

Financial Structure and Bank Profitability

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Abstract: Countries differ in the extent to which their financial systems are bank-based or market-based. This paper presents evidence on the impact of financial development and structure on bank performance using bank-level data for a large number of developed and developing countries. For countries that have underdeveloped financial systems, we show that a move towards a more developed financial system reduces bank profitability and margins. Controlling for both bank and market development, financial structure per se does not have an independent effect on bank performance.

Keywords: financial structure, bank profits, interest margins
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1. Introduction

Countries differ widely in their relative reliance on bank vs. market finance. Germany and Japan, for instance, are regarded as bank-based, as in these countries the volume of bank lending relative to the stock market is rather large. At the same time, the United States and the United Kingdom are considered to be more market-based. Recently, Demirguc-Kunt and Levine (1999) have constructed indices of the organization of the financial system, or financial structure, for a large set of developing and developed countries. They measure the relative importance of bank vs. market finance by the relative size of stock aggregates, by relative trading or transaction volumes, and by indicators of relative efficiency. Developing countries are shown to have less developed banks and stock markets in general. The financial sector - banks, other financial intermediaries and stock markets - becomes larger, more active and more efficient, as countries become richer. Further, in developing countries financial systems tend to be more bank-based.

The variety of financial systems around the world poses economists with several interesting questions. A substantial body of literature has already shown that both banking sector development and stock market development may lead to higher growth at the firm, industry and country level.² However, as discussed in Stulz (1999), financial structure – the *relative* importance of banks vs. markets – may also have important implications for firm performance and long-run economic growth. Demirguc-Kunt and

² See King and Levine (1993 a,b) and Levine and Zervos (1998) on evidence regarding financial development and economic growth. Rajan and Zingales (1998) show that industries that rely more heavily on external finance grow faster in countries with better-developed financial systems. Demirguc-Kunt and Maksimovic (1998) show that firms in countries with an active stock market and large banking sector grow faster than predicted by individual firm characteristics.

Maksimovic (2000) and Levine (2000) analyze the impact of financial structure on firm performance and economic growth, respectively.

In this paper we focus on the performance of the banking sector itself across different financial systems. The purpose of this paper is twofold. First, we investigate the impact of financial development on bank profits and margins. Second, after controlling for the level of financial development, we examine if financial structure has an independent impact on bank performance. If banks operating in different financial structures show differences in performance (especially bank margins), this could have important implications for economic growth. After all, if financial structure differences do not translate into differences in the cost of bank financing for firms, it becomes much less clear that they are important.

To our knowledge, this is the first paper considering the impact of financial structure on bank performance. Using bank-level data for a large number of developed and developing countries over the 1990-1997 period, we investigate if there is any relationship between measures of bank performance on the one hand, and levels of bank and stock market development, and financial structure on the other.

We consider two measures of bank performance: bank profitability (measured as profits divided by assets), and bank interest margins (measured as net interest income divided by assets). As an accounting identity, the bank interest margin equals (pre-tax) profits plus bank operating costs, plus loan loss provisioning (and minus non-interest income). Bank profitability and bank interest margins can be seen as indicators of the (in)efficiency of the banking system, as they drive a wedge between the interest rate received by savers on their deposits and the interest paid by lenders on their loans. As

such, these variables will affect the cost of bank finance for firms, the range of investment projects they find profitable and thus economic growth.

In general, we find that financial development has a very important impact on bank performance. Simple means tests show that countries with underdeveloped financial systems have significantly higher levels of bank profits and margins. Once we control for the level of financial development, however, there is no significant difference in bank profits or margins between bank-based and market-based systems.

These relationships are largely confirmed by regression analysis. Specifically, we see that higher bank development is related to lower bank profitability and interest margins. Lower profitability and lower interest margins should be reflections of increased efficiency due to greater competition among banks. Stock market development on the other hand, leads to increased profits and margins for banks especially at lower levels of financial development, indicating complementarities between bank and stock market finance. Stock market development may improve bank performance, for instance, as stock markets generate information about firms that is also useful to banks. Alternatively, the legal and regulatory environment that makes stock market development possible may also improve the functioning of banks.

The remainder of this paper is organized as follows. Section 2 discusses the data. Section 3 presents the empirical results. Section 4 concludes.

2. The data

This study combines bank-level data on profitability, interest margins and other bank-level variables with cross-country data on financial structure. Our bank-level data

are derived from bank balance sheets and income statements, as available from the BankScope data base compiled by Fitch IBCA. The data set covers all OECD countries as well as many developing countries. For a list of countries included in this study, see Table 1. Bank coverage is comprehensive for most countries with covered banks roughly accounting for 90 percent of all bank assets worldwide. The sample covers the period 1990-1997.

Table 1 also provides mean values of the bank-level variables used in the empirical work for each country separately. Profit/ta is computed as pre-tax profits divided by total assets. Two countries, Argentina and Finland, experienced on average negative bank profits over this sample period. Notably low also is the average profitability of Japanese banks at 0.2 percent of assets. Next, Net Margin/ta is net interest income divided by total assets. Thus, Net Margin/ta is an ex post interest margin that differs from the ex ante interest margin (simply the loan interest rate minus the deposit interest rate) because of possible loan defaults. The Net Margin/ta variable thus adjusts for the fact that banks that charge high interest rates may experience equally high loan default rates. Lowest values of Net Margins/ta are obtained by several developed countries, notably Finland, Ireland, the Netherlands, and Switzerland. Apart from low loan default rates, low Net Margin/ta can reflect low operating costs, and low (pre-tax) profitability. Overhead/ta is defined as a bank's non-interest expenses (mostly wages) divided by total assets. Countries with low Net Margin/ta indeed tend to also have low Overhead/ta. In the sample average values for profit and margin are 1.3 percent and 3.9 percent, respectively.

Next, the table provides information about several balance sheet items. These balance sheets items are direct indicators of the earning power and the cost side of banks. Hence, in empirical work relating bank profitability and interest margins to financial structure variables, we use bank-level variables derived from balance sheet as controls. Equity/ta is defined as book equity divided by total assets. International variation in Equity/ta reflects differences in capital adequacy as well as different definitions of book equity. Loan/ta is defined as total loans divided by total assets, while Non-Interest Earning Assets/ta is defined as cash, real estate and other non-interest earning assets divided by total assets. Finally, Customer & Short Term Funding/ta is deposits and other short-term funding divided by total assets.

Country averages of the financial development and structure variables are presented in Table 2. First, there are three size variables. Bank/gdp is the ratio of the total domestic assets of deposit money banks divided by GDP, providing a measure of the overall size of the banking sector. From the table, we see that richer countries generally have larger banking sectors. Next, Central bank/gdp is defined as the total assets of the central bank divided by GDP. Several developing countries (Bolivia, Jordan, Nigeria, and Panama) stand out with central bank assets exceeding 20 percent of GDP, while the size of central bank assets tends to be far more modest for developed countries. Thus in developing countries, the central bank plays a relatively large role in credit provision. As a final index of financial size, Mcap/gdp is the stock market capitalization divided by GDP. Again, there is a general tendency for richer countries to have larger stock markets. Some developing countries, notably Malaysia, Chile and Jordan, also have well-developed stock markets.

Next, the table contains two variables reflecting the volume or activity of the banking sector and the stock market, respectively. Bank credit/gdp is the credit to the private sector by deposit money banks divided by GDP. Hence, this variable proxies for the credit activity of the banking system. As seen, credit in Japan is relatively important at 117 percent of GDP. It is similarly very important in Switzerland (at 165 percent) and the United Kingdom (at 113 percent), which are countries with major international banking sectors. Poorer countries are shown to have comparatively little credit activity. Next, Tvt/gdp is the total value of stocks traded divided by GDP, as an indicator of stock market activity. Some developing countries, such as Bolivia, Guatemala, Nepal, Nigeria, Paraguay and Zambia, have hardly any stock market activity at all at 0.2 percent of GDP or less. Among the developed countries, Austria, Greece, and Italy also have relatively dormant stock markets with trading volume at less than 10 percent of GDP.

In the empirical work, we also examine how the performance of the banking sector (in terms of profits and the net interest margin) is related to the *relative* development of the banks and stock markets of bank and stock markets. To capture whether a financial system is bank-based or market-based, we use an index of financial structure constructed by Demirguc-Kunt and Levine (1999). Specifically, this Structure index is the means-removed average of relative size, relative activity and relative efficiency measures. Relative size here is calculated as the ratio of the stock market capitalization to total assets of deposit money banks; relative activity is defined as the total value of stocks traded divided by bank credit to the private sector; relative efficiency, finally, is given by the product of total value traded and average overhead costs of banks in the country. Higher values of Structure indicate a more market-based

financial system. We classify countries with values of the Structure variable above (below) the mean as market-based (bank-based) financial systems. Further, Market is a dummy variable that takes the value 1 for market-based systems and 0 for bank-based systems. The table shows that there is wide variation in financial structure within income groups as well as across income groups.

3. Empirical evidence

This section presents empirical evidence on the relationship between bank performance and financial structure. As an initial look at this relationship, Panel A of Table 3 provides the mean values of the Profit/ta and Net Margin/ta variables for bank-based and market-based systems separately. The figures show that both profits and margins of banks are lower in market-based financial systems, although only the difference in margins is statistically significant at the 5-percent level. These mean figures can be misleading, however, since they do not control for the development of the financial sector or other determinants of profits and margins.

In Panel B of Table 3, we look at differences in means for three groups of countries: underdeveloped, bank-based and market-based financial systems. A country's financial system is classified as underdeveloped if its bank and stock markets are *both* underdeveloped. A country's banking system or stock market, in turn, is considered underdeveloped if Bank credit/gdp or Tvt/gdp are below the sample mean, respectively. Accordingly, we now only classify financial systems as bank-based or market-based if the financial system is not deemed underdeveloped. This three-way classification points at a real difference between developed and underdeveloped financial systems. Indeed,

bank margins and profits decline significantly, as financial systems become developed. Further, bank profits and margins are higher in market-based systems than in bank-based systems, although these differences are not statistically significant.

Next, we study these relationships more formally within a regression setting. Our empirical framework extends the work in Demirguc-Kunt and Huizinga (1999) on the determinants of bank profitability and interest margins to include indices of financial structure. The basic regression equation is as follows

$$I_{i,j} = \alpha + \beta B_i + \gamma X_j + \delta S_j + \varepsilon_{i,j} \quad (1)$$

where $I_{i,j}$ is the independent variable (either Profit/ta or Net Margin/ta) for bank i in country j ; B_i are bank variables for bank i ; X_j are country variables for country j ; S_j are financial development and structure variables for country j ; and $\varepsilon_{i,j}$ is an error term. Versions of (1) are estimated with either bank-level data or country-level data. The bank-level specifications use bank mean values over the sample period for each bank. Country-level specifications instead use country mean values for bank and other variables. We report White's heteroskedasticity-consistent standard errors. Detailed variable definitions and sources are provided in the Appendix.

Table 4 reports the results of Profit/ta regressions along the lines of equation (1). In the first three specifications we include bank and stock market size measures among the independent variables to control for the level of financial development, while in the last three specifications we include activity measures instead. Specifications 1 and 4 use bank-level data, and the rest of the specifications use country-level data. We also try two

different measures of financial structure. Specifications (1) and (2) use the Structure index. In specification (3) we replace Structure by Market, which, as indicated, is a dummy variable based on Structure.

In Table 4, the bank-level and macroeconomic independent variables are the same across all specifications. Consistent with the evidence in Demirguc-Kunt and Huizinga (1999), Profit/ta is positively related to the lagged equity variable, Equity/ta_{t-1}. This may indicate that well-capitalized banks face lower expected bankruptcy costs for themselves and their customers, thereby reducing their cost of funding. Profits appear to decline with a greater proportion of Non-Interest Earning Assets/ta. Customer and short term funding develops mixed results in bank-level versus country-level specifications. On average, this type of customer funding may carry a low interest cost, but it is costly in terms of the required branching network. The Overhead/ta variable fails to be significant, suggesting that banks can fully pass on their non-interest expenses to their customers.

The macro variables are mostly insignificant except for inflation which is significant and positive throughout. This suggests that banks tend to profit in inflationary environments. We also see that Profit/ta is significantly and positively related to Tax Rate in the bank-level specifications. Tax rate is the effective tax rate on bank income constructed as the ratio of a bank's tax liability to its pre-tax profits. The positive coefficient on the Tax Rate variable suggests that banks in high-tax environments have to earn higher pre-tax profits to pay these taxes. This also suggests that banks are able to pass on at least part of their taxes to their customers.³

³ Demirguc-Kunt and Huizinga (forthcoming) examine how the pass-through of taxes by banks to their customers depends on whether the bank is domestic or foreign.

Next, we turn to the financial system variables. We want to explore the role of financial structure on bank performance, while controlling for the level of bank and stock market development. In the first three specifications, we control for financial development by including Bank/gdp , Central bank/gdp , and Mcap/gdp , as indicators of (central) bank and stock market size. In the last three specifications, we instead include Bank credit/gdp and Tvt/gdp as indicators of bank and stock market activity.

In all specifications, we see that private bank development measures, whether relating to size or activity, have negative signs, with statistically significant coefficients in four of the six regressions. This may suggest that banks in a well-developed banking market face tougher competition, and therefore lower profitability. We also see that Central bank/gdp enters with a positive coefficient. Since a high level of central bank activity is an indicator of lower (private) financial system development this is consistent with the previous result (see also Demiguc-Kunt and Levine, 1999).

Next, we see that Mcap/gdp and Tvt/gdp both obtain positive and significant signs in all specifications. This suggests that controlling for the level of bank development in countries with well-developed stock markets banks have greater profit opportunities. Why would stock market development ever increase bank profitability? A possible explanation is that stock market development allows firms to be better-capitalized, thereby reducing risks of loan default. Also, at a higher level of stock market development, much information on publicly traded firms is made available that also enables banks to better evaluate credit risk. However, the impact of stock market development on bank performance is not linear. Specifically, when we add a squared term of stock market development into our specifications, this squared term enters with a

negative and significant coefficient. This suggests that at some point the potential gains of stock market development for bank performance have been realized. After this point, it may become immaterial whether further financial development takes the form of bank market or stock market development (as is consistent with the Demirguc-Kunt and Maksimovic, 1996).

In specifications 1,2 and 4,5 we include the Structure index to capture whether a country is market-based or bank-based. Structure enters all four specifications with a negative sign, but it is only significant in the country-level regressions in specifications 2 and 5. This suggests that after controlling for the level of financial development, there is some evidence that a more market-based financial structure would lead to lower levels of bank profits. However, the correlations between the Structure index and measures of stock market development tend to be very high at over 80 percent. Therefore, in specifications 3 and 6 we replace the Structure variable with the Market dummy variable, with lower levels of correlation with our stock market indicators at about 60 percent. Using this indicator of financial structure, we no longer see a significant effect of financial structure on bank profits.

Table 5 presents the results of the Net Margin/ta regressions. Apart from the different dependent variables, the regressions in Tables 4 and 5 are completely analogous. Clearly, Profits/ta and Net Margin/ta are interrelated, as a bank's net interest income is a major determinant of its profitability.⁴ The Net Margin/ta variable perhaps more accurately reflects how financial structure affects the bank's financial customers (depositors and lenders) rather than the bank itself. However, most of the results in Table

⁴ To be precise, pre-tax profits are equal to net interest income, plus non-interest income, minus overhead, minus loan loss provisioning by the income statement identity.

4 and 5 are similar. In our discussion of Table 5, we will therefore focus on how the results in Table 5 differ from those in Table 4.

Starting with the bank-level variables, we see that the coefficient of Loan/ta is positive and significant in three specifications. This sensibly reflects that loans are interest-paying (as opposed to say the cash on the balance sheet), thereby increasing net interest income. Overhead/ta enters all specifications with positive coefficients which are significant in four cases. This suggests that banks pass on their non-interest expenses, such as wages, to their financial customers (in terms of lower deposit rates and/or higher lending rates).

Turning to the financial structure variables, we see that the results in Table 5 are largely similar to Table 4. Looking at the separate bank and stock market variables, we see that they are significant with the same signs as before. The Structure index is again negative throughout but now only significant in one specification. When replaced with the Market variable, the impact of financial structure on bank margins is no longer significant.

Our raw data indicate that bank profits and margins tend to be relatively high in underdeveloped financial systems regardless of financial structure. This suggests that financial structure is particularly important at lower levels of economic development. To test whether this is the case, we estimate regressions as in Tables 4 and 5 including an interaction term of the Structure variable and gdp per capita. The interaction term is not statistically significant and leaves the other results unchanged in the unreported regressions.

As an additional test, we include several institutional variables reflecting the legal and regulatory environment to the various specifications. We include these institutional variables as controls since they can be expected to have a direct impact on bank profitability. To a large extent, the institutional environment is expected to shape the financial structure, and therefore the impact of financial structure may be weaker after we control for the underlying institutional environment. Indeed, there is no clear role left for financial structure, after we include measures of legal code and effectiveness and restrictions on bank activities.⁵ These results are also not reported.

5. Conclusion

The empirical evidence of this paper suggests that banks have higher profits and margins in underdeveloped financial systems. Once we control for the level of financial development, financial structure, i.e. the relative development of banks versus markets, does not have an independent effect on bank profitability or margins. In developed financial systems, bank profits and margins are indeed not statistically different across bank-based systems and market-based systems.

Regression results indicate that greater bank development lowers bank profits and margins. Underdeveloped banking markets tend to be rife with resource-costly inefficiencies and less-than-competitive pricing behavior, as also suggested by their relatively high profitability and net interest margins. Thus greater bank development brings about tougher competition, higher efficiency and lower profits.

⁵ As institutional measures we have used indicators of Stockholder rights, Creditor rights, Contract enforcement, Common Law, and Restrictions on Banking. See the appendix for definitions.

We also see that in underdeveloped financial systems stock market development improves bank profits and margins. This reflects the complementarities between bank and stock market development. Specifically, stock market development and the improved availability of equity financing to firms may increase their borrowing capacity. Furthermore, the better and more easily available information which stock markets demand also enables banks to better evaluate credit risk. This can lead to an increase in bank profits. However, at higher levels of stock market development we no longer observe these complementarities.

Overall, our results provide evidence that differences in bank and stock market development do translate into differences in the cost of bank financing for firms. Indeed, for countries with underdeveloped financial systems, greater financial development would improve the efficiency of the banking sector, potentially leading to increases in growth, both at the micro or firm level and at the macro level. However, we find that financial structure per se does not have a significant, independent influence on bank profits and margins.

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Table I. Bank Characteristics

Ratios are calculated for each bank in each country and then averaged over 1990-97. All variables are divided by total assets. Data are from Bankscope data base of IBCA. Detailed variable definitions are given in the Appendix.

	Profit/ta	Net Margin/ta	Overhead/ta	Equity/ta	Loan/ta	Non-interest earning assets/ta	Customer & short term funding/ta
Argentina	-0.004	0.052	0.076	0.197	0.548	0.215	0.656
Australia	0.010	0.021	0.024	0.068	0.710	0.055	0.780
Austria	0.008	0.018	0.029	0.080	0.423	0.052	0.803
Belgium	0.005	0.018	0.022	0.072	0.301	0.031	0.889
Bolivia	0.014	0.048	0.045	0.117	0.670	0.057	0.848
Canada	0.003	0.019	0.021	0.090	0.694	0.041	0.844
Chile	0.006	0.041	0.031	0.155	0.545	0.153	0.746
Colombia	0.020	0.066	0.083	0.164	0.597	0.153	0.732
Denmark	0.013	0.047	0.035	0.105	0.526	0.036	0.825
Ecuador	0.018	0.069	0.078	0.133	0.530	0.117	0.679
Finland	-0.030	0.015	0.023	0.070	0.446	0.092	0.633
France	0.003	0.029	0.036	0.100	0.488	0.056	0.768
Greece	0.009	0.029	0.037	0.076	0.389	0.084	0.868
Guatemala	0.009	0.062	0.059	0.096	0.487	0.165	0.695
Honduras	0.031	0.076	0.044	0.109	0.552	0.124	0.779
India	0.002	0.030	0.028	0.053	0.445	0.071	0.868
Indonesia	0.016	0.040	0.028	0.115	0.686	0.038	0.759
Ireland	0.010	0.017	0.011	0.144	0.496	0.033	0.849
Italy	0.010	0.033	0.038	0.092	0.455	0.066	0.742
Japan	0.002	0.019	0.014	0.038	0.708	0.032	0.882
Jordan	0.010	0.024	0.025	0.093	0.436	0.099	0.854
Kenya	0.018	0.049	0.040	0.102	0.560	0.127	0.826
Korea	0.003	0.021	0.026	0.084	0.554	0.102	0.751
Malaysia	0.017	0.027	0.015	0.082	0.590	0.093	0.815
Mexico	0.012	0.043	0.046	0.177	0.568	0.126	0.773
Nepal	0.034	0.044	0.024	0.072	0.519	0.060	0.865
Netherlands	0.007	0.014	0.014	0.090	0.451	0.029	0.776
N. Zealand	0.013	0.025	0.025	0.041	0.753	0.045	0.886
Nigeria	0.025	0.059	0.084	0.092	0.260	0.139	0.675
Norway	0.009	0.027	0.023	0.057	0.771	0.041	0.800
Panama	0.015	0.027	0.020	0.101	0.629	0.046	0.849
Paraguay	0.023	0.067	0.067	0.137	0.548	0.227	0.822
Peru	0.018	0.072	0.082	0.121	0.571	0.125	0.803
Philippines	0.023	0.043	0.041	0.159	0.589	0.072	0.693
Singapore	0.014	0.021	0.012	0.153	0.579	0.163	0.828
S. Africa	0.019	0.046	0.038	0.155	0.768	0.027	0.788
Sri Lanka	0.023	0.041	0.038	0.135	0.529	0.091	0.662
Swaziland	0.020	0.058	0.062	0.065	0.647	0.066	0.876
Sweden	0.004	0.022	0.022	0.056	0.390	0.065	0.762
Switzerland	0.015	0.017	0.045	0.183	0.521	0.048	0.629
Thailand	0.008	0.028	0.019	0.073	0.841	0.039	0.857
UK	0.014	0.028	0.028	0.135	0.385	0.076	0.744
US	0.017	0.039	0.036	0.081	0.603	0.088	0.741
Zambia	0.045	0.119	0.123	0.131	0.240	0.237	0.768
Average	0.013	0.039	0.039	0.106	0.545	0.089	0.784

Table II. Financial Development and Structure

Data are averages for the period 1990-97. Detailed definitions and sources are given in the Appendix.

	Bank/gdp	Central bank/gdp	Mcap/gdp	Bank credit/gdp	Tvt/gdp	Structure	Market
Argentina	0.216	0.034	0.130	0.164	0.043	-0.104	0
Australia	0.767	0.030	0.713	0.696	0.331	0.111	1
Austria	1.261	0.004	0.123	0.932	0.078	-0.284	0
Belgium	1.175	0.013	0.355	0.563	0.052	-0.191	0
Bolivia	0.367	0.224	0.017	0.357	0.000	-0.389	0
Canada	0.656	0.039	0.588	0.565	0.292	0.091	1
Chile	0.465	0.197	0.838	0.451	0.085	0.321	1
Colombia	0.177	0.020	0.132	0.158	0.014	-0.033	0
Denmark	0.475	0.016	0.340	0.375	0.157	0.036	1
Ecuador	0.175	0.094	0.104	0.170	0.013	-0.217	0
Finland	0.799	0.010	0.295	0.771	0.118	-0.144	0
France	1.021	0.011	0.329	0.887	0.170	-0.171	0
Greece	0.413	0.193	0.149	0.183	0.058	-0.171	0
Guatemala	0.145	0.011	0.009	0.123	0.000	-0.399	0
Honduras	0.253	0.073	0.049	0.208	0.020	-0.249	0
India	0.344	0.129	0.277	0.242	0.076	0.022	1
Indonesia	0.492	0.020	0.184	0.460	0.077	-0.168	0
Ireland	0.361	0.010	0.265	0.293	0.141	-0.024	0
Italy	0.740	0.103	0.166	0.521	0.076	-0.228	0
Japan	1.311	0.047	0.792	1.169	0.284	-0.063	0
Jordan	0.713	0.211	0.649	0.620	0.124	0.028	1
Kenya	0.288	0.114	0.160	0.212	0.005	-0.146	0
Korea	0.551	0.011	0.372	0.532	0.439	0.142	1
Malaysia	0.816	0.012	2.015	0.748	1.140	1.301	1
Mexico	0.240	0.015	0.318	0.215	0.126	0.297	1
Nepal	0.216	0.111	0.050	0.162	0.002	-0.331	0
Netherlands	1.116	0.009	0.686	0.904	0.428	-0.012	0
N. Zealand	0.852	0.034	0.493	0.779	0.143	-0.103	0
Nigeria	0.110	0.201	0.058	0.083	0.001	-0.163	0
Norway	0.689	0.018	0.256	0.574	0.143	-0.142	0
Panama	0.576	0.206	0.086	0.558	0.003	-0.339	0
Paraguay	0.164	0.069	0.020	0.163	0.002	-0.361	0
Peru	0.134	0.003	0.145	0.116	0.050	0.097	1
Philippines	0.367	0.092	0.516	0.281	0.150	0.290	1
Singapore	0.952	.	1.365	0.829	0.702	0.399	1
S. Africa	0.662	0.028	1.658	0.613	0.148	0.629	1
Sri Lanka	0.271	0.097	0.161	0.211	0.021	-0.149	0
Swaziland	0.207	0.003	0.181	0.202	0.056	0.049	1
Sweden	0.537	0.060	0.623	0.460	0.332	0.347	1
Switzerland	1.769	0.015	0.981	1.647	0.755	0.008	1
Thailand	0.824	0.015	0.570	0.784	0.400	0.066	1
UK	1.160	0.030	1.126	1.137	0.551	0.149	1
US	0.731	0.050	0.799	0.644	0.616	0.319	1
Zambia	0.118	0.483	0.074	0.062	0.002	-0.303	0
Average	0.600	0.068	0.483	0.512	0.221	-0.006	0.477

Table III. Bank Performance and Financial Structure

Countries with underdeveloped financial systems have below mean values for both bank and market development. Countries are defined to have market-based financial systems if the value of their structure index is above the sample mean. Structure index is the means-removed average of relative size, relative activity and relative efficiency indicators as defined in Demirguc-Kunt and Levine (1999). Superscripts a,b,c,d and e denote pairs that are significantly different at 5 percent or lower significance level.

	N	Mean	Std. Dev.	Minimum	Maximum
Panel A:					
Bank-Based					
Profit/ta	23	.014	.015	-.030	.045
Net Margin/ta	23	.045 ^a	.025	.015	.119
Market -Based					
Profit/ta	21	.012	.006	.002	.023
Net Margin/ta	21	.032 ^a	.015	.014	.072
Panel B:					
Underdeveloped					
Profit/ta	19	.018 ^{d,e}	.011	-.005	.045
Net Margin/ta	19	.055 ^{b,c}	.022	.017	.119
Developed and Bank-Based					
Profit/ta	10	.005 ^d	.013	-.030	.016
Net Margin/ta	10	.025 ^b	.008	.015	.040
Developed and Market-Based					
Profit/ta	15	.010 ^c	.005	.003	.019
Net Margin/ta	15	.027 ^c	.011	.014	.047

Table IV. Bank Profitability and Financial Structure

Columns (1) and (4) are estimated using mean values for each bank for the 1990-97 time period. Columns (2) and (5) are estimated using country means over the sample period. Columns (3) and (6) replace Structure in specifications (2) and (5) by Market. Dependent variable is profit/ta which is before tax profits divided by total assets. Detailed variable definitions and data sources are given in the appendix. White's heteroskedasticity consistent standard errors are given in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Bank Level and Macro Controls						
Equity/ta _{t-1}	.024*** (.008)	.059 (.041)	.065 (.052)	.026*** (.008)	.096** (.043)	.092** (.044)
Loan/ta	-.002 (.003)	.000 (.008)	.002 (.008)	.000 (.003)	.004 (.008)	-.001 (.008)
Non-interest earning assets/ta	-.026* (.015)	-.078** (.039)	-.078* (.044)	-.026* (.015)	-.068** (.031)	-.073** (.035)
Customer & short term funding/ta	-.009** (.004)	.042 (.035)	.043 (.036)	-.007* (.004)	.062** (.031)	.068** (.034)
Overhead/ta	.025 (.053)	.136 (.130)	.155 (.144)	.009 (.054)	.079 (.121)	.135 (.137)
Gnp/cap	.0003*** (.0001)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	-.000 (.000)
Growth	.001** (.000)	.000 (.001)	.000 (.001)	.001 (.000)	-.001 (.001)	-.000 (.001)
Inflation	.001*** (.000)	.001** (.000)	.001** (.000)	.001*** (.000)	.001** (.000)	.001** (.000)
Tax rate	.004** (.002)	.001 (.013)	.005 (.018)	.005** (.002)	.001 (.011)	-.001 (.012)
Financial Development and Structure						
Bank/gdp	-.011*** (.003)	-.010* (.006)	-.003 (.005)			
Central bank/gdp	.055*** (.011)	.019 (.014)	.027* (.014)			
Bank credit/gdp				-.011*** (.003)	-.010* (.006)	-.006 (.006)
Mcap/gdp	.011*** (.003)	.015** (.006)	.005** (.002)			
Tvt/gdp				.019*** (.004)	.029*** (.009)	.020** (.008)
Structure	-.002 (.004)	-.018* (.010)		-.002 (.004)	-.015** (.006)	
Market			-.003 (.003)			-.005 (.003)
Adj R ²	.10	.35	.32	.10	.43	.39
N. of countries	43	43	43	44	44	44
N. of obs	2237	43	43	2249	44	44

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

Table V. Bank Interest Margins and Financial Structure

Columns (1) and (4) are estimated using mean values for each bank for the 1990-97 time period. Columns (2) and (5) are estimated using country means over the sample period. Columns (3) and (6) replace Structure in specifications (2) and (5) by Market. Dependent variable is the net margin/ta defined as interest income minus interest expense over total assets. Detailed variable definitions and data sources are given in the appendix. White's heteroskedasticity consistent standard errors are given in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Bank Level and Macro Controls						
Equity/ta _{t-1}	.024*** (.008)	.021 (.035)	.026 (.037)	.026*** (.008)	.028 (.036)	.023 (.036)
Loan/ta	-.002 (.003)	.013 (.009)	.015* (.009)	.000 (.003)	.022** (.008)	.020** (.008)
Non-interest earning assets/ta	-.026* (.015)	.023 (.032)	.025 (.036)	-.026* (.015)	.038 (.028)	.039 (.029)
Customer & short term funding/ta	-.009*** (.004)	.031* (.017)	.031* (.018)	-.007* (.004)	.030* (.017)	.031* (.018)
Overhead/ta	.025 (.053)	.452*** (.129)	.474*** (.151)	.009 (.054)	.437*** (.136)	.459*** (.143)
Gnp/cap	.0003*** (.0001)	.000 (.000)	-.000 (.000)	.000 (.000)	.000 (.000)	-.000 (.000)
Growth	.001** (.000)	-.000 (.001)	-.001 (.001)	.001 (.000)	-.001 (.001)	-.001 (.001)
Inflation	.001*** (.000)	.001** (.000)	.001** (.000)	.001*** (.000)	.001** (.000)	.001** (.000)
Tax rate	.004** (.002)	.013 (.012)	.018 (.016)	.005** (.002)	.016 (.011)	.016 (.016)
Financial Development and Structure						
Bank/gdp	-.011*** (.003)	-.023*** (.007)	-.015** (.006)			
Central bank/gdp	.055*** (.011)	.006 (.017)	.016 (.018)			
Bank credit/gdp				-.011*** (.003)	-.015** (.007)	-.013** (.006)
Mcap/gdp	.011*** (.003)	.016*** (.005)	.004** (.002)			
Tvt/gdp				.019*** (.004)	.011* (.006)	.006* (.004)
Structure	-.002 (.004)	-.021** (.008)		-.002 (.004)	-.007 (.005)	
Market			-.003 (.003)			-.002 (.003)
Adj R ²	.10	.87	.85	.10	.86	.85
N. of countries	43	43	43	44	44	44
N. of obs	2237	43	43	2249	44	44

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

Appendix

Variable Definitions and Sources

Bank Characteristics

Net margin/ta - interest income minus interest expense over total assets.

Profit/ta - before tax profits over total assets.

Equity/ta - book value of equity (assets minus liabilities) over total assets

Loan/ta - total loans over total assets

Non-interest earning assets/ta - cash, non-interest earning deposits at other banks, and other non-interest earning assets over total assets

Customer & short term funding/ta - all short term and long term deposits plus other non-deposit short term funding over total assets

Overhead/ta - personnel expenses and some other non-interest expenses over total assets

All bank level variables are obtained from BankScope data base of IBCA.

Macro Indicators

Gnp/cap - real GNP per capita.

Growth - annual growth rate of real GDP.

Inflation - the annual inflation from the GDP deflator.

The above data are from World Bank National Accounts.

Tax rate - total taxes paid divided by before tax profits for each bank, obtained from Bankscope.

Financial Structure

Bank/gdp - total assets of the deposit money banks divided by GDP.

Central bank/gdp – total assets of the central bank divided by GDP.

Bank credit/gdp – credit to the private sector by deposit money banks divided by GDP.

Mcap/gdp - stock market capitalization divided by GDP.

Tvt/gdp – total value of stocks traded divided by GDP.

Mcap/bank - stock market capitalization divided by total assets of the deposit money banks.

Tvt/bank credit – total value of stocks traded divided by bank credit to private sector.

*Tvt*overhead costs* – total value of stocks traded multiplied by average overhead/ta of banks in the country.

Structure – means-removed average of *Mcap/bank*, *Tvt/bank credit* and *Tvt*overhead costs*, as described in Demirguc-Kunt and Levine (1999). Higher levels indicate more market-based systems.

The above variables are constructed as described in Beck, Demirguc-Kunt and Levine (1999). Stock market information are from the Emerging Markets data base of the International Finance Corporation. The rest are from the International Financial Statistics of the International Monetary Fund.

Legal and Institutional Indicators

Stockholder rights – an index of shareholder rights from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998). The index is formed by adding 1 if: (1) the country allows the shareholders to mail their proxy to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median); or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. The index ranges from 1 to 6.

Creditor rights - an index of creditor rights from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998). The index is formed by adding 1 if: (1) the country imposes restrictions, such as creditors' consent or minimum dividends to file for reorganization; (2) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (3) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of assets of a bankrupt firm; and (4) the debtor does not retain the administration of its property pending the resolution of the reorganization. The index ranges from 0 to 4.

Contract enforcement index - produced by Business Environmental Risk Intelligence (BERI), this index measures the “relative degree to which contractual agreements are honored and complications presented by language and mentality differences.” It is scored 1-4, with higher scores for greater enforceability.

Common Law – A dummy variable that takes the value one for common law countries and the value zero otherwise. The source is La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998).

Restrictions on Banking – An aggregate index of restrictions on banking business, including securities underwriting, insurance underwriting, real estate, and owning and controlling nonfinancial firms. Ranges from 1 to 4, with higher scores indicating tighter restrictions. Source: Barth, Caprio and Levine (1998).