What drives bank-firm relationships in Poland? A panel data analysis

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Outline of the presentation

1. Motivation and purpose of the research
2. Relationship lending – theory and definitions
3. Empirical results
    - Number of financing banks
    - "Macro panel" A
    - "Micro panel" B
4. Conclusions

Motivation

- A contract between the lending bank and the firm leads to agency problem
- The global financial crisis has challenged the business model of banks and raised questions about their role in economy
- Relationship banking can be beneficial both for the creditors and debitors
  - **for banks**: reduces the information asymmetry between borrower and lender
  - **for firms**: better access to external finance, even when the firm's financial situation worsens

Purpose of the research

- Main goals:
  - determine which bank financing model is predominat in Poland
  - identifying what drives this choice
- Two-stage approach:
  - determine the number of banks financing each firm
  - identify the firms that use relationship lending according to our definition

Relationship lending – definitions (1)

- Situation where there are close ties between the firm and the lender (i.e. Petersen and Rajan 1994)
  - usual indicator: number of lenders (relationship lending=one lending bank)
- The provision of financial services by a financial intermediary that: (1) invests in obtaining customer-specific information, often restricted; and (2) evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products (Boot 2000)

Relationship lending – definitions (2)

- Three fundamental aspects of relationship lending from a bank's point of view (Berger, Udell 2002):
  1. a dependence on "soft" information about a firm, its owner, and its regional market
  2. coordination of this information by bank's loan officer
  3. a range of contracting problems involving the borrower, loan officer, senior management, owners, and regulators that bank must resolve

Relationship lending – benefits and costs

- Benefits:
  - **minimized agency dilemma** (which occurs as a result of a contract between the lending bank and the firm) - additional information acquired by bank reduces the cost connected with negative selection problem (Haffernan 2007)
- Costs:
  - **hold-up problem** (Sharpe 1990; Rajan 1992; Von Thadden 1992; 1995) - monopoly of information about the customer reduces competition in the bank loans market and in the future (ex post) can cause an increase in loan prices
  - **soft–budget constraint problem -** banks will continue to finance firms that experience financial difficulties, hoping to recover previously granted loans (Boot 2000)

Relationship banking - a summary

How to measure it:

- duration
- scope
- access to confidential information
- number of financing banks

What may determine it:

- firms characteristics
- banks characteristics
- financial system characteristics
- macroeconomic situation

What it influences:

- firms' financial situation
- profitability of banks
- cost and access to credit or other sources of finance

Data and definitions

- Main source of data – credit register
  - banks report their exposures above 500 thousand PLN (around 125 thousand EUR)
  - firm-level data - individual firms can be identified
- Number of financing banks = number of banks reporting given company to the credit register
  - only large firms are included - total exposures reported in credit register by all financing banks above 2 mln PLN (around 500 thousand EUR)
- **Definition: relationship lending/banking exists if there has been only one bank financing a given company over the last three subsequent years**

Number of financing banks

Country	**Period**	**Average**	**1 bank (% of firms)**
Germany	1993-2005	3.1	41.5
Spain	1984-2005	2.1	55
Italy	2008-2009	8	-
Czech Rep.	2002-2008	-	85
Portugal	1996-2004	3.1	25.7
Poland	**1997-2010**	**1.6**	**63.5**

- **Poland**:
  - in 1998: max = 32 , in 2010: max = 20.
  - pre-crisis average = 16-1,7, post-crisis = 1,5

Description

- Aim – examine how macroeconomic factors and financial system characteristics affect relationship banking according to our definition
- Sample:
  - years 1999-2010 (320 493 observations)
  - Source of data: NBP, FSA, WSE, CSO, OECD
- Method – panel logit:
  - success – relationship banking exists
  - random effects model due to sample characteristics

Model 1

$$\ln\left[\frac{p(RE_{it})}{1-p(RE_{it})}\right] = \alpha_0 + \sum_{j=1}^{n} \beta_j(FIRM_{it}) + \beta_{n+1}(RK_{it-1}) + \beta_{n+2}KB_t + \beta_{n+3}PKB_t + \nu_i + \epsilon_{it}$$

where:
RE_{it} - binary variable taking value of 1 (success) with probability p_i if relationship between a bank and a firm exists (only 1 and the same bank financing firm for at least 3 subsequent years) or 0 otherwise (with probability $1 - p_i$), $FIRM_{it}$ - matrix of corporate sector characteristics, RK_{t-1} - quality of banks' loan portfolio (lagges), KB_t - competition in banking sector, PKB_t - GDP growth, ν_i - individual random effect

Explanatory variables and expected signs

Variable	Description	Expected sign
lk	Credit exposures of all banks to firm i in period t (log)	negative
zagran	Binary=1, if firm i in period t is foreign-owned	positive
hightech	Binary=1 if firm i's sector is high-tech industry according to OECD	positive
RK	Share of firm's i non-performing loans (lagged)	positive
HHI	Herfindahla-Hirschman index	negative
CR5	Market share of 5 biggest banks	negative
lb	Number of banks	positive
lgpw	Number of firms listed on WSE	positive
aktbpkb	Banking sector assets to GDP	negative
PKB	GDP growth	negative

Results

Variable	(1)	(2)	(3)	(4)	(5)	(6)
lk	-0.658***	-0.656***	-0.617***	-0.630***	-0.687***	-0.664***
	(0.0146)	(0.0145)	(0.0142)	(0.0153)	(0.0149)	(0.0146)
zagran	0.624***	0.628***	0.602***	0.530***	0.653***	0.639***
	(0.0461)	(0.0461)	(0.0455)	(0.0485)	(0.0469)	(0.0461)
hightech				-0.197***		
				(0.0458)		
RK	1.187***	1.226***	1.192***	1.019***	1.233***	1.225***
	(0.0332)	(0.0334)	(0.0333)	(0.0343)	(0.0336)	(0.0332)
HHI	-2.949***					
	(0.0940)					
CR5		-0.0983***				
		(0.00308)				
lb			2.397***			
			(0.132)			
lgpw					1.101***	
					(0.0290)	
aktbpkb						0.0309***
						(0.000964)
PKB	0.0126**	-0.00782	0.0920***	0.0557***	0.0467***	
	(0.00577)	(0.00593)	(0.00599)	(0.00582)	(0.00567)	

Description

- Aim – examine the impact of firms characteristics
- Sample:
  - 14 033 separate non-financial corporations (46 719 observations)
  - years 1999-2011
  - source of data - Official Journal of the Republic of Poland (firms' financial reports)
- Method – panel logit:
  - success – relationship banking exists
  - random effects model due to sample characteristics

Model 2

$$\ln\left[\frac{p(RE_{it})}{1-p(RE_{it})}\right] = \alpha_0 + \sum_{j=1}^{n} \beta_j (FIRM_{it}) + \nu_i + \epsilon_{it}$$

where:
RE_{it} - binary variable taking value of 1 (success) with probability p_i if relationship between a bank and a firm exists (only 1 and the same bank financing firm for at least 3 subsequent years) or 0 otherwise (with probability $1 - p_i$), $FIRM_{it}$ - matrix of firm's i's characteristics, ν_i - individual random effect

Explanatory variables and expected signs

Variable	Description	Expected sign
lincome	Income (log)	negative
lassets	Assets (log)	negative
loss	Binary=1, if firm reports loss	positive
roa(roe)	Return on assets (equity)	negative
cur_liquid	Current liquidity ration (current assets to short-term debt)	negative
leverage	Leverage (debt to assets)	positive
trade_cred	Role of trade credit (trade credit to debt)	negative

Results

Variable	(1)	(2)	(3)	(4)	(5)	(6)
lassets	-0.521***		-0.520***		-0.528***	
	(0.0238)		(0.0238)		(0.0239)	
lincome		-0.477***		-0.490***		-0.476***
		(0.0228)		(0.0229)		(0.0227)
loss	-0.0570	-0.128***				
	(0.0457)	(0.0458)				
roa			0.00773***	0.0114***		
			(0.00148)	(0.00153)		
roe					0.00262***	
					(0.000716)	
cur_liquid	0.000350***	0.000283***	0.000314***	0.000235***	0.000301***	0.000246***
	(7.20e-05)	(7.07e-05)	(7.16e-05)	(7.01e-05)	(7.23e-05)	(7.13e-05)
leverage						-0.00224***
						(0.000695)
trade_cred	0.000783*	0.00238***	0.000736	0.00227***	0.000748*	0.00239***
	(0.000466)	(0.000668)	(0.000450)	(0.000665)	(0.000454)	(0.000668)

Conclusions

- Relationship lending predominates in Poland
  - Polish NFCs usually finance themselves in one bank only (average number of banks=1,6 for 1997-2010)
  - single bank financing is more common in Poland then in selected Western European countries
- Determinants of relationship financing:
  - **firm characteristics**: size (-), profitability (+), liquidity (+), trade credit financing (+)
  - **banking sector characteristics**: concentration (-), profitability (+), loan portfolio quality (+)
  - competition from capital market (+)
  - GDP growth (+)

THANK YOU!