Information Asymmetry, Relationship Banking and Financing Costs of SME's

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Motivation

- Delegated monitoring implies that firms operate with a single bank which pools the costs of asymmetric information (Diamond, 1984).
- Transaction costs are minimized by having only one bank relation.
- The optimality of a single bank relation changes by repeated lending (Sharpe, 1990).
- Diversification as insurance against the loss value-relevant information (Detragiache et al., 2000).
- Lack of coordination among investors (Bolton and Scharfstein, 1996; Hart, 1995; Dewatripont and Maskin, 1995).

Research Questions

- It is widely observed that many firms have multiple bank relations, whereas other even similar firms prefer a strong firm-bank relation.
- What determines firms' choice of having only one bank relation?
- What role does asymmetric information play and how to measure it?
- Is relationship banking associated with beneficial financing conditions?

Contribution and First Results

We contribute to the previous literature in several areas:

- Comprehensive discussion of the relationship between intangible assets, asymmetric information, relationship banking, and financing conditions.
- Based on existing literature and the unique role intangible assets might play regarding asymmetric information, we derive three testable predictions and we find that:
  1. Intangible assets can be used to proxy asymmetric information but do not prevent firms to finance externally.
  2. Firms' share of intangible assets statistically significantly determines firms' choice of an exclusive and persistent bank relation.
  3. Relationship banking is (potentially) associated with beneficial financing conditions.

Literature - Theoretical Considerations

- The theoretical literature dealing with relationship lending comes to the conclusion that there are two sides to a strong firm-bank relation (Boot, 2000).
- Benefits: a strong firm-bank relationship can reduce information asymmetry and, thus, loan terms better reflect the actual quality of the borrower (Boot and Thakor, 1994; Petersen and Rajan, 1995).
- Costs: the lender can use this information monopoly to extract additional rents. Therefore, a strong relationship can produce a hold-up problem (Farinha and Santos, 2002; Sharpe, 1990; Greenbaum et al., 1989).

Literature - Empirical Evidence

- Most prominent proxies are the length of the firm-bank relation, the exclusivity of the relation, physical distance and the integration of the firm-bank relation (Kysucky and Norden, 2014).
- Length and intentensity of its bank relation increases firm's credit availability and decreases loan prices and required collateral (Petersen and Rajan, 1994; Berger and Udell, 1995; Cole, 1998).
- Information monopoly by banks and concentrated markets cause a hold-up problem (Schenone, 2010; Degryse and Ongena, 2005; Petersen and Rajan, 1995).

Literature - Number of Bank Relations

- Firms have more bank relationships in countries with a decentralized and healthy banking system, in countries with inefficient judicial systems, and in countries where the enforcement of creditors' rights is weak (Ongena and Smith, 2000).
- Firms' size, leverage and market-to-book ratio decreases the likelihood of having a single bank relationship (Houston and James,2001).
- The likelihood of firms substituting a single bank relation in favor of several bank relation increases with the duration of its initial single bank relation (Farinha and Santos, 2002).
- Higher indebtedness decreases the probability of a single loan relation and liquidity increases it but firm size and profitability do not have a systematic impact (Ogawa et al., 2007).

Intangible Assets

- We implicitly assumes homogenous firms in a sense that firms pledge collateral in order to alleviate financial frictions.
- A higher asset redeployability increases the liquidation value of the collateral (Benmelech and Bergman, 2009).
- Firms' financing decisions depend in several ways on the collateral value of their inputs (Fabbri and Menichini, 2010).
- Intangible assets and knowledge created by innovation are difficult to quantify as collateral for debt financing (Hall and Lerner, 2010).

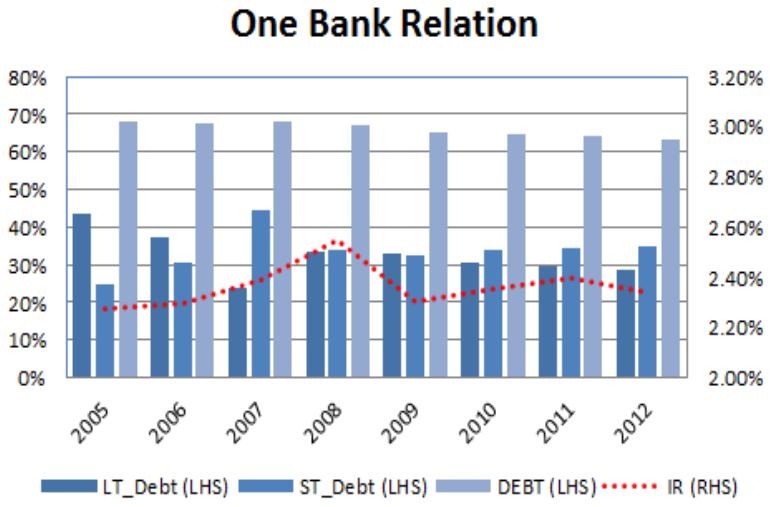
Predictions

1. If the fraction of intangible assets proxies for information asymmetry, a higher fraction should, *ceteris paribus*, lead to higher financing costs.
2. Firms with a high fraction of intangible assets should, *ceteris paribus*, be more likely to engage in relationship banking, since a close-firm bank relation can help to reduce information asymmetry.
3. If asymmetric information is reduced by a strong firm-bank relation, relationship banking, *ceteris paribus*, ought to improve financing conditions.

Data (1/2)

- Amadeus databank provides data including information on balance sheets, profit and loss accounts, the legal form, and the industrial code (Nace, Rev. 2) for German firms.
- Non-listed German firms of limited liability without floating debt between 2005 and 2012, for which we have at least 6 consecutive observations.
- In addition to information on balance sheets and profit and loss accounts, the amount of bank relations firms had between 2005 and 2012 is provided.
- However, the number of bank relations is not time-varying and capped at six.

Data (2/2)


One Bank Relation
80%
70%
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50%
40%
30%
20%
10%
0%
3.20%
3.00%
2.80%
2.60%
2.40%
2.20%
2.00%
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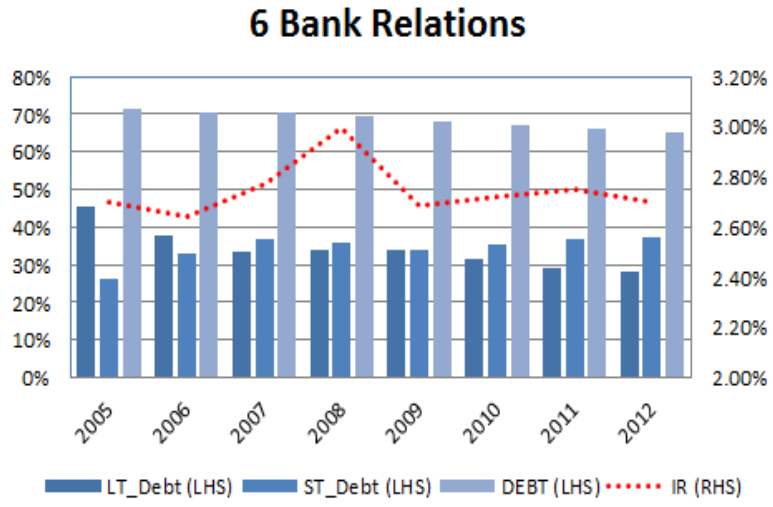
2012
LT_Debt (LHS)
ST_Debt (LHS)
DEBT (LHS)
IR (RHS)


6 Bank Relations
80%
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LT_Debt (LHS)
ST_Debt (LHS)
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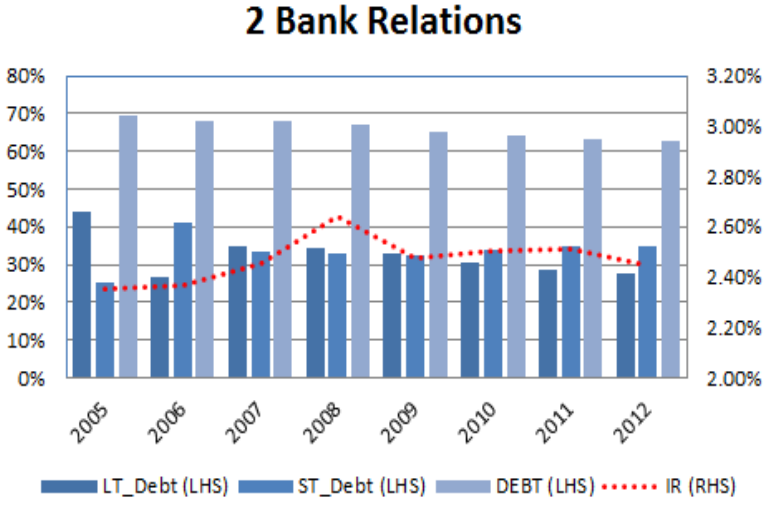
IR (RHS)


2 Bank Relations
80%
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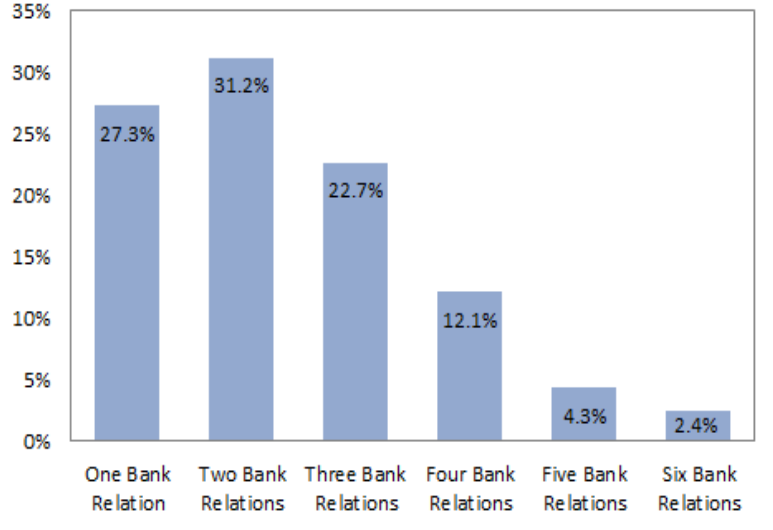

35%
30%
25%
20%
15%
10%
5%
0%
27.3%
31.2%
22.7%
12.1%
4.3%
2.4%
One Bank Relation
Two Bank Relations
Three Bank Relations
Four Bank Relations
Five Bank Relations
Six Bank Relations

Prediction 1.

If the fraction of intangible assets proxies for information asymmetry, a higher fraction should, *ceteris paribus*, lead to higher financing costs.

Prediction 1. - Estimation

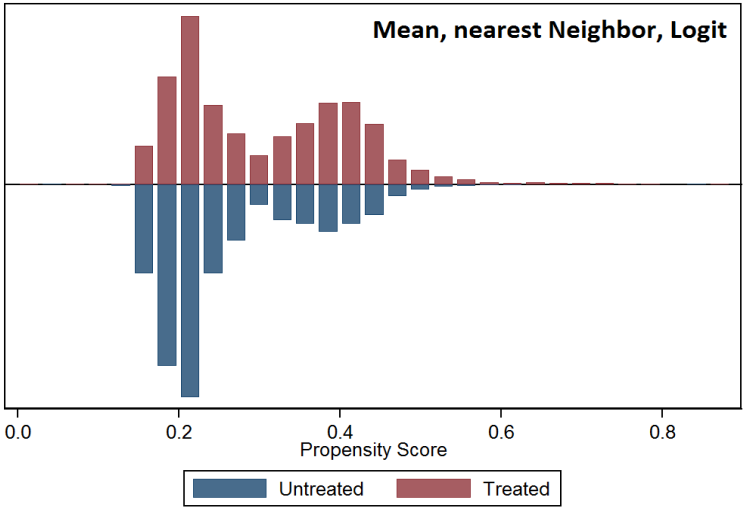
- Highly innovative firms which invest a lot in R & D activities, might prefer a single lender since they are not willing to share their knowledge with multiple lenders (Yosha, 1995). Thus, we have to check whether intangible assets really proxy asymmetric information.
- We apply propensity score matching and define two treatment groups which are firms whose share of intangible assets exceeds either the sample mean ($\approx$1.44%) or median ($\approx$0.03%), respectively.
- $E[Y(1)|D = 1]$ is the expected outcome given treatment, $E[Y(0)|D = 0]$ is the expected outcome absent of treatment, and SB is the selection bias.

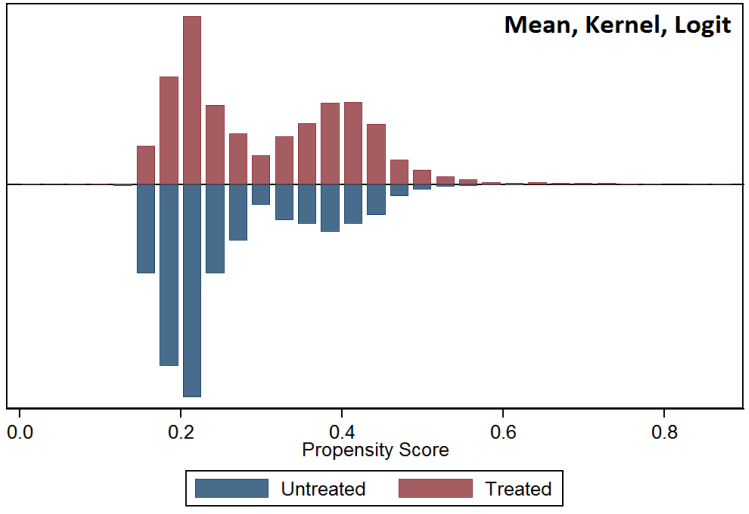
$$ATT = E[Y(1)|D = 1] - E[Y(0)|D = 0] + SB,$$

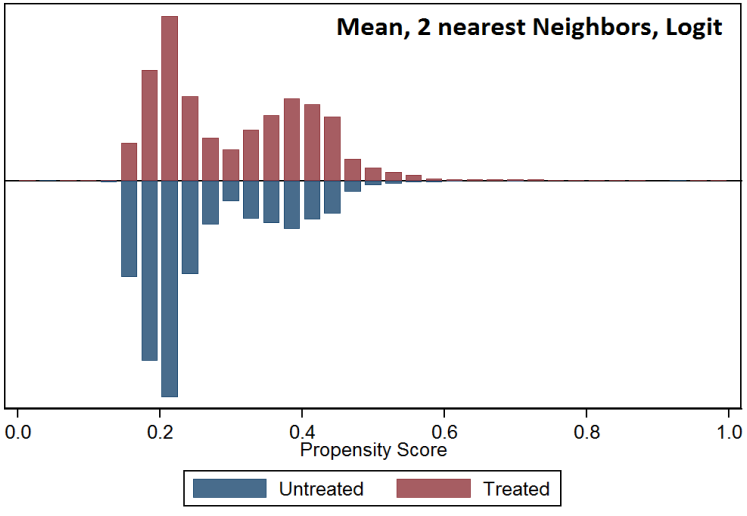
Prediction 1. - Selected Results

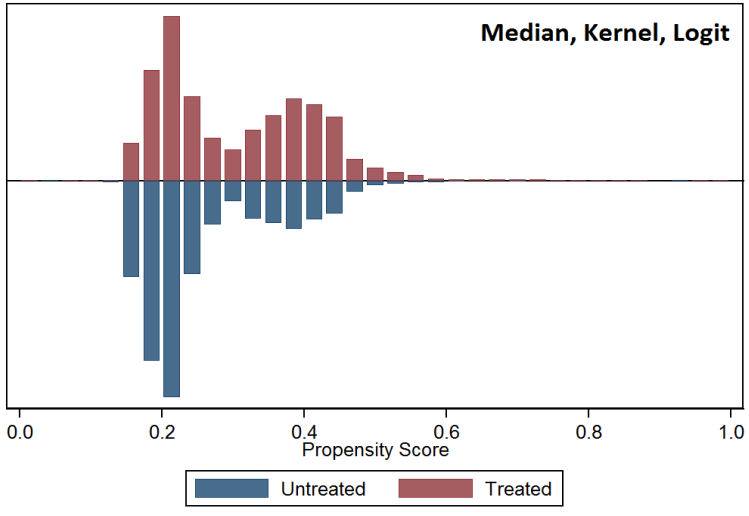
Treatment	Mean		Mean	
Matching	Kernel		Nearest Neighbor	
Model	Probit		Probit	
	Difference	T-Statistic	Difference	T-Statistic
Unmatched	0.000	-1.420	0.000	-1.420
ATT	0.001	2.330	0.001	2.330
pseudo R-squared	0.106		0.106	
Number of Obs	17003		17003	
Treatment	Median		Median	
Matching	Kernel		Nearest Neighbor	
Model	Logit		Probit	
	Difference	T-Statistic	Difference	T-Statistic
Unmatched	-0.001	-2.620	-0.001	-2.620
ATT	0.001	3.650	0.001	3.110
pseudo R-squared	0.112		0.109	
Number of Obs	17003		17003	

Propensity Score Matching - Quality Prediction 1.









Prediction 1. - Results

- The null hypothesis that the share of intangible assets does not affect financing conditions can be rejected and results are in favor of our prediction.
- Pecking order theory implies that asymmetric information causes management to prefer the issuance of debt over equity but this does not apply to intangible assets for which equity is the preferable way of finance (Myers and Majluf, 1984).
- Differences in equity ratios disappear comparing matched firms. This suggests that there is another way than equity to finance intangible assets which we expect to be relationship banking.

Prediction 2.

Firms with a high fraction of intangible assets should, *ceteris paribus*, be more likely to engage in relationship banking, since a close-firm bank relation can help to reduce information asymmetry.

Prediction 2. - Estimation

- We estimate the following baseline regression:

$$NBR_i = \beta \frac{IA_i}{TA_i} + X_i\gamma + I_i\delta + R_i\lambda + u_i$$

- Size of the firm which is either proxied by sales or employees.
- Redeployable collateral proxied by current assets (standardized by total assets).
- Indebtedness is either proxied by debt standardized by total assets or by short-term debt divided by long-term debt.
- Liquidity/ profitability proxied by EBITDA.

Prediction 2. - Logistic Regression

	(I) Coeff/OddsRatio	(II) Coeff/OddsRatio	(III) Coeff/OddsRatio	(IV) Coeff/OddsRatio
EMPL	-0.009***	-0.008***		
	1.000	1.000		
SLS			0.000	0.000
			1.000	1.000
CA/TA	-0.223***	-0.253***	-0.160*	-0.179**
	0.800	0.776	0.852	0.836
IA/TA	2.314***	2.341***	2.371***	2.404***
	10.116	10.389	10.707	11.069
D/TA	0.269***		0.280***	
	1.309		1.323	
DR		0.018***		0.015***
		1.018		1.015
EBITDA	0.000***	0.000***	0.000	0.000
	1.000	1.000	1.000	1.000
CONST	-0.469	-0.337	-0.508*	-0.368
OBS	21517	21517	17166	17166
CC	73.10%	73.15%	71.60%	71.63%
ROC	0.639	0.642	0.632	0.635

Prediction 2. - Results

- The null hypothesis that the fraction of intangible assets does not affect firms' choice of bank relations can be rejected.
- Size proxies are neither statistically significant (sales) nor economically meaningful (employees).
- Both proxies for indebtedness are significant an positive.
- Additional analyses:

1. We take into account the left-censoring in the dependent variable and estimate a Tobit regression.
2. We treat the dependent variable as a count variable and estimate a Poisson regression.

Prediction 3.

If asymmetric information is reduced by a strong firm-bank relation, relationship banking, *ceteris paribus*, ought to improve financing conditions.

Prediction 3. - Estimation

- We successfully identified one important determinant of firms' decision making regarding the choice between one or many lenders.
- We employ a one-firm one-bank relationship as treatment in a propensity score matching estimation.
- Firms' interest rate is defined as outcome variable.
- We estimate specifications (I) to (IV) according to the Logistic regression of Prediction 2.
- Logit or Probit, with one to the three nearest neighbors, and a normally distributed kernel.

Prediction 3. - Selected Results

Treatment	RB (I)		RB (II)	
Matching	3 Nearest Neighbors		3 Nearest Neighbors	
Model	Logit		Logit	
	Difference	T-Statistic	Difference	T-Statistic
Unmatched	-0.002	-9.700	-0.002	-9.700
ATT	-0.003	-9.710	-0.002	-7.790
pseudo R-squared	0.041		0.042	
Number of Obs	21517		21517	
Treatment	RB (III)		RB (IV)	
Matching	3 Nearest Neighbors		3 Nearest Neighbors	
Model	Logit		Logit	
	Difference	T-Statistic	Difference	T-Statistic
Unmatched	-0.002	-9.150	-0.002	-9.150
ATT	-0.003	-8.820	-0.002	-7.340
pseudo R-squared	0.037		0.038	
Number of Obs	17166		17166	

Prediction 3. - Results

- Comparisons show that firms engaged in relationship lending pay lower interest rates than other firms.
- The null hypothesis that relationship lending does not affect financing conditions can be rejected.
- However, difference are in an area below one percentage point.
- A natural limitation of our data is that it provides one window of observations.
- Thus, finding beneficial financing conditions related to relationship banking does not prove the non-existence of a hold-up problem.

Conclusion

- We discuss the relationship between intangible assets, asymmetric information, relationship banking, and financing costs for German SME's.
- Each topic has separately already received much attention in the academic literature.
- We contribute by the combination of all and, in particular, by assigning a special role to connection of intangible assets, asymmetric information, and firms' choice of bank relation.
- We find that the share of intangible assets significantly increases the probability of an exclusive and persistent bank relation.

Future Research

- Given data availability, future research ought to address the hold-up problem more precisely which requires knowledge about the development of a strong firm-bank relationship over time.
- The German three-pillar structure of the banking system is similar to banking systems in other European countries such as Austria, France, Italy, Spain and Sweden.