Nonbank Lending and the Transmission of Monetary Policy[†]

Dominic Cucic
Danmarks Nationalbank

Denis Gorea
Danmarks Nationalbank

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Abstract

We analyze the role of nonbank lenders in corporate and consumer credit markets and show that they affect the transmission of monetary policy to financial and real outcomes. We combine data on the universe of unsecured loans to firms and households in Denmark with firms' balance sheet information and individual tax records over the period 2003-2018. Nonbanks increase their share of credit supply after an interest rate hike in both the consumer and corporate credit markets. We find no evidence that higher policy rates induce nonbanks to lend to riskier borrowers. Nonbanks attenuate the bank lending channel of monetary policy by partially offsetting the reduction in bank loans, which has real effects. Borrowing from nonbanks almost fully isolates firms' investment and employment decisions from monetary policy and attenuates the response of household consumption.

Keywords: Monetary Policy; Nonbanks; Banks; Unsecured Loans; Shadow banks

JEL Classification: E51, E52, G23.

[†]Dominic Cucic: dc@nationalbanken.dk. Denis Gorea: dego@nationalbanken.dk.
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1 Introduction

A vast literature on the bank lending channel documents that traditional banks reduce their lending and curb risk-taking in response to a monetary tightening (Kashyap and Stein, 1994, and Bernanke and Gertler, 1995). While the reduction in credit supply by banks has received considerable attention in the literature, the evidence on the reaction of the increasingly important nonbank financial intermediaries to changes in monetary policy is rather scarce. Some have argued that monetary policy changes the funding cost of all financial intermediaries who borrow short-term, and therefore, nonbanks should react similarly to banks to changes in policy (Stein, 2013). Others have argued recently that monetary tightening shifts the supply of credit from banks to nonbanks (Drechsler et al., 2017, Elliott et al., 2021, and Xiao, 2020).

This paper contributes to this debate by answering three questions. First, does a tightening of monetary policy change the composition of credit supply by shifting credit from banks to nonbanks? Second, do nonbanks shift their credit towards more risky borrowers in response to a monetary tightening, that is, is there a nonbank risk-taking channel? Lastly, how does the substitution into more nonbank lending affect the transmission of monetary policy to financial and real outcomes such as firm investment and household consumption? We answer these questions empirically using annual data on the universe of unsecured corporate and consumer credit in Denmark between 2003 and 2018, combined with monetary policy shocks computed by Jarociński and Karadi (2020). To address questions about borrowers' riskiness and real outcomes, we combine our credit data with detailed data on firm balance sheets and income statements, as well as administrative data on every household in Denmark.

We begin by investigating if an unexpected monetary tightening induces a shift of credit supply from banks towards nonbanks by studying credit outcomes at the borrower-lender-year level. We find that a positive one standard deviation shock to monetary policy rates increases the nonbank debt share by about 5% in both corporate and consumer markets. In addition, compared to banks, nonbanks reduce the interest

rates on corporate credit while increasing the price of consumer credit. Nonbanks thus attenuate the pass-through of monetary policy into corporate lending rates while they reinforce the pass-through into consumer credit rates. While the relative decrease in the cost of nonbank credit for firms may explain nonbanks' increased market share in the corporate credit market, their expansion in consumer credit markets despite charging relatively higher interest rates appears puzzling.

This motivates our second question: do nonbanks increase their market share after a tightening by shifting credit supply to riskier borrowers? We address this question by analyzing if the nonbank debt share increases especially among ex-ante riskier borrowers. We proxy for borrower risk either with observable characteristics like leverage or with borrowers' history of debt delinquency. We do not find any evidence that nonbanks increase their market shares especially among riskier borrowers. In the case of consumer credit markets, we instead find that nonbanks shift their credit supply to borrowers with lower leverage and higher income.

After documenting an increase in nonbank credit supply *relative* to banks, we study outcomes aggregated at the borrower-year level to address the overall transmission of monetary policy. In particular, we study how a monetary policy shock affects total credit supply to borrowers, and what the associated real effects are. We find that banks reduce their lending after a monetary tightening, in line with the classic bank lending channel. The supply of nonbank credit, however, increases significantly to both firms and households. Although the substitution away from bank credit to nonbank credit is incomplete, nonbanks significantly attenuate the transmission of monetary policy to credit supply. This result shows that nonbank finance acts as a spare tire when bank lending tightens, similar to bond financing Holm-Hadulla and Thürwächter (2021).[1]

Lastly, we investigate how the attenuation of the bank lending channel by nonbanks affects the transmission of monetary policy to real outcomes. Our results show

[1] As relatively few firms in Denmark issue corporate bonds, substitution into corporate bonds is unlikely to affect our results.

that borrowers with pre-existing nonbank relationships ("nonbank borrowers") are insulated from the adverse consequences of unexpected interest rate hikes. On the corporate side, nonbank borrowers are able to sustain relatively higher investment, operating profit, and wage bills after a monetary tightening compared to borrowers without ties to nonbanks. Similarly, consumers with ties to nonbanks are able to consume more, purchase more valuable cars and have more valuable total asset holdings compared to households without nonbank ties.

Identifying the role of nonbanks in the transmission of monetary policy on credit supply is challenging for two reasons. First, changes in monetary policy rates are often shaped by macroeconomic developments, which are likely to directly affect credit supply too. Second, monetary policy may affect credit demand of borrowers at banks and nonbanks differently, especially if these two lenders have distinct clienteles. We deal with the first challenge, the endogeneity of monetary policy rates, by exploiting the long-standing Danish currency peg to the Euro. The fixed-exchange rate policy implies that Denmark effectively adopts the monetary policy that is decided by the ECB for the euro area with essentially no regard to the economic conditions in Denmark. This allows us to utilize monetary policy shocks series that were previously constructed for the euro area (Jarociński and Karadi, 2020, and Altavilla et al., 2019) to identify exogenous variation in Danish monetary policy rates. In addition to these shocks, in our regressions we control for local macroeconomic conditions in Denmark and stock market uncertainty to ensure that those economic factors are not driving our results on the shifts in credit supply.

To isolate credit supply effects, we exploit the annual reports of all lenders in Denmark to the Danish Tax Authority ("SKAT"). Each year, all entities in Denmark having issued credit over the previous 12 months are required to report account-level information to SKAT, which is used to determine tax obligations. We combine this account-level data with information from the Danish firm register to identify banks and nonbank financial intermediaries. Our data allows us to focus on borrowers who, in the

same period, receive unsecured credit from both banks and nonbanks. Our empirical analysis therefore follows the approach popularized by Khwaja and Mian (2008) and compares how lending decisions by banks and nonbanks to the same borrower differ in response to a monetary policy shock. Specifically, we utilize borrower-year fixed effects to control for time-varying borrower characteristics such as credit demand.[2]

In addition, we use the accounting statistics and tax records for the entire population in Denmark to obtain detailed information about income and balance sheets of borrowers in both corporate and consumer credit markets. Our full dataset covers the period 2003-2018 and features nearly 1.9 million firm-lender-year observations in the corporate credit market and 73 million household-lender-year observations in the consumer credit market. Focusing on borrowers with both bank and nonbank lenders in a given year reduces our samples to around 25% of their original size. To ensure that we capture the overall effect of monetary policy on credit supply in an economy where the majority of borrowers do not deal with banks and nonbanks simultaneously, we follow Degryse et al. (2019) and re-estimate our models when including borrowers with only one type of lender. To do so, we replace borrower-year fixed effects with fixed effects based on borrower types, which identify borrower groups with similar credit demand.

Literature review. This paper contributes to three strands of the literature. First, we add to the literature that explores how changes in monetary policy affect credit market outcomes (Kashyap and Stein, 2000, Jiménez et al., 2012, Jiménez et al., 2014, and Heider et al., 2019 among many others). In our paper, we focus on identifying the role that nonbanks play in the transmission of monetary policy to credit market outcomes, such as credit volume and interest rates. Chen et al. (2018) argue through the lens of a theoretical model and an empirical analysis of the Chinese credit market that monetary policy tightening drives credit away from banks and into shadow banks, which leads to more risky investments. The paper closest to ours is Elliott et al.

[2]See Jiménez et al. (2012) and Chodorow-Reich (2014), among many others, for further applications of this identification strategy.

(2021), who use data on syndicated loans, car loans to consumers and mortgage loans to show that nonbanks weaken the bank lending channel by providing more credit to ex-ante riskier borrowers during periods when monetary policy is tightened. We provide complementary evidence by studying nonbank lending in a European context, where detailed evidence on the role of nonbanks has been scarce. In contrast to Elliott et al. (2021), we study the *universe of unsecured* corporate and consumer credit and find no evidence of increased risk-taking by nonbanks after a monetary tightening. This divergence of results may be explained by the higher loss given default faced by lenders in unsecured credit markets, who are the focus of our analysis. Therefore, lenders in our data may act more prudently compared to the lenders of mostly secured credit studied by Elliott et al. (2021). [3] Furthermore, our data allows us to study not only the effect of monetary policy on credit quantities, as in Elliott et al. (2021), but also on the price of credit, that is on interest rates.

Second, due to the richness of our data, we can explore in greater detail how monetary policy affects real-economic outcomes, such as corporate investment and household consumption, in the presence of nonbank financial intermediaries. While empirical evidence on the real effects of monetary policy using aggregate data is rather abundant (Romer and Romer, 2004, Coibion, 2012, Gertler and Karadi, 2015, and Nakamura and Steinsson, 2018), there is a growing body of work that uses micro data to study such effects (Di Maggio et al., 2017, Cloyne et al., 2018, Wong, 2019, Cloyne et al., 2020, and Holm et al., 2021). We provide complementary evidence to this literature showing that nonbank lenders attenuate the transmission of policy rate increases to borrowers' real outcomes in both corporate and consumer credit markets. In particular, after a rate hike, investment, profits and employment by firms, and income, consumption and car purchases by households are significantly higher among those with ties to nonbank lenders compared to borrowers that rely mostly on bank loans. Moreover, contrary to the results in Elliott et al. (2021), we show that nonbanks' increased

[3] See Berger et al. (2011) for a detailed discussion on the differences in terms of lending patterns in secured and unsecured credit markets.

credit supply after policy rate increases largely eliminates the transmission to firms' real outcomes, such as investment, but only marginally attenuates the transmission to household consumption. We confirm the finding by Elliott et al. (2021) that nonbank credit allows households to sustain car purchases after a monetary tightening. However, our precise measure of households' overall consumption, based on tax records of incomes and wealth, shows that car purchases are a poor proxy for the response of overall consumption. While nonbank lending helps keep car purchases elevated after a tightening, overall consumption drops even for households that borrow mostly from nonbanks.

Third, our paper also relates to the literature on the increasing role that nonbank financial intermediaries play in various credit markets (Buchak et al., 2018, Fuster et al., 2019, Murfin and Pratt, 2019, and Irani et al., 2021). Chernenko et al. (2020) show that nonbanks are an important source of credit in a sample of U.S. publicly-traded middle market firms and that regulatory constraints on bank lending push unprofitable firms to borrow from nonbanks. Gopal and Schnabl (2020) show that finance and fintech companies have been a major provider of credit to small businesses after 2008 in the U.S., replacing the drop in credit supply that occurred due to banks rationing of loans to smaller firms. Our paper is the first to provide detailed evidence on the characteristics of the nonbank lending industry in an European context (Denmark). We also document differences in balance sheets and credit market outcomes across borrowers at nonbanks and banks.

2 Data

Our analysis is based on several administrative datasets collected by Statistics Denmark. The core data collection combines the universe of unsecured lending agreements between Danish lenders and borrowers in both consumer and corporate credit markets with additional information on borrowing firms and households as well as on lenders. In this section we provide a brief overview of the data and the sample restric-

tions we impose. Subsequently, we also provide descriptive statistics of our sample and describe briefly some characteristics of the nonbank lending sector in Denmark.

2.1 Data sources and sample restrictions

Loan data. Our data on corporate and consumer loans is based on Danish lenders' annual account-level reports of all loans to the Danish Tax Authority (SKAT) between 2003 and 2018. Each year, all entities in Denmark having issued unsecured credit over the previous 12 months are required to report information on each account that is active during the year, including the identity of the account holder, the account number, balance, and the sum of interest payments made on the account over the course of the year. The reporting covers any type of lending arrangement, including regular loans, credit card debt, commercial paper, and accounts with variable utilization such as revolving loans or overdraft deposit accounts.[4] As our data does not allow to distinguish between these types of credit, we study the effect of monetary policy on overall unsecured credit of each borrower. These reports are used to determine tax obligations and are of accordingly high quality. We collapse the raw data at the borrower-lender-account-year level to the borrower-lender-year level by summing balances and interest payments across accounts held by the same borrower at the same lender in each year. Importantly, borrowers in our dataset are firms or individuals, which allows us to draw conclusions regarding the effects of monetary policy for both the unsecured *corporate* credit market and the unsecured *consumer* credit market.

In addition to outstanding loans and interest payments, the data also covers loan maturity and the contractual interest rate for some observations. However, these variables are not relevant for taxes and not systematically reported by most lenders. Therefore, we follow Jensen and Johannesen (2017), and Renkin and Züllig (2021), and cal-

[4]The notable exception are mortgages, which in Denmark are exclusively provided outside the banking system by specialized mortgage institutions. Due to the specific regulations applied to Danish mortgage institutions we exclude them from our analysis. Hence our paper has little to say on how nonbanks affect the transmission of monetary policy in secured credit markets.

culate the effective interest rate paid by borrower b to lender l in year t as:

$$i_{b,l,t} = \frac{\text{Interest payments}_{b,l,t}}{0.5 \times (\text{Loan balance}_{b,l,t} + \text{Loan balance}_{b,l,t-1})}. \quad (1)$$

The effective interest rate is calculated as the sum of interest payments made in year t divided by the average outstanding loan balance at the end of the current and previous years. The denominator is an approximation of the average amount of loans outstanding during the current year and implicitly assumes that loan balances evolve linearly over the course of a year.

Lender and borrower characteristics. We complement our data on loans with detailed information on borrowers and lenders from various datasets compiled by Statistics Denmark. We use the Danish firm register ("FIRM") to obtain information on lenders and corporate borrowers. The register contains information on firms' legal form, age, location and employment. Importantly, a six-digit industry code for each firm in the register allows us to distinguish traditional bank lenders from other financial institutions granting loans.

To measure the characteristics of firms in our corporate loans sample, we use the Danish firm-level accounting statistics ("FIRE"). FIRE contains detailed accounting information for active businesses in Denmark with more than 50 employees as well as some information on smaller businesses, which are sampled less frequently by Statistics Denmark. The accounting data excludes firms in the governmental, financial, and agricultural sectors. Although the accounting data covers only 9,000 firms out of a total of around 190,000, these firms account for roughly two-thirds of total employment in Denmark.

The lack of accounting data for small firms does not raise major concerns in our analysis for two reasons: first, we use accounting information only in the part of our analysis that is concerned with the risk-taking channel of monetary policy and its real and financial effects. Our baseline results on the quantity and price of nonbank lend-

ing in response to monetary policy shocks do not rely on account information. Second, our identification strategy focuses on borrowers who, in a given year, borrow from at least one bank and one nonbank. We document at the end of this section that corporate borrowers satisfying this requirement tend to be larger, implying that the majority of smaller firms for which we lack accounting data would be excluded from our analysis in any case.

Since part of our loan-level data consists of consumer loans, we also merge our data with information on individuals from various registries compiled by Statistics Denmark or the Danish Tax Authority for the entire population of Denmark. The big advantage of using such information is that it does not suffer from selection bias, as all individuals are required by law to report their incomes accurately. Furthermore, incomes and wealth holdings of individuals are largely reported by third parties (employers or financial institutions), which alleviates any concerns about measurement error which may arise when using survey data for individuals.

We start by combining individuals who are recorded as borrowers in our loan-level data into household units by using the household identifiers from the population register. We deem this necessary for our analysis because individuals can smooth various economic shocks, such as shocks to their interest rates, through the joint borrowing at the level of the household to which they belong. That is, observing one individual borrowing mainly from a nonbank in the consumer credit data does not necessarily imply that this individual is primarily a nonbank customer, as their household partner may borrow more from banks. Viewed as a household these two individuals will be characterized as primarily borrowing from banks rather than nonbanks. This implies that the nonbank share of unsecured consumer credit could differ significantly at the individual level vs. the household level.

Once we've collapsed our loan-level data at the household level, we add information on household income from the administrative records of the tax authority (SKAT). Incomes in Denmark are reported with little to no errors, as the reporting system is au-

tomated and subject to no self-reporting bias. The information recorded in tax records allows us to compute disposable income at the household level. While wealth is not taxed in Denmark, any incomes arising from it such as dividends and capital gains are taxed. As a consequence, we also have detailed information on the wealth of Danish households which we also use in our analysis. Lastly, following Browning and Leth-Petersen (2003), we impute household consumption by subtracting any changes in net worth between years from the disposable income received during that year.[5]

Monetary policy shocks. To identify monetary policy shocks, we exploit the fact that Denmark's monetary policy is effectively aligned to that of the ECB. This introduces exogenous variation in policy rates, as the ECB does not set interest rates in the euro area based on changes in Danish GDP or its local credit conditions. Therefore, we use shocks to monetary policy computed for the euro area as instruments for monetary policy shocks in Denmark. Section 3 discusses our identification strategy in more detail.

Our main measure of monetary policy is the time series of monetary policy shocks constructed by Jarociński and Karadi (2020) for the Euro-area. This measure is based on a combination of high-frequency responses of asset prices and sign restrictions, and aims to separates "pure" monetary policy shocks from the "information effect" conveyed in the ECB's monetary policy announcements. To match the frequency of this shock series to our annual data on loans, we follow Coibion (2012) and Nelson et al. (2018), and convert this measure of monetary shocks into a level measure by taking the cumulative sum. Our annual shock measure ranges from -6.4 bps to 17.78 bps, with a mean of 2.69 bps and a standard deviation of 7.59 bps.[6]

Sample construction. To arrive at our baseline sample we restrict the data in a

[5]This approach has been used previously in many studies that rely on tax registry data from Denmark to compute consumption (see for example Leth-Petersen, 2010, Jensen and Johannesen, 2017, Crawley and Kuchler, 2020, and Andersen and Leth-Petersen, 2021). Abildgren et al. (2018) show that imputed spending computed based on income and wealth data is closely aligned with measures of spending that can be computed using survey data.

[6]We also considered how our results change when we use other measures for euro area monetary policy shocks that have been computed in the literature, such as Altavilla et al. (2019).

number of ways. For both the corporate and consumer loans, we begin with the universe of unsecured loans to Danish non-financial companies and households. We drop state-guaranteed student loans and loans granted by municipalities. We also drop all loans that are in some form of arrears or debt forgiveness. Lastly, we drop loans by mortgage banks, extraterritorial as well as governmental institutions and the Danish central bank.

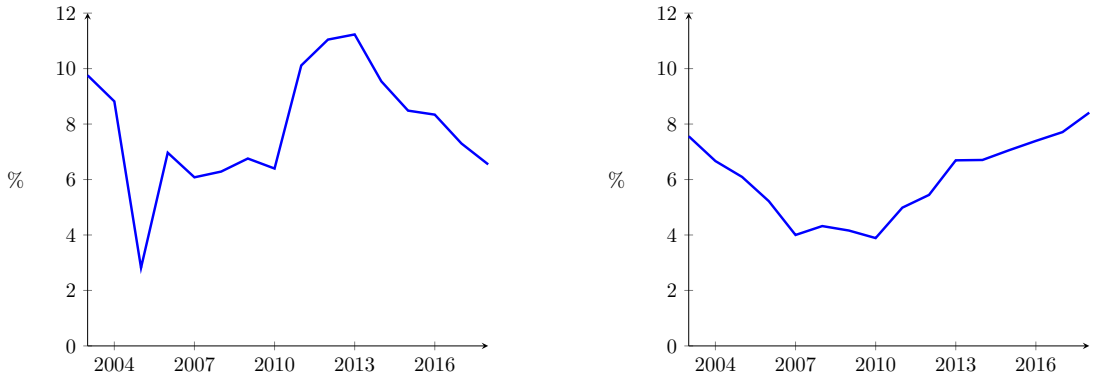
The final and most significant sample restriction is imposed by our identification strategy: following Khwaja and Mian (2008), we estimate the impact of monetary policy shocks on credit supply by comparing the lending decisions of banks and nonbanks to the same firm or household within a given year. Our empirical strategy thus excludes all borrowers who do not receive credit from at least one bank and one nonbank. We illustrate the effects of this sample restriction in the following subsection.

At the firm-level, we begin with all firms that were active during any year in the period 2003-2018. We then drop firms whose equity is below 1,000 USD. Further, we drop all firms with missing survey information in the accounting statistics. Lastly, we drop cooperatives, NGOs and other non-profits from our sample, mostly to exclude housing cooperatives, which are important players in Danish real estate markets.

2.2 Descriptive statistics

In this subsection we provide a series of descriptive statistics about our data, and in particular about nonbank lenders and their borrowers in Denmark. The goal of this exercise is to gain a better understanding of who nonbank lenders are, who they lend to, and whether these aspects differ from the existing evidence on nonbank lenders coming mainly from the United States and China.

We start by describing how the share of nonbank credit in total credit has evolved between 2003 and 2018. Figure 1 shows that, in both the case of the corporate credit market and the consumer credit market, the share of nonbanks has been hovering



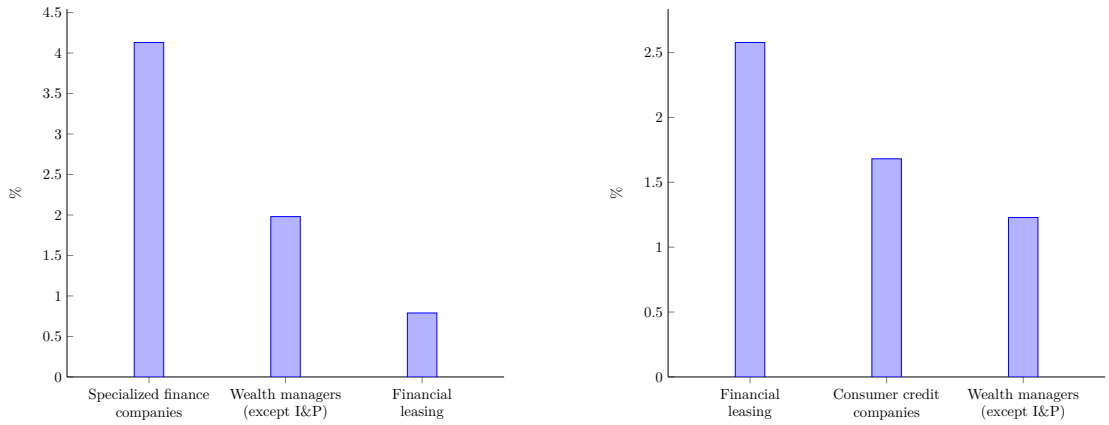
(a) Corporate Credit

(b) Consumer Credit

Figure 1: Share of nonbank debt in total debt

at around 8% during our sample period. In the corporate credit market, this share dropped prior to the financial crisis of 2008, increased shortly thereafter, but has been on a declining trend after 2013. The picture is somewhat different in the consumer credit market. The share on nonbanks has decreased between 2003 and 2010, but has been climbing steadily since. Considering that total unsecured credit in Denmark equals approximately 50 per cent of Danish GDP, the evidence presented in Figure 1 highlights the economic importance of nonbanks for Danish credit markets.

We next investigate which types of nonbanks are the most important in Denmark. Figure 2 depicts the share of credit to NFCs and households extended by the three largest nonbank lender industries, which we determine by using the 6-digit NACE industry codes for each lender in our sample. Figure 2 (a) shows that nonbanks not involved in monetary intermediation, such as specialized finance companies, are the most important type of nonbank lender in the Danish corporate credit market. They account for more than 4% of total unsecured corporate credit. Typically, these institutions finance themselves by issuing bonds and their lending can take a variety of forms, such as loans, international trade financing, and the provision of long-term finance to industry by industrial loan companies. These lenders tend to have a competitive advantage in terms of lending to particular industries, but are also likely more



(a) Corporate Credit

(b) Consumer Credit

Figure 2: Largest industries among nonbank lenders

sensitive to idiosyncratic demand shocks due to their highly concentrated lending portfolio relative to the portfolio of a typical bank.

The second largest type of nonbanks in the Danish corporate credit market comprises wealth managers (other than insurance companies and pension funds), venture capital firms and investment funds who invest for their own account in securities, bonds and other instruments. These institutions account for nearly 2% of all unsecured corporate credit. Lastly, firms engaged in financial leasing are the third largest nonbank lender type and account for about 0.8% of unsecured corporate credit.

Figure 2 (b) shows that in the consumer credit market, financial leasing companies dominate the list of nonbank lenders. These lenders are responsible for close to 3% of total consumer credit in Denmark. Consumer credit companies that are not deposit-taking institutions account for about 1.5%, while wealth managers, other than insurance companies and pension funds, extend around 1% of total consumer credit. Overall, our evidence suggests that a variety of nonbanks are important in consumer credit markets while the distribution of nonbank lenders in the corporate credit market is more concentrated around specialized finance companies.

We provide additional descriptive evidence on nonbank lenders in Denmark in Ap-

pendix A. In particular, we document to which industries banks and nonbanks lend to most, as well as how the uptake of nonbank debt in corporate and consumer credit markets varies across regions in Denmark.

Table 1 provides summary statistics of our data and answers two questions. First, we ask: how do borrowers at nonbanks differ from those at traditional banks? Second, we ask: how do the firms and households who borrow from both banks and nonbanks differ from the overall sample in our data? The second question is motivated by our identification strategy as it relies on borrowers that have credit arrangements with both types of lenders.

Panel A of Table 1 answers the first question for corporate borrowers by illustrating observable characteristics of all firms in our dataset, as well as for firms according to their main type of lender. Here we classify borrowers as nonbank borrowers if nonbanks hold more than 50% of the borrowers' outstanding loan volume in a given year. Similarly, bank borrowers are those borrowers who owe at least 50% of their outstanding credit to banks.

Panel A of Table 1 highlights that the full dataset features nearly 1.9m observations at the borrower-lender-year level, the large majority of which correspond to firms mostly financed with bank debt. Firms borrowing mostly from nonbanks tend to have larger balance sheets (measured in total assets) but fewer employees. Firms in the full sample are vastly heterogenous: while the average balance sheet size is 134m DKK (approx. 21m USD), the median balance sheet size is only 5m DKK (approx. 0.8m USD). Nonbank borrowers have on average twice the amount of debt outstanding than bank borrowers (6m vs 3.1m DKK), and the average interest rate paid by nonbank borrowers is less than half that of bank borrowers (5% vs 12%). While the median firm in the economy has no nonbank debt, the share of nonbank debt in total debt among nonbank borrowers is 92%.

Panel B of Table 1 presents the same descriptive statistics for the subsample of bor-

	All firms			Nonbank borrowers			Bank borrowers		
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median
Panel A. Full dataset									
Total assets (m DKK)	134.31	2,661.45	5.44	162.32	4,401.73	4.66	133.27	2,574.31	5.47
Total debt (m DKK)	3.20	48.81	0.06	6.01	173.76	0.12	3.10	37.02	0.05
Interest rate	0.11	0.34	0.05	0.05	0.12	0.04	0.12	0.35	0.05
Nonbank debt share	0.04	0.17	0.00	0.92	0.15	1.00	0.00	0.04	0.00
FTE employees	76.37	843.78	3.00	28.11	274.03	3.00	78.12	857.35	3.00
Firm age (Years)	14.87	15.22	10.00	15.81	18.84	10.00	14.83	15.08	10.00
No. of lenders	2.23	1.62	2.00	2.38	1.32	2.00	2.22	1.63	2.00
No. of nonbank lenders	0.26	0.56	0.00	1.29	0.62	1.00	0.22	0.52	0.00
Debt to equity ratio	5.29	70.13	2.01	5.99	192.06	1.99	5.26	60.90	2.01
N	1,888,881			66,308			1,822,573		
Panel B. Firms with bank & nonbank lenders									
Total assets (m DKK)	299.40	4,403.78	13.23	326.73	7,111.51	7.56	297.78	4,189.00	13.66
Total debt (m DKK)	8.02	96.54	0.15	11.93	282.33	0.19	7.79	72.24	0.15
Interest rate	0.12	0.37	0.05	0.06	0.11	0.04	0.13	0.38	0.05
Nonbank debt share	0.06	0.20	0.00	0.85	0.17	0.94	0.01	0.06	0.00
FTE employees	146.60	1,160.96	8.00	48.25	356.40	6.00	152.33	1,190.94	8.45
Firm age (Years)	18.64	15.76	15.00	16.04	15.49	12.00	18.79	15.76	15.00
No. of lenders	3.32	1.92	3.00	3.15	1.37	3.00	3.33	1.94	3.00
No. of nonbank lenders	0.60	0.75	0.00	1.53	0.77	1.00	0.55	0.71	0.00
Debt to equity ratio	5.75	44.22	2.12	5.81	33.10	2.14	5.74	44.78	2.12
N	370,977			20,421			350,556		

Table 1: Descriptives of corporate borrowers

This table provides descriptive statistics of firm characteristics borrowing in the Danish corporate credit market between 2003-2018. Nonbank borrowers are firms who, in a given year, receive at least 50% of their credit from nonbanks. Similarly, bank borrowers are mainly financed by banks. Statistics in Panel A include all firms in the baseline sample as described in Section 2. Panel B focuses on those firms who, in a given year, receive credit from at least one bank and one nonbank.

	All households			Nonbank borrowers			Bank borrowers		
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median
Panel A. Full dataset									
Total debt (thsd DKK)	132.11	1,062.04	6.90	62.81	1,066.30	16.44	137.38	1,061.53	6.02
Nonbank debt share	0.08	0.23	0.00	0.85	0.21	0.93	0.02	0.08	0.00
Interest rate	0.09	0.11	0.06	0.09	0.10	0.06	0.09	0.11	0.06
No. of lenders	3.29	2.41	3.00	4.07	2.75	3.00	3.23	2.37	3.00
No. of nonbank lenders	0.93	1.30	0.00	2.22	1.57	2.00	0.83	1.22	0.00
Disp. income (thsd DKK)	365.93	615.17	318.10	316.68	301.79	268.83	369.67	632.51	322.34
Age of oldest adult	47.78	14.85	47.00	49.01	14.38	49.00	47.69	14.88	47.00
Recently unemployed	0.09	0.28	0.00	0.09	0.29	0.00	0.09	0.28	0.00
N	72,815,493			5,142,829			67,672,664		
Panel B. Households with bank & nonbank lenders									
Total debt (thsd DKK)	170.65	1,464.54	23.00	72.20	1,212.21	24.91	181.44	1,489.20	22.68
Nonbank debt share	0.12	0.25	0.00	0.79	0.20	0.80	0.04	0.11	0.00
Interest rate	0.10	0.11	0.08	0.10	0.10	0.07	0.10	0.11	0.08
No. of lenders	4.40	2.52	4.00	4.90	2.75	4.00	4.35	2.49	4.00
No. of nonbank lenders	1.51	1.39	1.00	2.59	1.57	2.00	1.39	1.32	1.00
Disp. income (thsd DKK)	399.71	609.32	358.03	334.03	309.31	290.17	406.91	633.21	365.45
Age of oldest adult	48.65	12.51	49.00	50.45	12.63	51.00	48.45	12.48	48.00
Recently unemployed	0.10	0.30	0.00	0.11	0.31	0.00	0.10	0.30	0.00
N	20,291,278			2,004,404			18,286,874		

Table 2: Descriptives of household borrowers

This table provides descriptive statistics of household characteristics borrowing in the Danish consumer credit market between 2003-2018. Nonbank borrowers are households who, in a given year, receive at least 50% of their credit from nonbanks. Similarly, bank borrowers are mainly financed by banks. Statistics in Panel A include all households in the baseline sample as described in Section 2. Panel B focuses on those households who, in a given year, receive credit from at least one bank and nonbank. Disposable income ("disp. inc.") is measured as income after tax and interest payments. Recently unemployed stands for the share of households that have had a member unemployed during the previous 24 months.

rowers with simultaneous relationships with banks and nonbanks, which reduces our sample size by 80%. However, the proportion of nonbank and bank borrowers in our final sample remains largely unchanged. Comparing Panels A and B in Table 1 shows that firms in our final sample are nearly twice as large as the firms in the full dataset, both in terms of balance sheet size and employment. In line with this result they have more outstanding debt, are older and slightly less liquid. These differences are in line with the results by Degryse et al. (2019) who compare firms with single vs multiple lenders in Belgium. Importantly, the evidence presented in this table suggests that firms that borrow primarily from nonbanks are not necessarily riskier compared to bank-financed firms judging based on small difference in the debt-to-equity ratio across the two groups of firms.

Table 2 provides summary statistics of our sample in the consumer credit market. More than 70 million observations show that, compared to bank borrowers, households borrowing mainly from nonbanks have less than half the amount of unsecured debt. The average share of nonbank debt in total debt is 8%, although the median household does not hold any nonbank debt. On average, households have 3 different lenders in a given year, of which 1 is a nonbank. While the disposable income of nonbank borrowers is 14% lower compared to bank borrowers, the two types of households do not differ in their propensity to have been unemployed over the two years prior to the one we observe their loan for.

Panel B of Table 2 provides descriptive evidence on the sample of households with at least one bank and nonbank lender, which, despite a decrease in sample size by 72%, leaves us with 20 million household-lender-year observations. Compared to corporate borrowers, we find little differences between households in our full dataset and those with multiple lender types. Borrowers from multiple lenders have more unsecured debt outstanding and higher disposable income but show few other differences in terms of reliance on nonbank debt, interest rates, age and unemployment history.

3 Empirical strategy and identification

The aim of our empirical analysis is to estimate how monetary policy differentially affects the lending decisions of nonbanks relative to banks. We begin by discussing the challenges to the identification of monetary policy transmission on credit supply. Subsequently, we present the empirical specification that we use to estimate the effects of monetary policy shocks on nonbanks' and banks' lending decisions.

Analyzing the transmission of monetary policy through banks faces several challenges. Policy rate changes may be anticipated by market participants and/or driven by local lending conditions, giving rise to endogeneity concerns. Moreover, identifying the effect of monetary policy on credit supply requires distinguishing credit supply from demand effects.

We deal with the first challenge, the endogeneity of monetary policy, by exploiting the design of the monetary policy rule in Denmark. For more than three decades, the Danish Krone has been pegged to the German Mark or the Euro and exchange rate stability is the overriding objective of monetary policy. The key advantage of the Danish institutional setting is that the currency peg introduces a highly transparent source of exogenous variation in monetary policy: Denmark adopts the monetary policy that is decided in Frankfurt with essentially no regard to the economic conditions in Denmark. Although there is some alignment between business cycles in Denmark and the Euro Area, the currency peg introduces a source of exogenous variation in Danish monetary policy that we will exploit in the empirical analysis.

A detailed discussion of our identification approach relying on the Danish currency peg can be found in Andersen et al. (2021). Jordà et al. (2020) present a similar identification approach and exploit the currency pegs of 17 advanced economies over more than a century to estimate the effect of monetary policy on real GDP growth. Moreover, the variation in monetary policy that we rely upon is also similar to the one used in Jiménez et al. (2012), who study the transmission of monetary policy in Spain by ex-

ploiting that the monetary policy decisions made jointly by the members of the Euro Area are exogenous to the economic conditions in Spain. Similarly, Ioannidou et al. (2015) use the U.S. federal funds rate as an exogenous instrument for Bolivian interest rates to study how monetary policy affects risk-taking and pricing of loans by Bolivian banks.

To tackle the second identification challenge, separating credit supply from demand, we include granular borrower controls to capture borrowers' credit demand in our regressions. In particular, we include borrower-year fixed effects to control for unobservable borrower and loan characteristics as in Khwaja and Mian (2008). We also include lender fixed effects to account for time-invariant lender characteristics such as their business model. Our fixed effect specification thus compares lending terms to borrowers who, in a given year after a monetary policy shock, receive credit from at least one bank and nonbank. The identification assumption is that when different lenders grant a loan to the same borrower, any differences in lending decisions are due to supply (i.e., lender characteristics) rather than demand.

Degryse et al. (2019) discuss a potential drawback of identification strategies that are based on borrower-year fixed effects: if the majority of borrowers receive credit from only one type of lender, focusing on multiple-lender-type borrowers may imply that our estimates fail to capture the representative response to monetary policy shocks in credit markets. Tables 1 and 2 showed that this concern is especially valid in the corporate credit market, where firms have on average 2.2 lenders but only 0.26 nonbank lenders, but less so in consumer credit markets since households have on average 3.29 total lenders and 0.93 nonbank lenders. We take this concern seriously, especially because of the differences we document between single-lender-type borrowers and those with multiple lender types.

Therefore, we compare our baseline results to an alternative specification in which we include borrowers with a single lender type. To do so, we replace borrower-time fixed effects with industry-location-size-time (ILST) fixed effects as a time-varying de-

mand control. The industry bins are based on two-digit NACE classification codes; location bins are based on Denmark's 100 municipality codes and the size bins are based on deciles of total assets of the firms. In our analysis of consumer credit markets, our analog to the ILST are location-income-leverage-time fixed effects, where both income and leverage bins are based on the deciles of households' income and total leverage.

3.1 Specification

Bank-lending channel. We begin our analysis by testing an empirical model that aims to answer our first question: does monetary policy tightening change the composition of credit supply by shifting loans from banks to nonbanks? In particular, we study the reaction of the log debt volume and interest rates at the borrower-lender level to monetary policy shocks that occurred in the previous period.

Our preferred specification takes the following form:

$$\begin{aligned} y_{b,l,t} = \alpha_{b,t} + \delta_l + \beta(\text{Nonbank}_l \text{ x MP Shock}_{t-1}) \\ +\theta(\text{Nonbank}_l \text{ x Macro Controls}_{t-1}) + \varepsilon_{b,l,t} \end{aligned} \tag{2}$$

where the dependent variable $y_{b,l,t}$ is either the logarithm of the loan amount or the effective interest rate paid by borrower b to lender l in year t. $Nonbank_l$ is a dummy variable indicating non-bank lenders and $MP\ Shock_{t-1}$ contains the series of lagged monetary policy shocks. We include interactions of the nonbank dummy variable with four macroeconomic controls to account for macroeconomic conditions in Denmark (GDP growth, one quarter ahead GDP forecast, and CPI inflation), as well as stock market uncertainty (VIX). $\alpha_{b,t}$ are borrower-year fixed effects that control for unobservable credit demand in the spirit of Khwaja and Mian (2008). δ_l are lender fixed effects to account for unobservable lender characteristics such as differences in business models. Reported standard errors in all of our specifications are clustered at the borrower-lender level.

The main coefficient of interest is β, the coefficient on the interaction of the nonbank dummy with the lagged monetary policy shock. A positive β means that, after an unexpected monetary tightening, nonbanks increase their lending share relative to traditional banks. When studying interest rates as the outcome variable in specification (2), a positive beta coefficient implies that the interest rate on nonbank loans increases relatively more compared to banks after a monetary tightening.

In Appendix I we additionally report a series of robustness tests in which we vary different aspects of our preferred specification in equation (2). First, we vary the granularity of our fixed effects. For example, we alternatively include borrower-lender fixed effects to account for borrower-lender specific match characteristics such as geographical distance and relationship lending (Petersen and Rajan, 1995). As discussed above, we also test ILST fixed effects to expand our sample to include borrowers who borrow only from a single lender type. Second, we show that our results are robust to various ways of clustering the standard errors. Lastly, we show that our results are robust to alternative measures of monetary policy shocks.

Risk-lending channel. We then move to our second question: does the change in the composition of supply of credit following a tightening lead to more risky borrowing? To explore whether the effects are more pronounced for risky borrowers, we run separate regressions in which we include a triple interaction term:

$$y_{b,l,t} = \alpha_{b,t} + \delta_l + \beta(\text{Nonbank}_l \text{ x MP Shock}_{t-1}) + \theta(\text{Nonbank}_l \text{ x Macro Controls}_{t-1}) + \gamma(\text{Nonbank}_l \text{ x MP Shock}_{t-1} \text{ x Borrower Risk}_{b,t}) + \varepsilon_{b,l,t} \quad (3)$$

where *Borrower Risk*$_{b,t}$ is a measure of borrower riskiness. In the case of corporate borrowers, we use leverage, sales, and the ratio of cash to short-term debt as proxies for firm riskiness. The dummy variable, *Borrower Risk*$_{b,t}$, takes the value of 1 if: (i) the firms' leverage ratio is above the median ratio in a given year, and (ii) the sales are higher than median sales, and (iii) the cash ratio is above the median ratio. In the case of households, we construct our riskiness measures using information on household

leverage (debt-to-assets), disposable income, and unemployment status over the last two years. More specifically, our triple interaction term is based on a dummy variable, *Borrower Risk*$_{b,t}$, that takes the value of 1 if: (i) the households' debt-to-assets ratio is above the median ratio, (ii) the households' disposable income is higher than median income, and (iii) the likelihood that a household member was unemployed for at least 6 out of the last 24 months is above the median.

Borrower-level effects. Lastly, we provide an answer to our third question: what are the firm-level and household-level implications of changes in monetary policy in the presence of nonbanks? To answer this question, we aggregate all loans to a given firm or household in a year. We focus in particular on effects on financial variables such as total debt and real variables such as investment and consumption.

We start by estimating the implications on credit supply through the lens of the following model:

$$\log(y_{b,t}) = \alpha_b + \beta \text{MP Shock}_{t-1} + \theta \text{Macro Controls}_{t-1} + \varepsilon_{b,t}, \tag{4}$$

where $y_{b,t}$ is a measure of borrower-level credit. We use aggregate total firm/household credit, as well as total bank credit and total nonbank credit at the borrower-year level as our dependent variables in this regression. α_b is a borrower fixed effect, MP Shock$_{t-1}$ is the lagged, cumulative sum of JK monetary policy shocks in a given year and Macro Controls$_{t-1}$ is a vector of controls for macroeconomic conditions in Denmark (GDP growth, one quarter ahead GDP forecast, and CPI inflation), as well as stock market uncertainty (VIX). We cluster errors at the borrower level.[7]

We next study the real effects of monetary policy, by running the following regres-

[7]Since the estimation results for this model are obtained using borrower fixed effects, we focus only on borrowers who appear in at least two consecutive years in our sample. We show in the Appendix I.III that we obtain qualitatively similar results when using industry fixed effects instead, in order to include one-period borrowers.

sion at the borrower-year level:

$$\log(y_{b,t}) = \alpha_b + \beta(\text{Nonbank borrower}_{b,t-1} \text{ x MP Shock}_{t-1}) + \gamma\text{MP Shock}_{t-1} + \theta(\text{Nonbank borrower}_{b,t-1} \text{ x Macro Controls}_{t-1}) + \varepsilon_{b,t}, \tag{5}$$

where *Nonbank borrower*$_{b,t-1}$ takes the value of one if the firm/household b borrows more than 50% of their unsecured debt from a nonbank in the previous year, $t-1$. α_b is a borrower specific fixed effect. We also add to the model the set of macro controls that we described in Equation 2. The dependent variable, $y_{b,t}$, represents our measure of real effects. In the case of firms, the dependent variables are the firms': (i) total assets, (ii) investment, (iii) operating profits, and (iv) wage bill. In the case of households, we focus on the following dependent variables: (i) disposable income, (ii) consumption, (iii) market value of real estate, (iv) market value of new cars, and (v) market value of total assets.

We provide additional robustness tests in Appendix I, where we discuss how our results change when when we include additional borrower-level characteristics as controls in equation 5, as well as when we modify our *Nonbank borrower*$_{b,t-1}$ dummy to take the value of one if the borrower had any relationship with a nonbank in the previous period, regardless of the amount of credit they received.

4 Results

In this section we present our results based on the regression models discussed in Section 3. We first test if nonbanks expand their lending relative to banks after a monetary policy shock. Then, we analyze if nonbanks channel their credit supply to ex-ante riskier borrowers. We conclude by testing how nonbank lenders affect the transmission of monetary policy to real outcomes, such as household consumption and firm investment, as well as financial variables such as total debt.

4.1 The bank lending channel in the presence of nonbanks

Our main regression results for the effect of monetary policy shocks on nonbank lending in corporate and consumer credit markets, respectively, are presented in Tables 3 and 4. We alter the composition of our fixed effects across columns to ensure that our results are not affected by the choice of fixed effects. Results in column (1) are based on a specification with lender and year fixed effects. Column (2) instead features lender-borrower fixed effects to account for factors such as relationship lending that are specific to each lender-borrower pair, to which we add year fixed effects in column (3). Column (4) presents our preferred specification with borrower-year and lender fixed effects, with which we study lending decisions by nonbanks and banks to the same borrower in the same year. Finally, column (5) replaces borrower-year fixed effects with industry-location-size-time (ILST) fixed effects to include borrowers with a single lender-type (Degryse et al., 2019). The effects of monetary policy shocks on the quantity and price of credit are summarized in Panel A and Panel B, respectively.

We first discuss our results for the corporate credit market which are summarized in Table 3. We find that a one standard deviation increase of monetary policy rates increases the nonbank debt share significantly by about 4% based on our preferred specification in column (4) of Panel A. We obtain similar estimates when we vary the specification of our fixed effects in columns (1) to (3). Our results are also significant at the 5% level and the coefficient is halved when we use the less conservative specification in column (5), which is based on the sample that also includes borrowers with a single lender-type. The results in Panel B suggest that a one standard deviation increase of the monetary policy measure reduces the interest rate charged by nonbanks relative to the one charged by banks by about 40 basis points. Overall, the evidence in Table 3 suggests that nonbanks increase their market share in the corporate credit market significantly and charge relatively lower rates in response to a tightening of monetary policy.

Table 4 presents the results of our analysis of consumer credit. In our preferred

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	4.84***	4.98***	2.94***	4.09***	1.85**
	(0.73)	(0.55)	(0.59)	(1.51)	(0.94)
Observations	910,364	829,574	829,574	275,516	642,213
R2	0.19	0.80	0.80	0.65	0.40
B. Outcome var: Interest rate					
Nonbank x MP Shock	-0.004***	-0.004***	-0.002***	-0.004**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	1,119,945	1,026,918	1,026,918	380,162	782,823
R2	0.02	0.50	0.50	0.46	0.14
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes
Year FE	Yes		Yes		
Lender FE	Yes			Yes	Yes
Lender-Borrower FE		Yes	Yes		
Borrower-Year FE				Yes	
ILST FE					Yes

Table 3: Changes in nonbank lending to corporate borrowers

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *ILST* denotes industry-location-size-time fixed effects as described in Section 3. Standard errors (in parentheses) are clustered at the borrower-lender level. Panel A reports transformed coefficients that indicate the percentage change in the nonbank lending share in response to a 1 standard deviation increase of the monetary policy measure.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	7.26***	0.04	3.99***	5.77***	6.18***
	(0.08)	(0.05)	(0.07)	(0.12)	(0.08)
Observations	29,209,158	26,260,549	26,260,549	16,171,885	28,730,149
R2	0.18	0.79	0.79	0.54	0.26
B. Outcome var: Interest rate					
Nonbank x MP Shock	0.001***	0.002***	0.002***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	33,928,411	30,696,815	30,696,815	20,285,707	33,412,275
R2	0.10	0.59	0.59	0.50	0.12
Macro Var. Interactions	Yes	Yes	Yes	Yes	
Year FE	Yes		Yes		
Lender FE	Yes			Yes	Yes
Lender-Borrower FE		Yes	Yes		
Borrower-Year FE				Yes	
ILST FE					Yes

Table 4: Changes in nonbank lending to household borrowers

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *ILST* denotes location-income-leverage-time fixed effects as described in Section 3. Standard errors (in parentheses) are clustered at the borrower-lender level. Panel A reports transformed coefficients that indicate the percentage change in the nonbank lending share in response to a 1 standard deviation increase of the monetary policy measure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

specification in column (4), a one standard deviation increase of monetary policy rates increases the share of nonbanks in the consumer credit market significantly by about 6%. Column (5) shows that this result is robust to including households with a single lender-type by creating household-types based on their location, income and time period. The results in Panel B document that nonbank credit becomes relatively more expensive for households after a surprise tightening of monetary policy. We find that a one standard deviation increase of the monetary policy measure increases the interest rate charged by nonbanks relative to the one charged by banks by about 30 basis points, reinforcing the pass-through of higher policy rates into consumer rates. Hence, nonbanks increase their market share among consumers despite charging them relatively higher rates.

Having shown that nonbanks increase their share in credit supply after a monetary tightening, we provide suggestive evidence for why they may be able to so in Appendix B. In particular, we study how lenders' liabilities react to monetary policy shocks by augmenting our dataset with data on lenders' balance sheets. Our results suggest that nonbanks grow their long-term debt and equity in response to monetary policy shocks while banks' liabilities do not change significantly. The increase in funding may be the reason for nonbanks' expansion in credit markets after a monetary tightening, similar to evidence from the US presented by Xiao (2020).

We also test two alternative hypotheses which may explain why, after a monetary contraction, nonbank credit becomes cheaper relative to bank credit for corporate customers, but more expensive for households.[8] The first hypothesis centers around relationship lending: nonbanks may try to capitalize on the reduction in bank credit supply by offering relatively cheap credit to corporate borrowers in the hope of establishing or strengthening lending relationships. Households, on the other hand, may be viewed as less steady customers, who obtain nonbank credit mainly to finance one-off

[8] In tables II.1 and II.2 of the online appendix, we show that our results on the relative price of credit for nonbanks also hold when we study the average interest rates at the borrower-level for banks and nonbanks separately. We find that average rates paid by corporate borrowers to nonbanks decrease after a monetary policy tightening, while those paid by households increase.

expenses like a new TV or home repairs. We show in Appendix A.1 that this hypothesis is not supported by our data. We do not find evidence suggesting that lending relationships with corporate borrowers are on average of longer duration than lending relationships with households.

The second hypothesis we explore centers around sample selection: we may find nonbanks' reaction to policy rate changes to be different across corporate and consumer credit markets because the set of nonbank lenders differs across these markets. To test this assumption, we re-estimate our regression models for each market keeping only the nonbanks that are active lenders in both markets. Tables C.6 and C.7 show that our baseline estimates remain largely unchanged when we focus on this narrower sample of nonbanks, which implies that differences in nonbank types across the two credit markets do not drive our results.

Robustness. In Appendix I.I, we report two additional sets of robustness tests to our preferred specification with borrower-year and lender fixed effects. First, we replace our measure of monetary policy shocks by Jarociński and Karadi (2020), which disentangles information effects conveyed by ECB announcements from "pure" monetary policy shocks, with alternative measures based on high frequency movements of financial product prices around ECB announcements. We use the Jarociński and Karadi (2020) measure based on movements in 3-month Eonia interest rate swaps as well as measures based on Overnight Index Swaps (OIS) with varying maturities by Altavilla et al. (2019). The results from our estimation with these shock series in corporate and consumer credit markets are presented in Tables II.3 and II.4, respectively. The results are robust to using any alternative monetary policy shock measure based on movements of financial instruments with relatively short maturity (up to one year). Interestingly, however, shocks to the long end of the yield curve seem to have the opposite effect on nonbank lending. In particular, a monetary tightening identified by movements in 10 year German government bonds or OIS with a 10 year maturity leads to a decrease in the share of nonbank credit supply and an increase in the relative price

of nonbank credit. Furthermore, in Tables II.5 and II.6 we report our estimation results when clustering standard errors at various levels. We find that the significance of our results is mostly not affected by these alternative clustering approaches.
The expansion of the nonbank share in credit supply after a monetary tightening motivates our next question regarding the riskiness of nonbank lending.

4.2 Risk-taking channel of monetary policy

In this subsection we study if nonbanks increase their market shares in corporate and consumer credit by shifting credit supply to ex-ante riskier borrowers. Our results are based on estimating equation (3), in which we add a triple interaction term between our monetary policy shock measure, the indicator for nonbank lenders, and various proxies for borrower riskiness.

Table 5 shows that neither the quantity nor price of nonbank credit changes significantly, relative to bank credit, among firms who appear more risky ex-ante based on their leverage (columns 1 & 2) or sales (columns 3 & 4). None of the coefficients on the triple interaction effects are statistically significant. Firms with above median sales are the exception, as nonbanks charge them significantly lower interest rates compared to banks after a monetary tightening, but the size of the coefficient appears economically insignificant. We also explore firms' history of delinquency as a proxy of riskiness. To this end, we construct for each firm a dummy that equals one if the firm has been delinquent on any of its loans in the previous year. We find no evidence that nonbank lending to firms with a history of delinquency differs from bank lending to those firms, as indicated by columns (5) and (6) in Table 5.

In contrast, the results in Table 6 suggest that nonbanks direct their increased share of credit supply after a monetary tightening to households who ex-ante may be perceived as less risky.[9] Column (1) shows that the increase in the nonbank debt share

[9]Since the econometric specification is linear our results are symmetric for positive and negative monetary policy shocks. Consequently, our results imply that nonbanks reduce their share in credit supply but lend more to riskier households after an unexpected loosening of monetary policy.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	0.51	-0.00	1.23	-0.00	3.68**	-0.00**
	(1.72)	(0.00)	(1.65)	(0.00)	(1.45)	(0.00)
Triple - Leverage	-2.25	-0.00				
	(2.59)	(0.00)				
Triple - Sales			-3.60	-0.01**		
			(2.50)	(0.00)		
Triple - Past delinquency					-2.12	-0.00
					(10.07)	(0.01)
Observations	230,349	309,780	281,161	379,426	281,161	379,426
R2	0.66	0.46	0.65	0.46	0.65	0.46
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Risk-taking channel of monetary policy in corporate credit markets

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, ii) total sales. We also consider an indicator variable for riskiness that is based on past delinquencies for each borrower. That variable takes the value of one if the borrower was delinquent in the previous year of observation and zero otherwise. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	5.85***	0.000	3.60***	0.004***	6.17***	0.003***
	(0.17)	(0.000)	(0.14)	(0.000)	(0.13)	(0.000)
Triple - Leverage	-1.47***	0.000				
	(0.21)	(0.000)				
Triple - Income			2.92***	-0.003***		
			(0.23)	(0.000)		
Triple - Unemployment					-0.27	-0.002***
					(0.41)	(0.000)
Observations	14,944,449	18,689,780	16,170,775	20,284,312	16,171,885	20,285,707
R2	0.54	0.51	0.54	0.51	0.54	0.50
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Risk-taking channel of monetary policy in consumer credit markets

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether: i) the household is above the median of the debt-to-assets ratio distribution in a given year, ii) the households' disposable income is above the cross-sectional median in a given year, or iii) above the median probability of having been unemployed for at least 6 months in the last 2 years. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

is about 1.5% smaller for households with leverage above the median, and similar results obtain for households with above-median disposable incomes in column (3). Column (5) suggests that households unemployment status over the last 2 years does not seem to differentially affect nonbanks' lending decisions. Lastly, columns (2), (4), and (6) show that neither measure of borrower risk is associated with a statistically or economically significant difference between the price of nonbank vs bank credit.

Summing up, our results suggest that the growing share of nonbank debt in reaction to higher policy rates does not result in these intermediaries lending to riskier borrowers compared to banks. Instead, we find that in consumer credit markets nonbanks expand their market share especially among less risky clients. Our results on risk-taking differ from earlier evidence reported in the literature based on US data. More specifically, Elliott et al. (2021) find that nonbanks increase their credit supply relative to banks by lending more to riskier borrowers. We argue that two factors are likely driving our qualitatively different results: first, while Elliott et al. (2021) study the subset of households borrowing in the mortgage and car loan markets and a subset of larger firms borrowing in the syndicated loan market, our sample includes all firms and households borrowing irrespective of the motive, size or financial instrument. Therefore, our estimates are less prone to suffer from sample selection biases.

Furthermore, our data is based on unsecured credit, whereas Elliott et al. (2021) is based on loans that are mostly backed by collateral (e.g., mortgage loans). The existence of collateral reduces the risk associated with lending and could induce lenders to engage in riskier lending, as loss given default is lower for such loans compared to unsecured credit. Berger et al. (2011) provides evidence for this argument by showing that secured loans are twice as likely to have repayment problems compared to unsecured loans. Hence, we view our evidence on the lack of nonbank risk taking as complementary to the one in Elliott et al. (2021), because we study risk taking in the so far less explored market for unsecured credit.

Robustness. We provide several robustness tests of our results on nonbank risk

taking in Appendix I.II. First, we show that our results do not mask heterogeneity across nonbank lender types: we document in Tables II.7 to II.12 that different nonbank industries react similarly in terms of risk taking to changes in monetary policy. We focus on the three largest nonbank lender industries in each credit market and re-estimate risk taking regressions by focusing on one nonbank industry at a time. Our results remain largely unchanged irrespective of what nonbank lender industry we narrow our sample to. Tables II.13 and II.14 show that our results are robust to replacing borrower-time fixed effects in our regressions with industry-location-size time fixed effects (ILST) for firms and location-income-leverage-time fixed effects for households.

4.3 Borrower-level effects of monetary policy

In this section we first analyze the overall strength of the substitution of lending from banks to nonbanks in response to monetary policy shocks and subsequently document the real effects of these shocks in the presence of nonbanks.

4.3.1 Nonbanks and the financial effects of monetary policy

Having shown in section 4.1 that nonbanks increase their lending *relative* to banks after an unexpected monetary tightening, we now investigate absolute changes in various measures of credit at the borrower-level. To this end we aggregate our borrower-lender-year data up to the borrower-year level and estimate equation (4). Table 7 presents our analysis of corporate borrowers. The dependent variable in column (1) is total debt as reported in the balance sheets of firms, which includes both secured and unsecured debt. We find that a one standard deviation increase of the monetary policy measure decreases total debt at the firm-level by 1.66%. Column (2) shows that a monetary policy tightening leads to a drop in unsecured credit, but the effect is insignificant at the 10% level. Columns (3) and (4) study the effect on total bank and nonbank credit at the firm-level respectively. Our results in these columns suggest that bank

	(1) Debt	(2) Credit	(3) Bank Credit	(4) Nonbank Credit	(5) B Credit Pure	(6) Nb Credit Pure
MP Shock	-1.66***	-0.05	-0.23	6.92***	-0.71**	3.41***
	(0.11)	(0.26)	(0.27)	(0.71)	(0.29)	(0.99)
Observations	663,349	692,464	666,066	77,278	606,986	20,891
R2	0.86	0.71	0.71	0.82	0.72	0.92
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Financial effects of monetary policy: Firms

Data is collapsed at firm-year level. Outcome variables are in logs. *Debt* is computed as Total Assets - Equity from the balance sheet data, *Credit* is total unsecured debt. In columns (3) and (4) we separate our sample of borrowers based on whether the unsecured credit comes from banks or from nonbanks. Columns (5) and (6) re-estimate columns (3) and (4) using only those firms who exclusively borrow from banks and nonbanks (that is, those with a nonbank debt share equal to 0 or 1). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

credit does not react in a significant way to changes in monetary policy, while nonbank credit increases significantly by about 7%. Firms' reduction of total debt (column 1) suggests that the substitution away from bank towards nonbank credit in response to monetary policy shocks is incomplete.[10]

In columns (5) and (6) we restrict our samples to firms that obtain credit solely from either banks or nonbanks. Among these firms, we find a significant decrease in unsecured credit among bank-dependent borrowers (column 5), and a significant increase among nonbank borrowers (column 6). These results suggest that the effects of monetary policy on credit supply seem to be stronger among borrowers that are unwilling, or unable, to obtain credit from alternative lender types.[11]

Table 8 presents the results of our analysis of financial outcomes at the household-level. In column (1), we use the detailed information from the tax registry on total

[10]In Table II.17 in Appendix I.III we show that firms that borrow mainly from nonbanks are particularly sensitive to the evolution of monetary policy shocks. Re-estimating the regressions underlying columns (1)-(4) in Table 7 using only firms who mainly borrow from nonbanks shows that, after a monetary tightening, these firms significantly decrease their their overall level of unsecured credit, substituting loans provided by banks with loans provided by nonbanks.

[11]Most Danish firms do not rely on the corporate bond market for their financing needs, but rather obtain funding through loans from banks and nonbanks. Hence, we view our results on the financial effects of monetary policy as capturing most of the response in firms' liabilities.

	(1) Debt	(2) Credit	(3) Bank Credit	(4) Nonbank Credit
MP Shock	-3.11***	-5.11***	-5.52***	3.94***
	(0.02)	(0.04)	(0.04)	(0.06)
Observations	22,955,365	21,141,615	18,375,312	6,385,964
R2	0.83	0.69	0.67	0.69
Macro Controls	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes

Table 8: Financial effects of monetary policy: Households

Data is collapsed at household-year level. All outcome variables are in logs. *Debt* is total liabilities at the household level recorded in the wealth data. *Credit* is total unsecured debt from our loan-level data. Columns (3) and (4) split the unsecured credit based on whether it was obtained from a bank or a nonbank respectively. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

liabilities, including secured and unsecured credit, at the household level as our dependent variable. We find that a one standard deviation increase in the monetary policy measure decreases total debt by 3.11%, while unsecured credit (column (2)) decreases by about 5%. Column (3) shows that banks are driving the drop in unsecured credit, since column (4) illustrates a strong increase in nonbank credit supply of about 4%. Similar to our results on corporate borrowers, the increase in nonbank credit is insufficient to fully offset the reduction of household-level debt induced by the fall in bank lending.

To sum up, we find that when monetary policy is tightened, total bank lending to firms does not react significantly while bank lending to consumers decreases substantially. These results are consistent with the classic bank lending channel of monetary policy. Nonbanks, on the other hand, increase their lending in both credit markets but are unable to fully neutralize the effects of monetary policy on total borrower-level credit. We also show that the financial effects of monetary policy are somewhat stronger for households than for firms which is likely due the fact that households borrow more from nonbanks than firms, as described in section 2.2.

Robustness. Note that these results are based on our empirical specification with borrower fixed effects, which focuses on borrowers who appear in at least two consec-

	(1) Tot. Assets	(2) Investment	(3) Oper. Profit	(4) Wage Bill
MP Shock	-3.66***	-3.95***	-5.84***	-2.50***
	(0.10)	(0.20)	(0.15)	(0.08)
Nonbank relation x MP Shock	1.64***	7.30***	4.74***	0.81**
	(0.50)	(1.06)	(0.80)	(0.38)
Observations	486,830	350,364	404,948	379,772
R2	0.87	0.70	0.76	0.92
Macro Control Interactions	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes

Table 9: Real effects of monetary policy in corporate credit markets

Data is collapsed at firm-year level. All outcome variables are in logs. *Nonbank borrower* is a dummy equal to 1 if more than 50% of the firms' debt in the previous year came from nonbanks.

utive periods in our sample. In Tables II.15 and II.16 in Appendix I.III we show that our results are robust to the inclusion of one-time borrowers, which we achieve by replacing borrower fixed effects with industry fixed effects for firms and municipality fixed effects for households. In fact, we obtain even larger estimates when including one-time borrowers in our estimation.

4.3.2 Nonbanks and the real effects of monetary policy

In the previous sections, we documented that monetary policy shocks induce borrowers to (partially) substitute bank credit with nonbank credit. Next, we investigate if borrowers with pre-existing nonbank relationships are able to capitalize on these relationships by taking on more nonbank credit after a monetary tightening and channeling these funds to real economic activities such as investment and consumption. To answer this question, we examine the impact of monetary policy shocks on various real outcomes at the borrower-year level using the specification in equation (5).

Table 9 summarizes our results when studying firm-level outcomes. As expected, we find that an unexpected tightening of monetary policy leads to a significant decrease in firms' total assets (column 1), investment (column 2), operating profit (column 3), and total wage bill (column 4). However, pre-existing nonbank relationships

	(1) Disp. Income	(2) Consumption	(3) MV RE	(4) MV New Cars	(5) MV Total Assets
MP Shock	-2.05***	-2.52***	-6.02***	-1.45***	-6.81***
	(0.01)	(0.01)	(0.01)	(0.16)	(0.02)
Nonbank borrower x MP Shock	0.23***	0.94***	-0.08**	6.22***	1.21***
	(0.02)	(0.04)	(0.04)	(0.62)	(0.09)
Observations	24,302,612	23,232,087	14,850,076	131,562	24,096,429
R2	0.84	0.59	0.90	0.60	0.89
Macro Control Interactions	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes

Table 10: Real effects of monetary policy in consumer credit markets

Data is collapsed at family-year level. All outcome variables are in logs. *Nonbank borrower* is a dummy equal to 1 if more than 50% of the households' debt in the previous year came from nonbanks. MV stands for market value. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

help firms significantly in withstanding the rise in policy rates. In particular, a strong tie to nonbanks lowered firms' decline in total assets, operating profit, and their wage bill by between 40% and 80% (based on a comparison between the estimated coefficients on MP Shock$_{t-1}$ and the interaction of MP Shock$_{t-1}$ and the nonbank borrower dummy). Furthermore, corporate investment by these firms even increases by about 3% after a monetary contraction.

Table 10 illustrates our results on the real effects of monetary policy on households. An unexpected monetary tightening leads to a significant drop across various real outcomes among households relying mostly on bank credit: columns (1)-(6), respectively, document this effect on disposable income, consumption, and the market value of their real estate, new cars and total assets. Strong ties to nonbanks, however, insulate households from the adverse consequences of unexpected rate hikes. Households with strong ties to nonbanks experience significantly smaller declines of these real outcomes, but the effect is most notable on household consumption and especially on car purchases. Nonbank ties likely sustain car purchases as a large fraction of nonbanks in the consumer credit market are represented by leasing companies (see Figure 2).

Summing up, the evidence presented in this section shows that nonbanks nearly

eliminate the transmission of monetary policy to firms' real outcomes such as total assets, investments, profits and the wage bill. Nonbanks also seem to attenuate the real effects of monetary policy on household consumption and saving, albeit by a lesser extent. An exception is households' spending on new car purchases, which increase significantly for nonbank borrowers in response to a monetary policy tightening.

Robustness. In Tables II.18 and II.19 in Appendix I.III we show that our results remain robust to the additional inclusion of borrower-level controls. In addition, we repeat our estimation of the real effects of monetary policy with a variation of our indicator dummy for past nonbank exposure. In Tables II.20 and II.21 in Appendix I.III we classify borrowers as nonbank borrowers if they received any credit from nonbanks in the previous period, regardless of the credit amount (as opposed to the 50% threshold in our baseline results). This less strict definition of nonbank borrowers increases our estimated benefit of having a nonbank relationship when policy rates increase for nearly all of firms' and consumers' real outcomes.

5 Conclusion

We study how nonbank lenders affect the transmission of monetary policy using data on the universe of unsecured credit to Danish firms and households. We identify changes in monetary policy by exploiting exogenous variation in Danish policy rates due to the long-standing currency peg to the Euro, which effectively ties Danish monetary policy to the one in the euro area. We find that a one standard deviation surprise increase in the monetary policy rate increases the share of nonbank credit supply by 4% in the corporate credit market and by about 6% in the consumer credit market. Interestingly, while nonbank credit becomes cheaper relative to bank credit for corporate borrowers, it becomes more expensive for consumers. The puzzling increase in nonbanks' market share among consumers despite their credit becoming more expensive provides an interesting avenue for further research.

The increase in the nonbank market share following a monetary policy tightening does not come at the cost of risker lending by nonbanks. We show that, relative to banks, nonbanks do not lend significantly more to riskier firms in response to higher rates. Instead, nonbanks seem to increase lending to households that can ex-ante be perceived as less risky. Importantly, we obtain these results not only for the aggregate nonbank sector, but also when separately studying the largest types of nonbanks. This suggests that our results do not mask heterogeneity across nonbank lenders' behavior in Denmark. Hence, the evidence provided in this paper is not indicative of a nonbank risk-taking channel of monetary policy.

We close our paper with an analysis of how nonbank lending affects the transmission of monetary policy to real and financial outcomes at the firm and household level. As expected, banks reduce their credit supply after an unexpected monetary tightening. Nonbanks simultaneously increase their supply of credit, thereby attenuating the traditional bank lending channel of monetary policy. The substitution from bank to nonbank credit, however, is incomplete, meaning that total credit credit supply decreases. The increase in nonbank credit supply after monetary contractions has real effects: firms with pre-existing exposure to nonbank lenders fare significantly better after a monetary shock across a wide range of real outcomes such as investment, employment and firm growth. Similarly, households who borrow from nonbanks consume more, and buy more valuable real estate and cars compared to those without ties to nonbanks. Quantitatively, our results show that nonbanks nearly eliminate the transmission of monetary policy to real outcomes in the corporate sector and significantly attenuate the transmission to the household sector.

References

Abildgren, Kim, Andreas Kuchler, America Solange Lohmann Rasmussen, and Henrik Sejerbo Sørensen. 2018. "Consistency between household-level consumption data from registers and surveys." Danmarks Nationalbank Working Papers.

Altavilla, Carlo, Luca Brugnolini, Refet S Gürkaynak, Roberto Motto, and Giuseppe Ragusa. 2019. "Measuring euro area monetary policy." *Journal of Monetary Economics*, 108: 162–179.

Andersen, Asger Lau, Niels Johannesen, Mia Jørgensen, and José-Luis Peydró. 2021. "Monetary policy and inequality."

Andersen, Henrik Yde and Søren Leth-Petersen. 2021. "Housing wealth or collateral: How home value shocks drive home equity extraction and spending." *Journal of the European Economic Association*, 19(1): 403–440.

Berger, Allen N., W. Scott Frame, and Vasso Ioannidou. 2011. "Tests of ex ante versus ex post theories of collateral using private and public information." *Journal of Financial Economics*, 100(1): 85–97.

Bernanke, Ben S and Mark Gertler. 1995. "Inside the black box: the credit channel of monetary policy transmission." *Journal of Economic perspectives*, 9(4): 27–48.

Browning, Martin and Søren Leth-Petersen. 2003. "Imputing consumption from income and wealth information." *The Economic Journal*, 113(488): F282–F301.

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

Chen, Kaiji, Jue Ren, and Tao Zha. 2018. "The nexus of monetary policy and shadow banking in China." *American Economic Review*, 108(12): 3891–3936.

Chernenko, Sergey, Isil Erel, and Robert Prilmeier. 2020. "Why Do Firms Borrow Directly from Nonbanks?"

Chodorow-Reich, Gabriel. 2014. "The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis." *The Quarterly Journal of Economics*, 129(1): 1–59.

Cloyne, James, Clodomiro Ferreira, and Paolo Surico. 2020. "Monetary policy when households have debt: new evidence on the transmission mechanism." *The Review of Economic Studies*, 87(1): 102–129.

Cloyne, James, Clodomiro Ferreira, Maren Froemel, and Paolo Surico. 2018. "Monetary policy, corporate finance and investment." National Bureau of Economic Research.

Coibion, Olivier. 2012. "Are the effects of monetary policy shocks big or small?" *American Economic Journal: Macroeconomics*, 4(2): 1–32.

Crawley, Edmund and Andreas Kuchler. 2020. "Consumption Heterogeneity: Micro Drivers and Macro Implications."

Degryse, Hans, Olivier De Jonghe, Sanja Jakovljević, Klaas Mulier, and Glenn Schepens. 2019. "Identifying credit supply shocks with bank-firm data: Methods and applications." *Journal of Financial Intermediation*, 40: 100813.

Di Maggio, Marco, Amir Kermani, Benjamin J Keys, Tomasz Piskorski, Rodney Ramcharan, Amit Seru, and Vincent Yao. 2017. "Interest rate pass-through: Mortgage rates, household consumption, and voluntary deleveraging." *American Economic Review*, 107(11): 3550–88.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. 2017. "The deposits channel of monetary policy." *The Quarterly Journal of Economics*, 132(4): 1819–1876.

Elliott, David, Ralf Meisenzahl, José-Luis Peydró, and Bryce C Turner. 2021. "Nonbanks, banks, and monetary policy: Us loan-level evidence since the 1990s."

Fuster, Andreas, Matthew Plosser, Philipp Schnabl, and James Vickery. 2019. "The role of technology in mortgage lending." *The Review of Financial Studies*, 32(5): 1854–1899.

Gertler, Mark and Peter Karadi. 2015. "Monetary policy surprises, credit costs, and economic activity." *American Economic Journal: Macroeconomics*, 7(1): 44–76.

Gopal, Manasa and Philipp Schnabl. 2020. "The rise of finance companies and FinTech lenders in small business lending." *NYU Stern School of Business*.

Heider, Florian, Farzad Saidi, and Glenn Schepens. 2019. "Life below zero: Bank lending under negative policy rates." *The Review of Financial Studies*, 32(10): 3728–3761.

Holm-Hadulla, Fédéric and Claire Thürwächter. 2021. "Heterogeneity in corporate debt structures and the transmission of monetary policy." *European Economic Review*, 136: 103743.

Holm, Martin Blomhoff, Pascal Paul, and Andreas Tischbirek. 2021. "The transmission of monetary policy under the microscope." *Journal of Political Economy*, 129(10): 2861–2904.

Ioannidou, Vasso, Steven Ongena, and José-Luis Peydró. 2015. "Monetary policy, risk-taking, and pricing: Evidence from a quasi-natural experiment." *Review of Finance*, 19(1): 95–144.

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

Jarociński, Marek and Peter Karadi. 2020. "Deconstructing monetary policy surprises - the role of information shocks." *American Economic Journal: Macroeconomics*, 12(2): 1–43.

Jensen, Thais Lærkholm and Niels Johannesen. 2017. "The consumption effects of the 2007–2008 financial crisis: Evidence from households in Denmark." *American Economic Review*, 107(11): 3386–3414.

Jiménez, Gabriel, Steven Ongena, José-Luis Peydró, and Jesús Saurina. 2012. "Credit supply and monetary policy: Identifying the bank balance-sheet channel with loan applications." *American Economic Review*, 102(5): 2301–26.

Jiménez, Gabriel, Steven Ongena, José-Luis Peydró, and Jesús Saurina. 2014. "Hazardous times for monetary policy: What do twenty-three million bank loans say about the effects of monetary policy on credit risk-taking?" *Econometrica*, 82(2): 463–505.

Jordà, Òscar, Sanjay R Singh, and Alan M Taylor. 2020. "The long-run effects of monetary policy."

Kashyap, Anil and Jeremy Stein. 1994. "Monetary Policy and Bank Lending." In *Monetary Policy*. 221–261. National Bureau of Economic Research, Inc.

Kashyap, Anil K and Jeremy C Stein. 2000. "What do a million observations on banks say about the transmission of monetary policy?" *American Economic Review*, 90(3): 407–428.

Khwaja, Asim Ijaz and Atif Mian. 2008. "Tracing the impact of bank liquidity shocks: Evidence from an emerging market." *American Economic Review*, 98(4): 1413–42.

Leth-Petersen, Søren. 2010. "Intertemporal consumption and credit constraints: Does total expenditure respond to an exogenous shock to credit?" *American Economic Review*, 100(3): 1080–1103.

Murfin, Justin and Ryan Pratt. 2019. "Who finances durable goods and why it matters: Captive finance and the coase conjecture." *The Journal of Finance*, 74(2): 755–793.

Nakamura, Emi and Jón Steinsson. 2018. "High-frequency identification of monetary non-neutrality: the information effect." *The Quarterly Journal of Economics*, 133(3): 1283–1330.

Nelson, Benjamin, Gabor Pinter, and Konstantinos Theodoridis. 2018. "Do contractionary monetary policy shocks expand shadow banking?" *Journal of Applied Econometrics*, 33(2): 198–211.

Renkin, Tobias and Gabriel Züllig. 2021. "Credit Supply Shocks and Prices: Evidence from Danish Firms."

Romer, Christina D and David H Romer. 2004. "A new measure of monetary shocks: Derivation and implications." *American Economic Review*, 94(4): 1055–1084.

Stein, Jeremy C. 2013. "Overheating in credit markets: origins, measurement, and policy responses." Vol. 7.

Wong, Arlene. 2019. "Refinancing and the transmission of monetary policy to consumption."

Xiao, Kairong. 2020. "Monetary transmission through shadow banks." *The Review of Financial Studies*, 33(6): 2379–2420.

Appendix

A Descriptive Evidence

In this section we provide additional descriptive evidence on the nonbank lending sector in Denmark. First, we illustrate to which industries banks and nonbanks lend to the most. Figure C.1 shows that nonbank lending is skewed in favor of loans to the transportation and storage industry, which receives almost half of all nonbank credit. This credit is primarily channeled to firms operating sea and coastal freight water transport (not shown), which is an important sector in the Danish economy. In contrast, the distribution of bank credit across borrower industries is more evenly distributed across industries.

We also explore the degree to which nonbanks intermediate credit across different parts of Denmark. We use the location of borrowers, which in the case of firms is the location of their headquarters, to compute the share of nonbank credit in total unsecured credit within a municipality. Figure C.2 (a) documents how the share of nonbank corporate debt is distributed across Danish municipalities. There is some concentration of the nonbank debt share in the Danish Capital Region, where most municipalities have an above average share of nonbank credit. However, given the economic importance of the Capital Region in Denmark this does not come as a surprise.

Contrary to corporate credit, lending by nonbanks to households as a fraction of total consumer credit is somewhat more concentrated in the Eastern part of Denmark. As Figure C.2 (b) shows, nonbanks are responsible for a large share of total lending (above 10%) in the Zealand Region, the Capital Region (with the exception of the municipalities of Copenhagen, Frederiksberg and some of the wealthier municipalities North of Copenhagen), as well as many municipalities on the island of Funen and the smaller islands surrounding it. Most municipalities in Jutland have lower than average shares of nonbank lending in total consumer credit.

A.1 Lending relationships

In this subsection we provide descriptive evidence on the length of lending relationships in corporate and consumer credit markets, and whether the length of relationships differs across bank and nonbank lenders. Ex-ante one may expect lending relationships to last longer in the corporate credit market, as lenders and borrowers interact more often. In consumer credit markets, nonbank lenders especially are often viewed as temporary providers of credit, who provide financing for one-off purchases.

Table C.1 shows that the average lending relationship in both credit markets in our preferred regression samples, i.e. once we condition on borrowers who receive credit from both banks and nonbanks. In both credit markets the average lending relationship lasts roughly 4.5 years. Moreover, we find that bank relationships in both credit markets last ca. one year longer than nonbank lending relationships. Contrary to our initial hypothesis, we do not find evidence suggesting that lending relationships with corporate borrowers are on average longer lasting than lending relationships with households.

B Nonbank liabilities and monetary policy

Our results in section 4.1 showed that nonbanks expand their market share compared to banks in corporate and consumer credit markets after a monetary tightening. Moreover, we document in section 4.3 that nonbanks not only increase their share in credit supply relative to banks, but also increase their lending in absolute terms. To get a better grasp of why nonbanks react differently to monetary policy shocks compared to banks, we analyze how their liabilities respond to such shocks. In particular, we test how the growth rate of short-term debt, long-term, other debt and equity of lenders evolves after changes in monetary policy.

To this end, we augment our dataset with additional information on lenders' balance sheets collected by Bisnode, a private provider of balance sheet data. The data on

financial companies' balance sheets starts in 2014 and ends in 2018. Due to the short time horizon and relatively small number of lenders, we interpret the evidence in this section as suggestive rather than causal.

Table C.2 shows our results for nonbanks that are active in our corporate credit sample. The results suggest that nonbanks in corporate credit market experience a significant increase in their long-term debt after a monetary policy tightening. Table C.3 illustrates the same result for nonbank lenders in the consumer credit market. Both Tables also document a significant increase in nonbank equity when monetary policy is tightened. Tables C.4 and C.5 present the results of the same analysis for traditional banks in our sample. Contrary to our results for nonbanks, we find no significant changes in banks' liabilities in response to monetary policy shocks. The exception is a decrease in total debt of bank lenders in consumer credit markets, as shown in column (4) of Table C.5.

The evidence presented in this subsection is in line with Drechsler et al. (2017) who argue that banks experience an outflow of deposits if they do not pass on the increase in interest rates to their depositors following a monetary tightening. These deposits could then flow as long-term loans or equity investments towards nonbanks, which in our case use them to increase their share of lending. Thus, our results resemble those by Xiao (2020), who documents that tighter monetary policy in the US leads funding to flow out of traditional banks into nonbanks.

C Figures and tables

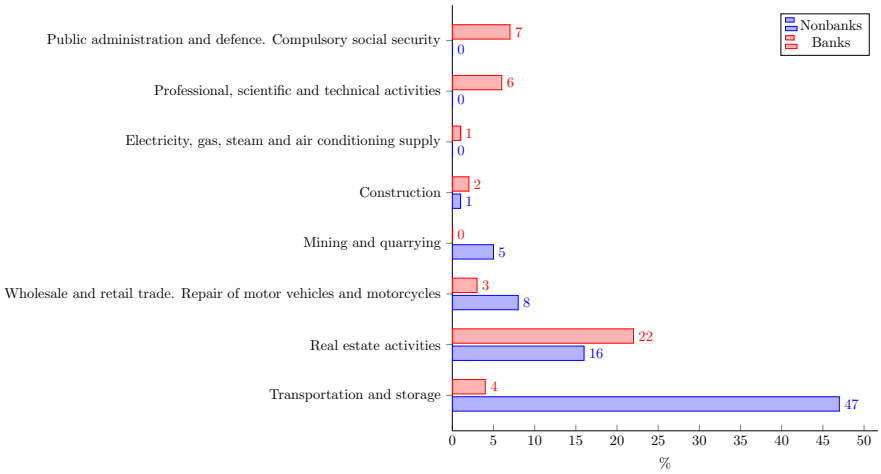
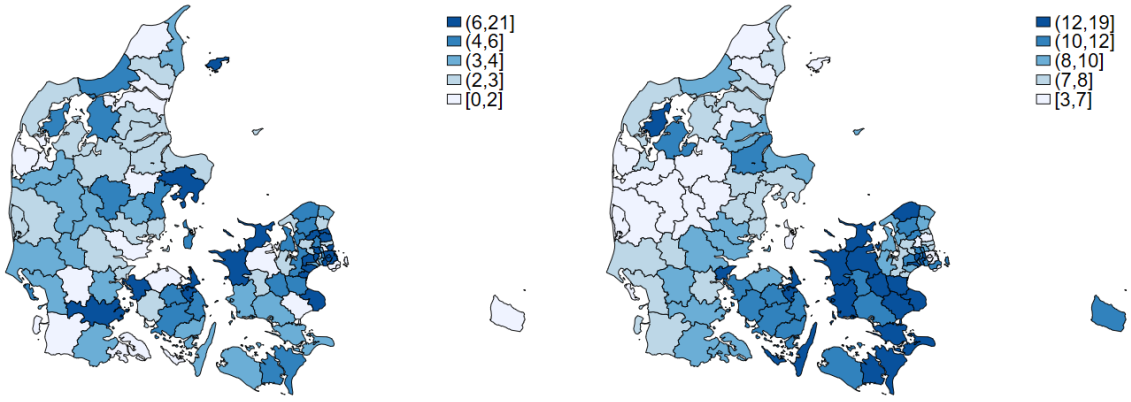


Figure C.1: Which industries borrow most from nonbanks and banks respectively?

This Figure illustrates how much different industries in Denmark borrow from nonbanks and banks, respectively. Blue bars indicate the share of nonbank lending going to each industry, while red bars indicate the share of bank lending.



(a) Corporate Credit (b) Consumer Credit

Figure C.2: Nonbank share in credit supply by municipality

	Nonbank relationships				Bank relationships			
	N	Mean	Std. Dev.	Median	N	Mean	Std. Dev.	Median
Panel A. Corporate credit market								
Duration (years)	74,938	3.69	2.03	3.00	305,224	4.96	3.01	4.00
Panel B. Consumer credit market								
Duration (years)	7,272,364	3.74	2.23	3.00	13,013,343	4.88	3.07	4.00

Table C.1: Bank vs nonbank lending relationships

This table contrasts the length of lending relationships (in years) across banks and nonbanks in the corporate and consumer credit markets. The relationship length is computed only for those observations featured in our preferred regression sample, i.e. for those firms and households who receive credit from at least one bank and nonbank in a given year.

	(1) g. short debt	(2) g. long debt	(3) g. other debt	(4) g. tot. debt	(5) g. equity
MP Shock	-0.26	0.30**	0.31	1.88	0.12
	(0.93)	(0.14)	(1.60)	(2.60)	(0.08)
Observations	165	73	153	165	165
R2	0.02	0.09	0.02	0.03	0.08
Macro Variables	Yes	Yes	Yes	Yes	Yes
Nonbank FE	Yes	Yes	Yes	Yes	Yes

Table C.2: Corporate credit - Changes in nonbank liabilities and monetary policy shocks

This table presents the estimation results for the econometric model shown below. We use balance sheet data between 2014 and 2018 for the nonbanks that issued credit to firms in our loan-level sample. Our dependent variable is the growth rate of each of the balance sheet components listed in the five columns of the table: (1) short-term debt, (2) long-term debt, (3) other debt, (4) total debt, and (5) equity. The MP shock is the monetary policy shock series based on high-frequency changes in Overnight Index Swaps (OIS) with maturity of 3 months identified by Altavilla et al. (2019). The macroeconomic controls are Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. We also saturate the model with nonbank fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$$\frac{\Delta y_{i,t+1}}{y_{i,t}} = \alpha + \beta \text{MP Shock}_{t-1} + \theta \text{Macro Controls}_{t-1} + \tau_i + \varepsilon_{i,t}$$

	(1) g. short debt	(2) g. long debt	(3) g. other debt	(4) g. tot. debt	(5) g. equity
MP Shock	2.94	0.33**	-0.77	1.02	0.18**
	(3.00)	(0.14)	(1.60)	(1.07)	(0.08)
Observations	381	147	332	382	385
R2	0.01	0.09	0.01	0.01	0.03
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes
Nonbank FE	Yes	Yes	Yes	Yes	Yes

Table C.3: Consumer credit - Changes in nonbank liabilities and monetary policy shocks

This table presents the estimation results for the econometric model shown below. We use balance sheet data between 2014 and 2018 for the nonbanks that issued credit to households in our loan-level sample. Our dependent variable is the growth rate of each of the balance sheet components listed in the five columns of the table: (1) short-term debt, (2) long-term debt, (3) other debt, (4) total debt, and (5) equity. The MP shock is the monetary policy shock series based on high-frequency changes in Overnight Index Swaps (OIS) with maturity of 3 months identified by Altavilla et al. (2019). The macroeconomic controls are Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. We also saturate the model with nonbank fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$$\frac{\Delta y_{i,t+1}}{y_{i,t}} = \alpha + \beta \text{MP Shock}_{t-1} + \theta \text{Macro Controls}_{t-1} + \tau_i + \varepsilon_{i,t}$$

	(1) g. short debt	(2) g. long debt	(3) g. other debt	(4) g. tot. debt	(5) g. equity
MP Shock	-0.12	-0.01	0.52	-0.04	0.03
	(0.11)	(0.12)	(0.54)	(0.03)	(0.03)
Observations	249	213	246	249	249
R2	0.02	0.02	0.01	0.01	0.01
Macro Variables	Yes	Yes	Yes	Yes	Yes
Nonbank FE	Yes	Yes	Yes	Yes	Yes

Table C.4: Corporate credit - Changes in bank liabilities and monetary policy shocks

This table presents the estimation results for the econometric model shown below. We use balance sheet data between 2014 and 2018 for the banks that issued credit to firms in our loan-level sample. Our dependent variable is the growth rate of each of the balance sheet components listed in the five columns of the table: (1) short-term debt, (2) long-term debt, (3) other debt, (4) total debt, and (5) equity. The MP shock is the monetary policy shock series based on high-frequency changes in Overnight Index Swaps (OIS) with maturity of 3 months identified by Altavilla et al. (2019). The macroeconomic controls are Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. We also saturate the model with nonbank fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$$\frac{\Delta y_{i,t+1}}{y_{i,t}} = \alpha + \beta \text{MP Shock}_{t-1} + \theta \text{Macro Controls}_{t-1} + \tau_i + \varepsilon_{i,t}$$

	(1) g. short debt	(2) g. long debt	(3) g. other debt	(4) g. tot. debt	(5) g. equity
MP Shock	-0.14	-0.04	0.39	-0.06*	0.06
	(0.11)	(0.12)	(0.44)	(0.03)	(0.04)
Observations	260	220	257	260	260
R2	0.02	0.01	0.01	0.02	0.02
Macro Variables	Yes	Yes	Yes	Yes	Yes
Nonbank FE	Yes	Yes	Yes	Yes	Yes

Table C.5: Consumer credit - Changes in bank liabilities and monetary policy shocks

This table presents the estimation results for the econometric model shown below. We use balance sheet data between 2014 and 2018 for the banks that issued credit to households in our loan-level sample. Our dependent variable is the growth rate of each of the balance sheet components listed in the five columns of the table: (1) short-term debt, (2) long-term debt, (3) other debt, (4) total debt, and (5) equity. The MP shock is the monetary policy shock series based on high-frequency changes in Overnight Index Swaps (OIS) with maturity of 3 months identified by Altavilla et al. (2019). The macroeconomic controls are Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. We also saturate the model with nonbank fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$$\frac{\Delta y_{i,t+1}}{y_{i,t}} = \alpha + \beta \text{MP Shock}_{t-1} + \theta \text{Macro Controls}_{t-1} + \tau_i + \varepsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	5.14***	5.05***	2.94***	4.26***	2.07**
	(0.73)	(0.55)	(0.60)	(1.52)	(0.94)
Observations	909,010	828,549	828,549	274,178	641,432
R2	0.19	0.79	0.80	0.65	0.40
B. Outcome var: Interest rate					
Nonbank x MP Shock	-0.004***	-0.003***	-0.002***	-0.004**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	1,117,226	1,025,232	1,025,232	377,242	781,307
R2	0.02	0.50	0.50	0.46	0.14
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes
Year FE	Yes		Yes		
Lender FE	Yes			Yes	Yes
Lender-Borrower FE		Yes	Yes		
Borrower-Year FE				Yes	
ILST FE					Yes

Table C.6: Corporate Lending - Nonbanks active in both credit markets

This table re-estimates our baseline results on the nonbank lending share in corporate credit markets, but drops all nonbanks which are not active lenders in the consumer credit market too. This exercise allows us to check if our results in the paper may be driven by sample selection, i.e. by different nonbanks active in the two credit markets.. This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a nonbank financial company and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	8.52***	-1.04***	2.82***	7.01***	7.24***
	(0.10)	(0.07)	(0.08)	(0.15)	(0.10)
Observations	26,615,396	23,966,180	23,966,180	13,136,567	26,185,065
R2	0.16	0.79	0.79	0.55	0.25
B. Outcome var: Interest rate					
Nonbank x MP Shock	0.000	0.000***	0.001***	0.002***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	30,743,398	27,815,849	27,815,849	16,497,900	30,285,047
R2	0.06	0.57	0.57	0.49	0.09
Macro Var. Interactions	Yes	Yes	Yes	Yes	
Year FE	Yes		Yes		
Lender FE	Yes			Yes	Yes
Lender-Borrower FE		Yes	Yes		
Borrower-Year FE				Yes	
ILST FE					Yes

Table C.7: Consumer Lending - Nonbanks active in both credit markets

This table re-estimates our baseline results on the nonbank lending share in consumer credit markets, but drops all nonbanks which are not active lenders in the corporate credit market too. This exercise allows us to check if our results in the paper may be driven by sample selection, i.e. by different nonbanks active in the two credit markets.. This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a nonbank financial company and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendix

I Robustness tests

In this online appendix we provide a series of robustness tests for the results presented in section 4. Following the structure of our results section in the main body of the paper, we first present additional evidence that the share of nonbank debt in total debt increases after an unexpected monetary policy tightening. Subsequently, we provide robustness tests regarding the risk-taking channel of monetary policy in the presence of nonbank lending, and on our results at the borrower-level, including the real effects of monetary policy.

I.I Robustness tests of the nonbank debt share

To test the robustness of our baseline results based on the estimation of equation (2), we re-estimate the equation with various modifications.

Alternative monetary policy shocks. First, we change our measure of monetary policy shocks. Recall that the results in the main body of the paper are based on the time series of monetary policy shocks constructed by Jarociński and Karadi (2020) for the Euro-area. This measure is based on a VAR with sign restrictions and separately identifies "pure" monetary policy shocks from the "information effect" conveyed in the ECB's monetary policy announcements. In Tables II.3 and II.4, we show that our baseline results in corporate and consumer credit markets, respectively, hold when using various other measures of Euro-area monetary policy shocks. In particular, results in column 2 are based on the Jarociński and Karadi (2020) shocks to the 3-month Eonia interest rate swaps induced by ECB announcements. Columns 3-5 are based on the monetary policy shocks constructed by Altavilla et al. (2019), who identify high-frequency changes in Overnight Index Swaps (OIS) with maturities of 3 months (3M), 1 year (1Y) and 10 years (10Y) around monetary announcements by the ECB. Column

6 is based on high-frequency changes in the yields of German soverign bonds with 10 year maturity. As these alternative measures of monetary policy shocks are available for varying time periods the sample size in this robustness test varies across the different models.

Clustering of standard errors. Next, we document that the results based on our preferred specification with borrower-year and lender fixed effects are robust to different ways of clustering standard errors. In column 1 of Tables II.5 and II.6 we begin by clustering standard errors at the borrower-lender level. We additionally run our specification when clustering at the borrower level (column 2), at the lender and borrower level (column 3), the borrower, lender, and year level (column 4), and finally at the borrower-lender-year level (column 5). As our sample period spans only 14 years we try to avoid clustering errors at the year level due to the problems associated with using a small number of clusters.

Nonbanks active in both credit markets. A potential concern regarding our results on the different behavior of nonbanks across the corporate and consumer credit market is that the results may be driven by sample selection. In particular, it may be that the types of lenders in corporate lending markets are very different from those lending to consumers. To rule out this concern, we re-estimate our results on the nonbank lending share based on equation (2) by keeping only those nonbanks in our sample, which are active lenders in both the corporate and consumer credit market.

Tables C.6 and C.7 show that our results remain robust, as the parameter estimates remain largely unchanged with respect to those reported in the main body of the paper. Additionally, the small drop in the number of observations in our regression with respect to our baseline results shows that few nonbank lenders specialize in either the corporate or consumer credit market. Instead, the majority of nonbanks lend to both firms and households.

I.II Risk taking

Top 3 nonbank industries. We also study whether different nonbank industries have markedly different responses to monetary policy shocks in terms of their risk taking. Tables II.7, II.8 and II.9 show that our benchmark results on the lack of risk taking among nonbanks in the corporate credit market are relevant even when we split the overall sample into loans provided by: (i) specialized finance companies, (ii) wealth managers, and (iii) financial leasing companies. We repeat the same exercise for the consumer credit sample, focusing on the top 3 players among nonbanks in this unsecured credit market. Tables II.10, II.11, and II.12 demonstrate that our results in the benchmark sample are also largely unchanged. As in the main text, we show that irrespective of nonbank industry we do not find any evidence of risk taking when it comes to consumer credit. On the contrary, similarly to the overall sample we find that nonbanks in top 3 industries lend to ex-ante safer consumers after a monetary policy tightening.

Fixed effects based on borrower characteristics. We also explored the robustness of our results on risk taking when we replace borrower-time fixed effects with industry-location-size-time (ILST) fixed effects as a time-varying demand control. As described in the main text, the industry bins are based on two-digit NACE classification codes; location bins are based on Denmark's 100 municipality codes and the size bins are based on deciles of total assets of the firms. The analog to the ILST for our regression using the consumer credit sample are location-income-leverage-time fixed effects, where both income and leverage bins are based on the deciles of households' income and total leverage. Tables II.13 and II.14 show that our results hold even for the setting in which we focus on an alternative version of time-varying dummies that control for demand for credit.

I.III Aggregate-level effects of monetary policy

Financial effects with one-time borrowers. We estimate the effects of monetary policy shocks on total credit supply to borrowers using equation (4). Our baseline results are thus obtained in a specification with borrower fixed effects, which focuses only on borrowers who appear in at least two consecutive years in our sample. Here we show that we obtain qualitatively similar results when we include one-time borrowers in our estimation. To do so, we use industry fixed effects in our analysis of corporate borrowers and municipality fixed effects when studying consumer credit markets. Tables II.15 and II.16 illustrate our results from estimating equation (4) with these alternative fixed effects.

Financial effects for firms that borrow mainly from non-banks. We also investigate whether our results on financial effects for firms depend on whether the firms borrow mainly from nonbanks. Column (1) of Table II.17 shows that firms borrowing mainly from nonbanks decrease their total debt significantly after a positive monetary policy shock. Furthermore, these firms also decrease their levels of unsecured debt as well as unsecured bank credit, as evidenced by Columns (2) and (3). Nonetheless, they seem to increase their borrowing from nonbanks in response to a monetary tightening, thus attenuating the drop in total debt. Unlike our results for aggregate sample presented in the main text, all coefficients in this table are significant at the one per cent level, suggesting that firms that borrow mainly from nonbanks are particularly sensitive to the evolution of monetary policy shocks.

I.IV Real effects of monetary policy

Borrower-level controls. In this section we re-estimate our models for the real effects of monetary policy at the borrower level to include additional borrower-level controls as explanatory variables. The model in corporate credit markets controls for lagged leverage, firm age, and 4-digit NACE industry code. Tables II.18 and II.19 present the results of our estimation of these extended models.

Nonbank relationships. We now test whether our results hold when we control for past nonbank relationships, as opposed to looking at nonbank dependent borrowers (i.e. those with at least 50% of their unsecured loans coming from nonbanks). Tables II.20 and II.21 show that our results are robust to this change in the nonbank dummy.

II Tables

	(1) Bank Interest	(2) Nonbank Interest
MP Shock	-0.04	-0.21***
	(0.03)	(0.04)
Observations	555,603	58,642
R2	0.40	0.60
Macro Controls	Yes	Yes
Borrower FE	Yes	Yes

Table II.1: Effects of monetary policy on interest rates paid by firms.

Data is collapsed at firm-year and lender-type level. Interest rates for each borrower are weighted average across all loans, using loan balances as weights. "MP shock" are lagged values of the JK monetary policy shocks. "Macro Controls" indicates that the regressions include Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Bank Interest	(2) Nonbank Interest
MP Shock	-0.04***	0.18***
	(0.00)	(0.00)
Observations	16,101,567	4,710,412
R2	0.51	0.70
Macro Controls	Yes	Yes
Borrower FE	Yes	Yes

Table II.2: Effects of monetary policy on interest rates paid by households.

Data is collapsed at firm-year and lender-type level. Interest rates for each borrower are weighted average across all loans, using loan balances as weights. "MP shock" are lagged values of the JK monetary policy shocks. "Macro Controls" indicates that the regressions include Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) JK (Sign)	(2) JK (HF)	(3) AL 3M	(4) AL 1Y	(5) AL 10Y	(6) AL 10Y DE
A. Outcome var: Log debt						
Nonbank x MP Shock	4.09***	4.51***	5.95***	0.64	-5.92**	-14.49***
	(1.51)	(1.55)	(1.46)	(1.71)	(2.76)	(1.65)
Observations	275,516	275,516	288,798	288,798	112,784	288,798
R2	0.65	0.65	0.65	0.65	0.62	0.65
B. Outcome var: Interest rate						
Nonbank x MP Shock	-0.004**	-0.004**	-0.005***	-0.003	0.008**	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)
Observations	380,162	380,162	399,907	399,907	160,655	399,907
R2	0.46	0.46	0.47	0.47	0.47	0.47
Macro Control Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.3: Corporate credit. Robustness: Different MP shocks.

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B) using various measures of monetary policy shocks (MP Shock). Column 1 uses the pure monetary policy shock measure by Jarociński and Karadi (2020), while column 2 reports their monetary shocks identified by high-frequency movements in 3-month Eonia interest rate swaps. Columns 3-5 are based on high-frequency changes in Overnight Index Swaps (OIS) with maturities of 3 month (3M), 1 year (1Y), and 10 years (10Y) identified by Altavilla et al. (2019). Column 6 is based on high-frequency changes in the yields of German soverign bonds with 10 year maturity. *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. Standard errors (in parentheses) are clustered at the borrower-lender level. Panel A reports transformed coefficients that indicate the percentage change in the nonbank lending share in response to a 1 standard deviation increase of the monetary policy measure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) JK (Sign)	(2) JK (HF)	(3) AL 3M	(4) AL 1Y	(5) AL 10Y	(6) AL 10Y DE
A. Outcome var: Log debt						
Nonbank x MP Shock	5.77***	4.12***	5.84***	3.75***	-0.07	-5.83***
	(0.12)	(0.13)	(0.11)	(0.14)	(0.18)	(0.12)
Observations	16,171,885	16,171,885	17,589,906	17,589,906	8,783,252	17,589,906
R2	0.54	0.54	0.54	0.54	0.55	0.54
B. Outcome var: Interest rate						
Nonbank x MP Shock	0.003***	-0.000***	0.001***	0.001***	0.002***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	20285707	20285707	22092009	22092009	11042073	22092009
R2	0.50	0.50	0.52	0.52	0.55	0.52
Macro Control Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE						
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
LenderFE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.4: Corporate credit. Robustness: Different MP shocks.

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B) using various measures of monetary policy shocks (MP Shock). Column 1 uses the pure monetary policy shock measure by Jarociński and Karadi (2020), while column 2 reports their monetary shocks identified by high-frequency movements in 3-month Eonia interest rate swaps. Columns 3-5 are based on high-frequency changes in Overnight Index Swaps (OIS) with maturities of 3 month (3M), 1 year (1Y), and 10 years (10Y) identified by Altavilla et al. (2019). Column 6 is based on high-frequency changes in the yields of German soverign bonds with 10 year maturity. *Nonbank* is a dummy variable equal to one if a lender is a nonbank financial company and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	4.09***	4.09***	4.09	4.09	4.09***
	(1.51)	(1.41)	(3.43)	(4.94)	(1.61)
Observations	275,516	275,516	275,516	275,516	275,516
R2	0.65	0.65	0.65	0.65	0.65
B. Outcome var: Interest rate					
Nonbank x MP Shock	-0.004**	-0.004***	-0.004***	-0.004	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	380,162	380,162	380,162	380,162	380,162
R2	0.46	0.46	0.46	0.46	0.46
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes
Clust.: Lender-Borrower	Yes				
Clust.: Lender			Yes	Yes	
Clust.: Borrower		Yes	Yes	Yes	
Clust.: Year				Yes	
Clust.: Lender-Borrower-Year					Yes

Table II.5: Corporate lending. Robustness: Different clustering

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. Panel A reports transformed coefficients that indicate the percentage change in the nonbank lending share in response to a 1 standard deviation increase of the monetary policy measure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)
A. Outcome var: Log debt					
Nonbank x MP Shock	5.77***	5.77***	5.77***	5.77***	5.77***
	(0.12)	(0.12)	(1.77)	(1.59)	(0.13)
Observations	16,171,885	16,171,885	16,171,885	16,171,885	16,171,885
R2	0.54	0.54	0.54	0.54	0.54
B. Outcome var: Interest rate					
Nonbank x MP Shock	0.003***	0.003***	0.003***	0.003	0.003***
	(0.000)	(0.000)	(0.001)	(0.004)	(0.000)
Observations	20,285,707	20,285,707	20,285,707	20,285,707	20,285,707
R2	0.50	0.50	0.50	0.50	0.50
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes
Clust.: Lender-Borrower	Yes				
Clust.: Lender			Yes	Yes	
Clust.: Borrower		Yes	Yes	Yes	
Clust.: Year				Yes	
Clust.: Lender-Borrower-Year					Yes

Table II.6: Consumer lending. Robustness: Different clustering

This table illustrates the results from estimating equation (2) using as the dependent variable the log of outstanding debt (Panel A) and the effective interest rate (Panel B). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. Panel A reports transformed coefficients that indicate the percentage change in the nonbank lending share in response to a 1 standard deviation increase of the monetary policy measure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	-23.261	-0.070**	-41.874*	-0.029	-24.495	-0.042*
	(21.466)	(0.032)	(16.432)	(0.026)	(16.930)	(0.024)
Triple - Leverage	16.618	0.050				
	(32.589)	(0.033)				
Triple - Sales			67.691	-0.031		
			(59.346)	(0.030)		
Triple - Past delinquency					-95.129	-0.413
					(17.799)	(0.356)
Observations	153,811	209,121	191,498	261,518	191,498	261,518
R2	0.65	0.48	0.63	0.48	0.63	0.48
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.7: Risk-taking channel - Corporate credit - Specialized finance companies

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a specialized finance company and equal to zero if the lender is a traditional bank. Firms that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, or ii) total sales. We also consider an indicator variable for riskiness that is based on past delinquencies for each borrower. That variable takes the value of one if the borrower was delinquent in the previous year of observation and zero otherwise. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	8.066*	0.001	9.075**	-0.002	3.273	-0.002
	(4.447)	(0.005)	(4.013)	(0.004)	(3.243)	(0.004)
Triple - Leverage	-13.728**	0.001				
	(5.503)	(0.007)				
Triple - Sales			-13.630**	-0.001		
			(5.188)	(0.007)		
Triple - Past delinquency					22.927	-0.010
					(25.074)	(0.012)
Observations	165,759	224,712	206,240	280,689	206,240	280,689
R2	0.65	0.48	0.63	0.48	0.63	0.48
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.8: Risk-taking channel - Corporate credit - Wealth managers (except I&P)

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a wealth management company (except for insurance companies and pension funds) and equal to zero if the lender is a traditional bank. Firms that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, or ii) total sales. We also consider an indicator variable for riskiness that is based on past delinquencies for each borrower. That variable takes the value of one if the borrower was delinquent in the previous year of observation and zero otherwise. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	-5.181*	0.003	-2.729	0.003	-0.226	-0.001
	(2.928)	(0.003)	(2.673)	(0.003)	(2.465)	(0.003)
Triple - Leverage	-2.356	-0.007				
	(4.488)	(0.005)				
Triple - Sales			-1.474	-0.013**		
			(4.729)	(0.005)		
Triple - Past delinquency					-3.348	-0.000
					(23.973)	(0.011)
Observations	175,993	240,891	217,343	298,375	217,343	298,375
R2	0.64	0.48	0.63	0.48	0.63	0.48
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.9: Risk-taking channel - Corporate credit - Financial leasing companies

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial leasing company and equal to zero if the lender is a traditional bank. Firms that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, or ii) total sales. We also consider an indicator variable for riskiness that is based on past delinquencies for each borrower. That variable takes the value of one if the borrower was delinquent in the previous year of observation and zero otherwise. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	8.603***	-0.000	6.130***	0.004***	8.492***	0.003***
	(0.286)	(0.000)	(0.237)	(0.000)	(0.210)	(0.000)
Triple - Leverage	-1.009***	-0.001***				
	(0.370)	(0.000)				
Triple - Income			1.847***	-0.003***		
			(0.371)	(0.000)		
Triple - Unemployment					-1.012	-0.003***
					(0.712)	(0.000)
Observations	10,251,452	12,857,818	10,919,668	13,750,341	10,920,303	13,751,141
R2	0.54	0.50	0.54	0.49	0.54	0.49
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.10: Risk-taking channel - Consumer credit - Financial leasing companies

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial leasing company and equal to zero if the lender is a traditional bank. Households that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether: i) the household is above the median of the debt-to-assets ratio distribution in a given year, ii) the households' disposable income is above the cross-sectional median in a given year, or iii) above the median probability of having been unemployed for at least 6 months in the last 2 years. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	3.864***	-0.000***	0.995***	0.003***	3.594***	0.003***
	(0.233)	(0.000)	(0.177)	(0.000)	(0.165)	(0.000)
Triple - Leverage	-1.260***	0.001***				
	(0.278)	(0.000)				
Triple - Income			4.560***	-0.003***		
			(0.309)	(0.000)		
Triple - Unemployment					0.833	-0.002***
					(0.513)	(0.000)
Observations	11,377,965	14,498,316	12,243,240	15,642,826	12,244,070	15,643,899
R2	0.54	0.51	0.54	0.50	0.54	0.50
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.11: Risk-taking channel - Consumer credit - Consumer credit companies

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a consumer credit company and equal to zero if the lender is a traditional bank. Households that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether: i) the household is above the median of the debt-to-assets ratio distribution in a given year, ii) the households' disposable income is above the cross-sectional median in a given year, or iii) above the median probability of having been unemployed for at least 6 months in the last 2 years. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	2.233***	0.000	-5.306***	0.003***	-2.070***	0.001***
	(0.662)	(0.000)	(0.441)	(0.000)	(0.403)	(0.000)
Triple - Leverage	-3.408***	-0.000				
	(0.840)	(0.000)				
Triple - Income			7.035***	-0.004***		
			(0.819)	(0.000)		
Triple - Unemployment					-0.069	-0.001
					(1.753)	(0.001)
Observations	7,679,257	9,875,419	8,258,411	10,668,916	8,258,883	10,669,539
R2	0.53	0.49	0.53	0.49	0.53	0.49
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.12: Risk-taking channel - Consumer credit - Wealth managers (except I&P)

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a wealth management company (except for insurance companies and pension funds) and equal to zero if the lender is a traditional bank. Households that have loans from other nonbanks are excluded from the sample. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether: i) the household is above the median of the debt-to-assets ratio distribution in a given year, ii) the households' disposable income is above the cross-sectional median in a given year, or iii) above the median probability of having been unemployed for at least 6 months in the last 2 years. Lower levels interactions are also included in the regression model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	1.24	-0.00**	1.25	-0.00***	1.38	-0.00***
	(1.03)	(0.00)	(1.05)	(0.00)	(0.90)	(0.00)
Triple - Leverage	0.06	-0.00				
	(1.58)	(0.00)				
Triple - Sales			-2.86*	0.00		
			(1.56)	(0.00)		
Triple - Past delinquency					12.54	0.00
					(10.41)	(0.01)
Observations	596,803	668,312	612,027	685,083	612,027	685,083
R2	0.42	0.14	0.41	0.14	0.41	0.14
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
ILST FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.13: Risk-taking channel of monetary policy in corporate credit markets single-lender firms

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, or ii) total sales. We also consider an indicator variable for riskiness that is based on past delinquencies for each borrower. That variable takes the value of one if the borrower was delinquent in the previous year of observation and zero otherwise. Lower levels interactions are also included in the regression model. ILST denotes industry-location-size-time fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) ln debt	(2) int. rate	(3) ln debt	(4) int. rate	(5) ln debt	(6) int. rate
Nonbank x JK	5.494***	-0.000***	5.003***	0.003***	6.397***	0.002***
	(0.108)	(0.000)	(0.091)	(0.000)	(0.084)	(0.000)
Triple - Leverage	-1.328***	0.000				
	(0.136)	(0.000)				
Triple - Income			0.513***	-0.002***		
			(0.147)	(0.000)		
Triple - Unemployment					-0.511*	-0.001***
					(0.242)	(0.000)
Observations	26,671,289	30,924,207	28,729,896	33,411,968	28,730,149	33,412,275
R2	0.27	0.13	0.26	0.12	0.26	0.12
Macro Var. Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lower-lvl interactions	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
ILST FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.14: Risk-taking channel of monetary policy in consumer credit markets single-lender households

This table illustrates the results from estimating equation (3) using as the dependent variable the log of outstanding debt (*lndebt*) and the effective interest rate (*intrate*). *Nonbank* is a dummy variable equal to one if a lender is a financial company other than a traditional bank and equal to zero if the lender is a traditional bank. *MP Shock* are lagged monetary policy shocks from Jarociński and Karadi (2020). "Macro Var. Interactions" indicates interaction terms of our nonbank lender dummy with Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. *Triple* corresponds to the triple interaction terms between our monetary policy shock measure, the indicator for nonbank lenders and an indicator for whether the borrower is above the median of: i) the leverage ratio, or ii) total sales. Lower levels interactions are also included in the regression model. ISLT denotes location-income-leverage-time fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Debt	(2) Credit	(3) Bank Credit	(4) Nonbank Credit	(5) Bank Credit Pure	(6) Nonbank Credit Pure
MP Shock	-1.98***	-4.42***	-3.88***	-6.59***	-5.56***	-13.01***
	(0.14)	(0.28)	(0.29)	(0.74)	(0.31)	(1.43)
Observations	808,852	885,929	790,078	94,920	723,918	24,421
R2	0.21	0.11	0.11	0.15	0.11	0.28
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.15: Total credit supply in corporate credit markets.

All outcome variables are in logs. "Macro Controls" indicates that the regressions include Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. Industry FE instead of borrower FE to include one-time borrowers. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Debt	(2) Credit	(3) Bank Credit	(4) Nonbank Credit	(5) Bank Credit Pure	(6) Nonbank Credit Pure
MP Shock	-5.72***	-8.14***	-7.67***	2.53***	-8.50***	3.13***
	(0.31)	(0.43)	(0.40)	(0.41)	(0.41)	(0.48)
Observations	23,783,146	21,959,356	19,183,927	6,879,582	13,660,031	1,026,364
R2	0.03	0.01	0.02	0.01	0.02	0.01
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table II.16: Total credit supply in consumer credit markets.

All outcome variables are in logs. "Macro Controls" indicates that the regressions include Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. Municipality FE instead of borrower FE to include one-time borrowers. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Debt	(2) Credit	(3) Bank Credit	(4) Nonbank Credit
MP Shock	-3.05***	-1.94***	-3.66***	7.15***
	(0.28)	(0.57)	(0.82)	(0.67)
Observations	69,879	87,370	59,506	87,370
R2	0.92	0.84	0.75	0.82
Macro Controls	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes

Table II.17: Financial effects of monetary policy: Firms with positive nonbank credit.

All outcome variables are in logs. "Macro Controls" indicates that the regressions include Danish GDP, GDP forecast, and inflation, as well as the VIX index for stock market uncertainty. Data is collapsed at firm-year level. *Debt* is computed as Total Assets - Equity from the balance sheet data, *Credit* is total unsecured debt. *Bank Credit* is total unsecured credit obtained from banks, and *Nonbank Credit* is total unsecured credit obtained from nonbanks. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Tot. Assets	(2) Investment	(3) Oper. Profit	(4) Wage Bill
MP Shock	-2.68***	-2.82***	-5.65***	-1.64***
	(0.08)	(0.18)	(0.13)	(0.06)
Nonbank borrower x MP Shock	2.12***	3.81***	4.31***	1.05**
	(0.48)	(1.04)	(0.78)	(0.37)
Observations	753,821	487,218	588,025	613,662
R2	0.86	0.69	0.74	0.90
Macro Control Interactions	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes

Table II.18: Real effects of monetary policy in corporate credit markets with borrower controls

Data is collapsed at firm-year level. All outcome variables are in logs. Nonbank borrower is a dummy equal to 1 if more than 50% of the firms' debt in the previous year came from nonbanks. Borrower controls include lagged leverage, firm age and 4-digit NACE industry code. MV stands for Market Value.

	(1) Disp. Income	(2) Consumption	(3) MV RE	(4) MV New Cars	(5) MV Total Assets
MP Shock	-0.07***	-1.67***	-3.24***	0.60***	-2.31***
	(0.01)	(0.01)	(0.01)	(0.16)	(0.02)
Nonbank x MP Shock	-0.50***	0.79***	0.88***	-1.10	1.01***
	(0.02)	(0.05)	(0.03)	(0.58)	(0.09)
Observations	22,315,612	21,319,501	13,827,992	131,267	22,292,146
R2	0.86	0.59	0.91	0.63	0.90
Macro Control Interactions	Yes	Yes	Yes	Yes	Yes
BorrowerControls	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes

Table II.19: Real effects of monetary policy in consumer credit markets with borrower controls

Data is collapsed at firm-year level. All outcome variables are in logs. Nonbank borrower is a dummy equal to 1 if more than 50% of the households' debt in the previous year came from nonbanks. Borrower controls include lagged leverage, household head's age and municipality. MV stands for Market Value.

	(1) Tot. Assets	(2) Investment	(3) Oper. Profit	(4) Wage Bill
MP Shock	-3.16***	0.03	-5.54***	-2.06***
	(0.08)	(0.19)	(0.13)	(0.06)
Nonbank relation x MP Shock	2.25***	8.72***	5.76***	1.37***
	(0.39)	(0.86)	(0.62)	(0.31)
Observations	776,689	504,294	607,849	621,635
R2	0.86	0.68	0.74	0.90
Macro Control Interactions	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes

Table II.20: Real effects of monetary policy in corporate credit markets

Data is collapsed at firm-year level. All outcome variables are in logs. Nonbank relation is a dummy equal to 1 if the firm had at least 1 nonbank lender in the previous year.

	(1) Disp. Income	(2) Consumption	(3) MV RE	(4) MV New Cars	(5) MV Total Assets
MP Shock	-2.03***	-2.51***	-5.96***	-1.43***	-6.73***
	(0.01)	(0.01)	(0.01)	(0.16)	(0.02)
Nonbank relation x MP Shock	0.03	0.70***	-0.86***	6.15***	0.15*
	(0.02)	(0.04)	(0.03)	(0.55)	(0.08)
Observations	24,302,612	23,232,087	14,850,076	131,562	24,096,429
R2	0.84	0.59	0.90	0.60	0.89
Macro Control Interactions	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes

Table II.21: Real effects of monetary policy in consumer credit markets

Data is collapsed at firm-year level. All outcome variables are in logs. Nonbank relation is a dummy equal to 1 if the firm had at least 1 nonbank lender in the previous year. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.