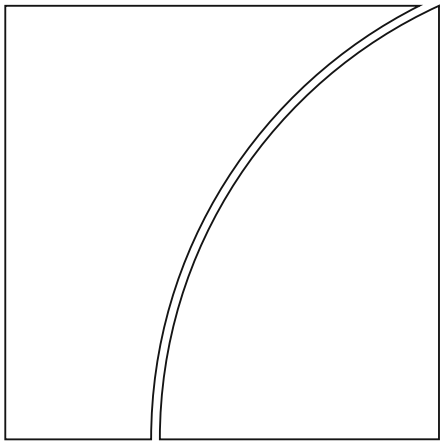

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Collateralized lending in private credit

by Iñaki Aldasoro and Sebastian Doerr

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May 2025

JEL classification: G20, G23, G28.

Keywords: private credit, direct lending, collateral, house prices, asymmetric information.

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Collateralized lending in private credit*

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Abstract

Private credit, often associated with unsecured lending, has experienced remarkable growth in recent years. We use U.S. loan-level data to show that total outstanding amounts of secured direct loans now surpass unsecured direct loans. Loans are more likely to be secured when informational frictions between lenders and borrowers are more severe. Comparing loans to firms within the same metropolitan statistical area (MSA) and industry, we observe that secured loans have lower amounts, higher spreads, and longer maturity than unsecured loans. Club deals and revolvers are increasingly common in both market segments, likely driven by rising bank participation. Finally, employing an instrumental variable strategy and cross-sectional variation in house prices across MSAs, we provide suggestive evidence of a 'real estate collateral channel' in private credit. When house prices rise, secured direct lending increases by substantially more than its unsecured counterpart, especially in collateral-dependent industries. We conclude by discussing the implications for monetary policy transmission and the evolving bank-private credit nexus.

JEL classification: G20, G23, G28.

Keywords: private credit, direct lending, collateral, house prices, asymmetric information.

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1 Introduction

Private credit – nonbank credit extended by specialized investment vehicles – has become an important source of corporate lending in the U.S. With total assets under management now exceeding $1.5 trillion, the private credit market rivals the markets for leveraged loans or high-yield bonds (IMF, 2024).[1] Within the private credit universe, direct lending has grown particularly fast. In direct lending, loans are directly negotiated between lenders and borrowers, and lenders typically hold the loan on their balance sheet until maturity.

Direct lenders predominantly serve middle-market firms with riskier profiles, offering bespoke financial solutions. Direct loans have equity-like features and often are covenant-heavy (Chernenko et al., 2022; Erel et al., 2024), with lenders using financial covenants to monitor borrowers and engage in relationship lending (Jang, 2025). Firms borrowing from private credit funds value flexible loan terms and appreciate that deals are better tailored to their needs (Block et al., 2024). An important purported advantage of private credit is that it is often uncollateralized (i.e. unsecured), benefiting borrowers that lack collateral. However, anecdotal evidence suggests a growing trend towards collateralized (i.e. secured) lending.[2] Such a shift might raise important questions about the dynamics and risks in the private credit market. In what follows, we use the terms secured and collateralized interchangeably.

We study the patterns and determinants of secured and unsecured direct lending in the U.S. private credit market using loan-level data. The data, provided by Pitchbook Data, Inc., range from 2000Q1 to 2024Q4 and contain information on the originating private credit fund(s), the borrowing firm, the outstanding amount, the interest rate spread, maturity, and whether the loan is secured (i.e., backed by collateral) or unsecured, among other items. We construct each lender's outstanding loan volume as a stock variable to proxy the loan's entry on lenders' loan books in each quarter. Each loan remains active until it matures.

[1] The rise in private credit happened against the backdrop of a growing footprint of nonbank financial intermediaries (NBFIs) in the mortgage market (Buchak et al., 2018), small business lending (Gopal and Schnabl, 2022), consumer credit (Tang, 2019), and syndicated lending (Aldasoro et al., 2022, 2023), among others.

[2] See, for example, McKinsey: The next era of private credit; Pimco: Private Credit: Asset-Based Finance Shines as Lending Landscape Evolves; or Private Debt Investor: Is asset-based lending Europe's next big trend?.

Figure 1 shows that secured and unsecured direct lending have seen rapid growth in recent years. Outstanding unsecured loans increased from negligible amounts in the early 2000s to slightly over $300 billion by end-2024 (black area). But outstanding secured loans increased even more sharply: from near-zero to about $370 billion over the same period (blue area). By now, secured direct lending constitutes over 50% of the total (red line). As we show, the stronger increase in secured lending is not explained by any particular industry, as it has happened *across all industries*.

The likelihood of a loan being secured is strongly correlated with measures of lenders' information about borrower risk. A loan is less likely to be secured when a lender is more specialized in the borrower's industry or region (i.e. when the lender has more industry- or region-specific knowledge), and more likely to be secured the greater the geographic distance between a lender and a borrower. These patterns are consistent with collateral mitigating informational frictions in lending (Benmelech, 2024) and echo findings for the banking sector (Petersen and Rajan, 2002; Blickle et al., 2021).[3] Moreover, we document a secular decline in lender specialization as well as an increase in average lender-borrower distance over the past 25 years among direct lenders. These trends could underlie some of the rise of collateralized direct lending.

Secured loans have smaller amounts, higher spreads and longer maturity than unsecured loans. These patterns hold even when we compare loans to firms in the same metropolitan statistical area (MSA) and industry.[4] Spreads on secured and unsecured loans have declined substantially over the past decades, but the decline has been steeper among unsecured loans.

To shed further light on how collateral shapes direct lending, we explore the role of real estate collateral.[5] In the face of financial frictions, an increase in local real estate prices, by improving collateral values, could enhance firms' capacity to borrow. Our analysis follows a large literature that documents the

[3]Collateral mitigates adverse selection and provides creditors with greater assurance and priority in liquidation, thereby enabling firms, especially those with higher default risk, to access credit and borrow at lower rates. See Benmelech et al. (2022, 2024) and Benmelech (2024) for overviews.

[4]Higher spreads among secured loans are consistent with the common finding that riskier firms need to pledge collateral (Benmelech, 2024), even though better-collateralized loans by the *same firm* have lower spreads than unsecured loans (Cerqueiro et al., 2016; Luck and Santos, 2024).

[5]Pitchbook does not provide information on the type of collateral. However, anecdotal evidence suggests that a material share of loans is secured by real estate collateral.

sizeable effects of real estate collateral on *bank credit* and firm outcomes (Gan, 2007; Chaney, Sraer, and Thesmar, 2012; Cvijanovic, 2014; Adelino, Schoar, and Severino, 2015; Corradin and Popov, 2015; Lin, 2016; Bahaj, Foulis, and Pinter, 2020; Ahnert, Doerr, Pierri, and Timmer, 2023).

Our empirical strategy uses cross-sectional variation in house prices across MSAs and a two-pronged approach to identification. First, we instrument MSA-level real estate prices with the interaction of local housing supply elasticities and the Federal Funds Rate (Saiz, 2010; Mian and Sufi, 2011; Chaney et al., 2012). The intuition underlying this instrumental variable (IV) is that reductions in interest rates lead to higher demand for housing. The strength of the reaction of local house prices depends on the local supply elasticity. If it is cheap to build new houses and increase supply, then a decrease in rates will have a modest effect on housing prices. If the elasticity is low, the increase in demand will translate into higher house prices. Second, whenever possible, we control for confounding unobservable time-varying factors at the industry and location level through the inclusion of industry*time and MSA*time fixed effects. In essence, we compare secured with unsecured loans to borrowers within the same industry and MSA.

We find that a rise in local house prices increases secured direct lending by substantially more than unsecured lending. The estimated effects are statistically significant in ordinary least squares (OLS) and IV regressions and robust to the inclusion of granular fixed effects. In terms of economic magnitudes, an increase in the local house price index by one standard deviation increases unsecured lending by an insignificant 10.7% and secured lending by an additional and highly significant 21%. We find no statistically significant effects of local house prices on loan spreads or maturity.

Finally, we highlight the rising footprint of banks in private credit. In particular, our evidence suggests that increased bank participation explains the rise of club deals and revolvers. In particular, while most direct loans include one lender and one borrower, club deals, i.e. deals involving more than one lender, have become increasingly common over the past decade. They now account for 40% of all secured and unsecured deals. Concurrently, the share of revolver loans (i.e. credit lines) has also been rising. Moreover, a deal is significantly more likely to involve a revolver if it is a club deal, and especially when it includes at least one bank. And both secured and unsecured club deals are increasingly likely to have a bank as a participant. While our data

do not allow us to directly establish the link, these patterns suggest that banks are increasingly joining direct lenders in club deals and thereby provide credit lines to borrowers, consistent with anecdotal evidence.[6]

The paper concludes by discussing the implications of our findings for the role of private credit, or NBFIs more generally, in the transmission of monetary policy. Understanding whether there is a 'collateral channel' in private credit could hold important lessons. A purported advantage of private credit is the superior ability of funds' to screen and monitor borrowers that are informationally opaque and lack collateral. The increasing prevalence of secured direct loans and the strong relationship between local house prices (and hence collateral values) and private credit cast doubt on this assertion. We further pose the question whether private credit will increasingly resemble the syndicated or leveraged loan market, where a syndicate of lenders originates a loan that bundles a term loan with a credit line, potentially to be traded in secondary markets.

2 Institutional background and data

This section first provides institutional background on private credit, with a focus on secured lending (for a general discussion on private credit, see IMF (2024) and Avalos et al. (2025)). It then discusses the data and the construction of the main variables for analysis.

2.1 Institutional background on private credit

Private credit generally refers to nonbank credit extended by specialized investment vehicles ("funds") to small and mid-sized non-financial firms (Block et al., 2024; Cai and Haque, 2024). In addition to the type of borrowers served, the private credit market differs from syndicated or leveraged loans in two important respects. First, private credit deals are usually directly negotiated between a borrower and a lender rather than being arranged by investment banks and comprising a large group of lenders. Second, private lenders hold

[6]See for example BNN Bloomberg: Wells Fargo, Centerbridge Direct Debt Deals Reach $2.8 Billion or Middle Market Growth: It Takes Two to Tango in Private Credit. Haque et al. (2024) provide evidence of co-financing of the same borrowers by private lenders and banks, but outside of club deals (with banks concentrating on credit lines).

loans on their balance sheet until maturity, rather than selling them in an active secondary market like syndicated/leveraged lenders do.[7]

The universe of private credit funds comprises various players that differ in the structure of their liabilities and/or assets. Most funds operate as closed-end structures that lock in capital for their entire life cycle, typically ranging from five to eight years. They do not trade publicly and are not available to retail investors, which makes them illiquid and subject to lighter regulation. However, some fund structures that offer investors more frequent redemption opportunities have grown in popularity. An important example are business development companies (BDCs), many of which list their shares on stock exchanges and are accessible to retail investors (Davydiuk et al., 2024).

Individual funds usually specialize in certain strategies. 'Direct lending', which typically refers to funds extending covenant-heavy floating-rate loans to small or mid-sized firms, is most commonly associated with private credit. It is often considered as the typical example of so-called unsecured cash-flow lending, which relies on cash generation from firms' regular operations instead of collateral. Other strategies include mezzanine, which involves junior or subordinated lending to larger firms (often with equity participation rights), asset-based finance, which requires hard assets as collateral, or funds that specialize in distressed assets such as non-performing loans.

The remarkable growth in direct lending over the past decade can be explained by both demand and supply factors. For one, firms value the flexible covenant structures and greater speed of execution afforded by private credit funds relative to banks, as well as funds' readiness to renegotiate loan terms and ability to provide bespoke contract terms (Block et al., 2024; Erel et al., 2024).[8] Reflecting these benefits, firms with negative earnings ('EBITDA'), higher debt, lower accounting transparency and low tangible collateral value are more likely to borrow from private credit funds (Chernenko et al., 2022; Jang, 2025). The riskiness of these firms is reflected in considerably higher spreads (Loumioti, 2022) and can explain why they are typically underserved by banks to begin with. Indeed, tighter regulation has increased the burden of

[7] Both aspects are either changing or likely to change. First, as we show below, so-called club deals containing more than one lender have risen substantially in recent years. Second, private credit lenders are considering establishing marketplaces for private credit (see Bloomberg: Apollo plans to build the first marketplace for private credit).

[8] Abuzov et al. (2024) estimate that borrowers value flexible covenants at a price that is equivalent to a loan with a 2.5 percentage point lower rate spread.

holding certain loans for banks, creating an opportunity for nonbanks such as direct lenders (Loumioti, 2022; Avalos et al., 2025).

Banks typically limit smaller, riskier firms to collateralized loans, whereas the extant literature emphasizes that private credit funds mostly engage in uncollateralized lending. However, as we document in this paper, private credit funds have strongly expanded their secured lending, which now accounts for more than half of their total lending. Direct loans can be secured by a variety of assets. These include real estate, aircraft, shipping, manufacturing or agricultural equipment and data centers, among others. Perhaps the most well-known collateral type is real estate, not least due to its well-documented and discussed cyclical properties (Leamer, 2015).

2.2 Data and variable construction

Loan-level data. We use data on private credit deals by U.S.-based borrowers provided by Pitchbook Data, Inc (henceforth Pitchbook), from 2000Q1 to 2024Q4. For each deal, Pitchbook provides the originating private credit fund(s), the borrowing firm, the outstanding amount, the interest rate spread (over standard reference rates such as LIBOR or SOFR), both start and end date of the loan (maturity), as well as certain borrower information, such as its identifier, location (MSA and county), and industry. In addition, we know the loan purpose (e.g. leveraged buyout (LBO)) and whether it was a revolver or term loan. Moreover, Pitchbook provides information on whether the loan is secured by collateral or not. Collateral can take various forms, including current assets, real estate or other non-liquid assets such as intellectual property. It can also include other hard assets such as aircraft or machinery. We focus on direct loans and only keep completed deals in U.S. dollars that are not amendments.

Deals often contain multiple debt portions. For example, one deal might combine a term loan with a revolver loan. We thus treat each debt portion as a separate observation, which we define as a loan. Most loans in private credit are bilateral, i.e. by one lender to one borrower. However, about one-quarter of all deals are so-called club deals and involve more than one lender. The median (mean) club deals has 2 (3.4) lenders (see below for further discussion on club deals). In such cases, we split the total loan amount into loan portions provided by each lender on a pro-rata basis as Pitchbook does not provide

data on actual lending shares.

We then construct each lender's outstanding loan volume as a stock variable to proxy the loan's entry on lenders' loan books in each quarter. Each outstanding loan remains active until it matures (Jiménez, Ongena, Peydró, and Saurina, 2014; Doerr, Raissi, and Weber, 2018; Morais, Peydró, and Ruiz, 2019; Doerr and Schaz, 2021).[9] For example, a private loan issued in 2005 with a maturity of five years remains active until 2010. Note that this approach implicitly assumes that loans are not sold on secondary markets, which is reasonable for private credit: By its very nature (and in stark contrast to e.g. syndicated loans), the loan originator generally keeps the loan on its balance sheet until maturity.

To identify banks among the lenders, we proceed in two steps. First, we use Pitchbook's lender file and categorize all lenders designated as 'commercial bank,' 'investment bank,' or 'merchant bank' as banks. Second, we classify all remaining lenders that have the token 'bank' in their name as banks.[10]

In our regressions below, we aggregate all outstanding loan portions to the lender-MSA-quarter level to obtain lender l's outstanding loan volume to all firms in MSA m in quarter t. The total loan volume in a given quarter hence corresponds to the sum of the value of all outstanding (new as well as continuing loans) from a given lender to firms in a given MSA. For other loan terms, such as maturity or rate spread, we aggregate individual loans using loan volumes as weights.

House prices and additional series. Information on quarterly MSA-level house prices is obtained from the Federal Housing Finance Agency (FHFA) for 404 MSAs. We obtain information on the local housing supply elasticity from Saiz (2010) and on the Federal Funds Rate (FFR) from FRED.

Descriptive statistics. Our final loan-level data set contains information on 286,000 loan-quarter observations for 1,481 lenders (of which 298 are banks) and 5,218 firms, from Q1 2000 to Q4 2024. Table 1 provides summary statistics for secured and unsecured direct loans, with the last column showing whether differences between the two are statistically significantly different. Unsecured

[9] When information on maturity is missing, we assume the loan's maturity to be the same as the average maturity across loans to firms in the same industry.

[10] The 10 largest banks by loan amounts are Capital One Financial, JP Morgan Chase, Deutsche Bank, PNC, The Goldman Sachs Group, BMO Financial Group, Wells Fargo, CIT Group, Bank of America, and BMO Bank.

loans are more likely to be a revolver or for an LBO. The average loan amount is slightly smaller for secured loans, while the overall deal size is substantially larger for secured loans ($354 million vs $225 million).[11] The rate spread is higher for secured loans (6.41 pp vs 6.31 pp for unsecured), and maturity is slightly longer for secured loans.

Table 2 present simple regression results showing that these patterns remain robust when comparing borrowers in the same MSA and industry in a given year. In fact, with MSA-industry-time fixed effects, coefficients get larger for spreads (column 2) and amounts (column 5). This could suggest that even within the same MSAs and industries, riskier firms are more likely to pledge collateral. They also remain robust to controlling for available loan (revolver yes/no, buyout yes/no, club deal yes/no, amount and maturity) as well as borrower (log of current number of employees, business is profitable yes/no) characteristics.These patterns are consistent with the common finding that riskier firms need to pledge collateral (Benmelech, 2024), even though better-collateralized loans by the *same firm* have lower spreads than unsecured loans (Cerqueiro et al., 2016; Luck and Santos, 2024).

We discuss patterns in secured and unsecured direct lending in more detail in what follows.

3 Stylized facts on secured and unsecured direct lending

Secured lending and informational frictions. Figure 1 shows that secured and unsecured direct lending have seen rapid growth in recent years. Outstanding unsecured loans increased from negligible amounts in the early 2000s to over $300 billion by 2024 (black area). Outstanding secured loans increased from near-zero to about $370 billion over the same time period (blue area). Consequently, secured lending has increased its share in total outstanding direct lending from less than 10% in the 2000s to over 50% today (red line). Its comparative growth was particularly fast between 2011 and 2014 as well as after 2017. The increase in secured lending has been broad-based. Figure 2, which plots the average share of secured lending before and after 2014 for

[11] One deal can contain multiple loans, e.g. when there is a term loan and a revolver in a deal and/or when there is more than one lender involved.

major industries, shows that the increase happened in all industries.

Figure 3, panel (a) shows that funds often specialize in either secured or unsecured lending. While about 23% of all funds do no secured lending at all, about 6% do so exclusively. In general, larger funds do more secured lending over the sample (panel b). Indeed, the share of specialized funds (i.e. those originating exclusively secured loans) has increased from about 2% to almost 15% over the past 25 years (blue bars, left axis, in Figure 4). However, the share of secured out of total loans has steadily increased also among non-specialized funds (i.e. those that originated an average share $\in (0, 1)$ of their portfolio as secured loans over the sample period). The black line (right axis) plots the average share of secured over total loans among non-specialized funds. It has increased from less than 5% in the early 2000s to around 50% as of end-2024.

Asymmetric information is a key friction in credit markets and collateral can act as one solution to align the incentives of lenders and borrowers (Benmelech, 2024). To examine whether the choice to originate a secured or unsecured loan correlates with informational asymmetries, we compute various measures that proxy for lender knowledge. In particular, we consider measures of lender specialization at the industry and MSA levels as well as the geographical lender-borrower distance.[12]

Table 3 presents suggestive evidence that collateral plays a role in overcoming informational frictions also in direct lending. We estimate regressions with a dummy of whether a loan is secured or not as dependent variable and measures of lender informational frictions as independent variables. For each measure, we estimate regressions without and with borrower MSA-industry-time fixed effects. The higher a lender's specialization, either at the industry or MSA level, the lower the likelihood that a loan is secured (columns (1)–(4)). Consistently, loans are more likely to be secured the greater the distance between lenders and borrowers (columns (5) and (6)). All correlations are highly statistically significant.[13]

The rise of secured lending could thus partly reflect structural changes

[12]Specialization in narrow industries or regions provides lenders with superior knowledge about borrower quality (Blickle et al., 2021). Greater lender-borrower distance can make the transmission of soft information to lenders more difficult (Petersen and Rajan, 2002; Herpfer et al., 2023).

[13]Results remain quantitatively and qualitatively unchanged when we control for five loan size bin $\times$ year fixed effects. This addresses the concern that smaller loans might be more informationally sensitive, and that loan size could be correlated with distance or specialization.

in the private credit market. As shown in Avalos et al. (2025), lenders' loan portfolios have become less concentrated in narrow industries in recent years. Moreover, as shown in Figure 5, lenders' average industry and geographic (i.e. MSA) specialization declined substantially over the past 25 years, whereas lender-borrower distance has steadily increased. These structural changes, possibly induced by a surge of investments in the private credit sector necessitating larger fund size, could result in more severe informational asymmetries. The rise in secured direct lending could therefore reflect the need to mitigate these information frictions with the use of collateral. We can use the aggregate evidence in Figure 5 and the coefficient estimates in columns (2) and (4) of Table 3 (-0.165 and -0.177) to perform back-of-the-envelope calculations. Based on the coefficient estimates, the roughly 50 pp fall in industry/MSA specialization of the average fund over the past 25 years increased the share of secured loans by 10–11 pp.

Turning to loan terms, Figure 6, panel (a) shows that spreads on secured and unsecured loans have declined substantially over the past decades. The decline has been steeper among unsecured (from 11 pp to 6 pp) than secured loans (from 8 pp to 6.5 pp). Loan maturities are similar for both types of loans (panel b) while average loan amounts have substantially increased for both loan types in recent years (panel c).

4 Direct lending and the collateral channel

Real estate collateral plays an important role in mitigating informational frictions in lending. Consequently, a large body of work has studied the implications of rising real estate values for economic activity. In early theoretical work, increases in collateral values stimulate credit supply and economic activity (Kiyotaki and Moore, 1997; Holmstrom and Tirole, 1997). Empirical work shows that rising real estate values increase firms' leverage, investment, and employment (Chaney, Sraer, and Thesmar, 2012; Cvijanovic, 2014; Bahaj, Foulis, and Pinter, 2020; Anderson, Bahaj, Chavaz, Foulis, and Pinter, 2023) as well as firm entry (Adelino et al., 2015; Corradin and Popov, 2015).

Pitchbook does not provide information on the type of collateral securing a loan. However, anecdotal evidence suggests that a material share of loans is secured by real estate collateral. To study the role of real estate collateral in

private credit, we investigate to what extent secured direct loans respond to changes in local real estate values. Understanding whether there is a 'collateral channel' in private credit is important: a purported advantage of private credit is the superior ability of funds' to screen and monitor borrowers that are informationally opaque and lack collateral (Block et al., 2024). A strong relationship between local house prices (and hence collateral values) and private credit might cast doubt on this assertion.

In what follows we first discuss our empirical strategy and identification and then present results on the collateral channel in private credit.

4.1 Empirical strategy

To analyze how secured and unsecured direct lending respond to local house prices, we estimate the following regression at the lender-MSA-loan type-quarter level:

$$\begin{aligned} log(amount)_{l,m,s,t} = \delta_1 \, House\ price\ index\ (HPI)_{m,t} + \delta_2 \, Secured_s \\ + \delta_3 \, HPI_{m,t} \times Secured_s + \theta_{l,m} + \tau^1_{m,t} + \tau^2_{l,t} + \varepsilon_{l,m,s,t}. \end{aligned} \tag{1}$$

The dependent variable $log(amount)$ denotes the logarithm of the total outstanding volume of secured vs unsecured direct loans (indexed by s) to all borrowers in MSA m by lender l in quarter t. The variable *House price index (HPI)* denotes the house price index in MSA m in quarter t, while the variable *Secured* is a dummy that takes on a value of one for secured loans and zero for unsecured loans. The inclusion of lender*MSA fixed effects ($\theta_{l,m}$), combined with a dependent variable in log-levels, implies an interpretation in changes. We cluster standard errors at the MSA level to account for serial correlation within the same borrower MSA over time.

In the absence of interaction terms, δ_1 captures the effect of changes in the house price index on overall direct lending. The coefficient δ_3 reflects the relative change in secured compared to unsecured direct lending as local house prices change.

Identification and causality. Potential concerns to establishing the causal effect of local house prices on lending are omitted variable bias (OMV) and reverse causality.

With respect to OMV, for example faster local GDP growth could stimulate the housing market as well as the demand for loans. By comparing secured to unsecured lending in the same MSA, Equation (1) allows us to control for observable and unobservable time-varying factors through granular fixed effects. First, we can include MSA*time fixed effects ($\tau^1_{m,t}$), which absorb for example changes in MSA GDP, unemployment, or incomes. An unobserved factor would then need to systematically affect the demand for secured and unsecured loans in the same MSA to a different extent. Second, we can also add lender*time fixed effects ($\tau^2_{l,t}$). With these time-varying fixed effects at the lender level, we effectively compare lending by the *same* fund during the same quarter to two MSAs that differ in the evolution of their house prices.

Second, there could be reverse causality. For example, suppose a very large fund that specializes in secured lending expands its credit supply to firms in MSA m but not MSA n. A relaxation in credit constraints could stimulate local firm investment and employment, leading to an increase in local real estate prices through higher demand from firms or households in MSA m. To address this concern, we instrument house prices through the local housing supply elasticity, interacted with the FFR (Saiz, 2010; Mian and Sufi, 2011; Chaney, Sraer, and Thesmar, 2012). The idea is that lower interest rates lead to higher demand for housing. How strongly house prices react depends on the local supply elasticity. If it is relatively cheap to build new houses and increase supply, for example in a city bordering agricultural land, then a decrease in rates will have a modest effect on housing prices. If housing supply elasticity is low, because housing development space is limited by mountains or water, the increase in demand will translate into higher prices.

Specifically, we estimate the following first-stage regression:

$$HPI_{m,t} = \gamma \cdot Elasticity_m \times FFR_t + \delta_m + \tau_t + \epsilon_{m,t}, \tag{2}$$

where $HPI_{m,t}$ is the real estate price index at the MSA level, $Elasticity_m$ denotes local housing elasticity also at the MSA level, and FFR_t captures aggregate movements in the Federal Funds Rate. The regression includes MSA (δ_m) and quarter (τ_t) fixed effects, as well as clustered standard errors at the MSA level. We then use the resulting predicted house price index as an instrumental variable for the actual HPI in regression Equation (1).

4.2 Results

Figure 7 examines the collateral channel of private credit non-parametrically. It provides binned scatter plots of average MSA-level loan growth against average MSA-level house price growth for secured (panel a) and unsecured (panel b) direct loans. While there is a positive correlation between house prices growth and lending for both loan types, the correlation is substantially stronger for secured loans. We now investigate this relationship more formally in a regression analysis.

Table 4 reports results from estimating Equation (1) and shows that secured lending increases by significantly more than unsecured lending when local house prices increase. Columns (1)–(4) estimate OLS regressions. Column (1) focuses on secured lending only and shows a significant positive correlation between local house prices and secured lending by private credit funds. Adding lender*time fixed effects in column (2) confirms this result. Column (3) looks at both secured and unsecured lending and adds interaction terms. It shows that the increase in local lending is concentrated in the secured segment. While the coefficients on the house price index (δ_1) and its interaction with the *Secured* dummy (δ_3) are positive, only the latter is statistically significant. Adding MSA*time fixed effects confirms this result in column (4).[14] In terms of economic magnitude, an increase in the local house price index by one unit (which corresponds to one standard deviation) increases unsecured lending by an insignificant 10.7% and secured lending by an additional statistically significant 21%.

Columns (5)–(8) estimate two-stage least squares (2SLS) regressions. We instrument the actual house price index with the house price index obtained from Equation (2), which predicts the index with an interaction of the housing supply elasticity and FFR. Results are near identical to those obtained in columns (1)–(4). An increase in local house prices causes more secured lending in general (columns 5–6), as well as when compared to unsecured lending (columns 7–8). Again results remain largely unaffected by the inclusion of time-varying fixed effects at the lender or MSA level. F-statistics safely exceed 100, suggesting that there is no weak instrument problem.

[14]Unfortunately our data do not provide much reliable information for firms. Among the variables that we do have consistently, *current employees* can be used as a proxy of firm size. When we use this and split firms into size quartiles and additionally control for size*time FE, results remain robust in Table 4.

Other loan terms. We also explore the effects of local house prices on loan terms other than amounts. Table 5 present the results. Higher house prices tend to be associated with higher spreads for secured lending, although results are not statistically significant without (column 1) or with (column 2) MSA-time fixed effects and not also when instrumenting the house price index in columns (3) and (4). Results are weakly significant for maturity: higher house prices are associated with longer maturities for secured loans relative to unsecured loans, especially when controlling for time-varying MSA characteristics (column 6) and when instrumenting house prices through local housing elasticity and the FFR (columns 7–8).

4.3 Further analysis

MSA-industry analysis. To further examine the effects of local house prices on direct lending, we perform an analysis at the lender-MSA-industry-time level. Such an analysis allows us to exploit variation across the 39 different industries in their heterogeneous reliance on secured lending. For each industry i, we compute the share of loans that is secured ('*collateral dependence*'). Across industries, this share averages 41% (with a median of 42%) and a standard deviation of 11.6%.

We then estimate the following lender-MSA-industry-time regression:

$$\begin{aligned} log(amount)_{l,m,i,t} = \gamma_1 \, HPI_{m,t} + \gamma_2 \, Collateral \, dep_i \\ + \gamma_3 \, HPI_{m,t} \times Collateral \, dep_i + \theta_{l,m} + \tau_{i,t} + \varepsilon_{l,m,i,t}. \end{aligned} \tag{3}$$

The dependent variable $log(amount)$ denotes the logarithm of the total outstanding loan volume to all borrowers in MSA m and industry i by lender l in quarter t. The variable *HPI* denotes the house price index in MSA m in quarter t, while the variable *Collateral dep* measures the share of secured loans in industry i. $\theta_{l,m}$ denote lender*MSA fixed effects. We cluster standard errors at the MSA level. If house prices stimulate mostly secured lending, we expect $\gamma_3 > 0$.

Equation (3) has the benefit that, in addition to lender*time and MSA*time fixed effects, we can include industry*time fixed effects. These control for any trends that affect borrowers within an industry. This addresses the concern that the prevalence of secured and unsecured loans differs across industries,

and that industries cluster in different MSAs.

Table 6 reports the results. Column (1) shows that also at the MSA-industry level, local house prices stimulate total lending. Column (2) adds interaction effects and shows that the effect of house prices on lending is substantially stronger in industries that in general rely more on collateral. Columns (3) and (4) confirm this finding as we add MSA*time and industry*time fixed effects. Columns (5)–(7) further confirm our results in 2SLS regressions, where we instrument the house price index with the elasticity$\times$FFR instrument.

5 The rising importance of banks: club deals and revolvers

The analysis so far highlighted that many of the frictions that are present in bank lending also play a role in direct lending. In this section we document that, possibly reflecting these similarities, banks have increased their footprint in the direct lending space in recent years.

Figure 8 presents information for club deals, revolvers and leveraged buy-outs. Club deals, i.e. deals involving more than one lender, have been on the rise for both unsecured and secured lending over the past decade (panel a). As of late-2024, club deals constitute 40% of all secured and unsecured deals. Revolvers have also been rising over the past decade, albeit sequentially: starting in 2015 the share of revolvers in unsecured lending shot up, stabilizing after the pandemic (panel b, black dashed line). More recently revolvers gained ground also in secured lending (blue line). The picture differs for LBOs, where both secured and unsecured lending sharply fell during the Great Financial Crisis (GFC) and have not recovered since (panel c).

Zooming in on club deals and revolvers suggests that their rise is linked through increased bank participation. Figure 9, panels (a) and (b) for secured and unsecured lending show that a deal is significantly more likely to involve a revolver if it is a club deal. This likelihood is even higher when a club deal includes at least one bank. For example, about 10% of all secured loans are revolvers, but the share rises to 20% for those that are club deals with banks. Among unsecured loans, the respective increase is from 5% to over 15%.

Figure 9, panels (c) and (d) further show that (secured and unsecured)

club deals are increasingly likely to have a bank as a participant. The black-shaded area plots the number of club deals with bank involvement and the blue-shaded area the number of club deals with no bank involvement. While both have increased, banks' footprint has increased substantially, especially in the unsecured segment.

While our data do not allow us to directly establish the link, these patterns suggest that banks are increasingly joining direct lenders in club deals and likely providing credit lines to borrowers.[15] This could also underlie the finding that banks have been found to provide credit lines to borrowers that also have a direct loan (Haque et al., 2024). We discuss the implications of these developments for the private credit market in the conclusion.

6 Conclusion

Private lending has seen remarkable growth in recent years, raising concerns about potential financial stability implications. While historically dominated by unsecured lending, we document that the secured segment of the private credit market has been growing even more strongly in recent years. Total outstanding secured direct loans currently exceed total outstanding unsecured direct loans in the U.S. The increase in secured lending has been broad-based across industries and might reflect rising informational frictions between direct lenders and their borrowers.

The growing importance of secured lending could imply that private credit may behave differently over the cycle going forward, especially in response to changes in the monetary policy stance. Previous work has argued that non-bank lending expands while bank lending contracts following a contractionary monetary policy shock. In this way, non-banks moderate the impact of monetary policy on credit supply and the real economy (Chen et al., 2018; Banerjee and Serena, 2024; Cucic and Gorea, 2021; Elliott et al., 2022, 2024), although the underlying channel remains subject to debate (Aldasoro and Doerr, 2023). In line with this, Degerli and Monin (2024) argue that monetary

[15] This is consistent with anecdotal evidence. See for example BNN Bloomberg: Wells Fargo, Centerbridge Direct Debt Deals Reach $2.8 Billion, "Wells Fargo provides a revolver and Overland supplies a term loan"; or Middle Market Growth: It Takes Two to Tango in Private Credit, "TCW provided cash-flow loans, and PNC would step in as the asset-based lender or revolver arranger."

policy transmission through private credit markets appears muted relative to financing through public credit markets or bank commercial and industrial lending. Our results suggest that secured private credit, which has grown in importance recently, is sensitive to house price values. As monetary policy has a strong effect on house prices, this private credit collateral channel might mean that private credit becomes more cyclical with respect to monetary policy going forward.

More generally, our stylized facts suggest that private credit may be moving in the direction of syndicated and leveraged lending. For one, loan amounts have grown while spreads have fallen, and now are relatively close to those in the leveraged loan market. Moreover, the growing prevalence of club deals featuring two or more lenders implies that many private credit deals are already akin to a syndicate. There is also a growing prevalence of revolvers as part of club deals, likely driven by rising bank participation. These developments suggest that banks and private credit funds increasingly form syndicates to originate larger loans that bundle term loans and credit lines. Finally, reports suggest that marketplaces might be in the horizon for private credit, pointing to the establishment of secondary markets for loan trading. Bringing these elements together supports the notion that "private credit is the new public credit" (Levine, 2025).

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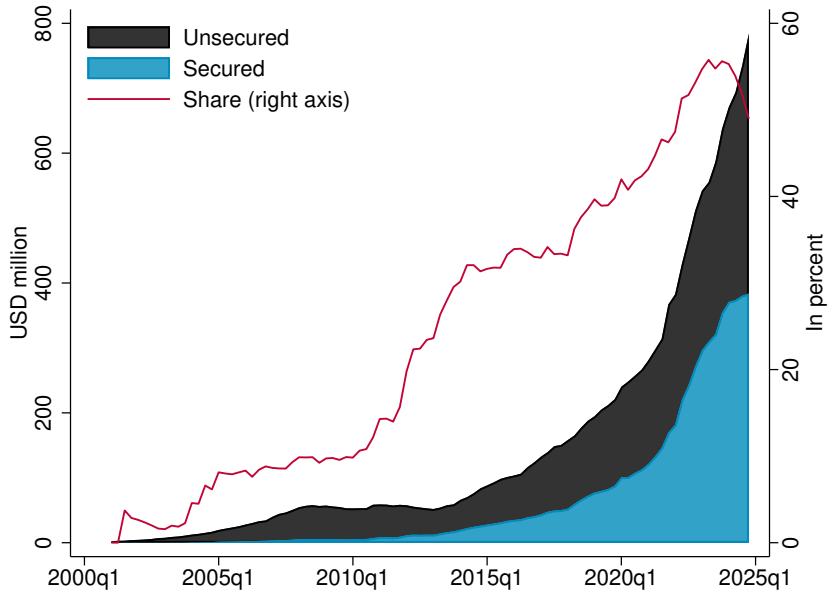
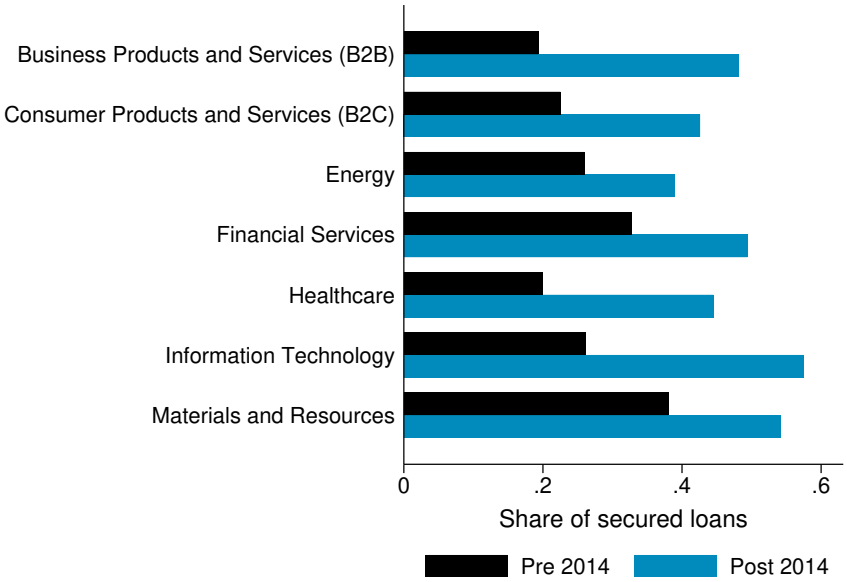
A Figures and tables

Figure 1: **The rise of secured direct lending**



This figure plots the evolution of total outstanding loan amounts for unsecured (black) and secured (blue) direct lending, as well as the share of outstanding secured over total lending (red, right axis), over the sample period.

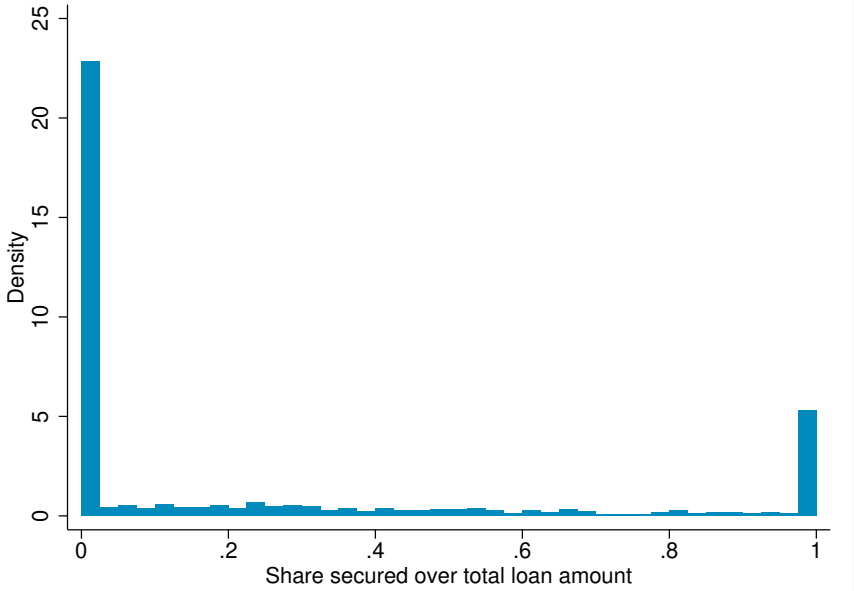
Figure 2: **Secured lending share by sector**



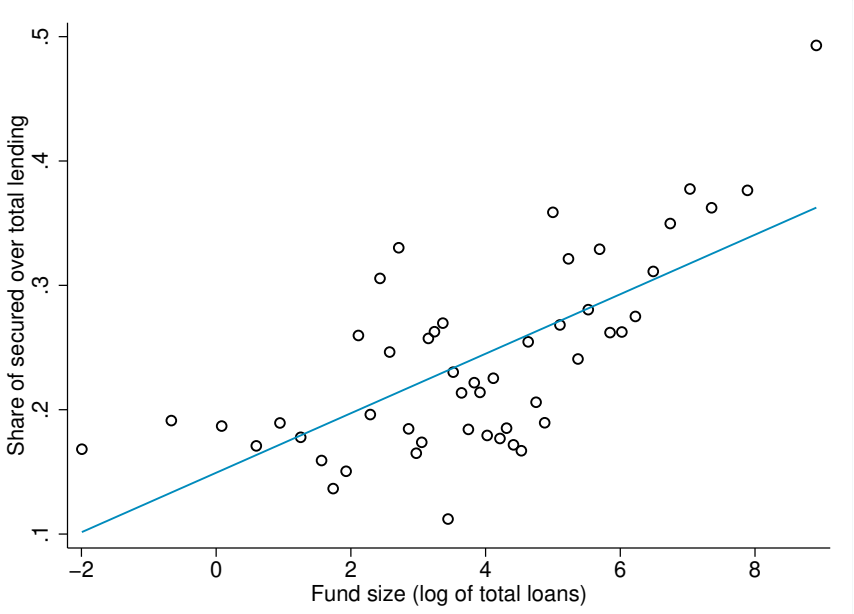
This figure plots the share of outstanding secured over total direct lending by industry, averaged over the pre-2014 (black) and post-2014 (blue) period.

Figure 3: **Share of secured loans across funds**

(a) Portfolio distribution

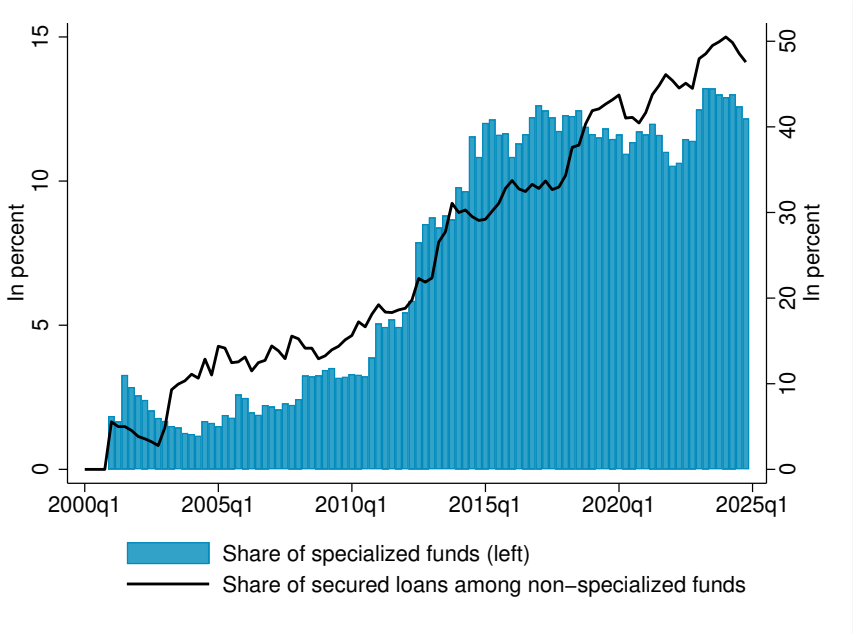


(b) Correlation with fund size



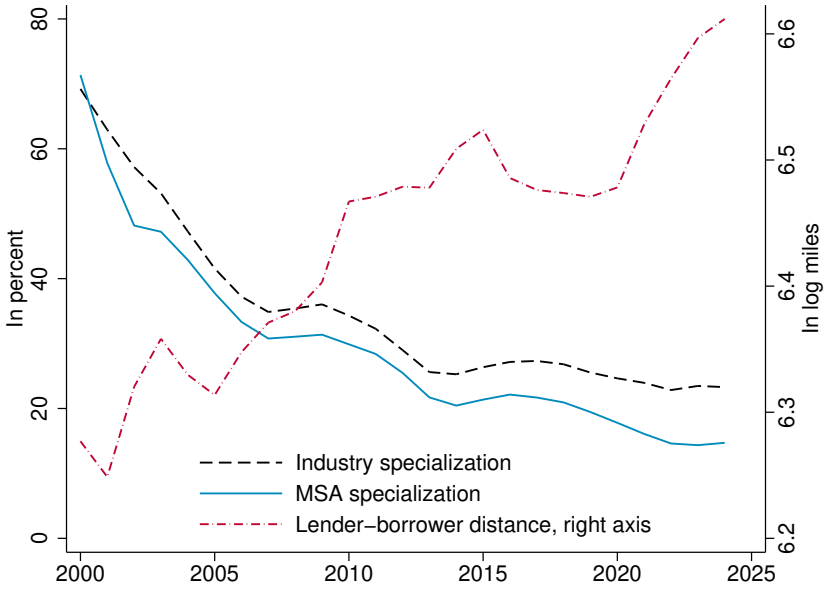
Panel (a) plots the distribution of funds based on their average share of outstanding secured over total loans. Panel (b) provides a binned scatter plot at the fund-year level of the share of outstanding secured over total loans on the y-axis against the log of the number of total loans on the x-axis.

Figure 4: **Share of specialized funds over time**



This figure plots the share of funds that only originate secured loans (i.e. secured share = 1) out of all funds in the sample over time (blue bars); as well as the share of secured loans over total loans for funds (black line) that, over the sample period, have originated a share of secured loans $\in (0, 1)$.

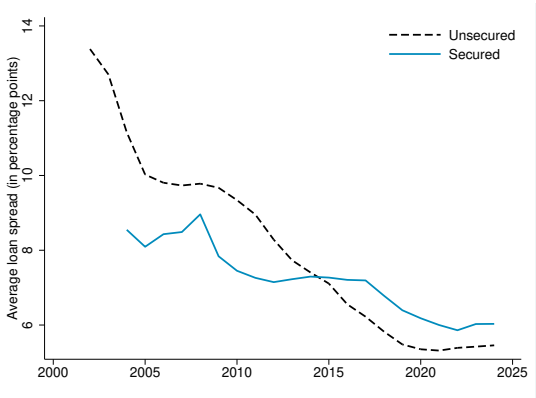
Figure 5: **Lender specialization declined over time**



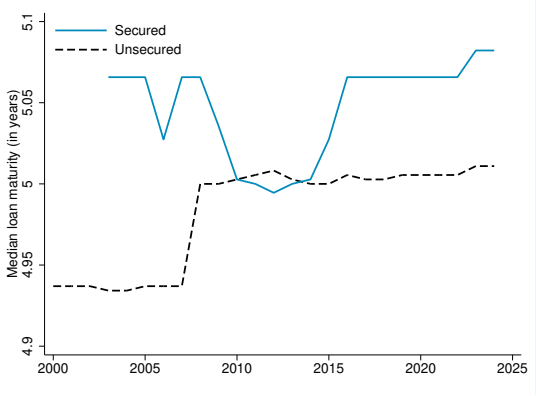
Industry specialization measures the share of industry i in lender l's total loan portfolio in quarter t, averaged across all lenders. *MSA specialization* measures the share of MSA m in lender l's total loan portfolio in quarter t, averaged across all lenders. *Lender-borrower distance* measures the distance (in log miles) between the headquarters county of the lender and the headquarters county of the borrower, averaged across all lenders.

Figure 6: **Rate spreads, maturity, and amounts**

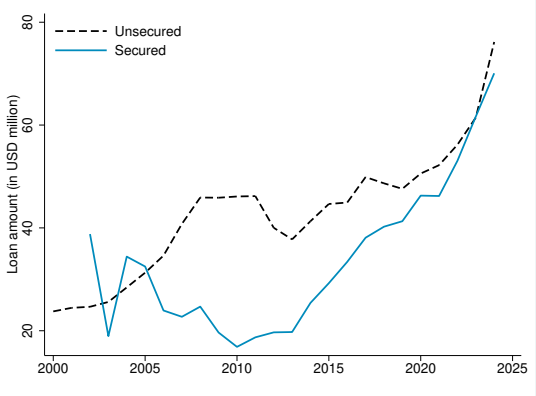
(a) Rate spreads



(b) Maturity



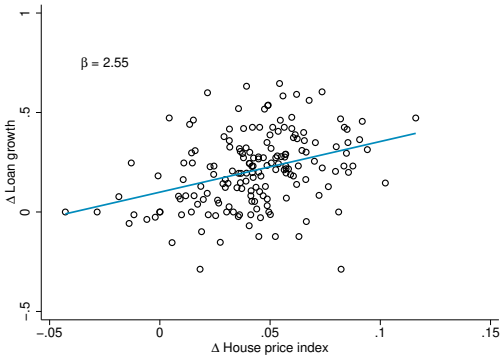
(c) Amounts



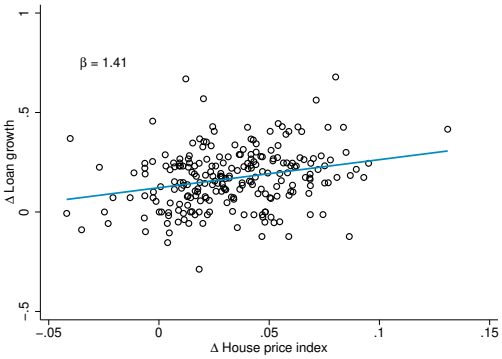
This figure plots average rate spreads, median maturity and average loan amounts for unsecured (black dashed line) and secured (blue line) loans.

Figure 7: **MSA house price growth and direct lending**

(a) Secured loans



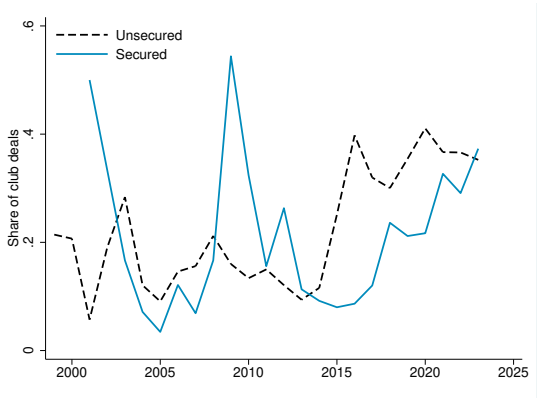
(b) Unsecured loans



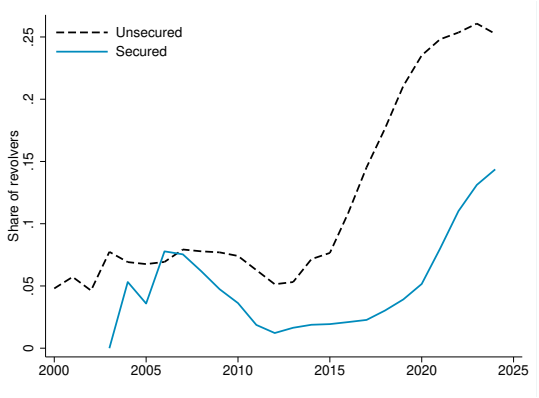
This figure provides binned scatter plots of average MSA-level loan growth against average MSA-level house price growth for secured (panel a) and unsecured (panel b) direct loans. The coefficient β indicates the coefficient estimate (ie the slope) of a regression of average loan growth on the average change in the house price index at the MSA level.

Figure 8: **Club deals, revolvers, and LBOs**

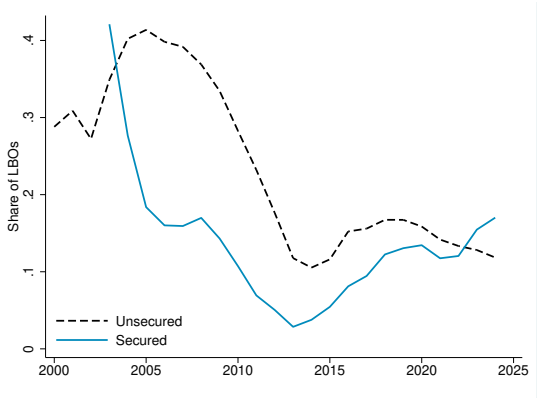
(a) Club deals



(b) Revolvers



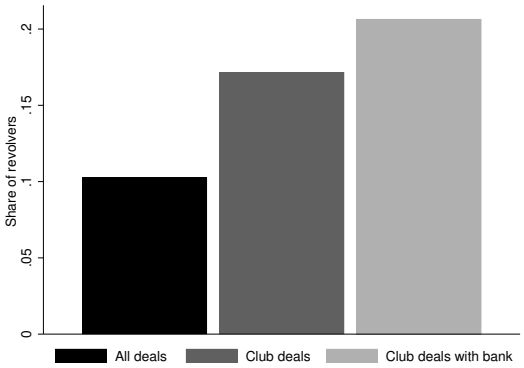
(c) Leveraged buyouts



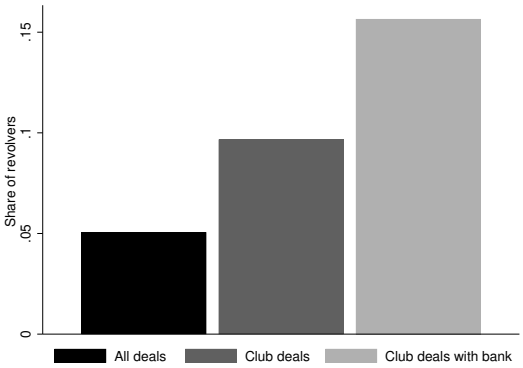
This figure plots the average share of club deals, revolver loans, and LBO loans for unsecured (black dashed line) and secured (blue line) loans.

Figure 9: **Revolvers, club deals, and the role of banks**

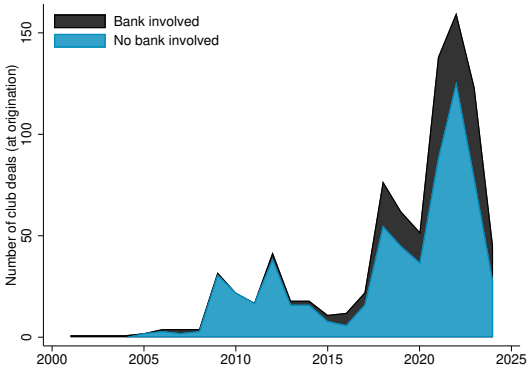
(a) Revolvers and club deals: secured



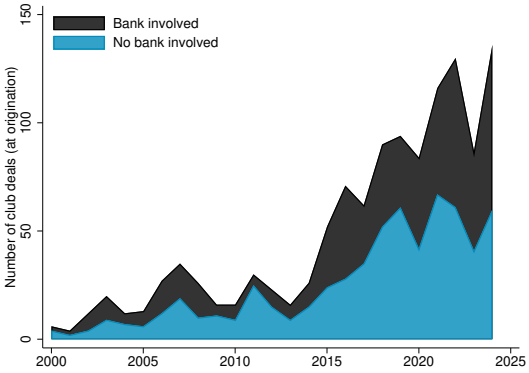
(b) Revolvers and club deals: unsecured



(c) Club deals involving banks: secured



(d) Club deals involving banks: unsecured



For secured and unsecured deals, panels (a) and (b) plot the average share of revolver loans out of all loans among all deals, club deals only, and club deals with bank involvement only. For secured and unsecured deals, panels (c) and (d) plot the total number of club deals with (black) and without (blue) bank involvement over time.

Table 1: **Loan characteristics by loan type**

	Secured		*Unsecured*		*Mean diff.*
	mean	sd	mean	sd	t
Deal size (in USD million)	353.64	(853.52)	224.86	(529.40)	-49.48
Loan amount (in USD million)	44.59	(86.22)	46.03	(83.20)	4.53
Spread (in pp)	6.41	(2.22)	6.31	(2.79)	-7.49
Maturity (in years)	5.25	(1.20)	5.04	(1.00)	-51.03
Revolver (0/1)	0.08	(0.28)	0.17	(0.38)	71.68
Leveraged buyout (0/1)	0.13	(0.33)	0.18	(0.38)	40.14
Club deal (0/1)	0.49	(0.50)	0.52	(0.50)	14.11
Number of lenders	3.06	(3.92)	2.67	(2.74)	-30.98
Observations	124836		160894		285730

This table reports summary statistics for the main variables, separately for secured and unsecured direct loans. The column *mean* denotes the mean and *sd* the standard deviation of each variable in each sub-group; *mean diff.* reports the t-value of a test for the statistical significance of the difference in means.

Table 2: **Comparing loan terms**

VARIABLES	(1) Spread	(2) Spread	(3) Spread	(4) Log(amount)	(5) Log(amount)	(6) Log(amount)	(7) Log(maturity)	(8) Log(maturity)	(9) Log(maturity)
secured	0.094***	0.400***	0.293***	-0.159***	-0.180***	-0.322***	0.031***	0.012***	0.020***
	(0.013)	(0.015)	(0.016)	(0.007)	(0.010)	(0.010)	(0.001)	(0.001)	(0.001)
Observations	161,861	140,620	133,312	278,158	237,506	222,228	284,692	244,350	222,020
R-squared	0.000	0.635	0.642	0.002	0.530	0.617	0.005	0.524	0.539
MSA*Industry*Time FE	-	✓	✓	-	✓	✓	-	✓	✓
Controls	-	-	✓	-	-	✓	-	-	✓

This table reports the results from regressing loan spreads (columns 1-3), the logarithm of loan amounts (columns 4-6), and the logarithm of loan maturity (columns 7-9) on a dummy that equals one if the loan is secured, as well as controls and fixed effects. Controls include loan characteristics (revolver yes/no, buyout yes/no, club deal yes/no, amount and maturity) as well as borrower characteristics (log of current number of employees, business is profitable yes/no). Observations are at the loan level. Standard errors (in parentheses) are robust. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: **Secured lending and informational frictions**

VARIABLES	(1) Secured (0/1)	(2) Secured (0/1)	(3) Secured (0/1)	(4) Secured (0/1)	(5) Secured (0/1)	(6) Secured (0/1)
Industry specialization	-0.268***	-0.165***				
	(0.003)	(0.003)				
MSA specialization			-0.333***	-0.177***		
			(0.003)	(0.004)		
Log(lender-borrower distance)					0.027***	0.014***
					(0.001)	(0.002)
Observations	284,261	255,682	250,655	232,391	181,871	156,993
R-squared	0.029	0.390	0.041	0.380	0.003	0.402
MSA*Industry*Time FE	-	✓	-	✓	-	✓

This table reports the results from regressing a dummy of whether a loan is secured or not on different measures capturing lenders' information about borrower risk. *Industry specialization* measures the share of industry i in lender l's total loan portfolio in quarter t. *MSA specialization* measures the share of MSA m in lender l's total loan portfolio in quarter t. *Log(lender-borrower distance)* measures the distance (in miles) between the headquarters county of the lender and the headquarters county of the borrower for those lenders and borrowers we could geolocate. Observations are at the loan level. Standard errors (in parentheses) are robust. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: **House prices and direct lending**

	(1)	(2)	(3)	(4)	(5) IV	(6) IV	(7) IV	(8) IV
VARIABLES	Secured Log(amt)	Secured Log(amt)	Log(amt)	Log(amt)	Secured Log(amt)	Secured Log(amt)	Log(amt)	Log(amt)
House price index (HPI)	0.204*	0.220**	0.107		0.388***	0.331***	0.052	
	(0.109)	(0.095)	(0.071)		(0.112)	(0.099)	(0.079)	
Secured (0/1)			-0.416*	-0.430*			-0.630***	-0.641**
			(0.220)	(0.229)			(0.238)	(0.246)
HPI × Secured			0.204***	0.210***			0.265***	0.270***
			(0.071)	(0.074)			(0.080)	(0.083)
Observations	38,579	38,426	91,617	87,332	37,499	37,349	88,143	84,795
R-squared	0.856	0.889	0.833	0.850				
Lender*MSA FE	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	-	-	-	✓	-	-	-
Lender*Time FE	-	✓	✓	✓	-	✓	✓	✓
MSA*Time FE	-	-	-	✓	-	-	-	✓
F-stat 1					403.6	507.6	252.5	-
F-stat 2							268.6	229.7

This table reports results for Equation (1). The dependent variable is the logarithm of loan amounts of type s (secured/unsecured) from lender l to borrowing MSA m in period t. Columns (5)-(8) instrument the house price index along the lines of Equation (2), using local housing supply elasticities and the federal funds rate. Standard errors (in parentheses) are clustered at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: **House prices, spreads, and maturity**

	(1)	(2)	(3) IV	(4) IV	(5)	(6)	(7) IV	(8) IV
VARIABLES	Spread	Spread	Spread	Spread	Maturity	Maturity	Maturity	Maturity
House price index (HPI)	-0.155		-0.085		-0.240		-0.559	
	(0.102)		(0.065)		(0.931)		(0.675)	
Secured (0/1)	-0.074	0.031	-0.128	0.018	-1.598	-1.816	-2.749	-2.779
	(0.306)	(0.293)	(0.366)	(0.355)	(2.174)	(2.174)	(2.382)	(2.378)
HPI × Secured	0.045	0.013	0.074	0.027	0.855	0.948*	1.226*	1.244*
	(0.082)	(0.081)	(0.100)	(0.098)	(0.566)	(0.565)	(0.639)	(0.632)
Observations	51,394	48,945	49,971	47,913	93,280	88,993	89,752	86,404
R-squared	0.873	0.885			0.815	0.840		
Lender*MSA FE	✓	✓	✓	✓	✓	✓	✓	✓
Lender*Time FE	✓	✓	✓	✓	✓	✓	✓	✓
MSA*Time FE	-	✓	-	✓	-	✓	-	✓
F-stat 1			260.1	-			247.2	-
F-stat 2			245	204.5			257.6	195.2

This table reports results from estimating Equation (1) but with alternative loan characteristics as dependent variables (spreads in columns (1)-(4) and maturity in columns (5)-(8)). Observations are at the the s (secured/unsecured) lender l borrowing MSA m and period t level. Columns (3)-(4) and (7)-(8) instrument the house price index along the lines of Equation (2), using local housing supply elasticities and the federal funds rate. Standard errors (in parentheses) are clustered at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: **House prices and direct lending – MSA-industry-level analysis**

	(1)	(2)	(3)	(4)	(5) IV	(6) IV	(7) IV
VARIABLES	Log(amt)	Log(amt)	Log(amt)	Log(amt)	Log(amt)	Log(amt)	Log(amt)
House price index (HPI)	0.163**	-0.474**			-0.355		
	(0.081)	(0.218)			(0.231)		
Collateral dependence		-3.658**	-3.263**		-3.250**	-2.775	
		(1.438)	(1.600)		(1.637)	(1.840)	
HPI × Collateral dependence		1.401***	1.269***	2.037**	1.253**	1.094*	1.726**
		(0.437)	(0.480)	(0.905)	(0.512)	(0.571)	(0.856)
Observations	93,482	93,482	89,189	89,156	90,314	86,969	86,936
R-squared	0.833	0.835	0.849	0.864			
Lender*MSA FE	✓	✓	✓	✓	✓	✓	✓
Lender*Time FE	✓	✓	✓	✓	✓	✓	✓
MSA*Time FE	-	-	✓	✓	-	✓	✓
Industry*Time FE	-	-	-	✓	-	-	✓
F-stat 1					243.6	-	-
F-stat 2					298.1	181.8	245.4

This table reports results for Equation (3). The dependent variable is the logarithm of loan amounts of type s (secured/unsecured) from lender l to borrowers in MSA m and industry i in period t. Columns (5)-(7) instrument the house price index along the lines of Equation (2), using local housing supply elasticities and the federal funds rate. Standard errors (in parentheses) are clustered at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

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