

Contestability in Banking Markets and Small Firm Use of Bank Financing: A Cross-Country Investigation

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**Prepared for the Macroeconomics Research in the Liberal Arts Conference
5-6 August 2008**

Draft – Not for Citation

Market power among banks may encourage relationship lending technologies, alleviating information asymmetry problems. Because such relationship lending is relatively more important for small businesses, this effect will be amplified for them. However, bank resources must be sufficient to cover the additional costs associated with this lending technology. Using cross-country data from surveys of firms and banks we find that market power among banks leads to increased use of bank financing and that this effect is higher for small firms. In addition, we find important interactions with other banking sector variables. In particular we find that higher interest margins and overhead costs are positively associated with firm use of bank financing. When interest margins are high, banks can afford the resources needed to effectively conduct relationship lending. In addition, small firms benefit when banks use more resources as reflected in higher bank overhead.

JEL Classification: G21; G28; G32

Keywords: access to credit; small and medium-sized enterprises, bank regulation

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1. Introduction

Regulators have a large influence on the structure of their country's banking sector and the profitability of its various activities. These regulators may encourage or restrict the level of bank competition depending on the relative weight of numerous goals and their perceived tradeoffs. However, the effect of the level of bank competition on firm access to bank financing remains a debate. Peterson and Rajan (1995) argue that when banks have some measure of market power, it encourages long-term lending relationships allowing banks to take into account potential future profits when evaluating the firm's creditworthiness. The result is greater access to credit.

We build on their work by focusing on the implications of bank competition for one type of lending technology that is relatively supported in long-term relationships, what is termed "relationship lending." Relationship lending differs from the more common transactions-oriented lending by relying more on "soft" information about the firm, its management, strategy, competition, etc. collected over time by a credit officer. This type of lending helps resolve problems of asymmetric information and is particularly important for small firms which may not have the collateral, formal reporting or established cash flows of larger firms conducive to transaction-oriented lending. When the lending bank has market power it is less concerned about another bank free riding off the signal information of its issuance of a loan to a firm. However, relationship lending is resource intensive and a relatively expensive technology for lending (Berger, Klapper and Udell, 2001). If a bank cannot charge an appropriate interest rate to reflect the higher costs, whether due to legal or social restrictions, it will negatively affect its issuance of

this type of lending technology. Unfortunately, usury laws are often an important hindrance to intermediation (Conning and Kevane, 2002).

To test the hypothesis that market power leads to more lending, particularly, relationship lending, we look for important interactions between bank competition and other banking sector variables which are associated with relationship lending. First, using cross-country, survey data from firms and banks, we test both for the effect of market power in banking on firm use of bank lending, and for whether it is amplified for small firms which tend to be more dependent on relationship lending technologies. Further, we test whether this relationship between market power and firm use of bank lending is dependent on support for the higher costs associated with relationship lending. For this reason we look at interactions of competition in the banking sector with higher interest margins and higher overhead expenditures.

The regression results provide support for Peterson and Rajan in that more market power in the banking sector increases the probability a firm will use bank lending. Consistent with their hypothesis, this result is amplified for small firms. However, the extent of this effect is shown to depend on interactions with other banking sector variables, in particular, interest rate margins and bank overhead. These results support the hypothesis that the increase in lending with market power includes more costly relationship lending technologies. When interest margins are high, the bank can afford to devote the additional resources needed to effectively conduct this type of lending. In addition, firms benefit when banks actually use more resources as reflected in higher bank overhead. Both of these effects are amplified for small firms. Further, these banking sector

variables are shown to have important direct effects on the probability of firms using bank lending, and again, results are amplified for small businesses.

Additional results confirm the differences in lending to small businesses. Examining the effects of general economic conditions, the positive effects of secure property rights and higher levels of private credit on the use of bank financing are amplified for small firms. However, while past economic growth generally increases the use of bank finance, it reduces bank lending for small firms, perhaps indicating some credit rationing during times of growth.

The paper proceeds as follows. The next section considers the literature on bank regulation, bank competition and access to credit and presents our hypothesis on bank competition and relationship lending. We then discuss the data and our empirical model. The results of the empirical investigation follow and the paper ends with a few concluding remarks.

2. Bank Competition and Access to Credit

Throughout the world, banking tends to be highly regulated. Economic theory is unclear as to the extent regulators should promote or limit competition within the banking sector. Economists generally argue that under certain assumptions perfect competition produces the greatest social welfare. However, due both to severe information problems and to substantial externalities, banking violates the necessary assumptions for this to hold.

Although general welfare conditions are not satisfied, some economists still argue the advantages of competition in banking. Vives (2001) discusses individual types of efficiency in the context of banking and seems to conclude on the side of competition, even imperfect competition, as

producing allocative, productive and dynamic efficiencies that outweigh scale and product-mix efficiencies associated with more market power. However, he also notes that the inherent fragility of the banking sector from moral hazard problems may be alleviated by some measure of market power. Thus, bank supervisors must seek to balance efficiency and stability goals in the policies they develop toward banking competition.

While stability and efficiency goals feature in regulators' design of banking policies, they must also consider apparent opposing effects of market power on access to credit, the focus of this paper. Lending is fraught with both moral hazard and adverse selection problems. Numerous banking practices have arisen to address these information problems, including collateral requirements, extensive monitoring, development of business analysis expertise, contracts, etc. However, these are not complete solutions and substantial risk remains.

Bank responses to this problem may lead to a negative relationship between market power in the banking industry and firm access to credit. The standard response of increasing interest rates to reflect the greater risk from information asymmetries exacerbates the adverse selection problem between banks and borrowers. Because of this, banks with market power may choose to ration credit instead of increase interest rates, leading to lower credit availability (Stiglitz and Weiss, 1981).

However, Peterson and Rajan (1995) argue a positive relationship between market power and firm access to credit. They assert that higher profits associated with market power lead banks to invest in more monitoring and the development of long-term relationships. These long-term

relationships provide the bank with the flexibility to take a longer view on earning a return and not to require credits to break even on a period by period basis. Thus, in their model market power leads to increased credit availability, especially for new or distressed firms.

Bank Competition, Small Firms and Relationship Lending

While Peterson and Rajan do not differentiate among different lending technologies, market power may result in a bias toward a certain type of lending technology and have differential effects on the size of firms which benefit. A country's financial sector consists of institutions and markets which employ a variety of investment/lending technologies to channel funds to entities which can use it productively. These technologies include bond issues, equity issues, transaction lending, asset lending, leasing, factoring, and relationship lending. (Berger and Udell 2002, Udell 2004). While larger firms may have access to several of these technologies, smaller firms usually have more limited options. Small firms differ from larger firms because they tend to be "informationally opaque." Their activities tend to be more informal; their business planning is often limited; and, they do not generate as much information from which to analyze their prospects and performance. (Berger, Klapper and Udell 2001)

For this reason, lending to small businesses tends to use the technology of relationship lending. Relationship lending involves the collection of information over time through contact with the firm, its owners, management, local community, etc. This information then becomes the primary basis for decisions on credit availability and terms for the firm. This type of lending differs from lending technologies more commonly used for large firms which are based both on more easily accessible information from the firm's financial statements and on more easily valued and monitored assets. The collection of this "soft" information is relatively resource intensive and

costly. Further, because the effort to gather information does not rise proportionally with the size of the loan, average costs for small borrowers are expected to be higher, discouraging banks from lending to this market, especially when interest rates cannot compensate.

Market power may be important for banks to engage in this type of lending. Banks which make the investment to learn about a firm risk another bank drawing away the borrower for future transactions by offering cheaper rates. The competitor bank can afford to offer better terms by free riding off the initial bank's evaluation that a firm was a good credit risk, evident in their decision to grant a loan, reducing some of its costs. For a bank with some measure of market power, this risk is reduced and it is more likely to expend the resources to collect the information necessary for relationship lending.

However, whether the bank is willing to expend resources on relationship lending activities depends on its ability to cover the higher associated costs. Many countries have either formal or informal caps on interest rates that hinder the bank's ability to charge sufficiently high interest rates to underwrite the resources needed to effectively operate this type of lending (Conning and Kevane, 2003). If regulatory restrictions prevent the bank from being able to charge high interest rate spreads, market power may not result in increased access to credit, for small or for any firms.

Hypotheses

The technology of relationship lending is a useful response to information asymmetries inherent in credit markets. It is particularly useful for small firms whose activities tend to be more informal and whose assets may not easily serve as collateral. This type of lending requires a bank

to invest substantial time and resources to collect soft information on a firm to determine its credit worthiness. A bank is more likely to engage in this type of lending technology if it does not fear other banks' free riding off the information it produces simply by observing that a firm has received a loan. This leads to the following hypotheses:

H1: More market power in the banking sector leads to increased firm access to credit.

H1A: Further, since the relationship lending supported by more market power is more important for small firms, the resulting increase access to credit is greater for small firms than for larger firms.

While these first two hypotheses are consistent both with Peterson and Rajan's more general proposition and the alternative proposition here that higher market power leads to more relationship lending, the next hypothesis is specific only to the latter.

H2: Because relationship lending is relatively more resource intensive than other lending technologies increased use of bank lending under market power among banks should be associated both with higher costs and higher income to cover those costs.

3. Data and Methodology

Most studies which empirically evaluate the effect of bank competition on lending concentrate on a single country, usually the US, e.g., Hannan (1991), Jackson and Thomas (1995), DeYoung, Goldberg, and White (1999), Scott and Dunkelberg (2001), Black and Strahan (2002). An exception is Beck, Demirgüç-Kunt and Maksimovic (2004) who utilize firm-level data from both developed and developing countries. They find that higher concentration in the banking sector

leads to increased perceptions of financing as an obstacle to firm operations and growth.

However, the interactions of concentration and country-level institutional variables produced strong caveats as their conclusions were generally reversed for more developed countries.

Similar to Beck, Demirgüç-Kunt and Maksimovic (2004), we use cross-country, firm-level data to investigate the effect of bank competition on firm access to lending. However, we build on their work by using a different dependent variable from the same data set. Rather than use the firm survey responses on whether finance was an obstacle to their operations, we look at actual use of local commercial bank finance. In addition, rather than bank concentration to measure the level of bank market power, we use Claessens and Laeven's (2004) measure of contestability. Further, we look specifically at bank performance measures to find evidence to support the hypothesis that increases in lending associated with market power among banks is biased toward relationship lending. The basic empirical strategy is to relate bank financing by firms to banking sector variables while controlling for certain firm characteristics, macroeconomic conditions and the institutional environment that might affect lending.

Data

To obtain data on firm financing, we make use of an extensive cross-country survey of firms undertaken by the World Bank known as the World Business Environment Survey (WBES). This project surveyed over 10,000 firms in 71 countries on a range of questions focused on firm perceptions of the business environment and includes information on firm characteristics as well as a limited number of performance indicators.² The surveyors collected a sample designed to maintain a set proportions of firms of different sizes in each country surveyed, with small-sized

² While ideally we would use data on the mix of loans by size of firm within bank portfolios, such data is not readily available.

firms (0-50 employees) and medium-sized firms (51-250 employees) each accounting for 40 percent of the total observations and large firms (250+ employees) accounting for the remaining 20 percent. This data is supplemented by country-specific and bank-sector-specific variables drawn from various sources as listed below. Data limitations in the combined data set bring the total number of countries actually used to a maximum of 56 covering over 5,800 firms.

Dependent Variable

Earlier studies on credit issues utilizing the WBES (Beck, et al, 2004, Clark, et al 2006) used for the dependent variable firm reported perceptions of finance as an obstacle. We build on this work by constructing an alternative dependent variable from the survey, a dummy variable indicating whether the firm has financing from a local commercial bank.³ The two measures have advantages and disadvantages and are complimentary. The Bank Loan dummy variable has the advantage of recording actual behavior and revealed preferences. However, the perceptions variable allows respondents a richer range of responses to express their relative assessment of the financial system. For example, while a firm may choose to transact a bank loan, it may be very critical of the process and terms. While the Bank Loan dummy variable does avoid some earlier identified problems of the firm perceptions variable, it also introduces others.⁴ The awarding of a loan involves an interaction between the firm and the bank involving both supply and demand

³ Nine additional sources of financing could also be selected: internal funds/retained earnings, equity, investment funds/special development finance, foreign banks, family/friends, moneylenders, supplier credit, leasing arrangement and other.

⁴ This measure was criticized by Ergungor (2004) both for problems with its use in an ordered probit as well as for problems in how the survey was conducted. When firms responded to the survey, financing was included among a list of twelve potential obstacles which they were to rate individually on a 4-point Likert-type scale (“no obstacle” – 1; “major obstacle” – 4). However, as Ergungor points out, the question required that no more than four of the possible choices be designated as “major” obstacles. This may have biased answers if financing is in fact a major obstacle, but it was the fifth major obstacle and thus downgraded to a lower designation because of the maximum of four that could be identified as major.

factors. Many of these factors will be firm specific and unobservable and we do not expect the explanatory power of the regressions to be high.

Looking at firms across all 56 countries, there is substantial variation on a country by country basis in firm use of local commercial bank financing. The percentage of all firms receiving loans from commercial banks had a mean of 40 percent while for small firms only the mean was 34 percent. For both, the standard deviation was about 20 percentage points. In three countries none of the small firms received financing from local commercial banks (Armenia, Kyrgyzstan, Mexico). In the majority of the countries (43 of the 56) the percentage of small firms receiving financing from local commercial banks was less than the percentage of all firms receiving such financing. The mean difference in the percentages was 8.7 percentage points. Pakistan had the highest difference at 24 percentage points with over 31 percent of all firms receiving bank financing while only 7 percent of small firms received bank financing. In a minority of countries (13) the percentage of small firms receiving financing from commercial banks exceeded the overall percentage of firms receiving bank financing. However, the average difference was only 3 percentage points.

Banking Sector Measures of Competition

Concentration ratios and Herfindahl indexes have often been used to measure the level of competition in a sector. However, use of these measures alone as a proxy for competition has been highly criticized (e.g., Baumol, et al, 1982). Claessens and Laeven (2004) argue for the use of a structural contestability measure to determine the level of competition in banking and generate their own cross-country measure of contestability in the banking sector. Using a

methodology developed by Panzar and Rosse (Rosse and Panzar, 1977; Panzar and Rosse 1982, 1987) they use bank level data to measure the effect of changes in input prices on bank revenues by country. Observations of changes in input prices resulting in changes in bank revenues are interpreted to indicate greater competition in the country's banking sector. Low correlations are interpreted to indicate the exercise of market power in pricing. We use Claessens and Leaven's cross-country **contestability** measure to indicate the level of competition in the banking sector. Higher values indicate more competition. To check for non-linearities, dummy variables are created for those countries with measured levels of contestability beyond one standard deviation from the mean and interacted with the simple contestability measure. The four countries with relatively high levels of contestability are South Africa, Brazil, Honduras and Costa Rica. The six countries with relatively low levels of constestability are US, Russia, India, Pakistan, Spain and Turkey.⁵

Based both on Peterson and Rajan's postulate as well as the hypothesis offered here that market power will have a biased effect on lending toward more relationship lending, we expect the overall effect of contestability to be negative and for this effect to be amplified for small businesses.

Banking Sector Performance Measures

We include two bank performance measures in our model, interest rate margins and overhead expenditures. Interest rate spreads reflect "(i) the efficiency and market power of the banking

⁵ The position of the US at the bottom of this ranking seems somewhat counter-intuitive. Concern that the US may serve as an outlier and have a large effect on the results, we ran basic regressions using contestability excluding the US observations. The results were not appreciable affected.

sector; (ii) the risk of default on loans; (iii) liquidity, currency, and other risks (iv) underlying regulations; and (v) explicit and implicit bank taxation.”⁶ Despite the numerous factors affecting the spread, higher levels for interest rate margins have been associated in the literature with inefficiency, and indirectly, low levels of competition (e.g., Inter-American Development Bank, 2004). The effects of regulations were recognized by Beim and Calomiris (2000) who observe that restrictions on interest rates paid to depositors results in high interest rate margins and serve as one way governments repress their financial systems (e.g., Beim and Colomiris, 2000).

However, regulations may also serve to lower interest rate spreads. Usury laws have been identified as an important hindrance to banks being able to charge market interest rates (Conning and Kevane, 2003). Such regulations can also serve as a kind of financial repression by preventing interest margins from rising to levels necessary to support the greater resources for credit analysis, monitoring etc. banks need to conduct relationship lending.

Higher levels of overhead have also been associated with inefficiency in the banking sector (e.g. Inter-American Development Bank, 2004). However, the higher level of resources necessary to support relationship lending may also be associated with higher overhead expenditures.

If the higher costs of relationship lending require higher interest margins and higher overhead costs, we would expect to see a positive relationship between these variables and lending. Since small business lending is more dependent on relationship lending technologies, we expect to see this effect amplified for small businesses.

⁶ Inter-American Development Bank (2004), pp. 6.

In addition, the influence of bank sector competition on lending may be influenced by the level of interest margins and overhead expenditures. Whether more market power leads to increased relationship lending may depend on having interest rate margins and overhead expenditures to support this type of lending. We include interaction variables between contestability and these variables to check for this effect.

Interest margin is the accounting value of net interest income as a percentage of total assets.

Overhead is the accounting value of overhead costs as a share of its total assets. Both measures are taken from Beck, Demirgüç-Kunt and Levine (2000). We interact them both with a dummy variable for small businesses and with the contestability measure.

Banking Sector Measures of Regulation

We look at two measures of the intrusiveness of banking regulation to determine whether this may have an effect on bank lending and whether the effect of bank competition on lending is influenced by the level of bank regulation. **Restrict** is a measure of restrictions of the types of activities in which banks are allowed to engage and is taken from Barth, Caprio and Levine (2001) for the year 1999. **Bank Freedom** is an average of the index computed by the Heritage Foundation from 1995-1999 as reported in Beck, Demirgüç-Kunt and Maksimovic (2004). It measures the extent of government intervention in the banking sector with a higher number indicating less intervention.⁷

⁷ As reported in Beck, Demirgüç-Kunt and Maksimovic (2004), “this indicator is based on five questions: (1) Does the government own banks? (2) Can foreign banks open branches and subsidiaries? (3) Does the government influence credit allocation? (4) Are banks free to operate without government regulations such as deposit insurance? (5) Are banks free to offer all types of financial services like buying and selling real estate, securities, and insurance policies?”

Firm-Level Control Variables

Certain firm-level characteristics affect the supply of loans from banks to firms. Credit decisions are made on an individual firm basis that involves much detailed information about the firm's current and historic balance sheets, cash flows, its business plan, management, competition, etc. Information specific enough for this analysis is not available in this data set. However, we do observe some firm characteristics that are expected to affect the bank's willingness to lend. These include firm ownership (foreign or public), the industry in which it operates, and establishment age.

Firms that have government ownership are expected to face a higher supply of loans for two reasons. First, government ownership may provide an implicit guarantee for a loan lessening the default risk and making banks more likely to lend. Second, government ownership may lead to coercion of the bank by the government to supply loans. To estimate the importance of this factor we use a dummy variable, **Gov't Own**, indicating government ownership of the firm.

Longer established firms are more likely to be offered a loan as they will have a longer track record of survival and more data by which the credit officer can evaluate the firm. We include a dummy variable, **Age**, indicating whether the firm has been established for more than three years. A dummy variable for exporters, **Export**, is also included as a credit supply variable. Firms which export may be viewed as higher performing firms and less of a credit risk, increasing the supply of credit to these firms.

Firms in different industries may rely on bank financing to different degrees. Cetorelli and Gambera (2001) use industry-level data to examine the effect of bank concentration on industry growth and show that different industries are more or less dependent on banks for financing. Given industry specific variation in banking relationships we use a dummy variable, **Manuf**, indicating whether the firm is in the manufacturing sector.⁸

Turning to the demand side, certain firm characteristics are expected to affect their demand for credit from the banking sector. Government ownership may indicate that a firm has access to funding directly from the government. This would produce a sign opposite of the expected supply effect described above for **Gov't Own**. We look to the data to resolve this ambiguity. Similarly, Foreign ownership is expected to have a negative effect on the demand for loans as firms with foreign ownership may have access to funding from the parent company.⁹ We use a dummy variable, **Foreign Own**, indicating foreign ownership to test for this effect.

Country-level Control Variables

Institutional Setting

Institutions, property rights in particular, have been shown to be an important determinant of loans. The variable **PropRights** is taken from the 1999 Heritage Foundation report and ranges from 1 to 5 with a country received a 1 when it has institutions that provide relatively strong protection of property rights. We expect the empirical model to produce a negative coefficient.

⁸ Beck, Demirgüç-Kunt and Maksimovic (2004) include service as an additional sectoral variable. However, we found some inconsistency in the coding of the two separate sectoral variables in the data set. As we were unable to resolve them, we chose to stick with the simplest indicator, that of manufacturing.

⁹ In early specifications we also included additional variables that could impact demand for loans. These were reported expected growth in sales and whether family or friends were a major source of financing. The latter was expected to indicate alternative sources of financing for small firms. However, these variables did not produce significant coefficients in any of the specifications and were dropped.

Macroeconomic Environment

Past GDP growth, if it were expected, may have led firms to invest in order to meet expected increases in demand. It may also have made banks more willing to lend, both implying a positive coefficient. However, GDP growth may also indicate high demand for limited financial resources that may lead to rationing and a negative coefficient. **GDP growth** is an average of the growth in PPP GDP from the previous 5 years taken from the Penn World Tables.

High levels of inflation are associated with macroeconomic instability and may reduce both the demand and supply of credit. The inflation variable used is calculated from GDP deflator data in the Penn World Tables. Note that this series differs from standard CPI based inflation variables because it takes into account real exchange rates.¹⁰

Both the level of GDP per capita and the level of private credit have been associated with financial development. However, because of strong multicollinearity of GDP per capita with several other variables in the empirical model we tried two alternatives, the log of GDP per capita and a dummy variable for high income countries. The log of GDP per capita had inconsistent results and did not improve the overall ability to explain the variation in lending. The dummy variable produced no significant coefficients. Both were dropped from the empirical models. Increases in private credit are expected to increase the probability of a loan. **Private Credit** is taken from Beck, Demirgüç-Kunt and Levine (2000).

¹⁰ Use of CPI-based inflation data from the *International Financial Statistics* had no important effects on the empirical results.

Because we expect lending to small firms to differ, interaction variables between the country-level variables and a dummy variable indicating small firm were included in the empirical model.

Table 1 provides sample coverage and basic statistics for the different variables. Table 2a and Table 2b provide correlation coefficients for the country level data for two different sample sizes.

Empirical Model

We use a logit model to test the hypothesis that a firm will use bank financing depending on firm-specific characteristics determining its demand for loans, firm-specific characteristics that affect the supply of a loan by a bank, country-specific macroeconomic and institutional variables, and country-specific banking structure and banking regulations.

$$(1) \quad Y = \beta_1 Firm + \beta_2 Country + \beta_3 Bank$$

Where Y is a dummy variable for whether the firm has a loan; $Firm$ is a vector of firm specific characteristics; $Country$ is a vector of country-specific variables; and $Bank$ is a vector of banking sector variables. The β_i are vectors of coefficients.

4. Regression Results

To test for the importance of bank competition on lending, we first establish a set of baseline regression results across a large sample of firms and countries. We then report expanded model specifications that include banking sector variables individually as well alternative specifications of the contestability variable to check for non-linearities. The final set of regressions show

important interactions between the level of competition and the other banking sector variables. Throughout the regressions we demonstrate that the factors affecting lending to small firms differ by including interactions between various independent variables and a firm-size dummy variable. For each regression, marginal effects are calculated and reported in the tables.

Baseline Regressions

Table 3 presents the baseline regression results on two different samples of firm size. Column A shows the results from a logit regression on a sample of only small firms across 56 countries. The coefficients indicate that small firms which operate in the manufacturing sector (credit demand factor) and have been in existence for more than three years as well as export (credit supply factors) are more likely to receive bank loans. Further, small firms operating in countries with more secure property rights and with higher levels of private credit are more likely to make use of bank financing. The expected sign for GDP growth had been indeterminate. The results indicate that small firms operating in higher growth countries are less likely to use bank loan financing. While this seems at first counter-intuitive, more insight into this result can be gleaned by looking at the regressions on the full sample.

In Table 3, column B, regression results are presented on an expanded sample of firms of all sizes. To determine whether small firms may have a different experience in lending markets the regression includes interactions between country level variables and a dummy variable for small firms. The results indicate that, as in the small firm sample, firms which are exporters, which operate in the manufacturing sector and which have been established for three or more years are more likely to finance with bank loans. In addition, the results indicate that Government-owned

firms and Foreign-owned firms are less likely to finance with bank loans consistent with the demand factor interpretation of these variables that firms with government or foreign ownership have access to alternative sources of funding.

Coefficients on the country-level variables are all significant. Firms operating in countries with more secure property rights and with higher levels of private credit are more likely to use firm financing. The interaction terms with these variables indicate that these effects are amplified for small firms.

Turning to GDP growth, there is an interesting shift in signs between the specifications in columns A and B. While it is negative in the small firm sample, in the sample with all firms the coefficient is positive. However, considering the negative coefficient of the interaction term of GDP growth and the small firm dummy variable, the results are consistent with column A. This negative interaction variable indicates that while GDP growth makes it more likely that medium and large firms will use bank financing, this does not hold for small firms. While it is only conjecture, one possible explanation is that high demand for financing during high growth periods may lead to credit rationing by means other than the interest rate and that the limited financing resources available are allocated away from small firms. Another possible explanation is that smaller firms have higher cash flows in times of growth obviating the need for bank financing.

The positive coefficient on inflation is a puzzle. Regressions using an alternative inflation variable based on CPI produced a significant, negative coefficient. The primary difference

between the CPI measure and the inflation variable reported in the table, based on a PPP GDP deflator, is an adjustment for real exchange rate differences.

The results in column B form our baseline regressions. Despite some potential multicollinearity problems with property rights and private credit, the coefficients are largely stable throughout the following regressions.¹¹

Basic Regressions with Banking Sector Variables

Table 4 introduces into the baseline regression a number banking sector variables including two performance indicators, interest margin and overhead, two indicators of regulatory intervention, restrict and bank freedom, and our key variable, contestability, an indicator of the level of competition. In the first four columns, successive variables are entered individually. Interest margins, bank overhead and the restrictions on banks have coefficients that are significantly different than zero. The positive coefficient on interest margin provides evidence that higher profitability of lending lead to higher levels of bank lending. This is counter to the usual view that higher interest margins indicate lower levels of efficiency in the banking sector. The negative coefficient on overhead, however, does support the interpretation of this variable as indicating a lower level of efficiency. However, as will be seen in following models, this result is reversed when interactions with contestability are introduced.

¹¹ Beck, Demirgüç-Kunt, Maksimovic (2004) include GDP per capita as a measure of economic development. However, this variable is highly correlated with other, more specific measures of development, such as institutional development (property rights) and financial development (private credit/GDP). Regressions were run with alternative specifications of economic development, such as the log of GDP per capita and a dummy variable for OECD countries. The resulting coefficients were not consistently significant. As the variable provided no additional explanatory value, more specific measures of development were already included it was dropped from subsequent regressions.

The positive coefficient on Restrict is significant at the 90 percent level indicating that regulatory restrictions on bank activity increase the probability a firm will use bank financing. The coefficients on bank freedom and contestability are not significantly different than zero. However, the results in column F indicate a non-linear relationship between contestability and the probability of firms using bank financing. The negative coefficient for contestability is evidence in support of both the Peterson and Rajan hypothesis and our hypothesis that more market power will increase bank lending. The interaction of contestability with a dummy variable for high values of contestability (contest_hi) indicate that this effect is mitigated for high levels of contestability. However, for low levels of contestability, as indicated by contest_lo, the result is amplified.

Note that the coefficients of the firm-level and country-level control variables are mostly stable, although some variables are no longer significantly zero in columns E and F when the sample size is substantially reduced.

Regressions with Banking Sector Variables Interacted with Contestability.

Table 5 provides results from regressions that include interactions of banking sector variables with the banking structure variable, contestability. As in Table 4, all regressions indicate a non-linear relationship between contestability and the probability firms use bank financing.

Contestability and its non-linear component, contest_Hi and Contest_Lo are all measured with significance, usually at the 99 percent level. However, as shown by the interaction with the small firms dummy and with the other banking sector variables, the relationship between contestability and firm use of bank financing is complex. Because of the interaction terms, the signs of the individual coefficients may be misleading. Although column D shows a change in

sign for contestability, once the interactions are taken into account, the signs and economic significance of contestability is consistent across the different specifications.

Ignoring the non-linearities at the tails, the equation for the effect of contestability on the use of bank lending by firms is:

$$(2) \quad \frac{d\text{bankloan}}{d\text{contestability}} = \beta_1 + \beta_2 * \text{bank variable} + \beta_3 * \text{small}$$

For all firms, and in all 4 specifications of Table 5, the effect of contestability ranges from -0.72 to -0.93 when evaluated at the mean level of the bank variable used in the specification of a given column. A ½ standard deviation change of 0.05 in the value of contestability would decrease the probability that a firm would use bank financing by 3.6 to 4.7 percentage points. However, for small firms only, the overall coefficient of contestability ranges from -0.94 to -1.28. Again, a ½ standard deviation change of 0.05 in the value of contestability would decrease the probability a small firm would use bank financing by 4.7 to 6.4 percentage points. This is economically meaningful given the average across all small firms is only 34 percent. This result provides support for the Peterson and Rajan proposition that market power in the banking sector can increase bank lending to firms, particularly to small firms. It is also consistent with the our proposition that market power in the banking sector increases the amount of relationship lending to firms, and again, to small firms in particular.

Looking directly at the interaction between contestability and interest margins in column A, the positive sign indicates that the negative effect of contestability is mitigated by higher interest

margins, i.e., that while more competition reduces access to credit, the effect is not as strong when the profitability of lending is high. For all firms, the negative relationship between bank lending and contestability turns to zero when the interest margin reaches 18.5 percentage points while for small firms it must be at least 22.3 percentage points. At these points, the attractiveness of lending due to high profitability trumps any negative effect of bank competition. Similarly in column B, the positive sign on the bank overhead interaction variable indicates that higher overhead costs also mitigate the negative effect of bank competition on bank lending. The threshold level at which the relationship between bank lending and contestability becomes zero is 13.1 percent for all firms and 15.4 percent for small firms. Before discussing the implications of these interactions, consider the marginal effects of these variables separately.

While both of these variables have negative coefficients singly, combined with their interactions with contestability, both have an overall positive effect on the probability a firm will use bank financing. These positive effects of higher interest margins and higher levels of overhead, with marginal effects of about 8 percentage points for a one standard deviation change, are twice the size for small firms as for all firms. These results are consistent with the use of different, more costly lending technologies for small firm lending. When interest margins are high, the bank can afford to devote the additional resources needed to effectively conduct this type of lending. In addition, small firms benefit when banks actually use more resources as reflected in higher bank overhead.

This reasoning is also consistent with the mitigating effect these variables have on the negative effect of contestability. While contestability is generally negative for firm use of bank financing,

when interest margins are higher and overhead is higher, again, situations favorable to relationship lending, the effects of higher contestability are not as strong.

Column C shows that regulations that restrict bank activities has a negative impact on access to credit. Unlike the other banking sector variables, for this, the impact is less for small firms with a change of only 1 percentage point in the probability a firm will receive a loan with a $\frac{1}{2}$ standard deviation change in the level of restrict. While the impact is twice as high when assessed for all firms, its economic significance is lower than for the other variables.

In column D when the banking variable of interest is banking freedom, although the coefficient on contestability switches signs, when the interaction with banking freedom is included, the total effect is, again, negative. However, in this case, the effect of changes in bank freedom has opposing signs when considering all firms and small firms only. Recall that higher levels of the bank freedom measure indicate more intervention by the government. The negative coefficient for all firms indicates that more freedom raises access to credit for firms. This effect largely disappears for small firms for which the overall effect is positive. A $\frac{1}{2}$ standard deviation increase in this measure (more government intervention) raises the probability a firm will use bank financing by 3.3 percentage points. As one of the 5 questions that go into the composition of this measure is about government interventions in the allocation of credit, this result may reflect efforts by the government to direct credit toward small businesses.

Note that some firm-level and country-level control variables are no longer significantly different than zero and that the pseudo R^2 term drops by over 40%. This is likely due to the loss of

observations and countries with the use of contestability as a dependent variable.¹² Still, the signs are consistent with earlier results.

Comparison to Previous Findings

As noted earlier, Beck, Demirgüç-Kunt, Maksimovic (2004) use the same cross-country firm-level data to analyze the effect of competition in the banking sector on business lending.

However, they use concentration as their measure of competition and perceptions of finance as a hindrance to firm operations as their dependent variable in an ordered probit model. Counter to the Rajan and Peterson hypothesis, after controlling for similar firm and country factors, they find that higher levels of concentration in the banking sector decreases the probability that a firm reports financing as an obstacle to their operations. However, as pointed out by Ergungor (2004), once the interactions with institutions are taken into account, this result disappears as levels of economic and institutional development rise, with efficient credit registries and with a high share of foreign banks.

In this study, we use a different measure of competition and, rather than examine the institutions and their interactions with bank competition, we look at interactions with performance measures that indicate the level of profitability of lending and resource expenditures. The central findings provide support for Rajan and Peterson that market power increased access to credit. Similar to Beck, et al, there are variables which mitigate this effect. However, the mitigating variables are related to the type of lending associated with relationship lending. The increase in access to credit may be biased toward relationship lending and particularly advantageous for small firms.

¹² 24 countries for which the contestability measure were not available were lost to regressions in Table 5 compared to Tables 3 and 4. These included 1 of 10 OECD countries, 8 of 20 Latin American countries, 3 of 9 Southeast Asian countries and 11 of 16 transition economies of the former Soviet Union and Central and Eastern Europe.

There is one additional difference that may likely derives from the difference in dependent variable. In general, the coefficient signs should be reversed in our model compared to Beck, et al. This is not always the case. While Beck, et al, find that foreign ownership is associated with lower perceptions of finance as an obstacle, our results show that foreign owned firms are less likely to use bank financing. While the signs are not reversed, the underlying cause, is likely the same; foreign owned firms have access to external sources of financing.

5. Concluding Remarks

The results of these cross-country regressions have important implications for regulators. First, more competition reduces the use of bank financing by firms, particularly small firms. However, this effect is mitigated when banks have higher interest margins or lower overhead costs, i.e., the profitability of lending is higher.

Regulators must balance multiple objectives that may be conflicting. Policies to ensure system stability may lead regulators to limit competition. Further, regulators may choose to limit the number of banking licenses due to the increasing costs of regulatory oversight with more banks. In contrast, regulatory goals designed to expand lending may have led regulators to expand the number of banks to increase competition. The results of this paper indicate that the goal of expanding lending, particularly to small firms, may be accomplished not by increasing competition in the banking sector but rather by granting some measure of market power. In addition, higher interest margins and higher overhead, while often interpreted as inefficient, can lead to increased lending especially for small firms. Regulators should reconsider whether policies, such as usury laws, may be counterproductive, especially to the small business sector.

These results may point toward another important consideration determining the level of lending, what are the opportunity costs of bank lending for their funds? In many countries other uses of funds such as government debt or investments in the stock market compete with lending. The share of resources a bank commits to lending operations will depend on its relative profitability. Higher interest margins increase the attractiveness of lending relative to these alternatives and leads to more intermediation. However, lending may require higher overhead costs than these alternative investments which may not incur the high costs of credit analysis and monitoring. Future research should seek to specifically identify the alternative uses of bank funds and what “crowding out” effects they may have on bank lending. “Crowding out” from government borrowing has long been identified as an important influence on investment and the overall macroeconomy. More closely identifying its effect on the use of bank lending, and any differential effects it may have on small businesses would be a useful additional exercise.

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Table 1: Country Level Variables					
Variable	Number Countries	Mean	Standard Dev	min	Max
Macro/Institutional					
Property Rights	56	2.661	0.9959	1	5
Inflation	56	-0.0578	0.1763	-0.3855	0.4084
GDP growth	56	0.1836	0.1058	-0.0878	0.3980
Priv Credit	56	0.3691	0.3021	0.0355	1.172
Bank Environment					
Contestability	32	0.6672	0.1130	0.41	0.92
Concentration	52	0.55	0.2000	0.18	1
Interest Margin	56	0.0636	0.0383	0.0176	0.1841
Overhead	56	0.0547	0.0289	0.0145	0.1603
Bank Freedom	56	2.696	0.7844	1	4
Bank Activity Restrictions	38	9.211	2.256	5	14

Table 2: Correlations								
Obs = 34	Prop Rights	Inflation	GDP Growth	Private Credit	Interest Margin	Bank Overhead	Bank Freedom	Contest-Ability
Prop Rights	1.0000							
Inflation	-0.0035	1.0000						
GDP growth	-0.0070	-0.0031	1.0000					
Private Credit	-0.5631	-0.1006	0.0696	1.0000				
InterestMargin	0.3185	0.1587	-0.3722	-0.6005	1.0000			
Bank Overhead	0.3468	-0.0407	-0.4495	-0.6058	0.7184	1.0000		
Bank Freedom	0.3769	-0.1939	0.1844	-0.2786	0.1160	0.0989	1.0000	
Contestability	0.1131	0.2189	0.0453	-0.0213	0.0783	0.1407	0.0750	1.0000
Concentration	0.4115	0.1489	-0.0220	-0.3470	0.2453	0.3101	0.2200	0.2931

Table 3: Logit Regression Results, Marginal Effects: Benchmark (no bank sector interactions)		
Dependent Variable: Bank Loan	Small Firm Sample Obs = 2475 Ctry = 56	Full Sample Obs = 5872 Ctry = 56
	A	B
Age	0.0782***	0.1141***
Export	0.1045***	0.0882***
Manuf	0.0397*	0.0482***
Foreign Own	-0.0365	-0.0774***
Gov't Own	0.0168	-0.1252***
Prop Rights	-0.1000***	-0.0623***
Inflation	0.0842	0.1579***
GDP growth	-0.3873***	0.2286***
Private Credit	0.1339***	0.0913***
PropR*Small		-0.0335***
GDPgr * Small		-0.6097***
PrivCred*Small		0.1228***
pseudo R ²	0.103	0.088

Table 4: Logit Regression Results, Marginal Effects – Individual Banking Sector Variables with no contestability interactions

Dependent Variable Bank Loan						
	Full Sample Obs = 5872 Ctry = 56	Full Sample Obs = 5872 Ctry = 56	Full Sample Obs = 4208 Ctry = 38	Full Sample Obs = 5364 Ctry = 52	Full Sample Obs = 3226 Ctry = 32	Full Sample Obs = 3226 Ctry = 32
	A	B	C	D	E	F
Age	0.1140***	0.1131***	0.1118***	0.1141***	0.1085***	0.0924***
Export	0.0909***	0.0849***	0.1017***	0.0883***	0.0878***	0.0812***
Manuf	0.0481***	0.0474***	0.0580***	0.0482***	0.0224	0.0275
Foreign Own	-0.0777***	-0.0779***	-0.0902***	-0.0772***	-0.0714***	-0.0776***
Gov't Own	-0.1236***	-0.1265***	-0.1070***	-0.1252***	-0.1270***	-0.1301***
Prop Rights	-0.0632***	-0.0599***	-0.0609***	-0.0607***	-0.0335**	-0.0425***
Inflation	0.1594***	0.1480***	0.1552***	0.1581***	0.0869	0.0581
GDP growth	0.2758***	0.1391***	0.1536*	0.2318***	0.3640***	0.4742***
Private Credit	0.1340***	0.0419	0.1054***	0.0929***	0.0813*	-0.0048
PropR*Small	-0.0316***	-0.0361***	-0.0214**	-0.0334***	-0.0254**	-0.0200
GDPgr * Small	-0.6230***	-0.5920***	-0.5520***	-0.6120***	-0.3065*	-0.4253**
PrivCred*Small	0.1220***	0.1228**	0.0972***	0.1228***	-0.0156	0.0223
Interest Margin	0.5661***					
Bank Overhead		-0.8492***				
Restrict			0.0077*			
Bank Freedom				-0.0033		
Contestability					-0.1006	-0.8960***
Contest_HI						0.1998***
Contest_LO						-0.3789***
pseudo R ²	0.089	0.089	0.057	0.088	0.0428	0.0506

Table 5: Logit Regression Results with Bank Contestability <i>with interactions</i>				
Dependent Variable Bank Loan				
	Full Sample Obs = 3226 Ctry = 32	Full Sample Obs = 3226 Ctry = 32	Full Sample Obs = 2819 Ctry = 26	Full Sample Obs = 3226 Ctry = 32
	A	B	C	D
Age	0.0845***	0.0825***	0.0857***	0.0812***
Export	0.0851***	0.0857***	0.0863***	0.0772***
Manuf	0.0249	0.0237	0.0223	0.0235
Foreign Own	-0.0822***	-0.0847***	-0.0707***	-0.0877***
Gov't Own	-0.1208***	-0.1168***	-0.0980***	-0.1322***
Prop Rights	-0.0508***	-0.0458***	-0.0877***	-0.0488***
Inflation	-0.0049	0.0214	0.1064	0.1273*
GDP growth	0.5961***	0.6668***	0.6523***	0.4326***
Private Credit	0.0085	0.0684	-0.0924	-0.0601
PropR*Small	-0.0153	-0.0181	0.0210	-0.0648**
GDP gr * Small	-0.2753	-0.2160	-0.4123 *	-0.6662***
Priv Cred*Small	0.1170	0.0802	0.0969	0.0356
Contestability	-1.1121***	-1.2396***	-1.8443***	0.6890*
Contest_Hi	0.1197**	0.1744***	0.3251***	0.2741***
Contest_Lo	-0.3447***	-0.3356***	-0.3378***	-0.3686***
Contest*Small	-0.2310*	-0.2154	-0.2757*	-0.3493***
Interest Margin	-3.3943***			
Marg*Small	1.2147**			
IntMargin*Contest	6.0136***			
Bank Overhead		-4.6502*		
Over*Small		1.6149		
BankOvr*Contest		9.4648**		
Restrict			-0.0849**	
Restrict*Small			0.0082	
Restrict*Contest			0.0987*	
Bank Freedom				0.3418***
Bfree*Small				0.1438***
BFree*Contest				-0.6010***
pseudo R ²	0.055	0.055	0.056	0.060