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How Bank Competition Affects Firms' Access to Finance

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Abstract

Combining multi-year, firm-level surveys with country-level panel data for 53 countries, the authors explore the impact of bank competition on firms' access to finance. They find that low competition, as measured by high values of the Lerner index, diminishes firms' access to finance, while commonly-used bank concentration measures are not robust predictors of firms' access to finance. In addition, they find that the impact of competition on access to finance depends on the environment that banks operate in. Some features of the environment, such as greater financial development and better credit information, can mitigate the damaging impact of low competition. But other characteristics, such as high government bank ownership, can exacerbate the negative effect.

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# 1.	Introduction

The impact of bank competition on financial markets and firms is an important topic for policymakers and researchers alike.[1] Interest on this subject intensified during the recent global financial crisis, as many questioned whether high competition was partly to blame.[2] At the same time, the downfall of some institutions as a result of the crisis and the emergency measures taken by some governments to deal with this episode - such as mergers, bailouts, recapitalizations, and extension of guarantees- have led to concerns about the future of bank competition and its potential implication for access to bank finance.[3]

How bank competition affects firms' access to finance is in itself a much debated question in the economic literature and in policy circles and, as we discuss below, the theoretical predictions and the empirical evidence on this subject are mixed. Combining multi-year firm-level surveys with panel country-level data on bank competition for 53 countries, this paper offers new evidence on the link between competition and firms' access to finance. In particular, our paper evaluates whether competition improves access to finance and analyzes the extent to which different features of the environment in which banks operate affect the link between competition and access.

Theory provides ambiguous predictions regarding the impact of competition on access to finance. The conventional *market power hypothesis* argues that competition in the banking system reduces the cost of finance and increases the availability of credit. On the other hand, the *information hypothesis* argues that, in the presence of information asymmetries and agency costs, competition can reduce access by making it more difficult for banks to internalize the benefits of investing in building lending relationships, in particular, with opaque clients (Petersen and Rajan, 1995; Marquez, 2002; Hausewald and Marquez, 2006).

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[1] *The Economist* magazine hosted a virtual debate on this topic on June 1st, 2011. See http://www.economist.com/debate/days/view/706

[2] For example, Dell'Ariccia, Igan, and Laeven (2008) document that the rapid growth of credit in U.S. mortgage markets in the run up to the crisis was accompanied by a reduction in lending standards (lower loan application denial rates), which they argue was in part explained by the entry of new and large lending institutions.

[3] See OECD (2009, 2010).

Most of the existing empirical studies on the link between competition and access to finance use concentration measures as proxies for competition and yield mixed results. Using data from the US, Petersen and Rajan (1994, 1995) find that SMEs are more likely to obtain financing when credit markets are concentrated.[4] Similarly, using a survey dataset of German manufacturing firms, Fischer (2000) finds that more concentration leads to more information acquisition and greater credit availability. On the other hand, using enterprise survey data for 74 countries, Beck, Demirguc-Kunt, and Maksimovic (2004) find that in more concentrated banking sectors firms of all sizes face higher financing obstacles and the impact of concentration decreases with firm size. Chong, Lu, and Ongena (2012) also find a positive association between concentration and credit constraints, using a survey on the financing of Chinese SMEs combined with detailed bank branch information.[5]

In contrast to previous studies that equate high concentration with lack of competition, recent papers that use direct measures of banks' pricing behavior provide less ambiguous findings on the link between competition and access to finance. Using the Panzar and Rosse H-statistic (1982,1987), which captures the elasticity of bank revenues to input prices, Claessens and Laeven (2005) find that competition is positively associated with countries' industrial growth in a sample of 16 countries over the period 1980-1990.[6] The authors argue that this suggests that more competitive banking sectors are better at providing financing to financially dependent firms. Exploiting a very rich dataset on Spanish SMEs and using the Lerner (1934) index – the difference between banks' prices and marginal costs relative to prices - as a measure of competition, Carbó-Valverde, Rodriguez Fernandez, and Udell (2009) also find evidence that competition promotes access to finance.[7] At the same time, the authors find that their results for

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[4] A related literature for the US has examined the impact of bank deregulation on access to finance. Zarutskie (2006) finds that deregulation in the US, which increased the competitiveness of US banking markets, caused newly formed firms to use significantly less external debt, consistent with the notion that competition exacerbates credit constrains. Rice and Strahan (2010) exploit the geographical variation in branching restrictions across US states and find that in states more open to branching, small firms are more likely to borrow and do so at lower rates. However, the authors find that there no effects on the amount that small firms can borrow.

[5] Relatedly, there are studies on the impact of bank mergers on SME lending that find that these firms can be hurt by mergers (see Peek and Rosengren, 1996; Berger et al., 1998; Sapienza, 2002; Bonaccorsi di Patti and Gobbi, 2007; and Degryse, Masschelein and Mitchell, 2010 among others). Erel (2011) shows that while, in general, bank mergers can benefit borrowers through lower interest rates, if the geographical overlap between merging banks is so extensive as to significantly increase concentration in banking markets, then spreads increase after mergers.

[6] Higher values of the H-statistic are associated with more competitive banking systems.

[7] Higher values of the Lerner index denote higher markups and lower levels of bank competition.

the Lerner index are not consistent with results using concentration measures as proxies for competition. They conclude that concentration is not a good measure of competition.

As described above, existing studies on the link between competition and financial access either analyze cross-sectional data or are only able to look at multi-year data for a single country. In contrast, our paper combines multi-year firm-level data with panel country-level data on bank competition. One advantage of our dataset is that it contains repeated cross-sections of firms for the countries in our sample. This allows us to control for unobserved differences between countries, using country fixed effects in our estimations. Such unobserved differences may be correlated with both access to finance and the extent of competition. Thus, our methodology isolates within country variation in competition and access. This is an improvement over previous cross-country studies, such as Beck, Demirguc-Kunt, and Maksimovic (2004). Furthermore, in contrast to US and cross-country studies that measure competition with concentration indicators, we also present results using the Lerner index, a direct measure of bank pricing behavior. Several studies have argued theoretically and empirically that pricing behavior measures such as the Lerner index are superior to concentration measures as indicators of competition.[8] Concentration is a measure of market structure, while competition is a measure of market conduct. There can be competition in concentrated markets, if there is a credible threat of entry and exit (i.e., if markets are contestable). A contribution of our paper is the ability to distinguish the impact of concentration and competition in a multi-country setting. Also, the fact that we offer cross-country evidence using the Lerner index allows for more general results relative to those that focus on individual countries.

We find that low competition, as proxied by high levels of the Lerner index, is associated with diminished access to finance by firms, while concentration has a less robust relationship with access. We use different weighting schemes to account for differences in the number of firms across countries and the variance of the estimated Lerner index. Overall, our results support the market power hypothesis. Furthermore, our results confirm that concentration measures are not reliable predictors of firms' access to finance, which is in line with previous contradictory evidence.

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[8] See among others Cetorelli (1999), Claessens and Laeven (2004), Demirguc-Kunt et al. (2004), and Carbo-Verde et al. (20009).

In addition, we explore whether the characteristics of the environment in which banks operate affect the impact of competition on access to finance.[9] To do that, we interact our measures of competition with country-level measures of financial development, the availability of credit information, and government bank ownership. We find that countries with higher levels of financial development and better information availability experience a less pronounced decline in access to finance as a result of low levels of competition (high values of the Lerner index). The flip side of this finding is that low competition is more detrimental for firms operating in countries with low levels of financial development or lacking credit information. In addition, we find that significant government bank ownership exacerbates the damaging impact of low bank competition.

The rest of the paper is organized as follows. Section 2 introduces our multiple datasets and presents summary statistics. Section 3 outlines our regression model. Section 4 presents our baseline results. Section 5 discusses the results interacting the competition measures with different aspects of the environment in which banks operate. Section 6 concludes. Appendices A1 and A2 contain detailed descriptions of the construction of the firm-level measure of access to finance and the estimation method for the Lerner index, respectively.

2.   Data

We combine firm-, bank- and country-level data from various sources. Table 1, Panel A gives a list of all the variables used in the paper and details their sources. The firm-level data come from World Bank Enterprise Surveys.[10] The data are collected in several waves and contain repeated cross-sections for the countries in our sample. Because our goal is to isolate within country variation in competition across time, we only focus on countries that have survey data for at least two years.

We use firm survey data to construct our measure of access to finance and several control variables. A*ccess to finance* is an indicator variable that equals one when a firm has a loan, overdraft, or line of credit, and zero otherwise. We prefer to use this objective measure of access

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[9] Beck et al. (2004) analyze how different aspects of the institutional and regulatory environment, as well as the ownership structure of the banking system, affect the impact of bank concentration on firms' perceptions of financing obstacles.

[10] The data are available at www.enterprisesurveys.org

to credit, rather than subjective measures of financing obstacles, because the former is more comparable across countries and it does not depend on cultural biases that might influence individuals' perceptions; plus it is more reliable and easier to interpret. Appendix A1 gives a detailed description of the process used to construct our measure of access to finance.

We also include several firm-level variables that may influence the extent of firms' access to finance, such as firm size, measured as log of the number of employees, a dummy for manufacturing industry (the omitted category is service and other industries), a dummy for exporting firms, a dummy for foreign-owned firms, a dummy for government-owned firms, and the log of firm age in years.

The bank-level data come from Bankscope, a commercial database by Bureau Van Dijk including annual balance sheet and income statement information for banks across the world. Only banks classified as commercial, cooperative, Islamic, savings, and bank holding companies are considered in the analysis. We leave out central banks and investment banks, because they are not directly involved in providing loans to firms.

We use bank-level data to construct the *Lerner index*, a direct measure of pricing behavior by banks, which captures the markup in prices – i.e., the difference between prices and marginal costs, measured as a ratio of prices. Higher values of the index indicate higher markups or lower levels of competition.[11] We start with annual bank-level data and estimate a translog cost function using all available data for each country. We then calculate the marginal cost equation (by taking the derivative of the translog cost equation) and finally the Lerner index for each bank, which we then average for each country and year. Appendix A2 describes in detail the process we use to calculate the Lerner index.

We also use bank-level data to construct two commonly used measures of concentration: *Concentration 3* is the share of banking system assets held by the three largest banks and

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[11] There is an extensive literature measuring bank competition using the Lerner index. See Fernandez de Guevara et al. (2005, 2007), Berger, Klapper and Turk-Ariss (2009), Carbó et al. (2009), Turk-Ariss (2009), Anzoategui, Martinez-Pería and Rocha (2010), Beck, de Jonghe, and Schepens (2011), Anzoategui, Martinez-Pería and Melecky (2012), and Delis (2012), among others.

Herfindahl index is the sum of the squared market share of each bank.[12] In both cases, higher values indicate more concentration.

Our final dataset is limited to countries which have both firm-level data on access to finance from the Enterprise Surveys and bank-level data from Bankscope to calculate the Lerner index and the concentration measures. This dataset contains information on 53 countries for the period 2002-2010.[13] Table A1 gives a list of the countries and years included in the final dataset. Some countries have had only two surveys in our time frame, while others have had three or more, with a maximum of five surveys for Bulgaria. The coverage of firms varies by country. For example, India has more than 4,000 firms covered in two surveys, while Malawi has fewer than 300 firms covered in two surveys. Because of this variation, we test the robustness of our results to weighting our regressions by the inverse of the square root of the number of firms in the survey, so that each country carries the same importance in our estimations. Our bank-level sample contains data on 3,409 banks and over 16,000 bank-year observations. Table A2 gives a list of countries in our sample along with the value of the Lerner index for each country over time.[14]

Finally, we supplement our dataset with annual country-level data from several sources. We obtain data on private credit to GDP and inflation from the World Bank *World Development Indicators* database. Data on the quality of credit information come from the World Bank *Doing Business* dataset[15] and information on the share of assets held by government-owned banks comes from the World Bank Survey of Bank Regulation and Supervision.[16]

Table 1, Panel B reports basic summary statistics for the firm survey variables and country-level variables. More than half of the firms in our sample have access to finance; in other words, they use at least one of three credit products such as loans, lines of credit, or

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[12] The Herfindahl index, calculated as $\sum_{i=1}^{n} \left[\frac{assets_i}{total\ assets} \right]^2$, gives a greater weight to larger banks.

[13] At the firm-level, we have over 68,000 observations.

[14] Because we use one year lagged values of the Lerner index in our regression, we report bank data for years 2001-2009.

[15] Data available at www.doingbusiness.org

[16] Data available at http://go.worldbank.org/SNUSW978P0

overdrafts.[17] The average size of our firms is about 100 employees, and it varies from one to over 1,700, with the median firm size of 25 employees. Thus, most of the firms in our sample are small and medium-sized enterprises. The median firm age is 12 years, while the average is almost 18. Firm age varies from one year old startups to close to 200 years old firms. In our sample, 62 percent of firms are in manufacturing (the rest are in services, retail or construction), 23 percent are exporters (classified as such if they export at least 10 percent of their total output), about 10 percent are foreign-owned, and about 5 percent of firms are considered government owned.

The Lerner index has an average of 0.25, a median of 0.23 and a standard deviation of about 0.07. The range is between 0.07, which indicates very low markups and, hence, high competition and 0.43, which implies very high markups and, therefore, low competition. Average concentration is high, with the top three banks comprising close to 60 percent of total bank assets. The lowest share of assets held by the top three banks is about 28 percent, while the highest is over 98 percent. The Herfindahl index varies between 0.05 and 0.74.

3.   Regression Model

Our goal is to evaluate the impact of bank competition on firms' access to finance. To do that, we estimate the following simple model:

$$Access_{ict} = a_c + b_1\, Competition_{ct} + b_2 F_{ict} + b_3 X_{ct} + e_{ict} \qquad (1)$$

where *Access* is the indicator variable for whether firm i in country c at time t has a bank loan, line of credit, or overdraft; *Competition* refers to either the Lerner index or to two measures of concentration: the share of assets held by the top three banks and the Herfindahl index. F and X represent firm-level (e.g., size, manufacturing, exporter, etc.) and country-level (e.g., inflation and financial development as proxied by private credit to GDP) control variables, respectively, described in the data section. We capture unobservable differences between countries by including country fixed effects (represented in equation 1 by a_c) and we cluster errors at the

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[17] While in principle it would be interesting to distinguish between firms that have access to each of these types of products, unfortunately, the design of the Enterprise Surveys does not allow for this possibility.

country-year level.[18] Thus, our estimates represent within country variation in the relationship between competition and access to finance. We assume that country-level measures of competition are exogenous to the firm-level measure of access to finance. In other words, each individual firm is small enough to affect country-level measures of bank competition. However, to further mitigate any possible reverse causality concerns, we use one year lagged values for competition, as well as for the other country-level control variables.

We use several weighting schemes in our estimations. First, because the Lerner index is an estimated variable, we weight our regression by the inverse of its standard deviation. This takes into account the precision with which the Lerner index is estimated and gives less weight to those observations that are estimated with less precision (i.e., that have larger standard errors). Second, because the number of firms varies for different surveys, we weight our regressions by the inverse of the square root of the number of observations (i.e., firms) in each country-year. This gives relatively less weight to countries with a large number of observations, which otherwise will be overrepresented in the sample. Third, we combine the two weighting factors in a product form (i.e., the weight equals the product of the inverse of the Lerner's standard deviation and the inverse of the square root of the number of firms in the country and year). Finally, we also report regressions without any weights for comparison.

4.   Baseline Results

Table 2 reports our baseline results for the estimation of equation (1). The estimations shown in column (b) are weighted by the inverse of the standard deviation of the Lerner index, while other regressions are not weighted. We observe that the Lerner index is significant in all specifications, while the measures of concentration (Concentration 3 and Herfindahl index) are not significant. This establishes our first main result that low competition (i.e., a high value of the Lerner index) is associated with lower access to finance, while the link between concentration and access to finance is not significant. Weighting regressions by the inverse of the standard deviation for the Lerner index does not materially alter our results (compare column (b) to column (a) in Table 2).

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[18] Because of the inclusion of country fixed effects and to avoid an incidental parameters problem, we report our results using a linear probability model, however, our results are robust to using a fixed effects logit model.

Since we estimate the regressions using a linear probability model, we can interpret the coefficient on the Lerner index as an increase in the probability of access to finance. In our sample, one standard deviation of the Lerner index is about 0.07. Using the estimated coefficient of about 0.75 (from model (b) in Table 2, which corrects for the variance of the Lerner index by appropriate weighting), we obtain that a one standard deviation change in the Lerner index results in an approximately 5 percentage points change in the probability of having access to finance. In our sample, the average access to finance dummy equals one for about 60 percent of all firms, with a standard deviation of about 49 percent. A 5 percentage points change is modest for an average country, but it is more economically important for a country with low access to start with.

Most of the control variables have the predicted signs. Larger and older firms are more likely to have access to finance. Manufacturing firms are more likely than service and retail enterprises to have access to finance, because they have more collateral which helps them obtain financing. Exporters also are more likely to have access to bank finance, however, foreign-owned firms are less likely. This might be because foreign firms can obtain financing from their parent company and, thus do not need to borrow from local banks. At the same time, government-owned firms appear less likely to have access to bank finance, which is a little surprising. We find that private credit, which is our measure of financial development, is associated with a higher likelihood of access to finance. The inflation rate has a negative association with our measure of access to finance, which is not surprising. Note that because of the country fixed effects, these variables capture the impact of the variation in inflation and private credit from the long-run country average.

In Table 3 we present our robustness checks with regressions weighted by the inverse of the square root of the number of firms in the country-year survey. Because there is a large variation in the number of firms in each survey and our variables of interest are measured at the country-year level, the regressions reported so far give more weight to surveys with a larger number of firms, which will have a disproportional impact on the estimated coefficients. We find that weighting by the inverse of the number of firms has no impact on the significance of the Lerner index. We continue to find that low competition has a negative impact on firms' access to finance.

## 5.	Interaction Results

The damaging impact of low levels of competition on access could be either mitigated or exacerbated by certain features of the environment in which banks operate. Here we investigate three such factors. First, we consider the extent of financial development in a country, measured by the ratio of private credit to GDP. This measure implicitly captures the institutional factors that determine the level of financial development, such as property rights protection or contract enforcement, as well as the actual use of finance by the private sector. We investigate whether the impact of competition varies depending on countries' levels of financial development.

Our hypothesis is that financial development will mitigate the damaging impact of lack of competition. As we discussed above, the *market power hypothesis* argues that competition in the banking market reduces the cost of finance and increases the availability of credit. Financial development is commonly associated with reduced cost of finance and wider availability of finance (see King and Levine, 1993 and Love, 2003). Therefore, in an environment with relatively low cost of finance, the marginal negative impact of low competition on costs is likely to be less damaging than in an environment where the costs are high to start with. Similarly, in an environment with wider availability of finance, the reduction in credit availability that is due to lack of competition is likely to be less damaging than in an environment with more scarcely available finance. Therefore, we anticipate that financial development will lessen the damaging impact of low competition on access.

Our second variable of interest is credit information. Availability of credit information is directly linked to the impact of competition through the information hypothesis discussed in the introduction. The hypothesis states that in the presence of information asymmetries and agency costs, competition can reduce access to finance by making it more difficult for banks to internalize the benefits of investing in building lending relationships, in particular, with opaque clients (Petersen and Rajan, 1995; Marquez, 2002). Therefore, with improvement in the availability of information through public or private credit registries, the information asymmetries are reduced and, thus, the impact of low competition on access to finance through its impact on information production is likely to be reduced.

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Finally, we consider how the extent of government bank ownership affects the link between competition and access. Often government-owned banks have a mandate to promote financial access, so in theory we would expect them to alleviate financing constraints. However, the empirical evidence suggests that government ownership is commonly associated with low bank efficiency and ineffective allocation of resources, including political lending (see La Porta et al., 2002; Iannotta, Nocera and Sironi, 2007; Micco, Panizza, and Yañez, 2007; Berger, Hasan, and Zhou, 2009; and Farazi, Feyen and Rocha, 2011, among others). In competitive environments the inefficiencies of government ownership could be mitigated by the pressure from competitors to government-owned banks. On the flip side, in countries with high government bank ownership lack of competition can be especially damaging as the checks and balances introduced by market mechanisms may be weak or absent. Thus, we expect that high government bank ownership will exacerbate the negative impact of low competition on access.

To investigate whether the impact of competition measures on access to finance varies as a function of country-level characteristics such as financial development, credit information, and government bank ownership, we interact each of these country-level variables with our measure of competition, while simultaneously adding the same country-levels variable by themselves in the regression. The three measures and their sources are described in Table 1A.

Table 4 reports our results for the interaction of financial development and competition. We observe a negative sign on the Lerner, as before, and a positive interaction with the measure of financial development. For both concentration measures we observe similar patterns – negative for concentration and positive for the interaction term.

The magnitude of the coefficients in model (a) implies that for a country with an average level of financial development in our sample (which equals to 0.4), the marginal impact of the Lerner index is about 0.6; for a country with low financial development (such as one standard deviation below the average), the marginal impact is twice as large and the magnitude is about 1.2; while for a country with a high level of financial development (such as one standard deviation above the average) the marginal impact of the Lerner index is about zero. Translating these effects into changes in the probability of access to finance, we find that a one standard deviation increase in the Lerner results in a drop of almost 8 percentage points in the likelihood

of access to finance, when financial development is low. The same change in the Lerner leads to a 4 percentage points decline in the probability of access to finance for firms in a country with an average level of financial development, and no change in the likelihood of access to finance for those firms in a country with high levels of financial development.

Table 5 presents the interactions with the country-level credit information index.[19] Once again, we observe that the Lerner index is negative and highly significant, while the interaction with credit information is positive and highly significant. The results for the Herfindahl index are similar, while in the case of the share of assets held by the top 3 banks neither the measure by itself nor the interaction are significant.

The credit information index varies from zero to six, with an average of about 3 and a standard deviation of 2. Using coefficients estimated in model (a), our results suggest that for a country with average credit information, the Lerner has a negative impact of 0.85, while for a country with low credit information (one standard deviation below the average), the impact more than doubles to 1.96. On the other hand, for countries with a high level of credit information (one standard deviation above the average), the impact is close to 0.27. Translating these into a probability of access to finance, we find that in a country with low credit information availability, a one standard deviation increase in the Lerner index results in about a 13 percentage point decrease in the probability of using a financial product such as a loan, line of credit or an overdraft. However, in a country with high credit information availability there is practically no impact. Thus, better credit information significantly mitigates the negative impact of low competition or high concentration.

Finally, in Table 6 we show interactions with the country average share of government bank ownership. Here, we observe that the interactions are negative and significant, suggesting that higher government bank ownership is associated with a more damaging impact of low competition and high concentration. The Lerner index by itself is not significant, which suggests that when government ownership of banks in the country is zero, the impact of competition or

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[19] Because credit information index has very low variability from year to year in our sample and is not available for earlier years in our sample, we use country average credit information in our interaction term. The average itself is than subsumed into the country fixed effects and does not enter on its own.

concentration on access to finance is also zero. However, in countries with high government ownership, the negative impact is significant.

The average government ownership in our sample is 0.25 with a standard deviation of 0.23. These numbers suggest that in a country with average government ownership the impact of Lerner is 0.79, while in a country that is one standard deviation above the average the impact is about twice as large, at 1.5. This translates into a decline in the probability of access to finance of about 10 percentage points as a result of a one standard deviation increase in the Lerner index in a country with high government bank ownership. The same impact is only 5 percent in a country with average government bank ownership and close to zero in a country without any government bank ownership.

To summarize, we find that the impact of competition and concentration depends on the environment in which banks operate. This may explain the contradictory results observed in the previous literature, as in some countries the negative impact of low levels of competition may be mitigated by some positive factors such as availability of credit information or the overall level of financial development, while in other countries the impact may be exacerbated by factors such as high government bank ownership.

6.   Conclusions

The theory on the impact of bank competition on access to finance offers conflicting predictions and the empirical literature provides mixed results and suffers from a number of limitations. Combining multi-year firm-level data on access to finance with panel country-level data on bank competition, this paper offers new evidence on the link between competition and access to finance. One advantage of our dataset is that it allows us to control for unobserved differences between countries, using country fixed effects. Thus, we are able to isolate within country variation in competition and access to finance. Also, contrary to other studies that equate concentration with competition, we conduct estimations using direct measures of banks' pricing behavior.

Our results indicate that higher bank competition, as measured by lower levels of the Lerner index, increases firms' access to finance, while commonly used concentration measures

are not reliable or robust predictors of financial access. In addition, we find that the impact of competition on access to finance depends on the environment in which banks operate and some features of the environment, such as higher levels of financial development and better credit information, can mitigate the damaging impact of low competition, while other characteristics, such as high government bank ownership, can exacerbate the negative impact.

Overall, our results suggest that there are benefits to promoting bank competition. We leave for future research an analysis of the specific policies (e.g., adopting low barriers to bank entry and exit, fostering competitive pressures from non-bank competitors, facilitating access to credit information, implementing measures to ensure consumer protection, etc.) that regulators can implement to increase competition in the banking sector.

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Table 1. Panel A: Variable Description and Data Sources

Variable	Description and Data Source
Firm-Level Variables	
Access to finance	Dummy variable equal to 1 if the firm has access to bank finance (loan, overdraft or line of credit) from World Bank Enterprise Surveys.
Firm size (employees)	Number of permanent full-time employees from World Bank Enterprise Surveys.
Manufacturing	Dummy variable equal to 1 if the firm is in the manufacturing sector from World Bank Enterprise Surveys.
Exporter	Dummy variable equal to 1 if 10% or more of sales are exported directly or indirectly by the firm from World Bank Enterprise Surveys.
Foreign-owned	Dummy variable equal to 1 if 50% or more of the firm is owned by foreign organizations from World Bank Enterprise Surveys.
Government-owned	Dummy variable equal to 1 if 10% or more of the firm is owned by the government from World Bank Enterprise Surveys.
Firm age	Age of the firm in years from World Bank Enterprise Surveys.
Country-Level Variables	
Lerner index	Lerner index constructed using variables from Bankscope (see Appendix 2).
Concentration 3	Fraction of total assets held by top 3 banks from Bankscope.
Herfindahl index	Herfindahl index calculated as the sum over all banks in the country of the squared market share (in terms of assets) of each bank from Bankscope.
Inflation rate	Inflation calculated as the annual change in the GDP deflator from the World Development Indicators (WDI) World Bank.
Financial development	Domestic credit to the private sector (fraction of GDP) from WDI.
Credit information index	Depth of credit information index is a measure of the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau, both by law, and in practice. (0-6) obtained from Doing Business Indicators.
Share of government-owned banks	Fraction of banking system's assets in banks that are 50% or more government-owned from the World Bank Regulation and Supervision Survey.

Table 1. Panel B: Summary Statistics

Variable	Obs	Mean	Median	Standard Deviation	Min	Max
Firm-Level Variables						
Access to finance	68353	0.602	1	0.489	0	1
Firm size (employees)	68353	100.622	25	207.429	1	1755
Manufacturing	68353	0.623	1	0.485	0	1
Exporter	68353	0.235	0	0.424	0	1
Foreign-owned	68353	0.095	0	0.293	0	1
Government-owned	68353	0.049	0	0.217	0	1
Firm age	68353	17.729	12	16.983	1	193
Country-Level Variables						
Lerner index	68353	0.251	0.235	0.067	0.066	0.437
Concentration 3	67720	0.589	0.567	0.172	0.279	0.985
Herfindahl index	68353	0.188	0.142	0.132	0.050	0.714
Inflation rate	68353	0.086	0.062	0.088	-0.074	0.795
Financial development	68353	0.403	0.295	0.300	0.019	1.571
Credit information index	38240	3.438	4	2.008	0	6
Share of government-owned banks	61693	0.250	.17	0.232	0	.752

Table 2: Baseline Regressions

The regressions below are estimated using country fixed effects and robust standard errors clustered at the country-year level. The dependent variable *Access to finance* is a dummy variable that indicates whether the firm has access to a loan, overdraft, or a line of credit. The *Lerner index* is a measure of competition (higher values imply lower levels of competition). The *Herfindahl index (HI)* and *Concentration 3* are measures of concentration. *Log firm size* is the logarithm of the firm's number of permanent employees. *Log firm age* is the logarithm of the firm's age in years. *Government-owned* and *Foreign-owned* are dummy variables that equal one if the firm has government or foreign ownership, respectively. *Exporter* is a dummy variable that indicates if the firm is an exporting firm. *Manufacturing* is a dummy variable that takes value 1 if the firm is in the manufacturing industry. *Financial development is* measured as domestic credit to the private sector as a fraction of GDP. The *inflation rate* is measured as the growth rate of the GDP deflator (annual). Results in column (b) are weighted by the inverse of the standard deviation of the Lerner Index. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Variables	Access to finance			
	(a)	(b)	(c)	(d)
Lerner index	-0.615**	-0.749**		
	[0.269]	[0.335]		
Concentration 3			-0.129	
			[0.142]	
Herfindahl index				-0.033
				[0.148]
Log firm size	0.086***	0.088***	0.087***	0.087***
	[0.004]	[0.004]	[0.004]	[0.004]
Manufacturing	0.028**	0.028**	0.031***	0.032***
	[0.011]	[0.011]	[0.011]	[0.011]
Exporter	0.032***	0.028***	0.032***	0.031***
	[0.008]	[0.010]	[0.008]	[0.008]
Foreign-owned	-0.080***	-0.092***	-0.083***	-0.081***
	[0.011]	[0.012]	[0.011]	[0.011]
Government-owned	-0.136***	-0.164***	-0.137***	-0.141***
	[0.031]	[0.035]	[0.031]	[0.032]
Log firm age	0.013***	0.016***	0.013***	0.012***
	[0.004]	[0.004]	[0.004]	[0.004]
Financial development	0.315***	0.331***	0.219**	0.273***
	[0.090]	[0.061]	[0.105]	[0.087]
Inflation rate	-0.357**	-0.450***	-0.347**	-0.359**
	[0.138]	[0.158]	[0.136]	[0.140]
Constant	0.486***	0.538***	0.525**	0.324**
	[0.153]	[0.162]	[0.202]	[0.148]
Observations	68,353	68,353	67,270	68,353
R-squared	0.211	0.187	0.213	0.209

Table 3: Regressions Correcting for Differences in the Number of Firms Across Countries

The regressions below are estimated using country fixed effects and robust standard errors clustered at the country-year level. The dependent variable *Access to finance* is a dummy variable that indicates whether the firm has access to a loan, overdraft, or a line of credit. The *Lerner index* is a measure of competition (higher values imply lower levels of competition). The *Herfindahl index (HI)* and *Concentration 3* are measures of concentration. *Log firm size* is the logarithm of the number of permanent employees. *Log firm age* is the logarithm of the firm's age in years. *Government-owned* and *Foreign-owned* are dummy variables that equal one if the firm has government or foreign ownership, respectively. *Exporter* is a dummy variable that indicates if the firm is an exporting firm. *Manufacturing* is a dummy variable that takes value 1 if the firm is in the manufacturing industry. *Financial development is* measured as domestic credit to the private sector as a fraction of GDP. The *inflation rate* is measured as the growth rate of the GDP deflator (annual). Results in columns (a), (c), and (d) are weighted by the inverse of the square root of the number of firms; those in column (b) are weighted by the inverse of (the square root of the number of firms × the inverse of the standard deviation of the Lerner Index). *** p<0.01, ** p<0.05, * p<0.1

Variables	Access to finance			
	(a)	(b)	(c)	(d)
Lerner index	-0.434**	-0.387**		
	[0.200]	[0.195]		
Concentration 3			-0.000	
			[0.122]	
Herfindahl index				0.034
				[0.138]
Log firm size	0.089***	0.089***	0.089***	0.089***
	[0.003]	[0.004]	[0.003]	[0.003]
Manufacturing	0.019*	0.018*	0.020*	0.020**
	[0.010]	[0.011]	[0.010]	[0.010]
Exporter	0.044***	0.042***	0.042***	0.044***
	[0.008]	[0.012]	[0.008]	[0.008]
Foreign-owned	-0.074***	-0.086***	-0.076***	-0.075***
	[0.012]	[0.013]	[0.012]	[0.011]
Government-owned	-0.198***	-0.232***	-0.197***	-0.200***
	[0.022]	[0.037]	[0.023]	[0.022]
Log firm age	0.013**	0.018***	0.013**	0.013**
	[0.005]	[0.007]	[0.006]	[0.005]
Financial development	0.357***	0.332***	0.352***	0.369***
	[0.056]	[0.043]	[0.060]	[0.052]
Inflation rate	-0.160	-0.212*	-0.152	-0.156
	[0.099]	[0.116]	[0.098]	[0.099]
Constant	0.369***	0.382***	0.341*	0.227*
	[0.135]	[0.138]	[0.186]	[0.130]
Observations	68,353	68,353	67,270	68,353
R-squared	0.199	0.181	0.201	0.198

Table 4: Regressions Including the Interaction of Competition and Concentration with Financial Development

The regressions below are estimated using country fixed effects and robust standard errors clustered at the country-year level. The dependent variable *Access to finance* is a dummy variable that indicates whether the firm has access to a loan, overdraft, or a line of credit. The *Lerner index* is a measure of competition (higher values imply lower levels of competition). The *Herfindahl index (HI)* and *Concentration 3* are measures of concentration. *Log firm size* is the logarithm the number of permanent employees. *Log firm age* is the logarithm of the firm's age in years. *Government-owned* and *Foreign-owned* are dummy variables that equal one if the firm has government or foreign ownership, respectively. *Exporter* is a dummy variable that indicates if the firm is an exporting firm. *Manufacturing* is a dummy variable that takes value 1 if the firm is in the manufacturing industry. *Financial development is* measured as domestic credit to the private sector as a fraction of GDP. The *inflation rate* is measured as the growth rate of the GDP deflator (annual). Results in column (b) are weighted by the inverse of the standard deviation of the Lerner Index. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Variables	Access to finance			
	(a)	(b)	(c)	(d)
Lerner index	-1.354***	-1.386***		
	[0.368]	[0.429]		
Concentration 3			-0.521***	
			[0.166]	
Herfindahl index (HI)				-0.677***
				[0.158]
Financial development	-0.160	-0.047	-0.223	0.130
	[0.226]	[0.171]	[0.151]	[0.088]
Lerner × Financial development	1.943**	1.779**		
	[0.777]	[0.696]		
Concentration 3 × Financial development			0.898***	
			[0.177]	
HI Index × Financial development				0.993***
				[0.197]
Log firm size	0.086***	0.088***	0.086***	0.086***
	[0.004]	[0.004]	[0.004]	[0.004]
Manufacturing	0.027**	0.027**	0.029***	0.029***
	[0.010]	[0.011]	[0.011]	[0.011]
Exporter	0.033***	0.030***	0.032***	0.031***
	[0.008]	[0.010]	[0.008]	[0.008]
Foreign-owned	-0.078***	-0.090***	-0.080***	-0.080***
	[0.011]	[0.012]	[0.011]	[0.011]
Government-owned	-0.136***	-0.164***	-0.128***	-0.129***
	[0.030]	[0.035]	[0.030]	[0.030]
Log firm age	0.012***	0.016***	0.012***	0.011***
	[0.004]	[0.004]	[0.004]	[0.004]
Inflation rate	-0.317**	-0.416**	-0.325**	-0.350**
	[0.145]	[0.160]	[0.135]	[0.134]
Constant	0.692***	0.696***	0.816***	0.513***
	[0.167]	[0.176]	[0.203]	[0.142]
Observations	68,353	68,353	67,270	68,353
R-squared	0.213	0.189	0.217	0.214

Table 5: Regressions Including the Interaction of Competition and Concentration with Credit Information

The regressions below are estimated using country fixed effects and robust standard errors clustered at the country-year level. The dependent variable *Access to finance* is a dummy variable that indicates whether the firm has access to a loan, overdraft, or a line of credit. The *Lerner index* is a measure of competition (higher values imply lower levels of competition). The *Herfindahl index (HI)* and *Concentration 3* are measures of concentration. *Log firm size* is the logarithm of the number of permanent employees. *Log firm age* is the logarithm of the firm's age in years. *Government-owned* and *Foreign-owned* are dummy variables that equal one if the firm has government or foreign ownership, respectively. *Exporter* is a dummy variable that indicates if the firm is an exporting firm. *Manufacturing* is a dummy variable that takes value 1 if the firm is in the manufacturing industry. *Financial development is* measured as domestic credit to the private sector as a fraction of GDP. The *inflation rate* is measured as the growth rate of the GDP deflator (annual). *Credit information* is the country average credit information index that measures the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau. Results in column (b) are weighted by the inverse of the standard deviation of the Lerner Index. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Variables	Access to finance			
	(a)	(b)	(c)	(d)
Lerner index	-2.758***	-3.219***		
	[0.568]	[0.476]		
Concentration 3			-0.333	
			[0.341]	
Herfindahl index				-0.729*
				[0.424]
Lerner × Credit information	0.557***	0.642***		
	[0.132]	[0.104]		
Concentration 3 × Credit information			0.059	
			[0.076]	
H Index × Credit information				0.184*
				[0.101]
Log firm size	0.087***	0.088***	0.089***	0.089***
	[0.004]	[0.004]	[0.004]	[0.004]
Manufacturing	0.019**	0.015*	0.024**	0.025**
	[0.009]	[0.009]	[0.009]	[0.010]
Exporter	0.033***	0.031***	0.031***	0.031***
	[0.008]	[0.010]	[0.008]	[0.008]
Foreign owned	-0.080***	-0.092***	-0.084***	-0.082***
	[0.011]	[0.012]	[0.011]	[0.011]
Government owned	-0.175***	-0.190***	-0.177***	-0.176***
	[0.027]	[0.033]	[0.028]	[0.028]
Log firm age	0.011***	0.015***	0.011***	0.010**
	[0.004]	[0.004]	[0.004]	[0.004]
Financial development	0.244***	0.271***	0.211**	0.283***
	[0.080]	[0.056]	[0.085]	[0.069]
Inflation rate	-0.346**	-0.432***	-0.368***	-0.409***
	[0.144]	[0.164]	[0.140]	[0.151]
Constant	1.119***	1.225***	0.711**	0.553***
	[0.226]	[0.203]	[0.346]	[0.195]
Observations	65,428	65,428	64,345	65,428
R-squared	0.224	0.199	0.219	0.217

Table 6: Regressions Including the Interaction of Competition and Concentration with Government Bank Share

The regressions below are estimated using country fixed effects and robust standard errors clustered at the country-year level. The dependent variable *Access to finance* is a dummy variable that indicates whether the firm has access to a loan, overdraft, or a line of credit. The *Lerner index* is a measure of competition (higher values imply lower levels of competition). The *Herfindahl index (HI)* and *Concentration 3* are measures of concentration. *Log firm size* is the logarithm of the number of permanent employees. *Log firm age* is the logarithm of the firm's age in years. *Government-owned* and *Foreign-owned* are dummy variables that equal one if the firm has government or foreign ownership, respectively. *Exporter* is a dummy variable that indicates if the firm is an exporting firm. *Manufacturing* is a dummy variable that takes value 1 if the firm is in the manufacturing industry. *Financial development is* measured as domestic credit to the private sector as a fraction of GDP. The *inflation rate* is measured as the growth rate of the GDP deflator (annual). *Share of government banks* is the fraction of banking system's assets in banks that are 50% or more government-owned. Results in column (b) are weighted by the inverse of the standard deviation of the Lerner Index. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Variables	Access to finance			
	(a)	(b)	(c)	(d)
Lerner index	-0.018	0.045		
	[0.294]	[0.261]		
Concentration 3			0.180	
			[0.198]	
Herfindahl index				0.338*
				[0.183]
Lerner × Share government banks	-3.068**	-4.131***		
	[1.281]	[1.123]		
Concentration 3 × Share government banks			-1.491*	
			[0.860]	
H Index × Share of government banks				-2.452**
				[0.940]
Log firm size	0.086***	0.088***	0.088***	0.088***
	[0.004]	[0.004]	[0.004]	[0.004]
Manufacturing	0.015	0.011	0.019**	0.019**
	[0.009]	[0.009]	[0.010]	[0.009]
Exporter	0.036***	0.034***	0.036***	0.036***
	[0.008]	[0.010]	[0.008]	[0.008]
Foreign-owned	-0.076***	-0.088***	-0.080***	-0.078***
	[0.011]	[0.012]	[0.011]	[0.011]
Government-owned	-0.204***	-0.220***	-0.209***	-0.208***
	[0.019]	[0.026]	[0.019]	[0.018]
Log firm age	0.010***	0.014***	0.008**	0.007*
	[0.004]	[0.004]	[0.004]	[0.004]
Financial development	0.354***	0.355***	0.266***	0.276***
	[0.085]	[0.059]	[0.078]	[0.076]
Inflation rate	-0.357**	-0.428**	-0.309**	-0.316**
	[0.150]	[0.184]	[0.150]	[0.156]
Constant	0.797***	0.937***	0.966***	0.643***
	[0.214]	[0.206]	[0.336]	[0.193]
Observations	62,143	62,143	61,060	62,143
R-squared	0.222	0.192	0.222	0.219

Table A1. Number of Firms, by Country and Year of Survey

	Survey Year									Total	# of Surveys
	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Albania	167			202		276				645	3
Angola					421				306	727	2
Argentina					1019				1017	2036	2
Armenia	169			351				356		876	3
Azerbaijan	167			345				291		803	3
Bangladesh	948					1471				2419	2
Belarus	247			325			240			812	3
Benin			182					143		325	2
Bolivia					603				346	949	2
Bosnia-Herzegovina				200				343		543	2
Botswana					340				260	600	2
Brazil		1619						1170		2789	2
Bulgaria	242		492	298		1008		269		2309	5
Burkina Faso					138			357		495	2
Cameroon					168			351		519	2
Chile			941		989				1003	2933	3
China	1353	1572								2925	2
Colombia					990				934	1924	2
Congo					338				334	672	2
Croatia	169			227		615				1011	3
Czech Republic	258			334				223		815	3
El Salvador		463			681					1144	2
Estonia	164			216				264		644	3
Georgia	172			198			334			704	3
Guatemala		431			503					934	2
Honduras		446			421					867	2
Hungary	243			605				283		1131	3
India	1461				3086					4547	2
Indonesia		644						1313		1957	2
Kazakhstan	246			582				464		1292	3
Kenya		211				653				864	2

Table A1. (continued)

| | Survey Year | | | | | | | | | | # of |
	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	Surveys
Latvia	170			203				262		635	3
Lithuania	197		228	205				267		897	4
Macedonia	165			199				354		718	3
Malawi				146				145		291	2
Mali		131				490			295	916	3
Mauritius				159				374		533	2
Moldova	173	103		349				354		979	4
Nicaragua		450			466					916	2
Peru	120				626				980	1726	3
Philippines		600						1093		1693	2
Poland	493	104		971				402		1970	4
Romania	250			594				472		1316	3
Russian Federation	489			593				903		1985	3
Serbia & Montenegro				298				482		780	2
Slovakia	158			212				252		622	3
Slovenia	185			221				271		677	3
South Africa		424				929				1353	2
Turkey	503		550	1276			1083			3412	4
Ukraine	446			588			756			1790	3
Uruguay					583				584	1167	2
Vietnam				1080				1014		2094	2
Zambia	190					482				672	2
Total	9545	7198	2393	10977	11372	5924	2413	12472	6059	68353	137

Table A2. Lerner Index by Country and Year

Countries	Lerner Index								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Albania	0.382	0.207	0.269	0.246	0.296	0.260	0.265	0.254	0.272
Algeria	0.255	0.362	0.404	0.452	0.510	0.509	0.447	0.504	0.550
Angola	0.449	0.463	0.616	0.537	0.437	0.399	0.368	0.396	0.430
Argentina	0.184	1.385	0.499	0.282	0.286	0.274	0.249	0.255	0.290
Armenia	0.261	0.276	0.370	0.346	0.311	0.343	0.309	0.307	0.213
Azerbaijan	0.429	0.277	0.348	0.349	0.338	0.277	0.274	0.281	0.267
Bangladesh	0.247	0.213	0.227	1.021	0.273	0.281	0.249	0.270	0.291
Belarus	0.254	0.198	0.189	0.199	0.203	0.244	0.294	0.275	0.287
Benin	0.295	0.292	0.267	0.248	0.232	0.172	0.213	0.272	0.314
Bolivia	0.177	0.247	0.181	0.160	0.167	0.194	0.235	0.303	0.230
Bosnia-Herzegovina				0.162	0.200	0.194	0.230	0.177	0.199
Botswana	0.227	0.207	0.227	0.273	0.252	0.303	0.207	0.281	0.185
Brazil	0.174	0.181	0.226	0.191	0.229	0.239	0.256	0.357	0.239
Bulgaria	0.290	0.206	0.245	0.225	0.237	0.284	0.285	0.254	0.268
Burkina Faso	0.310	0.375	0.343	0.307	0.337	0.298	0.314	0.212	0.258
Cameroon	0.471	0.478	0.451	0.450	0.421	0.417	0.406	0.380	0.221
Chile	0.317	0.288	0.279	0.209	0.300	0.347	0.383	0.231	0.377
China	0.224	0.295	0.319	0.314	0.336	0.354	0.351	0.336	0.331
Colombia	0.126	0.124	0.200	0.217	0.267	0.232	0.270	0.244	0.325
Congo	0.250	0.134	0.243	0.258	0.163	0.210	0.168	0.138	0.182
Costa Rica	0.107	0.109	0.199	0.204	0.195	0.186	0.201	0.157	0.135
Croatia	0.205	0.196	0.188	0.172	0.190	0.183	0.184	0.257	0.163
Czech Republic	0.100	0.127	0.184	0.196	0.177	0.176	0.222	0.221	0.301
Dominican Republic	0.141	0.129	0.134	0.190	0.141	0.135	0.117	0.134	0.148
Egypt	0.182	0.172	0.229	0.188	0.217	0.190	0.260	0.222	0.220
El Salvador	0.266	0.301	0.256	0.296	0.332	0.314	0.327	0.333	0.328
Estonia	0.066	0.129	0.171	0.176	0.257	0.344	0.252	0.161	0.160
Ethiopia	0.451	0.349	0.446	0.514	0.556	0.609	0.516	0.539	0.511
Georgia	0.405	0.349	0.341	0.332	0.403	0.374	0.239	0.272	0.276
Ghana		0.401	0.296	0.313	0.214	0.220	0.193	0.257	0.225
Guatemala	0.097	0.107	0.163	0.160	0.193	0.198	0.206	0.236	0.213

	Lerner Index								
Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009
Honduras	0.136	0.198	0.269	0.183	0.188	0.211	0.217	0.259	0.228
Hungary	0.176	0.183	0.197	0.222	0.224	0.233	0.228	0.192	0.226
India	0.153	0.207	0.228	0.276	0.232	0.226	0.224	0.199	0.213
Indonesia	0.194	0.194	0.207	0.243	0.226	0.227	0.229	0.230	0.214
Ivory Coast	0.269	0.259	0.229	0.251	0.274	0.242	0.256	0.235	0.294
Jamaica	0.202	0.202	0.225	0.217	0.236	0.230	0.221	0.278	0.285
Jordan	0.194	0.217	0.286	0.307	0.417	0.333	0.287	0.289	0.286
Kazakhstan	0.338	0.323	0.321	0.317	0.320	0.274	0.348	0.313	0.318
Kenya	0.192	0.209	0.261	0.246	0.268	0.277	0.290	0.246	0.245
Korea	0.228	0.241	0.262	0.279	0.271	0.261	0.248	0.213	0.223
Latvia	0.240	0.294	0.322	0.309	0.321	0.309	0.280	0.281	0.222
Lebanon	0.130	0.152	0.178	0.145	0.165	0.150	0.141	0.167	0.203
Lithuania	0.117	0.183	0.175	0.172	0.206	0.199	0.203	0.180	0.115
Macedonia	0.384	0.311	0.300	0.337	0.396	0.367	0.310	0.214	0.233
Malawi	0.322	0.365	0.309	0.280	0.370	0.350	0.377	0.353	0.392
Malaysia	0.302	0.326	0.339	0.334	0.313	0.303	0.301	0.293	0.326
Mali	0.293	0.284	0.312	0.291	0.293	0.323	0.244	0.221	0.241
Mauritania	0.274	0.288	0.300	0.250	0.362	0.398	0.309	0.396	0.407
Mauritius	0.289	0.394	0.238	0.285	0.283	0.288	0.272	0.294	0.263
Mexico	0.132	0.136	0.164	0.175	0.186	0.185	0.204	0.222	0.248
Moldova	0.365	0.388	0.340	0.349	0.268	0.288	0.298	0.243	0.290
Mozambique	0.291	0.197	0.164	0.198	0.247	0.243	0.221	0.253	0.315
Nepal	0.293	0.260	0.238	0.298	0.324	0.312	0.303	0.284	0.286
Nicaragua	0.193	0.190	0.271	0.374	0.372	0.355	0.396	0.398	0.407
Nigeria	0.290	0.266	0.233	0.233	0.270	0.320	0.323	0.365	0.331
Oman	0.279	0.404	0.409	0.437	0.435	0.430	0.365	0.411	0.434
Pakistan	0.129	0.173	0.280	0.292	0.332	0.302	0.238	0.240	0.218
Panama	0.226	0.272	0.309	0.302	0.307	0.298	0.270	0.289	0.292
Paraguay	0.090	0.056	0.042	0.072	0.124	0.094	0.108	0.079	0.096
Peru	0.170	0.224	0.217	0.714	0.321	0.316	0.339	0.352	0.354
Philippines	0.055	0.187	0.190	0.227	0.227	0.232	0.228	0.182	0.225
Poland	0.172	0.201	0.215	0.225	0.221	0.227	0.262	0.240	0.270
Romania	0.215	0.216	0.183	0.179	0.211	0.181	0.181	0.195	0.183

Countries	Lerner Index								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Russian Federation	0.319	0.259	0.258	0.235	0.245	0.244	0.251	0.253	0.104
Serbia		0.376	0.350	0.338	0.333	0.272	0.207	0.168	0.180
Sierra Leone	0.495	0.487	0.462	0.443	0.372	0.336	0.189	0.135	0.149
Slovakia	0.112	0.125	0.163	0.116	0.138	0.194	0.179	0.210	0.221
Slovenia	0.183	0.200	0.193	0.223	0.199	0.193	0.220	0.147	0.208
South Africa	0.347	0.374	0.240	0.154	0.244	0.293	0.319	0.292	0.272
Sri Lanka	0.174	0.183	0.227	0.240	0.220	0.251	0.228	0.215	0.232
Tanzania			0.468	0.429	0.284	0.319	0.303	0.325	0.273
Thailand	0.194	0.220	0.301	0.344	0.340	0.290	0.289	0.291	0.350
Turkey	0.229	0.199	0.263	0.196	0.217	0.207	0.209	0.201	0.265
Ukraine	0.223	0.208	0.216	0.234	0.207	0.245	0.216	0.269	0.262
Uruguay	0.001	0.092	0.033	0.151	0.236	0.193	0.256	0.231	0.229
Uzbekistan	0.580	0.373	0.293	0.290	0.318	0.350	0.357	0.310	0.286
Venezuela	0.238	0.279	0.299	0.314	0.267	0.305	0.280	0.263	0.300
Vietnam	0.263	0.246	0.203	0.213	0.231	0.237	0.246	0.214	0.243
Zambia	0.353	0.200	0.075	0.241	0.307	0.348	0.364	0.376	0.346

Appendix 1: Constructing the measure of access to finance

We use the World Bank Enterprise Surveys dataset (www.enterprisesurveys.org) assembled with a module of identical questions included in all questionnaires. The common framework of the questionnaire enables cross-country analyses using variables specified in the core module.

A complication in constructing the measure of access stems from changes in the core survey modules made for surveys administered after 2005. That is, the variables required to construct a measure of access are defined differently in the old (2002-2005) and new (2006-2010) core modules..

From the old surveys, we consider the following questions:

- "Do you have an overdraft facility or line of credit?": Yes/No

- "For the most recent loan or overdraft":

  o When was this financing approved (year)?

  o Did the financing require collateral or a deposit?

  o If yes, what share of collateral was:

    ▪ Land and buildings?

    ▪ Machinery?

    ▪ Intangible assets (accounts receivable, inventory)?

    ▪ Personal assets of owner/manager (e.g. house)?

  o What was the approximate value of collateral required as a percentage of the loan value?

  o What is the loan's approximate annual cost/ rate of interest?

  o What is the duration (term) of the loan?

From the new surveys, we consider the following questions:

- "At this time, does this establishment have an overdraft facility?": Yes/No

- "At this time, does this establishment have a line of credit or loan from a financial institution?": Yes/No

Given the nature of differences in the questionnaires, overdraft facility, line of credit, and loan are impossible to identify separately. Instead, we define *Access to finance* as having access to any one of the three credit facilities. The dependent variable, *Access to finance*, is a dummy variable that takes value 1 if the firm responds "yes" to either of the two questions, and 0 if "no" to both. A further obstacle arises due to the loan or overdraft question in the old surveys not being a dichotomous yes/no query. We assume that firms answering any further questions about their most recent loan or overdraft facility have access to at least one of the two types of financing.

Appendix 2: Constructing the Lerner Index[20]

The Lerner Index is defined as the difference between banking output prices and marginal costs (relative to prices). It is calculated as:

$$Lerner\ Index = \frac{P-MC}{P},$$

where P is the price of outputs and MC is the marginal cost.

Price is calculated as the total gross revenue of the bank divided by the total assets. We compute the marginal costs by taking the derivative with respect to total assets from the following empirical specification of the translog cost function:

$\ln(C_{it}) = \alpha_{0i} + \beta_0\ln(Q_{it}) + \beta_1 0.5[\ln(Q_{it})]^2 + \alpha_1\ln(W_{1it}) + \alpha_2\ln(W_{2it}) + \alpha_3\ln(W_{3it}) + \beta_2\ln(Q_{it})*\ln(W_{1it}) + \beta_3\ln(Q_{it})*\ln(W_{2it}) + \beta_4\ln(Q_{it})*\ln(W_{3it}) + \alpha_4\ln(W_{1it})*\ln(W_{2it}) + \alpha_5\ln(W_{1it})*\ln(W_{3it}) + \alpha_6\ln(W_{2it})*\ln(W_{3it}) + \alpha_7 0.5[\ln(W_{1it})]^2 + \alpha_8 0.5[\ln(W_{2it})]^2 + \alpha_9 0.5[\ln(W_{3it})]^2 + \alpha_{10}\ln(Equity)_{it} + \alpha_{11}\ln(Net\ Loans)_{it} + F_i + Y_t + e_{it}$

where C_{it} is total operating plus financial costs for bank i in time period t, Q is total assets, W_1 is the ratio of interest expenses to total deposits, W_2 is the ratio of personnel expenses to total assets, W_3 is the ratio of other operating and administrative expenses to total assets, Equity is the ratio of firm equity to total assets, Net Loans is the ratio of net loans to total assets, F_i are firm fixed effects and Y_t are the full set of year dummies. A constrained fixed effects regression with time dummies is estimated under restrictions of symmetry and homogeneity of degree one in the price of inputs.

We use bank-level data from Bankscope to calculate the Lerner Index. Only banks classified as commercial, cooperative, Islamic, savings, and bank holding companies are considered in the analysis.

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[20] We follow the literature on the Lerner index mentioned in footnote 11.

Within each country, we omit outlying observations that are in the top and bottom 1 percentile of the distribution for $\ln(W_1)$, $\ln(W_2)$, $\ln(W_3)$ and their interaction with each other, $\ln(\text{Equity})$ and $\ln(\text{Net Loans})$.

Under the assumption that the slope of the cost function within a country is constant through time, we calculate the marginal costs (MC) for all banks in a country from a single translog cost function regression over the entire range of available years from 1996-2010. Using the estimated coefficients, MC is calculated as:

$$MC_{it} = (\beta_0 + \beta_1 * \ln(Q_{it}) + \beta_2 * \ln(W_{1it}) + \beta_3 * \ln(W_{2it}) + \beta_4 * \ln(W_{3it})) * (C_{it} / \text{Total Assets})$$

Variations in bank-level Lerner within a country are, thus, a result of variations in Q, W_1, W_2, W_3, C, total assets and P. When the degrees of freedom in the fixed effects regression for a country are less than 20, we do not compute the Lerner Index due to low precision. In addition, the computed Lerner levels for banks within a country falling in the top and bottom 1 percentiles of the distribution are omitted as outliers. The Lerner Index for a country in a particular year is the average of all bank-level Lerners for that year.