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4. April 2005

Online at <http://mpra.ub.uni-muenchen.de/642/>
MPRA Paper No. 642, posted 2. November 2006

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Working Paper

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¹ I would like to thank Leszek Balcerowicz, Christian Harm and seminar participants at the Ronald Coase workshop for helpful comments. All mistakes are my own.

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Abstract:

Poland, as any other transition country, suffers from inefficient corporate governance as firms have difficulties with obtaining external financing. This paper aims to examine whether bank's involvement in corporate control reduces information asymmetries, and hence lessens firm's financial constraints – phenomenon frequently measured by investment-cash flow sensitivity. In the sample of all non-financial companies listed during 1999-2002 on the Polish stock exchange firms with a close relationship with banks are almost as much financially constrained as firms without such ties. However, the former group relies more heavily on bank loans than on internal capital in their investment activities. In contrast, firms without a close relationship with banks finance to larger extent their investment with internal capital than with credit. It may be interpreted that bank loans are more important source of financing for firms with bank ties than for firms without bank ties.

Key words: corporate control and governance, firm financing, relationship banking, emerging markets

1. Introduction

When the transition process began in post-communist economies, the state had withdrawn from corporate governance and a gap emerged. Since then, there has been an ongoing discussion of how to create an effective corporate governance system. The literature suggests that both banks and the capital market can be effective in corporate control as they are able to resolve the problem of information asymmetries between financiers and managers.

However, in a transition economy bank-based corporate governance system seems to be more plausible than market-based given the fact that banking sector is far more developed than capital market. The latter is emerging very slowly as well as institutions that support it. Nevertheless, most commentators favor the market based corporate governance. The major focus of the discussions has been placed on strengthening minority shareholder rights, improving the workings of supervisory boards, and building the market for corporate control in order to create an American type corporate governance system.

In the most advanced transition economies an enormous progress in reforming banking sector has been made due to restructuring of non-performing loans and wide range privatization, as well as restoring credibility of bankruptcy threat, when the borrower is not repaying debts. Hence, there are sufficient institutional requirements for banks to fill the gap in corporate governance after the state withdrawal. While operating under an effective corporate control mechanism in the form of credit, private firms can have better access to external financing, and hence economy can grow. Nevertheless, the role of banks has not been much emphasized in corporate governance reform in the post-communist countries.

In the literature is stressed that bank's involvement in corporate financing, and hence governance can be particularly advantageous for emerging market economies, where markets and firms are smaller, when legal protection is weaker and when there is less transparency than in developed market economies (Rajan and Zingales, 2003).

Banks play an important role in corporate control since, as creditors, they have access to insider information on their debtors. The closer relationship with their corporate client bank maintains, the more successful he is in reducing information asymmetries between himself and the borrower. In consequence, firms with a close

relationship with banks tend to be less financially constrained in their investment activities than firms without bank ties.

Information asymmetries are central to the role of banks in corporate governance. It is grounded in Akerlof's argument that a creditor is unable to judge the quality³ of an investment project that needs to be financed. He only knows the percentage of sound and unsound firms ("lemons") on the market, but information on a single borrower is unavailable. Hence, he demands risk premium from all firms. That may act as a deterrent to borrowing for firms with good prospects. As a consequence, a relatively higher number of unsound firms than sound firms are seeking external financing. Thus, high premium incorporated in the price of credit – interest rate – influences not only demand for capital, but also the risk inherent in different classes of borrowers. Bank loan contract with high interest rate, which means higher profit for a lender, can cause "selecting" only borrowers with poor prospects. As a result of the adverse selection, a financier deprives firms with good investment prospects of opportunities to gain and trigger inefficient allocation of resources.

Stiglitz and Weiss (1981) point out that lenders are aware of the problem of adverse selection and hence, they tend to limit the quantity of loans at any particular rate. Thus, information asymmetries hinder access to external debt even in market equilibrium and this leads to credit rationing. In this situation external financing may not be available to the borrowers, who are willing to pay the market rate. Then, firm investments depend on availability of internal capital.

Information asymmetries problem, that is essential element of imperfection in financial markets, makes not only the cost of external financing higher than internal one, but also leads to hierarchy of financing sources. The hierarchy is named a "pecking order" (Myers and Majluf, 1984). Firm's managers are assumed to have full information about the value of the firm's existing assets and investment projects. In contrast, external suppliers of funds are not capable to assess the quality of the credited firm. Therefore, they ask for a premium to offset losses that may arise from funding the lemons. In consequence, managers prefer less expensive internal capital to external financing.

Diamond (1984) argues that a bank-creditor is capable of lessening information asymmetries, thus benefiting not only lender, but also borrower through reducing both

³ Any project may be of good quality if it has positive net present value.

credit rationing and the cost of external financing.⁴ Bank monitoring activities concentrate on collecting information that is most of the time not available to other stakeholders. While obtaining firm-specific information they enjoy economies of scale (the cost of gathering information decreases by repeating procedures with different creditor customers) and scope (banks can make the most of acquired information delivering different services to the same client).

Empirical literature confirms that credit contract allows for an efficient monitoring of corporate borrowers, reducing information asymmetries. As a consequence, firms that maintain a close relationship with banks tend to be less financially constrained in their business activities than firms without such ties. For example, Hoshi, Kashyap and Scharfstein (1991) find that large Japanese corporations that have close financial ties to large banks, that serve as their primary source of external finance, face lesser financial constraints than firms without such a relationship with banks. Using data on the same group of firms for a later period of time, when liberalization of financial markets in Japan occurred, McGuire (2003) shows that difference in financial constraints between the two groups of firms is much smaller since access to other than bank loans sources of external financing (bonds) becomes available. Elston (1996) and Harm (1996) reveal similar results for German large corporations as well as Van Eas and Garretsen for Dutch large companies. However, Fohlin (1998) reports using data on German firms for the period 1905-1913 that the link between financial constraints and close relationship with banks is unstable. According to Houston and James (2001) the access to bank financing for US firms depends on the size of planned investments. In US several formal laws such as equitable subordination and lender liability limit bank's involvement in corporate financing, and hence governance. Their findings suggest that the role of banks in corporate control is determined by the institutional settings.

In transition economies a close relationship with banks could be very advantageous for corporate sector given rather scarce internal capital accumulation in corporate sector and difficulties with obtaining external financing. Better access to financial resources facilitates firm's investment, and hence economic growth. Despite

⁴ Some authors point out that close relationship with banks may generate lender's rent extraction from the borrower, because the latter is informationally captured by the former and, hence, not necessarily bring about the previously envisaged reduction in credit constraints for borrowers (Sharpe, 1990; Rajan, 1992). The empirical evidence is mixed. See Weinstein and Yafeh (1999) for empirical evidence in Japan and Elsas and Krahnert for Germany (1998).

of that there is little empirical evidence on the effect of bank-firm relationship on firm's financial constraints. Most studies were conducted for developed countries. Few papers are available on Korea⁵. This study is the first to address the issue for transition countries based on the example of Poland.

The remainder of this paper is organized as follows. Next section (section two) analyzes how the role of banks in corporate control evolved along with institutional transformation of a post-socialist economy. In the third section research methodology is explained. Fourth section covers data description. Fifth section discusses empirical results and selectivity bias. In the last one conclusions and future research agenda are presented.

2. How institutions matter for bank's involvement in corporate control?

The purpose of this section is to provide a brief description how credit was becoming a mechanism of corporate control during transition process from a centrally planned economy to a market economy. In Poland, similarly to other socialist countries, banks played a significant role in corporate financing and thus governance already in a pre-transition period. Capital market was nonexistent and hence banks were sole providers of external financing to corporate sector. State enterprises could only apply for credit in one bank that was appointed to control their expenditures. It aimed to abolish interbank competition for business. There were generally no fixed limits on the amount of credit that was available for state enterprises, which hence were not capable of going bankrupt. The phenomena was described in details by Kornai (1980) and named by him as a soft budget constraint. Banks operated rather as cashiers than financial intermediaries distinctive for market economies. This was a consequence of distributing credit according to the provisions of the central plan rather than to the criteria of financial viability. In other words, banks were not profit maximization-oriented entities and hence did not assure themselves loans repayment and return on their investment in the form of interests. Running under a soft budget constraint state enterprises were prone to overinvest. This created a situation, where a bank-firm relationship did not have the same *raison d'être* as in a market economy.

⁵ Ferri G., Kang T., Kim I. (2001), Bae K., Kang K., Lim C. (2002b), Kim Y., Park K., Ratti R., Shin H. (2002).

When socialist economic system collapsed, transition process began with markets and prices' liberalization; among others interest rate deregulation. The cost of credit increased sharply and state enterprises faced enormous difficulties to repay a huge burden of loans inherited from the centrally-planned economic regime. In addition price and foreign trade liberalization weakened the competitiveness of their products. The difficult market conditions forced some state enterprises to adjust by cuts in production that was hard to sell, and suspend investment projects. (Belka and Krajewski, 1997).

Along with liberalization and stabilization process institutional transformation began. The mono-bank was transformed into two-tier banking system and capital market started to emerge. On the threshold of transition bank loans were more important source of external financing than equity capital for enterprises, since the latter was scarce and came mainly from FDI⁶. Due to underdeveloped capital market banks had to maintain their function as main finance providers to firms. Inexperienced in applying market criteria to their lending decisions they continued to serve their corporate clients they had a relationship in pre-transition period. The concept of creditworthiness was immensely difficult to implement given that state enterprises had no "proven track record", rapid systemic change was already in place as well as there was lack of human resources skilled at assessing borrower financial situation. Moreover, an increase in credit cost caused that state enterprises in a good standing ceased financing with bank loans. Only those state enterprises that were in the difficult financial situation tended to finance themselves with credit (Gomulka, 1993). That led to highly concentrated banks' loan portfolios and ultimately to a severe problem of bad debts.

Given the magnitude of bad debts in banking sector a fundamental bank and enterprise restructuring program was indispensable. The main aim of the program was to stabilize the commercial banking sector by resolving of the problem of non-performing loans. It was related with two other goals. First, credit should go to firms that are able to make payments on existing debts and have perspectives to further develop. Second, banks should have incentives to monitor corporate clients in order to assure themselves credit repayment and return on their investment in the form of interests.

⁶ See *Transition Report 1998: Financial sector in transition*, EBRD, 1998.

In Poland the enterprise and bank restructuring program commenced in 1993 and lasted until 1996. There were nine state banks involved, whose main tasks were to establish workout departments, staff them adequately and take action to recover loans qualified as doubtful or loss. The program provided banks with three new tools to deal with non-performing loans: bank-led conciliation agreement, public sale of banks debts on the secondary markets, and possibility to swap their bad loans for shares of privatizing companies. The two last tools had limited effects. First, secondary markets for debt were very small because there was lack of capital in the whole economy. Second, according to the Banking Law (inspired by European Union Second Banking Directives) banks were allowed to hold certain limited amount of debtors' shares.⁷

As far as the first tool is concerned banks were to monitor the conciliation agreement they led, and were liable for any additional losses to others creditors, if the agreement conditions were not fulfilled by debtors⁸. Hence, they had incentives to insist upon financial restructuring as well as upon fundamental changes in the size or in debtor activities. The bank-led conciliation agreement enabled to impose on firms a hard budget constraint, build institutional capacity for resolution of financial distress. Besides it was free of fraud or corruption. But on the other hand it also resulted in a short-term banks' involvement in debtor' control. After the restructuring program came to the end banks decided to strictly restrict the amount of credit granted to corporate sector and hence their role in corporate control diminished considerably (Pawłowicz, 1996). The inherited from the centrally planned economy a bank-firm relationship has been loosened and ultimately firm's financial constraints have occurred (Konings, Rizov, Vandenbussche, 2002).

In the hindsight, the bank and enterprise restructuring program in Poland was successful. The main factor in its success was getting banks involved in activities that were to improve their loan portfolio. The fundamental bank incentives embraced the short-term binding restructuring act, opportunity of recapitalization and better protection of the creditors rights. In addition, the program contributed to introducing new mechanisms of corporate governance (e.g. debtor's equity holdings) and to re-establishing effectiveness of formally functioning mechanisms of corporate governance (e.g. credible threat of insolvency procedures).

⁷ The law says that bank shareholding in one corporate equity can not exceed 15% of own equity.

⁸ Similarity to the legal rule of loan subordination in US

Although the bank restructuring process was very important for creating institutional settings for using credit as a corporate control device, privatization (understood as reducing state ownership in the banking sector as well as creating new private banks) was a milestone. It enabled banks to transform their function from a passive cashier to an active financial intermediation that is interested in debtor's control in order to get credit repaid. With this regard competition from foreign banks played a great role. Their presence on the Polish market for financial services contributed to a sharp increase in interbank competition, and later at the end of 1990s to a reinforcing consolidation process in banking sector. As a consequence, diversification of bank loan portfolio has been decreased and hence, credit risk has risen. That is another important incentive for banks to get involved in corporate control by establishing a close relationship with their debtors.

The last step on the way to establish necessary conditions for banks to get involved in corporate governance was improvement in protection of creditor rights. A great effort has been made recently to reform insolvency and collateral laws in order to restore credibility of bankruptcy threat.⁹ The results are mixed as the laws are very efficient in books, however still the enforcement is rather weak [EBRD, Transition Report 2003].

3. Methodology

In this paper I examine the effects of bank's involvement in corporate control on firm's financial constraints in a transition economy based on the example of Poland. Specifically, I empirically investigate whether firms with a close relationship with banks are less financially constrained in comparison to the firms without such ties. Firm's financial constraints are measured by cash flow sensitivity of investment [see Fazzari, Hubbard, Petersen 1988].

In this methodology firms are divided into subsamples based on the criteria, which identify *a priori* the firms that face financial constraints. I use as a criterion a close relationship with banks. Typically in the recent studies duration of firm-bank relationship or a number of creditors are perceived as evidence of close ties with banks.

⁹ There is new bankruptcy law since 2003, which strengthens creditor rights.

In this paper I use placement of bankers on firm's supervisory board as a proxy of firm-bank relationship for the two following reasons. First, institutional reforms in banking sector in Poland caused breaking off credit connections between banks and enterprises imposed upon them within monobank system in the centrally-planned economy. A great number of new private banks have begun to operate in Poland since transition started. It increased enormously competition and then consolidation process in the Polish banking sector. As a consequence, firms may be constantly inclined to resign from existing bank relationship and encouraged to look for new lenders.

Second, given severe information asymmetries typical for a transition economy maintaining close credit relationship may not be sufficient for banks to monitor borrowers. With a banker on the firm supervisory board they can have more extensive knowledge about debtor's financial situation.

Having two subsamples: firms with at least one banker on the board and firms without bank representatives on the board, I look at the cash flow-investment sensitivity. Strong and positive correlation between internally generated funds and investment indicates the capital market imperfection – information asymmetries. This creates preference for cheaper internal capital over more expensive external capital. Firms that find it relatively more costly to raise external financing will demonstrate a greater investment-cash flow sensitivity. When bank dependent firms appear significantly less investment-cash flow sensitive than firms without personal bank ties, it may be interpreted as evidence that a close relationship with creditor lowers the cost of external financing. It will be consistent with the theory that bank's involvement in corporate control through sitting on firm supervisory boards diminishes information asymmetries between himself and borrower.

The equation looks like this:

$$I_{it}/K_{i(t-1)} = \alpha_0 + \alpha_1 CF_{it}/K_{i(t-1)} + \alpha_2 Q_{it} + \alpha_3 X_{it}/K_{i(t-1)} + \varepsilon_{it},$$

where I denotes investment spending in fix assets of the i^{th} firm in t time. Investment (I) is a dependent variable and is calculated as the first difference of gross fixed assets expenditures. Fixed assets include land, property, plant, equipment and patents.

There are two explanatory variables: Tobin Q and cash flow (CF). X controls for other variables that can determine the size of investment expenditures. The first explanatory variable represents future growth investment opportunities, which is

proxied by market-to-book ratio. The second variable, cash flow (CF), is measured as net income plus non-cash costs (e.g. depreciation) minus non cash expenditure. Hence, it is represented by cash flow from operating activities.

S. Fazzarii and others (1988) point out that in a world with complete information about capital market, investment expenditures would depend only on profitability of the firm's investment opportunities. Then as F. Modigliani i M. Miller (1958) argue investment could be financed by any combination of internal and external capital. However, in the real world there is always some degree of information asymmetries between a financier and a firm. It leads to a situation when the cost of external capital is higher than internal one. This can significantly reduce firm's investment activities, which then are restricted by the amount of cash flow generated internally.

Recent empirical work suggests that it is necessary to include on the right hand side of the equation an interaction term ($CF/K_{t-1} * Neg$) indicating negative cash flow observations. Neg is a dummy variable equals 1, if firm's cash flow is negative, or 0 otherwise. Allayanis and Mozumdar (2001) find that firms with negative cash flow have driven investment down to its lowest possible level, making it unable to respond to further reduction in cash flow. This reduces the investment-cash flow sensitivity for these observations.

In the above equation I added several control variables to determine the robustness of my results. They are defined as follows. I include production to control for a potential accelerator effect. High level of production may lead to increase capacity in the future, hence more fix assets investment expenditures are necessary. I use revenue from sales (S) as the proxy for production (Abel and Blanchard, 1986).

I also include a few variables that denotes sources of external capital: long-term and short-term bank loans (respectively: LBL and SBL) as well as other long-term and short-term liabilities (correspondingly OLL and OSL). Separating bank loans from other liabilities aims to identify the impact of availability of credit on investment activities. Severe credit rationing may lead to an increase of other liabilities in financing fix assets investments. According to Weller (2001) positive and significant relationship between different variables of external capital and investment expenditures in a transition country indicates that firms operate under a hard budget constraint.

To avoid heteroskedasticity all variables in the model are normalized by the stock of fixed assets at the beginning of the period – $K_{(t-1)}$.

Further I add to the equation a dummy variable (BH) that shows the impact of bank's equity holding on firm's investment. It equals 1, if there is at least one bank among firm's shareholders, 0 otherwise.

In order to control for possibilities to acquire external financing for investments from large block shareholders I include a variable indicating concentration of firm ownership structure (OC). It can take values from 1 – the most concentrated firm ownership structure to do 5 – the lowest level of concentration.¹⁰ Finally, to weed out macro shocks I add a yearly dummies.

4. Data

The sample I analyze is a set of all non-financial companies that have been continuously listed on the Polish stock exchange between 1999 and 2002. The timeframe, for which data was collected, enables to examine the effect of bank's involvement in corporate control on firm's financial constraints during economic downturn and upturn¹¹. The year 1999 represents economic boom as then GDP grew annually by 4,1%. This year together with the first quarter of the year 2000 was also considered to be the most profitable period for the companies listed in Poland. Later the economic growth significantly slowed down. And eventually, year 2001 brought recession - the worst rate of GDP growth in transition period equaled 1%.¹²

¹⁰ When the variable OC is set as 1 then it means that single shareholder holds more than 75%. If two or three shareholders hold more than 75% than the variable is equal 2. Concentration is set as 3 when the single shareholder holds more 50% and relatively 4 if two or three shareholders hold more than 50%. Concentration is considered to be 5 in all the cases in which the concentration is more dispersed than 50%.

¹¹ The literature points out that credit plays a different and in some ways complementary role to equity. Debtholders are viewed as more risk-averse than shareholders, because they do not share in upside gains. And thus bank's involvement in corporate governance is desirable during an economic downturn ("bad times"), when tight controls on spending and investment is needed, particularly in times of financial distress or during restructuring. See more Baer and Gray, 1996.

¹² The Polish economy grew very quickly in the second half of 90s. Since 1999 it has begun to slow down. However, in 2002 the growth was already signaling a probable recover from recession (1,4%), See EBRD, *Transition Report 2003*, 2004.

I restrict my sample to publicly traded companies for three interrelated reasons. First, data on listed companies is widely disclosed and reliable¹³. Second, these firms are large and hence external financing and corporate governance is of great importance for them. Third, the evidence suggests that firms in Poland operate under severe credit rationing, while financing needs in a transition economy are high (Weller, 2001). However, it is likely that public companies have better access to bank loans than other business entities as they are in better standing.

Public companies are considered to be well performing corporations in Poland, as the listing requirements are very stringent. Most of them also represent the largest firms in Poland. Their equities are listed on three different markets: main, parallel and free. The category of the market, on which a firm is listed, is determined by its book value. The minimum book value of a company is different for each market and it equals 65 millions PLN, 22 millions PLN, 4 millions PLN¹⁴ respectively. Given the values listed companies are considered to be large or middle-size. Disclosure rules are the same for all issuers regardless of the market, on which they are listed.

At the beginning of the sample selection process I distinguished 182¹⁵ non-financial companies that were listed on the Polish stock exchange at the end of the year 1999. They represented various industries and service sectors.¹⁶ Most of firms (57%) in the sample belonged to industry; 20% out of it produced food, 19% chemicals and 18% electro-machinery. 20% of firms represented construction sector and 22% focused on different services.

Over time, 34 firms dropped from the sample for the following reasons: financial distress and ultimately bankruptcy (13), transactions that took firms private¹⁷ (17) and mergers (4). Additional 6 firms were also excluded, because a complete set of the data regarding composition of the supervisory boards was unavailable. Over all I possess data on 568 firm-year.¹⁸

¹³ Since the year 1999 information disclosure proceedings for companies listed in Poland are very closely monitored. The reason is that the Law on the Public Trading of Securities date as of 21 August 1997, obliges public companies to deliver all information relevant to investors' decisions, came into force.

¹⁴ In the period 1999-2002 the Polish currency exchange rate was fairly stable, approximately 1\$ to 4 PLN.

¹⁵ At the end of the year 1999 there were 221 companies listed on the Warsaw Stock Exchange. I exclude from this group 15 NFIs and 24 financial enterprises.

¹⁶ For details see appendix 1.

¹⁷ It is usually decision taken by foreign strategic investors.

¹⁸ Since the sample contains firms with continuous data only, there might be a selectivity bias in the sample. However, in terms of results there should be no change in investment sensitivity to cash flow,

Given the two-tier structure of board of directors in Poland, there are two ways, in which a firm might have a bank representative on the supervisory board. First, banks' management team members can sit on the firm's supervisory board. Second, when the same individual is a member of bank and firm supervisory board. The first case was much more common in my sample. 86% of all bank representatives on firm supervisory board were bank managers.

Placement of bankers on firm supervisory board was common way of maintaining relationship with banks among listed companies. 49% of sample firms had at least one banker on the supervisory board during the years 1999-2002.¹⁹ Most of the time firms with such bank ties reported about one bank representative on their supervisory boards (75% of all observations). 21% of all observations concern situation, when a firm had two bankers on the board. Very rarely firms informed about three bank representatives (4% of all observations).

The largest banks in Poland²⁰ were the most active in developing relationship with their corporate clients by delegating their representatives to firm supervisory board. 67% of bankers on the supervisory board represented the six largest banks in Poland²¹. Those banks were also the largest creditors of the listed companies. Long-term loans granted to the sample firms by the six largest banks added up to 64% of all long-term credit delivered to all sample firms.

It was rather unusual to see a representative of one of the foreign banks operating in Poland on the firm supervisory board - (8% of all bankers). Long-term loans from these banks amounted to less than 1% of all long-term credit provided to the sample firms.

Having a bank representative on the board did not always indicate that firm was financed with credit. Sometimes banks placed their delegates on firm supervisory board in spite of that they were neither its creditors nor shareholders. 39% of sample firms

because both good firms (those that were taken private) and bad firms (those that went bankrupt) were excluded from the sample.

¹⁹ Supervisory board's composition should be revealed in the annual financial reports. Any changes should be announced publicly by sending a current report to the Polish Securities and Exchange Commission. Each current report show employment records of new board members.

²⁰ They were previously state banks, but now they are joint-stock companies, where block shares are in hands of foreign banks.

²¹ At that time those were: PKOBP, PEKAO, BPHPBK, CITI BANK HANDLOWY, ING BANK ŚLĄSKI, BRE.

had at least one bank-creditor delegate on their supervisory boards at least once during the years 1999-2002.

Table 1. shows some relevant statistics²² for the two sets of firms: with and without bankers on the supervisory board. The subscript BT refers to firms that had a bank delegate on their supervisory boards at least once during 1999-2002. The subscript NBT stands for firms that did not have at all bank board representation during 1999-2002. The two types of firms differ significantly taking into account the following variables: cash flow, long-term and short-term bank loans, long-term other liabilities and size of firms (measured by natural log from the total assets).

Similar results I obtained by comparing two different sets of firms: with and without a bank-creditor representative on their supervisory boards. The subscript BCT refers to firms that had a bank-creditor delegate on their supervisory boards at least once during 1999-2002, and the subscript NBCT stands for firms that did not have at all bank-creditor representation on the supervisory board during 1999-2002.

Table 1. Summary statistics comparing firms with bank ties and firms without bank ties.

	BT	NBT	Difference	BCT	BNCT	Difference
Mean I/K	0.216	0.226	0.165	0.260	0.198	0.948
Median I/K	0.077	0.098	0.857	0.079	0.088	0.093
Mean CF/K	0.148	0.250	3.159***	0.144	0.234	2.684***
Median CF/K	0.133	0.184	3.513***	0.124	0.175	3.477***
Mean Q	1.130	1.104	0.380	1.161	1.090	1.009
Median Q	0.970	0.931	1.687*	0.979	0.922	2.596***
Mean S/K	5.282	5.172	0.098	6.001	4.764	1.067
Median S/K	2.876	2.930	1.604	3.190	2.852	0.152
Mean LBL/K	0.116	0.095	1.326	0.138	0.086	3.146***
Median LBL/K	0.040	0.000	2.869***	0.050	0.000	3.969***
Mean SBL/K	0.353	0.274	1.853**	0.407	0.257	3.426***
Median SBL/K	0.217	0.173	2.705***	0.258	0.162	4.38***
Mean OLL/K	0.098	0.064	2.134**	0.112	0.061	3.145***
Median OLL/K	0.018	0.006	1.458	0.022	0.006	2.696***
Mean OSL/K	1.242	1.189	0.183	1.430	1.086	1.144
Median OSL/K	0.596	0.579	0.161	0.667	0.564	1.714*
Mean ln size of total assets	12.205	11.850	3.123***	12.319	11.846	4.05***
Median ln size of total assets	11.903	11.791	2.023**	11.960	11.832	2.75***

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

²² For more detailed summary statistics see appendix 2.

One might be tempted to use statistics to support the hypothesis that firms appreciate relationship with banks the most being in financial distress. The largest amount of bank loans went to firms with bankers on the boards that informed about negative cash flow from operating activities. This is a symptom of different state of financial distress such as: temporary financial distress, severe financial distress or insolvency.²³ In my sample most of the firms were in temporal financial distress since they report negative cash flow just once or twice during the years 1999-2002. Only 3 out of 77 firms informed about financial distress for three years in a row.²⁴

5. Regression results

Table 2. reports regression results separately for the two sets of firms: with (BT) and without a bank representative on the supervisory board (NBT).

²³ Firms can also suffer from negative cash flow at the early stage of growth. This variant is not applicable to my sample, as it comprises of listed companies that are considered to be established firms.

²⁴ See appendix 3, which provides summary statistics separating the group of firms with positive cash flow from the group of firms with negative cash flow.

Table 2. Fixed effects regression relating investment to cash flow for firms with a banker on the supervisory board (BT) and for firms without bankers on the supervisory board (NBT).

The dependent variable, fixed capital investment I, is regressed on cash flow - CF, market-to-book ratio-Q, income from sales, negative cash flow - CF*Neg (where Neg is a dummy variable equals 1, when cash flow is negative, 0 otherwise), long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL, a dummy for bank equity holdings - BH, ownership concentration dummies from 1 to 5 - OC, annual variable indicators (t2, t3, t4). Level variables are normalized by fixed capital at the beginning of the year - K(t-1).

	BT		NBT	
	1	2	3	4
CF/K _{t-1}	0,65**	0,37**	0,707***	0,533***
Q	0,01	-0,01	0,413***	0,461***
S/K _{t-1}	0,006	(-0,07)***	0,033***	-0,005
CF/K _{t-1} *Neg	(-1.47)**	-0,15	(-1,8)***	(-1,2)***
LBL/K _{t-1}		1,42***		0,885***
SBL/K _{t-1}		1,47***		0,302***
OLL/K _{t-1}		0,51***		-0,052
OSL/K _{t-1}		0,18***		0,1609***
BH		0,016		0,182*
CO_1		-0,036		0,161
CO_2		(-0,61)**		0,472
CO_3		-0,074		0,277
CO_4		-0,126		0,271
CO_5		NA		0,486
T2	(-0.358)***	(-0,28)***	0,083	0,025
T3	(-0.45)***	(-0,49)***	-0.009	-0,045
T4	(-0.477)***	(-0,44)***	-0,286	-0,013
Constant	0.344***	0,002	(-0.658)***	(-1,06)***
p-value (F)	0,4	0,00	0,00	0,00
Hausman test	0,9	0,13	0,00	0,00
R2 within	0.14	0,64	0,63	0,71
R2 between	0.11	0,14	0,41	0,39
R2 overall	0.13	0,39	0,52	0,54
N	276	276	292	292

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

The first and third columns of table 2. show the results for the simple investment regression equation. Investment of firms with a banker on the supervisory board was less sensitive to cash flow than investment of firms without bank representatives on the board. The second and fourth columns present results from an extended regression equation. The difference in investment-cash flow sensitivity between the two sets of firms increased. Again, internal capital was less important source of financing for firms with personal bank ties than for firms without such ties, because the former were less financially constrained than the latter.

I also find that investment of both sets of firms was positively and significantly related to the level of bank financing both long-term and short-term. However, the estimated coefficient of the variable indicating long-term bank loans was twice as large for firms with bankers on the board than for firms without bank representatives on the board. In case of short-term bank loans estimated coefficient was also much larger for firms with personal bank ties than for firms without such ties – five times as large. It suggests that bank financing was far more important for firms with a banker on the board than for firms without bank board representation.

Besides the results reveal that for firms with a banker on their supervisory boards the coefficients of both long-term and short-term bank loans were nearly five times larger than coefficient of cash flow. It may be interpreted as evidence that for those firms bank loans were more important for investment financing than internal capital.

In contrast, for firms with no bank representatives on the board estimated coefficient of cash flow was twice as large as estimated coefficient of short-term bank loans. Thus, for this set of firms internal capital was more significant than short-term bank loans for investment financing. However, estimated coefficient of long-term bank loans was larger than estimated coefficient of cash flow. Given that more than 50% of the firms did not receive long-term bank loans those results support the hypothesis that they were more financially constrained (see table 1).

Note that production appeared to influence the investment activities of firms with personal bank ties. However, it may have very minor impact on investment spending. The estimated coefficient of income from sales was negative, but very close to zero.

The relation between investment spending and the level of investment opportunities – measured by the market-to-book ratio – was positive and statically significant just for firms without bank representatives on the boards. They were smaller – as the summary statistics show²⁵ – than firms with bankers on the board and therefore were likely to have bigger incentives to invest and grow.

For both sets of firms the estimated coefficient indicating other short-term liabilities were statistically significant, but its impact on investment spending was much smaller than bank loans. As far as other long-term liabilities are concerned their increase was related to a rise in investment expenditures, but just for firms with personal bank ties. It seems that other creditors may treat bank participation in board activities as mechanism that can assure themselves debt repayments.

Ownership concentration was not statistically significant variable. Only in the case of firms with bankers on the board, whose 75% shares were concentrated in hands of two or three shareholders, investment was negatively related to ownership concentration. It may indicate that the largest investors undertook a firm restructuring. However, assets stripping hypothesis cannot be rejected.

I also included to the investment equation a variable that depicts bank equity holdings, because the role of bank as shareholders may be important for firm investment decisions. The effect of this variable was insignificant for firms that had a bank representative on the supervisory board. On the other hand for firms without bankers on the board it was positively and significantly related to investment expenditures.

Last, but not least, investment expenditures are very much sensitive to macro environment. From the data we see that the economic downturn from 2000-2002 had a negative impact on investment activities. Firms with bankers on the board reacted quickly on a decline of economic growth by decreasing of the amount spent on investment. Macro situation had no impact on investment of firms without bankers on the board.

As mentioned before most of bankers on the firm supervisory board represented the six largest banks in Poland. Those banks were also the main creditor of the sample companies during 1999-2002. Hence, it is worthwhile to examine whether placement of

²⁵ See appendix 2.

management team member from one of the six largest banks in Poland on firm supervisory board affects investment-cash flow sensitivity. With this respect two interaction terms were included to the equation. One consisted of cash flow (CF) and a dummy variable for large banks, when a banker represented one of the six largest banks in Poland (LB): $CF/K_{t-1} * LB$. Respectively, there was also interaction term between cash flow (CF) and a dummy variable for smaller banks (SB) - $CF/K_{t-1} * SB$.

Regression results²⁶ show that cash flow was important for firms that maintained personal relationship with one of the largest banks in Poland. Estimated coefficient for cash flow for firms with bankers from one of the largest banks on the board was smaller than for firms without bank board representation. Hence, investment of the former group was less sensitive to cash flow than investment of the latter group. However, the difference in investment-cash flow sensitivity between these two sets of firms was smaller in comparison to the outcome of analyzed previously subgroups of firms: with and without bankers on the board.

The relationship between interaction term $CF/K_{t-1} * SB$ and investment was statistically insignificant. It may be a result of a small number of observations, when firms had bankers from smaller banks on the supervisory board.

To investigate whether placement of a banker on the supervisory board indicates bank's involvement in corporate governance I repeated all estimation, classifying firms into two sub-sample differently. First group (BCT) consisted of firms with a representative of a bank that at least once during the research period 1999-2002 was their creditor. Second group (NBCT) included firms without bank-creditor delegates on the firm supervisory board.

Table 3. demonstrates that investment of firms with bank-creditor representatives on the board was almost as sensitive to cash flow as investment of firms without bank-creditor delegates on the board. The difference in investment-cash flow sensitivity between two distinguished sub-samples appeared to be very small. One interpretation may be that firms with bank-creditor representatives on the supervisory board faced similar financial constraints in their investment decisions as firms with no bank-creditor delegates on the board. It suggests that neither firms with bank-creditor representatives on the firm supervisory board have yet succeeded in mitigating

²⁶ See appendix 4.

Table 3. Fixed effects regression relating investment to cash flow for firms with a bank-creditor representative on the supervisory board (BCT) and for firms without bank-creditor delegates on the supervisory board (NBCT).

The dependent variable, fixed capital investment I , is regressed on cash flow - CF , market-to-book ratio - Q , income from sales, negative cash flow - $CF*Neg$, where Neg is a dummy variable equals 1, when cash flow is negative, 0 otherwise), long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL , a dummy for bank equity holdings - BH , ownership concentration dummies from 1 to 5 - OC , annual variable indicators (t_2, t_3, t_4). Level variables are normalized by fixed capital at the beginning of the year - $K(t-1)$.

	BCT	NBCT
CF/ K_{t-1}	0.5**	0.54***
Q	-0.003	0.45***
S/ K_{t-1}	-0.068	-0.007
CF/ K_{t-1} *Neg	-0.301	(-1.185)***
LBL/ K_{t-1}	1.4***	(0.921)***
SBL/ K_{t-1}	1.518***	(0.314)***
OLL/ K_{t-1}	0.47**	0.153
OSL/ K_{t-1}	0.152**	(0.163)***
BH	0.063	0.168
CO_1	-0.027	0.161
CO_2	(-0.691)***	0.394
CO_3	-0.133	0.224
CO_4	-0.084	0.201
	Brak	
CO_5	obserwacji	0.350
T2	(-0.3)***	-0.019
T3	(-0.507)***	(-0.117)*
T4	(-0.487)***	-0.066
Constant	-0.08	(-0.954)***
p-value (F)	0.00	0.00
Hausman test	0.00	0.00
R2 within	0.70	0.65
R2 between	0.10	0.35
R2 overall	0.42	0.48
N	212	356

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

asymmetric information between creditor and borrower. Nor, placement of a bank-creditor representative on firm supervisory board is not an ideal measure of corporate control exercised by banks.

Closer scrutiny of the results from table 2. and 3. reveals that investment-cash flow sensitivity of firms with a banker on the supervisory board increased after excluding from the first set 16 firms with bank delegates on the board that did not represent bank-creditor. Including those 16 firms to the subgroup where firms did not possess bank board representation did not impact their investment-cash flow sensitivity.

Regression outcome just for those 16 firms shows that investment was not statistically related to the level of cash flow. Additionally, neither other sorts of financing affected investment expenditures. One interpretation is that those 16 firms financed their investment from retained earnings or issuing corporate bonds. It is possible that those firms did not invest during 1999-2002 since mean of investment expenditures equals 0,068, and median respectively 0,056.

Analyzing the results from table 2. and 3. one should note that after relocating 16 firms from subgroup with bank ties to subgroup without bank ties estimated coefficient of other variables nearly did not change.

Controlling for possible selection bias

To control for selectivity bias that can arise at the firm level, I use the fixed effects estimation that takes care of the selection bias related to non-random exit from the sample. However, selectivity bias might not be related to firm's identity characteristics. It may occur in the choice of a measure of bank's involvement in corporate control, and then explains the difference in the investment-cash-flow sensitivity between firms with bankers on the board and firms without bank board representation. To cope with the problem I use, like in previous papers, the method described by Dubin and McFadden (1984). It involves first estimating logit model on the choice of bank representative to the firm supervisory board, and then using the predicted probability from the logit model as an exogenous variable in the investment equation.

Table 3. presents the outcome of logit regression. The relation between a dummy variable representing bank board representation and the following independent

variables: cash flow, firm's size, dummy for bank equity holdings, ownership concentration and short-term bank loans as well as other long-term liabilities is significant.

Negative estimated coefficient of cash flow indicates that the lower level of cash flow, the higher the probability of having bankers on the board. In other words, bank representatives sit on the supervisory boards of those firms that are likely to be in financial distress.

Also the value of estimated coefficient of size of firm is negative. It means that probability of bank delegates' appointment to the supervisory board increases with the size of firm.

Bank board representation is determined by the possibility of voting itself into board, as direct shareholding is highly significant.

Table 4. Logit estimates: firm characteristics associated with having a bank representative on firm's supervisory boards.

The dependent variable takes the value 1, when firms have bank representatives on firm supervisory board, otherwise 0. The independent variables encompass: fixed capital investment I, cash flow - CF, market-to-book ratio- Q, income from sales, long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL, a dummy for bank equity holdings - BH, ownership concentration dummies from 1 to 5 – OC. All the level variables are normalized by fixed capital at the beginning of the year - K(t-1). Lev is relation between the bank loans and all liabilities.

I/Kt-1	0.024
LBL/Kt-1	0.166
SBL/Kt-1	0.445*
LEV	0.290
OLL/Kt-1	0.886*
OSL/Kt-1	-0.054
S/Kt-1	0.009
CF/Kt-1	(-0.993)***
Q	-0.013
ln size of total assets	(-0.079)***
CO	0.136**
BH	1.158***
R2	0.485
N	568

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

Besides, the more concentrated ownership, the higher probability of having bank board representation. It implies the conflict of interests between large shareholder and creditor. Banks may be afraid that large shareholder can undertake more risky project as it was agreed upon in credit contract. The higher risk, the higher return on investment for shareholders. Creditor receives an unvarying return on investment in the form of interest rate.

Short-term bank loans and long-term other liabilities predict positively bank board representation. One interpretation is that bank representatives sit on the supervisory board of the firms that finance their activities with short-term credit. Also, banks tend to have their representatives in the firm supervisory board to oversee whether other creditors do not intend to satisfy their claims at the cost of banks.

In contrast, investment expenditures, level of production and future profitability of firm's investment do not offer positive predictions of bank board representation. It means that banks do not delegate their representatives to the supervisory board of firms that grow faster or have better investment perspectives.

At the second stage of Dubina and McFadden's test I examine whether the characteristics, that predict bank board representation, are related to investment rate. I estimate the investment equation for two sets of firms using random effects model that includes predicted probabilities of bank board representation as an exogenous variable. The coefficient of the additional variable measures the correlation between unobserved firm effects and unobserved factors that affect likelihood of having bank representative on the firm supervisory board. Hence, it indicates the significance and size of selectivity bias.

The outcome of random effect regression²⁷ for firms with banker on the board shows that effect of selectivity bias on investment-cash flow sensitivity is limited. The coefficient on the selectivity term is not statistically significant. As far as firms without bank board representation are concerned, the additional variable (the predicted probability from the logit model) has significant influence on the investment expenditures. After including this variable investment-cash flow sensitivity has increased. It suggests that selectivity bias causes underestimation of investment-cash flow sensitivity for firms without bank ties.

²⁷ See appendix 5.

I also use the Dubin and McFadden test to control for selectivity bias when bank's involvement in corporate control are measured by placement of a bank-creditor representative on firm supervisory board. Results of logit regression reveal (table 5.) that relation between variable representing bank-creditor board representation and the following independent variables: cash flow, firm's size, dummy for bank equity holdings, short-term bank loans as well as other long-term liabilities is significant. Note that the same variables decide about the presence of bank delegates on firm supervisory board (see table 4.).

Table 5. Logit estimates: firm characteristics associated with having a bank-creditor representative on firm supervisory board.

The dependent variable takes the value 1, when firms have a bank-creditor representative on firm supervisory board, otherwise 0. The independent variables encompass: fixed capital investment I, cash flow - CF, market-to-book ratio- Q, income from sales, long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL, a dummy for bank equity holdings - BH, ownership concentration dummies from 1 to 5 – OC. All the level variables are normalized by fixed capital at the beginning of the year - K(t-1). Lev is relation between the bank loans and all liabilities.

I/Kt-1	0.0930
LBL/Kt-1	0.7700
SBL/Kt-1	0.568***
LEV	0.7440
OLL/Kt-1	1.457***
OSL/Kt-1	-0.0380
S/Kt-1	0.0083
CF/Kt-1	(-1.01)***
Q	0.0100
ln size of total assets	(-0.134)***
CO	0.0700
BH	1.12***
R2	0.485
N	568

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

Results of random effects regression²⁸ for firms with a bank-creditor delegate on the board show that relation between additional variable – predicted probability of bank-creditor board representation from logit regression – and investment expenditures is not statistically significant. It is interpreted that selectivity bias does not influence investment-cash flow sensitivity. However, for firms without bank-creditor representatives on the board investment is positively and significantly related to the predicted probability of bank-creditor board representation from logit regression. After including the additional variable to equation investment-cash flow sensitivity increased. It suggests that selectivity bias causes underestimation of investment-cash flow sensitivity for firms without bank-creditor board representation.

Based on the results from Dubin and McFadden's test one cannot demonstrate that bank board representation is an inadequate measure of bank's involvement in corporate control.

6. Conclusions

On the threshold of the transition process from plan to market in postcommunist countries some researchers suggested that banks were to play a dominant role in corporate governance given the underdeveloped equity market and the existing under a socialist regime close relationship between banks and state enterprises. However, due to overwhelming problems with bad debts and on-going privatization in 1990s there were hardly any evidences that banks got involved in corporate control (except from the Enterprise and Bank Restructuring Program in Poland)²⁹.

After more than a decade since transition process commenced the research outcome shows that banks in Poland have not yet managed to decrease information asymmetries between themselves and borrowers by delegating their representatives to debtor's supervisory board. As a consequence, firms with a bank-creditor representative on their boards were as much financially constrained in their investment

²⁸ See appendix 6.

²⁹ For more see Baer, H.L., Gray C.W.: *Debt as a control device in transitional economies: The experiences of Hungary and Poland*, [w:] Frydman R., Gray Ch., Rapaczyński A.: *Corporate Governance in Central Europe and Russia*, Budapest: Central European University Press, 1996, Gray C., Holle A.: *Bank-led restructuring in Poland: An empirical look at the bank conciliation process*, World Bank, Policy Research Department, working paper, 1996, No. 1650, Dittus P.: *Bank reform and behavior in central Europe*, "Journal of Comparative Economics" 19, 1994

behavior as firms without bank-creditor delegates on their boards. It may be seen as evidence that the role of banks in corporate governance in Poland is still limited.

However, the empirical results also show that firms with a bank-creditor representative on their supervisory boards relied more heavily on bank loans than on internal capital in their investment activities. In contrast, firms without a bank-creditor representative on their supervisory boards financed to larger extent their investment with internal capital than bank loans. Hence, bank loans are more important source of financing for firms with bank ties than for firms without bank ties.

My findings demonstrate that it is not clear whether banks exercise corporate control over their debtors in Poland, but the hypothesis cannot be rejected. Recent completion of institutional reforms in banking sector should enable to set in motion the benefits from a close bank-firm relationship. Hence, banks are likely to begin playing an important role in corporate governance in transition economies.

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Appendix 1. Companies listed in Poland by sector

Sector	Number of companies in the sample	Number of companies listed in 1999
Industry	111	143
Food	17	23
Light industry	9	17
Wood & paper	5	7
Chemicals	16	17
Building materials	7	9
Construction	29	37
Electro-engineering	15	20
Metals	12	12
Other	1	1
Services	31	39
Wholesale & retail	9	16
IT	6	6
Telecom	3	3
Media	3	3
Other	10	11
Total	142	182

Appendix 2. Summary statistics for a sample of 142 listed firms over the period 1999-2002

	All firms				BT				NBT			
	1999		2002		1999		2002		1999		2002	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
I/K _{t-1}	0.498	0.192	0.046	0.026	0.583	0.197	0.033	0.014	0.418	0.191	0.058	0.038
CF/K _{t-1}	0.279	0.194	0.216	0.164	0.202	0.170	0.200	0.159	0.352	0.232	0.231	0.179
Total bank loans/K _{t-1}	0.413	0.230	0.349	0.273	0.537	0.293	0.373	0.307	0.295	0.191	0.326	0.217
LBL/K _{t-1}	0.110	0.003	0.075	0.001	0.131	0.047	0.086	0.025	0.090	0.000	0.065	0.000
SBL/K _{t-1}	0.303	0.142	0.274	0.180	0.407	0.143	0.287	0.202	0.205	0.129	0.261	0.155
Q	1.217	0.974	1.096	0.940	1.097	0.978	1.200	0.955	1.330	0.970	0.997	0.894
OLL/K _{t-1}	0.096	0.015	0.068	0.005	0.133	0.035	0.065	0.010	0.061	0.013	0.070	0.003
OSL/K _{t-1}	1.682	0.599	0.893	0.556	1.871	0.604	0.885	0.551	1.503	0.585	0.901	0.560
S/K _{t-1}	7.252	3.266	3.640	2.516	7.786	3.216	3.225	2.515	6.748	3.441	4.033	2.529
Total bank loans/ total liabilities	0.214	0.182	0.225	0.215	0.228	0.203	0.256	0.248	0.200	0.144	0.195	0.201
CO	4	4	4	4	4	5	4	4	4	4	3	4
Total assets (in mill PLN)	638,793	131,293	743,719	141,300	1,066,276	144,612	1,229,113	138,607	234,734	108,407	284,923	147,147
Number of observations				568				276				292
Dummy with value 1 for bankers on the board, 0 otherwise	0.5	0	0.5	1.00	1	1	1	1	0	0	0	0
Dummy with value 1 for bank shareholdings, 0 otherwise	0	0	0	0	0	0	0	0	0	0	0	0
Dummy with value 1 for negative cash flow, 0 otherwise	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 3. Descriptive statistics for sample of firms with positive and negative cash flow splitted by bank ties

Zmienne modelu	BT				NBT			
	1999		2002		1999		2002	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
I/K _{t-1}	0.591	0.246	-0.006	-0.012	0.545	0.286	0.070	0.024
CF/K _{t-1}	0.146	0.091	0.185	0.130	0.414	0.265	0.194	0.127
Total bank loans/K _{t-1}	0.667	0.389	0.471	0.427	0.314	0.177	0.407	0.309
LBL/K _{t-1}	0.164	0.064	0.090	0.014	0.073	0.000	0.079	0.000
SBL/K _{t-1}	0.503	0.254	0.381	0.328	0.242	0.129	0.327	0.209
Q	1.071	0.984	1.329	0.977	1.638	1.007	1.007	0.899
OLL/K _{t-1}	0.143	0.050	0.057	0.024	0.074	0.022	0.058	0.003
OSL/K _{t-1}	2.704	0.849	1.138	0.821	2.356	0.986	1.264	0.918
S/K _{t-1}	10.848	3.806	3.661	2.552	10.412	5.114	5.523	3.194
Total bank loans/ total liabilities	0.242	0.204	0.273	0.250	0.163	0.068	0.189	0.200
CO	4.35	5	3.9	4	3.59	4	3.30	4
Total assets (in mill PLN)	575,835	134,387	407,612	101,016	149,002	94,267	200,633	93,108
Number of observations				160				148
Dummy with value 1 for bankers on the board, 0 otherwise	1	1	1	1	0	0	0	0
Dummy with value 1 for bank shareholdings, 0 otherwise	0.48	0	0.55	1	0.14	0	0.19	0
Dummy with value 1 for negative cash flow, 0 otherwise	0.38	0	0.15	0	0.27	0	0.27	0

Appendix 4. Fixed effects regression relating investment to cash flow for firms with banker on the supervisory board (BT) and for firms without bankers on the supervisory board (NBT).

The dependent variable, fixed capital investment I , is regressed on interaction term (CF*LB) cash flow and dummy for the six largest banks in Poland, interaction term (CF*SB) cash flow and a dummy for the rest of banks, market-to-book ratio (Q), income from sales, negative cash flow (CF*Negative, where Negative is dummy variable equals 1, when cash flow is negative, 0 otherwise), long-term (LB) and short-term (SB) bank loans, other long-term (OLL) and short-term liabilities (OSL), dummy for bank equity holding (BH), ownership concentration dummies from 1 to 5 (OC), annual variable indicators (t_2 , t_3 , t_4). Level variables are normalized by fixed capital at the beginning of the year.

CF/ K_{t-1} *LB	0,46**
CF/ K_t *SB	-0,001
Q	-0,011
S/ K_{t-1}	(-0,073)***
CF/ K_{t-1} *Neg	0,106
LBL/ K_{t-1}	1.395***
SBL/ K_{t-1}	1.479***
OLL/ K_{t-1}	0,465**
OSL/ K_{t-1}	0,189***
BH	0,029
CO_1	-0,05
CO_2	(-0,638)***
CO_3	-0,095
CO_4	-0,165
CO_5	NA
T2	(-0,287)***
T3	(-0,506)***
T4	(-0,463)***
Constant	0,447
p-value (F)	0.00
Hausman test	0.00
R2 within	0,64
R2 between	0,15
R2 overall	0,4
N	276

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

Appendix 5. Random effects estimates of the investment equation for firms with banker on the supervisory board (BT) and for firms without bankers on the board (NBT).

The dependent variable, fixed capital investment I, is regressed on cash flow - CF, market-to-book ratio-Q, income from sales, negative cash flow - CF*Neg (where Neg is a dummy variable equals 1, when cash flow is negative, 0 otherwise), long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL, a dummy for bank equity holdings - BH, ownership concentration dummies from 1 to 5 - OC, annual variable indicators (t2, t3, t4). Level variables are normalized by fixed capital at the beginning of the year - K(t-1).

	BT	NBT
CF/Kt-1	0.10	1.6***
Q	-0.04	0.286***
S/Kt-1	(-0.049)***	(-0.03)***
CF/Kt-1*Neg	-0.15	-0.55
LBL/Kt-1	0.87***	0.3*
SBL/Kt-1	1.304***	(-0.378)***
OLL/Kt-1	0.585***	(-0.93)***
OSL/Kt-1	0.105*	0.222***
BH	0.38	(-1.41)***
CO_1	-0.06	-0.13
CO_2	(-0.476)**	-0.22
CO_3	-0.10	(-0.55)***
CO_4	-0.06	(-0.66)***
CO_5	NA	-0.76
T2	(-0.291)***	0.00
T3	(-0.484)***	-0.09
T4	(-0.47)***	-0.10
the predicted probability from the logit model	1.66	(-5.7)***
Constant	-0.77	(-2.3)***
p-value (F)	0.00	0.00
Hausman test	0.60	0.73
R2 within	0.21	0.50
R2 between	0.43	0.64
R2 overall	276	292

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better

Appendix 6. Random effects' estimates of the investment equation for firms with a bank-creditor representative on the supervisory board (BCT) and for firms without bank-creditor representative on the board (NBCT).

The dependent variable, fixed capital investment I, is regressed on cash flow - CF, market-to-book ratio-Q, income from sales, negative cash flow - CF*Neg (where Neg is a dummy variable equals 1, when cash flow is negative, 0 otherwise), long-term - LBL and short-term - SBL bank loans, other long-term - OLL and short-term liabilities - OSL, a dummy for bank equity holdings - BH, ownership concentration dummies from 1 to 5 - OC, annual variable indicators (t2, t3, t4). Level variables are normalized by fixed capital at the beginning of the year - K(t-1).

	BCT	NBCT
CF/Kt-1	0.53*	0.75***
Q	-0.02	0.314***
S/Kt-1	(-0.049)***	-0.01
CF/Kt-1*Neg	-0.25	-1.11
LBL/Kt-1	0.86***	0.49***
SBL/Kt-1	1.22***	0.11
OLL/Kt-1	0.39	-0.13
OSL/Kt-1	0.12	0.122***
BH	-0.02	-0.14
CO_1	-0.10	-0.05
CO_2	(-0.62)**	0.07
CO_3	(-0.33)*	0.00
CO_4	-0.27	-0.04
CO_5	NA	0.07
T2	(-0.313)***	-0.02
T3	(-0.5)***	-0.15
T4	(-0.53)***	(-0.12)*
the predicted probability from the logit model	0.11	(-0.588)*
Constant	0.25	(-0.59)***
p-value (F)	0.00	0.00
Hausman test	0.67	0.64
R2 within	17.00	0.40
R2 between	0.46	0.52
R2 overall	212	356

* coefficient significant at 10% or better

** coefficient significant at 5% or better

*** coefficient significant at 1% or better