Private Debt versus Bank Debt in Corporate Borrowing*

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Abstract

This paper examines the interaction between private debt and bank debt in corporate borrowing. Combining administrative bank loan-level data with non-bank private debt deals, we document that about half of U.S. private debt borrowers also rely on bank loans. These *dual borrowers* are typically larger, riskier firms with fewer tangible assets, lower interest coverage ratios, and higher leverage. When co-financing the same borrowers, private debt lenders typically extend larger but relatively junior term loans with longer maturities and higher spreads, while banks provide more senior loans, typically in the form of credit lines. Once a bank borrower accesses private debt, it often obtains additional bank credit but at significantly higher spreads. During times of market-wide distress, a borrower's reliance on private debt is associated with increased drawdowns and higher default risk of bank credit lines. Our findings suggest that while private debt substitutes for relatively riskier bank term loans, it complements bank credit lines. However, this complementarity may also impose costly externalities on bank loans by exacerbating their drawdown risk.

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

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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 U.S. 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), 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 do private and bank debt differ and interact? How do firms choose between bank debt and private debt? Do PD lenders compete with banks for the same borrowers, or do they serve an entirely different segment of borrowers? How does rise of private debt affect bank lending?

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 borrowers with and without access to bank debt. Interestingly, about half of the borrowers that rely on private debt also have bank debt, i.e., they are *dual borrowers*. The sample of dual borrowers allows us to examine the differences and interactions between bank and private debt, while controlling for borrower characteristics and credit demand. We find that banks and PD lenders extend distinct and imperfectly substitutable debt financing. Compared to the bank loans extended to the same borrower, PD loans are larger and more junior in bankruptcy. They also feature higher spreads and longer maturities. Moreover, banks typically provide senior credit lines, while PD lenders extend relatively riskier and junior term loans. Co-financing borrowers alongside PD lenders exposes banks to greater risks of credit line drawdowns and defaults during times of market-wide distress. Overall, our results show that private debt substitutes for riskier bank term loans but complements bank credit lines; however, this complementarity may also impose costly externalities on bank credit lines by raising their drawdown and default risks.

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

In this paper, *private debt* (in short, PD) or alternatively private credit refers to corporate loans made by non-bank lenders, such as BDCs or PD funds. For our analysis, we construct a novel dataset of bank loans and PD loans in the U.S., 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 such as origination date, maturity, spreads, loan size, loan type, debt seniority, and identifying information on borrowers and lenders.

We match PD borrowers in Pitchbook to bank borrowers in the Y-14 data, yielding three types of borrowers: (i) *PD-only borrowers*, (ii) *bank-only borrowers*, and (iii) *dual borrowers*, relying on both bank and private debt. Crucially, the Y-14 data contain detailed information about bank loans and the financial statements of bank borrowers, whereas such information is not available for PD-only borrowers not contained in the Y-14 data. Our sample includes many small and middle-market firms with book assets below $500 million that have limited access to public capital markets. Using Pitchbook's reported information on *deal type*, we note that PD loans extended to these borrowers are primarily used for Leveraged Buyout (LBO) financing, general corporate purposes, and refinancing. For about 80% of PD loans in Pitchbook, the borrower is backed by a private equity sponsor.

Our sample includes 2,917 unique dual borrowers, representing roughly half of all PD borrowers. These 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 assets and are larger, more levered, and exhibit higher bank-estimated default probabilities.[3] Moreover, PD loans

[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).

[3]For comparison purposes, we restrict the group of bank-only borrowers to borrowers with average bank loan commitments exceeding $5 million. These bank-only borrowers are also larger in terms of book assets, compared to excluded ones. Out of the approximately 70,000 remaining bank borrowers, which includes many SMEs, the share of dual borrowers is roughly 4%.

are larger, more commonly in the form of term loans, and have higher spreads and longer maturities than bank loans. For instance, mean and median spreads are about 600 basis points for PD loans, while they range from 120 to 170 basis points for bank loans.

Using our sample of bank and PD loans to dual borrowers, we start by analyzing the differences and substitutability between bank debt and private debt. We 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). That is, our regressions compare loans originated to the same borrower within the same year and quarter, differing by whether the lender is a bank or PD lender. In particular, our results are not driven by loans extended to different segments of borrowers.

We find that PD loans are typically larger, feature higher spreads, and have longer maturities than bank loans of the same type, when both are originated to the same borrower within the same year and quarter. Additionally, relative to comparable bank loans, PD loans are less likely to be first lien senior-secured. That is, private debt is generally junior and has a lower priority in bankruptcy relative to bank debt of the same borrower. Further, PD loans are more commonly structured as term loans and less likely as credit lines, which are mostly provided by banks. Taken together, when PD lenders and banks extend credit to the same borrowers, PD lenders assume greater credit risk by providing term loans with longer maturity and lower seniority than bank term loans, whereas banks primarily provide relatively senior credit lines with shorter maturities. During joint credit provision, PD lenders earn elevated loans spreads, which may reflect compensation for risk or for specific contractual provisions that banks are often reluctant to provide, such as "payment-in-kind" features.[4]

Importantly, the differences between bank debt and private debt are even more pronounced in leveraged buyout deals. In these transactions, there is a clear segmentation of credit provision. Banks typically provide senior credit lines, while PD lenders offer term loans that are junior to bank debt. In buyout deals, PD lenders charge significantly higher spreads compared to bank loans. In particular, PD buyout loans carry an additional 0.7 percentage

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

points in spreads relative to other (non-buyout) PD loans. This pattern may reflect the market power of private debt lenders (vis-a-vis banks) in providing LBO debt.

Next, we shed light on how the rise of private debt affects bank lending. We examine how bank borrowers adjust their reliance on bank debt once they access private debt the first time. Interestingly, we find that once a bank borrower starts borrowing from PD lenders, its propensity to obtain new bank loans, primarily in the form of credit lines, also increases. Following access to private debt, most bank borrowers not only continue their borrowing relationship with banks but also obtain additional bank debt. Using an event-study framework, we find that the probability of obtaining a new bank loan, particularly a new credit line, spikes within one quarter of a borrower's first use of private debt. We also confirm these results exploiting cross-sectional variation in (controlled) bank loan-level regressions.

The terms of outstanding bank loans also change in response to the borrower's access to private debt. We document that PD access is associated with an increase in loan commitment size as well as spreads on pre-existing bank loans. That is, once a borrower accesses private debt, banks grant additional credit by expanding the limit on existing loans, but charge higher spreads for doing so. Such adjustments on outstanding bank loans can occur, for instance, through loan renegotiation (Roberts and Sufi, 2009; Denis and Wang, 2014). In summary, bank borrowers rely more on bank debt, especially credit lines, after accessing private debt, but this comes with increased spreads. As a consequence, access to private debt is also associated with an increase in firm-level leverage and a decline in interest coverage ratio, i.e., higher interest expenses relative to earnings; moreover, the share of bank debt in total debt decreases and total bank debt (in dollars) increases.

Having shown that reliance on private debt shapes firms' use of bank debt, we investigate whether it also imposes any risks on outstanding bank loans. Our findings reveal that relative to bank-only borrowers, dual borrowers exhibit increased drawdowns and higher default risks on their bank credit lines during times of market-wide distress. To illustrate this, we exploit the Covid-19 pandemic as a shock to firms' liquidity needs, capturing market-wide distress (Chodorow-Reich, Darmouni, Luck and Plosser, 2022). We then examine how Covid-19

affected drawdowns and bank-estimated default probabilities for bank loans to dual borrowers and comparable bank-only borrowers. To alleviate endogeneity concerns, we control for borrower fundamentals, loan characteristics and also including loan and time fixed effects. At the onset of 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. That is, banks associated the credit line drawdowns with increased default risk. At the same time, dual borrowers were more likely to provide third-party loan guarantees (e.g., through private equity sponsors).[5]

Notably, credit line drawdown risk and default risk are closely linked, especially for dual borrowers. While credit line drawdowns are generally linked to increased default risk, we find that this effect is more pronounced for dual borrowers. These results suggest that private debt imposes a negative externality on bank loans to the same borrowers, operating through drawdowns on bank-provided credit lines. 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. As discussed in Greenwald, Krainer and Paul (2021), credit line drawdowns decrease bank capitalization, requiring banks to either raise new capital (which may be costly during crises) or reduce lending and retained earnings.

Next, we investigate how dual borrowers use the proceeds from private debt. We find that access to private debt is associated with an increase in intangible assets and sales growth, a decline in cash holdings, but no significant effect on capital expenditures (i.e., investment in tangible 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. 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.

[5]A credit guarantee is an explicit guarantee, which is a legally binding commitment of the guarantor to pay an amount to the lender in case the borrowing firm defaults under its obligations to the lender. In practice, the guarantor can be the parent company of a subsidiary, a related company in a group, a private equity sponsor etc. See Beyhaghi (2022) for further details.

According to our results, banks and PD lenders provide distinct and imperfectly substitutable debt financing. One concern inherent to this interpretation is the difficulty in disentangling credit demand-side from supply-side effects.[6] To disentangle these two, we exploit the collapse of the Silicon Valley Bank (SVB) in March 2023 as a negative, exogenous supply shock to leveraged and risky lending by banks. We document that the collapse of SVB is associated with a decline in the number of leveraged (i.e., risky) loans originated by banks, compared to previous years, whereas other types of bank lending appear unaffected. This indicates a tightening of bank lending standards. In our interpretation, banks reduced their risky lending (i.e., exhibited lower risk tolerance) following the SVB collapse, for instance, due to the increased uncertainty and fear over a larger-scale banking crisis.

As we formalize in a conceptual framework, the SVB collapse affects loan spreads for newly originated PD loans to dual borrowers in a different way depending on whether bank debt and private debt substitute or complement each other. When bank debt and private debt are perfect substitutes, banks and PD lenders compete in providing the same types of loans (with similar risk levels). Then, as banks refrain from extending the riskiest loans following the SVB collapse, these high-risk loans are increasingly shifted to PD lenders, lowering credit quality and raising spreads for the average newly originated PD loan. Crucially, we find that the SVB collapse is associated with a decline in spreads for newly originated PD loans to dual borrowers, rejecting that bank and private debt are perfect substitutes. That is, for dual borrowers and, mechanically, also for bank-only and PD-only borrowers without access to both debts, bank and private debt are imperfectly substitutable financing instruments.

Related Literature. Our paper contributes to the literature on non-bank direct lenders and private debt. Munday, Hu, True and Zhang (2018) and more recently, Erel, Flanagan and Weisbach (2024) analyze the performance of private debt funds. Block, Jang, Kaplan and Schulze (2023) present a survey of private debt funds, while Jang (2023), Davydiuk, Marchuk

[6] One does not observe whether firms, borrowing from PD lenders, have access to equivalent bank lending. For instance, it is ex-ante unclear whether such firms voluntarily choose PD loans over bank loans, or whether banks are unwilling to provide certain types of loans.

and Rosen (2020b) and Davydiuk, Marchuk and Rosen (2020a) analyze direct lenders. Carey, Post and Sharpe (1998), Denis and Mihov (2003) and, more recently, Chernenko, Erel and Prilmeier (2022) study non-bank loans, highlighting why firms rely on private debt. Existing papers show that PD lenders typically serve (riskier) borrowers which banks are less willing to lend to. A distinguishing feature of our paper is the detailed data on dual borrowers who use both types of debt, and constitute a large share of the private debt market. A novel finding is that bank debt and private debt are distinct and imperfectly substitutable, not only across different borrowers but also for the same borrower (within borrowers). Further, our data enables us to study how the rise of private debt affects bank lending. To the best of our knowledge, our paper is the first to demonstrate how private debt creates an externality on outstanding bank loans, through greater credit line drawdowns and default probabilities exhibited by dual borrowers during periods of aggregate stress.

Second, theoretical work (Diamond, 1991; Rajan, 1992; Holmstrom and Tirole, 1997; Morellec, Valta and Zhdanov, 2015) and empirical work (Becker and Ivashina, 2014; Ma, Stice and Williams, 2019; Darmouni and Siani, 2022) studied firms' choice between bonds (public debt) and bank debt. Our work, focuses on how firms choose between bank loans and private debt, and how access to private debt affects firm-level outcomes (e.g. investments).

Further, our paper relates to the literature on syndicated loan sales and (indirect) non-bank lenders such as CLOs (Sufi, 2007; Ivashina, 2009; Ivashina and Scharfstein, 2010b; Nadauld and Weisbach, 2012; Benmelech, Dlugosz and Ivashina, 2012; Irani and Meisenzahl, 2017; Irani, Iyer, Meisenzahl and Peydro, 2021; Gustafson, Ivanov and Meisenzahl, 2021; Haque, Mayer and Wang, 2023). Unlike these papers, our study focuses on non-bank lenders that *directly* originate loans themselves rather than buying loan shares in secondary markets. Finally, our paper also contributes to the literature on the role of creditors and capital structure in LBOs. Ivashina and Kovner (2011), Demiroglu and James (2010), Malenko and Malenko (2015), Shive and Forster (2021), Achleitner, Braun, Hinterramskogler and Tappeiner (2012), and Haque and Kleymenova (2023) study how PE sponsors and their reputation affect the terms of debt financing and debt covenants (and their violation) in

LBOs. We contribute by investigating the distinctions and substitutability between bank and private debt in funding LBOs.

1 Institutional Background

In this section, we provide a brief overview of the private debt market.[7] Private debt (PD), or private credit, refers to loans made by non-bank lenders to fund (mostly) non-financial businesses. It serves as an alternative financing option to traditional bank-held loans, institutional leveraged loans, or high-yield bonds. Private debt is used for various capital structure needs such as direct lending, mezzanine debt, distressed debt or special situations.[8] PD loans, particularly direct lending loans, are generally unrated and have a floating rate. They can be either senior-secured or target more junior parts of the capital structure. While the vast majority of these loans are held to maturity or a refinancing event, there is a growing market for private credit CLOs which facilitates the sale of PD loans and allows private debt managers to free up balance sheet and lend more.[9]

Private Debt Borrowers and Lenders. The typical PD borrowers are middle-market firms, often defined as those with annual revenues between $10 million to $1 billion, but PD lenders can finance larger companies as well. The two major types of PD lenders are private debt funds (or, alternatively, private credit funds) and BDCs BDCs participate primarily in direct lending, as opposed to other private debt strategies. In the U.S., PD funds account for around 60 percent of direct lending invested capital, while BDCs account for the remainder. Private debt funds are closed-end pooled investment vehicles with a lockup period of up to 10 years. BDCs are closed-end investment companies, subject to certain provisions stipulated in the 1940 Investment Company Act. Both types of lenders use moderate levels of leverage,

[7] In this paper, we use the terms private debt and private credit interchangeably.

[8] Private debt loans that are directly originated by a non-bank lender are called 'Direct Loans' or 'Direct Lending'. Direct Lending is the most dominant strategy in terms of assets under management.

[9] For further details see this article by Refinitiv LPC: https://www.lsta.org/news-resources/the-rise-of-private-credit-clos/

often in the form of bank credit lines. They are typically managed (and sponsored) by large asset managers (ex. Blackstone, Appollo, etc) and more recently by banks (ex. Goldman, JP Morgan, etc). Recent news coverage suggests that banks are teaming up with PD lenders to enter the private credit space. For example, JP Morgan recently financed the leveraged buyout of Kleinfelder Group by working alongside with a private debt lender, Oak Hill Advisors.[10]

Investors in Private Debt. The Federal Reserve Board's Financial Stability Report (FSR) published in May 2023 showed that, as of Q4 2021, the largest Limited Partners (LPs) in private debt are public and private pension funds. They held about 31 percent ($307 billion) of aggregate private credit fund assets. Other private funds made up the second-largest cohort of investors at 14 percent of assets, while insurance companies and individual investors each accounted about 9 percent ($92 billion).[11]

Contractual Difference 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." PD loans feature financial covenants similar to traditional bank-held loans but different from institutional term loans. 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, primarily held by banks. In practice, split control agreements delegate the exclusive right to monitor and renegotiate financial covenants to banks. Finally, private credit contracts are more likely to include

[10]Source: KBRA Direct Lending Deal (DLD) and Big Banks Are Copying From Private Credit's Playbook. Another recent example is the joint direct lending fund set up by KeyBank and Beach Point Capital. For further details, see : Tired of sidelines, Wall St. banks team up with private credit lenders.

[11]See Cai and Haque (2024) for additional details and a detailed discussion on the evolution of the market.

so-called "payment-in-kind" features. Such features allow for more flexible payment schedules, such as making interest payments in forms other than cash, often through additional debt.

2 Data and Empirical Facts

Most PD lenders in our sample are business development companies (BDCs) or private debt/credit funds (PD funds); a small share of PD lenders in our sample are bank-affiliated. For our analysis, we construct a novel panel data set of firms, borrowing from PD lenders and/or from banks, and their bank and PD loans. The sample period is from January 2013 to July 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.

2.1 Private Debt Data from Pitchbook

We obtain information about PD borrowers and their PD loans 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. Our data includes PD loans (all strategies) made by PD funds and BDCs (public and private), as well as loans provided by private credit arms or BDCs that are minority-owned and operated by large banks (e.g. Goldman Sachs BDC, Morgan Stanley Direct Lending Fund LLC, etc.).[12] Nearly all the loans in our sample are loans held by PD lenders such as a PD fund or BDC. Similar to Jang (2023), these include loans that direct lenders originated

[12]When banks have minority-ownership of private funds or BDCs, individual loans made by the PD fund or BDC is not consolidated into the bank's loan portfolio.

as well as bank-syndicated loans in which they have invested. Nearly 80 percent of PD loans are issued to a borrower that 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 strong coverage of loan-level information described below. Importantly, for 70 percent of the loans, we also observe if the private debt loan is 1st lien senior-secured or not. Appendix Figure A.1 reports the use of private credit. Private debt is used for new leveraged buyout activity, growth/expansion strategies, refinancing, or general corporate debt purposes. The Pitchbook sample contains 5,662 distinct PD borrower firms and around 16,900 unique PD loan facilities. Based on loan origination and maturity date, we estimate that aggregate PD loan volume was around $700 billion in July 2023.[13] Based on a conservative back-of-the-envelope calculation discussed in Appendix A.2, we estimate our sample covers around 70 percent of aggregate *deployed* private debt in the US as of 2023.

Pitchbook reports data at the loan-issuance level and provides standard loan-level characteristics, such as origination date, maturity, spreads, loan size, deal size, loan type, and identifying information on borrowers and lenders. 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 U.S. Figure 1 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. Many of these investment firms manage PE funds too, and recently expanded into private credit.

[13]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 U.S. is around $700 billion as of March 2023. According to Pitchbook, the U.S. accounts for approximately 65% of the 1.7 $trillion global private debt market.

Because BDCs, unlike PD funds, are subject to certain regulatory (reporting) requirements, loans made by BDCs are (likely) over-represented in Pitchbook's private debt data. Around 60% out of approximately 16,900 PD loans in our sample feature a BDC as lender. Moreover, our data (likely) over-represents *direct lending* (relative to other PD strategies), since BDCs do not participate in other private debt strategies such as mezzanine financing, distressed debt, or special situations.[14] Finally, the coverage of borrower-level financial information is limited, and we thus choose to omit such information from our analysis.[15]

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).[16] The dataset includes detailed information on all bilateral and syndicated loan facilities over $1 million in committed amounts held by Bank Holding Companies (BHCs). The reporting banks comprise over 85 percent of the total assets in the U.S. banking sector (Caglio, Darst and Kalemli-Özcan, 2021) and cover around 70-75% of all C&I lending in the U.S. (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

[14]Extensive discussions with market participants and practitioners suggest the key factors that drive the decision to use a BDC over a private debt fund are tax benefits, a more diversified funding base, greater availability of fund-level leverage and the intent to split loan commitments across multiple vehicles.

[15]Appendix Table A.1 provides available data on private debt borrowers who do not have bank loans.

[16]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

purpose indicator in the Y-14 cannot be used to identify LBO financing.[17] 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.[18] 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.

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 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.

Dual borrowers. Crucially for our analysis, *dual borrowers* have outstanding bank loans and thus are contained in the Y-14 database, when they borrow from PD lenders. This allows us to observe their financial and accounting information as well as information related to their individual bank loans at the time they tap into private debt. That said, our matched sample does not capture PD borrowers who do not borrow from banks and hence are not contained in the Y-14 data. As such, detailed firm financial and loan-level information is not available for these *PD-only borrowers*. A large part of our analysis exploits detailed firm financial and loan-level information and essentially compares dual borrowers to similar *bank-only borrowers*.

[17] 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.

[18] 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.

Dual and bank-only borrowers obtain bank debt financing in the form of syndicated and bilateral bank loans. Consequently, this paper focuses on one particular segment of private credit markets, namely, firms with access to both bank debt and private debt.

The importance of dual borrowers. Dual borrowers represent a sizeable share of the private credit market in the U.S. In our sample, there are about 5,700 unique PD borrowers; we identify 2917 unique dual borrowers. That is, around 50% of PD borrowers in our sample are dual borrowers. Moreover, Figure 2 displays the evolution of the corporate debt market over time, further highlighting the importance of dual borrowers. The upper panel depicts the aggregate dollar value of syndicated bank loans (green bar), of PD loans to dual borrowers (orange bar), and of PD loans to PD-only borrowers (blue bar), which are originated in a given year. The lower panel presents the percentage shares of each of these components. The aggregate dollar amount of PD loans originated to dual borrowers in a given year is larger than the aggregate dollar amount of PD loans to PD-only borrowers. In terms of volume, dual borrowers account for about 50% of the private debt market during most of our sample period.

Summary Statistics. Appendix Table A.3 shows that dual-borrowers are concentrated in sectors such as software, commercial services, healthcare services, insurance, information technology and other technology-focused industries. To examine 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*. Importantly, in our sample, the number of bank-only borrowers is significantly larger than the number of dual borrowers (see Table 1). The reason is that the Y-14 data cover many small firms, while access to private debt and thus the ability to jointly borrow from banks and PD lenders is concentrated among larger firms. Since PD lenders typically extend credit to relatively larger firms and provide relatively large loans (see below), we restrict the comparison group of bank-only borrowers to borrowers with average bank loan commitments exceeding $5 million. We restrict the sample of bank-only borrowers based on size of bank loan commitments rather than book assets, because most of our empirical analysis is carried

out on the loan level. The remaining bank borrowers tend to be larger in terms of book assets too, compared to bank-only borrowers excluded in our analysis. Panel B of Table 1 depicts the summary statistics of the remaining bank-only borrowers in our sample.

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. Next, 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%. The difference in debt is much more pronounced if we look at Debt/EBITDA, which is a standard measure of leverage in industry. Indeed, we observe that a significant share of dual-borrowers have Debt/EBITDA greater than 6, which is an implicit limit on bank funding as stipulated by the leveraged lending guidelines (Chernenko et al., 2022). One observes similar patterns, when looking at the mean instead of median.

Figure 3 shows that once a bank borrower accesses private debt and starts borrowing from PD lenders (i.e., takes out a PD loan at the first time in our sample), it experiences a sharp increase in Debt/EBITDA from around 3 prior to PD access to about 4.5 post-PD access; observe that Debt/EBITDA remains at an elevated level post-PD access. Notably, banks also report in the Y-14 data an estimate of the probability of default and loss given default for their borrowers. We observe that dual borrowers have a greater probability of default and loss given default than bank-only borrowers, suggesting that dual borrowers are riskier. Indeed, in Figure 4, we plot the median and interquartile range on bank reported ex ante probability of default on bank loans in event-quarters relative to a borrower's first private debt issuance in our sample. We observe that the median default probability does not exhibit any sharp changes when a borrower uses private debt. However, looking at the 75th percentile, we note a significant share of borrowers exhibit substantially higher default probability on outstanding bank loans immediately following private debt issuance. While the median default probability is between 1-2 percent, we observe the 75th percentile rises sharply to 4 percent from 2.5 percent upon access to private debt. This suggests issuing

private debt can raise default probability on bank loans, which we demonstrate in our formal analysis. Finally, dual borrowers tend to have less tangible or collateralizable assets than bank-only borrowers.

In addition, Table 2 presents loan-level summary statistics for all PD loans (Panel A), bank loans to dual borrowers (Panel B), and bank loans to bank-only borrowers (Panel C). Interestingly, PD loans have higher spreads than bank loans. The median spread for PD loans is about 6%, while it lies between 1.2 and 1.7% 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 $19-24 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 45-48% of bank loans are credit lines, while the share of term loans is about 30%. 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 percent for dual-borrowers, and 54 percent 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 4.3 and median maturity is 5 years).

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. 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.4 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.

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.

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.

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.

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.

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.

Finally, in Section 6.3, we show robustness of these results with a less restrictive sample by excluding firm-time fixed effects. 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 banks adjust their lending practices once bank borrowers start borrowing from PD lenders, that is, accesses private debt. One possibility is that borrowers repay their bank debt and end their banking relationship since they have an alternate financing option. Surprisingly, 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 to borrow from banks (they even borrow more) and do not drop out of our sample after accessing private debt (see also Section 6.2).

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 borrowers.[19] In Appendix A.4, we also confirm that our key results remain robust when we do not restrict the control group to leveraged loans.

[19]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 very comparable to dual borrowers.

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 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).

Next, we show that upon accessing private debt, firms also obtain additional bank debt financing through newly originated bank loans. To do so, we create an indicator that captures whether a given loan is newly originated (based on the "new loan origination flag" in the Y-14 data) In other specifications, we create analogously an indicator of whether a loan is a newly originated term loan or credit line respectively. Since the "new loan origination flag" is time-invariant, we cannot use loan fixed effects. 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 access to 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. Interpreted broadly, these findings highlight that PD lenders and banks often simultaneously originate credit to the same borrower and, akin to syndication, share the total credit commitment. During joint credit provision, banks typically provide credit lines and PD lenders provide term loans.

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 5 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.

Table 6 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 0.23 percentage point higher loan spreads, when the borrower firm also borrows from PD lenders. Given a median spread of bank 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 (Figure 3).

4.2 Credit Line Drawdown and Default Risks

We have shown that after gaining access to private debt, bank borrowers often obtain additional credit from banks, particularly in the form of credit lines. Bank-provided credit

lines 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). At the same time, they expose banks to drawdown risks. 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 loans during times of market-wide distress.

To examine how the reliance on private debt relates to drawdowns and default risks on bank credit lines, we follow Chodorow-Reich et al. (2022) and exploit 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 6 illustrates that dual borrowers exhibited a sharp spike in their credit line drawdown rate at the onset of Covid-19, increasing their drawdown rate from 25 percent to 35 percent.

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 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 effects of other macroeconomic events confounding 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.

Columns (1) and (2) of Table 7 show that dual-borrowers drew down their credit lines at the onset of Covid-19 more 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 drawdown rate of credit lines in the Y-14 sample of around 50 percent. Additionally, column (4) illustrates that for credit lines, banks estimated a higher probability of default for dual-borrowers at the onset of 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 our descriptive evidence in Table 1 and Figure 4, indicating dual borrowers are generally riskier, possibly over-leveraged, firms.

According to our previous findings, bank borrowers generally 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.[20] Overall, our results that while dual borrowers exhibited greater drawdown and default risks during Covid-19, they also were more likely to provide additional loan guarantees.

One may be concerned that bank-only borrowers drew down their credit lines less, because they had access to alternative financing during Covid-19, such as the paycheck protection program (PPP). While this possibility is not inconsistent with our interpretations, we view it as less likely. Recall that our control group of bank-only borrowers is restricted to 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 USD 100 million, well above the typical SME size range defined in Chodorow-Reich et al. (2022), which was eligible for PPP financing. Thus, it is unlikely that bank-only borrowers in our control group were eligible for PPP.

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

Finally, 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. Notably, we use loan fixed effects, which will account time-invariant factors specific to a loan, 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 8 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.

In summary, a bank borrower's reliance on private debt is associated with increased default and drawdown risks of bank loans during times of market-wide distress. These findings have important implications in the presence of bank capital regulation. For instance, as argued in Greenwald et al. (2021), when credit lines are drawn, risk weighted assets increase, reducing bank capitalization. This decreased capitalization generally requires that banks either raise capital — which is costly during a crisis — or reduce lending and retained earnings. As a result, in the presence of capital requirements, draws on credit lines can crowd out other forms of lending. Moreover, the higher ex-ante and ex-post default probability associated with dual borrowers during aggregate market distress can further affect regulatory capital requirements faced by large banks through bank stress tests. Overall, our results suggest that private debt imposes a negative externality on banks and bank loans.

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. 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:

$$y_{i,t} = \beta PD_{i,t} + FirmControls_{i,t-1} + FE_{i,t} + \epsilon_{i,t}, \tag{5}$$

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.

Results are reported in Table 9. 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 9 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 16 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 9 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) and (6) of Table 9 show 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. Our interpretation is that, following private debt access (i.e., when $PD_{i,t}$ takes a value of one), a given dollar of debt financing is less likely to be provided by a bank.

5.2 Real Firm Outcomes

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 (5) with each of these firm-level outcome variables. Table 10 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 Additional Tests

6.1 Bank Debt and Private Debt: Imperfect Substitutes

We showed that holding borrower characteristics fixed, banks and PD lenders provide distinct and, possibly, imperfectly substitutable debt financing. A concern inherent to this interpretation is the difficulty to disentangle credit demand-side from supply-side effects. One does not observe whether firms, borrowing from PD lenders, have access to equivalent bank lending. For instance, it is ex-ante unclear whether such firms voluntarily choose PD loans over bank loans, or whether banks are unwilling to provide certain types of loans. Given our previous findings, we consider it unlikely that bank debt and private debt are perfect substitutes. Additionally, PD loans feature significantly higher spreads than comparable bank loans. Consequently, it seems plausible that firms would prefer to borrow from banks at lower spreads whenever possible, resorting to the more costly private debt only when bank financing is unavailable.

To disentangle credit supply- and demand-side effects, we exploit the collapse of the Silicon Valley Bank ("SVB") in March 2023 as a negative, plausibly exogenous shock to leveraged lending by banks. Put differently, the SVB collapse represents a negative shock to the supply of riskier bank debt, which should affect relatively riskier borrowers the most. In our interpretation, banks reduced their risky lending (i.e., had lower risk tolerance) following the SVB collapse mainly due to the increased uncertainty and fear over a larger-scale banking crisis; thus, the reduction in risky bank lending need not be related to deposit flow or to the role of the SVB as a lender. 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 7 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.

The key idea behind our identification strategy is closely related to the one in Tang (2019), who studies the competition of banks and Peer-to-peer lenders.[21] Depending on whether banks and PD lenders provide similar (substitutable) or distinct (imperfectly substitutable or complementary) types of debt financing, a negative shock to risky bank lending has *different* effects on the credit quality and spreads of newly originated PD loans and bank loans. Given our data, we capture credit quality inversely by loan spreads, in that loans of higher (lower) quality are associated with lower (higher) spreads. Thus, examining how the SVB collapse changes spreads of newly originated PD loans and bank loans allows us to infer whether bank debt and private debt are perfectly or imperfectly substitutable.

In this context, we focus on dual borrowers. We view dual borrowers as on the margin of switching between bank debt and private debt. The interactions and competition of banks and PD lenders should be concentrated among dual borrowers. In contrast, bank-only and PD-only borrowers appear not to have access to both sources of debt financing. Thus, it is likely that for these types of borrowers, there is less or no interaction (or competition) between banks and PD lenders, rendering bank and private debt not substitutable for them.

To preview, the following conceptual framework formally illustrates that the SVB collapse should be associated with an increase (decrease) in spreads for newly originated PD loans, precisely when bank debt and private debt are perfect (imperfect) substitutes.

6.1.1 Conceptual Framework

To formalize the identification strategy, we develop a conceptual framework building on Tang (2019). Suppose that loans ℓ to dual borrowers are indexed by their credit quality or risk

[21] Tang (2019) exploits a regulatory shock to bank consumer lending to analyze whether banks and peer-to-peer lenders are substitutes or complements in consumer credit markets.

level ℓ, ranging from 0 (low quality, i.e., high risk) to 1 (high quality, i.e., low risk). That is, credit quality ℓ is distributed over $[0, 1]$. Notice that a given dual borrower might have outstanding loans of *different* quality, type, or risk, which are originated by banks *or* PD lenders. Indeed, as Section 3 has shown, bank loans and PD loans to the same borrower differ in their type, maturity, seniority, and accordingly risk level. Credit quality or risk is captured by a loan's spread, with the spread decreasing in credit quality, i.e., increasing in risk.

Motivated by our analysis, we consider that relative to banks, PD lenders extend relatively riskier loans. In particular, we assume that banks only extend loans with sufficiently high quality ℓ above a cutoff $b \in (0, 1)$. PD lenders, in turn, only extend loans whose quality ℓ lies within an interval $[\underline{p}, p] \subseteq [0, 1]$. Without any loss, we normalize $\underline{p} = 0$ and assume that $p \geq b$, in that the entire market, i.e., the interval $[0, 1]$, is covered: For each potential loan with quality $\ell \in [0, 1]$, there is a lender willing to extend it. A negative (exogenous) supply shock to risky bank lending corresponds to an increase in b. Thus, we interpret the SVB collapse as an increase in b, leading banks to cut their riskier lending by reducing the origination of risky (low-quality) loans below quality b.

Loan quality ℓ is distributed on $[0, 1]$ according to a (well-behaved and continuous) distribution $F(\ell)$. Over the quality range $[b, q]$, which in principle could be empty, banks and PD lenders overlap, and thus provide loans of similar type, risk, and quality. Let $\beta(\ell)$ denote the fraction of loans of quality ℓ that are bank loans, so fraction $1 - \beta(\ell)$ of quality-ℓ loans are PD loans. As in Tang (2019), we say that for a given quality ℓ, banks and PD lenders are complements if and only if $\beta(\ell) \in \{0, 1\}$, i.e., they do not provide loans of similar quality and risk level. Banks and PD lenders are substitutes if $\beta(\ell) \in (0, 1)$ and they provide loans of the same quality and risk level.

For the sake of illustration, we assume that $F(\ell) = \ell$, i.e., loan quality is uniformly distributed, and that $\beta(\ell) = 1/2$ on $[b, q]$, i.e., banks and PD lenders share the market equally on the loan quality range on which they overlap. The key insights are robust to altering these assumptions. We define $p_b = \max\{b, p\}$ and $b_p = \min\{p, b\}$. Then, we calculate average

quality of a bank loan, denoted θ^b, and the average quality of a PD loan, denoted θ^p:[22]

$$\theta^b = \frac{\int_b^1 \ell\beta(\ell)dF(\ell)}{\int_b^1 \beta(\ell)dF(\ell)} = \frac{2-p_b^2-b^2}{2-(p_b-b)} \quad \text{and} \quad \theta^p = \frac{\int_0^p \ell(1-\beta(\ell))dF(\ell)}{\int_0^p (1-\beta(\ell))dF(\ell)} = \frac{p^2+b_p^2}{2(p+b_p)}.$$

Intuitively, the average quality of bank loans θ^b is the ratio of the summed up quality of all bank loans, $\int_b^1 \ell\beta(\ell)dF(\ell)$, over the total number of bank loans, $\int_b^1 \beta(\ell)dF(\ell)$; the intuition for θ^p is analogous. Observe that θ^b increases in b, while θ^p increases in p. It also follows that $\theta^p \leq \frac{1}{2}$, with equality if and only if $p = 1$ and $b = 0$. We distinguish two scenarios.

First, suppose that banks and PD lenders extend loans of the same type/quality, i.e., bank and private debt are perfect substitutes. In our conceptual framework, this special case obtains for $b = 0$ and $p = 1$, so that $b_p = b$ and $p^b = 1$. Thus, the average borrower quality pre-shock is $\theta^b = \theta^p = \frac{1}{2}$. The shock represents an increase in b from $b = 0$ to $b > 0$, leading to $\theta^p < \frac{1}{2}$ post-shock. Thus, when banks and lenders are substitutes, the SVB shock should lead to an increase in credit quality (i.e., decrease in spreads) for bank loans, but to a decrease in credit quality (i.e., increase in spreads) for PD loans to dual borrowers.

Second, consider that banks and PD lenders extend loans of different type/quality, i.e., bank and private debt are perfect complements. In our framework, this corresponds to $p = b$, i.e., $p_b = b_p = b$. Then, the quality of loans is $\theta^b = \frac{1-b^2}{2(1-b)} = \frac{1+b}{2}$ and $\theta^p = \frac{b}{2}$. An increase in b therefore increases both θ^b and θ^p. Thus, when banks and PD lenders are perfect complements, the SVB shock should lead to an increase in credit quality (i.e., decrease in spreads) for both bank loans and PD loans to dual borrowers.

The intermediate case where bank and PD lenders partially overlap in the loan types they provide can be understood by combining the extreme cases highlighted above. Thus, when the SVB shock triggers a decrease in spreads for both bank loans and PD loans to dual borrowers, we are able to conclude that bank debt and private debt are *imperfect substitutes*.

[22] Observe that $\int_b^1 (1-\beta(\ell))dF(\ell) = 0.5(p_b-b)+1-p_b = 1-0.5(b+p_b)$. And, $\int_b^1 \ell\beta(\ell)dF(\ell) = \int_b^{p_b} 0.5\ell d\ell + \int_{p_b}^1 \ell d\ell$. Thus, $\int_b^1 \ell\beta(\ell)dF(\ell) = 0.25(p_b^2-b^2)+0.5(1-p_b^2)$. Likewise, $\int_0^p (1-\beta(\ell))dF(\ell) = b_p + 0.5(p-b_p)$. And, $\int_0^p \ell(1-\beta(\ell))dF(\ell) = \int_0^{b_p} \ell d\ell + \int_{b_p}^p 0.5\ell d\ell$. Thus, $\int_0^p \ell(1-\beta(\ell))dF(\ell) = 0.5b_p^2 + 0.25(p^2-b_p^2)$.

6.1.2 Empirical Analysis

Equipped with our insights from the conceptual framework, we now exploit the SVB collapse as a negative, exogenous shock to leveraged lending by banks to test whether bank debt and private debt are substitutable or not. Recall that in doing so, we focus on dual borrowers. We analyze both our sample of bank and PD loans.

First, using our sample of newly originated bank loans, we run the following loan-level difference-in-differences regression over a short time window around the SVB collapse:

$$Spread_{l,t} = \beta_0 \ PD_{i,t} + \beta_1 \ Post_t \times PD_{i,t} + FEs + Controls_{l,i,t} + \epsilon_{l,t}, \tag{6}$$

where $Post_t$ is an indicator taking the value of zero (one) before (after) the SVB collapse. The regressions include week or sector-week fixed effects, and the outcome variable is loan spreads. This way, we implicitly control for the effects of the SVB collapse on bank loans in general. We include the entire sample of newly originated bank loans and control for $PD_{i,t}$, i.e., whether the borrower has PD loans too. We also include loan controls (e.g., loan size and maturity) and firm controls (e.g., book assets, debt/assets, and EBITDA). As argued in the previous Section, we expect that following the SVB collapse, banks reduce the origination of relatively riskier loans by applying tighter lending standards; these tighter lending standards disproportionately affect the relatively riskier dual borrowers. That is, relative to other newly originated bank loans, the average quality (loan spreads) of newly originated bank loans to dual borrowers should increase (decrease) following the SVB shock, in that $\beta_1 < 0$.

Second, we also run the following difference-in-differences regression on the weekly level for our sample of newly originated PD loans:

$$Spread_{l,t} = \beta_0 \ Bank_{i,t} + \beta_1 \ Post_t \times Bank_{i,t} + FEs + Controls_{l,t} + \epsilon_{l,t}, \tag{7}$$

where $Bank_{i,t} \in \{0, 1\}$ captures whether PD borrower i also borrows from banks, i.e., is a dual borrower and contained in the Y-14 data. 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. We use the entire sample of newly originated PD loans (instead of restricting the sample to PD loans to dual borrowers); as for bank loans, this allows us to control for the effects of the SVB collapse on PD loans in general. We include various loan controls as well as firm fixed effects and sector-week (sector-time) fixed effects; these fixed effects absorb $Post_t$. As argued before, if banks and PD lender are perfect (resp. imperfect) substitutes, the SVB collapse is associated with an increase (resp. decrease) in loan spreads of newly originated PD loans to dual borrowers, relative to other newly originated PD loans. This is indicated by $\beta_1 > 0$ (resp. $\beta_1 < 0$).

Table 11 presents the estimation results for regression (6) in columns (1) and (2) and for regression (7) in columns (3) and (4). First, columns (1) and (2) 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 to bank loans. That is, relative to other bank loans, bank loans to dual borrowers tend to be riskier, i.e., have lower credit quality. Likewise, dual borrowers tend to feature higher risk and lower credit quality than bank-only borrowers. 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. Put differently, while bank loans to dual borrowers feature on average higher spreads than other bank loans, this difference diminished following the SVB collapse. This indicates that, following the SVB shock, banks seemed to reduce relatively riskier lending by applying tighter lending standards; these tighter lending standards disproportionately affected the more risky dual borrowers.

Second, columns (3) and (4) show that the coefficient on $Post_t \times Bank_{i,t}$ — that is, β_1 in (7) — is negative and significant. Thus, relative to other (newly originated) PD loans, newly originated PD loans to dual borrowers exhibited a larger decrease in spreads (increase in credit quality) following the SVB collapse. According to our conceptual framework, these findings suggest that bank debt and private debt are distinct and imperfectly substitutable

financing instruments. That is, PD lenders do not compete with banks in providing relatively senior and and safe debt. Instead, PD lenders focus on providing relatively junior and riskier loans. This suggests that PD lenders are, or have been, displacing banks in this credit market segment. Taken together, while private debt complements relatively safe and senior (credit line) debt by banks, it substitutes for relatively riskier (term) loans made by banks.

6.2 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 12 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.

6.3 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 only firm and time (year-quarter) fixed effects, thus drawing on a much larger sample. These results are reported in Appendix Table A.5. 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).

6.4 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 percent 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.4 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 U.S. 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, private debt loans are larger, often junior to bank loans, and have higher spreads and longer maturities. Once a bank borrower accesses private debt, its overall borrowing from banks increase, both through increased commitments on existing bank loans and new bank loans at higher spreads. PD access is associated with an increase in leverage, decrease in interest coverage ratio, and increase in intangible assets and sales growth. Our findings suggest that banks and PD lenders provide distinct and imperfectly substitutable debt financing. That is, private debt complements relatively safe and senior credit line debt by banks, but substitutes relatively riskier and junior term loans by banks. Co-financing borrowers alongside private debt exposes banks to greater risks of credit line drawdowns and defaults risk during periods of aggregate market stress. Overall, our results show that private debt substitutes for riskier bank term loans but complements bank credit lines; however, this complementarity also imposes an externality on bank credit lines by raising their drawdown and default risks.

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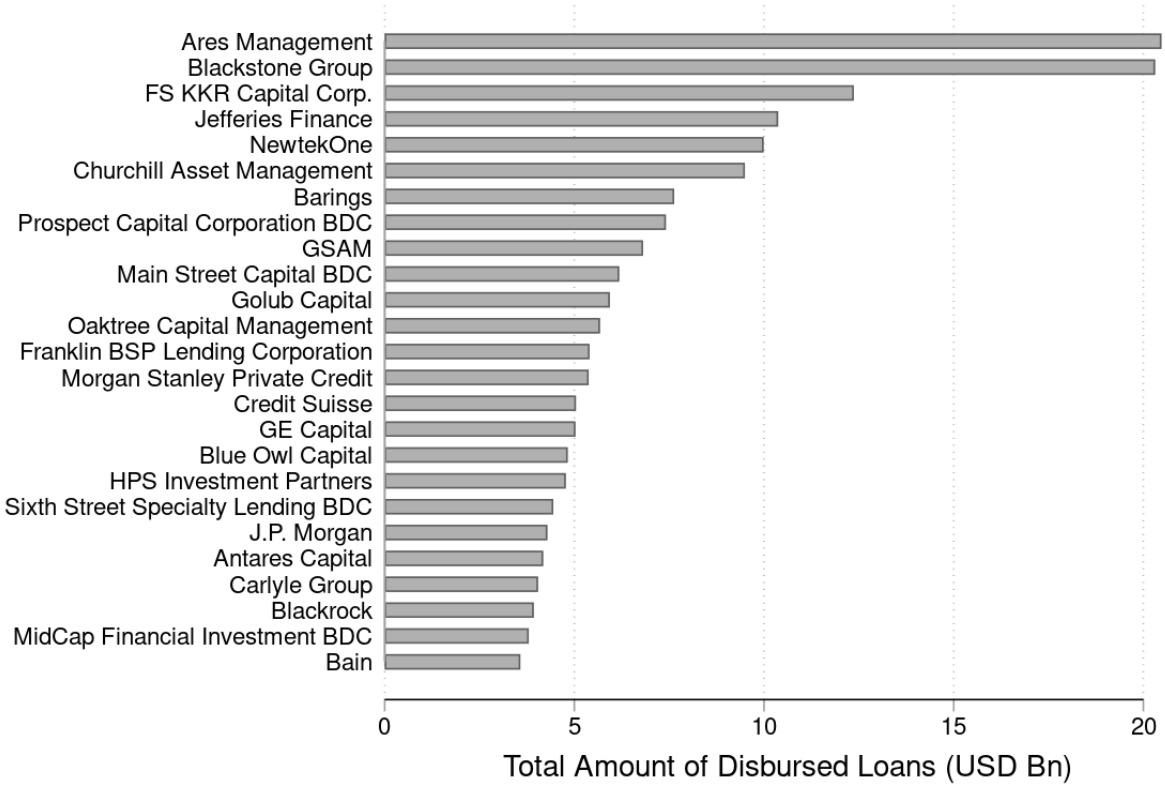
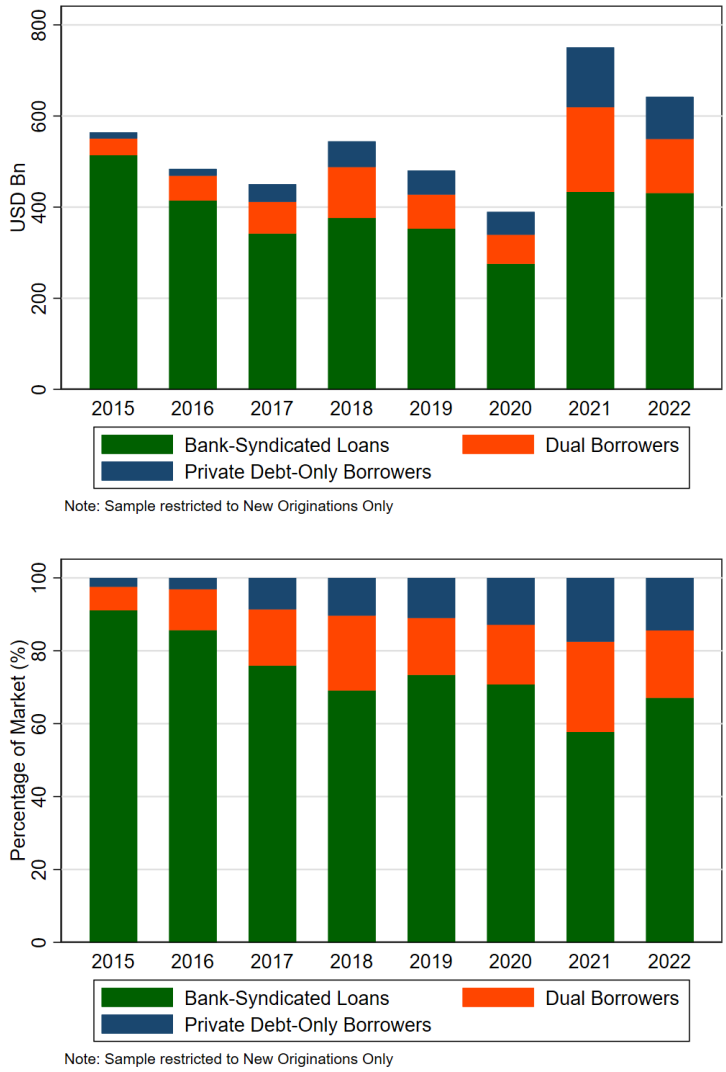
Figure 1: Top PD Lenders in Pitchbook Sample



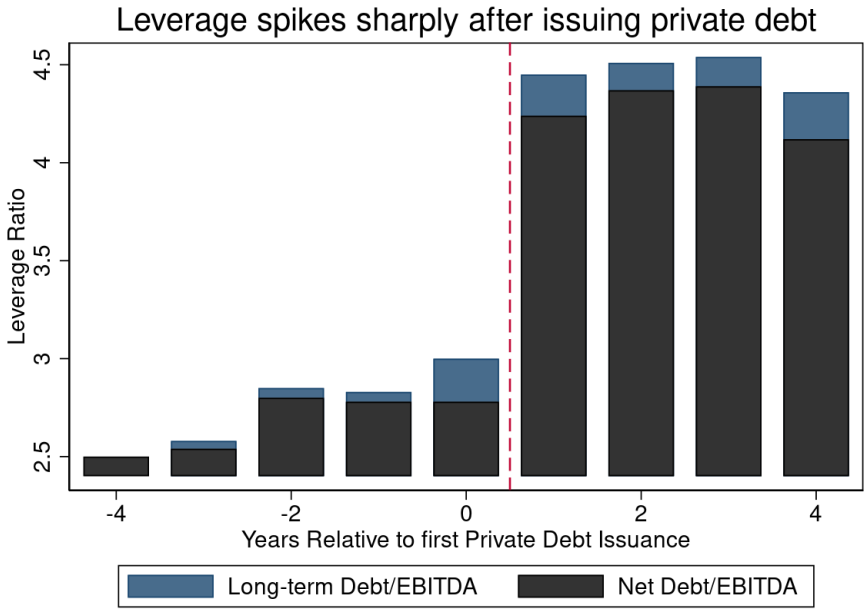
(a) *Notes: This figure reports top 25 private debt lenders in the full Pitchbook sample. The figure aggregates all PD loans in the Pitchbook sample across time. The sample is restricted to single lender loans since Pitchbook does not report loan shares in club deals. Single-lender PD loans constitute around 68 percent of all loans in the database. Note, that we aggregated loans originated by different private funds/BDCs belonging to the same asset manager to the manager level in this chart: for example 'Blackstone Group' includes both BCRED and Blackstone Secured Lending Fund, both of which are BDCs. Source: Pitchbook only*

Figure 2: The Evolution of the Corporate Loan Market



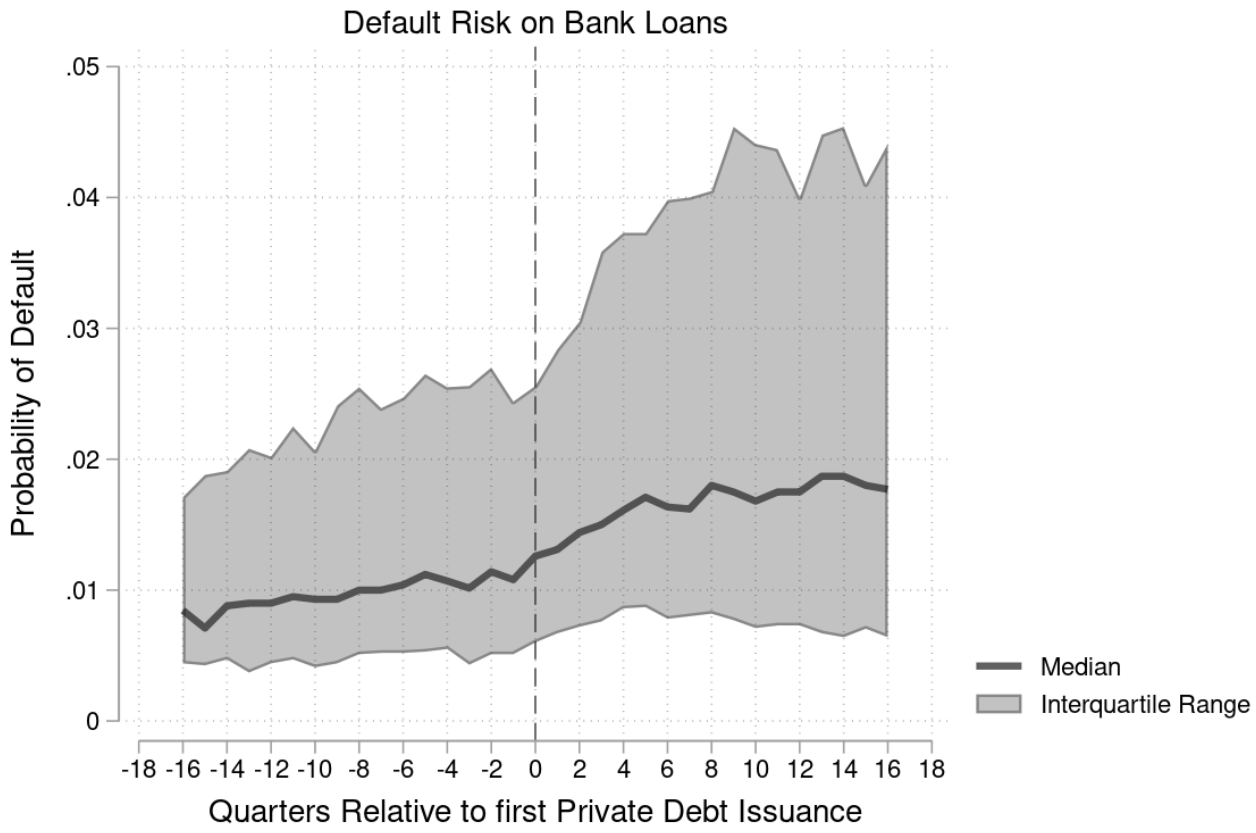
(a) *Notes: This chart plots the evolution of the corporate loan market, focusing on three market segments: (i) syndicated bank loans identified in the Y14Q (in green), (ii) private debt issued by Dual-Borrowers (in orange) (iii) private debt issued by non Dual-Borrowers (in dark blue). The top chart reports dollar value, while the bottom chart reports market share. Syndicated loans include both investment-grade and leveraged loans.*

Figure 3: Leverage Ratio When Firms Access Private Debt



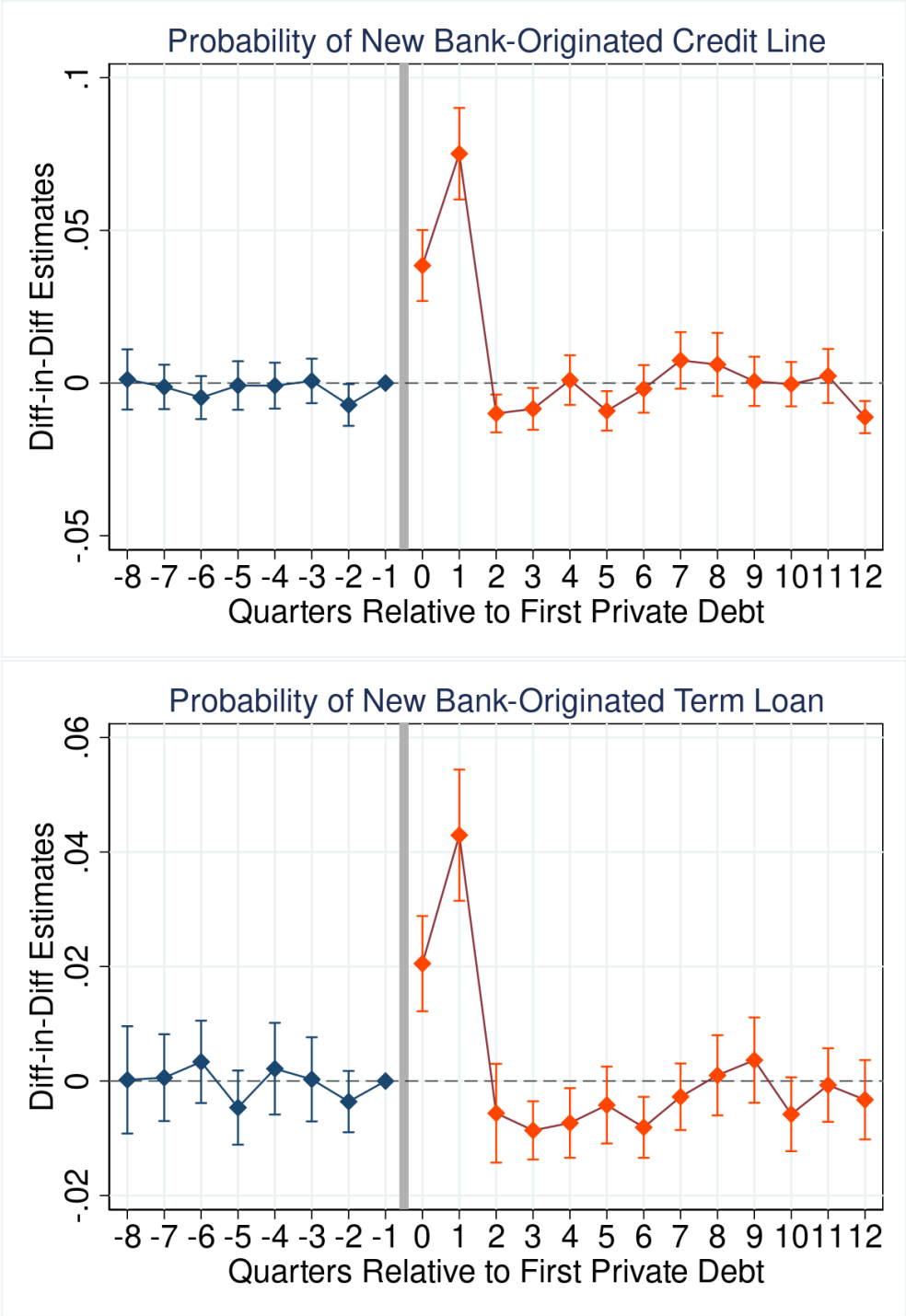
(a) *Notes: This reports a firm's Long-term Debt/EBITDA as well as Net Debt/EBITDA in the years around its first private debt issuance. The sample is restricted to Dual-Borrowers.*

Figure 4: The Evolution of Default Probability



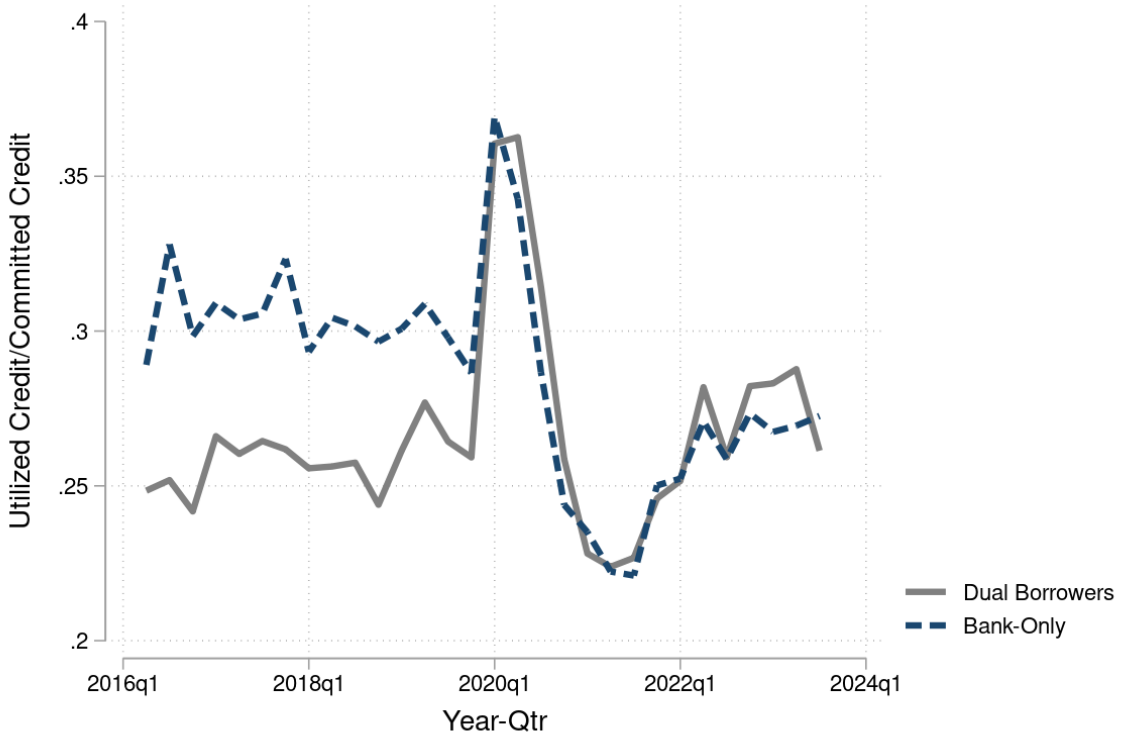
(a) *Notes: This figure plots the evolution of bank-estimated probability of default on outstanding bank loans to borrowers that issue private debt, in each event-quarter. The solid black line represents the sample median, while the grey shaded area represents the interquartile range.*

Figure 5: Probability of Obtaining New Bank Loan Upon Private Debt Issuance



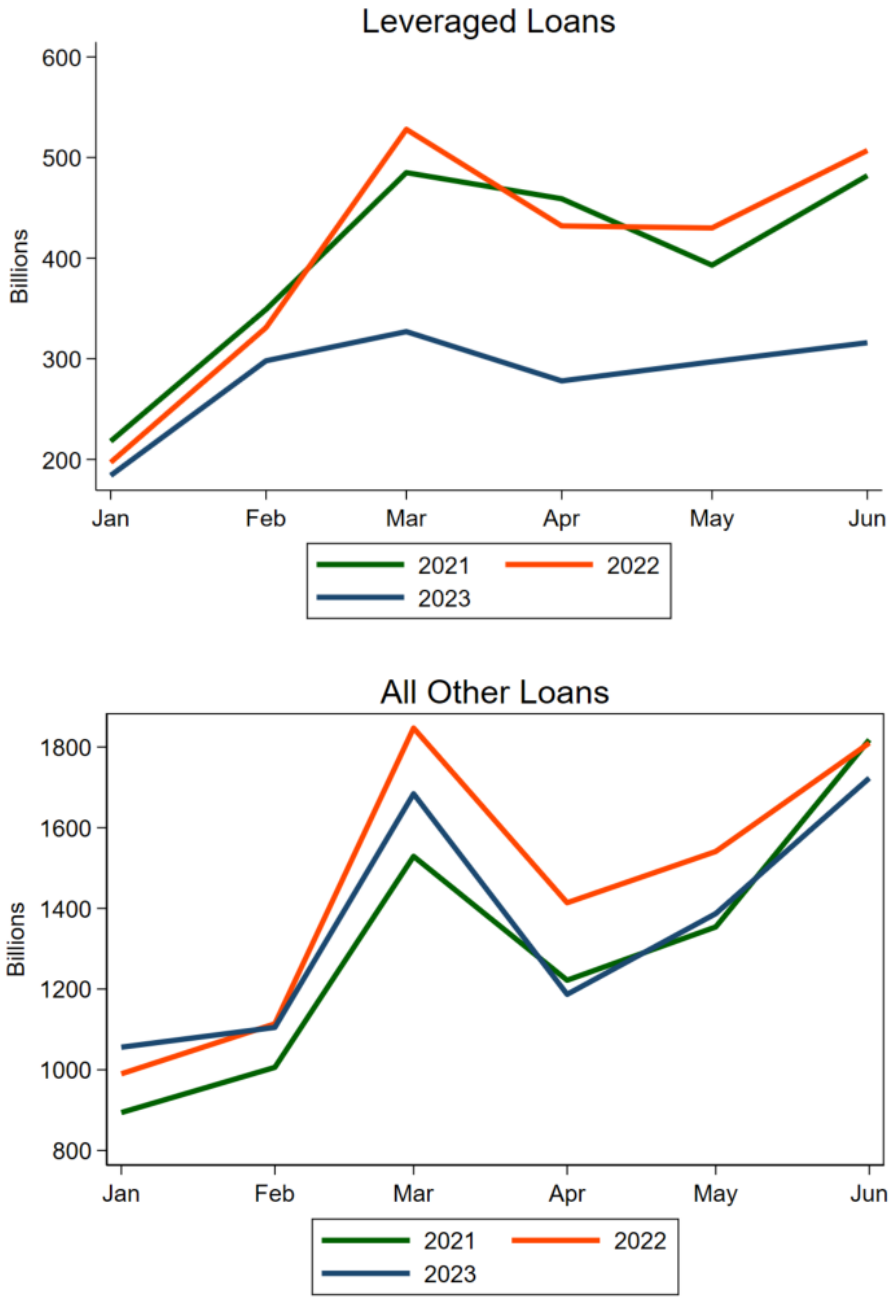
(a) *Notes: Dynamic difference-in-difference regression estimates for each quarter relative to a firm's probability of obtaining a new bank-originated credit line or term loan. All regressions include firm and sector-quarter fixed effects, as well as the following loan and firm-level controls: firm size (in logarithms), debt/asset, tangible asset/total asset, cash/asset, loan spreads, loan maturity.*

Figure 6: 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 7: 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 (mean) firm-level characteristics for firms, split between those who have both private and bank debt and those who only have bank debt. For better comparability, 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.*

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	6,814	23.5	4.8	14.0	30.0	26.5
Spread	6,814	1.7	0	1.7	2.9	1.5
Maturity	6,814	4.3	3.2	5	5	1.7
Share of Credit Lines	3,247	0.48	-	-	-	-
Share of Term Loans	2,009	0.29	-	-	-	-

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

Loan Size	167,103	18.7	2.0	5.3	22.5	27.6
Spread	167,103	1.3	0	1.2	2.2	1.2
Maturity	167,103	3.7	1.0	4	5	2.7
Share of Credit Lines	75,330	0.45	-	-	-	-
Share of Term Loans	51,331	0.31		-	-	-

(a) *Notes: This table plots basic loan-level sample characteristics of private debt to non-financial firms in Panel A. In Panel B, we report bank loan characteristics of companies with private debt. In Panel C, we report bank loan characteristics of companies without private debt. 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. Full definitions are provided in the Appendix.*

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)
$PD_l \times PE\ Buyout_d$			-0.310*			0.731***
			(0.186)			(0.243)
R-squared	0.732	0.8	0.776	0.863	0.903	0.905
Firm × Yr-Qtr FE	Y	N	N	Y	N	N
Firm × Yr-Qtr × Loantype 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 estimates at the loan-issuance level, where the dependent variable is loan amount (in logs) and loan spreads.* 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.* $PE\ Buyout_d$ *takes value 1 if a given deal, d, is a Private Equity Leveraged Buyout. 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 4: Maturity and Debt Seniority

	Maturity			Debt Seniority			1x TermLoan	1x CreditLine
	(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)
$PD_l \times PE\ Buyout_d$			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
FirmxYearQtr FE	Y	N	Y	Y	N	N	Y	Y
FirmxYearQtrxLoantype 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 estimates at the loan-issuance level, where the dependent variable is loan maturity, debt seniority (first lien senior secured), and indicators for term loans and credit lines.* 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.* $PE\ Buyout_d$ *takes value 1 if a given deal, d, is a Private Equity Leveraged Buyout. 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 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
SectorxTime 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 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. 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 6: New Bank Loans, Loan Spread and Default

	Loan (new)	Term Loan (new)	Credit Line (new)	Spreads	Spreads
	(1)	(2)	(3)	(4)	(5)
$PD_{i,t}$	0.028***	0.008***	0.014***	0.209***	0.078**
	(0.005)	(0.002)	(0.003)	(0.067)	(0.031)
R-squared	0.103	0.078	0.072	0.589	0.557
Firm FE	Y	Y	Y	Y	Y
BankxTime FE	Y	Y	Y	Y	Y
SectorxTime	Y	Y	Y	Y	Y
Sample	Full	Full	Full	New Loans	Full
N	584,000	584,000	584,000	27,595	584,000

(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. 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: 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
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	206,413	125,181	196,162	120,455	225,768	125,181

(a) *Notes: This table reports regression estimates investigating the behavior of loans to dual borrowers during the Covid-19 pandemic. $Drawdown_t$ 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 8: Private Debt and Ex-Post Default on Outstanding Bank Loans

	$1 \times$ *Default* (Days Past Due>90)		$1 \times$ *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 x Yr-Qtr FE	N	Y	N	Y
Sector x Yr-Qtr 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 estimates investigating the frequency of actual defaults on outstanding bank loans to Dual Borrowers.* $Drawdown_t$ *is the ratio of utilized to committed credit. 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.*

Table 9: Firm-level Test: Private Debt and Capital Structure

	Debt/Assets	Long-term Debt/EBITDA	Bank Debt (log)	Interest Coverage	Bank Debt/Total Debt
	(1)	(2)	(3)	(4)	(5)
PD_{it}	0.0275***	0.648**	0.166***	-2.854***	-0.0694***
	(0.01)	(0.27)	(0.04)	(0.57)	(0.02)
R-squared	0.829	0.443	0.686	0.879	0.723
Firm FE	Y	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y	Y
SectorxYear FE	Y	Y	Y	Y	Y
N	46,620	46,596	45,955	46,620	45638

(a) *Notes: This table reports regression estimates at the firm-year level investigating debt and leverage in dual borrowers. Firm Controls include a firm's total book assets, share of tangible assets, cash/assets, EBITDA/assets. Firm controls are included with one-perod lags. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table 10: Real Effects of Private Debt

	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
SectorxYear 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 estimates on firm-level outcomes, estimated at the firm-year level. 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. Interest Coverage Ratio is computed as EBITDA/Interest Expense. Standard errors are clustered at the firm level.*

Table 11: 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
SectorxWeekFE	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 estimates on credit spreads. $Post_t$ takes value 1 on or after the week of the SVB Collapse and generally captures the entire banking turmoil of March 2023. Estimation period is restricted to January-June 2023. Loan controls include loan amount and maturity. Firm controls are firm assets, debt/asset and EBITDA. Standard errors are clustered at the firm level.*

Table 12: 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.*

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
- Interest Coverage Ratio: EBITDA/Interest Expense
- Total Debt: Total Debt/Book value of total assets
- Total Bank Credit: Total Commitments of bank b to firm f (Y-14: CLCOG074) in year t scaled by assets. These include all types of loans such as revolving credit lines or term loans.
- Loan Maturity: Computed as the difference between loan maturity date and loan origination date (expressed in years)
- Utilization 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.

- 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).
  - 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.
  - This filtration strategy leads to a total of 17,126 loans.

- 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 1 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.

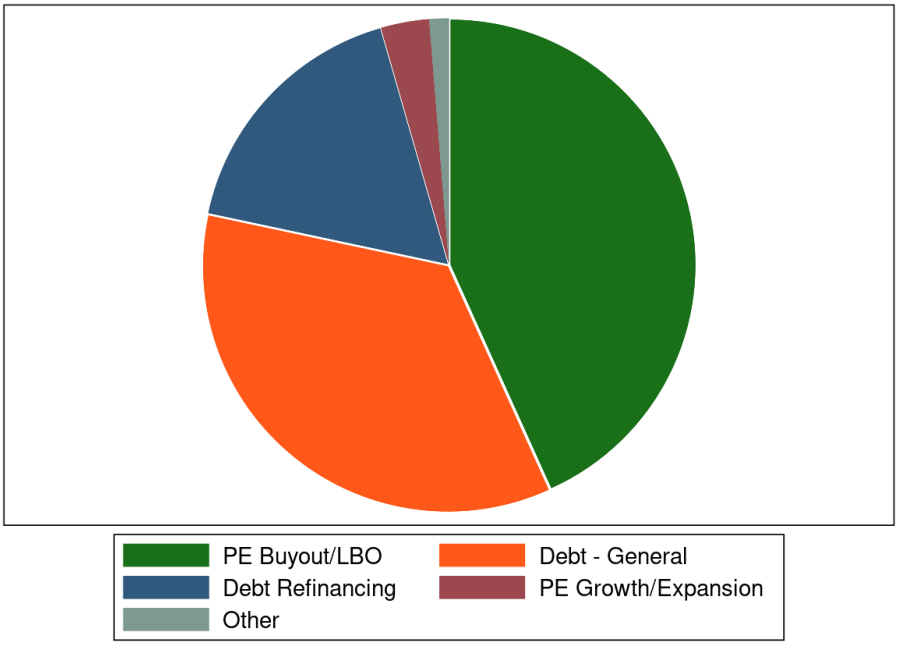
- Unless otherwise stated, all variables are winsorized at the 2.5 and 97.5 percent levels, following Favara, Minoiu and Perez-Orive (2022), and trimmed to remove outliers and likely reporting errors. Debt/EBITDA is winsorized at the 5.0 and 95.0 percent levels to further mitigate the effect of observations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



(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.*

Table A.1: Comparison with Only PD Borrowers

	PD Only (Mean)	Dual (Mean)	PD Only (Median)	Dual (Median)
Revenue ($ Mn)	2084	1750	400	438
EBITDA ($ Mn)	402	218	69	51.2
Net Debt ($ Mn)	2026	901	328	178

(a) *Notes: This table reports summary stats between borrowers that obtain debt from both banks and private debt funds (dual borrowers) with those that only rely on private debt funds (i.e. the unmatched sample from Pitchbook). The statistics for dual borrowers are restricted to the quarter where they obtained private debt for better comparability. Number of observations for dual borrowers is 4029. Number of observations for only private debt borrowers is 749, 355 and 294 for revenue, EBITDA and Net Debt. Financials for Private Debt Borrowers only are obtained from Pitchbook.*

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: Baseline Results Excluding Buyout

	Loan Amount (1)	Loan Spread (2)	Maturity (3)	Debt Seniority (4)	1x Credit Line (5)	1x Term Loan (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
FirmxYearQtr FE	N	N	N	N	Y	Y
FirmxYearQtrxLoantype 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.5: Baseline Results Excluding Firm-Time Fixed Effects

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

(a) *Notes: This table reports the baseline regression estimates reported in Table 3 and 4, excluding firm-time fixed effects. The specifications in this table include only firm fixed effects and time fixed effects. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

A.4 Results with Larger Control Group

In this section, we show that all of our main results presented in Sections 4.1 and 4.2 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.6: 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
SectorxTime 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.7: 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
BankxTime FE	Y	Y	Y	Y	Y
SectorxTime	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. 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 5 is inclusion of all loans in the Y14 data. Sectors are defined at the 2-digit NAICS level. Standard errors are clustered at the firm level.*

Table A.8: Loan Drawdown, Default Risk and Gaurantees

	Drawdown	Drawdown	Default Probability	Default Probability	Loan Gaurantee	Loan Gaurantee
	(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 7, 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.9: Ex-Post Default

	$1 \times Default$ (Days Past Due>90)		$1 \times Default$ (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
BankxTime FE	N	Y	N	Y
SectorxTime 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.*