Collateral and Credit

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What about:

1. Small and medium sized enterprises (SMEs) and bank-based financial systems?
2. Collateral types beyond real estate?
3. Measurement and magnitude of collateral channel and value?

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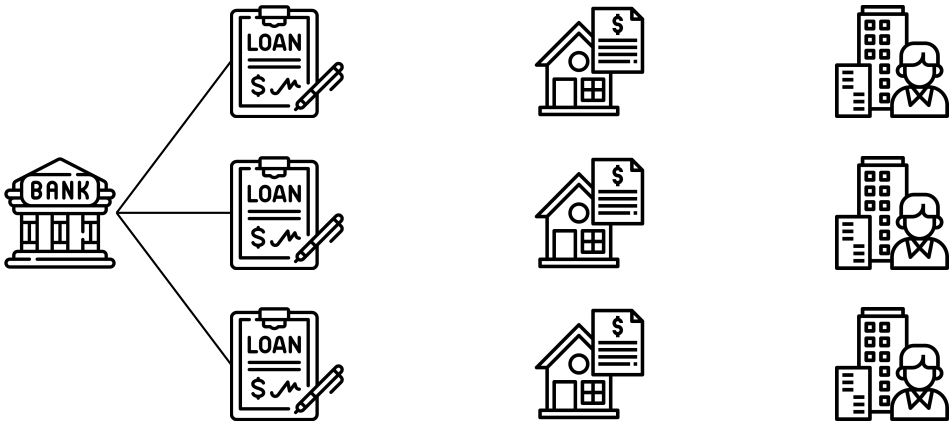

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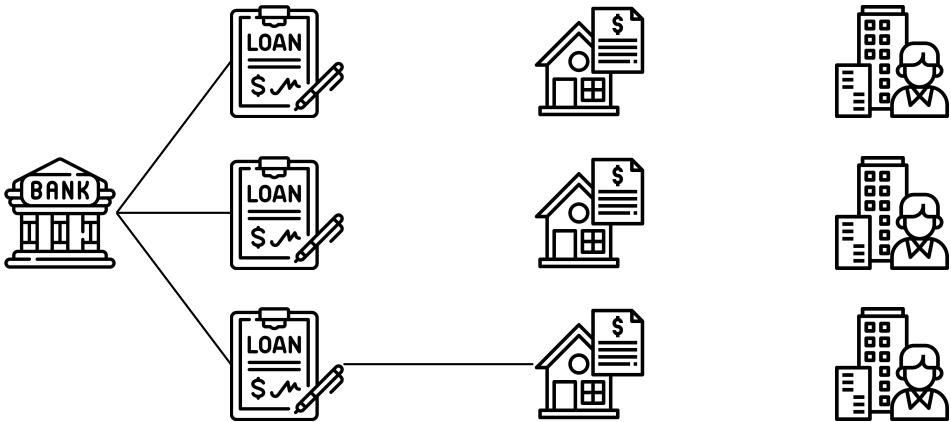

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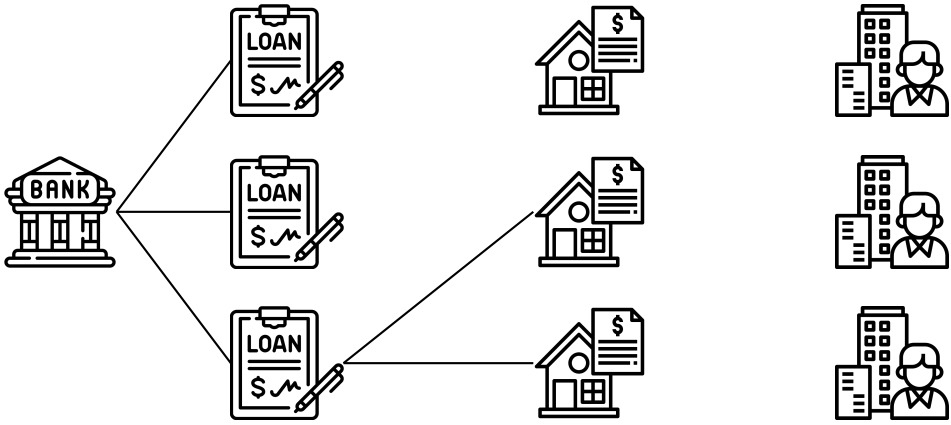

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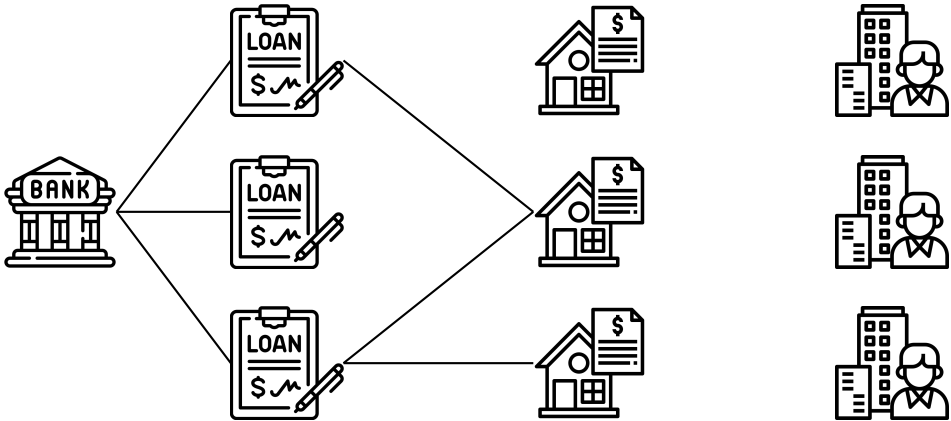

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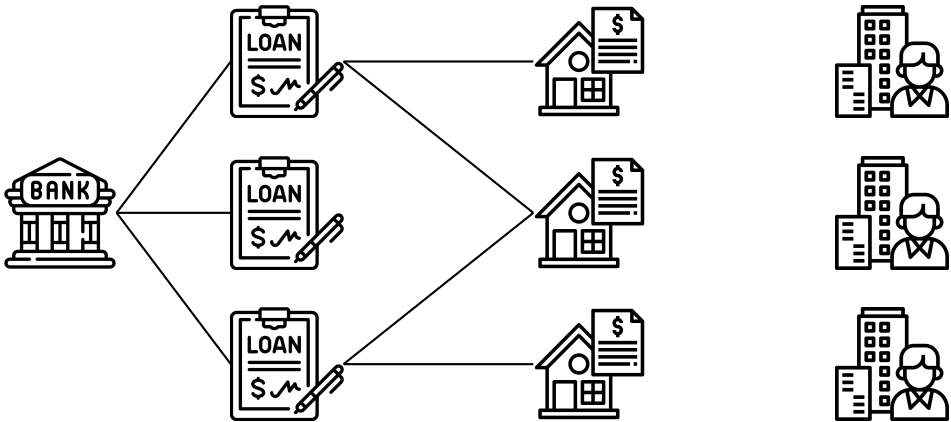

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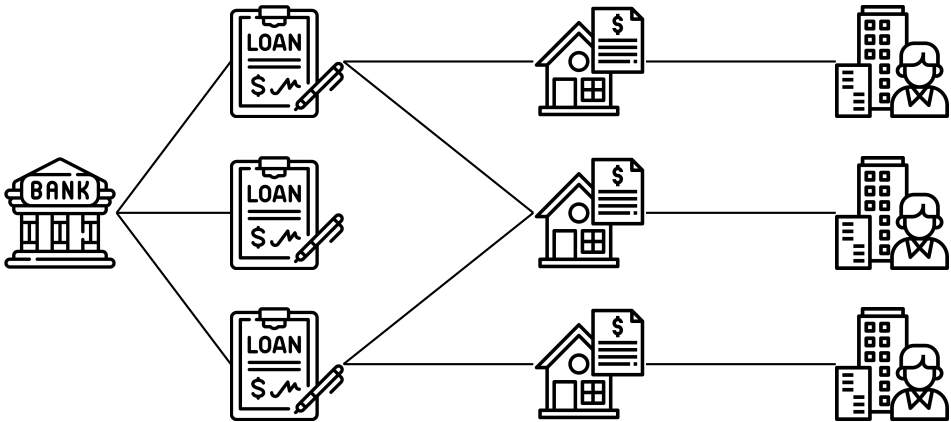

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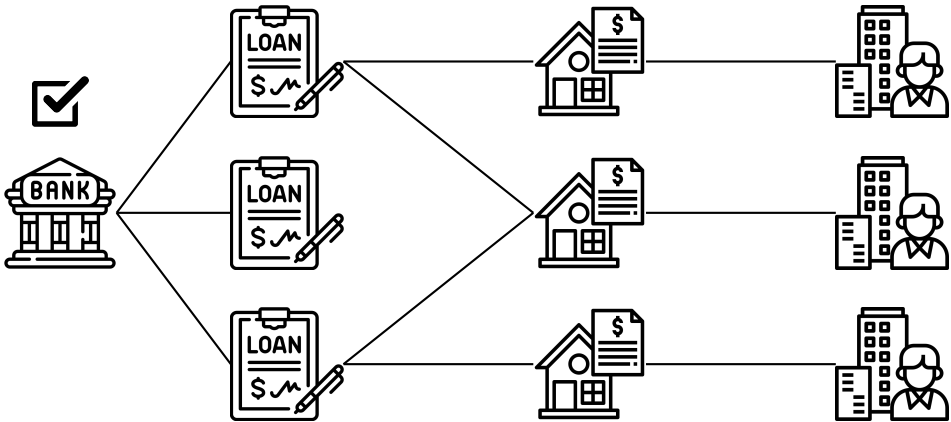

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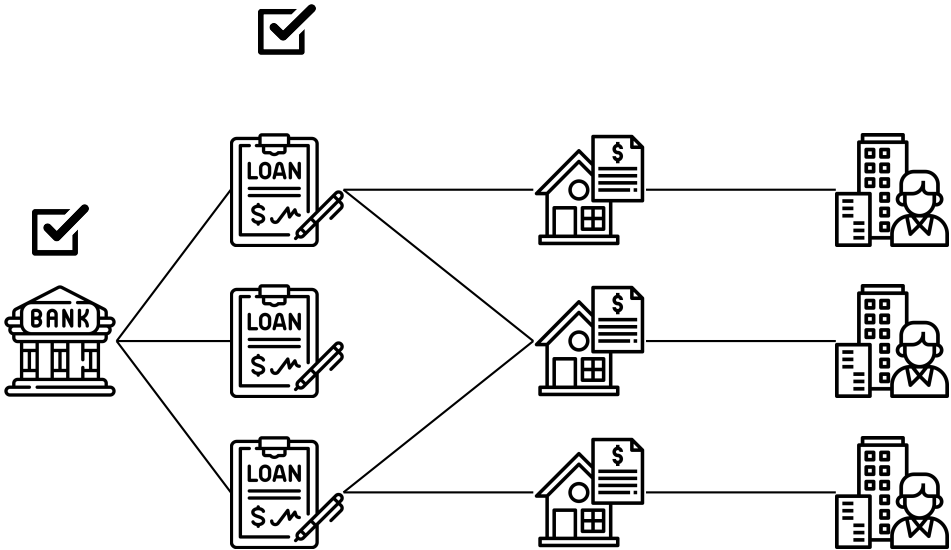

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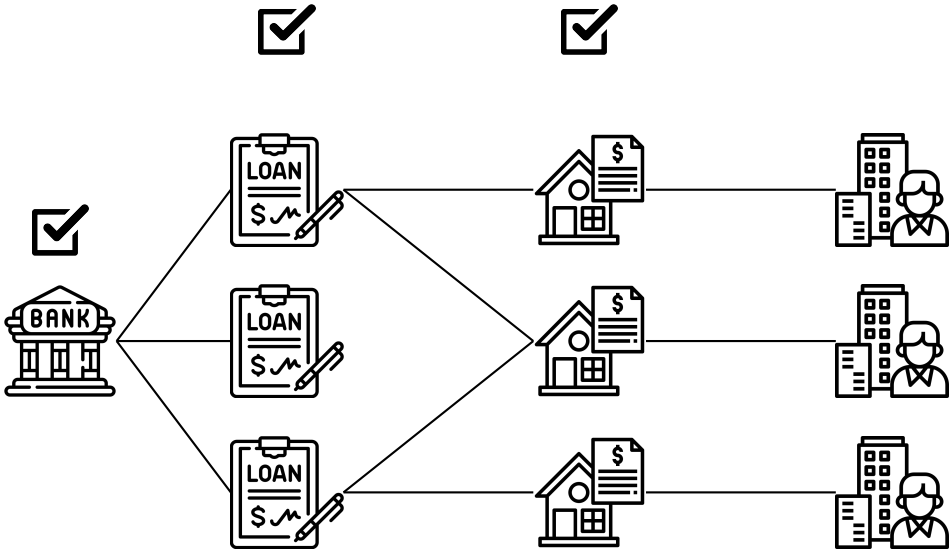

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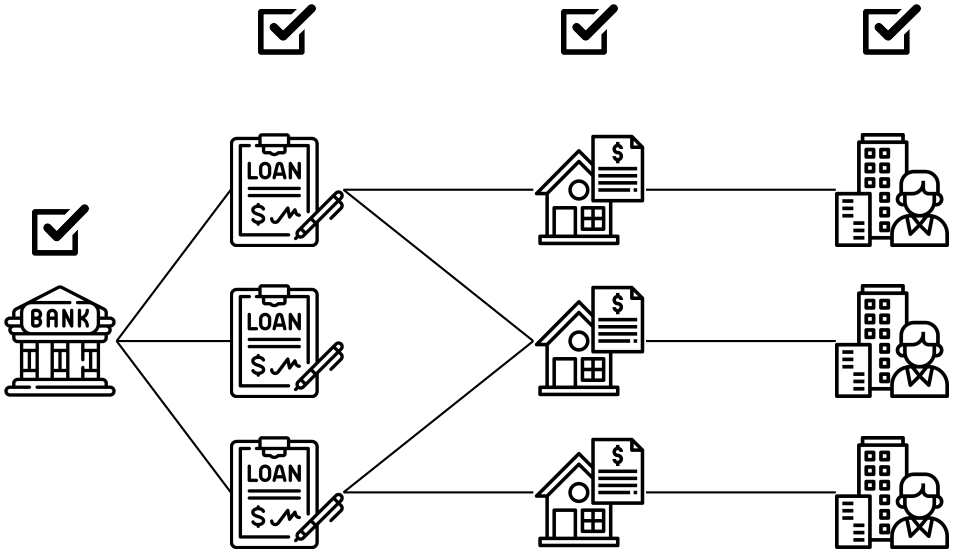

Data and Sample

The euro area corporate credit registry data from AnaCredit

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- reporting threshold: €25,000 per firm-bank relationship.
- detail information on loan and collateral characteristics.

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- 16 million loans, 12 million individual collateral, 3 million NFC, 2000+ banks.

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Sample: loans to nonfinancial firms (NFC) in 19 countries in December 2019 +

- 16 million loans, 12 million individual collateral, 3 million NFC, 2000+ banks.
- use data for December 2021 and 2023 to investigate pattern stability over time.

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Studies the role of collateral in bank credit using euro area corporate credit registry

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1. Focus on three dimensions of collateral: **presence**, **types**, and **value**.
2. Stylized facts on the **importance** and **composition** of collateral.
3. Collateral and Credit terms (loan **price** and **quantity**), as well as drivers of its heterogeneity.

Related Literature

The role of collateral in corporate financing (Bester, 1985; Besanko and Thakor, 1987; Boot and Thakor, 1994; Rajan and Winton, 1995; Benmelech and Bergman, 2009; Berger et al., 2016; Campello and Larrain, 2016; Cerqueiro et al., 2016; Benmelech et al., 2022; Ioannidou et al., 2022; Luck and Santos, 2023).

✚ **The importance of collateral types and values**

The role of collateral in macro-finance (Bernanke, 1983; Bernanke and Gertler, 1986; Kiyotaki and Moore, 1997; Chaney et al., 2012; Bleck and Liu, 2018; Donaldson et al., 2020, 2021; Caglio et al., 2021; Lian and Ma, 2021; Catherine et al., 2022; Kermani and Ma, 2023; Gupta et al., 2021).

✚ **Quantify the collateral value elasticity using actual collateral value**

Part 1: Collateral in the Euro Area

Presence: Collateral is Heavily Used

Share in total #loans:	**53%**
Share in total ONA:	**70%**

Table: Importance

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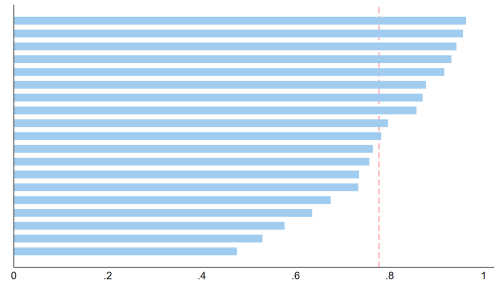

Figure: Cross country variation (ONA)

Type: Real Estate and Financial Assets are Mostly Used

#collateral	
Real estate	26%
Physical movable assets	11%
Financial assets	47%
Other assets	16%
ONA	
Real estate	53%
Physical movable assets	5%
Financial assets	35%
Other assets	7%

Table: Composition

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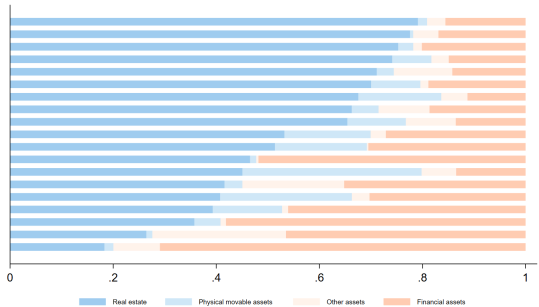

Figure: Cross country variation (ONA)

Value: Substantial Collateral Value in Banking Sector

Value (billion€)	**1837**
Secured loan ONA (billion€)	926
Real estate	49%
Physical movable assets	4%
Other assets	8%
Financial assets	39%

Table: Aggregate collateral value

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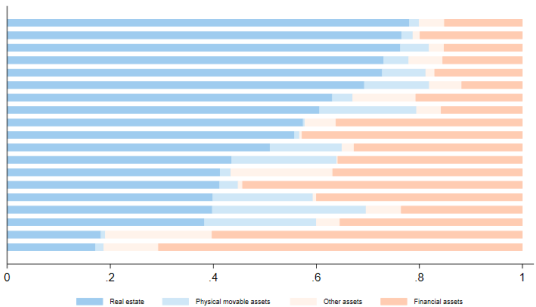

Figure: Cross-country variation (composition)

Part 2: The Role of Collateral in Bank Credit

The Role of Collateral

$$\text{Credit}_{f,b,i,t} = \beta \text{Collateral}_i + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

f firm, b bank, i loan, t time

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Credit	price	annualized loan rate
	quantity	natural logarithm of loan committed amounts
Collateral	**Presence**	1 if a loan is secured
	Type	1 if a loan is secured by THAT type of collateral
	Feature	1 if the collateral has certain feature
	Value	natural logarithm of sum of allocated collateral value of a loan

f firm, b bank, i loan, t time

Data and Sample

Monthly new loans issued to 472k+ NFC by 475 banks from 2019 to 2023

Variable	Mean	p25	p50	p75	SD	N
Interest rate	2.985	1.239	2.273	4.32	2.231	6,088,099
PD	0.041	0.005	0.013	0.032	0.102	6,088,709
Secured	0.454	0	0	1	0.498	6,088,709
Commit amount (million €)	0.227	0.013	0.031	0.102	0.82	6,088,709
Original maturity (days)	518.426	91	355	1200	477.624	6,088,709
Collateral value (million €)	0.284	0.009	0.025	0.088	10.083	2,762,553

Collateral Presence Improves Loan Terms

$$\text{Credit}_{f,b,i,t} = \beta \text{Collateral presence}_i + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

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	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Collateral presence	-0.173**	-0.099**	0.481***	0.331**
	(0.073)	(0.042)	(0.076)	(0.138)
PD	0.251***	0.663***	-0.054	0.061
	(0.075)	(0.127)	(0.036)	(0.058)
Maturity	-0.188***	-0.164***	0.302***	0.423***
	(0.044)	(0.058)	(0.053)	(0.080)
Loan type dummies	✓	✓	✓	✓
Firm-Time FE		✓		✓
Bank-Time FE	✓	✓	✓	✓
Bank-Firm FE	✓	✓	✓	✓
Sector-Country-Time FE	✓		✓	
N	5,835,528	3,779,951	5,836,153	3,780,446
Adj R^2	0.85	0.93	0.77	0.77

Secured loans 10-17 bps ↓ interest rates, 33%-48% ↑ amounts

All Collateral Types Improve Loan Quantity

$$\text{Credit}_{f,b,i,t} = \beta' \textbf{Collateral type}_i + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

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	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Real estate	0.062**	0.086*	0.460***	0.515***
	(0.030)	(0.044)	(0.111)	(0.070)
Physical movable assets	-0.127***	-0.073	0.397***	0.344***
	(0.046)	(0.053)	(0.074)	(0.107)
Other assets	-0.163**	-0.150**	0.322***	0.406***
	(0.067)	(0.063)	(0.069)	(0.041)
Financial assets	-0.203*	-0.129	0.385***	0.180
	(0.107)	(0.086)	(0.097)	(0.270)
PD	0.252***	0.657***	-0.050	0.049
	(0.076)	(0.130)	(0.037)	(0.059)
Maturity	-0.191***	-0.166***	0.308***	0.426***
	(0.045)	(0.057)	(0.053)	(0.078)
Loan type dummies	✓	✓	✓	✓
Firm-Time FE		✓		✓
Bank-Time FE	✓	✓	✓	✓
Bank-Firm FE	✓	✓	✓	✓
Sector-Country-Time FE	✓		✓	
N	5,774,951	3,738,979	5,775,576	3,739,471
Adj R^2	0.85	0.93	0.76	0.77

Real estate ↑ quantity

Other assets ↓ price, ↑ quantity

Collateral Feature Matters for Loan Term

$$\text{Credit}_{f,b,i,t} = \alpha \text{Collateral presence}_i + \beta' \textbf{Collateral feature}_i + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

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	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Collateral presence	-0.221*	-0.132	0.415***	0.156
	(0.124)	(0.095)	(0.112)	(0.307)
Immovable	0.120***	0.117**	0.224**	0.315***
	(0.040)	(0.058)	(0.094)	(0.091)
Liquid	-0.023	-0.032	-0.002	0.200***
	(0.043)	(0.047)	(0.049)	(0.072)
Redeployable	0.058	0.037	0.074	0.223
	(0.098)	(0.099)	(0.109)	(0.297)
PD	0.253***	0.659***	-0.054	0.046
	(0.076)	(0.129)	(0.036)	(0.058)
Maturity	-0.189***	-0.165***	0.303***	0.425***
	(0.045)	(0.058)	(0.053)	(0.079)
Loan type dummies	Yes	Yes	Yes	Yes
Firm×Time FE	-	Yes	-	Yes
Bank×Time FE	Yes	Yes	Yes	Yes
Bank×Firm FE	Yes	Yes	Yes	Yes
Sector×Country×Time FE	Yes	-	Yes	-
N	5,774,951	3,738,979	5,775,576	3,739,471
AdjR^2	0.85	0.93	0.77	0.77

Classify collateral based on inherent economic feature

Immovable 31% ↑ amounts relative to movable

High Collateral Value Increases Loan Quantity

$$\text{Credit}_{f,b,i,t} = \beta \text{Collateral value}_i + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

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	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
ln(Collateral value)	-0.043***	-0.024**	0.757***	0.842***
	(0.015)	(0.009)	(0.041)	(0.043)
PD	0.338***	0.997**	-0.039*	-0.168
	(0.121)	(0.408)	(0.023)	(0.130)
Maturity	-0.145*	-0.113**	0.034**	0.011
	(0.073)	(0.056)	(0.016)	(0.025)
Loan type dummies	✓	✓	✓	✓
Firm-Time FE		✓		✓
Bank-Time FE	✓	✓	✓	✓
Bank-Firm FE	✓	✓	✓	✓
Sector-Country-Time FE	✓		✓	
N	2,096,755	1,388,813	2,096,837	1,388,863
Adj R^2	0.90	0.96	0.94	0.96

1% ↑ collateral value ⇒ 4 bps ↓ interest rate

Collateral Value elasticity:
1% ↑ collateral value ⇒
0.7%-0.8% ↑ loan amounts

The Role of Collateral: Heterogeneity

$$\text{Credit}_{f,b,i,t} = \alpha \text{Collateral value}_i + \beta \text{Collateral value}_i \times \text{Macro}_{c,(t)} + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

Macro	**Facts in 2019**	share of collateralized loan amount
		share of loan amount collateralized by real estate
		loan-to-value ratio
		loan-to-value of real estate ratio
	Legal institutions	rule of law
		time to enforce contracts
		resolve insolvency

Collateral Channel Depends on How Other Uses Collateral

$$\text{Credit}_{f,b,i,t} = \alpha \text{Collateral value}_i + \beta \text{Collateral value}_i \times \text{Facts}_{c,2019} + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Panel A. Importance of collateral presence				
ln(Collateral value)	-0.045***	-0.026**	0.755***	0.837***
	(0.014)	(0.010)	(0.038)	(0.040)
ln(Collateral value) × Presence ONA	-0.046	-0.020	-0.046**	-0.043**
	(0.030)	(0.019)	(0.022)	(0.021)
Panel B. Importance of real estate collateral				
ln(Collateral value)	-0.045**	-0.025**	0.759***	0.848***
	(0.017)	(0.012)	(0.035)	(0.033)
ln(Collateral value) × RE ONA	0.034	0.009	-0.044*	-0.054**
	(0.025)	(0.018)	(0.026)	(0.026)
Loan controls	✓	✓	✓	✓
Firm×Time FE		✓		✓
Bank×Time FE	✓	✓	✓	✓
Bank×Firm FE	✓	✓	✓	✓
Sector×Country×Time FE	✓		✓	
N	2,096,755	1,388,813	2,096,837	1,388,863

Collateral Channel Depends on How Other Uses Collateral

$$\text{Credit}_{f,b,i,t} = \alpha \text{Collateral value}_i + \beta \text{Collateral value}_i \times \text{Facts}_{c,2019} + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Panel C. Importance of collateral value				
ln(Collateral value)	-0.046***	-0.026**	0.747***	0.828***
	(0.016)	(0.010)	(0.033)	(0.037)
ln(Collateral value) × Value LTV	0.016	0.008	0.073***	0.067**
	(0.013)	(0.008)	(0.027)	(0.027)
Panel D. Importance of real estate collateral value				
ln(Collateral value)	-0.045***	-0.026**	0.758***	0.846***
	(0.016)	(0.013)	(0.040)	(0.040)
ln(Collateral value) × Value RE	0.041	0.010	-0.009	-0.023
	(0.030)	(0.020)	(0.022)	(0.026)
Loan controls	✓	✓	✓	✓
Firm×Time FE		✓		✓
Bank×Time FE	✓	✓	✓	✓
Bank×Firm FE	✓	✓	✓	✓
Sector×Country×Time FE	✓		✓	
N	2,096,755	1,388,813	2,096,837	1,388,863

Collateral Channel Depends on Legal Institutions

$$\text{Credit}_{f,b,i,t} = \alpha \text{Collateral value}_i + \beta \text{Collateral value}_i \times \text{Legal}_{c,t} + \gamma' \mathbf{X}_{f,b,i,t} + \text{FE} + \varepsilon_{f,b,i,t}$$

	(1)	(2)	(3)	(4)
	Annualized interest rate		ln(Committed amount)	
Panel A. Rule of law				
ln(Collateral value)	-0.045***	-0.026***	0.743***	0.825***
	(0.016)	(0.009)	(0.032)	(0.036)
ln(Collateral value) × Rule of law	-0.009	-0.007*	-0.069***	-0.065***
	(0.009)	(0.004)	(0.022)	(0.021)
Panel B. Years of enforce contracts				
ln(Collateral value)	-0.044***	-0.025**	0.740***	0.821***
	(0.016)	(0.009)	(0.033)	(0.039)
ln(Collateral value) × Enforcement	0.002	0.003	0.068***	0.063**
	(0.010)	(0.007)	(0.023)	(0.024)
Panel C. Years of insolvency				
ln(Collateral value)	-0.050***	-0.029**	0.761***	0.851***
	(0.017)	(0.014)	(0.038)	(0.037)
ln(Collateral value) × Insolvency	-0.056*	-0.029	0.035	0.055
	(0.029)	(0.026)	(0.027)	(0.037)
Loan controls	✓	✓	✓	✓
Firm×Time FE		✓		✓
Bank×Time FE	✓	✓	✓	✓
Bank×Firm FE	✓	✓	✓	✓
Sector×Country×Time FE	✓		✓	
N	2,096,755	1,388,813	2,096,837	1,388,863

Conclusion

We study the role of collateral by using euro area corporate credit registry data.

Key facts about the importance, distribution, and composition of collateral.

Collateral is heavily used in corporate credit.

Collateral value elasticity: 1% $\uparrow \Rightarrow$ 0.7% $\uparrow$ loan committed amounts

Collateral remains crucial for understanding corporate financing and macro-finance.

Thank you for your attention!

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