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Banks' Corporate Control and Relationship Lending: Evidence from Retail Loans

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Abstract

Universal banks can have control over borrowers by holding equity stakes in the borrower firm. Banks' corporate control is likely to increase the likelihood of providing a future loan as they mitigate information asymmetry and agency costs of debt. Using panel data on Portuguese companies, we find that a bank corporate control enhances the probability of providing a future loan by 10 percentage points relative to a relationship lender with no control. This finding is robust to the inclusion of many firm-level controls, including firm fixed effects, and to instrumental variable methods to correct for the potential endogeneity of banks' equity stakes in borrower firms. Consistent with our hypotheses, the effect is significantly higher for borrowers with greater information asymmetry, while the effect is lower when the borrower has multiple lending relationships or multiple banks as shareholders. Our results suggest banks' corporate control affect the choice of the lender in the corporate loan market.

JEL codes: G21, G34.

Keywords: Corporate ownership, Retail loans, Universal banks, Non-financial firms

1 Introduction

Bank loans are the most common source of external finance for corporations worldwide. Banks have advantages in accessing and producing information on the companies they lend to by exploiting economies of scale and scope and by developing close relationships with firms.[1] Multiple loan transactions and delivery of other financial services imply that proprietary information can be accumulated in the bank-firm relation. Existing theory and evidence supports that "relationship banking" can generate significant benefits for the lender.

Bank-firm relationships extend beyond just repeated lending interactions. Universal banks act as lenders, but they also underwrite and trade securities, hold equity stakes in corporations, and manage mutual funds. Thus, banks can play a prominent role in the governance of corporations as (large) shareholders. A significant number of firms worldwide have concentrated equity holders like families, non-financial firms, and banks (La Porta, Lopes-de-Silanes, and Shleifer (1999)).[2] Additionally, a growing channel of bank influence over firm governance is through institutional holdings. Many universal banking groups have developed large asset management arms in recent years, such as bank trust services, mutual funds, and pension funds. These mutual funds can and do invest in the same publicly listed firms to which banks make loans and in which they have equity stakes. Universal banks can also have equity stakes in non-financial firms through theirs private equity and venture capital divisions.

Banks' stakes on non-financial firms can provide them access to information on the firm's financial health. For example, in some countries, like Germany, bank are represented on firms' board of directors that stem either from proxy voting (as banks hold votes of unregistered bearer shares of their depositors) or from an equity stake. Whenever a banker sits on a board, it will gain access to additional information that can provide some control over a borrower. This may affect the firm's access to the credit market if the insider bank is a potential lender.

We examine the effects of banks' involvement in corporate governance as shareholders on firms' access to the loan market. We test the hypothesis that an insider bank can be a more

[1] See Boot (2000) for a survey of this literature.

[2] Bank stakes are rare in the U.S., given the historical restrictions of the Glass-Steagall Act on bank ownership of non-financial firms. Several other countries allow banks to take equity stakes in non-financial corporations (see Santos (1998) for a survey).

effective monitor and mitigate financial constraints. When a bank is both a shareholder and a creditor, it may be better able to monitor borrower actions, and reduce the chances of premature liquidation. A bank holding a mixed debt-equity claim can also potentially mitigate the problems of asset substitution and under- or over-investment (Jensen and Meckling (1976) and Myers (1977)). Additionally, the bank-firm link may improve information flow between the bank and the firm. The borrower may be inclined to reveal more information to the bank, and the bank itself has greater incentives to produce information (Boot (2000)). With this additional information, banks may be better able to screen loans and obtain private information on the financial status of the borrower firm. If banks share these information rents with firms, we expect to see more lending when a bank plays a role in the governance of a firm.[3]

A testable implication therefore is that a an insider bank is more likely to capture the future lending business of its borrower. We formalize this implication in our first hypothesis:

Hypothesis 1 (H1): *An equity stake in a borrower increases the probability that a lender attracts future lending business from that borrower.*

Borrowers that face most severe information asymmetries (e.g., small firms with less established repayment histories) have the most to benefit from the monitoring services that banks provide. Thus, these models predict that informationally opaque borrowers would use relationship loans (i.e., loans from its insider bank) more frequently than borrowers for whom a substantial amount of information is available publicly. We capture this idea in our second hypothesis:

Hypothesis 2 (H2): *The more informationally opaque a borrower, the greater the likelihood it will borrow from its insider bank.*

The strength of the relationship with the insider bank is also likely to affect the choice of future lenders. Indeed, firms with the strongest relationship with the insider bank may not have many financing alternatives available due to an adverse selection problem and therefore would use loans from its insider bank more frequently. We capture this idea in our final hypothesis:

[3] A bank's special position as an insider may also allow it to extract rents from its information monopoly and potentially to "hold-up" a firm due to information asymmetries between other lenders and the borrower (Sharpe (1990) and Rajan (1992)).

Hypothesis 3 (H3): *The stronger the strength of the relationship between the borrower and the insider bank, the greater the likelihood it will borrow from its insider bank.*

We use a sample of loans to private and publicly listed non-financial portuguese firms over 2001-2007 to study the effect of corporate control relationships between banks and firms in the access of firms to the credit market. Our sample is dominated by private firms and small loans where information asymmetry and agency costs of debt are likely to be high. The issue of credit availability to smaller firms has drawn wide attention as these firms are said to be crucial for the development of many economies. To test our hypotheses, we pair each firm with each of the top 20 banks (in terms of loans activity) and estimate a logit model of the lender choice. The results indicate that firms tend to get more loans from banks that have equity stakes in firm than from banks with no such stakes. Banks with a control stake in the firm are roughly 10 percentage points more likely to be picked as future lenders than banks with no such stake (the probability increases from 14.2% to 24.9%). We find consistent results when we use an OLS model where the dependent variable is the weight of a given bank in the total amount of loans of a borrower in alternative to the logit model.

We then test hypothesis 2. We use firm size as our main proxy of information asymmetry. It is reasonable to argue that smaller-sized firms are less likely to be followed by investors. Stein (2002) argues that small-business lending relies mainly on soft information. This characterization suggests that smaller borrowers should find strong relationships (lending and governance) with banks particularly useful and beneficial. Smaller firms are also likely to be relatively more informationally opaque. Thus, small firms offer the most potential for proprietary information generation by a relationship lender and an insider bank. To the extent that relationships do mitigate the information problems that smaller firms face, we should expect to find a strong negative association between the size of a borrower and its use of an insider bank for future loans. We find that small firms are more likely to borrow from their insider bank, which is consistent with hypothesis 2. We also consider other proxies of information asymmetry such as asset tangibility and access to public debt markets. However, we do not find that asset tangibility and access to public debt markets have a statistically significant effect on the probability of an insider bank providing a future loan.

Finally, we test hypothesis 3. We use the number of lending relationships and the number of shareholders as proxies for the strength of the relationship with an insider bank.

Ongena and Smith (2000) show that multiple bank relationships indeed reduce the information monopoly by the relationship bank, but worsen the availability of credit as multiple relationships can reduce the value of information acquisition to any individual bank. A firm with a higher number of lending relationships is less likely to use the insider bank to obtain loans as it has other alternatives to raise external funds. Similarly, a firm with multiple banks as shareholders is not as much dependent on a single bank to raise financing. We find that both the borrower's number of lending relationships and bank shareholders reduce the probability that an insider bank provides a future loan. This finding is consistent with hypothesis 3.

An important concern with our findings is that a bank's presence as a equity holder arises endogenously in response to governance issues (Adams, Hermalin, and Weisbach (2010)). Indeed, a bank could become an insider in firms that have difficult to access to credit markets and have higher borrowing costs to start with. We address this concern in several ways. As a first way to address this concern we measure bank equity stakes with a one-year lag relative to the lender choice. The results are also consistent if we measure bank equity stakes using a three-year lag.

We also show that the positive effect of a bank insider stake on the lender choice remains strong after controlling for a long list of possible covariates. Our findings are not explained by bank reputation, past lending relationships and a variety of firm characteristics such as firm size and complexity, performance, ownership structure, and leverage, among others. Moreover, the results are robust to the inclusion of firm (and bank) fixed effects. The firm fixed-effects specification controls for unobserved sources of firm heterogeneity and solves problems in which an unobserved time-invariant variable simultaneously determines both the lender choice and the bank equity stake in the borrower firm.

A final approach we use to address endogeneity concerns is instrumental variable estimation methods, where the first stage models the bank equity stake using as instrument a variable that indicated whether the firm is publicly listed or private. Banks are more likely to have equity stakes in publicly listed firms as these stakes benefit from liquidity. We conclude that results are robust to all this endogeneity bias correction.

Other authors have studied prior lending activity and its effect on the probability that banks extend loans and win underwriting mandates (Yasuda (2005), Bharath et al. (2007),

and Drucker and Puri (2005)). The effect of prior lending activity on borrowing costs is also mixed. Bharath et al. (2008) find repeated borrowing from the send lender is associated with lower interest rate spreads. In contrast, Schenone (2009) finds evidence that lending relationships can help banks earn information rents in the form of higher interest rate spreads when firms face high switching costs (i.e., before going public).

Our research contributes to the literature on relationship banking by using insider stakes to capture how dependent the firm is on its lender. Other authors focus on other measures of the intensity of bank-firm relationships such as the geographic distance between bank and borrower (Petersen and Rajan (1994), Degryse and Ongena (2005)); the duration of the relationship (Petersen and Rajan (1994), Berger and Udell (1995), Degryse and Van Cayseele (2000), and Ongena and Smith (2001)); and the nationality of both bank and borrower (Carey and Nini (2007) and Houston, Itzkowitz, and Naranjo (2007)). The evidence favors improved credit availability, but there is mixed evidence regarding borrowing costs. Berger and Udell (1995) find that firms with longer lending relationships pay lower interest rates, while Degryse and Van Cayseele (2000) find contract terms deteriorate with the duration of relationships in Europe.

Evidence so far on the influence of banks on corporations through equity stakes or board seats is mixed (Drucker and Puri (2006)). In Germany, Gorton and Schmid (2000) find that banks use their equity holdings and board seats to improve firm performance, while more recently Dittman, Maug, and Schneider (2007) find evidence that bank representation on the boards of non-financial firms is not necessarily in the best interest of firms. In Japan, firms with close bank ties have higher borrowing costs (Weinstein and Yafeh (1998)). They also experience poorer profitability (Morck, Nakamura, and Shivdasani (2000)); adopt policies that favor creditors over shareholders (Morck and Nakamura (1999)); and face higher bond underwriting fees (Yasuda (2007)). In Europe, Kracaw and Zenner (1998) find a negative stock price reaction to bank loans if a banker sits on a borrower's board of directors.

In short, our findings suggest that universal banks involvement in non-financial corporations as shareholders has implications in the credit market. An insider bank is likely to be the firm's main lender, which may generate benefits to the firm in terms of credit availability but can also hold up the firm. This information monopoly could be later be exploited by the insider bank by extracting rents from the firm. This finding suggests that regulators

should be aware of the credit market implications of policies regarding the structure of the banking system, in particular in what respects the involvement of banks as shareholders of non-financial firms.

2 Data

2.1 Sample

We use an unique data set constructed from several data sources: the Securities Statistics Integrated System, the Central Credit Register, the Central Balance-Sheet Database, the Quadros de Pessoal and Thomson's Datastream. These data sources provide the necessary information to test our hypothesis on the Portuguese corporate sector. The data covers the period from 2001 to 2007.

The Securities Statistics Integrated System gathers information on equity and debt securities issued by non-financial firms allowing to identify the non-financial firms on which banks have equity stakes, as well as the market value of their positions.[4] This data source also allows us to identify if this equity stake is hold by the bank or through a mutual fund, pension fund, venture capital or insurance company belonging to the same banking group. The analysis is restricted to the 20 largest banks operating in Portugal, when measured regarding credit granted or equity holdings. In addition, this data source also includes information on debt securities issued by firm and owned by banks.

The Central Credit Register, managed by Banco de Portugal, collects monthly information on loans granted to non-financial corporations by all credit institutions operating in Portugal. Information on credit lines is also reported. We use information from this database to compute the number of banking relationships of each firm and the market share of banks in terms of credit granted to firms.

Additional data for this work comes from the Central Balance-Sheet Database, providing the accounting information on firms, such as assets, equity, debt, interest paid and earnings. The two other data sources, the Quadros de Pessoal, and Datastream, were used to complement the database with additional variables on firms. From the Quadros de Pessoal database, which is mandatory employment survey collected yearly by the Portuguese Min-

[4]The Securities Statistics Integrated System does not provide information on the issuer firm of about 30% of the value of banks securities holdings.

istry of Labor and Social Security, we are able to collect information on the existence of foreign shareholders in the company. Information on which firms are publicly listed firms is obtained from Datastream.

The final sample contains all non-financial firms with have information on both the Central Credit Register and the Central Balance-Sheet Database for at least four years in the 2001-2007 period. These firms are required to have annual total assets of at least ten million euros. Notice that the sample includes not only firms on which banks have equity stakes, but also other non financial firms.

We want to test if a bank is more likely to grant a loan to a firm where it has an equity stake. In order to do this analysis, we need to construct all possible pairs between banks and borrower firm. Some of these pairs are matched, that is, a bank lends to the firm; some are not matched. Hence, for each firm and for each year, we expanded the database to consider all possible combinations between each firm and the largest 20 banking groups operating in Portugal. Given that the sample period covers seven years of data, 20 banking groups and more than 2,000 firms, our test sample has more than 300,000 observations.

2.2 Descriptive Statistics

This section presents descriptive statistics of our variables. Table 1 presents detailed variables definition. In order to avoid spurious inference we exclude outliers, we winsorize variables at the bottom and top 1% level.[5]

Table 2 provides descriptive statistics of our data. Panels A and B provide the distribution of bank equity stakes on non-financial firms by year. The Bank Ownership (dummy) is a variable that takes the value of one when the equity stake is at least 1%, and zero otherwise. Panel A presents the number of bank equity stakes and panel B presents the number of firms with bank equity stakes. There is not much variation on the number of bank equity stakes over time. Banks have an equity stake on about 60 firms and each firm has 1 or 2 banking groups as shareholder on average. Our sample comprises a total of 874 bank equity stakes in the 2001-2007 period, corresponding to a total of 454 firm-year observations. Table 2 also presents information on which division of the banking group holds the equity stake: bank division or non-bank divisions (i.e., insurance companies, mutual funds, venture capital and

[5] (For the continuous firm-bank variables, the observations above the 98th percentile are also winsorized.)

pension funds). Equity stakes are more frequently in the bank division. The Public Debt Ownership (dummy) is a variable that takes the value of one when the banking group owns debt securities in non-financial firm and zero otherwise. There is an increase in ownership of debt securities by banks over time in the 2001-2007 period.

Panel C presents summary statistics of the bank ownership variable when measured as a percentage of the book value of equity. In our sample, the average equity stake per observation is 12% of the book value of equity, while the median is 5%. On average, the value of debt securities owned by banks, as a percentage of the book value of debt, is 13% and the median is 8%.

Panel D presents summary statistics of loans granted by banks as a percentage of the total loans of the firm. Loans granted by banks that are simultaneously creditors and shareholders of the firm represent, on average, 40% of the total loans of the firm. Taking into account all firm/bank observations when the bank does not have an equity stake, the average loan is lower (25%), implying that the when a bank has an equity stake in the firm is more likely to give a loan to the firm.

Panel E presents summary statistics of bank ownership non-financial firms and other firm-level control variables. Bank Ownership (%) is the sum of equity stake of all banks in each firm. On average, the share of capital owned by the banks is 22%.[6] The value of debt securities (Public Debt Ownership) owned by banks is 20% on average. The number of bank shareholders is a variable that measures the number of banking groups with equity stakes in a firm.[7] This variable has a large dispersion. In fact, the number of bank shareholders can be very high in the case of large or listed firms. Panel E also presents a comparison of summary statistics of firm-level control variables between firms with bank ownership and firms without bank ownership. The number of banking relationships variable corresponds to the number of banking groups granting credit to given firm. We do not observe a significant difference in the number of banking relationships between the two groups. Firms where banks have an equity stake are, on average, slightly larger but with less tangible assets then the other ones. Firms where banks have an equity stake are also less profitable, interest

[6] The maximum value observed is higher than 100% because this variable considers the market value of the equity stake of banks over the book value of equity. However, values higher than one are observed for just 1% of the observations.

[7] Notice that this variable can be much larger than 20, which is the number of bankings we are considering in the sample, as it was constructed before imposing this constraint.

coverage is lower, and the importance of foreign shareholders is smaller. Firms where banks have an equity stake are more likely to have public debt and to be publicly listed.

3 Empirical results

3.1 Main Results

A closer relationship between the bank and the firm should be associated with better information flow, allowing banks to better screen loans. A testable implication is that banks with equity stakes in the firm are more likely to capture future loans of the firm. To test this hypothesis, for each firm and in each year, we create a set of 20 potential lenders, which results in 20 firm-bank pairs per year. Each pair firm-bank, for each year, is the unit of observation in our sample. We estimate a logit model and a linear regression (OLS) model:

$$\begin{aligned} \text{Loan}_{i,g,t} &= \theta_t + \alpha_i + \vartheta_g + \beta(\text{Bank Ownership})_{i,g,t-1} \\ &\quad +\gamma(\text{Credit Relationship})_{i,g,t} + \delta X_{i,t-1} + \lambda Y_{g,t} + \varepsilon_{i,g,t} \end{aligned} \tag{1}$$

where $\text{Loan}_{i,g,t}$ is: (1) a dummy variable equal to one if bank g grants credit to firm i in year t and zero otherwise in the case of the logit model; or (2) credit granted by bank g to firm i as a percentage of the total loans of the firm in year t in the case of the OLS model. Bank $\text{Ownership}_{i,g,t}$ is: (1) a dummy variable equal to one if bank g has an equity stake in firm i in year t, and zero otherwise; or (2) equity stake of bank g as a percentage of the book value of equity of firm i in year t; this variable is lagged one period. Credit $\text{Relationship}_{i,g,t}$ is value of the loans that bank g granted to firm i in year t; this variable is lagged one period. $X_{i,t}$ are firm-level control variables, including assets (log), return on investment, tangible assets, interest coverage, leverage, number of banking relationships, number of bank shareholders, firm with public debt outstanding dummy variable and publicly traded firm dummy variable; firm-level control variables are lagged one period. $Y_{g,t}$ is market share of each bank g considering only loans granted to the corporate sector in year t. θ_t is a year fixed effect, α_i is a firm (or industry) fixed effect, and ϑ_g is a bank fixed effect. We estimate a specification with industry and year fixed effects and a specification with firm, bank and year fixed effects. Standard errors are adjusted for clustering at the firm level.

Table 3 reports the estimates of equation (1). Columns (1)-(4) report the results for the logit specification and columns (4)-(8) report the results for the OLS specification. The coefficient on the bank ownership variable is positive and statistically significant in all specifications. The effect is also economically significant. Using the estimate of the bank ownership (dummy) coefficient in column (1), the predicted probability of a bank granting credit to a firm if it does not have an equity stake in the firm is 14%, while the predicted probability of granting credit to the firm if it has an equity stake is 25% (other variables evaluated at their means). Thus, holding everything else equal, the probability of a bank granting credit to a firm is increased by 10.7 percentage points if it has an equity stake in the borrowing firm.

The results in Table 3 show that the finding of a positive effect of bank ownership on the choice a future lender is robust in several ways. First, we use a continuous variable for bank ownership. Second, we use an OLS specification where the dependent variable is the share of loans of the bank in a firm. Finally, we estimate a specification with firm (and bank) fixed effects. The firm fixed effects results show that time-invariant unobservable firm characteristics do not seem to explain our findings.

Other explanatory variables have the predicted sign and have a significant impact on the lender choice. The market share of the bank in the loan market has a positive and significant coefficient. The increase in probability of increasing the market share from the 5th- to the 95th-percentile is 40 percentage points using the estimates in column (1). In addition, the existence of a past credit relationship has a positive and significant coefficient, which indicates that past lending relationships increase the likelihood that the bank will be chosen for future loans by the same firm.

Table 4 present results of robustness checks of the results in Table 3. We present estimates for the logit model in equation (1) but we obtain consistent findings using the OLS model. We first check the sensitivity of the results to consider bank equity stakes only if they are above 5% of the book value of equity, rather than 1%. Columns (1) and (2) present the results for this robustness test. We find that the predicted probability of a bank granting credit to a firm increases from 14% if it does not have an equity stake in the firm to 28% if it has an equity stake. We next estimate specifications to take into account the division within the banking group that has the equity stake on the firm. We divide bank divisions into two groups: banks and non-banks (mutual fund, pension fund, venture capital or insurance

company). Non-bank divisions cannot grant loans, but can invest in the borrowing firm. Moreover, the rationale for investing in a firm may be different across the different types of bank divisions. Columns (3) and (4) present the results. We find that the probability of a bank granting credit to a firm is increased by 14 percentage points if it has an equity stake in the borrowing firm through the bank. Moreover, we find a similar effect if the equity stake is owned by a non-bank division bank of the banking group. Overall, our results are robust to alternative definitions of the size and type of bank equity stake.

Table 5 present results of robustness checks that include additional control variables. We present estimates for the logit model and OLS model in equation (1). We first control for bank public debt ownership, i.e., if the bank granting the credit also own debt securities issued by the firm. We consider both a dummy variable and a continuous variable similar to the bank equity ownership. We also include other firm-level control variables, including firm size, profitability, leverage, Interest, assets tangibility, number of banking relationships, number of financial shareholders, if the firm has issued debt securities, and if it has foreign shareholders. Our results remain robust as the coefficient of the Bank Ownership variable is positive and significant. Firm size and the number of banking relationships have a positive and significant effect on granted loans, while interest coverage has a negative effect.

3.2 Effect of Information Asymmetry

Equilibrium models of credit rationing suggest that small firms could be seriously vulnerable to credit rationing as they are often informationally opaque (Stiglitz and Weiss, 1981). The problem of information asymmetry between insiders and outsiders tend to be more severe for smaller firms, as these firms release less information, with lower frequency than larger firms and they are also less followed by analysts. Stein (2002) argues that small business lending relies mostly on informations that cannot be verified by other than the ones producing it. As a result, small firms may not be able to invest in positive net present value projects because potential providers of external finance may not be able to readily access the quality of projects. Hence, as banks with equity stakes may be able to collect more information on the firm, we should expect a negative association between firm size and its use of the insider bank to obtain future loan.

We test hypothesis 2 using firm size as a proxy for information asymmetry. We estimate

the logit (Panel A) and OLS (Panel B) models with firm and bank fixed effects in equation (1) including an interaction term of the bank ownership variable with firm size. Column (1) of Table 6 present the results. We find that the coefficient on bank ownership is positive and significant. Moreover, the coefficient of the interaction term is negative and significant at 1%, suggesting that the effect of an insider bank in lender choice if lower in larger firms. We conclude that smaller firms relay more on insider banks to obtain future loans.

We employ alternative proxies for borrower information transparency to test this hypothesis. We use the ratio of tangible assets over total assets to measure assets' tangibility. Firms with less tangible assets can be seen as facing more information asymmetry as assets tend to be more difficult to value. These firms are expected to rely more on insider bank financing. However, we do not observe a significant effect of the interaction term in this case (see column (2)). We also use a dummy variable for firms issuing debt securities and firms that are listed in a stock exchange. Firms whose securities are transacted in public markets tend to be more transparent as they may face stronger information requirements to the public they can be more easily followed by analysts. Moreover, firms with access to public debt markets have more financing alternatives. Results in column (3) of Table 6 show that this interaction term is not significant.

In summary, we find the effect bank equity stakes in the choice of future lenders is more pronounced in smaller firms. This is consistent with the idea that information asymmetry plays an important role in explaining our results as in hypothesis 2. Smaller firms are also more likely to have higher agency costs of debt. Additionally, we find that tangibility and the possibility to issue public debt does not seem to matter significantly for the relation between lender choice and bank equity stakes.

3.3 Effect of the Strength of Relationships

In this section we test hypothesis 3 that stronger firm-bank relationships have an effect on the probability of an insider bank to grant a credit to the firm. From the firm's point of view, a stronger bank relationship may be considered valuable as banks may be more willing to make unprofitable loans to customers during difficult financial times when they trust losses will be recouped over the course of a long relationship. On the other hand, banks may acquire private information over the course of a relationship and effectively "lock-

in" customers. Several empirical studies use the duration of a bank borrower relationship as a measure of the strength of relationship. Petersen and Rajan (1994) and Berger and Udell (1995) find that the duration of the bank-borrower relationship positively affects the availability of credit. This result is consistent with the idea that the longer the duration of the relationship, the greater the information exchange. On the other hand, Ongena and Smith (2000) conclude that the value of a relationship declines through time and that firms are able to end relationships early, possibly to avoid lock-in. Moreover, the ability of one bank to hold-up a firm is lower for firms with alternative sources of bank credit.

For our empirical tests, we use two variables to proxy for the strength of the relationship between firm and bank. We use the number of banking relationships and the number of financial shareholders of the firm. We expect that a firm with a higher number of lending relationships and number of financial shareholders to have a lower likelihood to select the insider bank as future lender. In contrast, firms with a lower number of lending relationships or financial shareholders are more likely to rely on the insider bank as they are more exposed to adverse selection (lemons problem) if they do not use the insider bank to obtain loans.

We estimate the logit (Panel A) and OLS (Panel B) models with firm and bank fixed effects in equation (1) including an interaction term of the bank ownership variable with the number of lending relationships and number of financial shareholders. The coefficient of the interaction terms are negative and significant in both cases, suggesting that the positive impact of bank ownership on credit granted decreases with the number of lending relationships and the number of financial shareholders. Firms with more lending relationships tend to be able to obtain credit form other banks besides the insider bank, which contributes to reduce the ability of the insider bank to hold-up the firm. Insider banks of firms with more financial shareholders may have access to less information. In both cases, the effect of the insider bank of the choice of future lenders decreases. The results are consistent with hypothesis 3.

4 Endogeneity

Endogeneity problems are ubiquitous in empirical research on corporate governance. In our setting, there could be many reasons for bank equity stakes and lender choice to be jointly determined. We have already addressed the potential endogeneity problems using firm fixed effects methods that control for unobserved sources of firm heterogeneity. Fixed effects

methods solve joint determination problems in which an unobserved time-invariant variable simultaneously determines both lender choice and bank ownership. It is also equivalent to looking only at within-firm changes in bank ownership. The fixed effects results go a long way toward dismissing omitted variables explanations as sources of endogeneity. Because only the effects of within-firm changes in bank ownership are taken into account, firm-specific omitted variables cannot explain the observed relation between lender choice and banker ownership.

Another approach to address endogeneity concerns is to use lagged bank ownership as an explanatory variable. We have done so in all our estimations. However, one could think that a one-year lag is not sufficient to address the joint determination concern. Thus, we estimate the logit and OLS models with firm and bank fixed effects in equation (1) with bank ownerships measured with a three-year lag. Table 7 present the results of these estimations, confirming a positive relation between lender choice and bank ownership.

We also use two-stage least squares (2SLS) address the potential endogeneity of PIN. Two-stage least squares methods allow us to address omitted variables and reverse causality issues simultaneously. The caveat is that, unlike the fixed effects method, it requires stronger assumptions that are usually not possible to test for. Under standard identification assumptions, we apply 2SLS methods to isolate the effect of bank ownership on lender choice. To this end, we need instruments for bank ownership: a variable that is correlated with bank ownership, but uncorrelated with lender choice except indirectly through other independent variables. That is, the instrument should be a variable that can be excluded from the original list of control variables without affecting the results. This last requirement cannot be tested by statistical methods. It is, in the end, an act of faith.

We use the publicly listed dummy as an instrument. This dummy takes the value of one if a firm is publicly listed and zero if a firm is private. Banks are more likely to have equity stakes or ownership in publicly listed firms as the shares of these firms benefit from liquidity. On the other hand, private firms equity stakes cannot be traded in public stock markets.

Column (1) of Table 8 present the results of the first stage regressions that use bank ownership (continuous variable) as the dependent variable. The results support the conclusion that the publicly listed dummy coefficient is positive and significantly related to bank ownership. F-test that the instrument can be excluded from the first-stage regressions is

strongly rejected. We conclude that our instrument is associated with bank ownership and that our specifications do not suffer from weak instruments concerns. Column (2) present the coefficients of the second-stage regression that uses a dummy variable of lender choice as the dependent variable. Since the variable in the second stage is a dummy variable a probit model is used in the second stage. There is still evidence of a positive relation between bank ownership and lender choice after taking into account the possibility that bank ownership is endogenous. The evidence suggests the existence of a causal link from bank ownership to lender choice in the credit market.

To assess the robustness of our conclusions from our instrumental variable tests, we employ an additional empirical strategy that involves estimating the effect of an endogenously chosen dummy variable (bank ownership) on another endogenous variable, which is continuous (credit granted by a bank to the firm as a percentage of the total loans of the firm). This set-up can be estimated using the treatment effects model. We report the results from the treatment effects model in columns (3) and 4) of Table 8. Column (3) presents the first stage results and we can see the publicly listed dummy coefficient is positive and significant, implying that banks are more likely to have equity stakes in publicly listed borrower firms. Column (4) reports the endogeneity-adjusted estimate of the existence of a bank equity stake in the borrower on the amount credit granted to that borrower (as a percentage of the total credit of the borrower). The coefficient is positive and significant. Thus, after controlling for endogeneity, in a treatment effects model, we continue to find that banks with equity stakes in the borrower are more likely to be chosen to provide future loans.

5 Conclusion

Our paper seeks to measure the effects that a bank corporate control over borrowers through equity stakes has in the credit market, in particular in the choice of the lender. For lenders, the establishment of an equity link with a borrower allows for more efficient information production and processing in offering future loans. Consequently, a lender with an equity stake in the borrower should be more likely to secure the future business of its borrowers. Using a sample of portuguese private and publicly listed firms, we find that the existence of an equity stake in a borrower significantly increases the likelihood of winning this borrower's future loan business both statistically and economically. Moreover, we find that the

increased likelihood of winning future business is most powerful for those borrowers that suffer from the greatest degree of informational asymmetry. Our findings suggest that universal banks involvement in non-financial corporations as shareholders has implications in the credit market. An insider bank is likely to be the firm's main lender, which may generate benefits to the firm in terms of credit availability but can also hold up the firm.

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6 Appendix

Table 1: Variables definition

The equity stake is defined as the market value of the participation as a percentage of the book value of equity.

Bank-firm variables	
Loan (dummy)	Dummy variable that takes the value of one if the banking group grants credit to the firm, and zero otherwise.
Loan (%)	Variable that measures the credit granted by the banking group as a percentage of total loans of the firm.
Bank Ownership (dummy)	Dummy variable that takes the value of one when the equity stake is higher than one percent, and 0 otherwise.
Bank Ownership (%)	Variable that measures the equity stake if higher than one percent and zero otherwise.
Bank Ownership 5 (dummy)	Dummy variable that takes the value of one when the equity stake is higher than five per cent, and 0 otherwise.
Bank Ownership 5 (%)	Variable that measures the equity stake if higher than five percent and zero otherwise.
Bank Ownership 5 (dummy, through *ENT*)	Dummy variable that takes the value of one when the entity with an equity stake higher than one percent is *ENT*, where *ENT* can be banks or non-banks. This variable is zero otherwise.
Bank Public Debt Ownership (dummy)	Dummy variable that takes the value of one when the banking group owns debt securities of the firm, zero otherwise.
Bank Public Debt Ownership (%)	Variable that measures the value of debt securities owned by the bank group as a percentage of total debt of the firm.
Credit Relationship	Variable that measures the credit granted by a banking group as a percentage of the total loans of a given firm at the end of the year prior to the loan.
Firm variables	
Assets	Logarithm of total assets.
Return on Investment	EBITDA as a percentage of total assets.
Tangible fixed assets	Tangible fixed assets as a percentage of total assets.
Interest coverage	EBITDA as a percentage of interest paid.
Leverage	Financial debt as a percentage of total assets.
Number of lending relationships	Number of banking groups granting credit or setting credit lines to a given firm. If a financial institution does not belong to a banking group it is taken as a banking group itself.
Number of financial shareholders	Total number of banking groups with an equity stake on a firm, where a financial institution not belonging to a banking group was assumed as a banking group itself.
Bonds	Dummy variable equal to 1 if the firm has public debt and zero otherwise.
Foreign capital	Variable that measures the percentage of capital owned by foreigners.
Listed	Dummy variable equal to 1 if the firm is publicly traded and zero otherwise.
Bank variables	
Bank Market Share	Bank market share measured in terms of granted credit.

Table 2: Descriptive statistics

Panel A: For the number of observations

	2001	2002	2003	2004	2005	2006	2007	Total
Bank Ownership (dummy)	109	122	138	126	128	132	119	874
Bank Ownership 5 (dummy)	59	64	70	63	62	61	58	437
Bank Ownership 5 (dummy, through banks)	38	36	34	29	25	23	22	207
Bank Ownership 5 (dummy, through non- banks)	23	31	41	38	42	44	42	261
Bank Public Debt Ownership (dummy)	157	136	134	146	173	308	425	1479

Panel B: For the number of participated firms

	2001	2002	2003	2004	2005	2006	2007	Total
Bank Ownership (dummy)	60	68	72	67	67	65	55	454
Bank Ownership 5 (dummy)	40	43	47	41	42	38	37	288
Bank Ownership 5 (dummy, through banks)	28	26	23	23	22	17	16	155
Bank Ownership 5 (dummy, through non- banks)	17	25	32	26	29	30	27	186
Bank Public Debt Ownership (dummy)	84	76	81	97	113	198	300	949

Panel C: Per observation, bank ownership and bank market share

	N	Mean	Sd	Median	Min	Max
Bank Ownership (%)	874	0.12	0.16	0.05	0.01	0.75
Bank Ownership 5 (%)	437	0.21	0.19	0.13	0.05	0.75
Bank Public Debt Ownership (%)	1479	0.13	0.14	0.08	0.01	0.64
Bank Market share	140	0.05	0.07	0.02	0.00	0.27

Panel D: Per observation, bank credit

Includes only firms where banks have equity stakes

	N	Mean	Sd	Median	Min	Max
Loan (%) (if Loan>0)	463	0.40	0.38	0.28	0	1
Loan (%) (if Loan=>0)	874	0.21	0.34	0.00	0	1

Includes only firms where banks do not have equity stakes

	N	Mean	Sd	Median	Min	Max
Loan (%) (if Loan>0)	48570	0.25	0.29	0.13	0	1
Loan (%) (if Loan=>0)	286808	0.04	0.15	0.00	0	1

Panel E: Per firm

Includes only firms where banks have equity stakes

	N	Mean	Sd	Median	Min	Max
Bank Ownership (%)	454	0.22	0.28	0.12	0.01	2.01
Bank Ownership 5 (%)	288	0.32	0.29	0.20	0.05	1.93
Bank Public Debt Ownership (%)	949	0.20	0.20	0.14	0.01	1.85
Number of financial shareholders	454	11.72	16.34	5.00	1	101

Includes only firms where banks have equity stakes

	N	Mean	Sd	Median	Min	Max
Log of assets	435	18.21	1.85	18.40	13.50	21.07
Return on Investment	435	0.04	0.06	0.01	-0.09	0.37
Tangible fixed assets	435	0.22	0.27	0.10	0.00	0.95
Interest coverage	434	3.59	18.62	0.82	-59.24	245.41
Leverage	435	0.30	0.22	0.31	0.00	0.91
Number of lending relationships	454	5.03	3.64	4	0	19
Bonds	435	0.39	0.49	0	0	1
Foreign capital	340	11.31	24.63	0	0	100
Listed	454	0.41	0.49	0	0	1

Includes only firms where banks do not have equity stakes

	N	Mean	Sd	Median	Min	Max
Log of assets	13022	17.42	1.04	17.19	13.95	21.07
Return on Investment	13022	0.08	0.09	0.07	-0.09	0.38
Tangible fixed assets	13022	0.28	0.26	0.21	0.00	0.95
Interest coverage	12996	13.27	49.27	2.96	-59.24	393.63
Leverage	13022	0.30	0.23	0.28	0.00	0.91
Number of lending relationships	13991	4.45	2.86	4	0	22
Bonds	13022	0.10	0.30	0	0	1
Foreign capital	10448	20.11	38.36	0	0	100
Listed	13991	0.01	0.11	0	0	1

Table 3: Effect of bank equity stake on lending

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Ownership (dummy)	0.695***	0.411*			0.019***	0.021***		
	(3.55)	(1.87)			(2.56)	(2.63)		
Bank Ownership (%)			3.575***	3.239***			0.160***	0.169***
			(4.60)	(2.79)			(3.59)	(3.54)
Bank Market Share	11.655***	9.589***	11.673***	9.580***	0.258***	0.343***	0.258***	0.343***
	(78.58)	(12.33)	(78.72)	(12.32)	(37.33)	(8.39)	(37.43)	(8.39)
Credit Relationship	12.404***	8.763***	12.403***	8.763***	0.710***	0.706***	0.709***	0.705***
	(27.69)	(29.49)	(27.69)	(29.48)	(116.71)	(113.22)	(116.59)	(113.10)
Industry dummies	Yes	No	Yes	No	Yes	No	Yes	No
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank dummies	No	Yes	No	Yes	No	Yes	No	Yes
Firm dummies	No	Yes	No	Yes	No	Yes	No	Yes
Model	Logit	Cond Logit	Logit	Cond Logit	OLS	OLS	OLS	OLS
pseudoR^2	0.375	0.501	0.375	0.501	0.591	0.592	0.591	0.592
semi-elasticity(Bank ownership)	0.107***		0.437***					
	(2.93)		(4.60)					
Number of obs	268887	264349	266667	264349	268887	268887	268887	268887

In columns 1 to 4, the dependent variable takes a value of one if the banking group grants credit to the firm in a given year and zero otherwise. In columns 4 to 8, the dependent variable is the weight of the credit granted by a banking group to a firm in a given year on the total credit of the firm in the same year. Bank Ownership (dummy) is a dummy variable that takes a value of one when there is a equity stake and zero otherwise. Bank Ownership (%) is the equity stake as a percentage of book value of equity. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Table 4: Robustness: Size and Types of Equity Stakes of 5 %

Variables	(1)	(2)	(3)	(4)
Bank Ownership 5 (dummy)	0.818***	0.637**		
	(3.28)	(2.25)		
Bank Ownership 5 (dummy, through banks)			0.865**	0.779**
			(2.46)	(2.01)
Bank Ownership 5 (dummy, through non- banks)			0.873**	0.760*
			(2.42)	(1.93)
Bank Market Share	11.670***	9.584***	11.668***	9.581***
	(78.59)	(12.33)	(78.60)	(12.32)
Credit Relationship	12.403***	8.764***	12.403***	8.764***
	(27.69)	(29.48)	(27.69)	(29.48)
Industry dummies	Yes	No	Yes	No
Year dummies	Yes	Yes	Yes	Yes
Bank dummies	No	Yes	No	Yes
Firm dummies	No	Yes	No	Yes
Model	Logit	Cond Logit	Logit	Cond Logit
pseudo - R^2	0.374	0.501	0.375	0.501
semi-elasticity (Bank ownership)	0.131***			
	(2.65)			
semi-elasticity (Bank ownership - through banks)			0.141**	
			(1.97)	
semi-elasticity (Bank ownership - through non banks)			0.142*	
			(1.94)	
Number of obs	268887	264349	268887	264349

The dependent variable takes a value of one if the banking group grants credit to the firm in a given year and zero otherwise. Bank Ownership 5 (dummy) is a dummy variable that takes a value of one when the equity stake is higher than 5% and zero otherwise. Bank Ownership 5 (dummy, through banks) and Bank Ownership 5 (dummy, through non-banks) are defined as before but for taking into account the diviosion of the baking group holding the equity stake. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Table 5: Robustness tests, control for other variables

Variables	(1)	(2)	(3)	(4)
Bank Ownership (dummy)	0.501**		0.021**	
	(2.11)		(2.54)	
Bank Ownership (%)		3.638***		0.173***
		(2.92)		(3.32)
Bank Market Share	9.208***	9.142***	0.342***	0.339***
	(10.21)	(10.15)	(6.61)	(6.65)
Credit Relationship	9.351***	9.353***	0.704***	0.703***
	(24.82)	(24.81)	(99.35)	(100.86)
Bank Public Debt Ownership (dummy)	0.367**		−0.000	
	(2.43)		(−0.07)	
Bank Public Debt Ownership (%)		0.742		0.020
		(0.79)		(0.44)
Log of assets	0.249***	0.250***	0.001*	0.001*
	(5.06)	(5.10)	(1.74)	(1.73)
Return on Investment	0.051	0.053	−0.002	−0.001
	(0.21)	(0.22)	(−0.41)	(−0.42)
Tangible assets	0.245	0.243	−0.001	−0.001
	(1.58)	(1.57)	(−0.73)	(−0.76)
Interest coverage	−0.001**	−0.001***	−0.000	−0.000
	(−2.46)	(−2.46)	(−0.77)	(−0.76)
Leverage	0.152	0.155	−0.000	−0.001
	(1.47)	(1.50)	(−0.83)	(−0.93)
Number of lending relationships	0.145***	0.150***	−0.000	0.000
	(18.40)	(18.37)	(−0.00)	(0.01)
Number of financial shareholders	−0.001	−0.002	0.000	0.000
	(−0.20)	(−0.21)	(1.42)	(1.40)
Bonds	0.043	0.044	0.000	0.000
	(1.05)	(1.08)	(0.63)	(0.59)
Foreign capital	−0.001	−0.001	0.000	0.000
	(−0.91)	(−0.91)	(0.78)	(0.77)
Industry dummies	No	No	No	No
Year dummies	Yes	Yes	Yes	Yes
Bank dummies	Yes	Yes	Yes	Yes
Firm dummies	Yes	Yes	Yes	Yes
Model	Cond Logit	Cond Logit	OLS	OLS
Pseudo R^2	0.509	0.509	0.589	0.589
Number of obs	193292	193292	196355	196355

In models (1) and (2) the dependent variable takes a value of one if the banking group grants credit to the firm in a given year and zero otherwise. In models (3) and (4) the dependent variable is the weight of the credit granted by a banking group to a firm in a given year on the total credit of the firm in the same year. Bank Ownership (dummy) is a dummy variable that takes value 1 when there is a equity stake and 0 otherwise. Bank Ownership (%) is the equity stake as a percentage of book value of equity. Bank Public Debt Ownership (dummy) is a dummy variable that takes value 1 when the banking group owns debt securities of the firm. Bank Public Debt Ownership (%) measures the value of debt securities owned by the bank as a percentage of total debt of the firm. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Table 6: Information asymmetry and strenght of relationships

Panel A: Logit model

Variables	(1) Assets	(2) Tangible Fixed Assets	(3) Bonds	(4) Number of lending relationships	(5) Number of financial shareholders
Bank Ownership (dummy)	4.984***	0.204	0.633*	1.286***	0.732***
	(3.07)	(0.79)	(1.92)	(3.37)	(2.58)
Bank ownership x firm variable	−0.242***	0.881	−0.421	−0.145***	−0.017***
	(−2.92)	(1.07)	(−1.11)	(−3.20)	(−2.76)
Firm variable	0.545***	0.228	0.200***	0.175***	0.001
	(10.69)	(1.38)	(4.09)	(23.16)	(0.26)
Bank Market Share	9.623***	9.595***	8.576***	9.031***	8.615***
	(12.36)	(12.34)	(12.32)	(11.64)	(12.37)
Credit Relationship	8.741***	8.765***	8.763***	8.623***	8.762***
	(29.54)	(29.49)	(29.49)	(29.92)	(29.49)
Industry dummies	No	No	No	No	No
Year dummies	Yes	Yes	Yes	Yes	Yes
Bank dummies	Yes	Yes	Yes	Yes	Yes
Firm dummies	Yes	Yes	Yes	Yes	Yes
Model	Cond Logit	Cond Logit	Cond Logit	Cond Logit	Cond Logit
pseudo R^2	0.502	0.501	0.501	0.505	0.501
Number of obs	264349	264349	264349	264349	264349

The dependent variable takes a value of one if the banking group grants credit to the firm in a given year and zero otherwise. Bank Ownership is a dummy variable that takes value 1 when there is an equity stake and 0 otherwise. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Panel B: Linear regressions

Variables	(1) Assets	(2) Tangible Fixed Assets	(3) Bonds	(4) Number of lending relationships	(5) Number of financial shareholders
Bank Ownership (dummy)	0.303***	0.028***	0.029**	0.044**	0.033***
	(3.18)	(2.91)	(2.53)	(2.52)	(2.88)
Bank ownership x firm variable	−0.015***	−0.040	−0.019	−0.004	−0.001**
	(−3.07)	(−1.47)	(−1.30)	(−1.65)	(−2.30)
Firm variable	0.002***	−0.001	0.000	−0.000	−0.000
	(3.36)	(−0.76)	(0.08)	(−0.06)	(−0.39)
Bank Market Share	0.343***	0.343***	0.343***	0.343***	0.343***
	(8.39)	(8.40)	(8.39)	(8.40)	(8.40)
Credit Relationship	0.706***	0.706***	0.706***	0.706***	0.706***
	(113.18)	(113.19)	(113.17)	(113.19)	(113.17)
Industry dummies	No	No	No	No	No
Year dummies	Yes	Yes	Yes	Yes	Yes
Bank dummies	Yes	Yes	Yes	Yes	Yes
Firm dummies	Yes	Yes	Yes	Yes	Yes
Model	OLS	OLS	OLS	OLS	OLS
R^2	0.592	0.592	0.592	0.592	0.592
Number of obs	268887	268887	268887	268887	268887

The dependent variable is the weight of the credit granted by a banking group to a firm in a given year on the total credit of the firm in the same year. Bank Ownership is a dummy variable that takes value 1 when there is an equity stake and 0 otherwise. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Table 7: Robustness tests - bank ownership variable lagged three periods

Variables	(1)	(2)	(3)	(4)
Bank Ownership (dummy)	0.574**		0.020**	
	(2.56)		(2.00)	
Bank Ownership (%)		2.582***		0.158**
		(2.88)		(2.28)
Bank Market Share	11.672***	11.689***	0.261***	0.259***
	(71.95)	(72.22)	(3.78)	(3.76)
Credit Relationship	11.798***	11.795***	0.695***	0.695***
	(24.75)	(24.75)	(94.98)	(94.85)
Industry dummies	Yes	Yes	No	No
Year dummies	Yes	Yes	Yes	Yes
Bank dummies	No	No	Yes	Yes
Firm dummies	No	No	Yes	Yes
Model	Logit	Logit	OLS	OLS
Pseudo R^2	0.36	0.36	0.576	0.576
Number of obs	179284	179284	179284	179284

In models (1) and (2) the dependent variable takes a value of one if the banking group grants credit to the firm in a given year and zero otherwise. In models (3) and (4) the dependent variable is the weight of the credit granted by a banking group to a firm in a given year on the total credit of the firm in the same year. Bank Ownership (dummy) is a dummy variable that takes value 1 when there is a equity stake and 0 otherwise. Bank Ownership (%) is the equity stake as a percentage of book value of equity. Robust *t-statistics* adjusted for firm clustering are in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Table 8: Instrumental Variables Regression Estimation

Variables	Instrumental Variables Probit		Treatment Effects Model	
	First Stage	Second Stage	First Stage	Second Stage
	(1)	(2)	(3)	(4)
Bank Ownership (dummy)				0.016**
				(2.46)
Bank Ownership (%)		37.69***		
		(10.47)		
Listed	0.006***		1.598***	
	(47.18)		(17.77)	
Bank Market Share	0.004***	7.027***		0.258***
	(10.52)	(133.13)		(37.33)
Credit Relationship	0.003***	4.022***		0.709***
	(24.45)	(131.20)		(116.71)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of obs	268887	268887	268887	268887

This table provides the results of a instrumental variables (IV) estimation with Listed as an instrument for Bank Ownership. The Instrumental Variables Probit consists of an OLS estimation in the first stage and probit in the second stage; the Treatment Effects Model consists on a logit estimation in the first stage and OLS in the second stage. In the Treatment Effects Model, robust *t-statistics* adjusted for firm clustering in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% level.

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