What Drives Bank Competition?

Some International Evidence

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Abstract: Using bank-level data, we apply the Panzar and Rosse (1987) methodology to estimate the extent to which changes in input prices are reflected in revenues earned by specific banks in 50 countries' banking systems. We then relate this competitiveness measure to indicators of countries' banking system structures and regulatory regimes. We find systems with greater foreign bank entry, and fewer entry and activity restrictions to be more competitive. We find no evidence that our competitiveness measure negatively relates to banking system concentration. Our findings confirm that contestability determines effective competition, especially through allowing (foreign) bank entry and reducing activity restrictions on banks.

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INTRODUCTION

Competition in the financial sector matters for a number of reasons. As in other industries, the degree of competition in the financial sector can matter for the efficiency of the production of financial services, the quality of financial products and the degree of innovation in the sector. A reason specific to the financial sector is the link between competition and stability, long recognized in theoretical and empirical research and most importantly in the actual conduct of prudential policy towards banks (Vives 2001). It has also been shown, theoretically as well empirically, that the degree of competition in the financial sector can matter for the access of firms and households to financial services and external financing, in turn affecting overall economic growth, although not all relationships are clear.

While some of these relationships between competition and banking system performance and stability have been analyzed in the theoretical literature, empirical research on the issue of competition, particularly cross-country research, is still in an early stage. A hindrance for the cross-country research used to be data problems, as little bank-level data were available outside the main developed countries, but recently established databases are allowing for better empirical work. Another hindrance on the interpretation of existing empirical work has been that it did not always take into account a number of theoretical issues. The long-existing theory of industrial organization has shown that the competitiveness of an industry cannot be measured by market structure indicators alone, such as number of institutions, or Herfindahl and other concentration indexes (Baumol, Panzar, and Willig 1982). The threat of entry can be a more important determinant of the behavior of market participants (Besanko and Thakor 1992). Theory also suggests that performance measures, such as the size of the banking margins or profitability, do not necessarily indicate the competitiveness of a banking system. These measures are influenced

by a number of factors, such as a country's macro-performance and stability, the form and degree of taxation of financial intermediation, the quality of country's information and judicial systems, and bank specific factors, such as scale of operations and risk preferences. As such, these measures can be poor indicators of the degree of competition.

Rather, testing for the degree of effective competition requires a structural, contestability approach, along the lines pursued in much of the industrial organization literature. As in other sectors, the degree of competition in the banking system should be measured with respect to the actual behavior of (marginal) bank conduct. And the actual behavior should be related not only to banking market structure, but also to entry barriers, including on foreign ownership, and the severity of activity restrictions, as those can limit the degree of intra-industry competition. Furthermore, the degree of competition from other forms of financial intermediation (capital markets, non-bank financial institutions, insurance companies) will play a role in determining banking system competitiveness. To date, however, few cross-country tests have taken this approach.

These considerations suggest some advantages of using a more structural approach to assessing the degree of competition in the financial sector. While one cannot expect to address all issues, a more formal test of the degree of competition will allow one to overcome some of these concerns. It will also allow a comparison of results to other approaches to measuring competition, such as using concentration ratios, the number of banks in a market, or outcomes such as banking margins. Structural competition tests have been applied to banking systems in a number of individual countries, but not on a broad cross-country basis. The purpose of this paper is to estimate and document a measure of competition for a large cross-section of countries and to find some factors helping explain differences. We specifically seek to analyze the role of

entry and activity regulations, and the role of foreign banks in affecting the competitive conditions of banking systems. Since the role of non-bank financial institutions in affecting the overall competition in the financial sector have received limited attention, we also study those.

Using bank-level data and applying an adapted version of the Panzar and Rosse (1987) methodology, we estimate the degree of competition in 50 countries' banking systems. We then relate our competitiveness measure to countries' structural and regulatory indicators. We find that systems with greater foreign bank entry, and lack of entry and activity restrictions have a higher competitiveness score. We find no evidence that banking system concentration negatively relates to competitiveness. Our findings confirm that contestability helps to determine effective competition, especially through allowing (foreign) bank entry and eliminating activity restrictions.

The paper proceeds as follows. Section 1 gives a review of related literature, both on the effects of competition in the financial sector as well as measuring competition in general and in the financial sector specifically. Section 2 discusses the methodology used to test for the degree of competition in the banking market of a particular country. Section 3 presents the data we use, the selection criteria we used for the sample we end up using, and the competitiveness measures. Section 4 relates the measure of competition to some structural and policy variables and presents the main empirical results. The section also reports several robustness tests. Section 5 concludes.

1. LITERATURE REVIEW

There are several, related strands of literature. We highlight some findings of the growing literature on the definition and effects of competition in the financial sector, and then review the

empirical literature that has investigated the relationships between structural and regulatory factors and performance, access to financing and growth, all as they relate to the competitive structure of the banking systems. Since these papers mostly not attempt to test a specific structural model, we review briefly the general theory on measuring competition and then review some of the empirical papers that have applied structural competition tests to the financial sector.

A. General Effects of Competition in Banking

As a first-order effect, one would expect increased competition in the financial sector to lead to lower costs and enhanced efficiency, even allowing for the fact that financial products are heterogeneous. Recent research has highlighted, however, that the relationships between competition and banking system performance, access to financing, stability and growth are more complex (for a recent review of the theoretical literature on competition and banking, see Vives 2001). Market power in banking, for example, may up to a degree be beneficial for access to financing (Petersen and Rajan 1995). The view that competition is unambiguously good in banking is more naive than in other industries and vigorous rivalry may not be the first best for financial sector performance. This literature has also shown that technological progress lowering production or distribution costs for financial services providers necessarily neither leads to more or better access to finance.

B. General Empirical Studies on Banking System Performance and Structure

A number of papers have investigated the competitive condition in banking systems. In one of the first papers, Berger and Hannan (1989) investigate the commonly observed relationship between market concentration and profitability using data for US banks during the period 1983-85. They try to separate the effects of non-competitive price behavior from those of greater

efficiency of firms with larger market shares and find that non-competitive price behavior could explain the relationship. Other studies have focused on the effects of consolidation in the banking systems (for a review of some of the earlier studies on consolidation and its effect on bank lending terms, see Gilbert 1984; for a review of more recent studies on the effects of consolidation, including studies on the effects of consolidation on access to financing, see Berger, Demsetz, and Strahan 1999). While many of these papers are not formal structure-performance-conduct tests, their results have been interpreted as indicative of the degree of competition and/or its causes and consequences in the financial sector (Berger 1995).

A number of recent papers have investigated the effects of regulations and specific structural or other factors presumed to relate to the competitive environment on banking performance. In a broad survey of rules governing banking systems, Barth, Caprio and Levine (2001) document for 107 countries various regulatory restrictions in place in 1999 on commercial banks, including various entry and exit restrictions and practices. Using this data, Barth, Caprio and Levine (2003) document, among others, that tighter entry requirements are negatively linked with bank efficiency, leading to higher interest rate margins and overhead expenditures, while restricting foreign bank participation tends to increase bank fragility. These results are consistent with the view that tighter entry restrictions tend to limit competition and emphasize that it is not the actual level of foreign presence or bank concentration, but the contestability of a market that determines bank efficiency and stability.

In a cross-country study on banking structure, Claessens, Demirgüç-Kunt and Huizinga (2001) investigate the role of foreign banks and show that entry by foreign banks makes domestic banking systems more efficient by reducing margins. Using bank level data for 77 countries, Demirgüç-Kunt, Laeven, and Levine (2003) investigate the impact of bank

concentration and regulations on bank efficiency. They find that bank concentration has a negative and significant effect on the efficiency of the banking system except in rich countries with well-developed financial systems and more economic freedoms. Furthermore, they find bank-level based support that regulatory restrictions on entry of the new banks, particularly concerning foreign banks, and implicit and explicit restrictions on bank activities, are associated with lower levels of bank margins. Their measure of bank efficiency, net interest margin, is not necessarily an indicator of the actual degree of competitive conduct in a market, but may reflect other factors, such as market power and risk preferences. They mitigate this problem by controlling for a number of differences across banks and countries such that they can interpret higher net interest margins as reflecting operational inefficiency. Our paper adds to this literature by using an indicator that directly measures the actual degree of competitive conduct.

C. Competition Testing: Theory

Most papers reviewed so far did not test for the degree of competition in the banking system using a specific structural model. The theory of contestable markets has drawn, however, attention to the fact that there are several sets of conditions that can yield competitive outcomes, with competitive outcome possible even in concentrated systems. On the other hand, collusive actions can be sustained even in the presence of many firms.

The concept of contestability has spanned a large theoretical and empirical literature covering many industries. Two types of empirical tests for competition have been applied to financial sector (and other industries). The model of Bresnahan (1982) and Lau (1982), as expanded in Bresnahan (1989), uses the condition of general market equilibrium. The basic idea is that profit-maximizing firms in equilibrium will choose prices and quantities such that marginal costs

equal their (perceived) marginal revenue, which coincides with the demand price under perfect competition or with the industry's marginal revenue under perfect collusion. This model allows for an easy to use test statistic and a direct relationship to a natural measure of excess capacity. Specifically, a parameter can be estimated which provides a measure of the degree of imperfect competition, varying between perfect competition or full market power. One empirical advantage is that one only needs to use industry aggregate data to estimate this parameter, although using firm-specific data is possible as well.

The alternative approach is Rosse and Panzar (1977), expanded by Panzar and Rosse (1982) and Panzar and Rosse (1987). This methodology, abbreviated here to the PR model, uses firm (or bank)-level data. It investigates the extent to which a change in factor input prices is reflected in (equilibrium) revenues earned by a specific bank. Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount as the rise in costs. Under monopoly, an increase in input prices will increase marginal costs, reduce equilibrium output and consequently reduce total revenues. The PR model also provides a measure ("H-statistic") between 0 and 1 of the degree of competitiveness of the industry, with less than 0 being a collusive (joint monopoly) competition, less than 1 being monopolistic competition and 1 being perfect competition. It can be shown, if the bank faces a demand with constant elasticity and a Cobb-Douglas technology, that the magnitude of H can be interpreted as an inverse measure of the degree of monopoly power, or alternatively, as we do, as a measure of the degree of competition.

The advantage of the PR model is that it uses bank-level data and allows for bank-specific differences in production function. It also allows one to study differences between types of banks (e.g., larges versus small, foreign versus domestic). Its drawback is that it assumes that

the banking industry is in long-run equilibrium, but a separate test exists whether this condition is satisfied.[1] As we have access to bank-level information and as we want to study differences among banks, we choose for the PR model (the empirical specification we use is explained in section two).

D. Competition Testing: Empirical Results for Banking Systems

A number of papers have applied either the Bresnahan or the PR methodology to the issue of competition in the financial sector, although mostly to the banking system specifically. Cetorelli (1999) provides more detail on these formal tests and reviews results of previous studies of empirical banking studies. One of the first Bresnahan test is Shaffer (1989). For a sample of US banks, he finds results that strongly reject collusive conduct, but are consistent with perfect competition. Using the same model, Shaffer (1993) finds that the Canadian banking system was competitive over the period 1965-1989, although being relatively concentrated. Gruben and McComb (2003) finds that the Mexican banking system before 1995 was super-competitive, that is marginal prices were set below marginal costs. Shaffer (2001) uses the Bresnahan model for 15 countries in North America, Europe, and Asia during 1979-91. He finds significant market power in five markets and excess capacity in one market. Estimates were consistent with either contestability or Cournot type oligopoly in most of these countries, while five countries were significant more competitive than Cournot behavior would imply.

Shaffer (1982) applied the PR model to a sample of New York banks using data for 1979 and found monopolistic competition. Nathan and Neave (1989) studied Canadian banks using the PR methodology and found results consistent with the results of Shaffer (1989) using the Bresnahan

[1] In case of short-run, but not long-run equilibrium, the parameter H represents a one-tail test in the sense that a positive value rejects any form of imperfect competition, but a negative value is consistent with a variety of possibilities, including short-run competition (Shaffer 1983).

methodology, i.e., a rejection of monopoly power. Several papers have applied the PR methodology to European banking systems.[2] Generally, the papers reject both perfect collusion as well as perfect competition and find mostly evidence of monopolistic competition (Bikker and Haaf 2001 summarize the results of some ten studies). Some studies have applied the PR methodology to some non-North American and non-European banking systems. For Japan, Molyneux, Thornton and Lloyd-Williams (1996) find evidence of a monopoly situation in 1986-1988. Tests on the competitiveness of banking systems for developing countries and transition economies using these models are few to date (Gelos and Roldos 2002, for example, using the PR-methodology report that banking markets of eight European and Latin American countries have not become less competitive, although concentration has increased).

Some studies find differences between types of banks. For example, De Bandt and Davis (2000) find monopoly behavior for small banks in France and Germany while they find monopolistic competition for small banks in Italy and for the large banks in all three countries in their sample. This suggests that in these countries small banks have more market power, maybe as they cater more to local markets.

2. METHODOLOGY

We use the Panzar and Rosse (1982, 1987) (henceforth PR) approach to assess the competitive nature of banking markets around the world. The PR *H* statistics is calculated from reduced form bank revenue equations and measures the sum of the elasticities of the total revenue of the banks with respect to the bank's input prices. The PR *H* statistic is interpreted as follows. $H<0$ indicates

[2] These papers include, among others, Molyneux, Lloyd-Williams, and Thornton (1994), Bikker and Groeneveld (2000), and De Bandt and Davis (2000).

a monopoly; H=1 indicates perfect competition; and 0<H<1 indicates monopolistic competition. Nathan and Neave (1989) point out that this interpretation assumes that the test is undertaken on observations that are in long-run equilibrium. We therefore also test whether the observations are in long-run equilibrium.

A. Competitive Environment Test

We estimate the following reduced form revenue equations on pooled samples for each country:

$$\begin{aligned} \ln(P_{it}) = \alpha &+ \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) + \\ &+ \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \\ &+ \delta D + \varepsilon_{it} \end{aligned} \tag{1}$$

where P_{it} is the ratio of gross interest revenue to total assets (proxy for output price of loans), $W_{1,it}$ is the ratio of interest expenses to total deposits and money market funding (proxy for input price of deposits), $W_{2,it}$ is the ratio of personnel expense to total assets (proxy for input price of labor),[3] $W_{3,it}$ is the ratio of other operating and administrative expense to total assets (proxy for input price of equipment/fixed capital). The subscript i denotes bank i, and the subscript t denotes year t. This model is similar to models used previously in the literature to estimate H-statistics for banking industries.

[3] Due to lack of data on total employees, we do not express the unit cost of labor in terms of total employees but in terms of total assets.

We include several control variables at the individual bank level. Specifically, $Y_{1,it}$ is the ratio of equity to total assets, $Y_{2,it}$ is the ratio of net loans to total assets, and $Y_{3,it}$ is the logarithm of total assets (to control for potential size effects). D is a vector of year dummies for the years 1995 through 2001 (we drop the year dummy for the year 1994). We take natural logarithms of all variables. We estimate model (1) both using OLS with time dummies and GLS with fixed bank-specific effects (in the latter case $\alpha = \alpha_i$). The *H*-statistic equals $\beta_1 + \beta_2 + \beta_3$. In what follows we refer to H1 as the H-statistic estimated using OLS, and to H2 as the H-statistic based estimated using GLS with fixed-bank effects.

B. Equilibrium Test

Since the PR-model is only valid if the market is in equilibrium, we also estimate the following equation for each country:

$$\begin{aligned} \ln(ROA_{it}) = \alpha &+ \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) + \\ &+ \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \\ &+ \delta D + \varepsilon_{it} \end{aligned} \qquad (2)$$

where ROA is the pre-tax return on assets (pre-tax profits to total assets). Because return on assets can take on (small) negative values, we compute the dependent variable as *ROA*'=ln(1+*ROA*) where *ROA* is the unadjusted return on assets. We define the equilibrium *E*-statistic as $\beta_1 + \beta_2 + \beta_3$. We test whether *E* = 0, again using a F-test. If rejected, the market is assumed not to be in equilibrium. The idea behind this test is that, in equilibrium, returns on bank assets should not be related to input prices. This approach for testing whether the

observations are in long-run equilibrium has previously been used in the literature (see, for example, Shaffer 1982 and Molyneux et al. 1996).

C. Alternative Specification

For robustness, we estimate an alternative reduced revenue equation where we include the ratio of total revenue to total assets as the dependent variable, where total revenue is calculated as gross interest revenue plus other operating revenues, such as fee income and commission income. The dependent variable now includes also non-interest revenues, which arguable makes it a more comprehensive measure of the overall degree of competition in banking services. The other, explanatory variables remain the same. Again, we estimate the model using OLS and GLS with fixed-bank effects and refer to H3 as the H-statistic based on model estimated using OLS, and to H4 as the H-statistic estimated using GLS with fixed-bank effects. We also check whether the market is in equilibrium using the same test as for the gross interest revenue to total assets ratio.

3. DATA AND RESULTS FOR THE COMPETITIVENESS INDICATOR

A. Data

We use bank-level data from BANKSCOPE, a database containing bank financial statements used in a number of other cross-country studies. We have panel data for the years 1994-2001 and we include all banks: commercial banks, savings banks, cooperative banks, and bank holding companies. We use data from consolidated accounts if available, and otherwise from unconsolidated accounts (to avoid double-counting).

We start with the complete sample of banks in BANKSCOPE, resulting in a total number of bank-year observations of 54,038 (on average 6,755 banks per year). The sample we end up using is smaller, however, as we apply some selection criteria. First, we apply a number of outlier rules to the main variables corresponding to the 1st and 99th percentiles of the distributions of the respective variables. This also deletes banks for which data on one of the main variables is not available, such as data on interest expense or personnel expense. We also delete countries with less than 50 bank-year observations (we need a reasonable number of bank-year observations for each country to estimate the H-statistics; we set the minimum number of observations to 50). This reduced sample consists of 37,107 bank-year observations. We also delete countries with data for less than 20 banks since we need at least 20 observations per country to get reasonable accurate H estimates for each country.[4] Furthermore, some countries in BANKSCOPE do not have adequate coverage of banks and only include the very large banks in the country. This reduces the sample by another 1,273 bank-year observations.

The final sample consists of 35,834 bank-year observations (4,479 banks on average per year). It is an unbalanced panel with the largest number of 5,002 bank observations for the year 1999.[5] The final sample we use consists of 50 countries. A description and definition of the variables can be found in Table 1. In terms of number of banks, banks from France, Germany, Italy, Switzerland and United States dominate the sample. In each of these countries we have more than 1,000 bank-year observations (see also Table 2).[6]

[4] We therefore drop observations from the following countries: Bahrain, Bolivia, Cyprus, El Salvador, Ireland, Israel, Jordan, Kazakhstan, Republic of Korea, Nepal, Saudi Arabia, Slovak Republic, Slovenia, Sweden, Thailand, United Arab Emirates, and Vietnam.

[5] The distribution of the sample across years is as follows: 3,934 banks in 1994; 4,327 banks in 1995; 4,633 banks in 1996; 4,731 banks in 1997; 4,852 banks in 1998; 5,002 banks in 1999; 4,741 banks in 2000; and 3,614 banks in 2001. The total number of bank-year observations is 35,834.

[6] We need to exclude a large number of Japanese banks, because BANKSCOPE does not have data on personnel expense for most large Japanese banks. Our sample of Japanese banks is therefore much smaller than the actual number of Japanese banks.

B. Competitive Environment Indicator

We estimate the *H*-statistics on the basis of the four models. The four estimates vary in terms of estimation technique, respectively Pooled OLS with time dummies (H1 and H3) vs. Fixed effects with time dummies (H2 and H4), and in terms of dependent variable, Gross interest revenue as dependent variable (H1 and H2) vs. Total revenues as dependent variable (H3 and H4). We find that the four measures generally provide close estimates of the H-statistic for each country. This suggests that the methods are relatively robust. Since each estimation method has some specific advantages and disadvantages, we take the average of the four estimates as our measure of the competitiveness of various banking markets. The results for the average of the four H-statistics, the standard errors, and the number of banks and observations used are reported in Table 2.[7]

The H-statistic varies generally between 0.60 to 0.80, suggesting that monopolistic competition is the best description of the degree of competition. There does not appear to be any strong pattern among type of countries, although it is interesting that some of the largest countries (in terms of number of banks and general size of their economy) have relatively low values for the H-statistics. As small banks may operate more in local markets that are less competitive, studying all banks may lead to a distorted measure of the overall competitiveness of a banking system, especially in countries with a large number of banks, such as the United States. In our empirical work, we will therefore investigate whether our results change when we

[7] We conducted the equilibrium tests for all the markets and found that the banking systems of most countries are in "equilibrium" (not reported). We nevertheless did conduct a robustness test by excluding those countries that fail to meet the equilibrium test at the 5 percent significance level, but our main results were not affected when excluding these countries.

compute H-statistics using data on large banks rather than all banks for countries with many banks.

4. DETERMINANTS OF THE COMPETITIVENESS INDICATOR

A. Cross-Country Regressions

We next identify factors that can explain the assessment of the competitiveness of the banking system across countries. To do so, we regress the average *H*-statistic on a number of country characteristics.[8] The regression model is as follows:

$$H_i = \alpha + \beta \mathrm{B}_i + \varepsilon_i$$

where H_i is the average *H*-statistic for country *i*, based on individual bank data for the period 1994-2001, and B_i is a vector of country characteristics. We run these cross-country regressions for our regular sample of 50 countries that includes only countries with at least 50 bank-year observations and at least 20 banks. As a robustness, we also run the cross-country regressions using a smaller sample of 39 countries that includes only countries with at least 100 bank-year observations and at least 20 banks.

As explanatory variables we use a number of variables also used in other cross-country studies to explain banking system performance, stability, and competitiveness. The explanatory data fall in four categories: market structure, contestability, inter-industry competition and general level of development. Data on banking structure and contestability typically refer to the

[8] We also performed all regression results using the four individual estimates for each estimation technique as robustness test (not reported).

situation as of end-1999, which is towards the end of our data period. As in other studies, we rely on the relative stability of the regulation and supervision frameworks. Data on inter industry competition and the country's general development refer to the beginning of the estimation period.

For the structure of the banking system, we use, from the date base established by Barth, Caprio, and Levine (2001), three variables: the 5-bank concentration ratio, a measure of banking system concentration; the Logarithm of the number of banks per million inhabitants in a particular country, as proxy for the density of banks; and the Foreign bank ownership variable, that is, the share in assets/numbers of banks which are foreign-controlled.[9] All of these measures have been used by others when investigating the impact of banking structure on performance, stability, and efficiency.

For the contestability of the respective markets, we use, again from the Barth, Caprio, and Levine (2001) data base, the Activity restrictions variable, indicating the limits imposed on commercial banks to engage in securities markets, insurance and real estate activities with higher scores indicating more restrictions; and the Entry fit test variable, an indicator of the severity of the entry regime with higher scores indicating less severe restrictions. The Activity variable refers to the legal rules in place while the Entry fit variable refers to the actual practices of the supervisory agencies in the country.[10]

We use two indicators to describe the competition coming from inter industry. To investigate the impact of the degree of competition banks face from capital markets, we use the size of the country's stock market capitalization to GDP. As a proxy for competition from non-

[9] We also used from the Barth, Caprio, and Levine (2001) data base the degree of state-owned banks, but did not find this variable to have significant effects and therefore did not add it.
[10] We also used from the Barth, Caprio, and Levine (2001) data base the degree of entry applications denied, but again did not find this variable to have significant effects and therefore did not include it.

bank financial institutions, we use data collected by Beck, Demirguc-Kunt and Levine (2000) on the amount of annual life insurance premiums collected divided by GDP. These data on stock markets and life insurance refer to the year-end 1994. We expect to find positive coefficients for both indicators as the more developed other parts of the financial sector are, the more competitive pressure there will be on the banking system.

We also control for the countries' general economic development, macro-economic stability and institutional framework as these can be expected to affect banking system performance. Others have, for example, found that banking system structure indicators have a less close relationship with competitiveness indicators in more developed countries (Demirgüç-Kunt, Laeven, and Levine 2003). As a proxy for the general level of development of the country, we use the logarithm of per capita GDP in 1995. We also expect that it will be less likely that a banking system will be more competitive when it is subject to high inflation as prices of financial services, such as interest rates, will be less informative. As an indicator for macro-economic stability, we use the inflation rate in 1995. Both per capita GDP and inflation come from the World Development Indicators (WDI). Finally, we want to investigate the role of the quality of the country's overall institutional framework, especially the degree of protection of property rights, which has been found to be an important foundation for a well-functioning financial system. For this, we use an index of property rights from the Economic Freedom Index, used by many others, with lower score indicating better protection of property rights. The index is the average for the period 1995-99 and is obtained from the Heritage Foundation.

Table 3 reports the matrix of correlations between and among the dependent and independent variables. As a start, it is useful to note that many of the correlations are not statistically significant; out of the 55 correlations 21 are significant at the 10% level. Most of these

significant correlations concern relationships among the independent variables that have been documented extensively. There are, for example, significant positive correlations between GDP per capita and the property rights index and our measures of financial markets development (stock market capitalization and insurance penetration). General development as measured by GDP per capita and property rights are also positively related, while inflation is negatively related to GDP per capita and financial market development variables.

More interesting are the relationships of the independent variables with the competitiveness measure. We find a statistically positive relationship between the competitiveness indicator and the banking system concentration variable, which suggests that more concentrated banking systems are more competitive. The correlation between the competitiveness indicator and the number of banks per population, in logs, is not statistically significant. In terms of contestability indicators, the only significant correlation with the competitiveness indicator is for the entry fit test, at the 7% level. The correlation with the foreign bank ownership is positive, but statistically significant only at the 16% level. The inter industry competition measures are not significantly correlated with the competitiveness indicator, nor are the GDP per capita, inflation and property rights variables.

Table 4 reports the base regression results regarding the cross-country determinants of the average *H*-statistic. The results are presented in columns, depending on the categories of independent variables included. All regressions include the two macro-economic variables we have, GDP per capita and inflation, to control for differences in economic development. Besides these two macro variables, the column Structure only includes the banking structure variables, i.e., the bank concentration, density of banks and foreign ownership variables. The column Contestability includes only the contestability indicators, i.e., restrictions on the activities of

banks in terms of providing other types of financial services and the entry fitness test variables. The column Inter-Industry investigates the impact of competition from other financial services industries by including variables on the size of capital markets and insurance industries. The fourth column combines two sets of indicators, the combined effects of banking structure and contestability. It excludes inter industry competition variables, as those are not statistically significant on their own. Finally, the last column Institutions investigates in addition to the banking structure and contestability variables, the role of property rights. In all regressions, we adjust the standard errors of the regression model using the White method to control for any remaining heteroskedasticity in the error terms.

We run our regressions using weighted least squares as the H-statistics are generated variables from the first step regressions with standard errors and we therefore face heteroskedasticity in the dependent variable. We use as weights the inverse of the estimated variance of a particular country's generated H-statistic, thus giving more value to those H-statistics that are estimated with less error. We also conducted the cross-country regressions using simple least squares as well as for each of the four individual H-statistics and we found very similar results (not reported).

We find little evidence that variables describing the banking system structure can help explain its measured competitiveness, or at least in the way typically posed. We find that bank concentration is not negatively correlated with the *H*-statistic, as may be expected, but rather we find a positive and statistically significant relationship, that is, more concentrated banking systems face a greater degree of competition. Similarly, the density of banks variable is not significantly positively related to the competition indicator, and, although not statistically significant, has even a negative sign, that is, the fewer banks relative to population, the more

competitive the system is. It suggests that the *H*-statistic and the bank concentration measure are two variables that cover different concepts, that is, bank concentration may not be a good summary statistic for bank competitive environment.[11] It confirms findings in the general industrial organization literature that the degree of competition is not necessarily related to market structure. In terms of the degree of foreign bank ownership, more foreign bank ownership seems to improve the level of competition in the home market, suggesting that the nature of ownership matters for competition.

Of the contestability variables we use, we find that cross-country variations in bank competition can be explained by differences in a lack of activity restrictions, with fewer restrictions enhancing competition. We find a similar effect for the severity of entry fitness tests, with less severe fitness tests positively affecting banking system competition. This suggests that more contestable systems face greater competition.[12] In terms of inter industry competition, we find no evidence that there is an impact of the development of the stock markets or insurance industry on the competitiveness of the banking system. In terms of the general level of development, we find that the GDP per capita and the inflation rate are never statistically significant and the signs of the coefficients are not always the same. This suggest no general patterns in the degree of competition across countries of different levels of development.

When we include both market structure and contestability variables to explain the variation in the competition indicator (column All), we find that market concentration, foreign bank ownership, and activity restrictions are statistically significant. The signs are the same, i.e., more

[11] This result is, however, importantly influenced by the United States and some other countries with a large number of banks. For these countries we find a low H-statistic while the markets have a relatively low degree of banking system concentration. Excluding four countries with large number of banks, United States, France, Germany, and Italy, we find no statistically significant relationship between the 5-bank concentration ratio and our measure of competitiveness (not reported).

[12] Since the effects of the degree of permitted contestability may vary by market structure, we also checked for interaction effects between our entry and activity restrictions variables and the banking structure variables. We did not find, however, any consistent results for these interaction effects (not reported).

concentrated banking system face greater competition, more foreign bank presence helps competition, and fewer activity restrictions is associated with greater competitiveness. Again, the general level of development and inflation variables are not significant. When including the property rights index (column Institutions), these results are maintained, while the property rights index itself is not significant. We find similar results when we use measures of the quality of the legal system (not reported). This suggests that the quality of the institutional framework does not exercise an independent effect on competition. In summary, it appears that assuring a contestable system is the most important to guarantee a competitive banking system.

B. Robustness test

We conduct a robustness check to verify that our results are not affected by the sample of countries we focus on in the regressions. Specifically, we run the regressions on a smaller sample of 39 countries that includes countries with at least 100 bank-year observations and at least 20 banks (i.e., at least five year-observations on average per bank). This rule leads us to exclude the following countries: Bangladesh, Czech Republic, Greece, Honduras, Japan, Latvia, Mexico, Panama, Paraguay, Turkey, and Ukraine. The regression results based on this smaller set of countries are reported in Table 5, where we follow the same specifications as in Table 4.

In the first column, the Structure regression, we find that banking system concentration and the foreign bank ownership variables remain statistically significant. The signs remain the same as for the larger sample: more concentrated banking systems and greater foreign bank entry is associated with more competitive banking systems. The number of banks is again not statistically significant. In the Contestability regression, we find that activity restrictions and entry fit test remain statistically significant explanatory factors of banking system competition,

i.e., less restricted and more open banking system are more competitive. As before, we do not find any evidence from competition from other segments of the financial services industry, capital markets or insurance, affecting banking system competitiveness (the Inter-industry regression). When including both Structure and Contestability variables, the All regression, we find that the foreign bank ownership and the activity restriction variables remain statistically significant. The signs remain the same as for the other regressions: more foreign bank ownership and fewer activity restrictions lead to more competition. The concentration and entry-fit test variables do no longer enter significantly. Finally, in the last regression, Institutions, we find that the effects of foreign bank ownership and activity restrictions on competition are preserved, and that the property rights index is again not statistically significant. In terms of overall development, the inflation and per capita income variables are again not statistically significant for any of the regressions in this sample of countries.

As mentioned earlier, studying all banks may lead to a distorted measure of the overall competitiveness of a banking system, because small banks may operate more in local markets that are less competitive. We therefore also conduct a robustness test where we estimated our competitiveness indicator using data on large banks only for those countries with many banks, i.e., the United States, France, Germany, and Italy. We then re-run the cross-country regressions and do not find any differences with the results of Tables 4 or 5 (not reported).

5. CONCLUSIONS

Using a structural model, we estimate competitiveness indicators for a large cross-section of countries. When we relate our competitiveness indicator to a number of country characteristics, we find that greater foreign bank presence and fewer activity restrictions in the banking sector can make for more competitive banking systems. We also find some evidence that entry restrictions on commercial banks can reduce competition. This suggests that being open to new entry is the most important competitive pressure. We find no evidence that banking system concentration is negatively associated with competitiveness. At the opposite, we find some evidence that more concentrated banking systems are more competitive. Similarly, we have some, although never significant evidence that the competitiveness of banking systems relates negatively to the number of banks in the country. We find that these results remain using several robustness tests.

While our results confirm much of traditional industrial organization theory that contestability rather than structure is the most important for competition, the fact that structure matters so little, or even in opposite ways to expectations, might surprise many involved with competition policy in the financial sector. Competition policy in the financial sector has traditionally centered on balancing franchise value, important for prudential concerns and related to the so-called special nature of banks, with allowing more competition forces with greater entry. This tradeoff implied that the preferred solution often was thought to be a more concentrated system with less entry, although that resulted in less competitiveness. But our results suggest that the tradeoff need not be between a more concentrated system and a less

competitive system. Having a contestable system may be more important to assure competitiveness than a system with low concentration.

Our results on the lack of importance of market structure suggest that competition policy in the financial sector is more complicated than perhaps previously thought. This may in part be because financial services industries have been undergoing rapid changes, triggered by deregulation and technological advances. These changes have made the definition of a financial market and any particular financial service more complex, and may have made market structure indicators less valuable measures of the competitive nature of financial systems. Developing proper competitiveness tests and methodologies will remain an important area of research and policy focus.

LITERATURE CITED

Barth, James R., Gerard Caprio Jr., and Ross Levine. (2001). "The Regulation and Supervision of Banks Around the World: A New Database." In *Integrating Emerging Market Countries into the Global Financial System*, edited by Robert E. Litan and Richard Herring, pp. 183-241. Washington, DC: Brookings-Wharton Papers on Financial Services, Brookings Institution Press.

Barth, James R., Gerard Caprio Jr., and Ross Levine. (2003). "Bank Regulation and Supervision: What Works Best?" *Journal of Financial Intermediation*, forthcoming.

Baumol, William J., John C. Panzar, and Robert D. Willig. (1982). *Contestable Markets and the Theory of Industry Structure*. San Diego, CA: Harcourt Brace Jovanovich.

Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine. (2000). "A New Database on the Structure and Development of the Financial Sector." *World Bank Economic Review* 14, 597-605.

Berger, Allen N. (1995). "The Profit-Structure Relationship in Banking – Tests of Market Power and Efficient-Structure Hypothesis*." Journal of Money, Credit, and Banking* 27, 404-431.

Berger, Allen N., Rebecca S. Demsetz, and Philip E. Strahan. (1999). "The Consolidation of the Financial Services Industry: Causes, Consequences, and Implications for the Future." *Journal of Banking and Finance* 23, 135-194.

Berger, Allen N., and Timothy H. Hannan. (1989). "The Price-Concentration Relationship in Banking." *Review of Economics and Statistics* 71, 291-299.

Besanko, David A. and Anjan V. Thakor. (1992). "Banking Deregulation: Allocational Consequences of Relaxing Entry Barriers." *Journal of Banking and Finance* 16, 909-932.

Bikker, Jacob A., and Katharina Haaf. (2001). "Competition, Concentration and Their Relationship: An Empirical Analysis of the Banking Industry." DNB Staff Report No. 68, De Nederlandsche Bank, July 2001.

Bikker, Jacob A., and Johannes M. Groeneveld. (2000). "Competition and Concentration in the EU Banking Industry." *Kredit und Kapital* 33, 62-98.

Bresnahan, Timothy F. (1982). "The Oligopoly Solution Concept Is Identified." *Economics Letters* 10, 87-92.

Bresnahan, Timothy F. (1989). "Studies of Industries With Market Power." In *Handbook of Industrial Organization*, Volume II, edited by Richard Schmalensee and Robert D. Willig, Chapter 17. Amsterdam: Elsevier Science Publishers.

Cetorelli, Nicola. (1999). "Competitive Analysis in Banking: Appraisal of the Methodologies." *Economic Perspectives*, Federal Reserve Bank of Chicago, First Quarter, 2-15.

Claessens, Stijn, Asli Demirgüç-Kunt and Harry Huizinga. (2001). "How Does Foreign Entry Affect Domestic Banking Markets?" *Journal of Banking and Finance* 25, 891-911.

De Bandt, Olivier, and E. Philip Davis. (2000). "Competition, Contestability and Market Structure in European Banking Sectors on the Eve of EMU." *Journal of Banking and Finance* 24, 1045-1066.

Demirgüç-Kunt, Asli, Luc Laeven, and Ross Levine. (2003). "Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation." *Journal of Money, Credit, and Banking*, Forthcoming.

Gelos, R. Gaston, and Jorge Roldos. (2002). "Consolidation and Market Structure in Emerging Market Banking Systems." IMF Working Paper 02/186, International Monetary Fund, November 2002.

Gilbert, R. Alton. (1984). "Bank Market Structure and Competition: A Survey." *Journal of Money, Credit, and Banking* 16, 617-645.

Gruben, William C., and Robert P. McComb. (2003). "Privatization, Competition, and Supercompetition in the Mexican Commercial Banking System." *Journal of Banking and Finance* 27, 229-249.

Lau, Lawrence. (1982). "On Identifying the Degree of Competitiveness from Industry Price and Output Data." *Economics Letters* 10, 93-99.

Molyneux, Philip, D. Michael Lloyd-Williams, and John Thornton. (1994). "Competitive Conditions in European Banking." *Journal of Banking and Finance* 18, 445-459.

Molyneux, Philip, John Thornton, and D. Michael Lloyd-Williams. (1996). "Competition and Market Contestability in Japanese Commercial Banking." *Journal of Economics and Business* 48, 33-45.

Nathan, Alli, and Edwin H. Neave. (1989). "Competition and Contestability in Canada's Financial System: Empirical Results." *Canadian Journal of Economics* 22, 576-594.

Panzar, John C., and James N. Rosse. (1982). "Structure, Conduct and Comparative Statistics." Bell Laboratories Economics Discussion Paper, Bell Laboratories.

Panzar, John C., and James N. Rosse. (1987). "Testing for 'Monopoly' Equilibrium." *Journal of Industrial Economics* 35, 443-456.

Petersen, Mitchell A., and Raghuram G. Rajan. (1995). "The Effect of Credit Market Competition on Lending Relationships." *Quarterly Journal of Economics* 110, 407-443.

Rosse, James N., and John C. Panzar. (1977). "Chamberlin vs. Robinson: An Empirical Test for Monopoly Rents." Bell Laboratories Economics Discussion Paper No. 90, Bell Laboratories.

Shaffer, Sherrill. (1982). "A Non-Structural Test for Competition in Financial Markets." In *Bank Structure and Competition*. Conference Proceedings, Federal Reserve Bank of Chicago, pp.225-243.

Shaffer, Sherrill. (1983). "Non-Structural Measures of Competition: Toward a Synthesis of Alternatives." *Economics Letters* 12, 349-353.

Shaffer, Sherrill. (1989). "Competition in the U.S. Banking Industry." *Economics Letters* 29, 321-323.

Shaffer, Sherrill. (1993). "A Test of Competition in Canadian Banking." *Journal of Money, Credit, and Banking* 25, 49-61.

Vives, Xavier. (2001). "Competition in the Changing World of Banking." *Oxford Review of Economic Policy* 17, 535-545.

Table 1 Description and definition of variables

Variable name	Description
H-statistic	H-statistic is calculated as the average of the implied H-statistics from four different structural models estimated for each country the years 1994-2001 based on the Panzar-Rosse (1987) approach, i.e., H1 through H4. H1 is estimated using pooled OLS with time dummies and with gross interest revenues as dependent variable in the reduced form revenue equations. H2 is estimated using pooled GLS with bank-specific effects and time dummies and with gross interest revenues as dependent variable in the reduced form revenue equations. H3 is estimated using pooled OLS with time dummies and with total revenues as dependent variable in the reduced form revenue equations. H4 is estimated using pooled GLS with bank-specific effects and time dummies and with total revenues as dependent variable in the reduced form revenue equations. Source: Authors' calculations using bank-level data from BANKSCOPE.
Concentration	5-Bank concentration ratio of deposits. Source: Barth, Caprio and Levine (2001).
Number of banks to population	The logarithm of the ratio of the number of banks in the country and the total population of the country. Source: Barth, Caprio and Levine (2001) and World Bank Development Indicators.
Foreign bank ownership	A measure of the degree of foreign ownership of banks, measured as the fraction of the banking system's assets that is in banks that are 50 percent of more foreign owned. Source: Barth, Caprio and Levine (2001).
Activity restrictions	A measure of a bank's ability to engage in activities other than banking (including securities, insurance, and real estate). A higher score indicates more restrictions on banks to engage in such activities. Source: Barth, Caprio and Levine (2001).
Entry fit test	A measure of entry restrictions on banks. A higher score indicates fewer restrictions on entry into banking. Source: Barth, Caprio and Levine (2001).
Market capitalization to GDP	Stock market capitalization to GDP. Source: Beck et al. (2000).
Insurance penetration	A measure of the size of the life insurance market measured as the ratio of the volume of life insurance premiums to GDP. Source: Beck et al. (2000).
Property rights	Index of property rights from the Economic Freedom Index. Average of the index for the period 1995-99. A lower score indicates better protection of property rights. Source: Heritage Foundation.
Per capita GDP	Logarithm of per capita GDP in 1995 values. Source: World Bank Development Indicators.
Inflation	Average over the period 1995-99 of the annual change in the consumer price index. Source: World Bank Development Indicators.

Table 2 H-statistics of banking systems around the world

Country	H-statistic	Standard error	Number of banks	Number of observations
Argentina	0.73	(0.06)	105	278
Australia	0.80	(0.11)	26	126
Austria	0.66	(0.04)	160	760
Bangladesh	0.69	(0.13)	28	132
Belgium	0.73	(0.05)	76	371
Brazil	0.83	(0.06)	96	248
Canada	0.67	(0.07)	49	224
Chile	0.66	(0.07)	31	148
Colombia	0.66	(0.08)	39	167
Costa Rica	0.92	(0.05)	30	111
Croatia	0.56	(0.09)	45	196
Czech Republic	0.73	(0.14)	25	90
Denmark	0.50	(0.05)	100	646
Dominican Republic	0.72	(0.09)	27	121
Ecuador	0.68	(0.09)	35	106
France	0.69	(0.02)	355	1,926
Germany	0.58	(0.02)	2,226	13,015
Greece	0.76	(0.07)	21	95
Honduras	0.81	(0.11)	21	68
Hong Kong, China	0.70	(0.07)	44	243
Hungary	0.75	(0.07)	26	112
India	0.53	(0.04)	60	399
Indonesia	0.62	(0.06)	97	353
Italy	0.60	(0.03)	472	2,508
Japan	0.47	(0.17)	44	100
Kenya	0.58	(0.11)	34	106
Latvia	0.66	(0.14)	24	85
Lebanon	0.69	(0.05)	63	371
Luxembourg	0.82	(0.04)	76	277
Malaysia	0.68	(0.06)	41	228
Mexico	0.78	(0.10)	27	58
Netherlands	0.86	(0.06)	44	227
Nigeria	0.67	(0.06)	42	186
Norway	0.57	(0.08)	48	259
Pakistan	0.48	(0.13)	21	148
Panama	0.74	(0.09)	32	88
Paraguay	0.60	(0.22)	23	92
Peru	0.72	(0.07)	24	132
Philippines	0.66	(0.05)	45	237
Poland	0.77	(0.06)	40	138
Portugal	0.67	(0.06)	37	213
Russian Federation	0.54	(0.07)	106	232
South Africa	0.85	(0.05)	45	186
Spain	0.53	(0.03)	157	839

Country	H-statistic	Standard error	Number of banks	Number of observations
Switzerland	0.67	(0.03)	227	1,048
Turkey	0.46	(0.21)	34	69
Ukraine	0.68	(0.15)	30	71
United Kingdom	0.74	(0.04)	106	569
United States	0.41	(0.01)	1,135	7,261
Venezuela	0.74	(0.07)	55	171

NOTES: The table displays the estimated average H-statistic for each country in the sample calculated for the years 1994-2001 using the Panzar-Rosse (1987) approach. The H-statistics are based on a sample that includes observations from countries with a total number of at least 50 bank-year observations and observations on at least 20 banks. Standard errors of the H-statistics are reported to the right of the H-statistics between brackets. Further details on the computation of the H-statistic and the data sources can be found in Table 1.

Table 3 Correlation matrix of main variables

	H-statistic	Concentration	Number of banks to population	Foreign bank ownership	Activity restrictions	Entry fit test	Market capitalization to GDP	Insurance penetration	Property rights	Per capita GDP
Concentration	0.38									
	(0.02)									
Number of banks to population	-0.01	-0.26								
	(0.94)	(0.12)								
Foreign bank ownership	0.25	-0.08	0.23							
	(0.16)	(0.68)	(0.20)							
Activity restrictions	-0.26	-0.10	-0.55	-0.05						
	(0.10)	(0.54)	(0.00)	(0.79)						
Entry fit test	0.29	0.31	0.14	0.02	-0.17					
	(0.07)	(0.05)	(0.37)	(0.90)	(0.30)					
Market capitalization to GDP	0.20	-0.13	0.13	0.08	-0.13	-0.03				
	(0.20)	(0.46)	(0.45)	(0.67)	(0.45)	(0.87)				
Insurance penetration	0.02	0.08	0.15	-0.31	-0.19	-0.03	0.42			
	(0.89)	(0.63)	(0.39)	(0.10)	(0.28)	(0.88)	(0.01)			
Property rights	0.11	0.13	-0.51	-0.19	0.35	0.11	-0.36	-0.45		
	(0.45)	(0.43)	(0.00)	(0.29)	(0.03)	(0.49)	(0.02)	(0.00)		
Per capita GDP	0.01	-0.07	0.69	0.16	-0.45	0.04	0.28	0.50	-0.82	
	(0.94)	(0.66)	(0.00)	(0.38)	(0.00)	(0.81)	(0.07)	(0.00)	(0.00)	
Inflation	0.04	0.25	-0.54	0.10	0.42	0.12	-0.26	-0.51	0.59	-0.66
	(0.76)	(0.14)	(0.00)	(0.60)	(0.01)	(0.47)	(0.10)	(0.00)	(0.00)	(0.00)

NOTES: H-statistic is the average H-statistic calculated using the Panzar-Rosse (1987) approach for the years 1994-2001. p-values in brackets below correlation coefficients. A description of each variable and the data sources can be found in Table 1.

Table 4 Cross-country determinants of H-statistics

	Structure	Contestability	Inter-industry	All	Institutions
Concentration	0.315**			0.203*	0.185**
	(0.133)			(0.100)	(0.087)
Number of banks to population	-0.005				
	(0.024)				
Foreign bank ownership	0.003***			0.003***	0.003***
	(0.001)			(0.000)	(0.000)
Activity restrictions		-0.039***		-0.026***	-0.022***
		(0.006)		(0.006)	(0.006)
Entry fit test		0.031***		0.002	-0.008
		(0.011)		(0.016)	(0.013)
Market capitalization to GDP			0.025		
			(0.061)		
Insurance penetration			-0.166		
			(1.998)		
Property rights					0.069
					(0.056)
Per capita GDP	-0.040	-0.032	-0.062	-0.020	0.010
	(0.034)	(0.023)	(0.056)	(0.020)	(0.030)
Inflation	-0.057	0.024	-0.045	0.015	0.006
	(0.040)	(0.030)	(0.054)	(0.026)	(0.024)
Number of countries	31	39	39	30	30
R-squared	0.58	0.66	0.10	0.79	0.81

NOTES: Dependent variable is the average H-statistic for a particular country calculated using the Panzar-Rosse (1987) approach for the years 1994-2001. All regressions are estimated using weighted OLS with heteroskedasticity-consistent standard errors. As weights, we use for each country observation the inverse of the variance of the generated H-statistic. A constant was added, but is not reported. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. A description of each variable can be found in Table 1.

Table 5 Robustness: Sample of countries with at least 100 bank-year observations

	Structure	Contestability	Inter-industry	All	Institutions
Concentration	0.297**			0.188	0.169
	(0.139)			(0.116)	(0.105)
Number of banks to population	-0.006				
	(0.030)				
Foreign bank ownership	0.004***			0.003***	0.003***
	(0.001)			(0.000)	(0.000)
Activity restrictions		-0.039***		-0.026***	-0.022***
		(0.006)		(0.007)	(0.007)
Entry fit test		0.030**		0.001	-0.008
		(0.011)		(0.018)	(0.015)
Market capitalization to GDP			0.026		
			(0.062)		
Insurance penetration			-0.024		
			(2.037)		
Property rights					0.068
					(0.067)
Per capita GDP	-0.042	-0.027	-0.065	-0.015	0.011
	(0.051)	(0.026)	(0.061)	(0.024)	(0.032)
Inflation	-0.063	0.027	-0.051	0.020	0.006
	(0.049)	(0.036)	(0.062)	(0.033)	(0.032)
Number of countries	23	30	34	22	22
R-squared	0.58	0.66	0.10	0.80	0.82

NOTES: Dependent variable is the average H-statistic for a particular country calculated using the Panzar-Rosse (1987) approach for the years 1994-2001. The regression results are based on a sample of countries that excludes countries with an estimated H-statistic that is based on a sample of less than 100 bank-year observations. All regressions are estimated using weighted OLS with heteroskedasticity-consistent standard errors. As weights, we use for each country observation the inverse of the variance of the generated H-statistic. A constant was added, but is not reported. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. A description of each variable can be found in Table 1.