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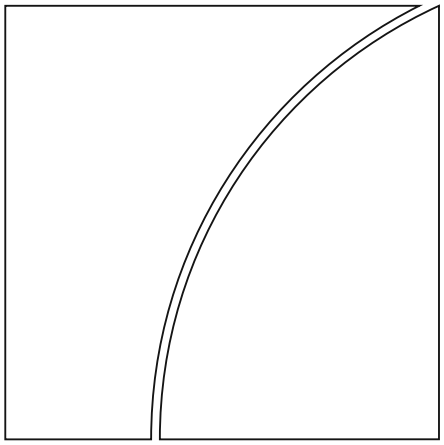

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by Ryan Banerjee and Jose-Maria Serena

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Dampening the financial accelerator? Direct lenders and monetary policy *

Ryan Banerjee† and Jose-Maria Serena‡

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Abstract

Direct lenders, non-bank credit intermediaries with low leverage, have become increasingly important players in corporate loan markets. In this paper we investigate the role they play in the monetary policy transmission mechanism, using US dollar syndicated loan data covering the 1997-2018 period. We show that direct lenders are more likely to join loan syndicates whenever monetary policy announcements trigger a contraction in borrowers' net worth irrespective of the directional change in interest rates. Thus, our findings suggest that direct lenders dampen the financial accelerator channel of monetary policy.

Key words: Direct lending; monetary policy; financial accelerator; credit channel

JEL: G21, G32, F32, F34

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1 Introduction

Over the past two decades, direct lending by non-bank financial institutions, ranging from business development companies (BDCs) to insurance companies, has mushroomed in US corporate credit markets. Direct lenders have arranged an increasing share of loans to corporates, particularly for term loan borrowing (Figure 1). As direct lenders become more important intermediaries, how they respond to monetary policy will be of growing relevance for the transmission of monetary policy to the real economy.

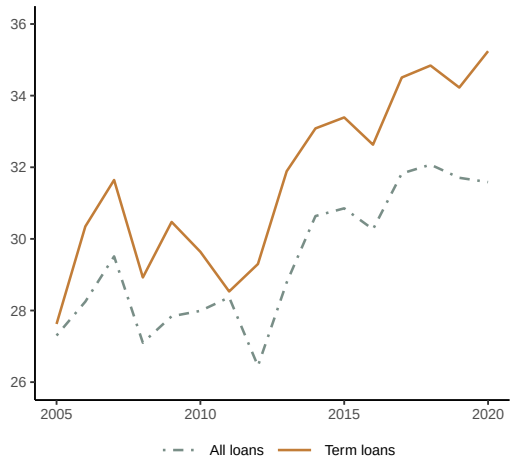

Figure 1: **Share of loans granted by direct lenders.** This figure shows the share of syndicated lending granted by direct lenders at origination. The sample consists of the top 100 direct lenders and top 100 banks in any given year for which information about the size of loans are available.

There are several aspects which suggest that the influence of monetary policy on lending by direct lenders may be different from the more widely studied effects on banks. First, direct lenders are less leveraged than banks. For deposit taking banks and investment banks, total liabilities are around 12 to 15 times equity. By contrast, direct lender leverage is much lower at around seven times book equity and just two times market equity on average (Figure 2 panels A and B). Second, direct lenders are less reliant on short-term debt (Panel C). Thus their business models are less dependent on maturity mismatch. Third, direct lenders' lending technology may also differ from that of banks. In particular, Chernenko et al. [2020] show that compared to banks, direct lenders are less likely to engage in ex-post monitoring of

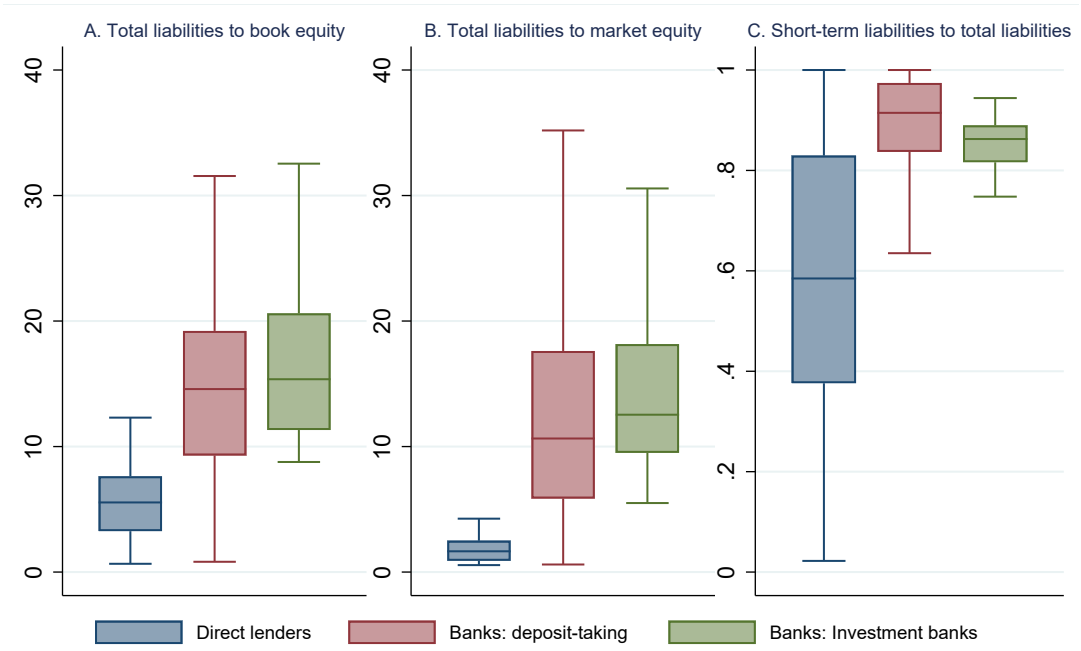

Figure 2: **Funding model of direct lenders and banks:** Box plot showing the interquartile range of total liabilities to book equity (Panel A), total liabilities to market equity (Panel B) and short-term liabilities to total liabilities (Panel C). Data are obtained from Fitch, on annual basis, for the period 1994-2018, and covers all the lenders in the syndicated loan market with available financial data. Metrics for direct lenders are shown in the blue box plot. Banks are split into two categories: deposit-taking (i.e. commercial banks), in the red box plot; and investment banks, in the green box plot.

their loans, but instead appear to engage in more ex-ante screening prior to loan origination.

Crucially, these three characteristics suggest that monetary policy may have less impact on direct lenders through the credit channel of monetary policy. Within the credit channel, this could occur by weakening the bank lending channel and/or the financial accelerator channel (Bernanke and Gertler [1995]).[1]

Under the bank lending channel of monetary transmission (Bernanke and Blinder [1988] and Kashyap and Stein [1995]), tight monetary policy drains deposits from the system which in turn reduces bank lending if banks face frictions in issuing uninsured liabilities to replace the shortfall in deposits. Since direct lenders business models are less dependent on short-term debt and are not dependent on deposit funding, this channel could be weaker.

The strength of the financial accelerator channel may also be weaker for direct lenders.

[1]The financial accelerator channel is also called the balance sheet channel in some studies.

Under the financial accelerator channel, changes in borrower net worth influences their incentives to make good investment choices and hence their ability to repay debts. This in turn affects the willingness of lenders to extend credit because they can only imperfectly monitor borrowers actions (Bernanke and Gertler [1989]). If direct lenders are less dependent on borrowers' skin-in-the game and monitoring compared to banks, but instead rely more on ex ante screening (Chernenko et al. [2020]), their lending may be less sensitive to monetary-policy-induced changes in borrower net worth. The strength of the financial accelerator could also been weaker due to differences in financial intermediary net worth. As the impact of monetary policy on lending also depends on financial intermediary leverage (Gambacorta and Shin [2018]), lower leverage of direct lenders may mean that their own net worth and hence their lending capacity is less sensitive to monetary policy shocks compared with more leveraged banks.

Against this backdrop, we explore if lending by direct lenders is less sensitive to monetary policy, and whether this relates to the weaker influence of the bank lending and/or financial accelerator channels. To conduct our investigation we use a dataset comprising 35,622 syndicated loans originated between 1997 and 2018 matched to borrower and lender characteristics. The syndicated loan market is a suitable venue to conduct this investigation, for several reasons. First, unlike bilateral direct loans, syndicated loan data are publicly available as they are disseminated by lead arrangers to produce lenders' league tables. Second, syndicated loans are simultaneously granted by various types of lenders which allows a comparison between direct lenders and banks in the same market. Typically, a lead arranger of the loan (the "relational bank") engages with the borrower, and it is in charge of finding other participants to close the deal. Lead arrangers can reach out to either other banks, or direct lenders, as all are active in the market.

We classify direct lenders as the subset of non-bank financial intermediaries engaged in primary market loan origination which are not subject to bank regulation nor similar supervisory oversight. Closed-end funds and BDCs are the most important group, followed

by specialised financial entities, insurance companies and pension funds, financial branches of non-financial firms and other credit intermediaries. Despite their differences, this classification of direct lenders results in the two common functional features that set them apart from banks as outlined above: they operate with little leverage and conduct limited maturity transformation. Importantly our definition does not include most investment banks, which operate with high leverage and conduct maturity transformation similar to traditional (deposit-taking) banks. This distinction differentiates our paper from other studies of non-bank lending which typically include investment bank-originated loans as non-bank lending e.g. Elliot et al. [2020].

To study the effect of monetary policy on lending decisions, we use an empirical model that links direct lender involvement in a syndicated loan to loan, firm, and macro determinants. We classify loans into two groups, one where the syndicates of lenders includes a direct lender and another where they do not, similar to Lim et al. [2012]. We then use monetary policy shocks obtained through intraday high-frequency identification methods around the Federal Reserve's monetary policy announcements to assess the impact of monetary policy on the probability that direct lenders join syndicates.

To uncover differences between banks and direct lenders across the bank lending and financial accelerator channels we conduct two exercises sequentially. First, we assess whether direct lenders attenuate the transmission of monetary policy through the bank lending channel. To this end we test if direct lenders are more (less) likely to engage in loan syndicates in response to an unexpected tightening (loosening) in interest rates. For these raw monetary policy shocks we do not observe any difference in the propensity of direct lenders to engage in loan syndicates compared to banks. To the extent that such monetary policy surprises result in a drain in loanable funds, this indicates that direct lenders do not smooth the traditional bank lending channel of monetary policy. This finding may also indicate that there may be limited frictions for banks, especially investment banks, to raise wholesale funding when interest rates rise, consistent with previous work showing the fading importance of deposit

drains when lenders can access other short-term liabilities (Chen et al. [2018],Elliot et al. [2020]).

Second, we explore if direct lenders attenuate the transmission of monetary policy through the financial accelerator channel. To this end, we exploit the fact that not all monetary policy announcements display a negative correlation between short-term interest rate surprises and equity market returns that would result in a reduction (increase) in corporate sector net worth when interest rates rise (fall). Rather, some instances of surprise interest rate tightening (loosening) are accompanied by positive (negative) equity market returns during tight intraday windows around monetary policy announcements. Following the literature we classify such monetary announcements that display a positive correlation between interest rate changes and equity returns as central bank "information shocks", while referring to monetary policy announcements that display the more standard negative correlation as "pure monetary shocks". This partitioning enables us to examine how monetary policy driven changes in net worth affect lending by direct lenders relative to banks, hence, uncovering the role of the financial accelerator in driving differences between direct lenders and banks following monetary policy shocks.[2]

For "pure monetary policy shocks", we observe that direct lenders are more (less) likely to join loan syndicates in response to an unexpected monetary tightening (loosening) relative to banks. Thus we document that the negative impact of rising interest rates on bank lending relative to direct lenders occurs only when borrowers' net worth worsens. For "information shocks", we observe that direct lenders are more likely to join loan syndicates in response to negative shocks, i.e. when an interest rate loosening is concurrent with a decline in equity prices.

Taking the impact of both pure monetary policy shocks and information shocks to-

[2]Such partitioning of high-frequency identified monetary policy shocks has been shown to solve a number of puzzles in the monetary economics literature. For example Jarociński and Karadi [2020] show that ignoring the differences between pure monetary shocks and central bank information shocks biases the inference on monetary policy nonneutrality.

gether, our main finding is that compared to banks, direct lenders are more likely to join syndicates relative to banks when monetary policy announcements trigger a decline in aggregate corporate sector net worth, irrespective of the directional change in short-term interest rates.

Given the fact that direct lenders step in (or are more stable in their lending relative to banks) when borrower net worth deteriorates, our results suggest that direct lenders actions and their strong growth in recent years could dampen financial accelerator mechanisms in the economy. These results are robust to a variety of alternative checks, including sensitivity to the lender definition, type of loan demand, and exclusion of influential sectors.

Our findings contribute to three strands of the literature. First, our paper adds to the literature on direct lenders and how they differ from banks. Previous research has analysed the type of borrowers catered for by direct lenders, finding that they specialise in lending to risky firms (Lim et al. [2014]). Chernenko et al. [2020] relates this greater risk appetite to regulatory factors, and to direct lenders' lending technology that relies on ex-ante screening. We contribute to this literature by analysing how these differences vis-a-vis banks impact their reaction to monetary policy.[3]

Second, we add to the literature on nonbanks and monetary policy. Previous research has shown that nonbanks smooth the bank lending channel of monetary policy because they are able to smooth shifts in bank deposits instrumented by monetary policy (Chen et al. [2018] and Elliot et al. [2020]). Our paper departs from these studies by investigating the role played by direct lenders, which excludes investment banks, whereas the nonbank definition in Chen et al. [2018] and Elliot et al. [2020] includes them. Relative to Chen et al. [2018] and Elliot et al. [2020], we show that direct lending is less sensitive to changes in borrowers' net worth. Hence, direct lenders smooth the financial accelerator channel of monetary policy.

[3]It is important to note that our paper differs from the literature analysing CLOs or loan mutual funds activitiy in loan markets (Fleckenstein et al. [2020], Niepmann and Schmidt-Eisenlohr [2019]). These are nonbank investors in loans, often securitised and tranched, in secondary markets. By contrast, the direct lenders we analyse extend loans in primary markets, and hence actively screen borrowers.

This appears to derive at least in part from lower leverage of direct lenders compared with investment banks, as well as commercial banks, but could also reflect differences in lending technology.

Finally, our results contribute to the literature on the financial accelerator and monetary policy (Bernanke [2007]). In the seminal contributions of Bernanke and Gertler [1989] and Bernanke and Gertler [1995], they argued that changes in net worth affect lending conditions, which is supported by empirical evidence (Ciccarelli et al. [2015]). By diminishing borrowers' "skin-in-the-game", a decline in net worth exacerbates moral hazard problems, and lenders react by increasing the external finance premium. The net worth of financial intermediaries also matters for the financial accelerator, not least because financial intermediaries with low net worth have more costly access to debt (Gambacorta and Shin [2018]). Thus changes in financial intermediaries net worth could also affect their lending capacity. We show that direct lenders' lending is less affected by both financial accelerator mechanisms, either because of their low leverage or because they rely more on ex ante monitoring than banks and less on borrower net worth. Hence their growing importance could attenuate the financial accelerator channel of monetary policy.

The rest of the paper is structured as follows. Section 2 discusses the data. In section 3 we present our empirical model. Section 4 shows the main results. Section 5 discusses our robustness checks. Section 6 inspects the mechanism between direct lenders and the financial accelerator. We provide the conclusions in section 7.

2 Data

2.1 Dataset construction

We construct a dataset which matches syndicated loan data from Refinitiv SDC Platinum, to borrower and lender characteristics from Refinitiv Eikon and Fitch. Our building block

is the syndicated loan dataset, which provides information on a number of loan attributes including amount, maturity, currency, plus the list of lenders as well as their role in the deal. We expand the syndicated loan dataset with lender reference data, sourced from Refinitiv Eikon and Bloomberg, and financial data from Fitch.

Using these inputs we classify each lender as either a bank, or a direct lender. We classify direct lenders as the subset of non-bank financial intermediaries engaged in the primary syndicated loan market which are not subject to bank regulation nor similar supervisory oversight. We operationalise this definition in four steps. First, we consolidate all branches and supported-affiliates into their immediate parent. Second, we classify as banks those entities treated as such by either the NAICS or the Refinitiv Business Classification (which is broader). Third, we classify as banks any remaining entity which at any time during its existence disclosed data on Tier 1 capital to risk weighted assets.[4] Finally, we do manual checks on the group of entities not disclosing data on Tier 1 capital to risk weighted assets, or with unavailable sectoral data, and when needed reclassify them as banks. All lenders not classified as a bank under these steps are classed as direct lenders. In our final sample of lenders we keep only institutions that have taken part in more than 50 loans.

After applying these filters, we identify 1,129 banks, and 400 direct lenders. Direct lenders can be classified into different categories, according to their type of economic activity. Using the NAICS subsector of each lender we identify five main clusters which together account for 72% of the direct-lender loans. Closed-end funds and BDCs are the most important group, accounting for 24% of the loan participations. Specialised financial entities rank second, and account for 21% of the transactions. Next, insurance companies represent 9% of direct loan participations. Financial branches of non-financial firms originate 9% of the direct loans. Credit intermediaries account for 7% of the loans.[5]

[4]For example, this step classifies firms such as Goldman Sachs and Morgan Stanley, that are often loosely termed as "investment banks" as banks for our entire sample.

[5]The five groups correspond, respectively, to the NAICS subcode "Funds, Trusts, and Other Financial Vehicles"; "Securities, Commodity Contracts, and Other Financial Investments and Related Activities"; "Insurance Carriers and Related Activities"; "Machinery Manufacturing", and "Credit Intermediation and

It is important to note that the major investment banks are not classified as direct lenders but instead classified as banks in our analysis. Functionally, investment banks are very different from direct lenders and in some aspects similar to banks taking deposits. Indeed, they operate with higher leverage than deposit-taking institutions and are more engaged in maturity transformation (Figure 2).

We further match the syndicated loan dataset with borrower information, sourced from Refinitiv Eikon. For each borrower, we obtain key financial items and construct standard measures of leverage, risk (Altman Z-score), profitability (EBITDA ratio), liquidity (quick ratio), collateral (fixed-asset ratio) and size.

Additionally, we use macroeconomic variables to control for US GDP growth, high-yield credit spreads on US dollar bonds (Merrill-Lynch index), S&P 500 equity returns, and US interest rates.

Finally, we obtain monetary policy shocks following Cieslak and Schrimpf [2019]. The shocks are changes in interest rates relative to Treasury futures within a -15 to +15 minute window around monetary policy announcements between 1997 and 2018. For press conferences and release of minutes they are computed over a slightly longer window, from -15 to +90 minutes, given that these communications tend to be more extensive and contain broader information, and hence, may take longer for investors to process. We classify these shocks as "monetary policy shocks".

As part of our analysis on the impact of monetary policy we follow Cieslak and Schrimpf [2019] and further partition monetary policy shocks into two groups based on their correlation with equity market price changes measured over the same announcement window using S&P 500 E-mini futures. Following Jarociński and Karadi [2020] we classify events with

Related Activities". Prime examples of entities in each group are, respectively: (1) Heller Financial Inc, Golub Capital and Ares Capital; (2) Oddo BHF SCA, Jefferies Group LLC and Antares Capital Corp; (3) Cathay Financial Holding Co Ltd, Nippon Life Insurance Co and Massachusetts Mutual Life Insurance Co; (4) General Electric and Siemens; (5) Alberta Treasury Branches and Madison Capital Funding LLC. The remaining 28% of loans are either granted by entities without a NAICS subsector, or clusters which represent less than 2% of the direct loans.

a negative correlation between stock returns and yields over the announcement window as "pure monetary shocks". Shocks which display a positive correlation are classified as "information shocks".[6]

In our empirical analysis we measure interest rate surprises as the change in the 2-year US Treasury futures contract over the intraday announcement window. This decision is motivated by the fact that over a significant period of our sample short-term interest rates were at the effective lower bound. Thus, short-term interest rates did not necessarily capture the impact of monetary policy announcements and actions over this period. By using the longer-term rate we capture the impact of unconventional monetary policy, in particular those signalling the future path of short-term interest rates. A number of studies have used 2-year rates to measure the monetary policy stance since short-term interest rates reached the effective lower bound following Hanson and Stein [2015].

For our empirical analysis, we aggregate interest rate shocks over a 90 day window before the loan was granted to account for lags in the process between the initial loan application and the granting of a syndicated loan.[7] Figure 3 shows time series of the pure monetary and information shocks series. In general, pure monetary policy shocks are on average larger in absolute value than information shocks. That said, information shocks appear to more prominent during the recession periods of 2008-09 and also in the early 2000s recession in the United States.

[6] Cieslak and Schrimpf [2019] call these "growth shocks".

[7] There is not a clear rule-of-thumb to select this window. We choose 90 days to take into account that syndicating a loan takes around 30 days (Ivashina and Sun [2011], Bruche et al. [2020]), and acknowledging the lags in the transmission of monetary policy decisions to lending decisions. The 90 day window is also similar to that used in Ottonello and Winberry [2020], who aggregate high-frequency identified monetary policy shocks to the quarterly frequency to analyse the impact of such shocks on corporate investment. We confirm the robustness of our results to window length in Section 10

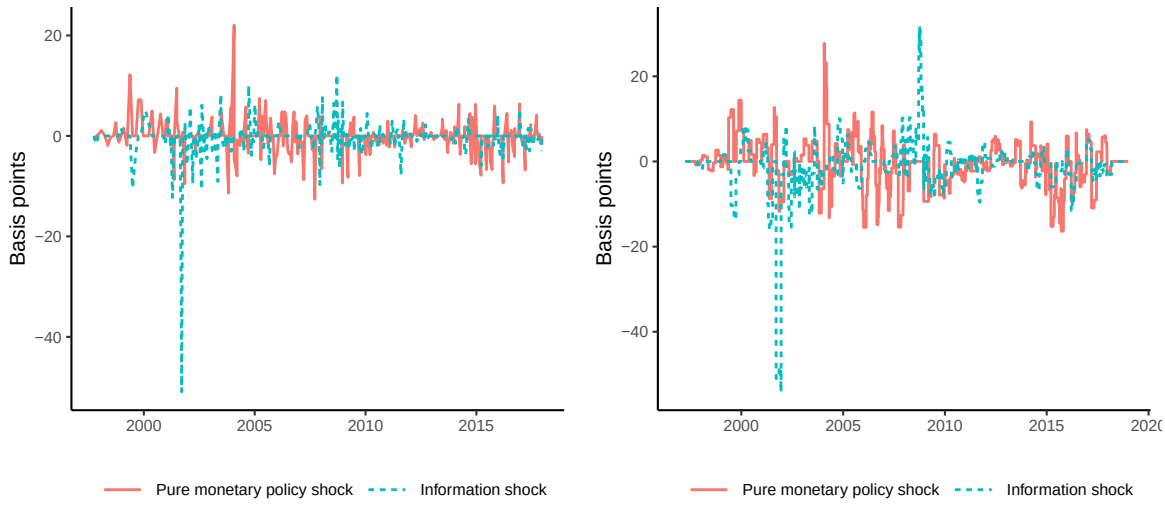

Figure 3: **Pure monetary policy and information shocks.** This figure shows the time series of pure monetary shocks (defined as monetary announcements where changes in 2-year yields and equity index returns are negatively correlated over the event window) and information shocks (where 2-year yields and equity index returns are positively correlated). The left panel shows the high-frequency identified shocks. The right-hand panel shows the surprises aggregated over a 90 day trailing window.

2.2 Sample description

From our initial sample 262,527 syndicated loans we restrict our dataset to US dollar loans only as we aim to capture the influence of monetary policy on US dollar borrowing conditions.[8] The dataset is further restricted to firms with borrower reference and balance sheet data and by the monetary policy shock data. Our final dataset consists of 35,622 loans, of which 9,617 with participation of direct lenders ("direct lender loans"), and 26,005 bank loans (no involvement of direct lenders) between 1997 and 2018. Thus, direct lenders take part in around one-quarter of all the syndicated loans in our sample (Table 1).

Term loans represent 40% of the loans in our sample, and credit lines the remaining 60%. Direct lenders have a greater involvement in term funding, and take part in 34% of the transactions, relative to just over 20% of the credit lines. Direct lenders are more present in the riskier leveraged loan segment, taking part in 35% of loans compared with just 18% of

[8] A related literature also examines the influence of US monetary policy on non-US dollar denominated borrow. In this study we drop non-US dollar loans as the transmission mechanisms can be different, not least due to effects on the exchange rate.

Table 1: **Attributes of direct lender involvement in syndicated loan markets:** the table provides the count of the syndicated loans denominated in dollars, for which we are able to source firm-level data. The loans as classified across several key dimensions: (1) term loans vs credit lines; (2) bank term (labelled Term, and Term "A", or institutional term (Term "B", "C", or "D") loans; (3) credit segment, either leveraged or investment grade. In the second and third column we show the fraction that are financed by at least one direct lender (Direct lenders) and by banks only (No direct lenders)

	Count	Direct lenders	No Direct lenders
Grand total	35,622	27.0	73.0
Term loans	14,118	34.0	66.0
Credit lines	21,504	22.4	77.6
Leveraged loans	18,235	34.7	65.3
Investment grade loan	12,577	17.7	82.3

investment grade loans. On average three direct lenders and 13 banks participate in loans we classify as direct lender loans. On average 10 banks participate in loans we classify as bank only loans.

Table 2: **Loan attributes:** the table provides summary statistics, namely the maturity at origination (in years), the amount (in US mn), and the spread (in bp) for loans where at least one direct lender participated in the syndicate (Direct lenders) and where only banks participated in the syndicate (No direct lenders). p25, p50 and p75 refer to the 25th, median and 75th percentiles of the distribution.

A. Direct lenders

	mean	p25	p50	p75
Maturity	10	6.3	10.0	11.9
Amount	388	50.0	150.0	400.0
Spread	260	150.0	250.0	325.0

B. No direct lenders

	mean	p25	p50	p75
Maturity	9	6.0	10.0	10.0
Amount	466	51.0	162.5	455.0
Spread	192	100.0	175.0	250.0

The terms and conditions of the loans with direct lender participation differ only slightly from those of bank only syndicates. Differences in maturity and size are negligible, as shown in Table 2. Nevertheless, spreads are significantly higher for loans with direct lender involvement.[9] This may signal that these deals are riskier (Chernenko et al. [2020]), but could also indicate that they join syndicates when bank funding is more scarce (Lim

[9]Median tests indicate a statistically significant difference between the maturity and spread of both type of loans.

Table 3: **Firm attributes:** The table provides summary statistics of firms which received loans where at least one direct lender participated in the syndicate (panel A) and where only banks participated in the syndicate (panel B).p25, p50 and p75 refer to the 25th, median and 75th percentiles of the distribution.

A. Borrowers from direct lenders.

	mean	p25	p50	p75
Total assets	10,828	721.3	2,220.9	8,961.6
EBITDA ratio	11	7.0	10.7	15.4
Quick ratio	115	72.1	102.0	142.0
Leverage ratio	41	25.5	38.4	53.8
Fixed assets ratio	53	21.5	47.7	79.9

B. Borrowers from bank only loans

	mean	p25	p50	p75
Total assets	12,935	790.2	2,909.4	11,984.0
EBITDA ratio	12	7.6	11.0	15.6
Quick ratio	117	72.7	103.7	143.1
Leverage ratio	35	22.1	33.2	46.3
Fixed assets ratio	54	21.8	48.7	81.0

et al. [2014]). A similar relation holds in the subset of term loans (See Online appendix Table OA.2), the main set of loans that we examine in our analysis below.

Panels A and B in Table 3 provide a univariate comparison of direct-lender and bank borrowers. Comparison of medians show that direct-lender borrowers are smaller than bank borrowers, operate with higher leverage, lower liquidity, and have a low fixed-assets ratio. These patterns are broadly in line with the findings of Carey et al. [1998], which indicate that direct-lender borrowers are riskier according to observable metrics.[10] That said, in the sample of term-loans borrowers from direct lenders have higher leverage, but have similar levels of liquidity and profitability to bank borrowers (Online appendix Table OA.3).

Finally, turning to lender attributes, Table 4 presents summary statistics on leverage and maturity mismatch of direct lenders and banks. Whether equity is measured at book or market value, direct lenders are less leveraged than banks across the distribution. Direct

[10]Median tests indicate a statistically significant difference between the attributes of borrowers from banks and direct lenders. These differences are in many instances similar to Chernenko et al. [2020]. However, we do not find that direct lender borrowers exhibit negative EBITDA. While we cannot fully compare our sample with theirs, we think this reflects that we look at much broader sample of firms, which are larger. By contrast, they look at middle-market firms with assets comprised between 10 US bn and 1 US bn.

Table 4: **Lender attributes:** The table provides summary statistics of lends in our sample split by lenders we classify as direct lenders (panel A) and those we classify as banks (panel B).p25, p50 and p75 refer to the 25th, median and 75th percentiles of the distribution. Leveraged defined as total liabilities to book or market equity. Short-term liability ratio defined as short-term liabilities to total non-equity liabilities.

A. Direct lenders

	mean	p25	p50	p75
Book leverage	7.8	2.5	5.7	12.2
Market leverage	8.0	1.8	5.0	12.2
Short-term liability ratio	0.8	0.7	0.9	1.0

B. Banks

	mean	p25	p50	p75
Book leverage	13.2	8.5	12.6	17.4
Market leverage	10.2	4.8	7.8	13.7
Short-term liability ratio	0.9	0.9	1.0	1.0

lenders also have a somewhat lower maturity mismatches relative to banks.

3 Empirical model

To analyse the impact of monetary policy on direct lenders, we estimate a logit model which relates the participation of direct lenders in syndicated loans to a number of determinants:

$$Pr(DL_{i,j,t,s} = 1) = F(\alpha X_i + \beta Y_{j,t-1} + \gamma Z_{s,t} + \delta_1 MP_s) \tag{3.1}$$

The dependent variable $DL_{i,j,t,s}$ takes the value of one if there is a direct lender in the syndicate loan i, to firm j, signed in calendar year t at date s, and zero if all lenders are banks. F is a logistic function, so that $F(z) = e^z/(1+e^z)$. The log-likelihood is given by:

$$lnL = \sum_{DL=1}^{N} ln(F_1(z)) + \sum_{DL=1}^{N} ln(1 - F_0(z)) \tag{3.2}$$

in this equation the vector z denotes the three vectors of covariates X_i, $Y_{j,t}$, $Z_{s,t}$, which include, respectively, loan, borrower, and macro variables.

We include a number of loan controls, X_i, to control for differences in the terms and conditions of the loans. This way we acknowledge that firms may borrow from direct lenders or banks due to difference in the types of loans offered (Chernenko et al. [2020]). Specifically, we include the loan maturity, as direct lenders are less engaged in maturity transformation and hence better suited to lend long term. In addition, we include the loan amount, as we expect direct lenders to join syndicates when deals are larger because of constraints on banks' capital.

The inclusion of borrower controls, follows previous research investigating the role played by non-bank lenders in credit markets (Carey et al. [1998], Denis and Mihov [2003], Chernenko et al. [2020], Loumioti [2019] or Jang [2020]). To this end, we include in vector $Y_{j,t-1}$ various firm-level measures of observable risk, including: leverage; EBITDA ratio; fixed-assets ratio; and quick ratio. Based on previous research, our expectation is that direct lenders cater to more levered and less profitable firms with fewer fixed-assets and low liquidity. In addition, we include firm total assets.

We also include a vector of macro controls, $Z_{s,t}$, which include US GDP growth in the quarter of the loan's closing date. It also includes credit spreads (Merrill-Lynch high-yield index), the S&P 500 return over the past 90 days, the 2-year US treasury rate and the 90 day change in the 2-year treasury rate all on day of the loan's closing.

Finally, our main interest is on the impact of monetary policy shocks, MP_s on the participation of direct lenders in syndicated loans. To test the impact of interest rate shocks, we first use raw "monetary policy shocks" defined as the change in interest rates relative to Treasury futures within a short intraday window around monetary policy announcements, irrespective of the concurrent change in equity returns.

In further analysis, we go on to split these "monetary policy shocks", MP_s, into "pure monetary shocks", MP_s^{PM}, and "information shocks", MP_s^{IS}, to assess the financial accelerator channel of monetary policy, where MP_s^{PM} denotes the set of monetary policy shocks

in which changes in interest rates and equity returns are negatively correlated within a tight intraday window, while MP_s^{IS} are those where the correlation is positive.

We first modify equation 3.1 and instead include pure monetary shocks as our measure of monetary policy tightening/loosening instead of the composite monetary policy shock MP_s:

$$Pr(DL_{i,j,t,s}) = F(\alpha X_i + \beta Y_j + \gamma Z_t + \delta_2 MP_s^{PM}) \tag{3.3}$$

We then go on to include information shocks, MP_s^{IS}, to assess the overall impact of monetary policy announcements on direct lenders

$$Pr(DL_{i,j,t,s}) = F(\alpha X_i + \beta Y_j + \gamma Z_t + \delta_2 MP_s^{PM} + \delta_3 MP_s^{IS}) \tag{3.4}$$

Firm and loan-level controls are winsorised at the 2.5 and 97.5 percentiles. We report standard errors clustered by closing date.

4 Results

4.1 Bank lending channel

Our baseline results are shown in Table 5 covering term loans in both the investment grade and lower rated segments of the syndicated term loan market. Direct lenders take part in one-third of the 14,118 syndicated term loans analysed in these regressions. In this table we report results estimating model 3.1 which uses the high-frequency identified "monetary policy shocks" based on changes in interest rates without taking into account the concurrent equity market return.

The main insight from Table 5 is that these raw monetary policy shocks do not have

any impact on the likelihood that direct lenders join syndicates. The coefficient of the monetary policy shock variable is not statistically significant in column I. It remains statistically insignificant in columns II and III where we add firm controls, and macro controls. To the extent that increases in interest rates also capture unexpected contractions in deposits, this result indicates that direct lenders do not appear to smooth the traditional bank lending channel of monetary policy.

Otherwise, the involvement of direct lenders in the loan market is consistent with previous research. We observe that direct lenders are more likely to join syndicates financing longer-term loans. In terms of borrower attributes, we find that direct lenders engage in lending to firms which are ex-ante riskier, such as high leverage firms, or firms with low fixed assets to total assets. This is consistent with Chernenko et al. [2020] who argue that direct lenders are well-suited to lend to firms with poor balance-sheet metrics. Unlike Chernenko et al. [2020], we do not find that they lend to less profitable firms, as the coefficient on the EBITDA ratio is not statistically significant. In addition, we find that direct lenders are less likely to lend to large firms. These results confirm the insights from the univariate analysis shown in section 2.

Turning to macro variables, stronger US GDP growth is positively associated with greater direct lender involvement. We also find that direct lenders are more likely to engage in syndicates when high-yield corporate bond spreads are wider. This finding squares well with aggregate findings underscoring the higher volatility of bank finance compared with non-bank credit, both during the 2007-2009 (Adrian et al. [2012]) and the Covid-19 crisis (Goel and Serena [2020]). Finally, we also find on average that direct lenders are more likely to engage in syndicates relative to banks when past equity returns have been high. This could reflect factors such as loan demand which in turn affect the likelihood that direct lenders engage in a loan syndicate.

Table 5: **Direct lenders and monetary policy:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. TL stands for "Term loans". All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Loan maturity	0.039**	0.043**	0.048**
	(0.02)	(0.02)	(0.02)
Loan amount	0.113***	0.122***	0.135***
	(0.02)	(0.03)	(0.03)
Firm assets		-0.072**	-0.064**
		(0.03)	(0.03)
Firm EBITDA ratio		0.014	0.015
		(0.02)	(0.02)
Firm quick ratio		0.034	0.036
		(0.02)	(0.02)
Firm leverage		0.163***	0.161***
		(0.02)	(0.02)
Firm fixed assets ratio		-0.071***	-0.075***
		(0.02)	(0.02)
GDP growth			0.148***
			(0.05)
Merril-Lynch HY spread			0.076***
			(0.01)
S&P 500 return			0.003***
			(0.00)
2 year interest rates	0.145***	0.133***	0.144***
	(0.01)	(0.01)	(0.01)
Δ 2 year interest rates	-0.100**	-0.107**	-0.057
	(0.05)	(0.05)	(0.06)
Monetary policy shock	0.137	0.193	0.144
	(0.33)	(0.33)	(0.33)
Observations	14118	14118	14118
Adjusted R-squared	0.014	0.021	0.024
Loan type	TL	TL	TL

4.2 Financial accelerator channel

Pure monetary shocks

To explore if direct lenders attenuate the financial accelerator channel of monetary policy we estimate equation 3.3, which utilises the "pure monetary policy shocks" which purge the

Table 6: **Direct lenders and pure monetary policy shocks:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. TL stands for "Term loans". All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.053**	0.057**	0.051**
	(0.02)	(0.02)	(0.02)
Observations	14118	14118	14118
Adjusted R-squared	0.015	0.022	0.024
Loan type	TL	TL	TL
Loan controls	X	X	X
Firm controls		X	X
Macro controls			X

raw shocks of events when there were positive correlations between interest rate changes and equity returns. In contrast to the insignificant results based on the raw monetary policy shocks, our results in Table 6 show that the coefficient on the pure monetary shock is positive and statistically significant. We observe this result in column I, in which the model includes loan covariates. This result holds when we add firm-level controls (column II), and macro controls (column III). For the sake of brevity we do not report the coefficients of the rest of covariates, which remain similar to the estimates in Table 5.

Thus, once we purge the raw monetary policy shocks from events when changes in interest rates were positively correlated with equity market returns, we do indeed find that direct lenders are more (less) likely to be part of loan syndicates when interest rates increase (decrease) - i.e. the results suggest they are more stable in their lending relative to banks. Taking together results of Tables 5 and 6, we conclude that direct lenders attenuate the impact of an interest rate tightening on loan supply, but only when there is a concurrent decline in equity prices.

Information shocks

We now further test the impact of central bank information shocks on direct lenders estimating equation 3.4. We report the results in Table 7, where for the sake of brevity we also omit the coefficients on the rest of the covariates.

Table 7: **Direct lenders and information shocks:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. TL stands for "Term loans". All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.056**	0.060**	0.053**
	(0.02)	(0.02)	(0.02)
Information shock	-0.062**	-0.059**	-0.052**
	(0.02)	(0.02)	(0.02)
Observations	14118	14118	14118
Adjusted R-squared	0.015	0.022	0.025
Loan type	TL	TL	TL
Loan controls	X	X	X
Firm controls		X	X
Macro controls			X

In Table 7, the coefficient on information shocks is negative and statistically significant when we estimate the model with loan controls only (column I). This result holds when we add firm controls (column II) and macro variables (column III). The negative coefficient on the information shock shows that direct lenders join loan syndicates when a fall in interest rates is concurrent with a worsening of borrowers' net worth. The coefficient on the pure monetary shock remains positive and statistically significant, as in Table 6.

Taking the coefficients on the pure monetary shocks and information shocks together, our results suggest that when central bank announcements are followed by a decline (increase) in borrower net worth direct lenders are more (less) likely to step in and fill the gap (or are more stable in their lending relative to banks). Importantly, this occurs irrespective of the

sign on the change in interest rates around central bank announcements.

4.3 Quantification of the channel

Above we documented that direct lenders are more likely to step into a syndicated loan upon a positive pure monetary policy shock and a negative information shock (or at least are more stable in their lending relative to banks). To quantify the size of the channel, we consider the marginal effect of one standard deviation sized pure monetary policy shock and a one standard deviation sized information shock. Using estimates from the fully specified model reported in Column III of Table 7, a positive one standard deviation pure monetary policy shock is associated with around a 1.2 percentage point increase in the probability of a direct lender participating in a loan. This compares to the standard deviation of the probability of direct lender participation in syndicated term loans in any month of 8 percentage points. Thus pure monetary policy shocks are around 15% of monthly variation in direct lender loan participation. For a negative one standard deviation information shock, the marginal effect on loan participation are almost identical at 1.2 percentage points, thus around 20% of the monthly variation in direct lender participating relative to banks. Although at first glance these marginal effects may appear relatively small, to put the quantitative effects in context, the marginal effect of a one standard deviation increase in the High-Yield credit spread increases the probability of a direct lender loan by 1.6 percentage points. Thus, while monetary policy may have a modest influence in the variation in direct lenders' loan participation, it is similar to another closely related time-varying macro factor.

4.4 Type of loans and credit market segments

We now turn to analyse direct lenders' reaction to monetary policy shocks in various segments of the loan market in Table 8. To ease reading the results, column I replicates our baseline results (i.e. those in column III of Table 7).

Table 8: **Credit market segments:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. TL stands for term loans. Lev stands for leveraged loans and IG for investment grade loans. Column I replicates the baseline results based on term loans only. Column II and III analyse, respectively, leveraged and investment grade loans. Column IV analyses credit lines. Standard errors clustered by time in parentheses. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. Standard errors clustered by time in parenthesis. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV
Pure monetary shock	0.053**	0.051**	0.062	-0.010
	(0.02)	(0.02)	(0.06)	(0.02)
Information shock	-0.052**	-0.056**	-0.055	0.002
	(0.02)	(0.03)	(0.06)	(0.02)
Loan type	TL	TL	TL	Credit line
Quality	All	Lev	IG	All

We first split loans into its two main categories based on the riskiness of the loan, namely leveraged transactions (which include also highly-leveraged transactions) and investment grade loans. These labels are attached by market participants at origination, and summarise the riskiness of the loans.[11] We observe that the results remain broadly similar for the segment of leveraged loans (column II), i.e. direct lenders join syndicates in response to positive pure monetary shocks, and negative information shocks. However, the coefficients are statistically insignificant when we analyse investment grade loans (column III). That said, the point estimates remain broadly similar. Moreover, this result may lack power due to the smaller sample of loans and lower involvement of direct lenders in investment grade loans. Indeed, results reported in Online appendix Table OA.4 show that we cannot reject the hypothesis that the influence of pure monetary policy shocks and information shocks on direct lender participation in a syndicate relative to banks are statistically the same for leveraged and investment grade term loans.

Our second exercise consists of analysing credit lines instead of term loans (column IV). We find that direct lenders are not more likely to join syndicates financing credit lines

[11]Relative to investment grade loans, leveraged transactions pay higher spreads, are granted to firms with higher credit risk, have longer maturities, and smaller amounts. See Avdjiev and Serena [2020] for further details.

in response to any type of monetary shock. This is consistent with their subdued activity in credit line provision which remains the realm of deposit-taking institutions (Kashyap et al. [2002]), and other financial intermediaries involved in short-term funding (Serena and Tsoukas [2020]).[12]

5 Robustness checks

We now conduct a number of robustness tests, modifying our baseline results along several dimensions. We first examine differences between types of direct lenders. Second, we examine if direct lenders change the type of borrowers they lend to in response to monetary policy shocks. Third, we examine if our results are driven by specific sectors. Fourth, we examine whether there are differences depending on the use of proceeds. Finally, we examine the sensitivity of our results to the monetary policy shock aggregation window.

5.1 Type of lenders

We now explore how the reaction to monetary policy shocks vary across different types of direct lenders. This is important in so far as our baseline regressions cover a wide range of financial institutions ranging from BDCs to insurance companies which have different funding structures, regulatory regimes and potentially differing risk preferences. Yet relative to banks, as a group they share similarities such as low leverage and do not engage in maturity transformation.

To assess if there are differences across different types of direct lenders, we conduct

[12]We also analysed if the direct lenders' response to monetary policy shocks is stronger for so-called cash-flow loans secured on the value of the firm, and not by specific assets (Lian and Ma [2020]). Data constraints prevent us from running a proper subsample estimation, as the majority of term loan are cash-flow loans. However, estimates for cash-flow loans only show that the impact of pure monetary and information shocks remain negative and positive, respectively; and the point estimate increases around 5%. The results squares well with previous findings showing that monetary policy shocks have a stronger impact on banks' cash-flow loans than on asset-based credit (Ivashina et al. [2020]).

Table 9: **Types of direct lenders:** This table reports results of a logit model of direct lenders participation in syndicated loans by the type of direct lender. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. The columns differ by restricting the sample of direct lender loans to participation of specific types of direct lender loans. Column I, Closed-end funds and BDCs (FT); Insurance companies and pension funds (IC/PF); Column III, non-financial corporates (Non-Fin); Column IV, Specialised financial entities (SCC); Column V, non-bank credit intermediaries (CI). All models include the loan, borrower, and macro covariates described in Section 3. TL stands for "Term loans". Coefficients on controls are not shown for the sake of brevity. Standard errors clustered by time in parenthesis. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The Leverage row shows median market leverage defined as total liabilities adjusted for insurance policies as a ratio of market capitalisation for the types of direct lenders.

	I	II	III	IV	V
Pure monetary shock	0.116***	0.167***	0.083	0.066**	0.061**
	(0.04)	(0.04)	(0.05)	(0.03)	(0.02)
Information shock	-0.146***	-0.073	-0.087*	-0.059**	-0.053**
	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)
Observations	11314	10214	10133	12878	13882
Adjusted R-squared	0.087	0.038	0.054	0.037	0.027
Loan Type	TL	TL	TL	TL	TL
Direct lender type	FT	IC/PF	Non-Fin	SCC	CI
Leverage	.79	1.42	1.26	2.34	3.56

subsample estimations analysing separately the response of direct lender loans with participation of one of the major types of direct lenders identified in Section 2 relative to bank only loans. The results are reported in Table 9.

Column I of Table 9 classifies direct lender loans as those where Closed-end funds and BDCs participate. The positive and significant coefficient on the pure monetary shock and the negative and significant coefficient on the information shock confirm that our baseline findings hold for this subset of direct lenders. In Column II direct lender loans are classified as those with insurance company and pension fund participation. The estimates show that the baseline findings also hold for these intermediaries, however, the coefficient on information shocks is no longer statistically significant. Column III restricts direct lender loans to those with non-financial firm participation. For these lenders, the point estimates remain qualitatively similar, however, statistical significance is lower, dropping to the 10% level for information shocks and being insignificant for pure monetary policy shocks. Column IV classifies direct lender loans as those with participation by specialised financial entities. The

sign and significance is consistent with our baseline findings, but compared to the estimates for Closed-end funds/BDCs and insurance companies/pension funds, the point estimates are smaller in absolute terms. Finally, Column V classifies direct lender loans as those with participation by non-bank credit intermediaries. Again the baseline results hold in this subsample. However, similar to the results for specialised financial entities, the point estimates are lower than those for Closed-end funds/BDCs and insurance companies/pension funds.

One potential driver of the different size of the estimated effects could be due to the funding structures of the different types of entities. Indeed, comparing the magnitude of the estimates with the the bottom row of Table 9 showing the mean leverage of the different types of direct lenders, there appears to be a broad negative relationship between leverage and the sensitivity of direct lenders to step in to loan syndicates. We explore the relationship between funding structures and loan participation further in Section 6.3.

5.2 Borrower characteristics

As shown in Tables 3 and 5, direct lenders tend to lend to riskier borrowers. Given this relationship, it is possible that direct lenders could alter the composition of lending to different types of borrowers in response to monetary policy shocks. We explore this possibility by interacting monetary shocks with borrower characteristics: size, leverage, EBITDA ratio, quick ratio and fixed asset ratios to test if borrower heterogeneity influences our baseline results. Results presented in Online appendix Table OA.5 suggest that monetary policy shocks do not have heterogeneous effects on firms based on their risk measured by balance sheet variables. Even with the inclusion of these interactions terms, our baseline findings for pure monetary policy and information shocks remain robust. This would imply that monetary policy shocks do not change the composition of lending by direct lenders.

5.3 Influential sectors

Next we explore if our results are driven by specific sectors which could be the case if monetary policy hits direct lending to specific industries more strongly.

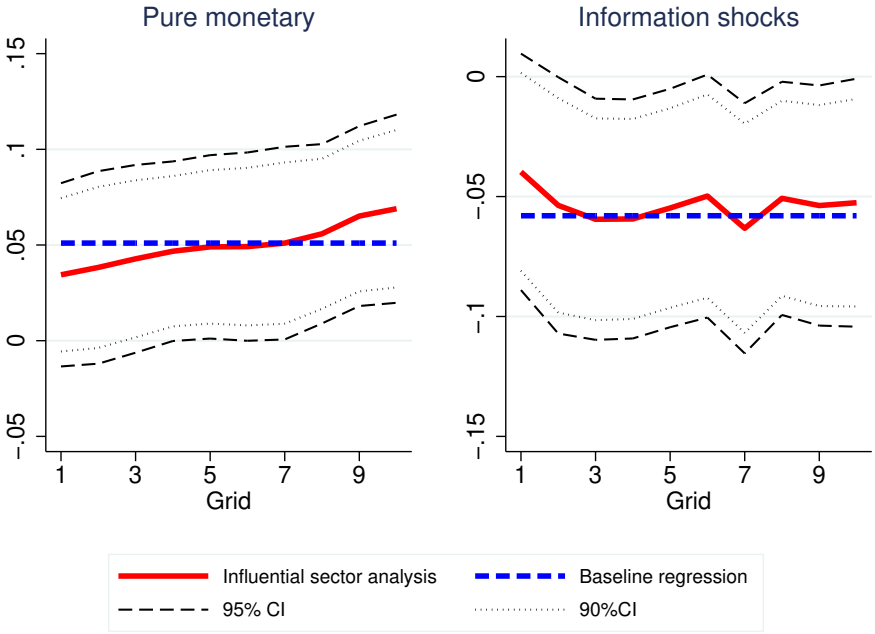

Figure 4: **Influential sector analysis:** Each point in the grid represents the point estimate of the baseline model given by equation 3.1, estimated excluding each of the sectors at a time, which are respectively (1) Technology; (2) Consumer Cyclicals; (3) Healthcare; (4) Utilities; (5) Telecommunications Services; (6) Energy; (7) Industrials; (8) Real Estate; (9) Consumer Non-Cyclicals; and (10) Basic Materials. The dash black lines are the 95% confidence intervals. The dash blue line plots the results obtained in the baseline model.

To this end, we re-run our baseline model by removing each of the ten Refinitiv TRBC sector classifications one at a time.[13] To summarise the results, we plot the point estimates, plus the 90% and 95% confidence intervals, in Figure 4. The dashed blue line plots the results obtained in the baseline model. Panel A plots the results of the pure monetary shocks, while Panel B displays the information shocks.

The results suggests that certain sectors are important for our results. In particular Figure 4 shows that omitting the technology sector would reduce the significance of our

[13]The ten sectors are the following: Basic Materials, Consumer Cyclicals, Consumer Non-Cyclicals, Energy, Real Estate, Healthcare, Industrials, Technology, Telecommunications Services, Utilities.

estimates for both our pure monetary policy shocks and to a lesser extent information shocks. The importance of the technology sector is perhaps not too surprising as this sector often has low levels of tangible collateral. That said, the point estimates are still relatively close to the full sample results, thus our general reading is therefore that our results are not entirely driven by specific sectors.

5.4 Use of proceeds

Next we explore if our results are driven by loans arranged for specific uses. Monetary policy could potentially have a stronger effect on certain uses of credit that are correlated with direct lenders lending preferences. To this end, we classify the loans according to the uses of proceeds disclosed when closing the transaction into four categories, respectively (1) fixed capital formation; (2) financial reasons (e.g. debt management, acquisitions); (3) working capital; (4) general corporate purposes. Then we run our baseline model by removing each use category one at a time. In Figure 5 we plot the point estimates, plus the corresponding 90% and 95% confidence intervals. The dashed blue line plots the results obtained in the baseline model. The results show that the impact of the shocks on direct lending does not significantly depend on the specific use of proceeds. Nevertheless, the decline in the point estimates when omitting borrowing for fixed capital formation suggests direct lenders' participation helps smooth corporate investment, compared with bank-only loans, consistent with a dampening of the transmission of monetary policy.

5.5 Monetary policy shock aggregation window

Finally, we assess the robustness of our results to the size of the shock aggregation window. In our baseline results pure monetary policy shocks and information shocks are aggregated over a trailing 90 day window from the issuance date to account for lags in the process of

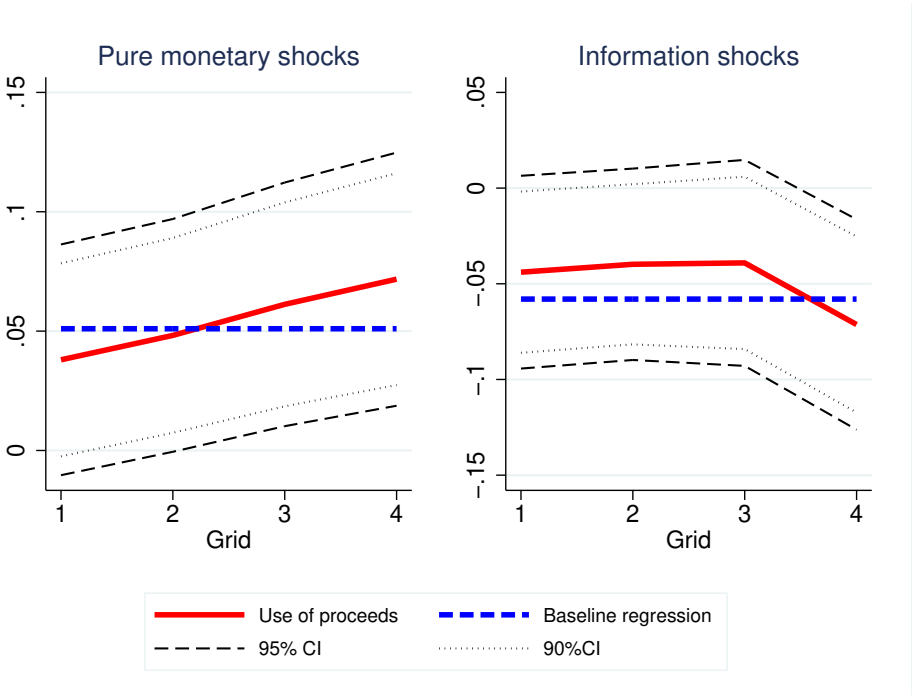

Figure 5: **Influential use of proceeds analysis:** Each point on the grid represents the point estimate of the baseline model given by equation 3.1, estimated excluding each of the uses of proceeds at a time. The points reflect respectively (1) fixed capital formation; (2) debt management; (3) working capital; (4) general corporate purposes. The dash black lines are the 95% confidence intervals. The dash blue line plots the results obtained in the baseline model.

lending decisions. One concern is that loan syndication decisions could be faster.[14] In Table 10 we present robustness results confirming that our results also hold in shorter 30-day shock aggregation window, with the coefficient on pure monetary policy shocks being positive and statistically significant in our three specifications and broadly similar in magnitude. For information shocks, the coefficients remain negative a significant but only at the 10% level.

Table 10: **Monetary policy shock aggregation window:** This table reports results of a logit model of direct lenders' participation in syndicated loans following the specification in Table 7 except where the shocks are aggregated over a 30 day trailing window. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. TL stands for "Term loans". All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.018***	0.018***	0.016**
	(0.01)	(0.01)	(0.01)
Information shock	-0.043*	-0.044*	-0.038*
	(0.02)	(0.02)	(0.02)
Observations	14118	14118	14118
Adjusted R-squared	0.015	0.022	0.024
Loan type	TL	TL	TL
Loan controls	X	X	X
Firm controls		X	X
Macro controls			X

5.6 Asymmetries

A number of studies have documented asymmetries between the impact of monetary policy tightening compared with loosening. For example in an early study, Cover [1992] finds that positive money supply shocks have a measurable effect on output while negative ones do not. In Online appendix Table OA.6 we examine if there are asymmetries in the effect of monetary policy shocks on the propensity of direct lenders to join a syndicate relative to banks. Overall, we do not find evidence of asymmetric effects. The results in columns I and III indicate that positive pure monetary policy shocks (i.e. when interest rates rise) are quantitatively very

[14]For example, Meisenzahl et al. [2021] find that the terms on syndicated loans can change relatively rapidly (within two weeks) in response to shocks.

similar to negative pure monetary policy shocks, even if this partition of shocks into positive a negative ones results in both being statistically insignificant. Similarly, for information shocks positive ones (i.e. when interest rates increase) appear to be quantitatively similar to negative ones. Thus, overall there does not appear to be be strong asymmetries between positive and negative monetary policy shocks.

6 Direct lenders and the financial accelerator

The evidence presented so far indicates that relative to banks, direct lenders are more likely to be part of a syndicate when equity markets decline around monetary policy announcements. If the impact of monetary policy on equity valuations is driving this relationship, then shocks to equity prices, as opposed to interest rates, should drive the relationship. One explanation about the reason is that the shocks affect borrower net worth and their borrowing capacity becomes constrained by the workings of the financial accelerator. However, it could also be that banks' lending capacity becomes more constrained than that of direct lenders when equity markets decline. In this section we conduct four exercises to establish the mechanism between equity price reactions, corporate net worth, bank lending constraints and direct lending triggered by monetary policy announcements.

6.1 Equity market shock

If the impact of monetary policy on equity valuations is driving direct lenders' propensity to join a syndicate, then it should be due to the shock to equity prices arising from the monetary policy announcement, rather than the shock to interest rates. To test whether the equity market reaction's to monetary policy shocks drives the propensity of direct lenders to join syndicates relative to banks, we directly include the equity market change in the tight monetary policy event window as a separate explanatory variable. If the equity market

reaction to monetary policy shocks drives the mechanism, then the probability of a direct lender joining a syndicate should be proportional to the shock to equity prices and less related to the concurrent shock to interest rates.

The negative and significant coefficient on the monetary policy event window equity return shows in column II of Table 11 shows that larger equity market declines are indeed associated with a higher propensity of direct lenders to step into loan syndicates compared to banks. Column III further shows that the event window equity return remains negative and highly significant once the monetary policy interest rate shocks (both pure monetary and information shocks) are included in the regression. Moreover, the point estimates on the interest rate shocks become around 20% smaller and their statistical significance drops to the 10% level. These results suggest that the impact of monetary policy on equity valuations is an important aspect of the transmission mechanism.

Table 11: **Equity returns in monetary policy event windows reduces the significance of pure monetary and information shocks.** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. Column I shows the results based on the specification in column III of Table 7. Column II includes the equity return in the tight monetary policy event window. Column III further includes the pure monetary policy and information shocks in the tight monetary policy event window. Column All models include loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time. TL stands for "Term loans". Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.051**		0.040*
	(0.02)		(0.02)
Information shock	-0.051**		-0.048*
	(0.02)		(0.02)
Event window equity return		-0.076***	-0.068***
		(0.02)	(0.02)
Observations	13996	13996	13996
Adjusted R-squared	0.025	0.025	0.026
Type loan	TL	TL	TL

6.2 Corporate or financial outlook

We have interpreted that the increase in direct lending triggered by either positive pure monetary policy shocks or negative information shocks may relate to the impact of borrowers' net worth on bank lending. However, this result could also reflect that banks themselves suffer a decline in valuations, restraining their lending ability (Disyayat [2010]).

To explore if the financial accelerator instead operates through borrowers' or lender balance sheets, we identify a subset of pure monetary and information shocks in which the decline in non-financial stocks outpaces that of the general index and another subset of shocks in which declines in bank stocks outpaces that of the general index. We label pure monetary shocks in which non-financial stocks outpace the general index as "corporate pure monetary shocks", and those where bank stocks outpace the general index as "financial pure monetary shocks. Similarly for information shocks, we label those in which non-financial stocks outpace the general index as "corporate outlook shocks" and those where bank stocks outpace the general index as "financial outlook shocks".

Consequently, we modify equation 3.4 including as a covariates the corporate pure monetary shocks, MP_s^{CMP}, financial pure monetary shocks, MP_s^{FMP}, corporate outlook shocks as MP_s^{COS} and financial outlook shocks MP_s^{FOS}:

$$Pr(DL_{i,j,t,s}) = F(\alpha X_i + \beta Y_j + \gamma Z_t + \delta_{21} MP_s^{CPM} + \delta_{22} MP_s^{FPM} + \delta_{31} MP_s^{COS} + \delta_{32} MP_s^{FOS}) \tag{6.1}$$

Table 12 summarises the results. To ease comparison, column I replicates the baseline results (column III in Table 7). Column II splits pure monetary shocks in into corporate and financial pure monetary shocks. We find that both types of pure monetary shocks enter with positive coefficients. Thus, qualitatively our results suggest that the financial accelerator channel operates through both firms' and banks' net worth. However, while

Table 12: **Shocks to corporate vs financial stocks:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. Column I shows the baseline results from column III of Table 7. In column II, we split the pure monetary shocks into two components, "Corporate pure monetary shocks" which are pure monetary policy shocks when the absolute return in the non-financial sector equities are greater than the return on the financial sector and "Financial pure monetary shocks" when the absolute return on bank equities is greater than that of the non-financial sector. In column III we split the information shocks into two components, "Corporate outlook shocks" which are information shocks when the absolute return in the non-financial sector equities are greater than the return on the financial sector and "Financial outlook shocks" when the absolute return on bank equities is greater than that of the non-financial sector. In column IV we drop the pure monetary and information shocks and only include Corporate pure monetary shocks, Financial pure monetary shocks, Corporate outlook shocks and Financial outlook shocks. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. TL stands for "Term loans". Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV
Pure monetary shock	0.054**		0.062***	
	(0.02)		(0.02)	
Information shock	-0.052**	-0.053**		
	(0.02)	(0.02)		
Financial pure monetary shock		0.031		0.040*
		(0.02)		(0.02)
Corporate pure monetary shock		0.052**		0.055**
		(0.02)		(0.02)
Financial outlook shock			-0.083***	-0.084***
			(0.02)	(0.02)
Corporate outlook shock			-0.009	-0.010
			(0.02)	(0.02)
Observations	14118	14118	14118	14118
Adjusted R-squared	0.025	0.025	0.025	0.025
Loan Type	TL	TL	TL	TL

corporate pure monetary policy shocks are statistically significant in columns II and IV, financial pure monetary policy shocks are only significant at the 10% level in column IV. This suggests that the impact of pure monetary policy shocks on corporate valuations could be more important in raising direct lender participation relative to banks.

For information shocks, we find that both types of shocks enter with negative coefficients (columns III and IV). However, only financial outlook shocks are statistically significant. Thus, our results suggests that information revealed by monetary policy announcements, that particularly affect bank valuations, influences the propensity of direct lenders to

step into loan syndicates relative to banks.

6.3 Leverage vs liquidity

In the introduction we noted that direct lenders differ from banks by (a) having lower leverage and (b) undertaking less maturity transformation. In this section we investigate which of these two factors is more important in explaining differences between direct lenders and banks by using the sample of loans granted by banks alone. To do so, we first examine if banks with low leverage (highly-capitalised) behave in a similar manner to direct lenders. Then second, we examine if high liquidity banks behave in a similar way to direct lenders.

Table 13: **Highly capitalised banks:** This table reports results of a logit model of highly capitalised banks' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a highly capitalised bank takes part in a syndicate, 0 otherwise. Highly capitalised banks are those with a high Tier 1 to RWA ratio at a quarterly level (above the percentile 75th of the distribution). Dollar term loans only. In columns I, we estimate equation 3.1 to asess responses to "monetary policy shocks". In columns II and III, we analyse the impact of "pure monetary policy shocks" and "information shocks". In column IV we estimate equation 3.4, which simultaneously examines both. All models include the loan, borrower, and macro covariates described in Section 3. TL stands for "Term loans". Coefficients on controls are not shown for the sake of brevity. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV
Monetary policy shock	0.060**			
	(0.02)			
Pure monetary shock		0.192***		0.207***
		(0.03)		(0.03)
Information shock			-0.131***	-0.152***
			(0.03)	(0.03)
Observations	9082	9082	9082	9082
Adjusted R-squared	0.069	0.074	0.071	0.078
Loan type	TL	TL	TL	TL

In this exercise, we drop all loans in which there is a direct lender in the syndicate. We then isolate the subset of highly capitalised banks, as institutions with a high Tier 1 capital to risk-weighted assets (RWA) ratio at a quarterly level. Specifically, highly-capitalised banks have a Tier 1 to RWA above the percentile 75th of the distribution of banks.

Highly capitalised banks take part in around two-thirds of the 9,082 loans without participation of direct lenders in our sample. The results we show in Table 13 indicate that highly-capitalised banks react in a very similar manner to direct lenders, i.e. they join syndicates when equity markets decline around monetary policy announcements. In contrast to direct lenders, the bank-only sample additionally shows that the coefficient on the raw monetary policy shocks is now positive and statistically significant (Column I).

Table 14: **Highly liquid banks:** This table reports results of a logit model of highly liquid banks' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a highly liquid bank takes part in a syndicate, 0 otherwise. Highly liquid banks are those with a high NSFR ratio at a quarterly level (above the percentile 75th of the distribution). Dollar term loans only. In columns I, we estimate equation 3.1 to asess responses to "monetary policy shocks". In columns II and III, we analyse the impact of "pure monetary policy shocks" and "information shocks". In column IV we estimate equation 3.4, which simultaneously examines both. Standard errors clustered by time in parentheses. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. TL stands for "Term loans". Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV
Monetary policy shock	0.909**			
	(0.43)			
Pure monetary shock		1.450**		1.444**
		(0.58)		(0.59)
Information shock			0.294	0.080
			(0.83)	(0.83)
Observations	7477	7477	7477	7477
Adjusted R-squared	0.074	0.074	0.073	0.074
Loan type	TL	TL	TL	TL

Next we conduct a similar exercise, isolating highly liquid banks. Again, we drop all loans in which there is a direct lender in the syndicate. We then isolate the subset of highly liquid banks, as institutions with a high net stable funding ratio (NSFR). Specifically, highly-liquid banks have a NSFR above the percentile 75th of the distribution, in our sample of banks.

In column I we observe that highly liquid banks join syndicates in response to raw monetary policy shocks, with a strong and statistically significant coefficient. Yet, this reflects a strong response to "pure monetary shocks", apparent in column II. In contrast the

coefficient on information shocks is insignificant. High liquidity banks do not step in when interest rate declines go hand-in-hand with declines in borrowers' net worth (column III).

Taken together, the results in Tables 13 and 14 underscore how direct lenders response to monetary policy more closely resembles those of banks with high capital. Their activity however, appears less similar to highly liquid banks, at least in terms of information shocks.

Our results in Table 13 are related to the debate on the role of bank capital for the strength of the bank lending channel. On the one hand, Kashyap and Stein [1994] discuss how capital requirements may dampen the transmission mechanism of monetary policy by interfering with the bank lending channel when capital constraints are binding. On the other hand, Gambacorta and Mistrulli [2004] and Jiménez et al. [2012] find that the bank lending channel is stronger when banks are weakly capitalised, i.e closer to their capital constraints. Our finding in column I of Table 13 appear consistent with the latter result as we find that banks with higher capital, which are less likely to be facing binding capital constraints, are more likely to lend following positive raw monetary shocks (and pure monetary shocks) compared with their less capitalised peers.

In addition, our results in Table 14 relate to Kashyap and Stein [2000] who show that there are cross-sectional differences in response to policy shocks based on bank balance sheet liquidity. Similar to Kashyap and Stein [2000], our results in columns I and II highlight cross-sectional differences in the response to raw- and pure-monetary shocks arising from differences in the liquidity of bank balance sheets.

Within direct lenders, the sensitivity of loan participation to monetary policy shocks also appears to be related to lender leverage. Panel A of Figure 6 plots median leverage of direct lenders grouped by the five major categories identified in Section 2.1 against the estimated sensitivity of each sectors (relative to banks) to pure monetary policy shocks presented in Table 9. The negative relationship in the left-hand panel shows that closed-end funds, BDCs and insurance companies/pension funds have the lowest leverage and are most

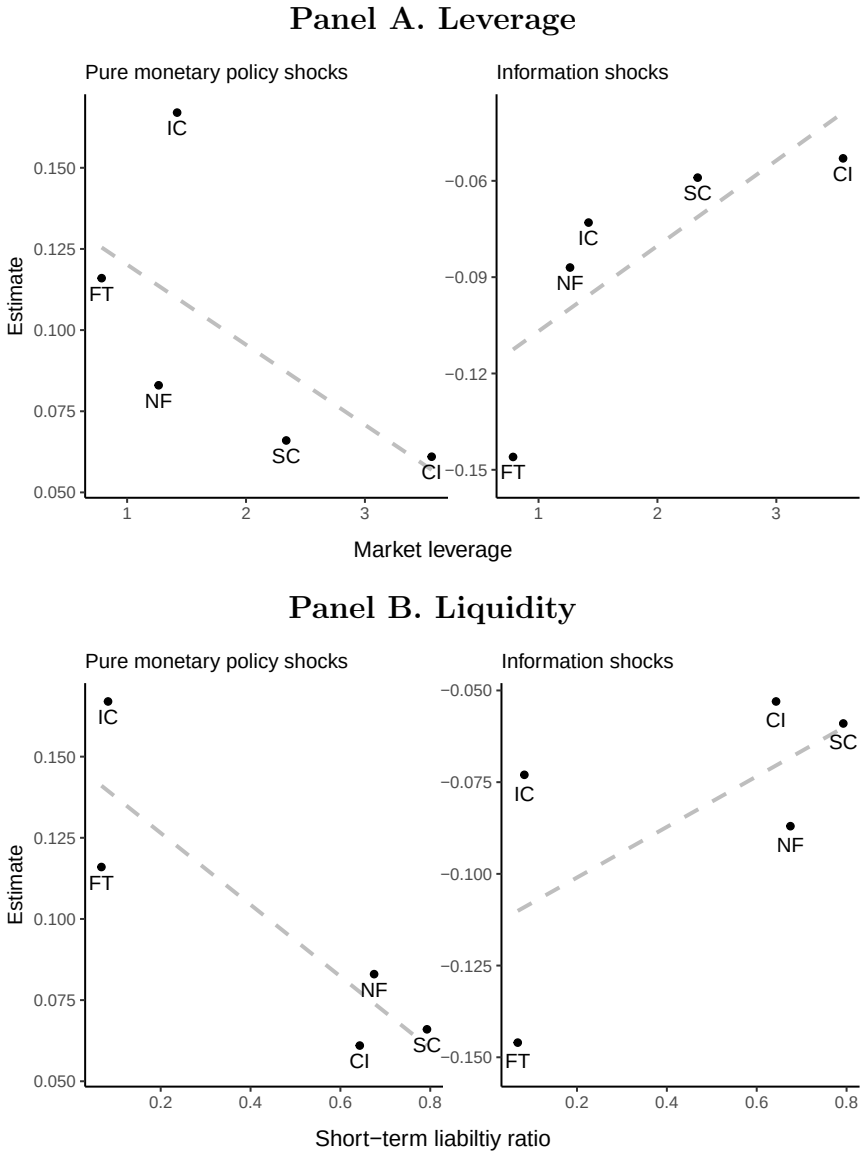

Figure 6: **Direct lender sensitivity to monetary policy shocks: Leverage and Liquidity.** This figure shows the relationship between median market leverage (Panel A.) and median ratio of short-term liabilities to total non-equity liabilities (Panel B.) of direct lenders grouped by the five major categories identified in Section 2.1 against the estimated sensitivity of each sectors to either monetary policy shocks presented in Table 9. The left-hand panels examines the relations with pure monetary policy shocks. The right-hand panels for information shocks. FT: Closed-end funds and BDCs; IC: Insurance companies and pension funds; NF: Non-financial firms; SC: Specialised financial entities; CI: non-bank credit intermediaries. Market leverage defined as total liabilities adjusted for insurance policies as a ratio of market capitalisation for the types of direct lenders. Dashed line is the OLS fitted line through the five points in each panel.

likely to step into a loan syndicated (relative to banks) following a positive pure monetary shock, while non-bank credit intermediaries have on average higher leverage and are relatively less likely to be part of a syndicate after the shock. Similarly, the right-hand panel shows

that the sensitivity to step in following news shocks is also correlated with leverage.

Turning to influence of liquidity across direct lenders, Panel B of Figure 6 also indicates a relationship between dependence of direct lenders on short-term funding and the sensitivity to monetary policy shocks.

6.4 Institutional vs bank term loans

As a final exercise to examine the mechanism we check whether direct lenders fill the gap left by banks in primary markets, and not by institutional investors in secondary loan markets who may purchase loans originated by banks. This exercise is important, as many loans are originated by banks but subsequently sold to end-investors (so called institutional loans). Previous research has shown that the origination of these loans by banks is driven by loan demand from institutional investors (Niepmann and Schmidt-Eisenlohr [2019], Fleckenstein et al. [2020] or Bruche et al. [2020]). Loan demand by end-investors is likely to be driven by different factors compared with bank loans that are held on their balance sheet. Consistent with this expectation, typically their investments are more resilient than bank lending during downturns (Adrian et al. [2012]).

Following Fleckenstein et al. [2020], we define bank term loans as those labelled as "Term" or "Term A" loans. Institutional loans are defined as those labelled "Term B", "Term C", "Term D", and "Term E". While banks originate both, they hold bank loans after their origination, and rapidly sell institutional loans to institutional investors.[15] One driver of this difference is tax (Blickle et al. [2020]). For example offshore collateralised loan obligations (CLOs) avoid participation in syndicates at origination to ensure they remain exempt from US taxes. Instead they agree with banks in advance to buy certain parts of loans issued through a syndicate in secondary markets. Indeed, Blickle et al. [2020] finds that post issuance, bank holdings of Term B loans fall significantly while those of funds

[15] As such, bank and institutional term loans differ in their terms and conditions. For instance, bank loans are amortising, while institutional loans are structured with a bullet payment (lump-sum at maturity).

Table 15: **Institutional investors:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Dollar loans only. Column I replicates the baseline results of Column III in Table 7, which over all term loans (TL). Column II analyses the subsample of bank term loans (BTL), whereas column III focuses on institutional term loans (ITL). Bank term loans are those labelled as "Term" or "Term A". Institutional loans are those labelled "Term B", "Term C", "Term D", and "Term E". Standard errors clustered by time in parentheses. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on control variables are not shown for the sake of brevity. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.053**	0.043*	0.004
	(0.02)	(0.02)	(0.04)
Information shock	-0.052**	-0.100***	0.144**
	(0.02)	(0.02)	(0.06)
Observations	14118	11089	3029
Adjusted R-squared	0.025	0.038	0.029
Loan Type	TL	B TL	I TL

increase. By contrast, they find a much smaller change for Term A loans. Overall, we observe that direct lenders are more involved in institutional term loans, taking part in 40% of the transactions; by contrast, they only take part in 28% of the bank loans.

We then examine whether the response of direct lenders to monetary policy shocks differs across bank and institutional term loans. If direct lenders step in in the place of banks but not for buyers of institutional term loans, we would expect the impact of monetary policy on direct lender participation to be weaker for institutional loans, but continue to hold for bank loans.

The results in Table 15 are consistent with our prior. Column II shows that direct lending is very sensitive to monetary policy shocks for bank term loans: the probability that a direct lender participates in a bank loan remains significant after a positive pure monetary shock, and the magnitude of the response to information shocks becomes more negative. By contrast, for institutional term loans the coefficient on pure monetary shocks is weaker and become statistically insignificant, while the coefficient on information shocks actually turning positive. These findings suggest that our baseline results do not reflect direct lenders

stepping into the gap left by institutional investors in the loan market but rather that they fill the gap left by banks.

7 Conclusions

Direct lenders are increasingly important players in the US corporate loan market, and the fallout from the Covid-19 pandemic has if anything boosted their growth. Direct lenders differ from banks as they have low leverage, limited maturity mismatches, and are not subject to bank supervision.

In this paper we provide new evidence on the role they play in the monetary policy transmission mechanism. Our results suggest that direct lenders do not smooth the impact of monetary policy through the bank lending channel. Rather, we find that direct lenders smooth the impact of monetary through the the financial accelerator channel. In particular, compared to banks direct lenders are more likely to be involved in syndicates when monetary policy announcements are associated with a fall in equity prices, irrespective of the directional impact of these announcements on interest rates. We conclude that this could reflect their low leverage or differences in their lending technology. Both of which may allow them to keep on lending to firms when net worth worsens, just as banks step back. In this sense, direct lenders are akin to other sources of non-bank credit which operate with low leverage (Adrian et al. [2012]).

An implication of this analysis is that direct lenders can dampen financial accelerator mechanisms in the economy (Carlstrom and Fuerst [1997] and Bernanke et al. [1999]), should they keep on growing at a rapid pace. Another implication is that the growing presence of direct lenders increases the ability of borrowers to substitute between bank vs non-bank credit as risk increases. This could enhance the robustness of the syndicated loan market, but only if direct lender leverage remains low.

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Online annex: Dampening the financial accelerator?

Direct lenders and monetary policy

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Appendix A Data appendix

Table OA.1: **Variables description**

A. Firm-level variables		
Variable	Description	Source
Total assets	Logarithm of total assets, in US bn.	Refinitiv Eikon.
EBITDA ratio	EBITDA to total assets, in pp.	Refinitiv Eikon.
Fixed assets ratio	Fixed assets to total assets, in pp.	Refinitiv Eikon.
Quick ratio	Current assets minus inventory to current liabilites, in pp.	Refinitiv Eikon.
Leverage ratio	Debt to total assets, in pp.	Refinitiv Eikon.
TRBC Economic sector	Economic sector given by the Thomson Reuters Business Classification scheme. Classifies firms into ten sectors.	Refinitiv Eikon.
Country	Country of incorporation.	Refinitiv Eikon.
B. Loan-level variables		
Variable	Description	Source
Direct lender loan	1 if at least one lender is a direct lender, 0 otherwise.	Refinitiv SDC Platinum.
Loan without direct lender participation	1 if there is not any direct lender in the loan syndicate, 0 otherwise	Refinitiv SDC Platinum.
Term loan	Term, Term A, B, C, D, E loans	Refinitiv SDC Platinum.
Credit line	Liquidity facilities.	Refinitiv SDC Platinum.
Bank term loan	Term and Term A loans.	Refinitiv SDC Platinum.
Institutional term loan	Term B, C, D or E.	Refinitiv SDC Platinum.
Leveraged loan	leveraged, or highly leveraged loans.	Refinitiv SDC Platinum.
Investment grade loan	Investment grade, or near investment grade loans.	Refinitiv SDC Platinum.
Spread	Basis points over LIBOR, for dollar loans.	Refinitiv SDC Platinum.
Maturity	Years to maturity, at origination.	Refinitiv SDC Platinum.
Amount	Loan amount in US mn.	Refinitiv SDC Platinum.
Use of proceeds	Use of proceeds, as described at origination.	Refinitiv SDC Platinum.

Table OA.1: **(Cont.) Variables description**

C. Lender-level variables		
Variable	Description	Source
Book leverage ratio	Total liabilities to book equity	Fitch and Refinitiv
Equity leverage ratio	Total liabilities to market value of equity	Fitch and Refinitiv
Short-term debt ratio	Total assets minus equity and long-term debt, to total assets, in pp.	Fitch and Refinitiv
Direct lender	Lender that is not subject to bank capital requirements.	Refinitiv SDC Platinum.
Bank	Lender subject to bank capital requirements.	Refinitiv SDC Platinum.
Lead arranger	Lender involved in arranging the loan i.e. gathering participants in the syndicated loan.	Refinitiv SDC Platinum.
Participant	Members of the loan syndicate other than the lead arranger.	Refinitiv SDC Platinum.
Tier 1 to RWA	Ratio of equity Tier 1 to risk-weighted assets.	Fitch
NSFR	Net stable funding ratio.	Fitch
Highly capitalised bank	Bank with a Tier 1 to RWA above the percentile 75th of the distribution in a given quarter on a sample of 135 global banks.	Fitch, Refinitiv Eikon.
Highly liquid bank	Bank with a NSFR above the percentile 75th of the distribution in a given quarter on a sample of 135 global banks.	Fitch, Refinitiv Eikon.
Investment bank	Bank which does not take deposits	Refintiv Eikon.

Appendix B Additional Tables

Table OA.2: **Loan attributes - Term loan sample:** the table provides summary statistics, namely the maturity at origination (in years), the amount (in US mn), and the spread (in bp) for loans where at least one direct lender participated in the syndicate of a term loan (Direct lenders) and where only banks participated in the term loan syndicate (No direct lenders). p25, p50 and p75 refer to the 25th, median and 75th percentiles of the distribution.

A. Direct lenders

	mean	p25	p50	p75
Maturity	11	8.0	10.1	13.8
Amount	350	50.0	150.0	380.0
Spread	307	190.0	275.0	375.0

B. No direct lenders

	mean	p25	p50	p75
Maturity	11	7.3	10.0	12.6
Amount	366	50.0	140.0	356.3
Spread	247	150.0	225.0	312.5

Table OA.3: **Firm attributes - Term loan sample:** The table provides summary statistics of firms which received term loans where at least one direct lender participated in the syndicate (panel A) and where only banks participated in the syndicate (panel B).p25, p50 and p75 refer to the 25th, median and 75th percentiles of the distribution.

A. Borrowers from direct lenders.

	mean	p25	p50	p75
Total assets	10998	725.7	2214.9	8713.2
EBITDA ratio	12	6.8	10.6	15.5
Quick ratio	117	74.1	103.1	142.0
Leverage ratio	43	27.7	40.9	56.9
Fixed assets ratio	54	21.6	49.5	81.6

B. Borrowers from bank only loans.

	mean	p25	p50	p75
Total assets	12843	858.8	2905.5	10724.3
EBITDA ratio	11	7.1	10.5	14.8
Quick ratio	116	73.0	103.6	140.4
Leverage ratio	39	25.0	36.8	50.9
Fixed assets ratio	56	23.3	53.1	83.4

Table OA.4: **Investment grade vs leveraged loans:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. IG: dummy variable taking on the value of one if the loan is classified as investment grade. Standard errors clustered by time in parentheses. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. Standard errors clustered by time in parenthesis. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Pure monetary shock	0.051**	0.062	0.045*
	(0.02)	(0.06)	(0.02)
Information shock	-0.056**	-0.055	-0.057**
	(0.03)	(0.06)	(0.03)
Pure monetary shock $\times IG$			0.084
			(0.07)
Information shock $\times IG$			0.056
			(0.08)
Observations	12742	2830	14118
Adjusted R-squared	0.022	0.039	0.025
Loan type	TL	TL	TL
Quality	Lev	IG	All

Table OA.5: **Borrower heterogeneity:** This table reports results of a logit model of direct lenders' participation in syndicated loans. The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. Standard errors clustered by time in parentheses. All models include the loan, borrower, and macro covariates described in Section 3. Coefficients on controls are not shown for the sake of brevity. Standard errors clustered by time in parenthesis. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV	V
Pure monetary shock	0.051**	0.053**	0.051**	0.052**	0.052**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Information shock	-0.056**	-0.053**	-0.055**	-0.058**	-0.058**
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
Pure monetary shock × Log assets	0.007				
	(0.02)				
Information shock × Log assets	0.020				
	(0.03)				
Pure monetary shock × Leverage		-0.007			
		(0.02)			
Information shock × Leverage		-0.018			
		(0.02)			
Pure monetary shock × EBITDA ratio			-0.015		
			(0.02)		
Information shock × EBITDA ratio			0.027		
			(0.02)		
Pure monetary shock × Quick ratio				0.028	
				(0.02)	
Information shock × Quick ratio				-0.002	
				(0.02)	
Pure monetary shock × Fixed assets ratio					-0.005
					(0.02)
Information shock × Fixed assets ratio					-0.014
					(0.03)
Observations	14118	14118	14118	14118	14118
Adjusted R-squared	0.024	0.024	0.024	0.024	0.024
Loan Type	TL	TL	TL	TL	TL
Firm controls	X	X	X	X	X
Loan controls	X	X	X	X	X
Macro controls	X	X	X	X	X

Table OA.6: **Asymmetries:** This table reports results of a logit model of direct lenders' participation in syndicated loans following the specification in Table **??** except where pure monetary and information shocks are partitioned into those with positive signs (i.e. positive interest rate surprises) and those with negative signs (i.e. negative interest rate surprises). The dependent variable is a categorical variable taking value 1 if a direct lender takes part in a syndicate, 0 otherwise. All models include the loan, borrower, and macro covariates described in Section 3. TL stands for "Term loan". All models cover both the investment grade and leveraged loan segment. Standard errors clustered by time in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Positive pure monetary shock	0.055		0.056
	(0.05)		(0.05)
Negative pure monetary shock	0.049		0.048
	(0.04)		(0.04)
Information shock	-0.058**		
	(0.02)		
Pure monetary shock		0.052**	
		(0.02)	
Positive information shock		-0.078	-0.079
		(0.05)	(0.05)
Negative information shock		-0.043	-0.042
		(0.04)	(0.04)
Observations	14118	14118	14118
Adjusted R-squared	0.024	0.024	0.024
Loan Type	TL	TL	TL

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