PD_{i,t}$ takes a value of 1 at or after the date a borrower first accesses private debt. Loan and firm controls include loan maturity, default probability, loss given default, firm size, debt ratio, Tangibility, EBITDA/Asset and Liquidity. The control group is bank loans to bank-only borrowers. Sector is defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Instrumenting for Private Debt Access: Robustness with BDC Fixed Effect

	Credit Lines			Term Loans		
	(1) 1(New Loan)	(2) New Loan Amount	(3) Interest Rate	(4) 1(New Loan)	(5) New Loan Amount	(6) Interest Rate
$PD_{i,t}$	0.080**	1.351**	0.473**	-0.024	-0.701	-0.442
	(0.038)	(0.618)	(0.203)	(0.099)	(1.639)	(0.567)
First Stage F-Stat	88.19	88.19	88.19	17.39	17.39	17.39
Bank×Time FE	Y	N	Y	Y	N	Y
BDC FE	Y	Y	Y	Y	Y	Y
Loan & Firm Controls	Y	Y	Y	Y	Y	Y
N	15,257	15,257	15,257	5,925	5,925	5,925

(a) *Notes: This table provides an additional robustness check to the second-stage regression (3) where we instrument for $PD_{i,t}$ (first stage regression), by including BDC fixed effects. Data is at the bank loan-time level (where the unit of time is quarterly) and sample period is January 2013 to June 2023. We focus on the subsamples of credit lines in (1) - (3) and term loans in columns (4) - (6). Data is at the loan-YearQtr level and sample period is January 2013 to June 2023. The estimation sample in Columns (1) - (3) is restricted to only credit lines (new and old) and columns (4) - (6) are restricted to only term loans (new and old). $PD_{i,t}$ is instrumented exploiting the 2018 relaxation in BDC leverage limits, which was subsequently adopted in a staggered fashion by some BDCs. For each borrower firm i, we identify its primary PD lender p (from which it will borrow) and, if that lender is a BDC, use the timing of its leverage limit relaxation adoption as an instrument for PD access. In more detail, for borrower firm i, we construct the dummy variable $Treated_{i,t}$ takes value of 1 if (i) borrower i will take out a PD loan from PD lender p at some point during our sample and (ii) PD lender p is a BDC which adopted the leverage limit relaxation and the adoption becomes effective by time t. In the first-stage regression, $Treated_{i,t}$ is used as instrument for $PD_{i,t}$. In column (1), we focus on the subsample of bank credit lines, and the dependent variable is a dummy taking value of 1 if a given bank credit line observation is newly originated in quarter t. In column (2), the dependent variable is the loan amount of a credit line when this credit line is newly originated in quarter t (set to zero if the loan is not newly originated at t), expressed in logs. Column (3) is the interest rate on the new credit line expressed in percent. Columns (4)-(6) focus on the subsample of term loans and the dependent variables are analogously defined. Firm Controls include the natural log of firm book asset, Tangibility, Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls include probability of default and loan maturity. The sample is restricted to bank borrowers that ever issued private debt (i.e. dual borrowers before and after they issued private debt). Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Private Debt Access and Bank Loans: Bank×Rating×Time Fixed Effects

Interest Rate	New Loans		Outstanding Loans	
	(1)	(2)	(3)	(4)
$PD_{i,t}$	0.198***	0.207***	0.0623**	0.0811***
	(0.047)	(0.048)	(0.028)	(0.029)
$Default\ Probability_{l,t}$	0.451	0.466	0.929***	0.985***
	(0.722)	(0.722)	(0.146)	(0.146)
$LGD_{l,t}$	0.293***	0.299***	0.211***	0.220***
	(0.037)	(0.037)	(0.019)	(0.019)
R-squared	0.640	0.639	0.631	0.630
Firm FE	Y	Y	Y	Y
Bank×Rating×Time FE	Y	Y	Y	Y
Sector×Time FE	Y	Y	Y	Y
Additional Loan & Firm Controls	Y	N	Y	N
N	133,924	133,924	2,402,021	2,402,021

(a) *Notes: This table reports the regression results of Eq. 3, estimating the effect of issuing private debt on the pricing on newly originated loans (columns 1 and 2) and existing loans (columns 3 and 4) after including Bank×Rating×Time Fixed Effects. Data is at the loan-YearQtr level and sample period is January 2013 to June 2023.* $PD_{i,t}$ *takes a value of 1 at or after the date a borrower first issues private debt. The dependant variable is the Interest Rate on the loans. Firm Controls include the natural log of firm book asset, Tangibility, Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls (where applicable) include the level of the loan commitment, and maturity. The control group is restricted to bank-reported leveraged loans. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Credit Line Borrowing of Bank-Only Leveraged Loan Borrowers

	1(New Credit Line)	New Credit Line Amount	Interest Rate
	(1)	(2)	(3)
$\mathbf{1}(New\ Term\ Loan)_{i,t}$	0.0703***	1.162***	0.201***
	(0.003)	(0.043)	(0.009)
R-squared	0.0460	0.0440	0.0389
Bank×Time FE	Y	Y	Y
Sector×Time FE	Y	Y	Y
Loan Controls	Y	Y	Y
N	497,251	497,251	497,251

* $p < .10$, ** $p < .05$, *** $p < .01$

(a) *Notes: This table reports regression of Eq. 3 to estimate the effect of issuing new term loans on the propensity to obtain new credit lines and the pricing on new credit lines. Data is at the loan issuance level and sample period is January 2013 to June 2023. The dependent variable in column (2) is a dummy if the a given bank loan is newly originated in quarter t and a credit line; 0 otherwise. The dependent variable in colum (2) is the loan amount if the loan is a credit line and newly originated; 0 otherwise. The dependent variable for column (3) is the interest rate.* $1(New\ Term\ Loan)_{i,t}$ *is a dummy which takes a value of 1 in a given year-quarter t if the borrower obtained a new bank-provided term loan in the same quarter. Loan and firm controls include loan maturity, default probability, loss given default, firm size, debt ratio, Tangibility, EBITDA/Asset and Liquidity. The control group is restricted to bank-reported leveraged loans. Sector is defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table IA5: Credit Line Drawdown: Exclusion of PPP Borrowers

	Drawdown	Drawdown	Default Probability	Default Probability
	(1)	(2)	(3)	(4)
$PD_{it} \times Covid_t$	0.0210***	0.0378***	0.218	0.356*
	(0.008)	(0.011)	(0.166)	(0.186)
PD_{it}	-0.00151	-0.00491	0.262	0.316
	(0.010)	(0.014)	(0.223)	(0.313)
R-squared	0.924	0.836	0.823	0.823
Loan FE	Y	Y	Y	Y
YearQtr FE	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y
Sample	Full	Credit Lines	Full	Credit Lines
N	202,806	123,058	192,810	118,427

(a) *Notes: This table reports regression of Eq.* (4) *reported in Table 9, after excluding the the sample borrowers that obtained loans from the paycheck protection program (PPP) during Covid.*