Private Debt versus Bank Debt in Corporate Borrowing*

Sharjil Haque† Simon Mayer ‡ Irina Stefanescu §

This Version: March 2025

Abstract

We examine the interaction between private debt and bank debt in corporate borrowing. By combining administrative bank loan-level data with non-bank private debt deals, we find that a significant portion of U.S. private debt borrowers also rely on bank loans. Relative to bank-borrowers that do not use private debt, these *dual borrowers* tend to be larger, riskier firms with fewer collateralizable assets and higher leverage. When co-financing the same borrowers, private debt lenders provide larger, but relatively junior and riskier term loans, with longer maturities and higher spreads, while banks predominantly offer credit lines. Once firms access private debt, they often obtain additional bank debt, mainly through new and larger credit lines, particularly when private debt lenders have a high reputation or provide larger loans. However, during periods of market-wide distress, dual borrowers display increased drawdown and default risks on their bank credit lines, exposing banks to larger liquidity risks. Overall, our findings suggest that private debt serves as a substitute for riskier, long-term bank loans while amplifying banks' role as liquidity providers through credit lines.

Keywords: Private Debt, Direct Lending, Bank Loans, Capital structure

*We thank Samuel Antill, Greg Brown, Mark Carey (discussant), Yuchen Chen (discussant), Sergey Cherneko (discussant), Tetiana Davydiuk, Brent Glover, Matt Gustafson, Sebastian Gryglewicz, Barney Hartman-Glaser, Vasso Ioannidou, Ivan Ivanov, Victoria Ivashina, Young Soo Jang, Christoph Kaufmann (discussant), Pete Kyle, Stephan Luck (discussant), Ralf Meisenzahl, Erwan Morellec, Sam Rosen, David Scharfstein, Sascha Steffen, Chris Telmer, Min Wei, Mike Weisbach, Shengxing Zhang, Yao Zeng, and seminar participants at the University of Maryland (Smith), CMU Tepper, Federal Reserve Bank of Chicago, the CMU-PSU-Pitt conference, the ERMAS 2024, UNC Institute for Private Capital, Bayes Business School, Regulating Financial Markets conference, International Monetary Fund, FSC Conference Fox Business School, Office of Financial Research (OFR), Federal Reserve Board, ECB, CEAR-GSU Conference, Jackson Hole Finance Symposium, UNC PERC 2024 and MFA 2025 for helpful comments and feedback. Joe Yuke, Karl Wirth, Arturo Bardales and Peter Wilschke provided stellar research assistance. Views expressed are those of the authors and not necessarily those of the Federal Reserve.

†Federal Reserve Board of Governors. Email: sharjil.m.haque@frb.gov

‡Carnegie Mellon University. Email: simonmay@andrew.cmu.edu

§Federal Reserve Board of Governors. Email: irina.stefanescu@frb.gov

The global private debt (PD) market has grown exponentially in recent years, from $230 billion in 2008 to nearly $1.7 trillion in 2023. The US private debt market is now comparable in size to the leveraged loan and high-yield bond markets. One prominent concern echoed by the press, practitioners, and policymakers alike is that PD lenders, predominantly PD funds or Business Development Companies (BDCs) that provide direct loans to companies, are displacing banks in corporate lending.[1] While prior studies examined firms' choice between bonds (public debt) and bank loans (Diamond, 1991; Rajan, 1992; Becker and Ivashina, 2014), our understanding of *private debt* remains limited. How does the rise of private debt shape banks' role in corporate credit provision? How do private and bank debt differ and interact? Do PD lenders compete with banks for the same borrowers, or do they serve a different segment of borrowers?

This paper aims to address these questions by studying the role of bank debt and private debt in corporate borrowing and firms' capital structure. 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 to the same borrowers are typically larger, riskier, more junior in bankruptcy, and feature higher spreads and longer maturities. Dual borrowers use private debt primarily for term loans, while they rely on banks for credit lines. We show that a borrower's use of private debt is associated with an increased reliance on bank credit lines, particularly when PD lenders provide more credit or have a high reputation, as measured by assets under management. This suggests that private debt enhances access to bank credit lines. However, credit lines to dual borrowers exhibit higher drawdown and default risks that primarily materialize during market-wide distress. Thus, co-financing dual borrowers alongside PD lenders may expose banks to significant liquidity risks. Our results suggest that while PD lenders are displacing banks in the provision of riskier term loans, they are not competing with banks in liquidity provision through credit lines, for instance, because banks' deposit-based funding structure gives them an advantage in this area (Kashyap, Rajan and Stein, 2002). In fact, the rise of private debt amplifies banks' role in liquidity provision.

[1] See for example analysis by the Bank of England or commentary by Business Insider.

In this paper, private debt (PD), or private credit, refers to corporate loans made by non-bank lenders, primarily BDCs or PD funds. For our analysis, we construct a novel dataset of bank loans and PD loans in the US, with detailed borrower financial information from January 2013 to June 2023. We combine administrative bank loan-level information from the Federal Reserve's Y-14 H.1 schedule (henceforth, Y-14 data) with PD loans from Pitchbook.[2] Pitchbook reports PD loan data at the loan-issuance level, covering standard loan-level characteristics. 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 BDCs and PD funds.

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. The Y-14 data include detailed information on bank loans and bank borrowers' financial statements, which is unavailable for PD-only borrowers outside Y-14. Our sample primarily includes small and middle-market firms with book assets below $500 million and limited access to public capital markets. Based on Pitchbook's deal type information, PD loans for these borrowers are mainly used for leveraged buyouts, general corporate purposes, and refinancing. For about 80% of PD loans in Pitchbook, the borrowers are backed by a private equity sponsor.

Our sample includes 2,917 unique dual borrowers, representing roughly half of all PD borrowers. Dual borrowers operate primarily in sectors such as software, information technology, healthcare services, commercial services, and other technology-focused industries. Compared to bank-only borrowers, dual borrowers have less tangible, collateralizable assets and are larger, more levered, and exhibit higher bank-estimated default probabilities. Similar to Chernenko, Erel and Prilmeier (2022), we find that firms with negative cash flows are significantly more likely to issue private debt for the first time, as the Leveraged Lending guidance discourages banks from lending to these firms. We also show that dual borrowers

[2]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).

typically use the proceeds from private debt to invest and to grow, and that access to private debt is linked to higher sales growth and intangible assets.

Our data reveal that PD loans are larger, more commonly structured as term loans, and have higher spreads and longer maturities compared to bank loans. For example, the unconditional sample mean and median spreads are around 600 basis points for PD loans, while they range from 130 to 180 basis points for bank loans. However, these patterns may simply reflect differences in borrower characteristics and the types of borrowers served by PD lenders and banks. To isolate differences in lending practices between PD lenders and banks, we focus on our sample of dual borrowers and compare loans originated to the same borrower within the same year and quarter, which differ by whether the lender is a bank or a PD lender. In particular, our loan-level regressions control for any time-varying borrower characteristics, including credit demand and private equity backing, through borrower-time fixed effects or borrower-time-loan type fixed effects (Khwaja and Mian, 2008).

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. When co-financing the same borrowers, banks typically offer credit lines, while PD lenders provide term loans. Because it is typically junior and has lower priority in bankruptcy, private debt is riskier than the same borrower's bank debt. Higher loan spreads compensate PD lenders for the higher risk (Erel, Flanagan and Weisbach, 2024), but could also reflect specific contractual provisions in PD loans that banks are often reluctant to offer, such as "payment-in-kind features."[3] In leveraged buyout deals, PD lenders earn even higher spreads compared to banks. In particular, PD buyout loans carry an additional 70 basis points in spreads relative to non-buyout PD loans.

We explore how the rise of private debt affects bank lending, specifically whether it reduces or increases banks' provision of credit. Interestingly, we find that after accessing private debt, most bank borrowers not only maintain their borrowing relationships with banks but also increase their use of bank debt, typically through new credit lines. Using an

[3]See, for example, recent news by Fitch related to rising trend of payment-in-kind features in PD loans.

event-study framework, we show that the probability of obtaining a new bank credit line spikes within one quarter of a borrower's first use of private debt. We confirm these findings by exploiting cross-sectional variation in bank loan-level regressions, where we examine how a borrower's reliance on private debt is linked to the propensity to obtain new bank loans (extensive margin) and the size of such newly-originated bank loans (intensive margin). In both analyses, we restrict the control group of bank loans to bank-only borrowers to leveraged loans, control for firm characteristics that likely affect credit demand and supply, and include firm fixed effects. We also absorb time-varying heterogeneity in lender characteristics and industry conditions by including bank-time and industry-time fixed effects. We find that a firm's dependence on private debt — measured either by a dummy variable or the size of PD loans received — is associated with a higher propensity to obtain new and larger bank loans, particularly credit lines, indicating increased reliance on bank debt at both the intensive and extensive margins. In addition to extending new loans, banks also increase credit by expanding commitments on existing loans once a borrower begins using private debt.

We confirm through firm-level analysis that the use of private debt is associated with higher total bank debt and a greater share of bank credit line commitments relative to total bank debt. Thus, while dual borrowers depend significantly on bank financing, they primarily rely on it for liquidity through credit lines rather than for long-term credit. Additionally, our analysis reveals that reliance on private debt is associated with lower interest coverage ratios, higher leverage, and higher spreads on bank loans. As we show, financing dual borrowers exposes banks to greater credit line drawdown risks, which may explain these elevated spreads.

Our findings suggest that private debt amplifies banks' role in liquidity provision through credit lines, potentially by increasing firms' demand for credit lines, enhancing firms' access to bank credit lines (i.e., their supply), or both. For example, we show that firms often use private credit to invest and expand operations, which can increase both their demand for and access to liquidity through credit lines. A potential supply-side economic mechanism is that private debt, being relatively junior and riskier than bank debt, effectively insures the more senior bank loans in the firm's capital structure, thereby expanding the firm's

borrowing capacity with banks — a mechanism theoretically demonstrated in Hartman-Glaser, Mayer and Milbradt (2024), who show that debts of different seniorities can act as complements. Additionally, PD lenders' provision of relatively junior, riskier credit may serve as a certification of the borrower's creditworthiness — since PD lenders screen and monitor borrowers — or as a signal of their willingness to support the borrower in distress situations. Both effects should enhance access to bank credit even if banks conducted their own due diligence or are actively monitoring the borrower.

Both the insurance and certification effects of private debt are likely to be stronger when (i) PD lenders invest more, giving them more skin in the game, or (ii) PD lenders have a high reputation (measured by assets under management), indicating a greater ability to offer support in distress or to screen and monitor borrowers. Consistent with these arguments, we find that firms are particularly likely to obtain new and larger bank credit lines after accessing private debt when (i) PD lenders have a high reputation or (ii) provide larger loans. Finding (ii) indicates that an increased reliance on private debt on the intensive margin is associated with greater use of bank debt, which is consistent with both supply-side and demand-side explanations of how private debt is linked to greater use of bank credit lines. Additionally, the positive link between PD lender reputation and reliance on bank credit lines supports the supply-side view that private debt enhances borrowers' access to bank credit lines.

Having shown that private debt amplifies banks' liquidity provision through credit lines, we now demonstrate that it is also associated with increased drawdown risks on these lines and a higher probability of default following drawdown. To illustrate this, we exploit the onset of Covid-19 as a shock to firms' liquidity needs, capturing market-wide distress (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 comparable bank-only borrowers. Our analysis reveals that they drew down an additional 4 percentage point of their unused credit line commitment relative to comparable bank-only borrowers, which is economically large considering the median (mean) credit line utilization rate in the entire Y14 data is around 26 (35) percent. This result is

robust to controlling for borrower and loan characteristics (e.g. credit spreads), including loan and time fixed effects, as well as differences in utilization of loans from the paycheck protection program (PPP). At the same time, dual borrowers were more likely to provide third-party loan guarantees (e.g., through private equity sponsors) during Covid-19, which may have helped them maintain access to bank credit lines.

As discussed in Greenwald, Krainer and Paul (2021), credit line drawdowns affect banks by reducing their capitalization, potentially forcing them to raise new capital (which can be costly during crises) or to cut lending, making drawdown risks costly for banks (Acharya, Engle, Jager and Steffen, 2024c). Our findings suggest that as private debt becomes more prevalent and amplifies banks' role in liquidity provision, banks are becoming increasingly exposed to firms' liquidity or drawdown risks that primarily materialize during periods of market-wide distress. Thus, financing dual borrowers — which rely heavily on both bank credit lines and private debt — could impose significant liquidity risks on banks.

We further explore the competition between banks and PD lenders by showing how PD lenders respond to reduced competition from banks and highlighting the marginal loans over which they compete. To this end, we use the collapse of Silicon Valley Bank (SVB) in March 2023 as a negative, exogenous supply shock to leveraged bank lending. First, we verify that the SVB collapse led to a decline in leveraged (i.e., risky) bank loans, while other types of lending remained unaffected, indicating tighter bank lending standards. We interpret this as a response to heightened uncertainty and fears of a broader banking crisis. Second, we show that the SVB collapse is associated with a decline in spreads on newly originated PD loans, particularly for PD loans to dual borrowers. This suggests that the marginal loans — over which PD lenders and banks compete and which migrate to PD lenders post-shock — 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, the SVB collapse illustrates that as banks pull back from risky lending, PD lenders expand into loans that banks would have traditionally originated, resulting in an overall less risky loan portfolio due to the higher quality of these loans. Taken together, our results indicate that, while not competing with banks for credit

lines, PD lenders (i) serve the market segment of "very risky" loans that banks avoid and (ii) compete with banks at the margin for moderately risky term loans with credit quality exceeding that of the average PD loan. Crucially, competition between banks and PD lenders is concentrated in term loans to dual borrowers with access to both types of debt.

Related Literature. We contribute to the empirical literature on non-bank lending, specifically on banks' competition and interaction with non-banks. Early contributions include Carey, Post and Sharpe (1998); Denis and Mihov (2003). 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) and Haque, Jang and Wang (2025) study banks' lending to non-bank financial intermediaries. Jang (2023); Block, Jang, Kaplan and Schulze (2022); Davydiuk, Marchuk and Rosen (2020a,b); Chernenko et al. (2022) study direct lending to middle market firms. Chernenko, Ialenti and Scharfstein (2024) examine bank lending to BDCs and whether regulatory arbitrage can explain the rise of private debt.

Our work differs from the above papers in several key ways. First, by focusing on mostly private small and middle-market firms, we show that while PD lenders displace banks in riskier and junior term loans, they do not compete in providing credit lines and may even enhance banks' role as liquidity providers. Second, our comprehensive regulatory data (Y-14), which includes both syndicated and bilateral bank loans (i.e., loans originated and retained by banks), reveals that many PD borrowers also rely on bank loans, particularly credit lines, thereby connecting banks and PD lenders through dual borrowers and exposing banks to liquidity risks. In contrast, commercial vendor datasets like Dealscan do not cover bilateral bank loans and, therefore, cannot fully assess the connection between banks and PD lenders via dual borrowers. Third, our sample of dual borrowers allows us to examine the role of bank and private debt in firms' capital structures, highlighting the differences between these types of debt within the *same* borrower. This analysis distinguishes our paper from existing

literature on direct non-bank lending (e.g., Chernenko et al. (2022)), which emphasizes that PD lenders often serve *different* borrowers whom banks are reluctant to lend to.

Next, we connect to the literature on syndicated loans and the participation of non-bank lenders in those, such as CLOs, insurance companies, and loan mutual funds (Sufi, 2007; Ivashina, 2009; Ivashina and Scharfstein, 2010b; Benmelech, Dlugosz and Ivashina, 2012; Irani and Meisenzahl, 2017; Irani, Iyer, Meisenzahl and Peydro, 2021; Haque, Mayer and Wang, 2023). In complementary work, Acharya, Gopal and Steffen (2024a) show that public firms in the US, which rely heavily on institutional term loans with non-bank participation, draw down credit lines more intensely during market-wide distress when institutional term loan funding dries up (Fleckenstein, Gopal, Gutierrez Gallardo and Hillenbrand, 2024), making banks reluctant to extend credit lines. In our data, most firms reliant on non-bank debt are private, small and middle market firms. Moreover, we focus on non-bank lenders that originate loans, primarily BDCs and PD funds (i.e., direct lenders). We note that these PD lenders have a different funding structure, and generally hold loans to maturity, which may make their activities less fragile than those of CLOs or loan mutual funds. This could explain why, unlike Acharya et al. (2024a), we find that private non-bank debt enhances banks' liquidity provision through credit lines, though it is also linked to drawdown risks.

Finally, we document that private debt is commonly used to finance LBOs and private equity-backed borrowers. Consequently, the rise of private debt affects the debt structure and financing terms of LBOs, as studied in (Ivashina and Kovner, 2011; Demiroglu and James, 2010; Malenko and Malenko, 2015; Shive and Forster, 2021; Haque and Kleymenova, 2023).

1 Institutional Background

In this section, we provide a brief overview of the private debt market. See also Erel et al. (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 leveraged 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).[4]

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."

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

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.

2 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.

2.1 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 A.2 provides detailed description of our data construction, cleaning strategy and Pitchbook's sample coverage, and we provide an overview of the data here.

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 middle-market arms of smaller banks not subject to the stress tests.[5] 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.

Relative to other databases on private debt, Pitchbook offers several advantages such as a larger sample of PD loans and extensive coverage of loan-level information described below. Figure 2 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 Pitchbook sample contains 5,662 distinct PD borrower firms and around 16,900 unique PD

[5]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.

loan facilities. Based on loan origination and maturity dates, we estimate that aggregate PD loan volume was around $700 billion in July 2023.[6] Based on a conservative back-of-the-envelope calculation discussed in Appendix A.2, we estimate our sample covers around 70% of aggregate *deployed* private debt in the US as of 2023.

Pitchbook reports standard loan-level characteristics, such as origination date, maturity, spreads, loan size, deal size, loan type, private equity sponsorship 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. Notably, around 30% of the PD loans are so-called *club deals*. Club deals typically involve a group of lenders who jointly originate credit, akin to syndication. This group of lenders primarily consists of PD lenders, but may also include traditional banks or private credit arms of banks. We restrict our sample to PD lenders and PD borrowers located in the US. Figure 3 shows the top 25 PD lenders in our dataset. These include Ares Management, Blackstone Group, Jefferies Finance, Churchill Asset Management, Barings, and FS KKR Capital Corporation. To further confirm the reliability of our sample, 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.

2.2 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).[7] 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

[6]This figure does not take into account loan chargeoffs or early repayments. 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. According to Pitchbook, the US accounts for approximately 65% of the 1.7 $trillion global private debt market.

[7]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 June 2012 to support the Dodd-Frank Act Stress Tests.

in the US banking sector (Caglio, Darst and Kalemli-Özcan, 2021) 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 commitments, utilization, maturity, spreads, priority in bankruptcy, collateral, existence of credit guarantees as well as loan-type and loan purpose. One limitation is that the loan purpose indicator in the Y-14 cannot be used to identify LBO financing.[8] 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, 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, involving verification of matched borrower industry and borrower-local county.[9] Eventually, we can match 2,917 (out of 5,662) private debt borrowers to bank borrowers from the Y-14 data. Thus, around 50% of PD borrowers in our sample are *dual borrowers*, in that they borrow from both banks and PD lenders around the same time.[10]

2.3 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

[8] As shown in Haque, Jang and Mayer (2022), there are many LBO-financed firms in the Y-14 data which are not systematically captured through the 'M&A' category of reported loan purpose, or any of the other categories.

[9] Further details of our data cleaning procedure are described in Appendix A.3. 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.

[10] In terms of timing, Appendix Figure A.1 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.

from both banks and PD lenders (at the same observation date), bank-only borrowers only borrow from banks, and PD-only borrowers only borrow from PD lenders.

Crucially for our analysis, *dual borrowers* — those with outstanding bank loans — are included in the Y-14 database when they borrow from PD lenders. This allows us to observe their financial and accounting information, as well as details of their individual bank loans. However, our matched sample does not include PD borrowers who do not borrow from banks and, therefore, are not part of the Y-14 data. As a result, detailed firm financial and loan-level information is unavailable for these *PD-only borrowers*. Much of our analysis relies on this detailed financial and loan-level information, comparing *dual borrowers* to similar *bank-only borrowers*. Both dual and bank-only borrowers obtain bank financing through syndicated and bilateral loans. Accordingly, this paper focuses on a specific segment of the private credit market — firms with access to both bank and private debt. 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 1 shows banks are increasingly lending to dual borrowers. Aggregate Y14 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 14 percent at the end of 2023.

2.4 Summary Statistics

Table A.3 shows that dual-borrowers primarily operate in sectors such as software, commercial services, healthcare services, insurance, information technology and other technology-focused industries. For firm-level characteristics, we collapse all firm-level information at the borrower level using sample means. 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 that on average, dual borrowers (with median book assets of $326 million) are significantly larger than bank-only borrowers (with median book assets of $99 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. Fourth, dual borrowers exhibit on average higher bank-estimated probabilities of default — which are reported in the Y14 data. Finally, appendix Table A.4 formally tests which ex-ante firm characteristics predict a borrower's issuance of private debt in a regression framework. Similar to Chernenko et al. (2022), 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.[11] 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

[11]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 a relatively small sample as we focus only on observations *pre* private debt issuance and the year of first private debt issuance by a bank borrower and the inclusion of firm fixed effects.

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%.[12] 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.[13]

3 How do Bank Loans and Private Debt Loans Differ?

It is not possible to determine whether and how bank debt and private debt differ, or if they substitute for each other, by comparing sample averages of bank and PD loans made to different borrowers; observed differences 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.

[12]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).

[13]Appendix Table A.1 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.

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 A.7 illustrates, our findings are robust to excluding buyout loans from our sample, indicating that our findings are not driven by buyout loans but hold more generally.

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.

One drawback of the firm-time fixed effect approach is that it restricts the sample to firms that borrow from multiple lenders in a given year and quarter. Many firms in our sample have loans with more than one lender, but these firms could be systematically different along some dimensions. For this reason, in Section 6.2, we show robustness of these results with less restrictive samples following two strategies. First, we relied on a different source of variation using state x 2-digit NAICS industry x year-quarter fixed effects, similar to other studies (e.g. Sachdeva, Silva, Slutzky and Xu (2023)), to effectively compare firms operating in the same industry and state at the same point in time, while including the same controls. This

approach doubles our sample size relative to the baseline. Second, we exclude firm-time fixed effects and only using firm fixed effects and time effects.

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.

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-loantype fixed effects, reveal that the spreads of PD loans are about 1.7 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. 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. Generally, the elevated spreads of PD loans may reflect compensation for risk or greater contractual flexibility provided by PD lenders, for instance, through *payment-in-kind* features, willingness to "amend-and-extend" or PD lenders' market power.

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 and significant, suggesting that the difference in seniority (priority) between bank loans and PD loans is smaller for buyout loans. In other words, in buyout deals, PD lenders are more likely to provide first-lien senior-secured loans than in non-buyout deals.

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, bank debt and private debt are distinct and imperfectly substitutable financing instruments. While private debt complements relatively secure and senior credit line debt provided by banks, it substitutes for and competes with relatively riskier and junior term loans offered by banks.

4 The Rise of Private Debt and Bank Lending

4.1 How does Private Debt Affect Bank Lending?

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 once a bank borrower accesses private debt, the commitment size of existing bank loans tends to increase and the borrower exhibits an increased propensity to also obtain new bank loans, predominantly in the form of credit lines. In particular, bank borrowers generally continue their borrowing relationships with banks (they even borrow more) and do not drop out of our sample after accessing private debt (see also Section 6.1). Overall, the use of private debt is associated with an increased reliance on bank debt and credit lines, suggesting that private debt amplifies banks' role in liquidity provision through credit lines. Notably, consistent with these findings, Section 5.1 shows that a borrower's reliance on private debt is also linked to higher bank debt (in dollars) and leverage on the firm level.

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

$$y_{l,t} = \beta PD_{i,t} + LoanControls_{l,t} + FirmControls_{i,t} + FEs + \epsilon_{l,t}, \tag{2}$$

where $y_{l,t}$ is a bank loan-specific outcome variable. The dependent 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. Thus, when firm i starts borrowing from PD lenders (in addition to borrowing from banks), the indicator $PD_{i,t}$ takes a value of 1, otherwise 0. We include loan

controls, such as loan size, spread, and maturity, and firm controls, such as the logarithm of book assets, asset tangibility, as well as debt, cash, and EBITDA scaled by book assets.

Depending on the fixed effects included, our regressions exploit two types of variation. First, with loan fixed effects, we compare existing bank loans to a given bank borrower before and after this borrower accesses private debt. Second, including sector-time and bank-time fixed effects, we compare a given bank's loans to dual borrowers to observably similar loans to bank-only borrowers in 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. With the inclusion of bank-time fixed effects, our baseline specification also controls 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 loan borrowers, consistent with evidence in Block, Jang, Kaplan and Schulze (2023).[14] Appendix Table A.5, which reports firm and loan characteristics of this subset of bank-only borrowers, confirms that these leveraged-loan bank borrowers are much more similar to dual borrowers, for instance in terms of Debt/Asset, Tangible Assets, probability of default and (median) firm and loan size. Further, in Appendix Section A4, we show that all our key results remain robust when we lift this restriction and compare loans made to dual borrowers to all other bank loan borrowers observed in the Y-14.

Bank Loan Commitment Increases Following PD Access. First, we run regression (2) with the logarithm of loan commitment (i.e., loan size) and the change in loan commitment denoted as the outcome variables, while including loan fixed effects. Table 5 shows that the coefficient on $PD_{i,t}$ is positive and statistically significant (at different confidence levels) across all specifications. Hence, a borrower's access to private debt is associated with an

[14]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.

increase in loan commitments on its existing bank loans. Such increases in loan commitment post-origination may reflect loan renegotiation upon access to private debt (Roberts and Sufi, 2009; Denis and Wang, 2014; Roberts, 2015).

Event Study: Borrowers Obtain New Bank Loans Following PD Access. Next, we create an indicator that captures whether a given loan is newly originated at observation date t, denoted $New_{l,t}$. Specifically, loan l is classified at report date t as a new origination if t lies in the *same* year-quarter as the year-quarter of the reported origination date. In other specifications, we create analogously an indicator of whether a loan is a newly originated term loan (denoted $NewTermLoan_{l,t}$) or credit line (denoted $NewCreditLine_{l,t}$) respectively. Since the "new loan origination flag" is time-invariant, i.e., does not change over the loan's lifetime, we cannot use loan fixed effects (which would absorb all variation). Our regressions now include, in addition to firm and loan controls, firm, bank-time, and borrower sector-time (industry) fixed effects. Table 6 presents the regression results, and shows that the coefficient on $PD_{i,t}$ is positive and significant across all specifications. That is, when a firm starts borrowing from PD lenders, it also tends to take out new loans from banks. Interestingly, we estimate a larger positive coefficient on $PD_{i,t}$, when we examine whether a loan is a new credit line. Accordingly, while a borrower's reliance on private debt is associated with an increased propensity to take out a new bank loan in general, this borrower is more likely to obtain a credit line rather than a term loan from the bank.

Moreover, we perform an event study in a time window around bank borrowers' access to private debt; we analyze a borrower's propensity to obtain a new credit line and term loan upon accessing private debt respectively. In particular, we run the following dynamic difference-in-difference specification

$$New_{l,t} = \sum_{s=-8}^{12} \beta_s PD_{i,t+s} + X_{i,l,t} + FEs + \epsilon_{l,t}, \tag{3}$$

where $New_{l,t} \in \{0, 1\}$ either captures whether 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). Figure 4 graphically depicts the difference-in-differences estimates. Observe that the difference-in-difference estimates are close to zero prior to PD access, while they are highly positive at the time of PD access and the quarter thereafter; the difference-in-difference estimates return toward zero again two quarters after PD access. The coefficients in the quarter of PD access and thereafter are noticeably larger for credit lines than for term loans. Consequently, once a bank borrower taps into private debt, this borrower exhibits an increased propensity to also obtain new bank loans, primarily credit lines.

Bank Loan Spreads Increase following PD Access. Table 6 also shows that access to private debt is associated with increased loan spreads on bank loans. The effect is larger when focusing on newly originated loans, in which case the outcome variable is the spread of loan l originated at time t. The regression results indicate that a given bank charges about 0.20 percentage points higher loan spreads, when the borrower firm also borrows from PD lenders. Given a median spread of bank loans of about 1.5 percentage points, PD access is associated with about 10% higher spreads on bank loans. Thus, once a bank borrower accesses private debt, banks extend additional credit at increased spreads. The increased spreads may reflect that banks price-in higher default risk for loans to dual borrowers, since their leverage increases sharply after tapping into private debt.

Firm-Level Evidence. We showed that a borrower's dependence on private debt is associated with an increased reliance on bank debt, particularly credit lines, and with higher loan spreads on bank loans. We confirm these findings in firm-level regressions where we compare dual borrowers to similar bank-only borrowers, including firm fixed effects, sector-time fixed effects, as well as time-varying controls. The exact empirical specification is discussed in greater detail in Section 5.1, and the regression results are presented in Table 7. Table 7 shows that the use of private debt is linked to higher leverage (measured by Debt/Assets or Debt/EBITDA) and a lower interest coverage ratio.

More importantly, 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. These findings suggest that while PD lenders are displacing banks in providing riskier term loans, they are not competing with banks in liquidity provision through credit lines and may even strengthen banks' role as liquidity providers.

4.2 How Private Debt Amplifies Banks' Role as Liquidity Providers

We find that the use of private debt is linked to an increased reliance on bank debt, specifically credit lines, making private debt and bank credit lines appear as complements. In particular, our results suggest that private debt amplifies banks' role in liquidity provision through credit lines. Indeed, access to private debt could increase firms' demand for credit lines, improve their access to bank credit (i.e., the supply of credit lines), or both. For example, in Section 5.1, we show that firms often use private credit to invest and expand operations, which can increase both their demand for and access to bank credit lines. A potential supply-side economic mechanism is that private debt, being relatively junior and riskier than bank debt, takes on risk and effectively insures the more senior bank loans in the firm's capital structure, thereby expanding the firm's borrowing capacity with banks. This mechanism is theoretically demonstrated in Hartman-Glaser et al. (2024), who show that debts of different seniorities and types (i.e., term loans and credit lines) act as complements. Additionally, PD lenders' provision of relatively junior, riskier credit may serve as a certification of the borrower's creditworthiness — since private debt lenders may screen and monitor borrowers when investing — or as a signal of their willingness to support the borrower in distress situations, both of which should enhance borrowers' access to bank credit. Note that the investment and certification of PD lenders could complement information production by banks and still convey valuable information for banks, even if they do or did their own due diligence.

Both the insurance and certification effects of private debt are likely to be stronger and borrowers should be more likely to obtain new bank credit lines after accessing private debt,

especially when (i) PD lenders provide larger loans, giving them more skin in the game, or (ii) when PD lenders have higher asset under management (AUM) and thus have a strong reputation, indicating a greater ability to absorb borrower risk, offer support in distress, or conduct due diligence. We test this hypothesis and provide additional empirical support for the idea that private debt enhances access to bank credit, using both extensive and intensive margin measures of bank lending.

Extensive Margin Outcome Variable. We first construct a dummy variable, $Reputation_i$, for each dual borrower i. This variable takes the value of 1 if the PD lender extending credit to a specific bank borrower is among the top 20 PD lenders, as reported by Preqin for the period 2013-2023, based on assets under management. To capture the intensive margin of a borrower's dependence on private debt as well as PD lenders' skin-in-the-game, we calculate for dual borrower i the amount of its first PD loan received — which we denote by $PDLoanAmount_i$.

Next, we regress an indicator capturing whether (i) a loan is any newly originated loan (i.e., $New_{l,t}$), or (ii) specifically a newly originated credit line (i.e., $NewCreditLine_{l,t}$) or (iii) a newly originated term loan (i.e., $NewTermLoan_{l,t}$) on our measure of $Reputation_i$ or $PDLoanAmount_i$ — recall that these indicators were introduced in Section 4.1. Table 8 presents the regression results. Across all specifications, the coefficients on $Reputation_i$ and $PDLoanAmount_i$ are positive and significant. As before, these coefficients are larger when the outcome variable is the credit line rather than term loan indicator. This suggests that the use of private debt is more strongly associated with increased reliance on bank debt — particularly credit lines — when the PD lender has a high reputation and provides larger loans. These findings provide empirical support for the idea that a borrower's reliance on private debt — both on the extensive and intensive margin — is associated with greater reliance on bank debt and credit lines, amplifying banks' role as liquidity providers through credit lines. They provide also support for the supply-side explanation that private debt use expands firms' access to bank credit lines.

Intensive Margin Outcome Variable. We examined the effects of private debt on a borrower's reliance on bank debt using a binary outcome variable (extensive margin) that captures whether a borrower obtains a new bank loan. We now employ an intensive margin measure to quantify the amount of new bank debt obtained by borrowers after gaining access to private debt. Specifically, we now calculate $New_{l,t}$ as the logarithm of the loan amount of loan l at time t, provided loan l is newly originated at that time; if not, we set $New_{l,t}$ to zero. Similarly, we calculate $NewCreditLine_{l,t}$ (or $NewTermLoan_{l,t}$) as the logarithm of the loan amount for newly originated credit lines (or term loans) at time t; otherwise, they are set to zero. Notably, our quarterly loan-level regressions control for the number of new loans, new credit lines, and new term loans (depending on the specification) that the borrower receives in a given quarter. Further, we include firm controls, as well as firm, sector×year-year, and bank×year-quarter fixed effects. Loosely speaking, we compare the size of new bank loans to bank-only and dual borrowers at a given point in time. Table 9 presents the results when $New_{l,t}$, $NewCreditLine_{l,t}$, and $NewTermLoan_{l,t}$ are used as outcome variables in regression (2), where we include our measure of lender reputation, the PD loan amount, and similar controls and fixed effects as before.

We observe from Table 9 the coefficients on $PD_{i,t}$, $PDLenderReputation_i$, as well as $PDLoanAmount_i$ are positive and statistically significant in all specifications. Thus, relative to comparable bank-only borrowers, dual borrowers are more likely to receive new bank loans and credit lines, and these new bank loans (credit lines) tend to be larger, indicating an increased reliance on bank debt and particularly credit lines. Taken together, Table 8 and Table 9 suggests that a borrower's reliance on private debt—measured on both the extensive and intensive margins—is associated with an increased likelihood of obtaining new bank loans and larger bank loans, particularly credit lines. In other words, private debt amplifies banks' liquidity provision through credit lines on both the extensive and intensive margins.

4.3 Credit Line Drawdown and Default Risks

We have shown that the use of private debt is associated with enhanced access to bank credit lines, which are an important tool for liquidity risk management and a crucial source of funding for firms in distress (Ivashina and Scharfstein, 2010a; Berrospide and Meisenzahl, 2015). When providing corporate 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' credit supply (Greenwald et al., 2021; Acharya, Jager and Steffen, 2023). In this section, we show that bank borrowers' reliance on private debt is associated with increased drawdown and default risks of bank credit lines 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. Figure 5 shows that dual borrowers exhibited a sharp spike in their credit line drawdown rate at the onset of COVID-19, increasing utilization from 25% to 35%. In contrast, bank-only leveraged-loan borrowers, who began with higher utilization, did not draw down their credit lines as intensively.

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 three different (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. Third, we employ a loan guarantee indicator, capturing whether a loan has a loan guarantee from a separate legal corporate entity at a given point in time. 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.

Reliance on Private Debt Linked to Higher Drawdown and Default Risks. Columns (1) and (2) of Table 10 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. Further, since our loan level controls include interest rate spread, one potential takeaway is that banks do not fully anticipate the additional liquidity and default risk stemming from borrowers' reliance on private debt. Alternatively, since spreads in credit lines are pre-determined, banks cannot generally renegotiate pricing unless the borrower violates a loan covenant, even if they anticipate greater risk.

According to our previous findings, bank borrowers often obtain additional bank debt, once they access private debt. Why do banks provide dual borrowers with such loans, considering their elevated drawdown and default risks during times of market-wide distress? Our results in columns (5) and (6) provide a potential explanation by showing that dual-borrowers were significantly more likely to provide loan guarantees to banks during Covid-19.[15]

[15]Prior studies have shown that loan guarantees can lead to greater availability of credit by reducing loss given default (Beyhaghi, 2022).

Private Debt and Default on Bank Loans. We examine whether a bank borrower's reliance on private debt is linked with more frequent (realized) defaults on bank loans. We measure defaults in two ways. First, following Haque et al. (2023), we define default as a dummy taking value of 1 if any interest or principle payment in a given loan is past due by more than 90 days. Second, we construct a "chargeoff dummy" which takes a value of 1 if lender report positive chargeoff on a given loan at a given time. We then estimate a variant of regression (2), augmented with the interaction term $Drawdown_t \times PD_{i,t}$. As before, we include both loan and firm controls as well as various fixed effects. Using loan fixed effects, we account for time-invariant loan characteristics, such as loan type. Some specifications exploit a different source of variation by considering firm and bank-time fixed effects, effectively comparing loans made by the same bank to dual and bank-only borrowers in the same sector.

Table 11 illustrates that drawdowns in general are associated with an increased likelihood of default. Interestingly, this effect is stronger for dual borrowers, in that the coefficient on the interaction term $Drawdown_t \times PD_{i,t}$ is positive and significant. When a bank borrower also relies on private debt, as opposed to only borrowing from banks, it draws more heavily on its credit lines during distress and becomes more likely to default following a credit line drawdown of a given size.

Summary and Interpretation. In summary, a bank borrower's reliance on private debt is associated with increased use of bank credit lines, as well as increased drawdown risks and default risks on bank-provided credit lines. We find that during times of market-wide distress, dual borrowers drew down their credit lines more heavily than comparable bank-only borrowers. 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 significant liquidity risks.

PPP and Alternative Explanations. 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. Therefore, it is unlikely that bank-only borrowers in our control group were eligible for PPP or, at the very least, had systematically better access to it.

Nevertheless, using publicly available data from the Small Business Administration (SBA), we confirm our results are unchanged if we excluded 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 ($\approx 2\%$), consistent with the arguments mentioned above. Re-estimating Eq. 4, we show in Appendix Table A.6 that all our results are unchanged.

4.4 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 6 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.[16]

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.

[16]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.

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.[17] 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 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 13 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

[17] 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.

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 13 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.

5 Firm-Level Effects

5.1 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 of 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; these firms borrow from banks

once they tap into private debt. 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 7. 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 (1) of Table 7 use firm-level debt (i.e., total debt/assets) 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 2.75 percentage points. The economic magnitude is large, given a median level of Debt/Assets of about 40%. 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 7 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.

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 A.2 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 A.3 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.

5.2 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 A.3. 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 Robustness

6.1 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 A.10 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.

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 x time fixed effect, and introduce state x industry x time fixed effects, where industry is measured by 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 A.8. 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 x time fixed effect and introduce only firm and time (year-quarter) fixed effects. These results are reported in Appendix Table A.9. 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 Baseline 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 (2) excluding all private debt loans used for buyout financing. Appendix Table A.7 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 et al. (2022).

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. That is, for a significant share of PD borrowers, banks and PD lenders (such as BDCs or private debt funds) extend credit, akin to syndication. In such joint credit provision, PD lenders provide larger loans with higher spreads, typically under the form of term loans, while credit line debt is obtained mostly from banks. 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 often obtains additional bank credit lines, especially when private debt lenders have high reputation (measured by their asset under management)

or provide large loans (giving them more skin-in-the-game). These findings indicate that private debt enhances borrowers' access to and dependence on bank credit lines. Overall, our findings suggest that private debt substitutes for riskier, long-term bank credit, but amplifies banks' role as liquidity providers through credit lines. In particular, PD lenders do not compete with banks in providing liquidity through credit, possibly reflecting banks' deposit-based funding structure that gives them an advantage in this area. However, because dual borrowers exhibt 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.

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), 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.

References

Acharya, Viral V, Manasa Gopal, and Sascha Steffen, "Fragile Financing? How Corporate Reliance on Shadow Banking Affects Bank Provision of Liquidity," *Working Paper*, 2024.

_ , _ , Maximilian Jager, and Sascha Steffen, "Shadow Always Touches the Feet: Implications of Bank Credit Lines to Non-Bank Financial Intermediaries," *Available at SSRN 4847858*, 2024.

_ , Maximilian Jager, and Sascha Steffen, "Contingent Credit Under Stress," Technical Report, National Bureau of Economic Research 2023.

_ , Robert Engle, Maximilian Jager, and Sascha Steffen, "Why did bank stocks crash during COVID-19?," *The Review of Financial Studies*, 2024, *37* (9), 2627–2684.

Becker, Bo and Victoria Ivashina, "Cyclicality of credit supply: Firm level evidence," *Journal of Monetary Economics*, 2014, *62*, 76–93.

Benmelech, Efraim, Jennifer Dlugosz, and Victoria Ivashina, "Securitization without adverse selection: The case of CLOs," *Journal of Financial Economics*, 2012, *106* (1), 91–113.

Berlin, Mitchell, Greg Nini, and Edison G. Yu, "Concentration of control rights in leveraged loan syndicates," *Journal of Financial Economics*, 2020, *137* (1), 249–271.

Berrospide, Jose M and Ralf Meisenzahl, "The real effects of credit line drawdowns," 2015.

Beyhaghi, Mehdi, "Third-party credit guarantees and the cost of debt: Evidence from corporate loans," *Review of Finance*, 2022, *26* (2), 287–317.

Bidder, Rhys M, John R Krainer, and Adam Hale Shapiro, "De-leveraging or de-risking? How banks cope with loss," *Review of Economic Dynamics*, 2021, *39*, 100–127.

Block, Joern, Young Soo Jang, Steven N Kaplan, and Anna Schulze, "A survey of private debt funds," Technical Report, National Bureau of Economic Research 2023.

Block, Jorn H, Young Soo Jang, Steven N Kaplan, and Anna Schulze, "A Survey of Private Debt Funds," *Available at SSRN*, 2022.

Brown, James R, Matthew T Gustafson, and Ivan T Ivanov, "Weathering cash flow shocks," *The Journal of Finance*, 2021, *76* (4), 1731–1772.

Buchak, Greg, Gregor Matvos, Tomasz Piskorski, and Amit Seru, "Fintech, regulatory arbitrage, and the rise of shadow banks," *Journal of financial economics*, 2018, *130* (3), 453–483.

Caglio, Cecilia R, R Matthew Darst, and ebnem Kalemli-Özcan, "Risk-taking and monetary policy transmission: Evidence from loans to smes and large firms," Technical Report, National Bureau of Economic Research 2021.

Cai, Fang and Sharjil Haque, "Private Credit: Characteristics and Risks," 2024.

Carey, Mark, Mitch Post, and Steven A Sharpe, "Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting," *The Journal of Finance*, 1998, *53* (3), 845–878.

Chernenko, Sergey, Isil Erel, and Robert Prilmeier, "Why do firms borrow directly from nonbanks?," *The Review of Financial Studies*, 2022, *35* (11), 4902–4947.

_ , Robert Ialenti, and David Scharfstein, "Bank Capital and the Growth of Private Credit," Technical Report, Harvard University Working Paper 2024.

Chodorow-Reich, Gabriel, Olivier Darmouni, Stephan Luck, and Matthew Plosser, "Bank liquidity provision across the firm size distribution," *Journal of Financial Economics*, 2022, *144* (3), 908–932.

Cohen, Gregory J, Jacob Dice, Melanie Friedrichs, Kamran Gupta, William Hayes, Isabel Kitschelt, Seung Jung Lee, W Blake Marsh, Nathan Mislang, Maya Shaton et al., "The US syndicated loan market: Matching data," *Journal of Financial Research*, 2021, *44* (4), 695–723.

Davydiuk, Tetiana, Tatyana Marchuk, and Samuel Rosen, "Direct lenders in the US middle market," *Available at SSRN 3568718*, 2020.

_ , _ , and _ , "Market Discipline in the Direct Lending Space," *Available at SSRN 3729530*, 2020.

Demiroglu, Cem and Christopher M James, "The role of private equity group reputation in LBO financing," *Journal of Financial Economics*, 2010, *96* (2), 306–330.

Denis, David J and Jing Wang, "Debt covenant renegotiations and creditor control rights," *Journal of Financial Economics*, 2014, *113* (3), 348–367.

_ **and Vassil T Mihov**, "The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings," *Journal of financial Economics*, 2003, *70* (1), 3–28.

Diamond, Douglas W, "Monitoring and reputation: The choice between bank loans and directly placed debt," *Journal of political Economy*, 1991, *99* (4), 689–721.

Erel, Isil, Thomas Flanagan, and Michael Weisbach, "Risk-Adjusting the Returns to Private Debt Funds," *Working Paper*, 2024.

Favara, Giovanni, Camelia Minoiu, and Ander Perez-Orive, "Zombie lending to us firms," *Available at SSRN 4065886*, 2022.

_ **, Ivan Ivanov, and Marcelo Rezende**, "GSIB surcharges and bank lending: Evidence from US corporate loan data," *Journal of Financial Economics*, 2021, *142* (3), 1426–1443.

Fleckenstein, Quirin, Manasa Gopal, German Gutierrez Gallardo, and Sebastian Hillenbrand, "Nonbank lending and credit cyclicality," *Review of Financial Studies (forthcoming)*, 2024.

Garfinkel, Jon A, Erik J Mayer, Ilya A Strebulaev, and Emmanuel Yimfor, "Alumni networks in venture capital financing," *SMU Cox School of Business Research Paper*, 2021, (21-17).

Gopal, Manasa and Philipp Schnabl, "The rise of finance companies and fintech lenders in small business lending," *The Review of Financial Studies*, 2022, *35* (11), 4859–4901.

Gornall, Will, Oleg Gredil, Sabrina T Howell, Xing Liu, and Jason Sockin, "Do employees cheer for private equity? the heterogeneous effects of buyouts on job quality," *The Heterogeneous Effects of Buyouts on Job Quality (December 24, 2021)*, 2021.

Greenwald, Daniel L, John Krainer, and Pascal Paul, "The credit line channel," in "in" Federal Reserve Bank of San Francisco 2021.

Haque, Sharjil and Anya V Kleymenova, "Private equity and debt contract enforcement: Evidence from covenant violations," 2023.

_ , **Simon Mayer, and Teng Wang**, "How Private Equity Fuels Non-Bank Lending," *Available at SSRN 4429521*, 2023.

_ , **Young Soo Jang, and Jessie Jiaxu Wang**, "Indirect Credit Supply: How Bank Lending to Private Credit Shapes Monetary Policy Transmission," *Available at SSRN 5125733*, 2025.

_ , _ , **and Simon Mayer**, "Private Equity and Corporate Borrowing Constraints: Evidence from Loan Level Data," *Available at SSRN 4294228*, 2022.

Hartman-Glaser, Barney, Simon Mayer, and Konstantin Milbradt, "A Theory of Cash Flow-Based Financing with Distress Resolution," *Review of Economic Studies (forthcoming)*, 2024.

Irani, Rustom M and Ralf R Meisenzahl, "Loan sales and bank liquidity management: Evidence from a US credit register," *The Review of Financial Studies*, 2017, *30* (10), 3455–3501.

_ , **Rajkamal Iyer, Ralf R Meisenzahl, and Jose-Luis Peydro**, "The rise of shadow banking: Evidence from capital regulation," *The Review of Financial Studies*, 2021, *34* (5), 2181–2235.

Ivashina, Victoria, "Asymmetric information effects on loan spreads," *Journal of financial Economics*, 2009, *92* (2), 300–319.

_ **and Anna Kovner**, "The private equity advantage: Leveraged buyout firms and relationship banking," *The Review of Financial Studies*, 2011, *24* (7), 2462–2498.

_ **and David Scharfstein**, "Bank lending during the financial crisis of 2008," *Journal of Financial economics*, 2010, *97* (3), 319–338.

_ **and** _ , "Loan syndication and credit cycles," *American Economic Review*, 2010, *100* (2), 57–61.

Jang, Young Soo, "Are Direct Lenders More Like Banks or Arm's-Length Investors? Evidence from Loan Agreements and COVID-Related Distress," *Evidence from Loan Agreements and COVID-Related Distress (August 2, 2023)*, 2023.

Jiang, Erica Xuewei, "Financing competitors: Shadow banks' funding and mortgage market competition," *The Review of Financial Studies*, 2023, *36* (10), 3861–3905.

Kashyap, Anil K, Raghuram Rajan, and Jeremy C Stein, "Banks as liquidity providers: An explanation for the coexistence of lending and deposit-taking," *The Journal of finance*, 2002, *57* (1), 33–73.

Khwaja, Asim Ijaz and Atif Mian, "Tracing the impact of bank liquidity shocks: Evidence from an emerging market," *American Economic Review*, 2008, *98* (4), 1413–1442.

Malenko, Andrey and Nadya Malenko, "A theory of LBO activity based on repeated debt-equity conflicts," *Journal of Financial Economics*, 2015, *117* (3), 607–627.

Rajan, Raghuram G, "Insiders and outsiders: The choice between informed and arm's-length debt," *The Journal of finance*, 1992, *47* (4), 1367–1400.

Roberts, Michael R, "The role of dynamic renegotiation and asymmetric information in financial contracting," *Journal of Financial Economics*, 2015, *116* (1), 61–81.

_ **and Amir Sufi**, "Renegotiation of financial contracts: Evidence from private credit agreements," *Journal of Financial Economics*, 2009, *93* (2), 159–184.

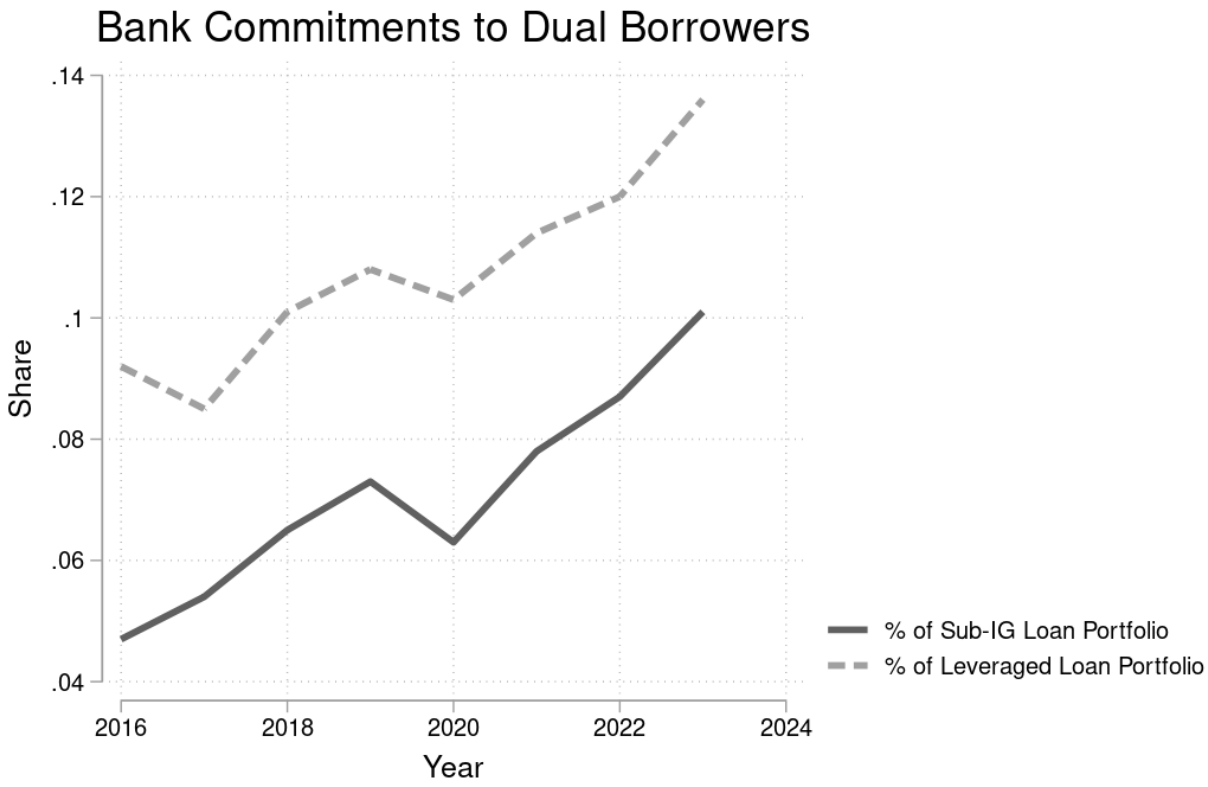
Sachdeva, Kunal, André F Silva, Pablo Slutzky, and Billy Xu, "Defunding Controversial Industries: Can Targeted Credit Rationing Choke Firms?," *Available at SSRN 4273118*, 2023.

Shive, Sophie and Margaret Forster, "Quos Custodiunt Custodes? Sponsor Reputation and Capital Structure Dynamics in Leveraged Buyouts," *Working Paper*, 2021.

Sufi, Amir, "Information asymmetry and financing arrangements: Evidence from syndicated loans," *The Journal of Finance*, 2007, *62* (2), 629–668.

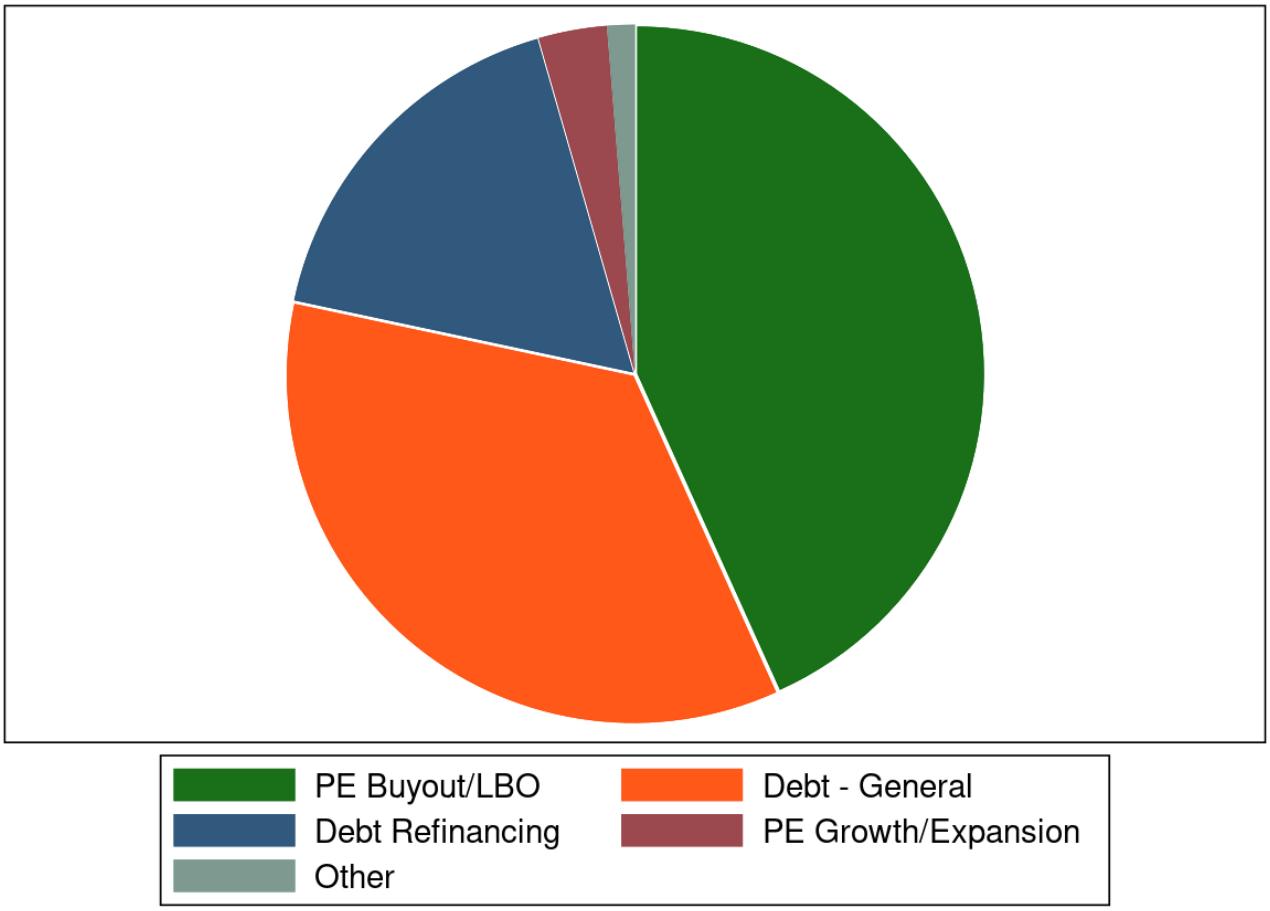
Tang, Huan, "Peer-to-peer lenders versus banks: substitutes or complements?," *The Review of Financial Studies*, 2019, *32* (5), 1900–1938.

Figure 1: Bank Loan Commitments to Dual Borrowers



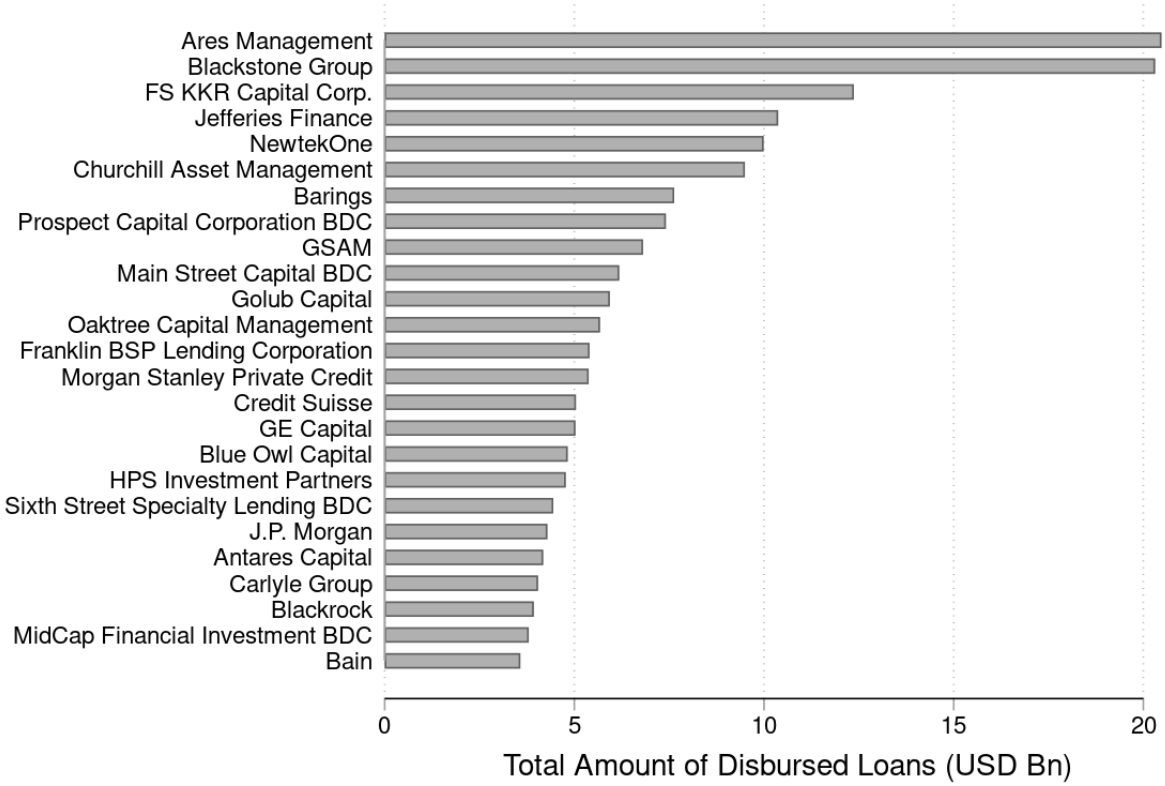
(a) *Notes: This figure reports the share of bank loan commitments to dual borrowers in percent of total leveraged loans (dashed line) and total sub-investment grade loans (dark solid line) held by banks. Sub-Investment Grade loans are defined as those with credit rating of BB or lower.*

Figure 2: The Use of Private Debt and Deal Types



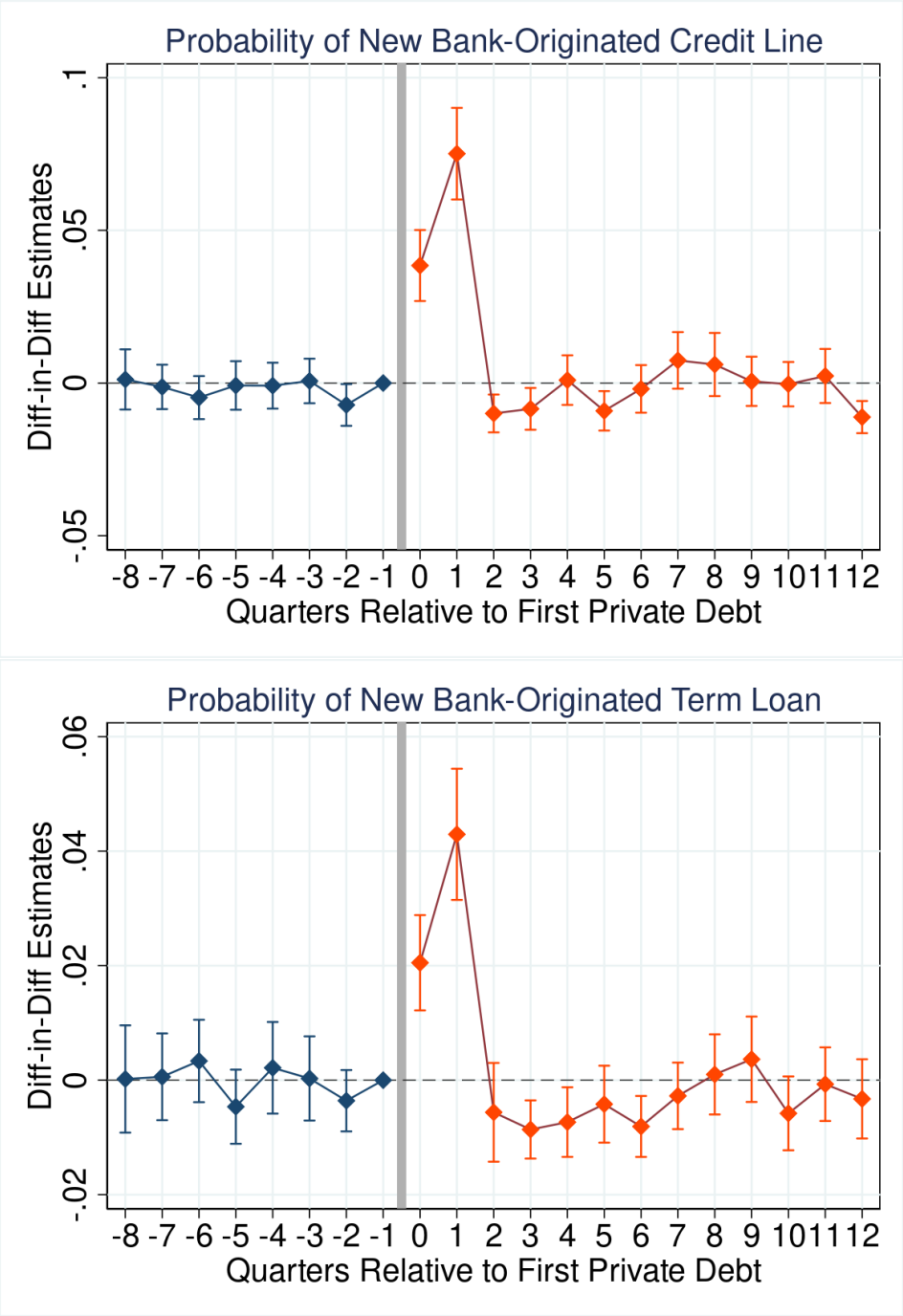
(a) *Notes: This figure reports the share of private debt deals by deal type, weighted by dollar amount of deal size. 'Debt - General' refers to debt raised for general corporate purposes. Source: Pitchbook.*

Figure 3: Top PD Lenders in Pitchbook Sample



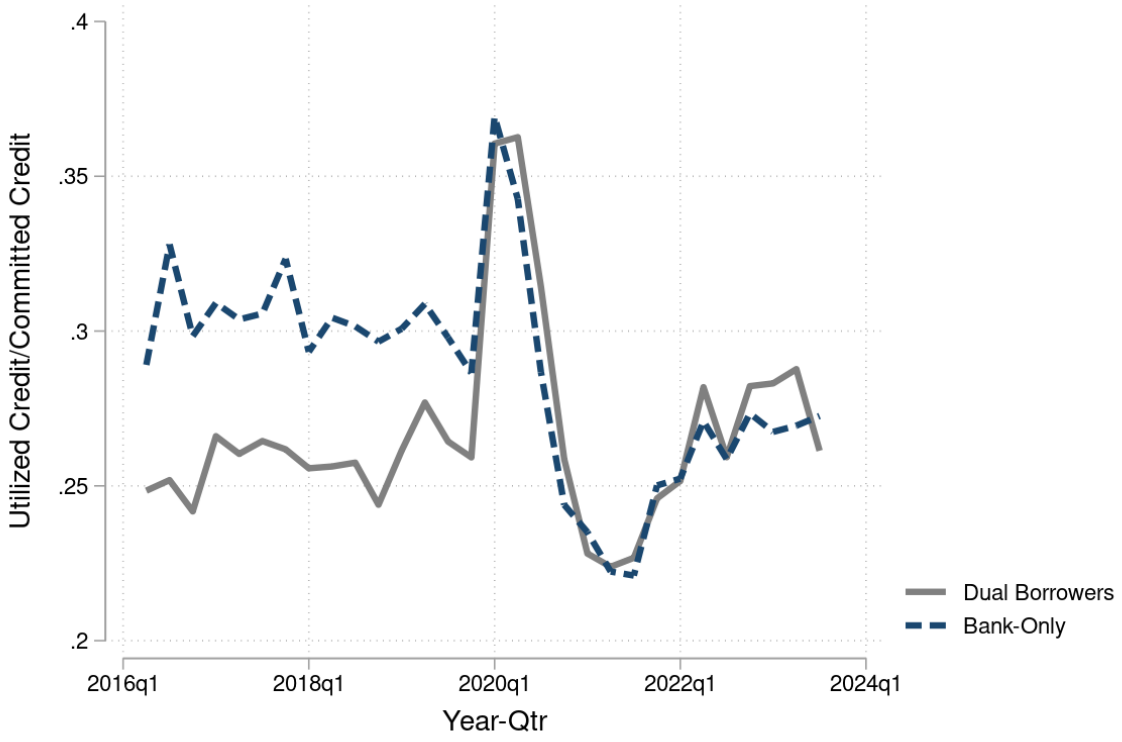
(a) *Notes: This figure reports top 25 private debt lenders in the full Pitchbook sample. The figure aggregates all PD loans in the Pitchbook sample across time. The sample period is January 2013 to July 2023. The sample is restricted to single lender loans since Pitchbook does not report loan shares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

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



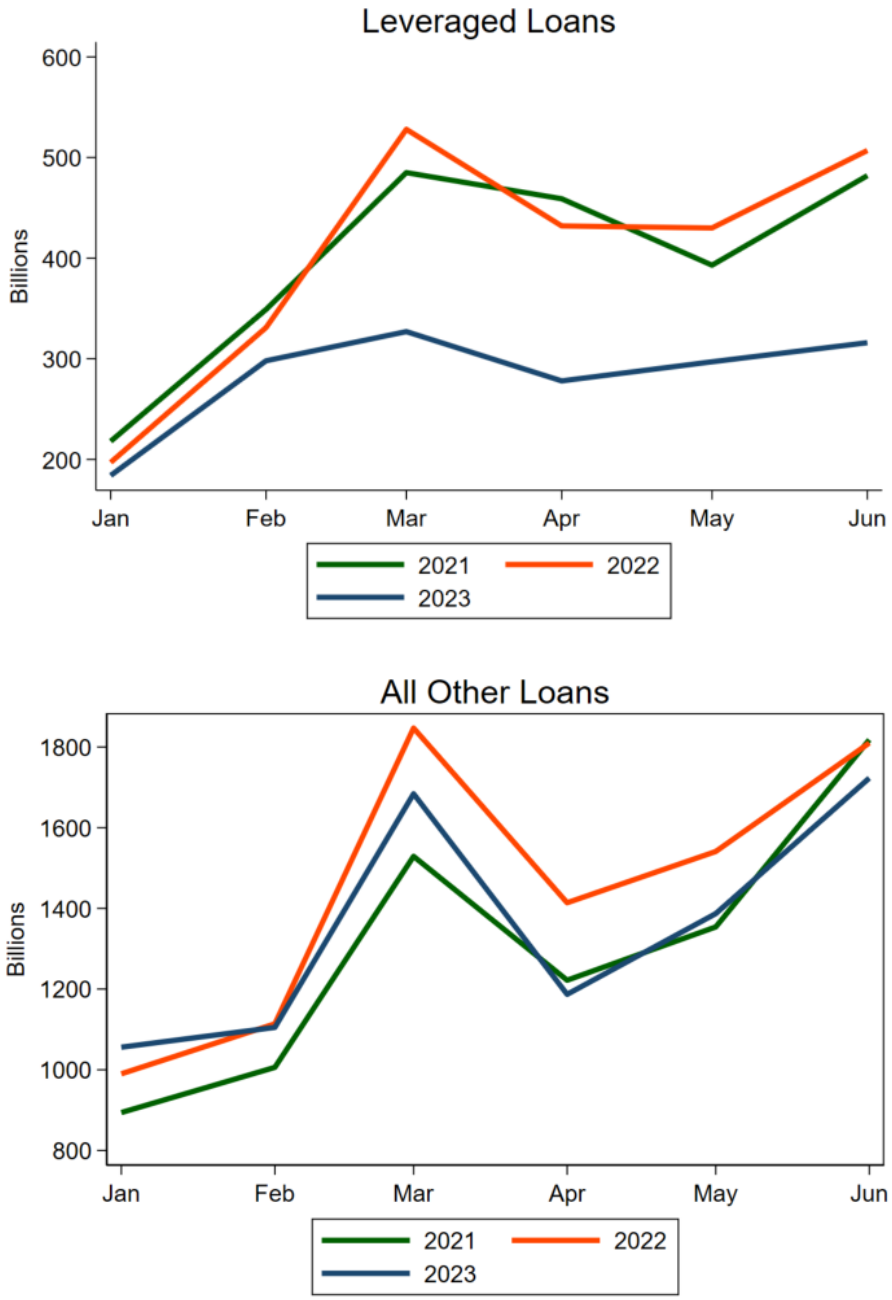
(a) *Notes: This chart examines the probability of obtaining new bank loans once a borrower first issues private debt. It presents dynamic difference-in-difference regression estimates from Eq. 3 for each event-quarter relative to a firm's first private debt issuance. The data is at the loan-YearQtr 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: Credit Line Drawdown Rate of Dual Borrowers



(a) *Notes: This figure plots the mean credit line drawdown rate, defined as the ratio of utilized to committed credit, for dual borrowers. The grey line plots dual borrowers, while the dark blue line plots bank-only leveraged-loan borrowers. The figure shows dual borrowers exhibited sharp spike in drawdown rate during the Covid pandemic.*

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. 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 effect, however, for other loans. This suggests that the SVB collapse represented an exogenous, negative shock to leveraged bank lending, but not necessarily to bank lending in general.*

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	66,838	1,190	25.7	80.1	410	3,940
Net Sales	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. Liquidity is defined at Cash and Marketable Securities over total assets. All variables are defined in Appendix A.1.*

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	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	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	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	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. Panel A reports all private credit facilities obtained from Pitchbook. Panel B reports bank loan characteristics of companies with private debt (i.e. Dual Borrowers) using Y14. Panel C reports bank loan characteristics of companies without private debt (i.e bank only borrowers). All samples are restricted to new originations only. In Panel A, loans other than revolving credit line and term loans include hybrid loans. In Panels B and C, loans other than revolving credit lines and term loans include capitalized lease obligation, standby letter of credit, fronting exposures etc. All variables are defined in Appendix A.1.*

Table 3: Bank Loans versus PD Loans: Loan 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 regression of Eq. 1 to estimate 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. The dependent variable is loan amount (in logs) 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: 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 regression of Eq. 1 to estimate 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 loan amount and spreads only. Standard errors are clustered at the firm level.*

Table 5: Bank Credit Provision Upon Private Debt Issuance: Existing Loans

	Commitment (log)	Commitment (log)	Commitment (change)	Commitment (change)
	(1)	(2)	(3)	(4)
$PD_{i,t}$	0.030**	0.035**	0.018***	0.019***
	(0.014)	(0.014)	(0.014)	(0.014)
R-squared	0.966	0.966	0.438	0.437
Loan Controls	Y	Y	Y	Y
Firm Controls	Y	N	Y	N
Sector×YearQtr FE	Y	Y	Y	Y
Loan FE	Y	Y	Y	Y
N	542,000	542,000	465,000	465,000

(a) *Notes: This table reports regression of Eq. 2 to estimate the effect of issuing private debt on loan commitments of existing bank loans. 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. In columns (1) and (2), the dependent variable is the natural log of loan commitment. In columns (3) and (4), the dependent variable captures the percentage change in loan commitments for a given unique loan facility. To minimize the effect of outliers, columns (3) an (4) excludes observations with percentage changes less than -100 percent. The sample is restricted to existing loans, thus, excludes new originations. Firm Controls include the natural log of firm book asset, Tangibility (Tangible Asset/Total Asset), Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls include the amount of loan commitment, loan spread and maturity. The control group is restricted to bank-reported leveraged loans to bank-only borrowers. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 6: Bank Credit Provision Upon Private Debt Issuance: New Loans and Loan Pricing

	Loan (new)	Term Loan (new)	Credit Line (new)	Spreads	Spreads
	(1)	(2)	(3)	(4)	(5)
$PD_{i,t}$	0.037***	0.010***	0.021***	0.191***	0.078**
	(0.005)	(0.002)	(0.003)	(0.052)	(0.031)
R-squared	0.122	0.085	0.095	0.556	0.577
Firm FE	Y	Y	Y	Y	Y
Bank×YearQtr FE	Y	Y	Y	Y	Y
Sector×YearQtr FE	Y	Y	Y	Y	Y
Sample	Full	Full	Full	New Loans	Full
N	583,787	583,787	583,787	40,612	583,787

(a) *Notes: This table reports regression of Eq. 2 to estimate the effect of issuing private debt on the probability of issuing new bank loans and on loan spreads. 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. In column (1), the dependent variable takes a value of 1 if a given loan* l *at time* t *is a new origination, 0 otherwise. In column (2), the dependent variable takes a value of 1 if a given loan* l *at time* t *is a new origination and is a credit line, 0 otherwise. In column (3), the dependent variable takes a value of 1 if a given loan* l *at time* t *is a new origination and is a term loan, 0 otherwise. In columns (4) and (5) the dependent variable is interest rate spread, reported by banks in basis points for new loans and all loans respectively. At report date* t*, loan* l *is classified as new origination using the "new origination flag" reported in the Y-14 data, specifically when date* t *lies within a quarter of the loan's origination date. 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, loan spread 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 7: 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 regression of Eq. 6 to estimate the differential effect of issuing private debt on firm-level financial outcomes, relative to bank-only borrowers. Data is at the (borrower) firm-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 issues 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 8: How Private Debt Increases Reliance on Bank Debt (Extensive Margin)

	New Loan	New Loan	New Credit Line	New Credit Line	New Term Loan	New Term Loan
	(1)	(2)	(3)	(4)	(5)	(6)
PD Lender Reputation	0.0752***		0.0488***		0.0197**	
	(0.018)		(0.012)		(0.008)	
PD Loan Amount $\times$ $PD_{i,t}$		0.0198***		0.0117***		0.00481***
		(0.003)		(0.002)		(0.001)
$PD_{i,t}$	0.0343***	0.0276***	0.0123***	0.0148***	0.00910***	0.00755***
	(0.005)	(0.005)	(0.003)	(0.003)	(0.002)	(0.002)
R-squared	0.122	0.122	0.0949	0.0951	0.0846	0.0846
Bank×YearQtr FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Sector×YearQtr FE	Y	Y	Y	Y	Y	Y
Firm & Loan Controls	Y	Y	Y	Y	Y	Y
N	583737	583737	583737	583737	583737	583737

(a) *Notes: This table reports regression of Eq. 2 to estimate the effect of heterogeneity in private debt lender reputation and private debt loan amount on the probability of issuing new bank loans. 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. In column (1)-(2), the dependent variable takes a value of 1 if a given loan is a new origination, 0 otherwise. In column (3)-(4), the dependent variable takes a value of 1 if a given loan is a new origination and is a credit line, 0 otherwise. In column (5)-(6), the dependent variable takes a value of 1 if a given loan is a new origination and is a term loan, 0 otherwise. PD Lender Reputation takes value of 1 if the private debt lender for a given bank borrower is among the top 20 PD lenders reported by Preqin for the period 2013-2023, based on assets under management. PD Loan Amount is the private debt loan amount that a given bank borrower has received from the PD lender, which by definition is 0 for the control group. The control group is restricted to bank-reported leveraged 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, loan spread and maturity. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 9: How Private Debt Increases Reliance on Bank Debt (Intensive Margin)

	Any Loan	Any Loan	Credit Line	Credit Line	Term Loan	Term Loan
	(1)	(2)	(3)	(4)	(5)	(6)
PD Lender Reputation	0.607***		0.404***		0.175*	
	(0.215)		(0.120)		(0.091)	
PD Loan Amount $\times$ $PD_{i,t}$		0.1008***		0.0483**		0.0349***
		(0.037)		(0.020)		(0.013)
$PD_{i,t}$	0.231***	0.208***	0.0805***	0.0749*	0.0801***	0.0706***
	(0.062)	(0.064)	(0.040)	(0.041)	(0.024)	(0.013)
R-squared	0.306	0.306	0.250	0.250	0.202	0.202
Bank x YearQtr FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Sector x YearQtr FE	Y	Y	Y	Y	Y	Y
Firm & Loan Controls	Y	Y	Y	Y	Y	Y
N	579579	579579	578126	578126	578126	578126

(a) *Notes: This table reports regression of Eq. 2 to estimate the effect of heterogeneity in private debt lender reputation and private debt loan amount on the dollar amount of newly originated bank loans. 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. In column (1)-(2), the dependent variable is the natural log of the dollar amount of a newly originated loan, 0 otherwise. In column (3)-(4), the dependent variable is the natural log of dollar amount of a newly originated credit line, 0 otherwise. In column (5)-(6), the dependent variable is the natural log of the dollar amount of a newly originated term loan, 0 otherwise. PD Lender Reputation takes value of 1 if the private debt lender for a given bank borrower is among the top 20 PD lenders reported by Preqin for the period 2013-2023, based on assets under management. PD Loan Amount is the private debt loan amount that a given dual borrower i has received in its first PD loan up to time t. By definition, this variable is 0 for the control group of bank-only borrowers, and it equals zero prior to first access to private debt (i.e., when* $PD_{i,t} = 0$*). Columns (1)-(2) control for the total number of newly originated loans given to a borrower-YearQtr. Columns (3)-(4) control for the total number of newly originated credit lines given to a borrower-YearQtr. Columns (5)-(6) control for the total number of newly originated term loans given to a borrower-YearQtr. The control group is restricted to bank-reported leveraged 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, loan spread and maturity. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 10: Covid, Bank Loan Drawdown and Default Risk

	Drawdown	Drawdown	Default Probability	Default Probability	Loan Gaurantee	Loan Gaurantee
	(1)	(2)	(3)	(4)	(5)	(6)
$PD_{it} \times Covid_t$	0.0211***	0.0379***	0.228	0.367**	0.0195**	0.0161**
	(0.01)	(0.01)	(0.17)	(0.19)	(0.01)	(0.01)
PD_{it}	-0.00115	-0.00503	0.272	0.334	0.0213*	0.0189
	(0.01)	(0.01)	(0.22)	(0.31)	(0.01)	(0.01)
R-squared	0.923	0.836	0.822	0.822	0.911	0.908
Loan FE	Y	Y	Y	Y	Y	Y
YearQtr FE	Y	Y	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y	Y	Y
Sample	Full	Credit Lines	Full	Credit Lines	Full	Credit Lines
N	206,413	125,181	196,162	120,455	225,768	125,181

(a) *Notes: This table reports regression of Eq. 4 to estimate the effect of a borrower's reliance on private debt and its bank loan drawdown rate, default probability and likelihood of providing loan gaurantee during the Covid Pandemic. Data is at the loan-YearQtr level 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 issues 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.* $Default\ Probability$ *are bank-internal estimates of default probabilities, which banks report in the Y-14 data for loans l they originate; default probabilities are time-varying over the loan's lifetime and are expressed in percent. Loan Guarantee takes a value of 1 if a given loan has a credit guarantee, 0 otherwise. 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 11: Private Debt and Ex-Post Default on Outstanding Bank Loans

	$1(Default)$ (Days Past Due>90)		$1(Default)$ (Loan Chargeoff>0)	
	(1)	(2)	(3)	(4)
$PD_{it} \times \ Drawdown_t$	0.554**	0.296**	0.892*	0.555**
	(0.300)	(0.100)	(0.500)	(0.300)
PD_{it}	-0.237*	-0.143*	-0.491	-0.306
	(0.100)	(0.100)	(0.300)	(0.200)
$Drawdown_t$	0.500***	0.196***	-0.192	0.283***
	(0.100)	(0.000)	(0.200)	(0.100)
R-squared	0.408	0.256	0.618	0.405
Loan FE	Y	N	Y	N
Bank×YearQtr FE	N	Y	N	Y
Sector×YearQtr FE	Y	Y	Y	Y
Firm FE	N	Y	N	Y
Loan and Firm Controls	Y	Y	Y	Y
N	570,868	583,737	411,662	421,256

(a) *Notes: This table reports regression of Eq. 4 to estimate the differential effect of a dual-borrower's loan drawdown rate on realized defaults, relative to bank-only borrowers. 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.* $Drawdown_t$ *is the ratio of utilized to committed credit. In columns (1) and (2), Days Past Due is an indicator taking value of 1 if any principle or interest payment is past due by more than 90 days. In columns (3) and (4),* $Loan\ Chargeoff$ *is an indicator taking value of 1 if the lender reports positive loan charge-off for a given loan. Loan and firm controls include loan amount, spread, maturity, utilization, firm size and leverage. The control group is restricted to bank-reported leveraged loans to bank-only borrowers. For ease of interpretation, the regression estimates and standard errors are converted to percentage points. 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**	0.000867	-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 regression of Eq. 6 to estimate the differential effect of issuing private debt on firm-level real outcomes, relative to bank-only borrowers. Data is at the (borrower) firm-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 issues private debt. Firm Controls include a firm's total book assets, share of tangible assets, cash/assets, EBITDA/assets. Firm controls include log (total assets), debt/assets and EBITDA, which 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.*

Table 13: 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 regression of Eq. 5 to estimate 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 issues 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.*

Appendix

A.1 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.
- Credit Line Share: Bank Credit Line Commitment in percent of all Bank Commitment
- New Loan Origination: 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.

A.2 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. 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 nearly identical. Finally, we plotted the top 25 PD lenders in our sample in Figure 3 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 coverage. 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.

A.3 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.

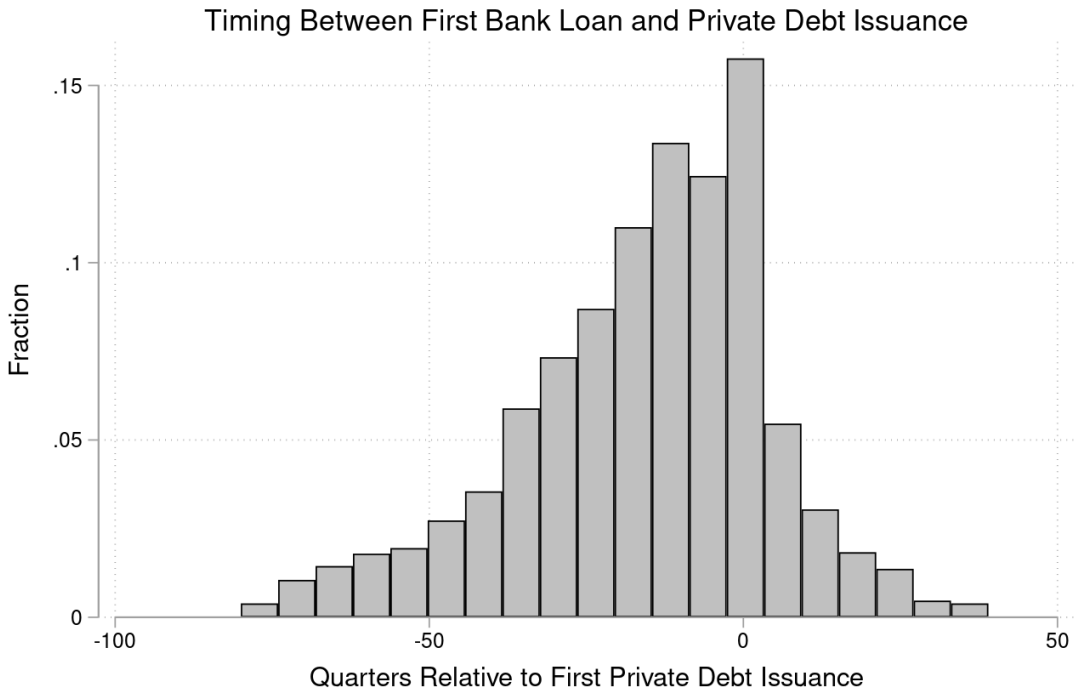
- Unless otherwise stated, all variables are winsorized at the 2.5 and 97.5 percent levels, following Favara, Minoiu and Perez-Orive (2022), and trimmed to remove outliers and likely reporting errors. Debt/EBITDA is winsorized at the 5.0 and 95.0 percent levels to further mitigate the effect of observations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

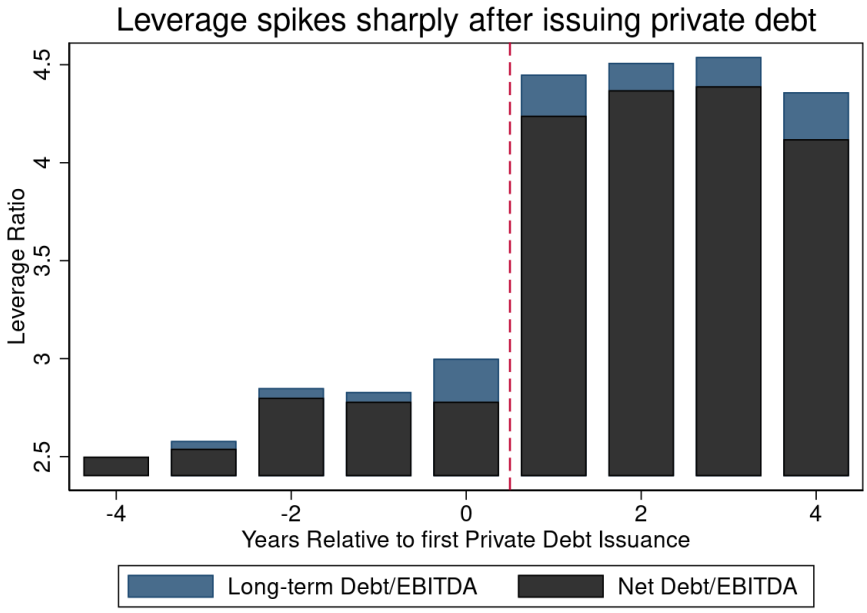
- Finally, we verify that the distribution of key variables in our full Y-14 sample is consistent with previous studies that use Y-14 such as Favara et al. (2022), Brown et al. (2021) or Greenwald et al. (2021).

Figure A.1: Do Borrowers First Get Bank Loans or Private Debt?



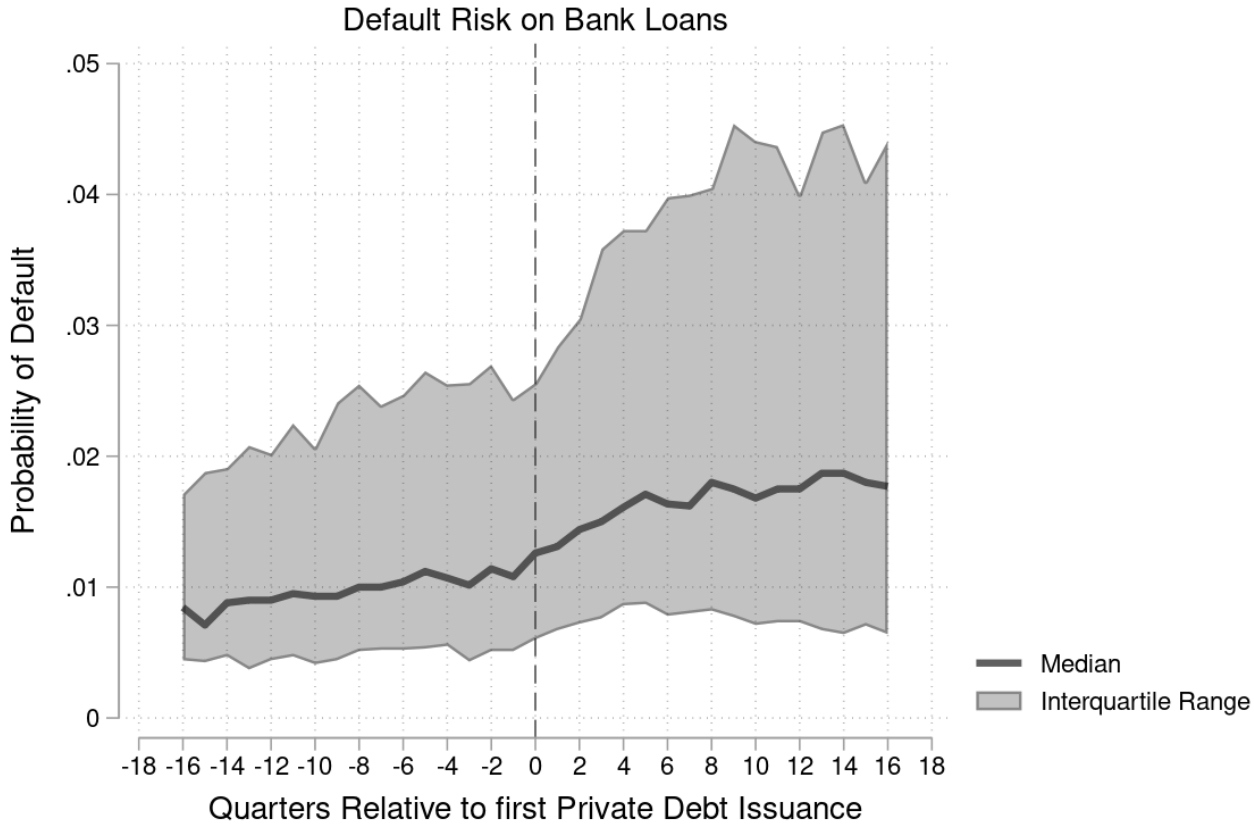
(a) *Notes: This chart plots the distribution of borrowers in terms of the difference in timing between their first origination of a bank loan relative to a private debt facility. The x-axis plots the difference between the date of first bank loan origination and first private debt origination (in number of quarters). The histogram shows most borrowers in the same obtain bank loans prior to obtaining private debt.*

Figure A.2: Event Study: Leverage Ratio



(a) *Notes: This reports a firm's Long-term Debt/EBITDA as well as 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 A.3: 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.*

Table A.1: 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 between borrowers that obtain debt from both banks and private debt funds (dual borrowers) in Panel A and those that only rely on private credit loans in Panel B. Panel B consists of borrowers that do not appear in the Y14 bank loan dataset and are thus referred to as 'PD Only Borrowers'.*

Table A.2: Pitchbook Private Debt Sample Characteristics

Year	Number of Loans	Dollar Amount ($ Bn)	Avg. Maturity (Months)	Avg. Loan Size ($ Mn)
2013	927	39.9	65	43
2014	1342	60.5	64	46
2015	864	49.4	64	58
2016	848	64.3	65	77
2017	1199	93.1	64	79
2018	2027	132.9	64	66
2019	1932	96.1	65	50
2020	1600	96.3	65	61
2021	3105	232.9	67	76
2022	2494	163.2	64	66
2023	788	68.2	55	88
Total	17,126			

(a) *Notes: This table plots basic sample characteristics of private debt loans to non-financial firms, split by year. The data is sourced from Pitchbook and is restricted to US-based borrowers and creditors. *2023 data is restricted to July 2023. Avg. refers to Average.*

Table A.3: 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 Pitchbook-reported industry distribution of private debt for dual borrowers. The table reports only the top 15 sectors by share of private debt, where the share is computed as the total loans extended to borrowers in a particular industry relative to all private debt provided to dual borrowers in aggregate.*

Table A.4: Ex-Ante Characteristics of Dual Borrowers

$Y : PD_{i,t} = 1$	(1)	(2)	(3)
$1 \times \ (EBITDA < 0)_{t-1}$	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

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

(a) *Notes: This table reports regression estimates where the dependant 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* $t => -2$*, 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* $t => -4$*, 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* $t => -5$*, 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 A.5: Characteristics of Bank Borrowers that use 'Leveraged Loans'

Panel A: Firm-level Characteristics	N	Mean	P25	P50	P75	SD
Total Assets	22,557	2,570	60	255	1,410	6,960
Net Sales	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	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	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 Y14. Panel A reports all firm-level characteristics. Panel B reports all loan level characteristics. Panel B is restricted to new originations only. Total Assets and Sales are expressed in $ Mn, Probability of Default and Loss Given Default are expressed in percent, while all other variables are expressed in percent of total assets. All variables are defined in Appendix A.1.*

Table A.6: Robustness of Credit Line Drawdown Result to Exclusion of PPP Borrowers

	Drawdown	Drawdown	Default Probability	Default Probability	Loan Gaurantee	Loan Gaurantee
	(1)	(2)	(3)	(4)	(5)	(6)
$PD_{it} \times \ Covid_t$	0.0210***	0.0378***	0.218	0.356*	0.0187**	0.0149**
	(0.008)	(0.011)	(0.166)	(0.186)	(0.008)	(0.008)
PD_{it}	-0.00151	-0.00491	0.262	0.316	0.0198	0.0164
	(0.010)	(0.014)	(0.223)	(0.313)	(0.013)	(0.013)
R-squared	0.924	0.836	0.823	0.823	0.910	0.908
Loan FE	Y	Y	Y	Y	Y	Y
YearQtr FE	Y	Y	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y	Y	Y
Sample	Full	Credit Lines	Full	Credit Lines	Full	Credit Lines
N	202,806	123,058	192,810	118,427	221,723	123,058

(a) *Notes: This table reports regression of Eq. 4 reported in Table 10 to exclusion of borrowers that obtained loans from the paycheck protecton program (PPP) during Covid.*

Table A.7: Baseline Results Excluding Buyout

	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 only. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table A.8: Baseline Results Using State x Industry x Time Fixed Effect

	Loan Amount (1)	Loan Spread (2)	Maturity (3)	Debt Seniority (4)	1x Credit Line (5)	1x Term Loan (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 x Industry x 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 A.9: Baseline Results Excluding Firm-Time Fixed Effects

	Loan Amount (1)	Loan Spread (2)	Maturity (3)	Debt Seniority (4)	1x Term Loan (5)	1x Credit Line (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 A.10: Firm Characteristics: Which Firms Drop Out

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

	N	Median	Mean
Total Assets (USD Mn)	3,090	242	1390
Net Sales (USD 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 (USD Mn)	36,229	382	1780
Net Sales (USD 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.*

A.4 Results with Larger Control Group

In this section, we show that all of our main results presented in Sections 4.1 and 4.3 are robust to exclusion of bank-reported leveraged loan flag. In our baseline analysis, we choose to restrict the control group to leveraged loans as many bank loans are rated investment-grade and these are extended to high credit quality borrowers that also have access to the investment-grade bond market. Such borrowers are least likely to issue private debt. Put differently, investment grade borrowers are very different from dual borrowers, creating sample selection issues. We now show that our estimates are qualitatively unchanged and even get stronger in some cases if we run our tests relative to all bank borrowers in the Y14.

Table A.11: Bank Loan Commitments and Private Debt

	Commitment (log)	Commitment (log)	Commitment (change)	Commitment (change)
	(1)	(2)	(3)	(4)
PD_{it}	0.035**	0.045**	0.015***	0.016***
	(0.013)	(0.013)	(0.005)	(0.005)
R-squared	0.973	0.973	0.437	0.437
Loan Controls	Y	Y	Y	Y
Firm Controls	Y	N	Y	N
Sector×Time FE	Y	Y	Y	Y
Loan FE	Y	Y	Y	Y
N	3,360,617	3,360,617	2,998,125	2,998,125

(a) *Notes: This table reports regression estimates where the dependent variable is a time-varying measure of loan commitments to a borrower i by bank b in time t for a given loan facility. The key difference from Table 5 is that the control group includes all Y14 loans, including investment grade loans. In columns (1) and (2), the dependent variable is the natural log of loan commitment. In columns (3) and (4), the dependent variable captures the percentage change in loan commitments for a given unique loan facility. To minimize the effect of outliers, columns (3) an (4) excludes observations with percentage changes less than -100 percent. The sample is restricted to existing loans, i.e., excluding new originations. Firm Controls include the natural log of firm book asset, Tangibility, Debt/Asset, Cash/Asset and EBITDA/Asset. Loan Controls include the level of the loan commitment, loan spread 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 A.12: New Bank Loans and Credit Spreads Upon Access to Private Debt

	Loan (new)	Term Loan (new)	Credit Line (new)	Spreads	Spreads
	(1)	(2)	(3)	(4)	(5)
PD_{it}	0.014***	0.004***	0.007***	0.170***	0.056*
	(0.004)	(0.002)	(0.003)	(0.057)	(0.030)
R-squared	0.085	0.072	0.077	0.568	0.597
Firm FE	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y
Sector×Time	Y	Y	Y	Y	Y
Sample	Full	Full	Full	New Loans	Full
N	3,580,065	3,580,065	3,580,065	133,158	3,580,065

(a) *Notes: This table reports regression estimates where the dependent variable captures indicators for newly originated loans, newly originated term loans, newly originated revolving credit facilities, and interest rate spread. These indicators are described in greater detail in the main text in Section 4.1 or Table 6. 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, loan spread and maturity. The key difference from Table 6 is inclusion of all loans in the Y-14 data, while Table 6 focuses on leveraged loans. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table A.13: Loan Drawdown, Default Risk and Guarantees

	Drawdown	Drawdown	Default Probability	Default Probability	Loan Guarantee	Loan Guarantee
	(1)	(2)	(3)	(4)	(5)	(6)
$PD_{it} \times Covid_t$	0.0446***	0.0671***	0.559***	0.675***	0.0436***	0.0383***
	(0.007)	(0.011)	(0.166)	(0.180)	(0.013)	(0.014)
PD_{it}	0.00059	-0.00446	0.265	0.287	0.0235*	0.0204
	(0.01)	(0.01)	(0.22)	(0.31)	(0.01)	(0.01)
R-squared	0.927	0.846	0.793	0.787	0.923	0.911
Loan FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y	Y	Y
Sample	Full	Credit Lines	Full	Credit Lines	Full	Credit Lines
N	882,420	528,435	813,829	488,200	1,148,156	528,435

(a) *Notes: This table reports regression estimates investigating the behavior of loans to dual borrowers during the Covid-19 pandemic. All specifications are identical to Table 10, except the control group includes all Y14 loans, including investment grade loans. $Drawdown_t$ is the ratio of utilized to committed credit. Covid takes a value of 1 in 2020Q1 and 2020Q2 following Chodorow-Reich et al. (2022). Default probability is expressed in percent. The estimation sample is restricted from 2018:Q1 onwards to 2020:Q2. All specifications include time and loan fixed effects. Thus, the coefficients on the interaction terms have the interpretation of the average additional loan drawdown (columns 1 and 2), probability of default (columns (3 and 4) and likelihood of loan gaurantees (column 5 and 6) in 2020 for firms classified as Dual 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 A.14: Ex-Post Default

	$1(Default)$ (Days Past Due>90)		$1(Default)$ (Loan Chargeoff>0)	
	(1)	(2)	(3)	(4)
$PD_{it} \times Drawdown_{l,t}$	0.514**	0.192	1.060**	0.587**
	(0.200)	(0.100)	(0.500)	(0.200)
PD_{it}	-0.00237*	-0.0454	-0.491	-0.306
	(0.001)	(0.100)	(0.003)	(0.002)
$\text{Drawdown}_{l,t}$	0.399***	0.136***	-0.0497	0.0836***
	(0.001)	0.000	(0.002)	(0.001)
R-squared	0.414	0.298	0.568	0.407
Loan FE	Y	N	Y	N
Bank×Time FE	N	Y	N	Y
Sector×Time FE	Y	Y	Y	Y
Loan and Firm Controls	Y	Y	Y	Y
N	3,521,806	3,580,065	2,453,293	2,495,189

(a) *Notes: This table reports regression estimates investigating the frequency of actual defaults on outstanding bank loans to Dual Borrowers.* $Drawdown_t$ *is the ratio of utilized to committed credit. The sample includes all Y14 loans. In columns (1) and (2), default is an indicator taking value of 1 if any principle or interest payment is past due by more than 90 days. In columns (3) and (4), default is an indicator taking value of 1 if the lender reports positive loan charge-off for a given loan. Loan and firm controls include loan amount, spread, maturity, utilization, firm size and leverage. For ease of interpretation, the regression estimates and standard errors are converted to percentage points. Standard errors are clustered at the firm level.*