Bank market power and short term and long term firm investment

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This paper investigates the effects of bank market power on firm investment on the short and long term. Our results suggest that an increase in bank market power has a negative effect on the firm investment on the short term, but on the long term the investment tends to recovery. We extend the analysis by analyzing the direction and we find that bank market power influences on the level of firm investment, but not the opposite side. Finally, we also show that cash flow is sensitive to bank market power for small and medium enterprises (95 words).

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1. Introduction

The development of financial intermediation system plays a fundamental role for economic growth in the long term. Important papers in the economic literature have shown the importance of this link that permits the capital accumulation, productivity improvements, and economic growth (King and Levine, 1993; Levine and Zervos, 1998). The external financial cost is a key element because within a developed financial system because of this one can be reduced and make growth the number of firms (Rajan and Zingales, 1998).

Economic literature has shown that banking consolidation is intimately related with to bank-borrower relationship and as result to credit availability (Petersen and Rajan, 1995). Traditional Structure-Conduct-Performance (SCP hereafter) approach argues that bank market power has a close influence on higher prices and profitability for firms. In particular, in the case of banking markets the traditional *market power approach* ensures that less competitive banking markets are associated with less credit availability and higher interest rates (Berger, 1995; Boot and Thakor, 2000; Sapienza, 2002; Scott and Dunkelberg, 2003, 2010; Elsas, 2005). On the other hand, *efficiency hypothesis approach* advocates that competitive market power weaken bank-firm relationships and damage the investment in soft-information by banks. Therefore, less competitive bank markets improve credit accession. This constitutes a relevant question, particularly, for small and medium enterprises (SME hereafter), considering that they represent the core of Spanish financial network. In particular, economic literature has recently evolved in this strand. Even, several papers establishes that firms with high number of relationships could damage firm investment (Degryse and van Cayseele, 2000; Degryse and Ongena, 2001; Farinha and Santos, 2002; Degryse *et al.*, forthcoming), or even more intense relationships could improve credit availability (see

Carbó *et al*., forthcoming) or reduce collateral requirements (see Jimenez *et al*., 2009; Behr *et al*., 2011). On the other hand, some authors have found little evidence of the evidence of the benefits for relationship lending derived from bank competition (e.g. Kano *et al*., 2011).

Summarizing, the particular key question treated by financial literature is the influence on bank market power on firm financing (see Carbo *et al*., 2009a) which serves as starting point to study the effects on firm investment. Therefore, our research aims to go one step further, and set the goal of this paper to investigate the effects of bank market power on firm investment considering its effects on the short term and the long term. To our knowledge, this is the first paper to propose that bank market structure might influence on firm investment decisions. The contribution of this paper is fourfold: (i) bank market power exert negative influence in firm investment rate on the short run; (ii) the effects of bank market power is greater for the short run than for the long run, and the investment rate is recovered on the long run. The results are robust when we employ alternative investment variables as growth of assets or investment over assets, or even we substitute the Lerner index for measures of bank loan concentration; (iii) we also perform Granger causality test to demonstrate the existence of directional causality between bank market power and firm investment. We find that bank market power causes firm investment, but not the opposite side, and finally, (iv) we also find the existence of cash flow sensitivity to investment considering bank market power environment, in particular, we find evidence for SME rather tan the larger ones, which means that bank market becomes SME more conservatives in the short run but this effect could be relaxed

The remainder of this paper is organized as follows. Section 2 offers the background for theoretical and empirical literature on the different firm investment methodologies and bank market structure approaches. Section 3 presents the methodology. Section 4 offers the main results. Finally, section 5 presents the main conclusions and policy implications.

2. Background on bank competition, information production and firm financing

Financial literature has been concerned to study the problem between credit condition and firm growth. Most studies have been centred on the mitigation problem of information availability focusing on the main two lending technologies: soft and hard information. Under the common wisdom, researchers are ought to think that hard information, based on financial statement lending technology, are suitable to serve largest firms which are more transparent or higher debt quality, whilst on the other hand, relationship lending are more suitable for the smallest ones (see de la Torre *et al.*, 2010; Berger and Black, 2011).

The Petersen and Rajan's (2002) seminal work concludes that better information accession is not necessarily conditioned to hard information about borrower creditworthiness since this fact allows banks to lend to more increasingly distance firms without compromising their ability to underwrite or monitoring these credits.[1] However, recent financial literature recognizes that financial institutions not only employ statement information as transactional lending as a whole, but hard information technology could be also employed for smallest firms as fixed-asset lending, asset-based lending, credit scoring and the soft technology properly of relationship lending (see Berger and Udell, 1998, 2002, 2006). Nevertheless, we find several studies reporting evidence on the use of transactional lending to boost the small business

[1] This branch of financial research has motivated numerous studies on the importance of the impact of bank-borrower distance on credit availability, loan pricing and borrower-lender performance (see Degryse and Ongena ,2005; Agarwal and Hauswald, 2006; Berger and De Young, 2006; Brevoort and Hannan, 2006, and De Young *et al*., 2008, forthcoming).

financing reducing information asymmetry (Frame *et al*., 2001; Berger *et al*., 2005a,b, forthcoming a,b; de Young *et al.*, 2008, forthcoming).

The main sense on lending technologies is focused on bank-borrower relationship and the evidence on credit availability, loan interest rates and collateral requirements (Goddard *et al*., 2007). Traditional industrial organization theory has been focused on the Structure-Conduct-Performance (SCP hereafter) paradigm which defends that market structure exerts a strong influence on firm behaviour and performance (Goddard *et al*., 2007, forthcoming; Carbó *et al*., 2009b). The traditional SCP approach suggests that bank market imperfections will be traduced in setting less favourable prices to customers –higher interest rates- (Berger, 1995). Relative with SCP theory is the *market power approach* which ensures that firms with high level of market concentration and well differentiated products are capable to exert market power. In the other hand, the *efficiency hypothesis* in which dominant firms are more efficient and therefore this will be translate in lower marginal costs and more favourable prices for customers (Berger and Hannan, 1989; Hannan and Berger, 1991).[2]

We find in the economic literature arguments in defence of SCP and the *market power hypothesis* (e.g. Boot and Thakor, 2000; Sapienza, 2002; Scott and Dunkelberg, 2003, 2010; Elsas, 2005).[3] We find in the literature arguments which defends that bank concentration suppose an obstacle for obtaining finance, especially in countries with a poor institutional development or restrictions (Beck *et al*., 2004) and especially for small firms (Craig and Hardee, 2007).[4] Coccorese (2008) finds that banking consolidation whilst in the long run emerges an inverse relationship, and economic

[2] See Berger *et al*. (2004) for a complete literature review about concentration and competition.
[3] Scott and Dunkelberg (2010) find significant positive association between changes in bank competition reported by small firms and reports on banking outcomes or service quality that is independent of deposit concentration, firm risk or credit usage.
[4] Berger (2007) propose the elimination of barriers and restrictions between Eastern Europe and Western Europe to create a more consolidate and efficient financial system.

expansion tends to reduce the concentration market shares in favour of competitors. Agostino and Trivieri (2008) shows, for Italian firms, in competitive environments is found more use of bank loans instead of less transparent firms.

Berger *et al*. (1999) rejected the SCP paradigm in favour of *efficiency hypothesis*. De Jonghe and Vander Vennet (2008) also apply a Tobin's Q to position in favour of efficiency hypothesis. Claeys and Vander Vennet (2008) do not reject the SCP paradigm for Western European countries but support the efficiency hypothesis for Eastern European countries. Cetorelli and Gambera (2006) and Cetorelli (2004) find that bank competitive environments the number of firms increases and they are more reduced in size. Zarutskie (2006) examines the impact of bank competition on the bank credit and firm investment and she conclude that in bank competitive environments younger firms invert less, suggesting that competition increases firm financing constraints, diminishing the effects in the long run, in line with Rice and Strahan (2010) whom find that firms in a more competitive environment are more likely to borrow from bank at a lower cost. The results are consistent with Petersen and Rajan (1994, 1995, 2002) in which the more bank competition deter to lend to firms which net worth is unknown, and subsidizing credit risk with higher interest rates. The recent extent of economic literature analyzes the existence of higher profits as result if collusion due to the presence of market power, or as a consequence of higher efficiency (Degryse and Ongena, 2008; Treggene 2009; Dick and Hannan, 2010).

We propose in this paper an important research question because of bank competition could influence on the benefits derived from the relationship between banks and firms, particularly for SME. The seminal work of Petersen and Rajan (1994, 1995) provides the theoretical framework showing that competition in credit markets is a key question to determine the value of lending relationships. In this line, the authors establish that competition and long-term relationship are not necessarily compatible, and banks are less able to retain borrowers. A number of papers investigate the role of market structure on the employment of a determinate lending technology, particularly to study the propensity to engage lending relationship or transaction lending.[5] In particular, Dell'Ariccia (2000) shows that the effect of banking competition on screening could result some ambiguous resulting in a prisoner's dilemma in which banks should decide between relationship and transactional lending. Boot and Thakor (2000) show that bank competition reduce the profitability of transactional lending in relation with relationship lending. Therefore, the authors find the existence of the benefit that each bank gains investing in knowledge is decreasing as the rent increases, so the rent per unit of relationship lending decreases. Degryse and Ongena (2001) finds that profitability is higher if firm maintains only a single bank relationship, whilst firms replacing relationship with more banks are generally smaller and younger than firms not replacing relationships. On the other hand, Farinhas and Santos (2002) find evidence that firms with poor performance are more likely to engage multiple relationships. The analysis of these *ex post* effects of those multiple relationships does not detect and increase in the firm's leverage and investment. Moreover, firms with weaker, short or multiple relationships obtain smaller discounts when they decide to switch banks and have shallower loan rate cycle (Ioannidou and Ongena, 2010). These results reveal the unwillingness by the incumbent banks of increase its exposure to a firm with past poor performance. Degryse and Ongena (2005) find that loan prices decrease as the distance between firm and lending banks are higher, and they find a similar effect when the distance is also increasing between firms and competing banks. Barath *et al*. (2011) provide evidence between transactional and relationship lending showing that both

[5] See Goddard et al., (2007, forthcoming) for a complete literature review of market structure and

forms of technologies are identical for largest borrowers. Moreover, the authors show that past relationships could reduce collateral requirements associated with obtaining bank financing. Carbó *et al.* (forthcoming) find that firms with more intense relationships throughout its length and lower number of banks enjoy greater credit availability and are less likely to suffer credit constraints. Kano *et al*. (2011) find that bank-borrower relationship depends on three factors identified by economic literature: verifiability of information, bank size and complexity, and bank competition. Based on Japanese database, the authors find evidence that longer relationship are benefit for borrowers and smaller banks in terms of reduced loan interest rates and credit availability, although they find that bank competition has little effect on the benefits derived from relationship lending. Those results are in line with Uchida *et al*. (2008) whom find that more opaque (transparents) and smaller (larger) firms tend to borrow from small (large) banks. The authors attribute this fact to the competitive advantage of large banks to deliver firm financial statements, whilst smaller banks are able to establish longer relationships with small firms. Therefore, borrowers find several benefits from more intense relationships to improve credit availability, and reduce collateral requirements (Jimenez *et al*., 2010; Behr *et al*., 2011), or reducing switching cost (Ioannidou and Ongena, 2010).[6] On the other hand, Shikimi (2005) found that weaker relationships are associated with higher credit availability, although at a higher cost.

[6] The theory is divided on the how the collateral requirement is affect by relationship lending. In this way, Bester (1985) and Besanko and Thakor (1987) argues that collateral requirement is viewed as risk indicator. Rajan and Winston (1995) find that collateral acts as incentive to investigate the borrower, whilst Menkhoff *et al*. (2006, 2010) find that collateral requirement are oriented to reduce the loan risk in developing markets.

3. Methodology

3.1. Theoretical approach

In this section we develop the theoretical foundations which serve as basis to relate firm investment and bank market power. In our model, we consider a firm which produces a perishable product employing an initial amount of initial investment, fixed capital, variable capital considered as labour force. Second, we take into account to propose our model that firms differ in their managers' skills in order to search credit conditions, as well as firms also differ in information availability and credit risk. These features enable us to isolate the investment price since each firm pays a different price for its capital depending on bank interest rate, financial expenses and firm's risk premium. Third, risk premium to be paid by the firm is a factor which depends fundamentally on bank's risk aversion, as well as credit availability and bank market structure. Then, we could consider risk aversion as bank specific and use it as nexus variable to link firm's characteristic and bank market structure, i.e. bank market power.

In order to place our main hypotheses, we base our theoretical framework on Euler equation model *à la* Bond and Meghir (1994) in order to be able to relate firm investment and the price. Therefore, we consider a firm whose net present value at the start of period *t* in the absence of taxes is given by the following Bellman's equation:

$$V_t\left(K_{t-1}\right) = \max_{L_t, K_t}\left\{\Pi\left(K_t, L_t, I_t\right) + \beta'_{t+1}E\left[V_{t+1}\left(K_t\right)\right]\right\} \quad (1)$$

s.t. $K_t = (1-\delta)K_{t-1} + I_t$ (2)

where $\Pi(K_t,L_t,I_t)$ is the net revenue function in which L represents costless adjustable factors and I represents gross investment at the beginning of period and is immediately productive, but the firm faces strictly convex adjustment cost in changing its capital stock. The capital stock K evolves according to the equation of motion (2) where δ is the depreciation rate. The expectation operator $E[\cdot]$ is conditional on information available at the beginning of period t and the expectations are taken over future interest rates, input, and outputs prices, and technology. We assume symmetric information and the firm objective is to maximize the wealth of its shareholders. Defining r_t to be the firm's nominal required rate of return between periods t and $t+1$, and $\beta'_{t+1} = 1/(1+r_t)$ is the firm discount factor. To obtain an empirical model of investment we represent the firm's revenue function given by

$$\Pi_t = p_t F(K_t, I_t) + p_t G(K_t, I_t) - wL_t - p^I I_t \tag{3}$$

Where $G(I_t, K_t) = \frac{1}{2} b K_t \left(\left(\frac{I}{K} \right)_t - c \right)^2$ is a symmetric adjustment cost function (Hubbard *et al.*, 1995) which is linearly homogeneous function in investment and capital (Hayashi, 1982), where c is the bliss point in the adjustment function (Hubbard *et al.*, 1995) and $b > 0$ is the cost parameter that determines the function curvature and represents the magnitude to investment cost (Hubbard and Kashyap, 1992). The term $(I/K)_t$ is the investment rate and constitutes the objective of this paper. $F(K_t,I_t)$ is a constant return to scale production function, p_t is the price of firm's output, w_t is the vector of prices for variable inputs L and P_t^I is price of investment goods. The price elasticity of demand is given by $(\alpha = 1 - (1 / \varepsilon) > 0)$ with $\varepsilon > 1$.

We derive the firm's revenue function (3) with respect to investment (I) and capital (K) to obtain the first-order conditions

$$\left(\frac{\partial \Pi}{\partial I} \right)_t = -b\alpha p_t \left(\frac{I}{K} \right)_t + bc\alpha p_t - p_t^I \tag{4}$$

$$\left(\frac{\partial \Pi}{\partial K} \right)_t = \alpha p_t \left(\frac{Y}{K} \right)_t - \alpha p_t \left(\frac{\partial F}{\partial L} \frac{L}{K} \right)_t + b\alpha \left(\frac{I}{K} \right)_t^2 - bc\alpha p_t \left(\frac{I}{K} \right)_t \tag{5}$$

The Euler equation characterizing the optimal path of investment is given by

$$(1-\delta)\beta'_{t+1} E\left[\frac{\partial \Pi}{\partial I} \right]_{t+1} = -\left(\frac{\partial \Pi}{\partial I} \right)_t - \left(\frac{\partial \Pi}{\partial K} \right)_t - \nu_t \left(\frac{B}{K} \right)^2 \tag{6}$$

We isolate the price of investment goods (P^I_t) as a relevant variable in our model. To the best of our knowledge, this is the first paper that isolates the price of investment goods to study the factors that affects the firm financing investment. The debt term $(B/K)^2$ represents the loans borrowed by the firm (B) to the stock of capital (K) and controls for non separability between investment and borrowing decisions and is eliminated under Modigliani and Miller (1958) debt irrelevance ($\nu_t = 0$).

We introduce (4) and (5) into (6), and then, we define the marginal products of marginal variables as $\frac{\partial F}{\partial L} = \frac{w}{\alpha p_t}$.

Then, the final expression resulting is:

$$\left(\frac{I}{K}\right)_{t+1} = c(1-\phi_{t+1}) - \frac{1}{(1-\delta)\beta'_{t+1} b\alpha p_{t+1}} P^I_{it} - \frac{1}{b\alpha p_{t+1}} P^I_{it-1} + (1+c)\phi_{t+1}\left(\frac{I}{K}\right)_t + \frac{\phi_{t+1}}{b\alpha}\left(\frac{CF}{K}\right)_t \phi_{t+1}\left(\frac{I}{K}\right)_t^2 - \frac{(1+r_t)\nu_t}{(1-\delta)b\alpha}\left(\frac{B}{K}\right)^2 \quad (7)$$

Where $\phi_{t+1} = \frac{(1+r_{t+1})\,p_{t+1}}{(1-\delta)\,p_t} > 1$ represents the real discount factor and we assumed to be constant through the time and across firms and treat it as a parameter. Similarly, $\frac{CF}{K} = \frac{p_t Y_t - wL}{p_t K_t}$ is the ratio of real cash flow to the capital stock and we reflect the proportion of internal funds that the firm employ to invest.

The firm's investment depends on the existent level of itself in the previous period, the internal funds and the amount of debt that the firm is capable to contract. Finance is associated with transaction cost incorporated in our model by introducing the cost function associated with obtaining credit $P_t^I(\cdot)$. This function represents, loan arrangement fees and commissions charges, and implicit cost, such as cost of verification of financial status. Therefore, for simplicity of expression, we can assume that all the explicit and implicit costs increase linearly with the level of borrowing, i.e., $P_t^I(B_t) = \theta B_t$, $\theta > 0$.

The firm utilizes to finance its investment both bank loans and internal funds. We suppose that the investment price function $P_t^I(B_t)$ to be a linearly function in investment costs associated with the factors explained above.

$$P_t^I = \beta_0 + \beta_1 r_t^B + \beta_2 RP_t + \beta_3 FE_t \quad (8)$$

Where the intercept (β_o) is the amount of internal funds that the firm employ to invest which is specified as independent because of we are concerned only in banking market analysis. The term r_t^B represents the interest rate paid by the firm, risk premium (RP_t) is the additional amount of paid by firm for risk, and finally, Financial expenses (FE_t) are the expenses associated to obtain bank credit. The whole coefficients are expected positive.

This model avoids the problems associated to the Tobin's Q estimating the first order conditions and solving the investment Euler equation (Bond and Meghir, 1994; Bond *et al.*, 2003). The Euler equation approach could be intended as an alternative model. The possibilities that permit the shadow price to depend of cash flow as measure of financial dependence (Hubbard *et al.*, 1995; Hubbard, 1998). In the absence of financing constraints, Euler equation develops under perfect markets assumptions whilst in presence of financing constraints is misspecified (Whited, 1998; Carpenter and Guariglia, 2008). Love (2003) shows that firms under financing constraints are showed to have a low discount factor (i.e. high cost of capital) and tend to postpone future investments. The Tobin's Q approach has receipt numerous critics. Kaplan and Zingales (1997, 2000) criticize that the correlation that exist between fixed investment and cash flow is not a good indicator for measuring financing constraints. Particularly, The Q included in regressions as proxy of investment opportunities is not a good measure thus the coefficient on the cash flow could be biased doubt to the correlation among cash flow and investment (Gomes, 2001; Alti, 2003; Almeida and Campello, 2007). Acharya *et al.* (2007) eliminates the possible values of Q that results negative to minimize the impact of attrition over the stability of data processing and it requires that the firm appears a minimum of six years.[7] Recently, Hennesy and Whited (2007) show when financial frictions are introduced in models those are closer to the reality. Hennessy *et al*. (2007) contributes with a model in which the firm optimize through the time and under uncertainty three important frictions: convex cost of external equity because of, counter intuitively, firm invest less conditioned to Q by the extraordinary costs associated to issue equity; restrictions of collateral induce more the investment, and debt overhang make the investment diminishes. More recently, Almeida *et al*. (2011) criticises the consistency of measurement of errors proposed by Erickson and Whited (2002) compared with instrumental variables estimator. The authors argue that the EW estimator is biased and deliver inconsistent measures for investment, Tobin's Q and cash flow. In this way, Erickson and Whited (2011) response to those critics improving the estimator usefulness by developing a minimum distance estimator to be used on unbalanced panel data.

The starting point to estimate the risk premium (RP_t) is the seminal model proposed by Ho and Saunders (1981). Subsequently, this model has been extended in several studies that estimate the bank interest margin (i.e. Allen, 1988; McShane and Sharpe, 1985; Angbanzo, 1997; Saunders and Schumacher, 2000; and Carbó and Rodríguez, 2007).

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[7] The Acharya *et al*. (2007) results are centred in the substitution effect between the debt and cash between the constrained firms. Their main finding is that the constrained firms deploy a preference system for the use of cash flow excess to reduce debt. These considerations might include measures as gain of cash, debt effective cost, or the diversion of free cash flow by part of managers. The lines of credits are seen as cash transference for future low cash flow states.

The bank is viewed as a risk-averse dealer in the credit market acting as an intermediary between the demanders and supplier of funds.[8] The bank has three components in its portfolio. The first component is its initial wealth (W_0) which is invested in a diversified portfolio. The second component is a net credit inventory (I). It is assumed that deposits (D) and loans (L) has the same maturity period. The difference in market value of deposits and loans defines the bank's credit inventory (I = L – D). Finally, the third component is the bank's short-term net cash flow or money market position (M). The bank sets the loan rate and charges a premium to compensate credit risk

The bank's initial wealth is determined by the difference between the portfolio (I_0) and the money market position (M_0)

$$W_0 = L_0 - D_0 + M_0 = I_0 + M_0 \tag{9}$$

Maudos and Fernandez (2004) introduce the operational cost of the bank which are assumed to be a function of deposits captured (C(D)) and a function of loans made (C(L)) which configure the bank's net credit inventory [C(I) = C(D) + C(L)]. The bank's final wealth is given by

$$\begin{aligned} W_T &= (1 + r_I + Z_I)I_0 + M_0(1 + r + Z_M) - C(I_0) \\ &= I_0 + I_0 r_I + I_0 Z_I + M_0 + M_0 r + Z_M M_0 - C(I_0) \\ &= W_0(1 + r_w) + I_0 Z_I + M_0 Z_M - C(I_0) \end{aligned} \tag{10}$$

where $r_I = \frac{r_L L_0 - r_D D_0}{I_0}$ is the average profitability of the net credit inventory, $r_w = r_I \frac{I_0}{W_0} + r\frac{M_0}{W_0}$ is the average profitability of the bank's initial wealth and $Z_I = Z_L \frac{L_0}{I_0} + Z_D \frac{D_0}{I_0} = Z_P \frac{L_0}{I_0}$ is the average risk of the net credit inventory. The terms Z_M and Z_L reflect the uncertainty faced by the bank distributed as two random variables, the

[8] The bank's utility function is a Von Newmann-Morgenstern utility function continuous and doubly differentiable U' > 0 and U'' < 0 and therefore the model ensures that the bank is risk-averse.

first is towards interest rate risk distributed as $Z_M \sim N(0,\sigma_M^2)$,and the second one towards credit risk distributed as $Z_L \sim N(0,\sigma_L^2)$. Controlling for interaction between credit risk and interest rate risk the joint distribution follows a bivariate normal with non-null covariance (σ_{LM}^2).

The bank maximizes its expected utility function using the Taylor expansion around the level of wealth

$$EU(W) = U(\overline{W}) + U'(\overline{W})E(W-\overline{W}) + \tfrac{1}{2}U''(\overline{W})E(W-\overline{W})^2 \qquad (11)$$

The problem of maximization is therefore as follows

$$\mathrm{Ma}\,x_{RP} EU(\Delta W) = (\alpha_L - \beta_L * RP)\Delta EU(W_L) \qquad (12)$$

And the risk premium for loans is given by

$$RP = \frac{1}{2}\frac{\alpha_L}{\beta_L} + \frac{1}{2}\frac{C(L)}{L} - \frac{1}{4}\frac{U''(\overline{W})}{U'(\overline{W})}\left[(L+2L_0)\sigma_L^2 + (L-2M_0)\sigma_M^2 + 2(M_0 - L_0 - L)\sigma_{LM}\right] \qquad (13)$$

The model reflects the elasticity of the demand for loans (β_L), such as the less elastic the demand the bank will be able to apply greater the risk premium. Therefore, the ratio (α_L/β_L) represents the bank market power, being (α) the intercept. The model also reflects the average operating cost of loans; this is an extension of the model made by Maudos and Fernandez (2004). The risk-aversion [–U''(W)/U'(W)] resulting the expression greater than zero, the greater is risk-aversion banks will charge higher risk premium to firms. The volatility of money market interest rates (σ_M^2) and the credit risk (σ_L^2) are increasing the risk premium, as well as, jointly with (σ_{LM}^2). The total volume of credit is given by ($L + 2L_0$). For a given value of money market interest rate or credit risk a large operation would mean a potential loss so the bank requires a grater risk premium. Once we have revised the economic literature on firm investment and bank market power, and based on the theoretical framework presented above, we could propose the following two testable hypotheses:

Hypothesis 1: *There is an inverse relationship between bank market power and the firm investment rate. As the bank market power increases, the firm investment rate declines.*

Hypothesis 2: *The impact of bank market power is greater on the short run than on the long run. Therefore, we can predict that the effects of bank market power will be gradually easing.*

3. 2. Empirical specification and variables approximation

Based on the equation (11) the final specification to estimate is given by:

$$\left(\frac{I}{K}\right)_{i,t+1} = \varphi_0 + \varphi_1 P_{it}^I + \varphi_2 P_{it-1}^I + \varphi_3 \left(\frac{I}{K}\right)_{it} + \varphi_4 \left(\frac{CF}{K}\right)_{it} + \varphi_5 \left(\frac{I}{K}\right)_{it}^2 + \varphi_6 \left(\frac{Y}{K}\right)_{it} + \varphi_7 \left(\frac{B}{K}\right)_{it}^2 + \varphi_8 MA_{jt} + \varphi_9 Crisis_t + \sum_{h=1}^{H} \varphi_h IND_h + \sum_{l=1}^{L} \varphi_l REG_l + \varepsilon_t \tag{14.a}$$

The cost of firm's investment (P_{it}^I) is related to the bank market power, and the cost of loans:

$$P_{it}^I = \gamma_0 + \gamma_1 \left(\frac{FE}{TA}\right)_{it} + \gamma_2 \left(\frac{r^B}{TA}\right)_{it} + \gamma_3 LERNER_{jt} + \gamma_4 \left(\frac{C(L)}{L}\right)_{jt} \tag{14.b}$$

The main endogenous variable to measure firm investment is the ratio investment to firm's capital ratio $(I/K)_{it}$ represented in expressions (7) and (14.a). Firm investment (I_{it}) will be proxied as the fixed capital stock available by the firm *i*, corrected by capital depreciation (δ) considered as a constant equal to 0.1, computed according to the capital motion equation represented in the expression (2), whilst firm's capital (K_{it}) represents *the firm's fixed assets* in balance sheet. Alternatively, we include two alternative variables to measure firm investment and control for robustness in our results (see Li and Zhang, 2011). First, we include asset growth ($\Delta A_{it}/A_{it-1}$) measured as change in firm's total assets over lagged total assets. This variable predicts future abnormal returns. Second, we also include the ratio investment to total assets $(I/A)_{it}$.

The ratio cash flow over capital $(CF/K)_{it}$ controls for cash flow-investment sensitivity (see Kaplan and Zingales,1997; Bond and Soderbom, 2010). Cash flow (CF_{it}) is measured as *profit before tax and extraordinary* plus *depreciation*. Firm's debt $(B/K)_{it}$ will be proxied as the SABI items *Non-current liabilities: long term debt* and *current liabilities: loans* over *firm's fixed assets*. The firm's financing investment could be carried out for increasing of internal funds though the life of firm. Thus, we could add to the model the output term to control for imperfect competition and is eliminated from the Euler equation under perfect competition, otherwise the coefficient on this term is positive. We measure the output $(Y/K)_{it}$ as sales generated by the firm over *firm's fixed assets*. Finally, the variable $Crisis_t$ is a temporal dummy to control for the effect of financial crisis which takes on the value one from 2007 to 2009, and zero otherwise.

The expression (14.b) reports the components of the cost of investment. However, the ratio $(FE/TA)_{it}$ is measured as the firm's financial expenses over firm's total assets; whilst the ratio $(r^B/TA)_{it}$ represents the firm's interest paid over total assets. The following three variables are related to the link between the firm and its correspondent bank. Hence, the variable $(C(L)/L)_{it}$ represents the bank cost for loans and is measured as the ratio bank's average operating cost over bank's total loans.

The market structure (α_L/β_L) are proxied by Lerner index as the main indicator of market power. We employ the Lerner index ($LERNER_{jt}$) based on the model proposed by Fernandez *et al*. (2005, 2007) to estimate the bank market power derived of Monti-Klein imperfect competition model given by:

$$LERNER_{jt} = \frac{r_{jt} - r_t - C'_{jt}}{r_{jt}} = \frac{p_{jt} - C'_{jt}}{p_{jt}} \tag{15}$$

Where r_{jt} is the interest rate that the bank *j* charges to borrowers, and r_t is the interest rate of inter-bank market, as noted above, and C'_{jt} is the bank marginal cost. The margin ($r_{jt} - r_t - C'_{jt}$) determines the market power, and p_{jt} is the ratio *interest income* plus *other operating income* to *bank's total assets*. The computation of marginal cost (C'_{jt}) is based on the specification of the following translog cost function:

$$\begin{aligned}\ln C_{jt} &= \alpha_0 + \ln TA_{jt} + \tfrac{1}{2}\alpha_k (\ln TA_{jt})^2 + \sum_{h=1}^{3}\beta_h \ln w_{hjt} + \tfrac{1}{2}\sum_{h=1}^{3}\sum_{k=1}^{3}\beta_{hk} \ln w_{hjt} \ln w_{kjt} \\ &+ \tfrac{1}{2}\sum_{h=1}^{3}\gamma_h \ln TA_j \ln w_{hjt} + \mu_1 Trend + \mu_2 \tfrac{1}{2} Trend^2 + \mu_3 Trend \ln TA_j \qquad (16.a) \\ &+ \sum_{h=1}^{3}\lambda_h Trend \ln w_{hjt} + \ln u_j\end{aligned}$$

Where C_{jt} is the bank's total cost (financial and operating costs), TA_{jt} is total assets, and w_{jt} the cost of inputs (labour, capital, and the cost of deposits). We include the variable *Trend* to control for technological changes over time. A system of factor demand (share) equations is derived according to Shephard's lemma as:

$$\frac{\partial \ln c_j}{\partial \ln w_{hj}} = m_{hjt} \equiv \beta_h + \sum_{j=1}^{3}\beta_k \ln w_{kjt} + \tfrac{1}{2}\gamma_h \ln TA_{jt} + \lambda_h Trend \tag{16.b}$$

where m_{hjt} is the cost share of factor *h* for bank *j* in period *t*.

As a robustness check we substitute the Lerner index for Hirschman-Herfindhal index (HHI_{jt}) and the concentration index $C3_{jt}$ and $C5_{jt}$ in the expression (14.b), as it is shown in Carbó *et al.* (2009a,b).

3. 3. Testing Granger causality test

We use Granger causality test to study the direction of Lerner index and firm investment and among the financial measures. We employ four lags (*l*) of the variables in order to capture the long term effects of bank market power, and concentration, measures on the firm investment rate. Since our sample consist in a panel data, the empirical specification follows Holt-Eaking *et al.* (1988) considering fixed effects (f_i), N firms (i = 1,…, N), and T periods (t = 1,…, T). Finally, the statistical significance for the Granger test is measured using an F-test. We expect two plausible results:

Case 1: We expect that bank market power is statistically significant and causes firm investment rate:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \sum_{l=1}^{L}\beta_l \left(\frac{I}{K}\right)_{i,t-l} + \sum_{l=1}^{L}\gamma_l Lerner_{j,t-l} + \varphi_t f_i + u_{it} \tag{17.a}$$

Case 2: We expect that firm investment rate should not be cause of influence on bank market structure:

$$Lerner_{jt} = \beta_0 + \sum_{l=1}^{L}\beta_l \left(\frac{I}{K}\right)_{i,t-l} + \sum_{l=1}^{L}\gamma_l Lerner_{j,t-l} + \varphi_t f_i + u_{it} \tag{17.b}$$

4. Data, database construction and summary statistics

The main data source containing firm level data is the *Bureau van Dijk's* SABI (2010) database. The SABI database contains comprehensive information on balance sheet, financial statement and financial ratios around 1 million of Spanish and Portuguese firms for the period 1998 to 2009. Our sample consists on 61,174 firms, which suppose a panel data consisting in 578,188 firm-bank observations.

For each company SABI reports the main bank which firm operates with as variable. Therefore, this characteristic allows us to complement firm information with the parameters of its correspondent bank balance sheet and financial statement and for each period, i.e., we are able to link firm and bank information in only a unique database. Hence, the second set of variables consists on bank information. We construct the bank dataset from the financial statements provided by Spanish Banking Association

(AEB), Spanish Savings Banks Association (CECA) for savings banks data, and National Union of Credit Cooperatives (UNACC) for credit cooperatives data.[9] After construct firm and bank panel data, we are able to merge both datasets. To our knowledge, merging firm and bank databases in a unique one is the best methodology to study how the phenomena derived form banking markets are transmitted to firms.

Table 1 contains the definition and explanatory comments of the variables employed in this paper. To alleviate the effects of outliers, we winsorize all variables at 5% before include them in our test. Table 2 reports summary statistics of the variables employed in this research. Regarding to investment variables we show from Panel A that firm investment rate $(I/K)_t$ shows a mean of 0.28 ranging from -0.24 and 1.98, whilst asset growth ($\Delta A_{it}/A_{it-1}$) and investment to assets ratio show a mean value of 0.13 and 0.0001, respectively. Regarding to control variables, the ratio cash flow over capital $(CF/K)_{it}$ shows a mean of 0.89, whilst the ratio leverage over capital $(B/K)_{it}$ has a mean of 2.32. The Lerner index (LERNER_t) is the variable of interest showing a mean value of 0.22 ranging from 0.001 and 0.68, whilst the mean value for the HHI is 1.29 per cent, and C3 and C5 0.48 and 0.34 per cent, respectively. Panel B reports the mean values of investment variables, cash flow and leverage divided by four quartiles of Lerner index. This first statistical test shows that $(I/K)_{it}$ ranges from 0.33 in the first quartile to 0.28 in the fourth quartile, whilst (I/A)it ranges from 0.00018 in the firs quartile to 0.00016 in the fourth quartile. This result reveals in a first step that investment variables are decreasing as bank market power environment is increasing.

To compliment the above result we perform two-sample Kolmogorov-Smirnov test and test for comparison of means as it is shown in Table 3. In the first step, we create the dummy variable $\mathrm{Lerner\_D}_{jt}$ which takes on the value one for values of

[9] The acronyms correspond with the Spanish denominations: *Asociación Española de Banca* (AEB), *Confederación Española de Cajas de Ahorros* (CECA), and *Unión Nacional de Cooperativas de Crédito* (UNACC).

LERNER$_{it}$ from third quartile in order to proxy for high bank market power environment. Kolmogorov-Smirnov test reject the null hypothesis (H_0: F(z) - G(z) = 0) and confirms the existence of significant difference in distribution of all our investment variables at one percent (p=0.000). Since Kolmogorov-Smirnov test only report for differences in distribution but not the sign adopted by variables, therefore, we should perform the parametric test for comparison of means in order to know where lays the sign of each variable. We show that parametric test reject the null hypothesis (H_0: mean(0) – mean(1) = 0) for all our investment variables and shows that the alternative hypothesis is confirmed for $(I/K)_{it}$ and $(I/A)_{it}$ for environment with lower level of bank market power at one percent (H1: mean(0) – mean (1) > 0). Contrary to our expectations, the asset growth ($\Delta A_{it}/A_{it-1}$) variable show higher values in environment of high bank market power. Regarding to $(CF/K)_{it}$, we show that firms tend to maintain higher liquidity levels in environment of higher bank market power environment which reveals conservatives attitude of firms to invest. The other interest variable is leverage $(B/K)_{it}$ which reveals that is easier to firm to obtain bank financing in a more competitive banking market, as well as $(r^B/TA)_{it}$ which reveals that in a more competitive banking market is cheaper to obtain bank financing. Considering the obtained results as a whole, we could conclude that those parameters are in line with papers supporting *market power hypothesis* which establishes that in presence of bank market power firms are less able to obtain bank financing because of credit availability is restricted. Therefore, with those results in hand we are able to show that firm investment is also negatively affected by bank market power. The reasoning which links bank market power, bank financing and firm investment is easy to understand. Firms need to finance their capital investment using bank financing, which in light of *market power hypothesis* is less available because banks limit credit availability; as result, firm have less financial resources to carry out the necessary investment in fixed capital.

5. Results

5. 1. Baseline model

The estimation of the expressions (14.a) and (14.b) are shown in table 4 by using Arellano and Bond (1991) GMM estimator in order to test our hypotheses. The results suggest that an increase in bank market power, measured as LERNER_{jt} has a twofold effect on firm investment. According with our hypotheses we find that an increase of bank market power induces to a reduction of firm investment rate $(I/K)_{it}$ in the short term (-0.0585) whist, on the other hand, we find that the firm investment rate is recovery in the long run (0.0702) considering the whole sample. Those results are robust whether we substitute $(I/K)_{it}$ for asset growth $(\Delta A_{it}/A_{it-1})$ and investment over assets ratio $(I/A)_{it}$ as dependent variable. In this way, we find very close results is we consider $(\Delta A_{it}/A_{it-1})$ as dependent variable compared to the case of $(I/K)_{it}$, showing a coefficient of -0.0475 for LERNER_{jt-1} and 0.0586 for LERNER_{jt-2}. On the other hand, the results for $(I/A)_{it}$ are qualitatively similar in sign and significance but showing lower values reaching -0.000080 and 0.0000590, for LERNER_{jt-1} and LERNER_{jt-2}, respectively.

Moreover, we are also concerned to study whether the effect of bank market power has similar effect on large and small and medium firms. We obtain the expected signs for both type of firms but we also find that the effect of bank market power is higher and significant at 1 per cent for SME (-0.0587) than the larger ones (-0.0326). Moreover, we find that the correction for firm investment is also higher for the SME (0.0745) than the larger ones (0.0320). Those results are found to be consistent when we introduce the variable MA_{jt} because of we obtain positive and significant coefficient for the whole sample (0.004), being only significant for the SME (0.005) suggesting that bank merger processes has a higher influence on smaller firms rather than larger ones. The above results are robust with the asset growth and investment over assets specifications.

The discussion of the results presented above proceeds as follows. In a lower competitive environment, firms which need bank financing are credit constraints under the *bank market power hypothesis*. In a first period, they are not being able to have the demanded bank financing to carry out the necessary investments. This means that in the short term bank market power can restrict firm investment in fixed capital. Then, in a second period, firms are capable to adapt themselves to the new situation of higher bank market power environment, thus they can restore the levels of investment. Our result should be interpreted by the supply side of banking market since we are considering as determinant a strictly exogenous factor as bank market power, which is an independent factor firms as will be demonstrated in the next subsection. However, those regression results represent a second step to connect our theory with those studies supporting *market power hypothesis*. We also find that this effect is more exacerbated for SME which are more restricted due to problems derived from information asymmetry. Financial literature has demonstrated that less competitive environment might dampen relationship lending for SME, and even, diminish credit availability, in favour of transactional lending for more transparent and largest firms. Therefore, in the light of our results is logical to conclude that the impact of bank market power on firm investment might be higher for SME than for the largest firms.

The rest of control variables show the expected signs. We find that crisis dummy present negative and significant sign (-0.0151) indicating that during the recent crisis period firms decrease significantly the investment process, and then reflects the loss of economic growth. Regarding the debt variable $(B/K)^2_{it-1}$, the sign is negative and significant which seems to be the correct one as implied by the tax bankruptcy cost specification, as has been shown by Bond and Meghir (1994). Moreover, we have shown the expected sign for cash flow predicted by the theoretical model, hence, the negative sign predicted by the Bond and Meghir's (1994) theoretical model has been made under the assumption of the firm can rise the finance at a given price. If this assumption is incorrect then the cash flow may reflect an excess of sensitivity of investment to cash flow, a fact consistent with the economic literature.

5. 2. Granger causality test

We are also concerned to study the causality between firm investment and bank market power. We employ the Granger causality test with four lags for bank market power and concentration variables, and firm investment rate. The results shown in table 5 suggest that bank market power (LERNER_{jt}) predicts firm investment, but firm investment does not predict bank marker power. To check the robustness of this result, we incorporate in our Granger test alternatives measures of bank concentration such as the indexes HHI and C5. The results are qualitatively similar to those obtained above in signs and significance, so we can conclude, employing several measures, which banking structure is a strong conditioning for firm investment, but we do not find empirical evidence that the relationship could be the inverse situation considering bank market power neither even bank concentration measures. Moreover, firm control variables maintained for the whole regressions conserve the expected signs and significance for all the specifications.

The results obtained in this research reinforce the line with the *market power approach* exposed above. Hence, in this way, this finding imply that bank market structure affects credit conditions such as credit availability or interest rates, but not the reverse happens and firms could not conditions bank market structures depending on the level of firm investment. Therefore, our results show bank market power is a strictly exogenous factor to firm financing behaviour.

5. 3. Cash flow-investment sensitivity

In this section we examine whether firm's internal funds availability exert some kind on influence on the firm investment depending on bank market power. Table 6 presents the cash flow sensitivity analysis by using 2SLS Baltagi's instrumental variables estimator. We also divide the sample in large and SME firms in order to consider the differences in cash flow sensitivity depending on firm size. We find that firms classified as SME exhibit a larger sensibility to cash flow (0.0471) than the larger ones (0.0342). The results remain similar even we exclude firm control variables of specification. Nevertheless, the main interest is to check the sensitivity of internal funds on bank market power and firm investment. Therefore, we interact $(CF/K)_{it}$ and LERNER_{jt} in order to check the joint effect of internal funds and bank market power on firm investment. We obtain negative and statistically negative sign for the lagged variable for Lerner index ($\text{LERNER}_{jt-1}*(CF/K)_{it}$) whilst, on the other hand, the sign turn to become positive in the current period ($\text{LERNER}_{jt}*(CF/K)_{it}$). Therefore, we conclude that bank market power is cash flow sensitive, and the effect become negative in the long term. We also find differences depending on the firm size. The effect is statistically significant for SME but we do not find the same for the larger ones.

The results are inverted whether we interact the sensitivity of investment to cash flow and the former one. We find that the sign of for the lagged value of bank market power and cash flow ($\text{LERNER}_{jt-1}*(CF/K)_{it}$) became negative and significant, whilst the sign for the current period is positive and significant. Moreover, investment interaction remain positive and statistically significant for the lagged period for investment ($(I/K)_{it}*(CF/K)_{it}$) and even considering the investment squared ($(I/K)^2_{it}*(CF/K)_{it}$).

5. 4. Robustness check: the effects of bank concentration

The specification of the baseline model presented in table 4 suggest that bank market power exert a negative effect on firm interment rate on the short term, buy on the other hand, this relationship is corrected in the long term becoming increasing.

To check the robustness of our previous results, we estimate in table 7 three alternative specifications replacing LERNER_{jt} by measures of bank market concentration such as HHI_{jt}, $C3_{jt}$, and $C5_{jt}$ and dividing the sample in large firms and SME. The correspondence of HHI and Lerner index, and the relationship with firm investment, depends on the evolution of market contestability and bank information production (Carbo *et al*., 2009). We obtain results similar to those obtained using the Lerner index which demonstrates the robustness of our results. The alternative measures support the existence of declining of firm investment rate in the short term, whist the relations turn to be positive in the long term.

6. Conclusions

In this paper the relationship between bank market power and firm investment have been studied in the context of two main competing hypotheses. On the one hand, the *market power hypothesis* supports that concentrated bank markets are related with less credit availability and leads to a financial obstacle for firms. On the other hand, *efficiency hypothesis* suggest that dominant financial institutions are more efficient and could translate lower marginal cost and, therefore, lower interest rates for firm financing.

This paper offers new evidence on the effect of bank market power on the firm investment. To undertake our analysis we perform several statistical tests using a unique twofold database combining panel data from firms, and banks. Our empirical findings suggest that the effects of bank market power exert a negative effect on firm investment in the short term, but in the long term firms are able be adapted to the new circumstances of banking markets and the firm investment would be increased. We also perform the Granger causality test in order to determinate the causality between bank market power and firm investment rate. Our results confirm that bank market power is a determinant of firm investment, but we do not find causality in the opposite direction. The results are robust whether we include measures of bank concentration such as HHI and C5 index. In a second step, we are also concerned to study the cash flow-investment sensitivity and the effects of bank market power on internal funds. Hence, we find that bank market power is cash flow sensitive to investment diminishing the impact on cash flow in the long term.

In the light of our findings, the main policy implications that can be derived are those related with the formation of a sound banking system derived from M&A or financial integration. Many governments are reluctant to permit mergers or new entrants (policy-induced barriers) for fear that the resulting market power make to decrease the economic growth. We find evidence of this financial integration can derive in a stable firm investment rate, and consequently permits the economic growth in the long term.

Table 1:
Definition of variables

Variable	Definition
Firm variables	
Firm investment $(I/K)_{it}$	This ratio is the endogenous variable and represents the rate of investment. This ratio is defined as the difference among the tangible fixed assets at end year minus the depreciation (assumed 10%) of the tangible fixed assets at the beginning of the year over the amount of tangible fixed assets.
Asset growth (ΔA_{it})	This ratio constitutes an alternative proxy for the investment growth in terms of total assets. This ratio is defined as the growth rate of firm's total assets.
Investment over assets $(I/A)_{it}$	This ratio is defined as the difference between firm's investment as we have defined above (I), and firm's total assets (A). This ratio also proxy for firm's investment level.
Cash-flow over capital $(CF/K)_{it}$	This ratio is defined as cash flow in relative terms to the proportion of capital. Cash flow is defined as net income plus depreciation plus changes in deferred taxes (Kaplan and Zingales, 1997, 2000; Fazzari *et al*., 2000).
Firm leverage $(B/K)_{it}$	This ratio measures firm leverage over the proportion of capital. This variable represents the level of risk which the firm is able to support..
Financial expenses $(FE/TA)_{it}$	This ratio is proxied as the amount of financial expenses incurred by the firm's total assets. Financial expenses are the expenses associated to obtain bank credit
Bank interest rate for I $(r^B/TA)_{it}$	This ratio measures the financial cost over firm's total assets. The term r^B represents the interest rate paid by the firm to obtain bank financing.
Firm output $(Y/K)_{it}$	This variable represents the firm output. This ratio is proxied as total sales plus the variation in stocks during the year over the amount of tangible fixed assets.
Bank Variables	
Bank cost for loans $(C(L)/L)_{jt}$	This ratio represents the bank's average operating costs for loans. This ratio is measured as operating cost over total loans.
$LERNER_{jt}$	Lerner index measures the degree of competition in banking markets. This index is defined as the difference among the price and the bank marginal cost, divided by the price, and measures the capacity of the bank to set price above the marginal cost, being an inverse function of the elasticity of the demand and the number of banks.
$LERNER\_D_{ji}$	Dummy variable which takes on the value one if Lerner is above the median, and zero otherwise.
HHI_{jt}	Herfindhal-Hirschman concentration index measures the degree of market concentration. This index is defined as the squared market shares of each one of the banks operating in the Spanish market.
$C3_{jt}$	The concentration index C3 measures the degree of market concentration for the three largest banks operating in the Spanish market.
$C5_{jt}$	The concentration index C5 measures the degree of market concentration for the five largest banks operating in the Spanish market.
Price of labour $(w_1)_{jt}$	This ratio is defined as personnel cost over total assets. The variable is measured in natural logarithm.
Price of capital $(w_2)_{jt}$	This ratio is defined as operating cost (except personnel cost) over fixed assets. The variable is measured in natural logarithm.
Price of deposits$(w_3)_{jt}$	This ratio is defined as financial cost over deposits. The variable is measured in natural logarithm.
$Crisis_t$	This dummy controls for crisis period and takes on the value one from 2007 to 2009, and zero otherwise.
Mergers and Acquisitions (MA_{jt})	This dummy controls for mergers and acquisitions processes, and takes on the value one whether the financial institution has been enveloped in a process of M&A.

Table 2:
Summary statistics

Panel A: Summary statistics					
Variable	Observations	Mean	SD	Min.	Max.
Firm variables					
$(I/K)_{it}$	427,912	0.2813127	0.5277204	-0.2362832	1.975
$(I/K)^2_{it}$	427,912	0.1700819	0.3001115	0.0007277	0.9410364
$(\Delta A_{it}/A_{it-1})$	435,816	0.1308849	0.2563873	-0.2169172	0.8244228
$(\Delta A_{it}/A_{it-1})^2$	435,816	0.0873366	0.1712306	0.0001016	0.6856772
$(I/A)_{it}$	427,901	0.000158	0.0003569	-0.000157	0.0013715
$(I/A)^2_{it}$	427,901	1.79e-07	5.07e-07	1.82e-12	2.13e-06
$(CF/K)_{it}$	483,066	0.8940378	1.328627	-0.0971272	5.282685
$(B/K)_{it}$	413,996	2.324521	7.290771	0.00	58.33333
$(B/K)^2_{it}$	413,996	58.55861	377.7071	0.00	3,402.778
$(FE/TA)_{it}$	484,447	0.0182237	0.0179719	0.00	0.0958084
$(r^B/TA)_{it}$	481,804	0.0170357	0.0164634	0.00	0.0842517
$(Y/K)_{it}$	391,289	18.15885	21.02752	1.578984	67.19231
Bank variables					
$(C(L)/L)_{jt}$	571,738	0.0021198	0.0041773	4.48e-07	0.0363564
LERNER_{jt}	286,305	0.2193837	0.1493782	0.0006745	0.6832959
HHI_{jt}	578,154	0.0129423	0.019828	0.00	0.0785534
C3_{jt}	400,338	0.0047919	0.0049498	0.00	0.0189458
C5_{jt}	292,183	0.0033579	0.0033127	0.00	0.0132126
Price of labour ($\ln(w_{1jt})$)	575,320	-4.569463	0.3244934	-6.791513	-1.361451
Price of capital ($\ln(w_{2jt})$)	568,459	-2.470802	1.571512	-10.4102	5.806305
Price of deposits($\ln(w_{3jt})$)	577,021	-3.719975	0.4122791	-8.699653	-0.8853336
Dummies					
$Crisis_t$	578,188	0.2547545	0.4357235	0.00	1.00
MA_{jt}	578,188	0.3407819	0.4739726	0.00	1.00

Panel B: Means of investment variables, cash flow and leverage depending on the quartiles of LERNER_{jt}. Standard Errors in parenthesis.					
	Observations	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
$(I/K)_{it}$	427,912	0.3312377	0.2669492	0.2627551	0.2879356
		(0.5732014)	(0.5112919)	(0.5037093)	(0.5151222)
ΔA_{it}	435,816	0.1172832	0.113532	0.1356893	0.1576307
		(0.2561884)	(0.2486805)	(0.2535963)	(0.2572901)
$(I/A)_{it}$	427,901	0.0001884	0.0001427	0.0001399	0.0001688
		(0.0003872)	(0.0003399)	(0.0003356)	(0.0003605)
$(CF/K)_{it}$	483,066	0.8596219	0.7795086	0.8739317	0.8113462
		(1.302885)	(1.209579)	(1.288377)	(1.204683)
$(B/K)_{it}$	413,996	1.699321	1.962852	1.859209	1.609669
		(4.538185)	(5.030817)	(4.879051)	(4.512294)

Table 3:
Parametric test for comparison of means and two-sample Kolmogorov-Smirnov test for equality of distribution functions by LERNER_D$_{jt}$.

	Parametric test for comparison of means		Kolmogorov-Smirnov
	Mean differences are reported. Diff = mean (0) – mean (1) under H_0: Diff = 0 t-statistics in parenthesis. Standard errors are reported.		Diff: F(z) – G(z) under H_0: Diff = 0
Variable	**Coefficient (t-statistics)**	**Standard errors**	**Coefficient [p-value]**
Firm variables			
$(I/K)_{it}$	0.0230266††† (14.1573)	0.0016265	0.0176 [0.000]
$(\Delta A_{it}/A_{it-1})$	-0.0306263*** (-39.1897)	0.0007815	0.0650 [0.000]
$(I/A)_{it}$	0.0000101††† (9.1882)	1.10e-06	0.0123 [0.000]
$(CF/K)_{it}$	-0.031193*** (-8.0834)	0.0038589	0.0303 [0.000]
$(B/K)_{it}$	47.09448††† (2.6472)	17.7906	0.0261 [0.000]
$(FE/TA)_{it}$	0.0019166††† (36.8350)	0.000052	0.0511 [0.000]
$(r^B/TA)_{it}$	0.0014501††† (30.3264)	0.0000478	0.0444 [0.000]
$(Y/K)_{it}$	-0.6092249*** (-8.9855)	0.067801	0.0153 [0.000]
Bank variables			
$(C(L)/L)_{jt}$	0.0024433††† (229.2520)	0.0000107	0.4664 [0.000]
HHI_{jt}	0.0206666††† (456.0154)	0.0000453	0.6454 [0.000]
$C3_{jt}$	0.0034498††† (216.1979)	0.000016	0.4487 [0.000]
$C5_{jt}$	0.0019238††† (126.2729)	0.0000152	0.2352 [0.000]
Price of labour ($\ln(w_{1jt})$)	0.0266096††† (30.8878)	0.0008615	0.2035 [0.000]
Price of capital ($\ln(w_{2jt})$)	0.0212458††† (5.0867)	0.0041768	0.0851 [0.000]
Price of deposits($\ln(w_{3jt})$)	0.4741475††† (542.3220)	0.0008743	0.5581 [0.000]
Dummy variables			
$Crisis_t$	0.2032619††† (179.8123)	0.0011304	0.2033 [0.000]
MA_{jt}	0.3248717††† (273.1635)	0.0011893	0.3249 [0.000]

Notes: *, **, *** statistically significant at the 10, 5 and 1% level, respectively under Ho: Diff. < 0
†, ††, ††† statistically significant at the 10, 5 and 1% level, respectively under Ho: Diff. > 0

Table 4: The impact of bank marker power on firm investment, 1998-2009

Arellano and Bond (1991) dynamic panel data regression.
t-statistics in parenthesis (White (1980) heterokedastic-robust standard errors).

	$(I/K)_{it}$			$(\Delta A_{it}/A_{it-1})$			$(I/A)_{it}$		
	The whole sample	Large firms	SME	The whole sample	Large firms	SME	The whole sample	Large firms	SME
Intercept	0.277***	0.277***	0.278***	0.0781***	0.0738***	0.0787***	0.000163***	0.000137***	0.000167***
	(71.13)	(15.97)	(66.80)	(37.19)	(12.35)	(34.90)	(63.75)	(18.06)	(60.96)
$(I/K)_{it-1}$	0.0144***	0.0143***	0.0140***						
	(10.50)	(3.40)	(9.55)						
$(\Delta A_{it}/A_{it-1})_{it-1}$				-0.00217	0.00376	-0.00329			
				(-1.08)	(0.61)	(-1.52)			
$(I/A)_{it-1}$							0.0243***	0.0246***	0.0238***
							(13.44)	(3.96)	(12.52)
$(FE/TA)_{it-1}$	-0.657***	-0.834***	-0.631***	-1.067***	-1.082***	-1.055***	-0.0000747	-0.000237*	-0.0000528
	(-5.59)	(-3.32)	(-4.83)	(-13.18)	(-5.14)	(-11.97)	(-1.37)	(-2.14)	(-0.85)
$(FE/TA)_{it-2}$	0.0923	-0.173	0.131	0.0534	-0.0232	0.0816	0.0000889	0.00000251	0.0000878
	(0.84)	(-0.70)	(1.07)	(0.69)	(-0.11)	(0.99)	(1.39)	(0.02)	(1.23)
$(r^B/TA)_{it-1}$	-0.643***	-0.0259	-0.728***	-3.317***	-2.616***	-3.418***	-0.000929***	-0.000291	-0.00102***
	(-4.43)	(-0.07)	(-4.58)	(-30.90)	(-8.61)	(-29.80)	(-11.49)	(-1.43)	(-11.45)
$(r^B/TA)_{it-2}$	-0.310*	0.401	-0.407**	1.229***	1.190***	1.211***	-0.000316***	0.0000819	-0.000355***
	(-2.32)	(1.17)	(-2.78)	(12.82)	(4.16)	(11.91)	(-3.75)	(0.38)	(-3.85)
LERNER_{jt-1}	-0.0585***	-0.0326*	-0.0587***	-0.0475***	-0.0374***	-0.0464***	-0.000080***	-0.0000267***	-0.0000838***
	(-13.00)	(-2.45)	(-12.25)	(-15.95)	(-4.03)	(-14.73)	(-28.91)	(-3.45)	(-28.48)
LERNER_{jt-2}	0.0702***	0.0320*	0.0745***	0.0586***	0.0684***	0.0589***	0.0000590***	0.0000192*	0.0000623***
	(16.16)	(2.35)	(16.18)	(20.99)	(7.31)	(19.91)	(21.08)	(2.35)	(20.95)
$(C(L)/L)_{jt-1}$	-3.779***	-2.200**	-3.902***	-2.947***	-2.312***	-2.983***	-0.00120***	-0.000647***	-0.00126***
	(-16.32)	(-3.23)	(-15.87)	(-20.85)	(-5.69)	(-19.82)	(-12.27)	(-3.38)	(-11.88)
$(C(L)/L)_{jt-2}$	-2.857***	-2.931***	-2.827***	-1.461***	-3.074***	-1.418***	-0.00233***	-0.000350	-0.00237***
	(-15.41)	(-4.40)	(-14.68)	(-12.01)	(-6.14)	(-11.26)	(-22.93)	(-1.39)	(-22.42)
$(CF/K)_{it-1}$	-0.0447***	-0.0439***	-0.0449***	0.0102***	0.0127***	0.00987***	-0.000019***	-0.0000195***	-0.0000190***
	(-26.26)	(-10.04)	(-24.71)	(12.35)	(5.24)	(11.42)	(-19.72)	(-6.94)	(-18.73)
$(I/K)^2_{it-1}$	1.523***	1.518***	1.523***						
	(476.63)	(153.20)	(452.49)						
$(\Delta A_{it}/A_{it-1})^2_{it}$				1.275***	1.269***	1.276***			
				(467.76)	(160.31)	(438.93)			
$(I/A)^2_{it}$							650.9***	635.5***	652.0***
							(426.58)	(117.24)	(410.17)
$(Y/K)_{it-1}$	-0.0105***	-0.0105***	-0.0105***	0.000267***	0.0000128	0.000291***	-0.000005***	-0.00000464***	-0.00000458***
	(-63.84)	(-22.76)	(-60.38)	(3.68)	(0.05)	(3.85)	(-45.72)	(-13.23)	(-44.00)

$(B/K)^2_{it-1}$	-1.63e-12	-1.53e-08***	-1.63e-12	4.27e-14	-8.47e-11	4.86e-14	-1.40e-16	1.74e-12***	-1.39e-16
	(-1.34)	(-18.39)	(-1.34)	(0.13)	(-0.39)	(0.15)	(-1.06)	(9.54)	(-1.06)
$Crisis_t$	-0.0151***	-0.00545	-0.0149***	-0.0222***	-0.0120**	-0.0223***	-0.000009***	-0.00000177	-0.00000898***
	(-6.72)	(-0.90)	(-6.17)	(-14.69)	(-2.82)	(-13.72)	(-8.75)	(-0.84)	(-8.14)
MA_{jt}	0.00474*	0.00232	0.00509*	0.00519**	0.00410	0.00539**	0.00000284	-0.00000210	0.00000327
	(2.02)	(0.32)	(2.07)	(3.07)	(0.85)	(3.01)	(1.80)	(-0.48)	(1.96)
Obs	204,303	22,397	181,906	206,637	22,708	183,929	204,303	22,397	181,906
Wald test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test (p-value)	0.0000	0.0188	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060	0.0000
m1 (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m2 (p-value)	0.0872	0.1603	0.1643	0.0000	0.4224	0.0043	0.7361	0.9356	0.6797

Notes: *, **, *** statistically significant at the 10, 5 and 1% level, respectively.

Table 5: Granger Causality Test

Instrumental variable regression with fixed effects
The whole variables are expressed in first differences.
t-statistics in parenthesis

	$(I/K)_{it}$	$LERNER_{jt}$	$(I/K)_{it}$	HHI_{jt}	$(I/K)_{it}$	$C5_{jt}$
Intercept	-0.141***	0.0230***	-0.0688**	0.000381***	-0.0500	0.00189***
	(-7.14)	(16.03)	(-2.80)	(24.14)	(-0.67)	(84.04)
$(I/K)_{it-1}$	-0.322***	0.00578	-0.304***	-0.000170	-0.315***	0.00000281
	(-15.88)	(0.78)	(-14.37)	(-1.82)	(-11.90)	(0.22)
$(I/K)_{it-2}$	-0.185***	0.00193	-0.163***	-0.000166*	-0.156***	0.00000137
	(-9.33)	(0.40)	(-7.87)	(-2.22)	(-5.89)	(0.11)
$(I/K)_{it-3}$	-0.083***	-0.000203	-0.0692***	-0.000140*	-0.0685**	-0.000000559
	(-5.17)	(-0.06)	(-4.13)	(-2.55)	(-3.19)	(-0.05)
$(I/K)_{it-4}$	-0.0147	-0.000846	-0.0123	-0.0000775*	-0.000441	-0.000000851
	(-1.54)	(-0.43)	(-1.24)	(-2.48)	(-0.03)	(-0.14)
$LERNER_{jt-1}$	0.108*	-0.0690***				
	(2.14)	(-3.99)				
$LERNER_{jt-2}$	0.612***	-0.0744***				
	(19.10)	(-6.11)				
$LERNER_{jt-3}$	0.700***	-1.014***				
	(16.37)	(-96.50)				
$LERNER_{jt-4}$	0.355***	-0.346***				
	(8.80)	(-37.69)				
HHI_{jt-1}			15.17***	-0.0212***		
			(5.99)	(-8.11)		
HHI_{jt-2}			9.764***	-0.204***		
			(5.31)	(-94.98)		
HHI_{jt-3}			8.715***	0.127***		
			(4.40)	(52.32)		
HHI_{jt-4}			0.350	0.199***		
			(0.27)	(97.96)		
$C5_{jt-1}$					84.19***	-0.163***
					(4.16)	(-12.70)
$C5_{jt-2}$					0.889	-0.191***
					(0.10)	(-42.63)
$C5_{jt-3}$					-81.96***	-0.723***
					(-8.38)	(-147.23)
$C5_{jt-4}$					-96.44***	-0.650***
					(-6.41)	(-76.42)
$(CF/K)_{it}$	-0.194***	0.0150***	-0.222***	-0.0000385	-0.216***	-0.00000664
	(-18.27)	(4.22)	(-20.12)	(-0.82)	(-14.93)	(-0.94)
$(Y/K)_{it}$	-0.084***	0.00480	-0.0884***	0.0000248	-0.079***	-0.000000975
	(-38.44)	(1.89)	(-38.30)	(1.28)	(-30.07)	(-0.73)
$(B/K)^2_{it}$	7.77e-10	5.74e-11	-5.21e-12**	-4.34e-16	-5.90e-12***	-1.74e-16
	(0.48)	(0.45)	(-3.16)	(-0.06)	(-3.95)	(-0.24)
$(r^B/TA)_{it-1}$	1.986	4.736***	5.463***	0.000828	1.828	0.00170*
	(1.75)	(12.02)	(4.68)	(0.16)	(1.15)	(2.19)
$(FE/TA)_{it-1}$	-0.562	-1.669***	1.140	-0.00211	0.253	0.00116**
	(-0.90)	(-8.23)	(1.76)	(-0.79)	(0.30)	(2.82)
Obs	51,418	51,366	57,089	57,089	27,403	27,403
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: *, **, *** statistically significant at the 10, 5 and 1% level, respectively.

Table 6: Cash flow-investment sensitivity depending on firm size

Dependent variable: rate of investment $(I/K)_{it}$
t-statistics in parenthesis.
2SLS Baltagi instrumental variables estimator

	The whole sample			Large firms			Small and medium firms		
Intercept	0.0458***	0.0566***	0.0458***	0.0470***	0.0841***	0.0465***	0.0436***	0.0536***	0.0436***
	(46.77)	(65.28)	(46.82)	(16.85)	(8.89)	(16.46)	(41.22)	(52.62)	(41.26)
LERNER_{jt}	-0.0514***	-0.0278***	-0.0519***	-0.0488*	-0.00230	-0.0497*	-0.0478***	-0.0191***	-0.0479***
	(-6.36)	(-5.92)	(-6.43)	(-2.27)	(-0.11)	(-2.33)	(-5.41)	(-3.80)	(-5.42)
LERNER_{jt-1}	0.0458***	0.0381***	0.0461***	0.0486**	0.00775	0.0482**	0.0435***	0.0359***	0.0435***
	(6.85)	(10.45)	(6.90)	(2.66)	(0.58)	(2.65)	(6.00)	(9.47)	(6.00)
$(I/K)^2_{it}$	1.640***	1.500***	1.640***	1.680***	1.571***	1.679***	1.644***	1.513***	1.644***
	(407.38)	(382.13)	(407.35)	(137.50)	(61.57)	(137.19)	(373.09)	(333.58)	(372.97)
$(CF/K)_{it}$	-0.0663***	-0.104***	-0.0665***	-0.0484***	-0.115***	-0.0487***	-0.0662***	-0.103***	-0.0665***
	(-53.32)	(-113.95)	(-53.47)	(-12.46)	(-13.91)	(-12.42)	(-49.27)	(-101.56)	(-49.44)
$(CF/K)_{it-1}$	0.0474***	0.0765***	0.0473***	0.0342***	0.0592***	0.0348***	0.0471***	0.0752***	0.0471***
	(50.19)	(98.89)	(50.16)	(11.80)	(18.96)	(12.09)	(46.25)	(89.79)	(46.27)
$\text{LERNER}_{jt}*(CF/K)_{it}$	-0.000104***	0.000271***	0.000169**	-0.00431	0.000921	0.00201	-0.000101***	0.000281***	0.000145**
	(-7.34)	(4.07)	(3.07)	(-1.35)	(0.71)	(1.18)	(-6.81)	(4.17)	(2.70)
$\text{LERNER}_{jt-1}*(CF/K)_{it}$	0.0000941***	-0.000211***	-0.000148**	0.00407	-0.000229	-0.00209	0.0000910***	-0.000224***	-0.000125**
	(8.70)	(-3.75)	(-2.99)	(1.29)	(-0.17)	(-1.26)	(8.24)	(-3.98)	(-2.58)
$(I/K)_{it-1}*(CF/K)_{it}$		0.000118***	0.000104***		0.00120***	0.000467		0.000103***	0.0000846***
		(6.32)	(4.28)		(3.41)	(0.37)		(5.43)	(3.61)
$(I/K)^2_{it}*(CF/K)_{it}$		0.0000877***	0.0000710***		0.00121***	-0.00129		0.0000857***	0.0000617***
		(6.38)	(4.88)		(4.99)	(-1.62)		(6.09)	(4.38)
$(C(L)/L)_{jt}$	-2.194***	-3.504***	-2.187***	0.481	-5.576***	0.591	-2.223***	-3.671***	-2.222***
	(-14.09)	(-28.85)	(-14.04)	(0.81)	(-7.31)	(1.00)	(-13.61)	(-28.04)	(-13.60)
$(Y/K)_{it}$	-0.000651***		-0.000647***	-0.00088***		-0.000877***	-0.000636***		-0.000631***
	(-19.04)		(-18.90)	(-8.76)		(-8.71)	(-17.31)		(-17.18)
$(FE/TA)_{it}$	0.454***		0.458***	0.397		0.400	0.343*		0.352*
	(3.60)		(3.63)	(1.35)		(1.36)	(2.40)		(2.46)
$(B/K)^2_{it}$	1.62e-13*		-2.18e-13	-1.39e-08		-0.00000011*	1.59e-13		-1.24e-13
	(1.97)		(-1.47)	(-1.30)		(-2.56)	(1.92)		(-0.85)
$(r^B/TA)_{it}$	-0.790***		-0.793***	-0.741*		-0.721*	-0.668***		-0.677***
	(-5.97)		(-6.00)	(-2.34)		(-2.29)	(-4.48)		(-4.54)
Obs	232,926	348,315	232,926	27,381	36,003	27,381	205,545	312,312	205,545
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: *, **, *** statistically significant at the 10, 5 and 1% level, respectively.

Table 7: Robustness check. Measures with concentration index: HHI, C3, and C5.

Dependent variable: rate of investment $(I/K)_{it}$
t-statistics in parenthesis (White (1980) heterokedastic-robust standard errors).
Arellano and Bond (1991) dynamic panel data regression.

	The whole sample			Large firms			Small and medium firms		
Intercept	-0.602***	-0.590***	-0.584***	-0.561***	-0.576***	-0.551***	-0.600***	-0.591***	-0.587***
	(-62.58)	(-40.37)	(-47.32)	(-18.31)	(-13.39)	(-15.31)	(-58.71)	(-37.88)	(-44.37)
$(I/K)_{it-1}$	1.621***	1.631***	1.619***	1.725***	1.786***	1.724***	1.602***	1.608***	1.601***
	(96.61)	(69.42)	(83.12)	(28.58)	(20.19)	(24.34)	(91.11)	(65.93)	(78.52)
$(FE/TA)_{it-1}$	1.115***	1.400**	0.891*	0.875	-0.0357	-0.297	1.164***	1.626**	1.084**
	(3.61)	(3.01)	(2.36)	(1.11)	(-0.03)	(-0.31)	(3.45)	(3.17)	(2.61)
$(FE/TA)_{it-2}$	-0.568	-0.701	-0.631	-1.198	-0.754	-1.634	-0.448	-0.671	-0.476
	(-1.85)	(-1.46)	(-1.63)	(-1.64)	(-0.60)	(-1.56)	(-1.33)	(-1.30)	(-1.14)
$(r^B/TA)_{it-1}$	0.462	0.161	0.500	0.567	0.154	0.939	0.322	0.0382	0.332
	(1.23)	(0.29)	(1.09)	(0.55)	(0.10)	(0.77)	(0.79)	(0.06)	(0.67)
$(r^B/TA)_{it-2}$	1.051**	1.171*	1.107*	0.850	1.728	1.946	1.001*	1.065	0.951
	(2.88)	(2.08)	(2.43)	(0.87)	(1.13)	(1.51)	(2.54)	(1.77)	(1.95)
HHI_{jt-1}	0.468			0.509			0.421		
	(1.95)			(0.74)			(1.66)		
HHI_{jt-2}	-0.367			-0.652			-0.393		
	(-1.73)			(-1.08)			(-1.74)		
$C5_{jt-1}$		-10.39**			-15.40			-9.271*	
		(-2.60)			(-1.22)			(-2.22)	
$C5_{jt-2}$		12.46*			21.06			12.06*	
		(2.53)			(1.39)			(2.33)	
$C3_{jt-1}$			-11.74**			-8.217			-11.11**
			(-3.09)			(-0.76)			(-2.76)
$C3_{jt-2}$			10.28*			6.154			10.22*
			(2.37)			(0.52)			(2.21)
$(C(L)/L)_{jt-1}$	-1.697**	-2.296**	-2.381**	-3.146	-3.874	-2.838	-1.641*	-2.300**	-2.417**
	(-2.63)	(-2.71)	(-2.90)	(-1.76)	(-1.50)	(-1.16)	(-2.38)	(-2.58)	(-2.78)
$(C(L)/L)_{jt-2}$	0.406	-6.279	-4.890	-7.601	-15.65	-15.48	0.0395	-5.313	-3.977
	(0.12)	(-1.63)	(-1.30)	(-0.78)	(-1.40)	(-1.43)	(0.01)	(-1.30)	(-1.00)
$(CF/K)_{it-1}$	0.154***	0.155***	0.156***	0.134***	0.132***	0.139***	0.156***	0.158***	0.158***
	(34.73)	(23.48)	(28.99)	(10.48)	(6.82)	(9.10)	(33.40)	(22.67)	(27.77)
$(I/K)^2_{it-1}$	-2.887***	-2.892***	-2.884***	-3.065***	-3.119***	-3.067***	-2.859***	-2.860***	-2.856***
	(-101.53)	(-72.32)	(-86.83)	(-30.23)	(-20.92)	(-25.62)	(-96.21)	(-69.05)	(-82.35)
$(Y/K)_{it-1}$	0.0405***	0.0408***	0.0404***	0.0416***	0.0427***	0.0414***	0.0403***	0.0405***	0.0402***
	(107.55)	(76.04)	(90.29)	(34.62)	(24.87)	(30.74)	(101.45)	(71.71)	(84.84)

$(B/K)^2_{it-1}$	1.90e-12	8.71e-12***	8.79e-12***	3.17e-11***	3.16e-12**	2.59e-12*	1.83e-12	8.67e-12***	8.75e-12***
	(0.76)	(4.85)	(4.97)	(10.04)	(2.85)	(2.46)	(0.74)	(4.84)	(4.98)
$Crisis_t$	-0.0234***	-0.0160*	-0.0112*	-0.0286*	-0.0572*	-0.0289	-0.0213***	-0.0147*	-0.0110
	(-6.28)	(-2.39)	(-2.08)	(-2.22)	(-2.45)	(-1.54)	(-5.45)	(-2.10)	(-1.96)
MA_{jt}	-0.00434	-0.0160	-0.0156	0.000251	-0.000336	0.00874	-0.00492	-0.0175	-0.0175*
	(-0.71)	(-1.86)	(-1.85)	(0.01)	(-0.01)	(0.30)	(-0.77)	(-1.95)	(-1.99)
Obs	218,607	107,289	151,542	24,859	11,214	16,491	193,748	96,075	135,051
Wald test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000
m1 (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m2 (p-value)	0.1988	0.9721	0.1638	0.1910	0.4726	0.5111	0.2343	0.9138	0.2054

Notes: *, **, *** statistically significant at the 10, 5 and 1% level, respectively.

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