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When the Spare Tyre Goes Flat: Monetary Policy Transmission through Non-Banks

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When the Spare Tyre Goes Flat: Monetary Policy Transmission through Non-Banks

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Abstract

We examine how monetary policy transmits through non-bank lenders (NBLs) using comprehensive loan-level data covering the universe of all loans in an economy. A one-percentage-point (pp) increase in the policy rate leads NBLs to raise lending rates by 0.17 pp more than banks and to contract credit sharply on the extensive margin. We show that this amplification is driven by a liability wedge: banks' price-insensitive deposit franchise stabilizes their funding costs, whereas NBLs rely on short-term wholesale debt that reprices immediately. This funding fragility exposes NBLs to rapid balance-sheet deterioration, resulting in higher pass-through and a stronger contraction in lending. This credit contraction spills over to the real economy, causing firms with high non-bank exposure to reduce assets, liabilities, employment, and profitability significantly more than bank-dependent firms. Consequently, we show that NBLs can act as stronger amplifiers of monetary policy than banks.

JEL classification: E51, E52, G21, G23.

Keywords: Non-bank lending, NBLs, Monetary Policy Transmission, Bank Lending Channel, Credit Channel, Pass-through.

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Non-Technical Summary

Over the last decade, the global financial system has undergone a structural shift, with a growing share of credit intermediation moving beyond traditional deposit-taking banks to a diverse set of Non-Bank Lenders (NBLs), including retail credit firms and specialised finance providers. As central banks tightened monetary policy sharply to combat inflation over 2022– 2024, an important question in both the academic literature and policy debate emerged: do NBLs function as a "spare tyre" for the economy—absorbing monetary tightening relative to banks—or instead amplify monetary policy transmission? This paper addresses this question by analysing the transmission of monetary policy through NBLs compared with traditional banks during the recent tightening cycle.

Our analysis identifies a fundamental liability wedge that drives divergent behaviour between banks and non-banks. Traditional banks benefit from a deposit franchise—a stable base of retail deposits that is largely insensitive to policy rate increases. This provides banks with a valuation shield, keeping funding costs relatively contained as interest rates rise. By contrast, NBLs lack access to deposit funding and rely heavily on wholesale markets. When this funding is predominantly short term, increases in policy rates pass through rapidly to funding costs, imposing tighter balance-sheet constraints on non-banks and amplifying monetary policy transmission relative to banks.

Using comprehensive loan-level data covering the universe of term credit in Ireland, we show that NBLs transmit monetary policy more aggressively than banks, with clear real effects. First, NBLs pass through policy rate increases to borrowers more strongly than banks. A one percentage point policy rate increase raises NBL lending rates by around 0.17 percentage points more than banks'. The effect is driven by NBLs reliant on short-term funding, while those with longer-term funding structures exhibit pass-through comparable to banks. Second, beyond pricing, NBLs contract credit supply more sharply. As policy rates rise, NBLs retrench from lending, reducing new loan volumes by around 6 per cent more than banks per percentage point increase in the policy rate. Finally, this contraction has tangible real effects: firms that rely heavily on non-bank credit are unable to fully substitute towards bank lending during periods of monetary tightening and consequently experience larger declines in assets, employment, and profitability than bank-dependent firms. These findings challenge the prevailing view that non-banks act as a buffer during periods of monetary tightening. Instead, they suggest that NBLs can amplify monetary policy transmission, particularly when reliant on short-term wholesale funding. As the non-bank sector continues to expand, monetary policy transmission is likely to become increasingly sensitive to the funding structures of non-bank lenders.

1 Introduction

The bank lending channel is a critical amplifier of monetary policy (Bernanke, 2007).[1] Empirical work documents that policy rates influence credit supply by tightening bank balance sheet constraints (Kashyap and Stein, 2000; Jiménez et al., 2012). Over recent decades, however, financial systems have undergone a profound structural transformation: an increasing share of credit intermediation now occurs *beyond banks* (IMF, 2023; FSB, 2024; ESRB, 2025). This activity is carried out by diverse non-bank lenders (NBLs) — including retail credit firms, leasing companies, investment funds and other specialised finance providers. This structural shift raises a fundamental question for central banks: does monetary policy transmit through these non-bank intermediaries in the same way as through banks? This paper addresses that question by analysing how monetary policy affects lending by non-bank lenders relative to traditional deposit-taking banks, using comprehensive loan-level data that cover the entire universe of credit in an economy.

While monetary policy "gets in all the cracks," the strength of transmission can depend critically on how intermediaries are funded and regulated. Banks rely on insured retail deposits — a source of funding that is not only quantity-stable but, crucially, highly insensitive to policy rates.[2] This deposit franchise acts as a valuation shield, insulating banks' net interest margins from the full force of monetary tightening. NBLs, in contrast, raise funds in wholesale markets, where they are price-takers exposed to immediate repricing. This creates theoretical ambiguity: NBLs might dampen transmission by acting as a "spare tyre" when banks are constrained by regulation (Van den Heuvel, 2002; Elliott et al., 2025; Bednarek et al., 2025), or they might amplify it if their wholesale funding costs spike faster than those of banks (Hanson et al., 2015; Aldasoro et al., 2025). We argue that liability duration is key: while NBLs funded with long-term debt may be insulated, those reliant on short-term wholesale funding face a direct transmission of the policy rate to their balance sheets.

Our analysis is built on the Irish Central Credit Register (CCR) — a granular, loan-level registry that captures all credit contracts above €500 originated by both deposit-taking institutions (banks) and NBLs. We classify lenders into banks — comprising licensed banks and credit unions, which are funded by retail deposits — and NBLs — comprising Retail Credit Firms (RCFs) and Specialised Finance Providers (SFPs), which rely on wholesale and market-based funding.[3] Our working sample covers roughly

[1] Throughout the paper, we use the term "bank lending channel" to refer to the modern, intermediary balance-sheet channel — namely, the application of the financial-accelerator logic and the external finance premium of Bernanke and Gertler (1989) and Bernanke et al. (1999) to the balance sheets of financial intermediaries rather than to non-financial firms (Gertler and Karadi, 2011; He and Krishnamurthy, 2013).

[2] A large empirical literature documents the stability and special pricing power of core deposits, which provides banks with a funding hedge (Hannan and Berger, 1991; Neumark and Sharpe, 1992; Driscoll and Judson, 2013; Drechsler et al., 2021).

[3] We provide a detailed description of the distinction between RCFs and SFPs in Section 2. RCFs lend to households and firms and include both broad-based lenders and institutions specialising in mortgages, car finance, leasing, or hire purchase. SFPs are a more heterogeneous group comprising credit and investment funds, real estate funds, and various special purpose vehicles (SPVs), including collateralised loan obligation (CLO) vehicles.

three million new instalment loans originated between 2022 and 2024, of which NBLs account for about 20% by both number and volume. The dataset spans the universe of business loans, personal loans (including asset financing), mortgages (consumer and commercial), and syndicated credit, covering both secured and unsecured lending. This comprehensive coverage provides a unique opportunity for a unified comparison of bank and non-bank lending during the period of rapid monetary policy tightening of 2022-2024.

Estimating the causal effect of monetary policy on credit supply is inherently challenging. Policy rates are endogenous to macroeconomic conditions, and observed lending outcomes reflect the joint equilibrium of credit demand and supply. We address these concerns using a heterogeneity design that exploits the distinct funding structures of lenders within the Irish credit market. Specifically, we compare the lending responses of NBLs and banks operating within the same domestic economy and under the same monetary policy regime. This differential approach effectively differences out aggregate, time-varying shocks — including the endogeneity of policy to euro area conditions — that affect all lenders simultaneously. Our setting further strengthens identification: as a small member of the euro area, Ireland takes the ECB's policy rate as exogenous to domestic economic conditions. In this respect, our identification strategy is similar to that in Jiménez et al. (2012) for Spain and Ioannidou et al. (2015) for Bolivia. To disentangle credit supply from demand, we employ high-dimensional fixed effects, including borrower–time fixed effects as in Khwaja and Mian (2008) and industry–location–size–time (ILST) fixed effects 'a la Degryse et al. (2019).

Our baseline results, estimated at the loan level, reveal a stark divergence in the pass-through of monetary policy to lending rates. We find that a one-percentage-point (pp) increase in the ECB deposit facility rate leads NBLs to raise interest rates on newly originated loans by 0.17 pp more than banks. This effect is highly statistically significant and robust across a range of specifications that flexibly control for unobserved credit demand. In contrast, we find that adjustments on the intensive margin of quantity — loan size — are economically modest, with only a 1% decline in loan size for a 1 pp increase in the monetary policy rate. While NBLs do reduce loan sizes slightly more than banks, these effects are relatively small, indicating that on the intensive margin, NBLs transmit monetary policy primarily through prices rather than quantities.[4]

While the intensive-margin adjustment occurs primarily through prices, it is coupled with a sharp contraction on the extensive margin of credit supply. While NBLs do not significantly shrink individual loan sizes, they aggressively reduce the number of loans they originate. At the county-lender level, a 1 pp policy rate increase is associated with NBLs reducing their total volume of new lending by approximately 6% and the number of new loans by 9% relative to banks. Furthermore, using firm-level data, we find that a 1 pp rate hike reduces a firm's probability of taking a loan from an NBL in a given quarter by 0.4 pp relative to a bank — an economically meaningful decline given the 8.5% average quarterly borrowing probability in our sample. As policy tightens, we also find that firms with a higher pre-existing reliance on NBLs shift their new borrowing toward the banking sector. This substitution is consistent with the widening cost wedge we document: as NBL credit becomes relatively more expensive, demand naturally flows toward the less constrained, deposit-subsidized banking sector. However, the magnitude of this shift

[4]We also examine effects on loan maturities in a loan-level regression but find economically insignificant results.

is relatively modest, suggesting that credit reallocation is only partial. Consequently, for borrowers unable to switch, the contraction in non-bank credit supply represents a net tightening of financial conditions rather than a complete substitution towards bank credit.

Next, we provide direct evidence that the heterogeneous response of banks and NBLs is rooted in the differences in their funding structures. Banks benefit from a deposit franchise that acts as a hedge against rising rates. We show that during the 2022–2024 tightening cycle, rates on overnight deposits — which account for nearly 90% of all deposits — remained virtually unchanged, while their volumes remained stable. This stickiness generated a significant funding subsidy, shielding banks' net interest margins from the rising monetary policy rate. In contrast, NBLs lack this endowment and operate as price-takers in wholesale markets, where funding costs reprice quickly with the policy rate. We show that the 30 largest NBLs — which collectively account for approximately 99.5% of all non-bank loans by count and 85% by volume — are, on average, highly leveraged and finance their activities predominantly with short-term debt, with a weighted-average ratio of short-term to total liabilities of nearly 80%.[5] This heavy reliance on short-term funding implies that NBLs' liability costs rise closely with the policy rate, tightening their balance sheet constraints exactly when banks are insulated by the stickiness of deposit rates.

To test this funding mechanism directly, we exploit heterogeneity in liability structures within the NBLs themselves. We show that NBLs with an above-mean reliance on short-term funding — those most exposed to a rapid liability repricing — exhibit a significantly stronger rate pass-through (by 0.21–0.23 pp) relative to banks. In sharp contrast, NBLs financed at longer maturities show no significant difference from banks. This finding implies that when NBLs secure term funding that matches the duration of their assets, thereby at least temporarily shielding their net worth against interest rate increase, their transmission behaviour becomes more similar to that of banks. Comparing the two non-bank groups directly confirms that short-term-funded NBLs pass through the policy rate significantly more than their long-term-funded peers, establishing liability duration as the critical determinant of the intermediary's balance sheet constraint.

Further, we examine heterogeneity within both the bank and non-bank sectors, which further validates the liability-driven mechanism. First, we disaggregate the banking sector into licensed banks and credit unions. Credit unions, which are funded almost exclusively by member retail deposits, effectively maximize the liability hedge. Consistent with our framework, they display a significantly lower pass-through (by 0.13 to 0.15 pp) than even licensed banks, while NBLs exhibit a high pass-through of about 0.15 pp relative to licensed banks.

Second, we examine heterogeneity within the non-bank sector by comparing RCFs and SFPs. Despite distinct business models — RCFs lend continuously like banks, while SFPs lend in lumpy, deal-specific transactions — both exhibit similarly elevated pass-through relative to banks. The case of SFPs is particularly instructive: many operate as Special Purpose Vehicles (SPVs) with CLO structures that finance lending on a "deal-by-deal" basis. Even when such entities issue longer-maturity debt for a specific deal, they lack a legacy liability pool to cross-subsidize new lending.[6] Consequently,

[5] These 30 NBLs comprise 27 RCFs and 3 SFPs.

[6] For most of SPVs we lack balance sheet data.

they are forced to price strictly at the current marginal cost of funds. The fact that these 'deal-by-deal' lenders behave similarly to short-term–funded RCFs confirms that exposure to market pricing — whether through short duration or deal-specific structures — is the common friction driving the non-bank transmission channel, and not intrinsic institutional characteristics or regulatory differences.

Finally, we show that the contraction in non-bank credit supply has economically meaningful real effects. Using firm-level balance sheet data, we find that borrowers with greater pre-existing exposure to non-bank lenders experience significantly worse real outcomes following monetary policy tightening than firms relying primarily on banks. A one percentage point increase in the policy rate is associated with a 1.6 to 2 percent larger contraction in fixed assets for NBL-dependent firms relative to bank borrowers. These adverse effects—also evident in employment, profitability, and leverage—grow monotonically with firms' reliance on non-bank credit. Taken together, this evidence shows that the "liability wedge" we identify is not merely a financial friction, but a mechanism that amplifies monetary shocks in the real economy when firms are unable to substitute from non-bank to bank funding.

Our paper contributes to three strands of the literature. First, we contribute to the literature on the credit channel of monetary policy by isolating the intermediary balance-sheet channel. This channel applies the financial accelerator logic of Bernanke et al. (1999) to the balance sheets of intermediaries rather than borrowers (Gertler and Karadi, 2011; He and Krishnamurthy, 2013). While empirical work confirms that banks' balance-sheet constraints drive credit supply (Kashyap and Stein, 2000; Jiménez et al., 2012), identifying the specific "financial accelerator" mechanism within banks is confounded by their unique structure. Banks possess a deposit franchise that acts as a "valuation shield" against monetary policy tightening, providing an interest-rate hedge (Hannan and Berger, 1991; Neumark and Sharpe, 1992; Driscoll and Judson, 2013; Drechsler et al., 2021), and face regulatory constraints that create a parallel "bank capital channel" (Van den Heuvel, 2002). We argue that NBLs, which lack both the deposit franchise and bank-specific capital requirements, serve as a cleaner laboratory for testing this channel. As a result, they more closely resemble the "pure" intermediaries of macro-finance theory: lacking the deposit hedge, deterioration in their net worth is directly reflected in their borrowing costs, forcing the sharp contraction in lending supply and increase in lending rates that we document — a contraction that naturally shifts credit demand towards the less constrained banking sector.

Second, we contribute to the growing literature on monetary policy transmission through non-bank lenders. The dominant view is that NBLs act as a "spare tyre," expanding credit relative to banks during tightening cycles and thereby attenuating transmission (Elliott et al., 2025; Cucic and Gorea, 2025; Bednarek et al., 2025; Banerjee and Serena, 2024; Agarwal et al., 2023; Xiao, 2020). The "dampening" effects found in prior work often rely on banks being constrained by capital requirements (Bednarek et al., 2025; Elliott et al., 2025), NBLs holding long-term debt (Cucic and Gorea, 2025), low leverage (Banerjee and Serena, 2024), or the unique liability structure of money market funds (Xiao, 2020). A notable exception is Enkhbold (2023), who finds that US shadow mortgage lenders amplify shocks due to funding fragility. Similarly, though unrelated to monetary policy, Aldasoro et al. (2025) challenge the "spare tyre" view in the context of global financial crises, showing that non-banks retrench credit significantly more than banks due to their lack of stable deposit funding. We show that when NBLs are leveraged and rely on short-term wholesale funding, they transmit monetary

policy more strongly than banks, exhibiting significantly stronger rate pass-through and a sharper contraction on the extensive margin.[7]

Finally, our analysis also broadens the scope of the non-bank intermediation literature. Existing research often focuses on specific segments such as corporate lending (Chernenko et al., 2022; Bednarek et al., 2025), syndicated loans (Irani et al., 2021; Chernenko et al., 2022; Banerjee and Serena, 2024; Aldasoro et al., 2025), fintech (Buchak et al., 2018; Gopal and Schnabl, 2022), mortgages (Enkhbold, 2023; Agarwal et al., 2023), or unsecured lending (Cucic and Gorea, 2025). We complement these studies by analyzing non-bank lending using a comprehensive dataset covering the full universe of term loans issued by both banks and NBLs in an advanced economy with an active non-banking sector. Importantly, our data span secured and unsecured products across all consumer and non-consumer segments. This breadth allows us to show that the funding-driven contraction we document is a structural feature of non-bank intermediation, not one tied to specific asset classes or market niches.

The rest of the paper proceeds as follows. Section 2 describes the data, institutional setting, and summary statistics. Section 3 outlines the empirical strategy and identification. Section 4 presents the baseline results on the intensive and extensive margins. Section 5 provides evidence to support the economic mechanism. Section 6 explores further lender-type heterogeneity. Section 7 offers the analysis of the real effects of monetary policy transmission through NBLs relative to banks, and, finally, Section 8 concludes.

2 Data and Institutional Settings

Credit in Ireland is supplied by two main types of institutions: banks, which take deposits, and NBLs, which do not and instead rely on wholesale or institutional funding. Banks comprise traditional licensed banks (including domestic and foreign institutions) and credit unions, which are member-owned cooperatives. Both accept deposits covered by a statutory deposit insurance scheme. Irish domestic banks function as universal lenders across business, mortgage, syndicated, and personal credit markets, while foreign banks are more concentrated in large corporate and syndicated lending. Credit unions remain focused on personal loans with some participation in consumer mortgages.

NBLs encompass a wide range of credit providers registered with the Central Bank of Ireland, primarily divided into *Retail Credit Firms* (RCFs) and *Specialised Finance Providers* (SFPs). RCFs are a statutory category authorised to lend to households and firms, serving as both broad-based lenders and specialists in areas such as mortgages, car finance, and leasing. SFPs are a more heterogeneous group comprising credit and investment funds, real estate funds, and various special purpose vehicles (SPVs), including collateralised loan obligation (CLO) vehicles. Their activity is concentrated in commercial mortgages, business loans, and leasing, often involving larger or more complex transactions than

[7] Crucially, in our sample, banks were well-capitalized following Basel III reforms, and the tightening cycle did not coincide with a strong recessionary asset-quality crisis, minimizing the regulatory constraints that typically trigger the "spare tyre" mechanism.

those served by RCFs. Together, RCFs and SFPs account for nearly all non-bank lending in Ireland.[8]

2.1 Data Source and Sample Construction

Our primary data source is the Irish Central Credit Register (CCR), a monthly credit registry that records all credit contracts above €500 originated by both banks and NBLs. Our working sample comprises approximately 3 million newly originated instalment (term) loans between 2022 and 2024, spanning business loans, consumer loans (including asset financing), mortgages (commercial and residential), and syndicated products.[9]

The CCR provides detailed information on new loans, including standard attributes such as interest rate, loan size, and maturity, as well as finer characteristics such as loan type (16 categories), interest rate type, and borrower type.[10] We identify all lenders in the CCR and classify them into banks and NBLs. Our sample consists of 335 lenders of which 219 are banks — comprising 19 licensed banks (5 domestic and 14 foreign) and 200 credit unions — and 116 are NBLs, comprising 27 RCFs and 89 SFPs.[11]

To complement the loan-level CCR data, we use Orbis Global (Moody's Analytics) to obtain balance sheet information for the 30 largest NBLs in our sample, which includes most RCFs. While NBLs are not subject to the same strict disclosure requirements as banks, making data for smaller firms sparse, these 30 institutions account for 99.5% of all non-bank loans in our data. Finally, to examine the real effects of credit supply, we obtain annual firm-level financial statements and employment data for non-consumer borrowers from Dun & Bradstreet.

Figures 1 and 2 provide an overview of NBL activity in our sample relative to banks. NBLs account for about 20% of total lending, whether measured by volume or count. RCFs originate a large number of relatively small loans, serving primarily consumers and small firms, whereas SFPs account for a smaller number of high-value loans concentrated

[8] Other non-bank lenders include high-cost credit providers, loan book holders, local authorities, and the National Asset Management Agency (NAMA). SFPs correspond to the "Others" category in the Central Bank of Ireland register; we adopt the "SFP" label for clarity.

[9] Credit card lending is excluded as it constitutes revolving credit without clear origination and maturity dates, and its pricing—based on carried balances, fees, and promotional offers—differs fundamentally from instalment loans. Other non-instalment products, such as overdrafts and revolving credit facilities, are also excluded because they lack fixed repayment schedules.

[10] Loan types include consumer products (e.g., personal loans, hire purchase, personal contract plans, leasing, home mortgages, buy-to-let mortgages, and premium financing) and non-consumer products (e.g., business loans, business hire purchase, business leasing, commercial mortgages, stocking finance, and syndicated loans). Interest rate structures are classified as fixed, variable, or mixed. Borrowers are identified as consumers or non-consumers (traders or firms), and loans may include one or more co-borrowers. For firms, enterprise size (micro, small, medium, large) follows the European Commission Recommendation 2003/361/EC. The CCR also contains information on organisational form and institutional sector classification.

[11] Note that we exclude from our analysis loans issued by NBLs such as high-cost credit providers, loan book holders, local authorities, and the National Asset Management Agency (NAMA). Many of these NBLs only originate loans sporadically, account for a very small portion of lending, and/or do not have data available on them.

in corporate lending. Notably, NBLs are active in nearly all loan segments except syndicated loans.[12]

Geographically, NBLs have a broad footprint across Ireland. Figure 3 plots the share of new lending volume provided by NBLs across counties. Their activity is not exclusively concentrated in Dublin; they are active in virtually all counties. When separated by borrower type (Figure 4), non-bank consumer lending is relatively uniform across counties. While non-consumer lending exhibits greater regional variation, every county still has a meaningful non-bank presence.

2.2 Summary Statistics

Tables 1 and 2 present summary statistics for our loan-level sample, which contains 2,989,405 distinct loan contracts. About 90% of loans are issued to consumer borrowers, whereas the remaining 10% are to non-consumers. Banks issue 79% of these loans, and NBLs issue 21%. Among bank loans, roughly 58% originate from credit unions, while among NBLs most loans are originated by RCFs.

Because some loans involve multiple borrowers, and our empirical strategy controls for credit demand by interacting borrower fixed effects with other dimensions, we duplicate loans that list co-borrowers. This increases our overall working sample by about 7% to 3,189,778 observations.[13]

Table 1 shows that average loan interest rates at origination are 7.6%, with slightly higher rates for banks than for NBLs. Table 2 further breaks down banks into licensed banks and credit unions, showing that licensed banks charge rates comparable to RCFs, while credit unions charge the highest rates and SFPs the lowest.

In terms of loan volumes, banks on average originate larger loans than NBLs. However, this masks heterogeneity: Table 2 reveals that licensed banks issue substantially larger loans than credit unions, reflecting their greater involvement in syndicated, business, and mortgage markets. Similarly within NBLs, SFPs originate markedly larger loans than RCFs, consistent with their focus on large business transactions. Finally, loan maturities average 53 months in the full sample. Banks issue loans with somewhat longer maturities (56 months) than NBLs (42 months), driven mainly by licensed banks (77 months) due to their large share of mortgages.

3 Empirical Strategy and Identification

The goal of our analysis is to estimate how monetary policy affects the lending outcomes (interest rates, volume, and maturities) of NBLs relative to banks. Analysing the effects of monetary policy on credit supply is inherently challenging. Policy rates are endogenous—set in response to macroeconomic conditions and partly anticipated—and monetary

[12] For brevity of exposition, we aggregate sixteen loan types into six categories: business-related loans, personal loans (including asset financing), mortgages (commercial and consumer), syndicated loans, and other types. In the regression analysis, however, we control for loan type in a disaggregated manner.

[13] Excluding co-borrowers from the regressions does not materially affect the results as we control for loans with co-borrowers directly in our regressions.

policy influences both credit demand (through the balance sheet channel) and credit supply (through the bank lending channel).

We address these concerns in several ways. First, we adopt a heterogeneity design, estimating differential responses of NBLs relative to banks. This substantially mitigates endogeneity for three reasons: (i) monetary policy decisions, even when endogenous to euro area conditions, affect all lenders simultaneously, so comparing NBLs to banks differences out the common component; (ii) both groups operate in the same domestic environment under the same central bank policy, reducing the risk of omitted aggregate factors; and (iii) our focus is on relative transmission mechanisms (e.g. funding structures, business models) that are not the object of the ECB's endogenous reaction. Finally, Ireland's position as a small open economy further strengthens identification: the policy rate is set for the entire euro area and is therefore far less endogenous to Irish-specific conditions than to those of larger member states. Our baseline measure of monetary policy is the ECB facility rate, but all results are robust to using monetary policy shocks identified using high-frequency data (Jarociński and Karadi, 2020; Altavilla et al., 2019). Thus, our identification strategy relates in spirit to Jiménez et al. (2012), who exploit the fact that euro area policy decisions are exogenous to Spanish conditions, and Ioannidou et al. (2015), who use the U.S. federal funds rate as an exogenous instrument for Bolivian interest rates.

To isolate the effect of monetary policy on credit supply from shifts in credit demand, we control for unobserved time-varying borrower characteristics using fixed effects. Following Khwaja and Mian (2008), we saturate our baseline specification with borrower–time fixed effects. A key limitation of this approach is that it requires borrowers to maintain relationships with multiple lenders, thereby excluding single-lender borrowers and potentially biasing the analysis toward firms with multi-lenders. To address this concern, we also adopt the approach of Degryse et al. (2019), who propose using industry–location–size–time (ILST) fixed effects as an alternative demand control.[14]

Since ILST fixed effects are by definition only available for non-consumer borrowers, we adopt the closest analogue feasible when analysing all loans (consumer and non-consumer) jointly and consumer loans alone. A key challenge in consumer credit is that, unlike firms, consumers rarely borrow repeatedly even at annual frequency, making the standard borrower–time fixed effects even more problematic than with firms. Moreover, consumer loans are not direct substitutes: households take mortgages, car loans, or personal loans for different purposes, often linked to life-cycle stage or affluence. These observable dimensions — loan type (loan market segment), borrower category (consumer, trader, firm), and location (county) — nevertheless contain rich information about underlying credit demand. By grouping borrowers into cells defined by loan market segment, borrower type, location, and time, (i.e., the SBLT fixed effects), we absorb common demand shocks within each cell. This approach is similar in spirit to the industry–location–size–time fixed effects of Degryse et al. (2019) for firms but tailored to consumer lending, allowing us to retain both single- and multi-lender borrowers while flexibly controlling for demand.

[14] Our definition of industry follows the one-digit NACE section level rather than the finer two-digit classification used in Degryse et al. (2019). While coarser, this grouping continues to absorb sectoral demand heterogeneity across broad economic activities.

3.1 Baseline Specification: Loan-Level Analysis

Our baseline specification for analysing the heterogeneity of monetary policy effects on NBL lending relative to banks is given by

$$y_{b,i,l,t} = \alpha_{b,t} + \alpha_i + \beta\, D_i(\text{NBL}) \times \text{MPRate}_{t-1} + \gamma' Z_l + \epsilon_{b,i,l,t}, \tag{1}$$

where the dependent variable $y_{b,i,l,t}$ is a loan-level outcome at origination for loan l issued by institution i to borrower b in quarter t. We examine three outcomes: the loan interest rate, the logarithm of loan size (in €), and the logarithm of loan maturity (in months).[15] The indicator $D_i(\text{NBL})$ equals one for non-bank lenders and MPRate_{t-1} is the lagged ECB deposit facility rate. Thus, β captures the differential effect of monetary policy on NBLs relative to banks. To absorb unobserved credit demand, we include borrower–quarter fixed effects, $\alpha_{b,t}$, in the spirit of Khwaja and Mian (2008). Lender fixed effects, α_i, control for time-invariant heterogeneity across lenders, such as size or business model. Finally, we include loan-level controls Z_l, such as contractual maturity, interest rate type, and market segment. Standard errors are clustered at the borrower–lender level to allow for arbitrary correlation in residuals across multiple loans within a borrower–lender relationship.[16]

Note that we define our specification using the level of the monetary policy rate, rather than first differences, to accurately capture the liability wedge — specifically, the widening cost differential between banks' insensitive deposit franchise and NBLs' market-priced wholesale funding. The financial pressure on NBLs stems from the absolute cost of funding, not the rate of change. Since NBLs must frequently roll over short-term wholesale debt, they face elevated interest expenses as long as rates remain high, whereas banks remain shielded by sticky deposit rates. Using first differences would incorrectly treat periods of stable but restrictive rates as a "zero shock," implying NBLs recover their competitive position the moment rate hikes pause. Moreover, given that our sample spans the rapid tightening cycle of 2022–2024, the level of the rate serves as the best proxy for the cumulative tightening of financial conditions. Differencing in such a focused period would obscure the regime shift, failing to capture how the cost of capital progressively binds NBL balance sheets.

3.2 Extensive Margin Analysis

To study how non-bank lending responds to monetary policy at the extensive margin relative to bank lending, we proceed in two steps. First, we examine the response of aggregate — both consumer and non-consumer — lending volumes and loan counts at

[15] When focusing on firms and studying lending volumes, we aggregate across all loans l received by borrower b from lender i in quarter t. The outcome variable is then the logarithm of the total credit extended to firm b by lender i in quarter t, rather than the logarithm of loan amount.

[16] We do not cluster standard errors by time for two reasons. First, our preferred specification already includes borrower–quarter fixed effects ($\alpha_{b,t}$), which absorb all common shocks affecting borrowers within a given quarter. Because these fixed effects remove any quarter-specific variation in the residuals, an additional cluster correction along the time dimension would be redundant. Second, our sample spans only three years or twelve quarters, which provides too few time clusters for reliable cluster-robust inference (Cameron and Miller, 2015).

the lender level. Second, using firm-level data, we analyse loan availability to firms from banks versus NBLs.[17]

To examine the effect of monetary policy on lending aggregated at the lender level, we estimate

$$y_{i,c,t} = \alpha_{i,year(t)} + \alpha_{c,t} + \beta\, D_i(\text{NBL}) \times \text{MPRate}_{t-1} + \epsilon_{i,c,t}, \tag{2}$$

where the dependent variable $y_{i,c,t}$ is the lender–county-quarter outcome, measured either as the logarithm of total new lending volume or as the logarithm of the number of new loans originated by lender i in county c in quarter t. As before, the indicator $D_i(\text{NBL})$ equals one for non-bank lenders, and MPRate_{t-1} denotes the lagged ECB deposit facility rate. The coefficient β captures the differential effect of monetary policy to NBLs relative to banks. We include lender–year fixed effects, $\alpha_{i,year(t)}$, to absorb time-varying heterogeneity across lenders, and quarter-county fixed effects, $\alpha_{c,t}$, to account for aggregate demand shocks in a given county. Standard errors are clustered by lender-county.

To examine how loan availability to non-consumers (firms and traders) from banks versus NBLs changes with monetary policy, we estimate the following linear probability model:

$$D_{b,j,t}(\text{Loan}) = \alpha_{b,t} + \beta_0 D_j(\text{NBL}) + \beta\, D_j(\text{NBL}) \times \text{MPRate}_{t-1} + \epsilon_{b,j,t}, \tag{3}$$

where the dependent variable $D_{b,j,t}(\text{Loan})$ equals one if firm b obtains a loan from lender type $j \in \{\text{bank}, \text{NBL}\}$ in quarter t, and zero otherwise. This specification is estimated on a stacked firm×lender-type×quarter panel. $D_j(\text{NBL})$ indicates whether credit comes from an NBL or a bank and MPRate_{t-1} denotes the lagged ECB deposit facility rate. The coefficient β captures the differential effect of monetary policy on the probability of borrowing from NBLs relative to banks. To absorb unobserved credit demand, we include borrower–quarter fixed effects, $\alpha_{b,t}$, following Khwaja and Mian (2008). Standard errors are clustered at the firm level.[18]

Finally, we examine whether borrowers tend to *substitute* NBL credit with that provided by banks following monetary policy tightening. To this end, we estimate a linear probability model in which the dependent variable $D_{b,l,t}(\text{NBL})$ equals one if loan l obtained by borrower b in quarter t is originated by an NBL and zero if it is issued by a bank.[19] Our identification strategy exploits cross-sectional differences in firms' pre-tightening reliance on NBLs by interacting the monetary policy rate with a measure of firm-level exposure to non-bank credit prior to the tightening cycle. Specifically, we

[17] In the analysis of loan availability, we focus only on non-consumer lending because unlike firms, the same consumers rarely borrow on a quarterly basis–even at annual frequency such events are very scarce.

[18] We also estimate equation (3) without conditioning on lender type j — that is, at the firm–quarter level rather than the firm–lender_type–quarter level—for all loans combined, and separately for bank and non-bank loans.

[19] In this specification, we do not aggregate loans at the firm level but retain the firm-loan-quarter level. This is important because some lending from banks and NBLs may be complementary rather than strictly substitutive. Maintaining the loan-level dimension allows us to account for differences across loan types when analysing substitutive behaviour.

define

$$\text{NBLExposure}_{b,2020\text{–}21} = \frac{\text{Total borrowing of firm } b \text{ from NBLs in 2020–2021}}{\text{Total borrowing of firm } b \text{ from NBLs and banks in 2020–2021}}, \tag{4}$$

which captures the share of a firm's borrowing sourced from NBLs before rates began to rise. The estimated specification is

$$D_{b,l,t}(\text{NBL}) = \alpha_t + \alpha_{b,\text{year}(t)} + \beta\, \text{NBLExposure}_{b,2020\text{–}21} \times \text{MPRate}_{t-1} + \gamma' Z_l + \epsilon_{b,l,t}, \tag{5}$$

where Z_l denotes loan-level controls such as contractual maturity, interest-rate type, and market segment; depending on the fixed-effects structure, we also include $\text{NBLExposure}_{b,2020\text{–}21}$. Across specifications, we include different sets of fixed effects. In the baseline regression, α_t denotes quarter fixed effects, while $\alpha_{b,\text{year}(t)}$ represents firm-year fixed effects.[20]

3.3 Economic Mechanism

Unlike banks, NBLs lack access to deposits — a cheap and stable source of funding — and instead rely primarily on wholesale funding, which is considerably more sensitive to monetary policy. This reliance can make NBLs more exposed to policy rate changes, particularly when their liabilities are tilted toward short-term debt.

To test this mechanism directly, we exploit loan-level data and examine whether NBLs' sensitivity to monetary policy increases with their dependence on short-term funding. We proceed in two steps.

First, we re-estimate equation (1) while explicitly distinguishing between NBLs with relatively short- versus long-term funding profiles. We define two mutually exclusive dummy variables at the lender-year level, $D_{i,y-1}(\text{STF})$ and $D_{i,y-1}(\text{LTF})$, equal to one for NBLs whose ratio of short-term funding is above or below, respectively, the sample mean across all NBLs in a given year. We then estimate:

$$y_{b,i,l,t} = \alpha_{b,t} + \alpha_i + \beta_1\, D_{i,y-1}(\text{STF}) \times \text{MPRate}_{t-1} + \beta_2\, D_{i,y-1}(\text{LTF}) \times \text{MPRate}_{t-1} + \gamma' Z_l + \epsilon_{b,i,l,t}, \tag{6}$$

where all variables are defined as before. The coefficient β_1 captures the marginal effect of monetary policy on lending outcomes for NBLs that rely more heavily on short-term funding relative to banks, while β_2 reflects the relative response for those funded predominantly at longer maturities. Standard errors are clustered at the borrower–lender level.

Second, we restrict the sample to loans originated by NBLs and directly compare the response to monetary policy between short- and long-term funded NBLs. Specifically, we estimate:

$$y_{b,n,l,t} = \alpha_{b,t} + \alpha_n + \beta\, D_{n,y-1}(\text{STF}) \times \text{MPRate}_{t-1} + \gamma' Z_l + \epsilon_{b,n,l,t}, \tag{7}$$

where the dependent variable $y_{b,n,l,t}$ denotes a loan-level outcome at origination for loan l issued by NBL n to borrower b in quarter t. The borrower-time and NBL fixed effects are denoted by $\alpha_{b,t}$ and α_n, respectively. As before, we consider three outcomes: the loan

[20] We cannot control for firm-quarter fixed effects because they would absorb the policy interaction term.

interest rate, the logarithm of loan size (in euros), and the logarithm of loan maturity (in months). The coefficient β measures the differential sensitivity of short-term-funded NBLs relative to long-term-funded NBLs. Standard errors are again clustered at the borrower–lender level.

3.4 Real Effect of Monetary Policy

To study real effects of monetary policy transmission through NBLs relative to banks, we examine whether firms more exposed to non-bank credit respond differently to changes in the policy rate than firms less exposed to such credit. Specifically, we estimate the following firm-year regression:

$$\text{Outcome}_{b,t} = \alpha_b + \alpha_t + \beta D_b\,(\text{NBLExp}) \times \text{MPRate}_{t-1} + \gamma' \text{Controls}_{b,t-1} + \varepsilon_{b,t}, \qquad (8)$$

where $D_b\,(\text{NBLExp})$ is a firm-level indicator equal to one if firm b's exposure to non-bank lending satisfies $\text{NBLExposure}_{b,2020\text{–}21} \geq x$, with $x \in [0,1]$ denoting a threshold that captures the intensity of reliance on NBL credit. As before, $\text{NBLExposure}_{b,2020\text{–}21}$ measures firm b's share of borrowing from NBLs as a fraction of total borrowing over the period 2020–2021, and is defined in equation (4).

The specification includes firm fixed effects (α_b), year fixed effects (α_t), and lagged firm-level controls. Identification exploits differential exposure to NBL credit across firms interacted with aggregate monetary policy movements. Crucially, we control for time-varying industry-specific sensitivity to monetary policy (Industry $\times$ MPRate), ensuring that our results are not driven by NBL borrowers clustering in sectors that are naturally more sensitive to interest rates. The identifying assumption is that, conditional on firm and year fixed effects, exposure to NBL borrowing in 2020–2021 is orthogonal to time-varying shocks affecting firm outcomes other than through differential monetary policy transmission. By construction of $\text{NBLExposure}_{b,2020\text{–}21}$ and to mitigate endogeneity concerns, the regression is estimated on the subset of firms with borrowing activity during 2020–2021. Standard errors are clustered at the firm level. Firm fixed effects absorb time-invariant heterogeneity, and industry-specific responses to monetary policy are controlled for directly, so residual dependence is primarily within firms over time.

4 The Monetary Policy Transmission through NBLs

In this section, we present our baseline results on the effect of monetary policy on new lending by NBLs relative to banks. First, using loan-level data, we examine pass-through to interest rates and transmission to quantities and maturities. We find that NBL lending outcomes are more sensitive to policy changes, with most of the adjustment occurring through prices. Second, we assess whether this stronger pass-through to lending rates also affected the extensive margin of credit supply.

4.1 Baseline Results: Loan-Level Evidence

Table 3 presents the main results from estimating equation (1), which examines how monetary policy affects non-bank lending relative to banks using the full sample of loans. We analyze three loan-level outcomes: the interest rate at origination (Panel A), the

logarithm of loan size (Panel B), and the logarithm of loan maturity (Panel C). Each panel reports results under alternative fixed-effect specifications for robustness. Columns (3) and (4) present our baseline specifications with borrower–year and borrower–quarter fixed effects, respectively, which identify the differential response of NBLs relative to banks for the same borrower within a given year or quarter. Column (5) reports results with segment–borrower-type–location–time (SBLT) fixed effects, where time corresponds to the quarter, allowing us to include borrowers with only a single lender type.

We find that a one-percentage-point increase in the monetary policy rate leads to a higher pass-through by NBLs relative to banks of 0.15-0.17 percentage points. This effect is highly statistically significant and robust across specifications with borrower–time fixed effects and our SBLT fixed effects, while the less restrictive specifications in columns (1) and (2) yield slightly larger estimates. By contrast, although monetary policy has a negative effect on non-bank loan volumes and maturities relative to banks, these effects are economically small. Since the dependent variables in Panels B and C are in logs, the OLS coefficients represent percentage changes: a one-percentage-point policy rate increase reduces loan size or maturity by only about 1–2%, which is relatively modest compared with the response in prices. In the next section, we examine a corresponding effect on the extensive margin.

Tables 4 and 5 report results from estimating equation (1) separately for consumer and non-consumer loans. Note that for non-consumers, in Table 5, we use ILST fixed effect instead of SBLT.[21] The findings confirm our all-loan analysis: NBL lending outcomes are more sensitive to monetary policy changes than those of banks, the difference effect is economically significant for loan rates (Panel A), while it is modest for loan volumes (Panel B), and loan maturities (Panel C). We find that NBLs pass through more to interest rates on consumer loans than on non-consumer loans. For consumer loans, NBLs pass through 0.15–0.19 percentage points more to lending rates per one-percentage-point policy rate increase, compared with 0.11–0.12 for non-consumer loans. For both loan types, monetary policy has a relatively more negative effect on NBL loan size and maturity than on banks, but these differences are not economically significant (Panels B and C).

4.2 Extensive Margin

While our baseline results show that NBLs pass through monetary policy more strongly to lending rates than banks, the effects on loan size and maturities are economically modest. This relatively small adjustment on the intensive margin of quantities raises the question of whether policy instead operates through the extensive margin. The loan-level regressions in equation (1) capture only the intensive margin — the terms of loans that are originated. In this subsection, we turn to the extensive margin and ask whether NBLs contract lending more sharply than banks. We approach this from two angles. First, at the lender level, we test whether NBLs reduce the volume or number of new loan originations more than banks. While this comparison helps to reveal heterogeneous policy effects on lending, it does not distinguish whether the changes

[21] The outcome variable in Panel B of Table 5 is the logarithm of a firm's new debt—that is, the sum of all loans obtained by firm i from lender l in quarter t—rather than the logarithm of individual loan size. Accordingly, these regressions do not include loan-level controls.

are driven by supply constraints or shifts in borrower demand. We address this issue via aggregate lending at the lender-county level to control for common demand shocks within a county. Second, at the borrower level, we analyse whether non-consumers (firms and traders) are less likely to obtain credit from NBLs relative to banks when policy tightens.[22] By including firm×time or ILST fixed effects, we absorb demand-side shocks and can thereby isolate the supply channel better.

Table 6 reports the results of estimating equation (2), which examines how new lending volumes and loan counts at the lender level respond to changes in the policy rate. Panel A presents results at the lender level, showing that a one–percentage-point increase in the deposit facility rate lowers new lending volume by NBLs relative to banks by about 4% and the number of new loans by roughly 7%, controlling for lender–year and quarter fixed effects. Although these effects are both economically and statistically significant, this specification does not distinguish whether the heterogeneous response reflects differences in credit supply or demand. To address this, Panel B re-estimates equation (2) at the lender–county level, aggregating lending within each county and including county–quarter fixed effects to absorb local demand shocks. The results indicate that a one–percentage-point increase in the policy rate reduces NBL loan volumes relative to banks by around 6% and the number of new loans by about 9%.

Table 7 reports results from the borrower-level linear probability in equation (3), showing that firms are less likely to obtain credit from NBLs when monetary policy tightens. Using borrower-quarter fixed effects in a stacked bank/NBL panel, we estimate that a one-percentage-point increase in the policy rate reduces the probability of obtaining a loan from an NBL by about 0.4 percentage points relative to banks (see Table 7, column 4). While the effect is modest in absolute terms, it is meaningful relative to the baseline probability of borrowing in a given quarter (around 8–9 percentage points), implying a notable drop in credit access from NBLs as rates rise.

Table 7 also shows that the overall probability of obtaining any loan declines with policy tightening — especially from NBLs — which is consistent with the negative interaction effect. At the same time, a slight increase in the probability of obtaining credit from banks suggests some switching from NBLs to banks, a possibility we explore further in the next exercise.

To explore the extent to which firms reallocate borrowing away from NBLs toward banks as monetary policy tightens, Table 8 presents the results of the switching regression from equation (5). In this specification, the dependent variable equals one if a newly issued loan is originated by an NBL and 0 if by a bank. The key explanatory variable is the interaction between a firm's prior NBL exposure (its share of total borrowing from NBLs during 2020-21) and the lagged policy rate.

The estimated coefficient implies that a one-percentage-point increase in the policy rate reduces the probability that a fully NBL-exposed firm obtains its next loan from an NBL relative to a bank by about 1 percentage point (column 4). With a 4.5 pp rise in the policy rate during 2022-2023, this corresponds to roughly a 4.5 pp drop in NBL usage in favor of banks — or about a 10 % decline relative to the baseline exposure effect. The result is robust across alternative fixed-effect structures (borrower, borrower-year, and industry-location-size-quarter). These findings provide evidence that as policy tightens, firms with a higher pre-existing reliance on NBLs shift their new borrowing

[22] For this credit availability regression, we restrict the analysis to non-consumer borrowers, as the estimation relies on repeated interactions between firms and lenders.

toward the banking sector. This substitution is consistent with the widening cost wedge we document: as NBL credit becomes relatively more expensive, demand naturally flows toward the less constrained, deposit-subsidized banking sector. However, the magnitude of this shift is relatively modest, suggesting that credit reallocation is only partial. Consequently, for borrowers unable to substitute, the contraction in non-bank credit supply represents a net tightening of financial conditions rather than a complete substitution towards bank credit.

While the price discrepancy between banks and NBLs drives some substitution, the banking sector does not fully absorb the credit demand shed by NBLs. This incomplete substitution can be rationalized by the marginal cost of bank funding. The "deposit shield" we identify — stable, low-rate funding — is largely an endowment tied to the bank's existing franchise; it cannot be scaled up instantaneously to fund a massive expansion in lending.

If banks were to aggressively expand their balance sheets to accommodate all borrowers fleeing the non-bank sector, they would eventually exhaust their stable deposit base and be forced to fund the marginal loan with wholesale liabilities. As shown in Figure 6, the cost of wholesale funding rises one-for-one with the policy rate. Consequently, a bank funding the marginal loan with wholesale debt faces the same high cost of capital as an NBL. At this margin, the "liability advantage" of the bank disappears, and the bank lending channel binds: banks rationally ration credit rather than lending at unprofitable rates or expanding into expensive wholesale markets. Thus, the frictional nature of deposit supply acts as a capacity constraint, preventing the banking sector from acting as a perfect substitute for the contracting non-bank sector.

5 The Economic Mechanism

In this section, we provide evidence supporting the economic mechanism underlying the higher sensitivity of non-bank lending to monetary policy. A key distinction between banks and NBLs is that NBLs lack access to deposit funding and instead rely on wholesale funding. A large empirical literature documents the relative stability of deposits and the lower interest-rate sensitivity of deposit rates compared with wholesale funding, highlighting its natural hedge against liquidity and interest rate risk (Hannan and Berger, 1991; Neumark and Sharpe, 1992; Gatev and Strahan, 2006; Driscoll and Judson, 2013; Hahm et al., 2013; Drechsler et al., 2021).[23]

Theoretically, the bank lending channel operates because intermediaries face an external finance premium (EFP) on their non-deposit sources of funding (Bernanke, 2007; Gertler and Karadi, 2011; He and Krishnamurthy, 2013). However, banks benefit from a "valuation shield" via their deposit franchise, which keeps their average cost of funds low even as rates rise. Unlike banks, NBLs rely exclusively on wholesale funding, leaving them fully exposed to the EFP. Consequently, an increase in the monetary policy rate raises NBLs' funding costs disproportionately more than in the case of banks, which also severely compresses their net interest margins relative to banks. To preserve their net worth, NBLs are forced to pass through policy changes more strongly to borrowers and, amid rising funding costs, to contract lending volumes sharply.

[23] A large theoretical literature proposes the rationale behind the relative stability of deposits and their shielding effect on banks (Gorton and Pennacchi, 1990; Kashyap et al., 2002; Huang and Ratnovski, 2011; Hanson et al., 2015).

This mechanism relies on two structural features of non-bank intermediation. First, NBLs must be highly leveraged. If NBLs operated under low leverage, they could absorb the funding shock without contracting (Banerjee and Serena, 2024). However, we show in Panel A of Table 9 that equity ratios for the 30 largest NBLs in our sample, which account for 99.5% of all loans by count and 85% by volume, are low. The table confirms that our NBLs are highly leveraged, with the median equity-to-asset ratio just 0.14–0.17. When weighted by loan volume, the ratio drops to roughly 0.01–0.03. This implies that the bulk of new non-bank lending is originated by intermediaries with extremely high leverage, making their lending capacity highly sensitive to net worth erosion.

Second, NBLs' debt must be of short maturity. If NBLs were financed predominantly by long-term debt, their funding costs would be temporarily insulated from policy rate hikes, potentially dampening transmission (Cucic and Gorea, 2025). By contrast, reliance on short-term funding forces frequent rollovers at new market rates, directly transmitting the policy rate change to the intermediary's balance sheet. Panel B of Table 9 shows that NBLs in our sample are heavily reliant on short-term debt: the mean and median ratios of short-term to total liabilities are close to two-thirds, reaching nearly four-fifths when weighted by loan volume. This confirms that NBLs lack the duration shield provided by long-term liabilities, leaving them exposed to immediate repricing risk.

Finally, we verify that the "deposit shield" for banks is active in our sample. Although the stability of deposit funding is well documented, we confirm it holds during the 2022–2024 tightening cycle. Figure 5 plots aggregate interest rates and volumes for household and firm deposits. Panel A shows that the interest rate on overnight deposits (approximately 90% of the total) remained virtually unchanged throughout the cycle, despite the sharp rise in policy rates. Panel B demonstrates that deposit volumes were remarkably stable. This combination of price insensitivity and volume stability generated a significant funding subsidy for banks. In sharp contrast, euro area money market rates (Figure 6) — which proxy for NBL wholesale costs — moved almost one-for-one with the policy rate. This divergence highlights the liability wedge: banks were insulated by the deposit franchise, while NBLs absorbed the full force of the monetary contraction.

We next move from cross-institutional evidence — comparing banks with NBLs — to a more formal analysis of within-NBL heterogeneity in funding composition, focusing on differences in short-term funding exposure among NBLs. If our proposed mechanism is correct, NBLs that rely more heavily on short-term funding should exhibit greater sensitivity to monetary policy. We test this prediction in two ways. First, we compare the monetary policy sensitivity of short- versus long-term-funded NBLs relative to banks. Second, we examine the monetary policy sensitivity of short- relative to long-term-funded NBLs.

Table 10 compares the monetary policy sensitivity of short- versus long-term-funded NBLs relative to banks using the full sample of loans. Consistent with the funding-structure hypothesis, NBLs with an above-mean ratio of short-term to total liabilities — captured by the dummy variable $D(\text{STF})$ — display a stronger pass-through of policy rate changes, transmitting roughly 0.21-0.23 percentage points more to lending rates than banks. In contrast, NBLs with below-mean short-term funding ratios either do not differ significantly from banks or exhibit weaker pass-through (column (5)). The results

for loan size (Panel B) and loan maturity (Panel C) are broadly consistent, with short-term-funded NBLs showing stronger contractionary effects on both margins.[24]

We then test the mechanism directly within the NBL sector by re-estimating the specification using only NBL-originated loans (Table 11). The results confirm that short-term-funded NBLs exhibit significantly stronger monetary policy pass-through relative to long-term-funded NBLs, with magnitudes similar to those obtained in the full-sample analysis.

6 Lender-Type Heterogeneity in Monetary Policy Transmission

In this section, we examine the robustness of our results along an additional dimension of institutional heterogeneity. Throughout the main analysis, all deposit-taking institutions were grouped together as "banks." However, within this category, lenders differ in the extent to which they rely on *retail deposit funding* — the key dimension underlying our mechanism. A particularly relevant subgroup is *credit unions*. In Ireland, credit unions are member-owned cooperative financial institutions that provide savings and loan services to members of a defined community or occupational group. They operate under the Credit Union Act 1997 and are supervised by the Central Bank of Ireland. Irish credit unions are funded almost entirely by member savings — withdrawable shares and deposits — which constitute retail liabilities protected by the Deposit Guarantee Scheme up to €100,000 per member per institution (CBI, 2025).

Because credit unions rely exclusively on retail funding, our economic mechanism predicts that they should be the *least* sensitive to monetary policy, thus exhibiting the weakest pass-through to lending rates. We test this prediction by re-estimating equation (1) using the loan interest rate at origination as the outcome variable and distinguishing among three lender types: licensed banks (base category), credit unions, and NBLs. The results, reported in Panel A of Table 12, confirm this prediction. Credit unions display a substantially lower monetary policy pass-through to lending rates — by about 0.13–0.15 percentage points per one-percentage-point increase in the policy rate — relative to licensed banks. At the same time, controlling explicitly for credit unions leaves the estimated NBL differential virtually unchanged: NBLs continue to exhibit roughly 0.15 percentage-point stronger pass-through than banks per one-percentage-point policy rate increase.

Next, we examine the robustness of our results to heterogeneity *within* the NBL type. As discussed earlier, NBLs are divided into two broad groups: *Retail Credit Firms* (RCFs), which constitute a statutory category, and *specialised finance providers* (SFPs) — a residual group that includes investment funds, real estate vehicles, and special purpose vehicles. RCFs are active across both consumer markets (mortgages, hire purchase, personal contract plans, and personal loans) and business markets (leasing, hire purchase, and stocking finance). SFPs, by contrast, focus primarily on business lending — especially commercial mortgages, leasing, and hire purchase. While RCFs operate more like banks, originating and holding diversified loan portfolios composed of

[24] Short-term-funded NBLs account for approximately 65% of all NBL loans, while long-term-funded NBLs represent the remaining 35%, providing a sufficiently large sample for reliable identification.

numerous smaller loans, SFPs typically originate large, infrequent, and more idiosyncratic loans. The composition of SFP lending varies markedly from year to year, suggesting a pattern that is more demand-driven. Distinguishing between these two NBL types in our regression analysis therefore helps mitigate potential demand-side influences on the estimated policy transmission.

We re-estimate equation (1) using the loan interest rate at origination as the outcome variable and distinguishing between RCFs and SFPs. The results, reported in Panel B of Table 12, show that differentiating between NBL types does not alter our main findings: both RCFs and SFPs exhibit a similar degree of monetary policy pass-through to lending rates, comparable to the estimates obtained when NBL heterogeneity is not explicitly accounted for. This confirms that our results are robust to institutional differences within the NBL type.

While we lack granular balance sheet data for many SFPs, their institutional structure offers a clear economic rationale for their high sensitivity to monetary policy. A substantial portion of SFP lending — particularly in commercial real estate and corporate finance — is done by Specialised Purpose Vehicles (SPVs) structured as CLOs. Unlike banks or RCFs that fund new loans from a commingled pool of liabilities with a blended average cost of funds and existing funding pool, SFPs often operate on a "deal-by-deal" basis. Each new loan originated via an SPV must be fully financed at the current marginal market rate at the moment of origination. They have practically no legacy "back book" of cheaper funding to cushion the rise in their marginal funding costs. Therefore, even if standard RCFs are highly sensitive due to short-term wholesale liabilities, deal-based SFPs should be at least as sensitive, as their relevant cost of funds is purely marginal and immediately reflects the new policy rate environment. The comparable pass-through estimates for RCFs and SFPs in Table 12 are consistent with this mechanism: both lack the deposit franchise that insulates banks, leaving them fully exposed to market repricing, albeit through different funding channels: the marginal-cost-of-origination channel in the case of CLO structured SFPs, in parallel to the short-term wholesale funding exposure of RCFs.

7 Real Effects of Monetary Policy

We study the real effects of monetary policy transmission through NBLs relative to banks by analysing how firms with greater exposure to non-bank credit respond to changes in the policy rate compared with firms that rely more heavily on bank credit. Specifically, we estimate equation (8) at the firm-year level. The estimation sample consists of firms that were actively borrowing in 2020–2021 from either banks or NBLs (or both), while firm outcomes are observed over the full sample period 2020–2024.

Table 13 reports summary statistics for the firm-level variables used in the estimation. Firms are classified into three groups based on their borrowing activity during the 2020–2021 reference period: "Banks" comprises firms that borrowed exclusively from banks; "NBLs" comprises firms that borrowed exclusively from non-bank lenders; and "Mixed" comprises firms that borrowed from both sources. Table 13 shows that firms borrowing exclusively from non-bank lenders are, on average, larger and slightly more profitable than bank-only borrowers. While mixed borrowers tend to be the largest at the median, the overall distributions of balance sheet size, leverage, profitability, and liquidity are broadly comparable across funding types. In particular, median firm size, leverage ratios,

and employment are of similar magnitudes across groups, suggesting that firms relying on NBL credit are not fundamentally different from bank borrowers along observable characteristics. This supports the interpretation that subsequent differences in real outcomes reflect differential monetary policy transmission rather than strong ex ante firm selection into non-bank borrowing.

We estimate equation (8) for five firm-level outcomes: log total assets, log total fixed assets (property, plant, and equipment), log total liabilities, return on assets, and log total employment. To define exposure to non-bank credit, we consider three thresholds for a firm's share of borrowing from NBLs as a fraction of total borrowing over 2020–2021, setting the threshold x equal to 0.5, 0.8, and 1. Table 14 reports the distribution of firm-year observations across alternative values of the threshold x, showing that tightening the definition of NBL exposure reduces the share of observations classified as NBL-exposed from roughly one-third of the sample to about one-fifth.

The results of estimating regression (8) are reported in Table 15 and provide strong evidence that firms relying more heavily on non-bank lending experience worse real outcomes during periods of monetary policy tightening. This finding is consistent with our earlier results showing only limited substitution between non-bank and bank credit. Across all outcomes, firms with greater exposure to NBL funding exhibit larger declines in response to increases in the policy rate relative to firms borrowing primarily from banks. While statistical significance varies across outcomes, both the magnitude and significance of the estimated effects increase monotonically with the intensity of reliance on NBL credit, as captured by higher values of x. The monotonicity of these effects — where fully exposed firms (Panel C) suffer significantly larger contractions than moderately exposed firms (Panel A) — reinforces the causal link between NBL funding fragility and real economic contraction.

The estimated effects are economically meaningful. For example, while total assets contract by nearly 1 percent, fixed assets of firms borrowing exclusively from NBLs contract by approximately 1.6 to 2.2 % more than those of bank-borrowing firms following a one percentage point increase in the policy rate. In addition, total liabilities respond in a similar manner to total assets, suggesting that firms dependent on NBL funding are generally unable to offset tighter monetary conditions by substituting toward bank credit.

8 Conclusion

In his 2007 speech as Chairman, Ben Bernanke raises the question of whether the rise of non-bank lenders renders the bank lending channel less relevant (Bernanke, 2007). The bank lending channel is macroeconomically relevant only if a significant group of borrowers are bank-dependent—meaning that when a bank reduces its loan supply, these borrowers cannot costlessly and perfectly substitute to another lender. If such perfect substitutes existed, a contraction in bank credit would have no real effect: the borrower would simply obtain the loan elsewhere, leaving the aggregate supply of credit unchanged.

Non-bank lenders, like banks, possess the ability to gather information and to screen and monitor borrowers, making them potential substitutes for banks. However, Bernanke casts doubt on this view, noting that:

> *"Like banks, nonbank lenders have to raise funds in order to lend, and the cost at which they raise those funds will depend on their financial condition… Thus, nonbank lenders also face an external finance premium… the ideas underlying the bank-lending channel might reasonably extend to all private providers of credit".*

Our paper provides a direct empirical test of this conjecture. We find that the lending channel not only extends to NBLs, but is in fact *stronger* for them: monetary policy transmits more powerfully through the non-bank sector than the banking sector. This result challenges the traditional view that banks are the primary agents of the credit channel and the view of NBLs as a "spare tyre." Instead, our findings suggest a bifurcation in the transmission mechanism: banks are insulated by their deposit franchise, while short-debt-funded NBLs — exposed to the full force of market repricing — act as the active propagators of monetary policy. As non-bank intermediation continues to grow, the aggregate sensitivity of credit supply to monetary policy will increasingly depend on the funding fragility of these "pure" intermediaries.

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Figures

Figure 1. **Loan Market Segments by Lender Type.**
This figure shows the distribution of lender types across six loan market segments and for all loans combined. Panel A reports shares by loan volume, and Panel B reports shares by loan count. Loan market segments include business loans, personal loans (including asset financing), commercial and consumer mortgages, syndicated loans, and other products. Lender types comprise (i) banks, including licensed banks and credit unions, and (ii) non-bank lenders (NBLs), including Retail Credit Firms (RCFs) and Specialised Finance Providers (SFPs).
Data source: The Central Credit Register.

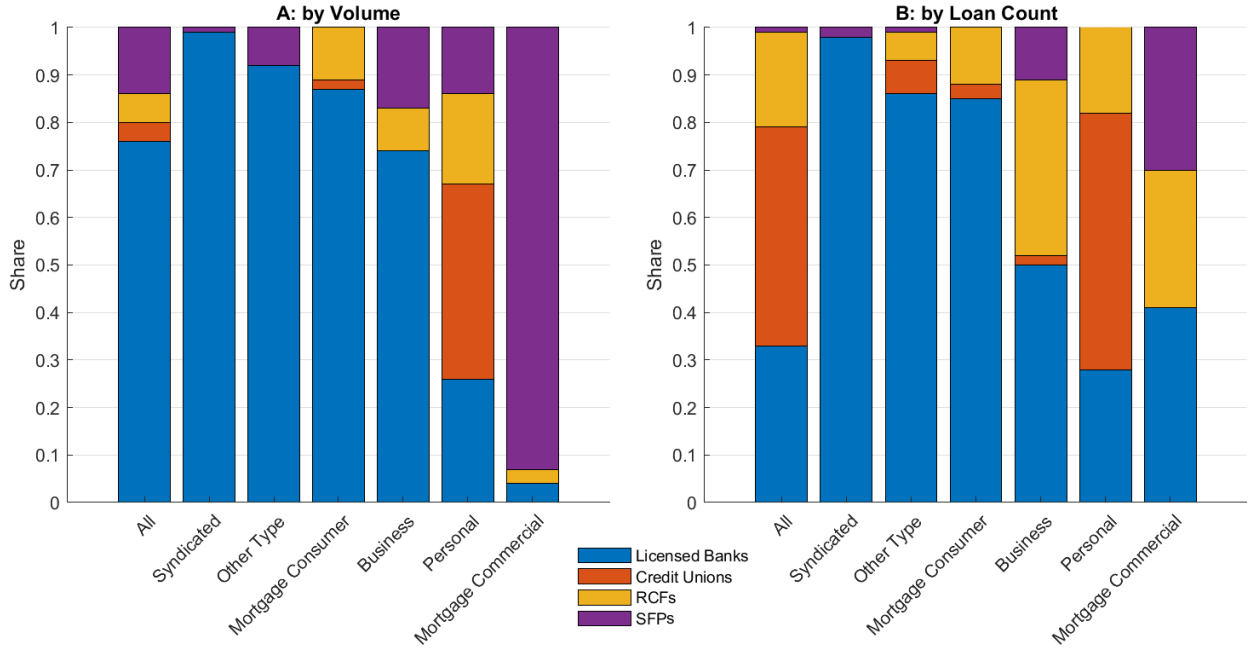


Figure 2. **Lender Types by Loan Market Segment.**
This figure shows the distribution of six loan market segments across all lenders and by four lender types. Lender types comprise (i) banks, including licensed banks and credit unions, and (ii) non-bank lenders (NBLs), including Retail Credit Firms (RCFs) and Specialised Finance Providers (SFPs). Panel A reports shares based on loan volume, and Panel B reports shares based on loan count. Loan market segments include business loans, personal loans (including asset financing), commercial and consumer mortgages, syndicated loans, and other products. *Data source: The Central Credit Register.*

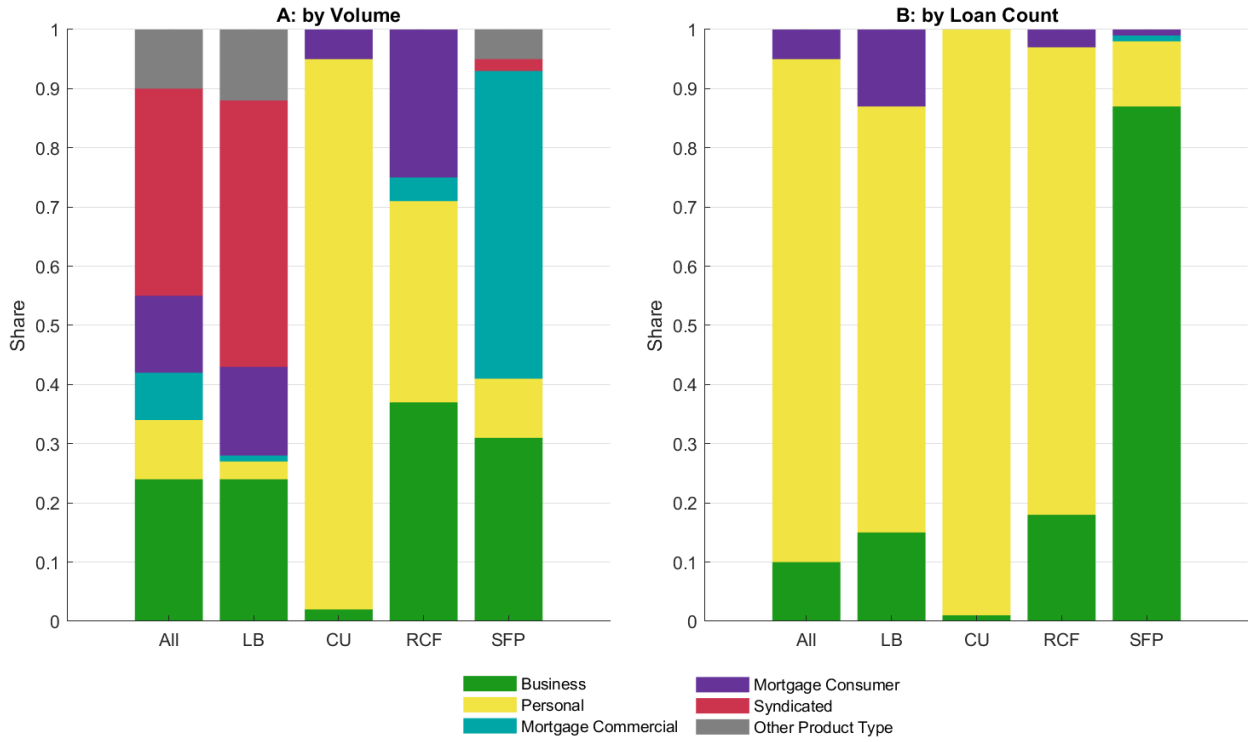


Figure 3. **Non-Bank Lending Share by County.**
This figure reports the share of new lending (by volume) provided by non-bank lenders across counties in Ireland during 2022–2024. For each county, the share is calculated as the volume of new lending by non-bank lenders divided by the total volume of new lending in that county. *Data Source: Central Credit Register.*

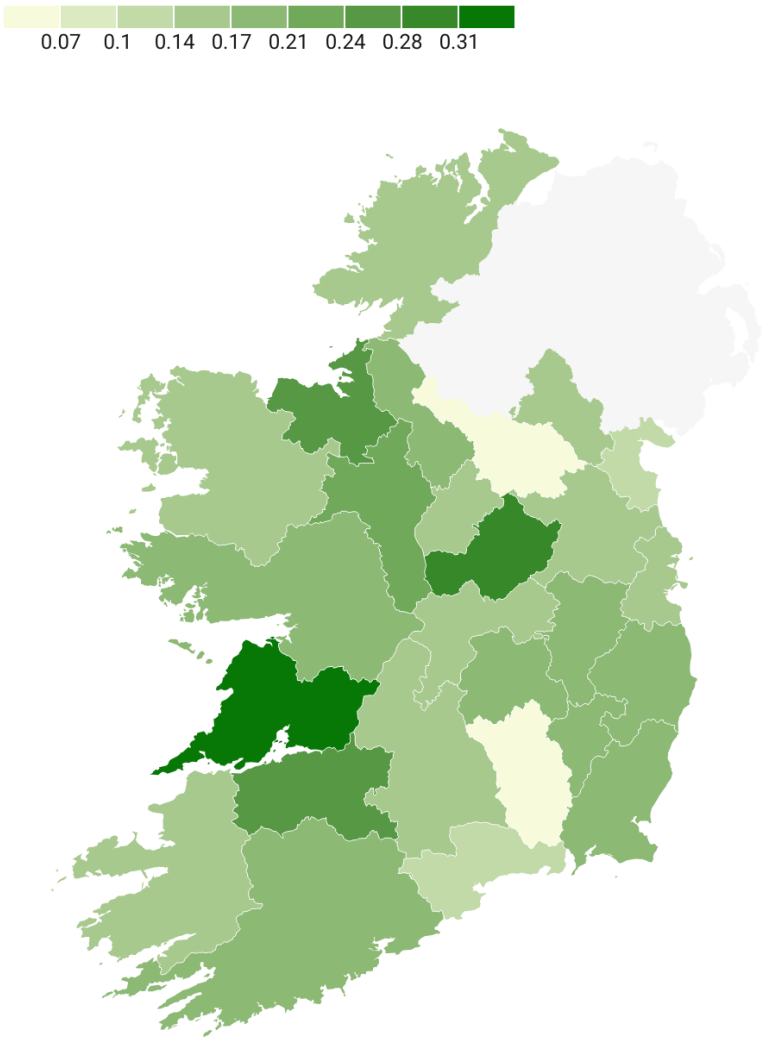


Figure 4. **Non-Bank Lending Share by County: Consumer vs. Non-Consumer.**
This figure reports the share of new lending (by volume) provided by non-bank lenders across counties in Ireland during 2022–2024, separately for consumer loans (Panel A) and non-consumer loans (Panel B). For each county, the share is calculated as the volume of new lending by non-bank lenders divided by the total volume of new lending in that county within the respective segment.
Data Source: Central Credit Register.

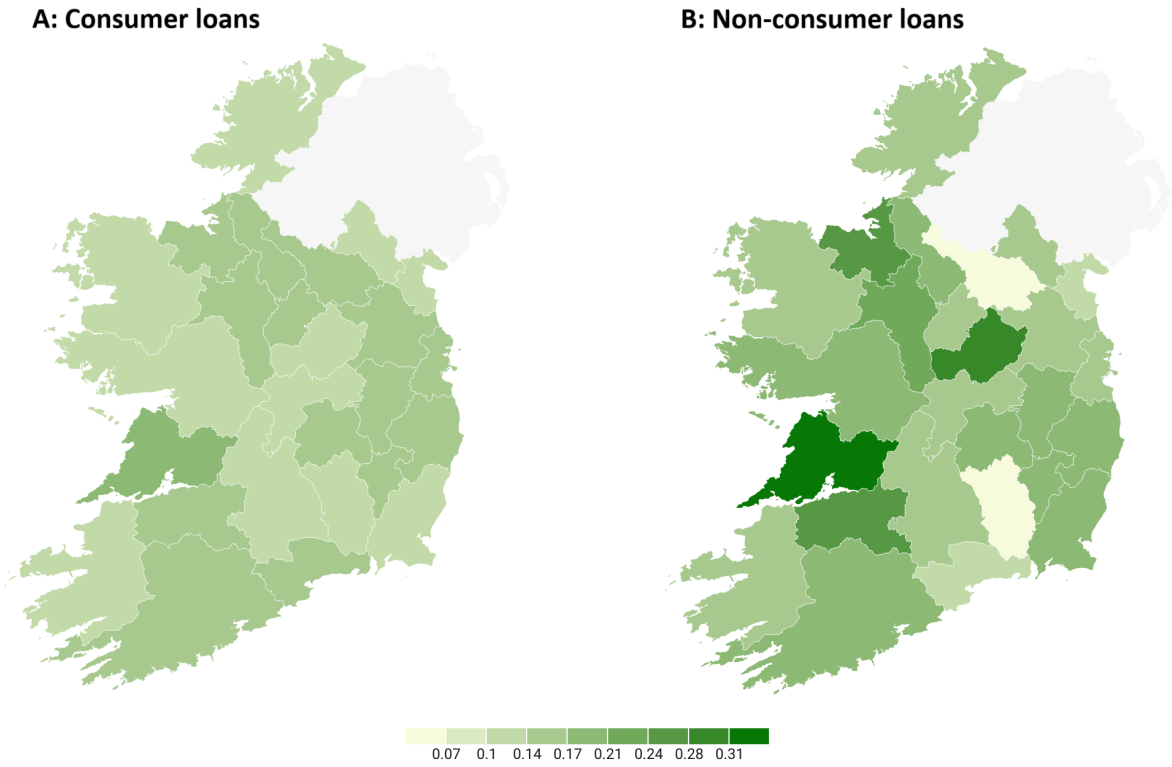


Figure 5. **Deposits of Households and Non-Financial Corporations.**
This figure shows deposit interest rates (Panel A) and deposit volumes (Panel B) for households (HH) and non-financial corporations (NFC) in Ireland, together with the ECB deposit facility rate, from 2022 to 2024 at monthly frequency. Deposits are reported by maturity: for HHs, overnight, redeemable at notice, and with maturities up to and over two years; for NFCs, overnight and with agreed maturity. Overnight deposits dominate, accounting for nearly 90% of all deposits for both HHs and NFCs.
Data source: CBI, Retail Interest Rates.

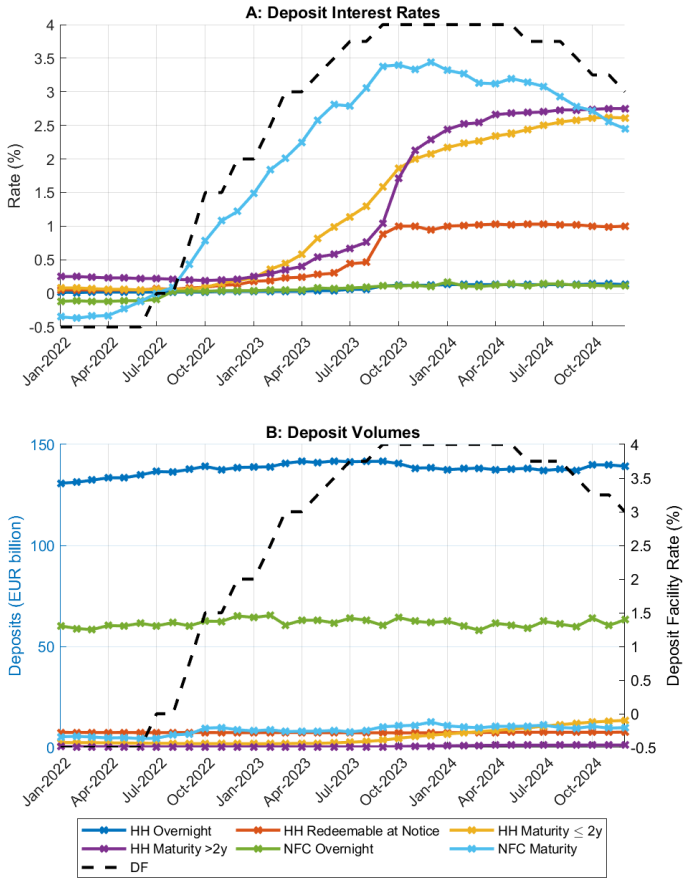
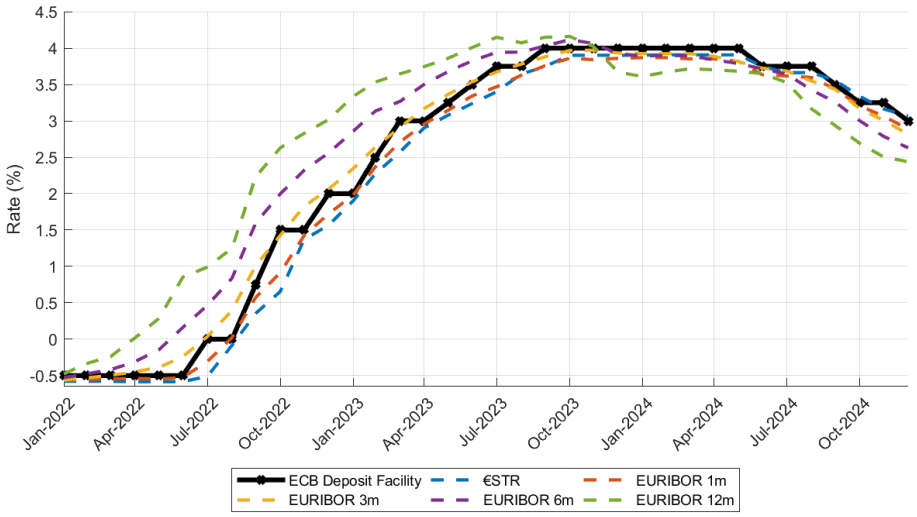


Figure 6. **Policy Rate and Money Market Rates.**
This figure shows the ECB Deposit Facility (DF) rate alongside euro area money market rates at different maturities. The money market rates include the euro short-term rate (€STR) and EURIBOR rates with maturities of 1, 3, 6, and 12 months.
Data Source: ECB Data Portal.



Tables

Table 1. **Summary Statistics by Lender Type.**
This table presents summary statistics for the loan-level sample used in the analysis, disaggregated by lender type (Banks vs. non-bank lenders (NBLs)) and for the total sample. The sample covers the period 2022–2024. Variable definitions are provided in Section 2.

Variable	Bank	NBL	Total
A. Sample size			
N(loans)	2,359,160	630,245	2,989,405
N(loans with co-borrowers)	2,546,610	643,168	3,189,778
N(non-consumer loans)	158,401	152,196	310,597
N(lenders)	219	116	335
N(borrowers)	1,287,510	387,782	1,475,534
N(non-consumer borrowers)	85,254	53,878	125,560
B. Interest rate at origination (%)			
Mean	7.8	6.8	7.6
Median	8.5	6.7	8.2
Std. dev.	2.5	4.7	3.1
C. Financed amount (€)			
Mean	109,054	97,109	106,536
Median	8,000	12,970	8,700
Std. dev.	3,902,174	7,835,729	4,996,115
D. Maturity (months)			
Mean	56	42	53
Median	40	36	37
Std. dev.	72	50	68
E. Indicators			
D(Credit union)	0.58	0.00	0.46
D(NBL)	0.00	1.00	0.21
D(RCF)	0.00	0.95	0.20
D(SFP)	0.00	0.05	0.01

Table 2. **Summary Statistics by Lender Type and Subtype.**
This table presents summary statistics for the loan-level sample, further disaggregating lender types. Banks are divided into Licensed Banks (LB) and Credit Unions (CU). Non-Bank Lenders (NBLs) are divided into Retail Credit Firms (RCF) and Specialised Finance Providers (SFP).

	Bank		NBL		
Variable	**LB**	**CU**	**RCF**	**SFP**	**Total**
A. Sample size					
N(loans)	985,712	1,373,448	595,727	34,518	2,989,405
N(lenders)	19	200	27	89	335
B. Interest rate at origination (%)					
Mean	7.0	8.5	6.9	4.5	7.6
Median	8.2	8.8	6.9	4.0	8.2
Std. dev.	2.8	2.0	4.7	3.7	3.1
C. Financed amount (EUR)					
Mean	246,669	10,289	30,291	1,250,284	106,536
Median	12,275	6,100	12,745	20,500	8,700
Std. dev.	6,034,128	15,234	208,946	33,500,000	4,996,115
D. Maturity (months)					
Mean	77	41	43	41	53
Median	48	37	36	36	37
Std. dev.	99	34	51	39	68

Table 3. **Non-bank Lending Relative to Banks — All Loans.**
This table reports estimates of equation (1) at the loan–borrower–lender–quarter level for three outcome variables: loan interest rate at origination (Panel A), log loan size (Panel B), and log loan maturity (Panel C). The key regressor is the interaction between the non-bank lender dummy, D_i(NBL), and the one-quarter lagged monetary policy rate, MPRate_{t-1}, (the ECB deposit facility rate). Each outcome is estimated under five specifications that differ in the fixed effects included; all models control for loan characteristics such as type/segment, interest rate type, and contractual maturity. SBLT fixed effects denote Segment $\times$ Borrower-Type $\times$ Location $\times$ Time fixed effects, which control for common shocks to specific loan market segments and borrower types within a county-quarter. Cluster-robust standard errors, clustered at the borrower–lender level, are reported in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
A: Outcome variable: Interest rate					
D_i(NBL)$\times$MPRate$_{t-1}$	0.21***	0.28***	0.17***	0.15***	0.17***
	(0.01)	(0.03)	(0.01)	(0.03)	(0.01)
Observations	3,189,778	3,189,778	3,189,778	3,189,778	3,026,223
R^2	0.57	0.92	0.91	0.97	0.58
B: Outcome variable: Log loan size					
D_i(NBL)$\times$MPRate$_{t-1}$	-0.01**	-0.02***	-0.01**	-0.01**	-0.02***
	(0.003)	(0.01)	(0.005)	(0.005)	(0.004)
Observations	3,189,778	3,189,778	3,189,778	3,189,778	3,026,223
R^2	0.72	0.95	0.95	0.98	0.72
C: Outcome variable: Log loan maturity					
D_i(NBL)$\times$MPRate$_{t-1}$	-0.01***	-0.01***	-0.01***	-0.00**	-0.01***
	(0.002)	(0.001)	(0.001)	(0.005)	(0.002)
Observations	3,189,475	3,189,475	3,189,475	3,189,475	3,025,965
R^2	0.76	0.95	0.95	0.98	0.76
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
SBLT FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 4. **Non-bank Lending Relative to Banks — Consumer Loans.**
This table reports estimates of equation (1) for consumer loans at the loan–borrower–lender–quarter level for three outcome variables: loan interest rate at origination (Panel A), log loan size (Panel B), and log loan maturity (Panel C). The key regressor is the interaction between the non-bank lender dummy, D_i(NBL), and the one-quarter lagged monetary policy rate, MPRate_{t-1}, (the ECB deposit facility rate). Each outcome is estimated under five specifications that differ in the fixed effects included; all models control for loan characteristics such as type/segment, interest rate type, and contractual maturity. SBLT fixed effects denote Segment $\times$ Borrower-Type $\times$ Location $\times$ Time fixed effects, which control for common shocks to specific loan market segments and borrower types within a county-quarter. Cluster-robust standard errors, clustered at the borrower–lender level, are reported in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
A: Outcome variable: Interest rate					
D_i(NBL)$\times$MPRate$_{t-1}$	0.18***	0.17***	0.17***	0.16***	0.19***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)
Observations	2,858,919	2,858,919	2,858,919	2,858,919	2,714,067
R^2	0.55	0.92	0.91	0.97	0.56
B: Outcome variable: Log loan size					
D_i(NBL)$\times$MPRate$_{t-1}$	-0.01***	-0.02***	-0.01**	-0.01**	-0.02***
	(0.003)	(0.002)	(0.004)	(0.004)	(0.004)
Observations	2,858,919	2,858,919	2,858,919	2,858,919	2,714,067
R^2	0.72	0.95	0.96	0.98	0.72
C: Outcome variable: Log loan maturity					
D_i(NBL)$\times$MPRate$_{t-1}$	-0.01***	-0.01***	-0.01***	-0.01**	-0.01***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Observations	2,858,906	2,858,906	2,858,906	2,858,906	2,714,054
R^2	0.78	0.96	0.96	0.98	0.78
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
SBLT FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 5. **Non-bank Lending Relative to Banks — Non-Consumer Loans.**
This table reports estimates of equation (1) for non-consumer loans. Panels A and C use the loan–borrower–lender–quarter level, while Panel B aggregates to the borrower–lender–quarter level. The outcome variables are: loan interest rate at origination (Panel A), log quarterly debt—cumulative debt raised by borrower b from lender i in quarter t (Panel B), and log loan maturity (Panel C). The key regressor is the interaction between the non-bank lender dummy, D_i(NBL), and the one-quarter lagged monetary policy rate, MPRate_{t-1} (the ECB deposit facility rate). Each outcome is estimated under five specifications that vary in the fixed effects included; all models additionally control for loan characteristics such as type/segment, interest rate type, and contractual maturity. ILST fixed effects denote Industry $\times$ Location $\times$ Size $\times$ Time fixed effects, which absorb demand shocks specific to firms of a given size and industry within a county-quarter. Cluster-robust standard errors, clustered at the borrower–lender level, are reported in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
A: Outcome variable: Interest rate					
D_i(NBL)$\times$MPRate$_{t-1}$	0.11***	0.20***	0.12***	0.11***	0.13***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.01)
Observations	330,859	330,859	330,859	330,859	194,991
R^2	0.65	0.89	0.91	0.96	0.70
B: Outcome variable: Log loan debt					
D_i(NBL)$\times$MPRate$_{t-1}$	0.00	-0.02**	-0.01***	-0.00**	-0.01***
	(0.00)	(0.006)	(0.003)	(0.002)	(0.004)
Observations	208,823	208,823	208,823	208,823	113,346
R^2	0.30	0.91	0.91	0.97	0.43
C: Outcome variable: Log loan maturity					
D_i(NBL)$\times$MPRate$_{t-1}$	-0.01**	-0.00	-0.02***	-0.01**	-0.01***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)
Observations	330,569	330,569	330,569	330,569	194,750
R^2	0.70	0.92	0.93	0.96	0.81
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
ILST FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 6. **Extensive Margin: Loan Volume and Count at Lender-County Level.**
This table reports estimates of equation (2). The unit of observation is lender i in quarter t in Panel A, and lender i in county c and quarter t in Panel B. In column (1), the dependent variable is the logarithm of new loan volume originated by lender i in quarter t, while in column (2) it is the logarithm of the number of new loans issued by lender i in quarter t. The key regressor is the interaction between an indicator for non-bank lenders, $D_i(\text{NBL})$, and the lagged monetary policy rate, MPR_{t-1} (the deposit facility rate). The estimated coefficients represent semi-elasticities: a one–percentage-point increase in the policy rate lowers new-loan volumes or loan counts of NBLs relative to banks by approximately $\beta \times 100$ percent. Specifications in Panel A include quarter fixed effects and lender-year fixed effects, while those in Panel B include county-quarter fixed effects and lender-year fixed effects to absorb local demand shocks. Robust standard errors are clustered by lender in Panel A, and by lender-county in Panel B, and are reported in parentheses.

	(1)	**(2)**
A: Lender Level		
Dependent variable, ln(.)	New Loans Volume$_{i,t}$	New Loans Number$_{i,t}$
D_i(NBL) $\times$ MPRate$_{t-1}$	-0.04**	-0.07**
	(0.02)	(0.04)
Observations	3,171	3,171
R^2	0.94	0.98
Quarter FE	Y	Y
Lender-Year FE	Y	Y
B: Lender-County Level		
Dependent variable, ln(.)	New Loans Volume$_{i,c,t}$	New Loans Number$_{i,c,t}$
D_i(NBL) $\times$ MPRate$_{t-1}$	-0.06***	-0.09***
	(0.01)	(0.02)
Observations	31,840	31,840
R^2	0.55	0.46
County-Quarter FE	Y	Y
Lender-Year FE	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 7. **Extensive Margin: Credit Availability to Non-Consumer Borrowers.**
This table reports estimates of the linear probability model in equation (3). In columns (1)–(3), the unit of observation is borrower b by quarter t; in column (4) it is borrower–quarter by lender type $j \in \{\text{bank}, \text{NBL}\}$ (stacked panel). In column (1) the dependent variable equals one if borrower b obtains at least one loan in quarter t, and zero if it does not. In column (2) the dependent variable equals one if borrower b obtains at least one loan from a bank in quarter t, and zero if it does not. In column (3) the dependent variable equals one if borrower b obtains at least one loan from an NBL in quarter t, and zero if it does not. Finally, in column (4), the dependent variable equals one if borrower b obtains at least one loan from $j \in \{\text{bank}, \text{NBL}\}$ in quarter t, and zero if it does not. The key regressor in column (4) is the interaction of the lagged monetary policy rate, MPRate_{t-1} (the ECB deposit facility rate), with an NBL indicator $\text{D}_j(\text{NBL})$ which is equal to 1 if lender type j=NBL, and zero otherwise. Specifications (1)–(3) include borrower–year fixed effects, while specification (4) includes borrower–quarter fixed effects. Robust standard errors, clustered at the borrower level, are reported in parentheses.

	(1)	(2)	(3)	(4)
Variable	**$\text{D}_{b,t}$(Loan)**	**$\text{D}_{b,t}$(Bank)**	**$\text{D}_{b,t}$(NBL)**	**$\text{D}_{b,j,t}$(Loan)**
MPRate_{t-1}	-0.005***	0.002***	-0.007***	
	(0.001)	(0.000)	(0.000)	
$\text{D}_j(\text{NBL})$				-0.028***
				(0.001)
$\text{D}_j(\text{NBL}) \times \text{MPRate}_{t-1}$				-0.004***
				(0.000)
Constant	0.152***	0.092***	0.064***	0.085***
	(0.001)	(0.001)	(0.001)	(0.000)
Observations	1,503,540	1,503,540	1,503,540	3,007,080
R^2	0.26	0.27	0.32	0.50
Borrower-Quarter FE	N	N	N	Y
Borrower-Year FE	Y	Y	Y	N

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 8. **Substitution Between Banks and NBLs (Non-Consumer Loans).**
This table reports estimates of a linear probability model in equation (5) at the loan-borrower-lender-quarter level for non-consumer loans. The dependent variable equals one if loan l obtained by firm b from lender i in quarter t is originated by a non-bank lender (NBL), and zero otherwise. The key regressor is NBLExposure$_{b,2020-21} \times$ MPRate$_{t-1}$, where NBLExposure$_{b,2020-21}$ is firm b's share of NBL volume in total (bank+NBL) volume during 2020–2021, and MPRate$_{t-1}$ is the ECB deposit facility rate lagged one quarter. We report four specifications that vary the included fixed effects; all models control for loan characteristics (contract/segment, interest-rate type, contractual maturity). ILST fixed effects denote Industry $\times$ Location $\times$ Size $\times$ Time fixed effects, which absorb demand shocks specific to firms of a given size and industry within a county-quarter. Cluster-robust standard errors, clustered at the borrower–lender level, are in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**
Outcome variable: D$_{l,b,t}$(NBL)				
NBLExposure$_{b,2020-21} \times$ MPRate$_{t-1}$	-0.01**	-0.01**	-0.01**	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)
NBLExposure$_{b,2020-21}$	0.44***			0.50***
	(0.02)			(0.02)
Constant	0.37***	0.48***	0.47***	0.33***
	(0.02)	(0.04)	(0.04)	(0.01)
Observations	233,795	233,795	233,795	152,791
R^2	0.60	0.84	0.89	0.60
Quarter FE	Y	Y	Y	
Borrower FE		Y		
Borrower-Year FE			Y	
ILST FE				Y
Loan controls	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 9. **NBL Leverage Ratio and Liability Maturity.**
This table summarizes annual statistics for the 30 largest non-bank lenders (NBLs) in the sample, ranked by the number of loans issued. Together, these 30 NBLs account for more than 99% of all NBL loans in the sample. For each year, the mean, median, and weighted average of the equity-to-assets ratio and the short-term-liabilities-to-total-liabilities ratio are reported. The weighted average uses as weights each NBL's share of the total number of NBL loans originated in that year.
Data source: Orbis Global (Moody's Analytics).

	2020	2021	2022	2023
A: Equity over Assets				
Mean	0.49	0.54	0.70	0.73
Median	0.14	0.16	0.17	0.16
Weighted average	0.01	0.03	0.03	0.03
B: Short-term over Total Liabilities				
Mean	0.62	0.68	0.68	0.68
Median	0.52	0.76	0.66	0.62
Weighted average	0.71	0.81	0.81	0.74
Number of observations	30	30	30	30

Table 10. **Non-Bank Lending and Short-Term Funding — All Loans.**
This table reports estimates of equation (6) using loan-level data at the loan–borrower–lender–quarter level for three outcome variables: the loan interest rate at origination (Panel A), the logarithm of loan size (Panel B), and the logarithm of loan maturity (Panel C). The two mutually exclusive dummy variables, $D_{i,y-1}(\text{STF})$ and $D_{i,y-1}(\text{LTF})$, are defined at the lender–year level and equal one for NBLs whose ratio of short-term funding is above or below, respectively, the sample mean across all NBLs in that year. The ratio of short-term funding is computed as the ratio of short-term liabilities to total liabilities. MPRate_{t-1} denotes the one-quarter-lagged monetary policy rate (the ECB deposit facility rate). Each outcome is estimated under five specifications that differ in the fixed effects included; all models additionally control for loan characteristics such as loan segment, interest-rate type, and contractual maturity. SBLT fixed effects denote Segment $\times$ Borrower-Type $\times$ Location $\times$ Time fixed effects, which control for common shocks to specific loan market segments and borrower types within a county-quarter. Standard errors are clustered at the borrower–lender level and reported in parentheses.

Variable	(1)	(2)	(3)	(4)	(5)
A: Outcome variable: Interest rate					
$D_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	0.28***	0.25***	0.23***	0.21***	0.24***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)
$D_{i,y-1}(\text{LTF})\times\text{MPRate}_{t-1}$	0.11***	0.13***	0.03	0.01	-0.05***
	(0.02)	(0.02)	(0.02)	(0.05)	(0.01)
Observations	3,181,359	3,181,359	3,181,359	3,181,359	3,181,359
R^2	0.56	0.92	0.91	0.97	0.57
B: Outcome variable: Log loan size					
$D_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	-0.02***	-0.04***	-0.02***	-0.02***	-0.03***
	(0.00)	(0.02)	(0.01)	(0.01)	(0.00)
$D_{i,y-1}(\text{LTF})\times\text{MPRate}_{t-1}$	0.01**	-0.02	-0.00	0.00	-0.01***
	(0.00)	(0.01)	(0.01)	(0.02)	(0.00)
Observations	3,181,359	3,181,359	3,181,359	3,181,359	3,181,359
R^2	0.72	0.95	0.95	0.98	0.72
C: Outcome variable: Log loan maturity					
$D_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	-0.01***	-0.01***	-0.02***	-0.02**	-0.02***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
$D_{i,y-1}(\text{LTF})\times\text{MPRate}_{t-1}$	-0.01**	-0.01**	0.01	0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
Observations	3,181,058	3,181,058	3,181,058	3,181,359	3,181,058
R^2	0.76	0.95	0.96	0.98	0.76
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
SBLT FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 11. **Non-Bank Lending and Short-Term Liability — NBL Loans.**
This table reports estimates of equation (7) using NBL loan-level data at the loan–borrower–nbl–quarter level for three outcome variables: the loan interest rate at origination (Panel A), the logarithm of loan size (Panel B), and the logarithm of loan maturity (Panel C). $D_{i,y-1}(\text{STF})$ denotes a dummy variable equal one for NBLs whose ratio of short-term funding is above the sample mean across all NBLs in a given year $y-1$. The ratio of short-term funding is computed as the ratio of short-term liabilities to total liabilities. MPRate_{t-1} denotes the one-quarter-lagged monetary policy rate (the ECB deposit facility rate). Each outcome is estimated under five specifications that differ in the fixed effects included; all models additionally control for loan characteristics such as loan segment, interest-rate type, and contractual maturity. Standard errors are clustered at the borrower–lender level and reported in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
A: Outcome variable: Interest rate					
$\text{D}_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	0.10***	0.12***	0.17***	0.15***	0.19***
	(0.02)	(0.04)	(0.03)	(0.05)	(0.01)
Observations	643,178	643,178	643,178	643,178	643,178
R^2	0.60	0.94	0.94	0.98	0.61
B: Outcome variable: Log loan size					
$\text{D}_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	-0.02***	-0.03**	-0.02**	-0.02**	-0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	643,178	643,178	643,178	643,178	643,178
R^2	0.85	0.97	0.97	0.98	0.85
C: Outcome variable: Log loan maturity					
$\text{D}_{i,y-1}(\text{STF})\times\text{MPRate}_{t-1}$	-0.02***	-0.02***	-0.01**	-0.01*	-0.01***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Observations	643,163	643,163	643,163	643,163	643,163
R^2	0.82	0.96	0.96	0.98	0.82
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
SBLT FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 12. **Lender Type Heterogeneity and Monetary Policy Pass-Through.**
This table reports estimates of a modified equation (1) at the loan–borrower–lender–quarter level controlling for either Bank heterogeneity (Panel A) or NBL heterogeneity (Panel B). The outcome variable is the loan interest rate. The key regressor is the interaction between a lender-type dummy, $D(X)$, where X stands for lender type, and the lagged monetary policy rate, MPRate_{t-1} (the ECB deposit facility rate). Panel A separates lenders into NBLs, credit unions (CU), and licensed banks (base group). Panel B distinguishes between two types of non-bank lenders—retail credit companies (RCF) and specialised finance providers (SFP) — relative to banks (base group). Each specification varies in the fixed effects included, while all regressions additionally control for loan characteristics such as loan type/segment, interest rate type, and contractual maturity. SBLT fixed effects denote Segment $\times$ Borrower-Type $\times$ Location $\times$ Time fixed effects, which control for common shocks to specific loan market segments and borrower types within a county-quarter. Cluster-robust standard errors, clustered at the borrower–lender level, are reported in parentheses.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Outcome variable: Interest rate					
A: Bank Heterogeneity					
D_i(NBL)$\times$MPRate$_{t-1}$	0.11***	0.18***	0.15***	0.14**	0.15***
	(0.01)	(0.03)	(0.01)	(0.05)	(0.00)
D_i(CU)$\times$MPRate$_{t-1}$	-0.16***	-0.13***	-0.15***	-0.19***	-0.13***
	(0.00)	(0.00)	(0.01)	(0.02)	(0.00)
Observations	3,153,773	3,153,773	3,153,773	3,153,773	3,153,773
R^2	0.57	0.92	0.91	0.97	0.58
B: NBL Heterogeneity					
D_i(RCF)$\times$MPRate$_{t-1}$	0.21***	0.28***	0.16***	0.15***	0.17***
	(0.01)	(0.03)	(0.01)	(0.03)	(0.00)
D_i(SFP)$\times$MPRate$_{t-1}$	0.15***	0.22**	0.19***	0.17**	0.12***
	(0.04)	(0.11)	(0.05)	(0.07)	(0.03)
Observations	3,189,778	3,189,778	3,189,778	3,189,778	3,189,778
R^2	0.57	0.92	0.91	0.97	0.57
Quarter FE	Y	Y	Y		
Lender FE	Y		Y	Y	Y
Lender-Borr. FE		Y			
Borrower-Year FE			Y		
Borrower-Quarter FE				Y	
SBLT FE					Y
Loan controls	Y	Y	Y	Y	Y

Note: *** $p < 0.01$, ** $p < 0.05$.

Table 13. **Firm Characteristics by Funding Source.**
This table reports summary statistics for the firm-level estimation sample used in the real effects analysis. Firms are classified into three groups based on their borrowing activity during the 2020–2021 reference period: "Banks" comprises firms that borrowed exclusively from banks; "NBLs" comprises firms that borrowed exclusively from non-bank lenders; and "Mixed" comprises firms that borrowed from both sources. "All Firms" reports statistics for the full estimation sample. *Total Assets*, *Total Fixed Assets*, and *Total Liabilities* are reported in thousands of EUR. *Total Employees* is the number of full-time equivalent staff. *Return on Assets* is the ratio of net income to total assets. $\text{NBLExposure}_{b,2020-21}$ is the firm's share of borrowing from NBLs during 2020–2021. Data source: Dun & Bradstreet.

Variable	Statistic	Banks	NBLs	Mixed	All Firms
Total Assets (EUR '000)	Mean	11,900	54,700	5,221.50	17,000
	Median	436.29	668.28	753.93	615.02
	Std. Dev.	286,000	960,000	82,800	456,000
Total Fixed Assets (EUR '000)	Mean	7,418.67	29,000	2,972.38	9,489.19
	Median	106.63	148.99	243.11	171.91
	Std. Dev.	211,000	622,000	66,000	302,000
Total Liabilities (EUR '000)	Mean	8,854.64	38,600	3,415.98	12,000
	Median	215.82	275.61	402.59	306.43
	Std. Dev.	218,000	780,000	70,600	367,000
Debt-to-Asset Ratio	Mean	0.73	0.66	0.68	0.69
	Median	0.57	0.53	0.59	0.58
	Std. Dev.	0.73	0.68	0.54	0.64
Return on Assets	Mean	0.21	0.24	0.26	0.24
	Median	0.24	0.28	0.31	0.28
	Std. Dev.	0.59	0.60	0.49	0.55
Total Employees*	Mean	38	52	32	38
	Median	7	10	12	10
	Std. Dev.	578	370	159	383
Current-to-Total Liabilities Ratio	Mean	0.76	0.81	0.75	0.76
	Median	0.86	0.95	0.81	0.85
	Std. Dev.	0.26	0.27	0.24	0.26
Current Ratio	Mean	2.46	3.03	2.03	2.37
	Median	1.43	1.58	1.35	1.41
	Std. Dev.	3.41	4.25	2.60	3.28
$\text{NBLExposure}_{b,2020-21}$	Mean	0	1	0.34	0.34
	Median	0	1	0.11	0
	Std. Dev.	0	0	0.40	0.44
Observations		44,877	24,117	57,916	126,910

* The number of observations for Total Employees is 86,704.

Table 14. **Distribution of Firm–Year Observations by NBL Exposure Threshold.** This table reports the distribution of firm–year observations by the indicator variable $D_b(\text{NBLExp})$, which equals one if firm b's exposure to non-bank lending satisfies $\text{NBLExposure}_{b,2020\text{–}21} \geq x$. $\text{NBLExposure}_{b,2020\text{–}21}$ is defined as the share of borrowing from non-bank lenders as a fraction of total borrowing over 2020–2021. Columns correspond to alternative threshold values $x \in \{0.5, 0.8, 1\}$.

	x		
	0.5	0.8	1
$D_b(\text{NBLExp}) = 0$	84,485	89,713	102,793
$D_b(\text{NBLExp}) = 1$	42,425	37,197	24,117
Total	126,910	126,910	126,910

Table 15. **Impact of Monetary Policy on Firm-Level Outcomes.**
The table reports regression results for equation (8) estimated at the firm–year level. The sample consists of firms that were actively borrowing in 2020–2021, with outcomes observed over the full sample period. In columns (1)–(5), the dependent variables are from Dun & Bradstreet: log total assets (column 1), log total fixed assets (property, plant, and equipment) (column 2), log total liabilities (column 3), return on assets (column 4), and log total employment (column 5). $D_b(\text{NBLExp})$ is a firm-level dummy equal to one if firm b's exposure to non-bank lending satisfies $\text{NBLExposure}_{b,2020\text{–}21} \geq x$, where $\text{NBLExposure}_{b,2020\text{–}21}$ measures firm b's share of borrowing from NBLs as a fraction of total borrowing over 2020–2021 and $x \in [0, 1]$ captures the intensity of reliance on NBL credit. The threshold x is set to 0.5, 0.8, and 1 in Panels A, B, and C, respectively. Estimates in columns (1)–(3) and (5) are expressed in percent, while those in column (4) are in percentage points. Standard errors are clustered at the firm level and reported in parentheses.

Variable	Total Assets (1)	Fixed Assets (2)	Total Liabilities (3)	ROA (4)	Total Employees (5)
A: NBLExposure$_{b,2020\text{–}21} \geq 0.5$					
$D_b(\text{NBLExp}) \times \text{MPRate}_{t-1}$	-0.56	-1.60^{***}	-0.18	-0.10	-0.16
	(0.29)	(0.30)	(0.23)	(0.10)	(0.16)
Observations	126,910	126,910	126,910	126,910	86,704
R^2	0.90	0.92	0.92	0.79	0.96
B: NBLExposure$_{b,2020\text{–}21} \geq 0.8$					
$D_b(\text{NBLExp}) \times \text{MPRate}_{t-1}$	-0.72^{**}	-1.85^{***}	-0.46^{**}	-0.16^{*}	-0.29^{*}
	(0.31)	(0.31)	(0.22)	(0.10)	(0.16)
Observations	126,910	126,910	126,910	126,910	86,704
R^2	0.90	0.92	0.92	0.79	0.96
C: NBLExposure$_{b,2020\text{–}21} = 1$					
$D_b(\text{NBLExp}) \times \text{MPRate}_{t-1}$	-0.87^{***}	-2.15^{***}	-0.73^{***}	-0.20^{*}	-0.33^{**}
	(0.31)	(0.32)	(0.25)	(0.11)	(0.16)
Observations	126,910	126,910	126,910	126,910	86,704
R^2	0.90	0.92	0.92	0.79	0.96
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y	Y
Industry×MPRate	Y	Y	Y	Y	Y

Note: $^{***}\, p < 0.01$, $^{**}\, p < 0.05$.

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