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A New Database on the Structure and Development of the Financial Sector

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This article introduces a new database of indicators of financial structure and financial development across countries and over time. The database is unique in that it combines a wide variety of indicators that measure the size, activity, and efficiency of financial intermediaries and markets. It improves on previous efforts by presenting data on the public share of commercial banks, introducing indicators of the size and activity of nonbank financial institutions, and constructing measures of the size of bond and primary equity markets.

An expanding literature establishes the importance of financial development for economic growth (Levine 1997). Measures of the size of the banking sector and the size and liquidity of the stock market are shown to be highly correlated with subsequent growth of gross domestic product (GDP) per capita. Moreover, emerging evidence suggests that both the level of banking and the development of the stock market have a causal impact on economic growth.[1] The recent financial crises in Southeast Asia and Latin America further underline the importance of a well-functioning financial sector for the whole economy.

This article introduces a new database, the first to provide comprehensive measures of the development, structure, and performance of the financial sector. The database includes statistics on the size, activity, and efficiency of banks, nonbank institutions, equity markets, and bond markets (including both primary and secondary markets) across a broad spectrum of countries and through time. It thus enables financial analysts and researchers to investigate a wide array of issues.[2]

1. See King and Levine (1993a, 1993b) and Levine and Zervos (1998) for the correlation between these variables, and Levine, Loayza, and Beck (2000), Beck, Levine, and Loayza (2000), Neusser and Kugler (1998), and Rousseau and Wachtel (1998) for evidence on causality. Also Demirgüç-Kunt and Maksimovic (1998) show that firms in countries with an active stock market and large banking sector grow faster than predicted by the characteristics of individual firms. Rajan and Zingales (1998) show that industries that rely more heavily on external finance grow faster in countries with better-developed financial systems.

2. The database and further details on its construction are available at the following address: http://www.worldbank.org/research/projects/finstructure/database.htm.

Thus far the profession has relied on a few indicators of the banking sector and the stock market using data from the International Monetary Fund's (IMF) *International Financial Statistics* and the International Finance Corporation's *Emerging Market Database*. To build the database introduced in this article, we draw on a wider array of sources and develop indicators of the size, activity, and efficiency of a much broader set of financial institutions and markets. We use bank-specific data to construct indicators of the market structure and efficiency of commercial banks. Furthermore, we compile data on the split between public and private ownership in the banking sector.

This database is the first to define and construct indicators of the size and activity of nonbank financial intermediaries, such as insurance companies, pension funds, and nondeposit money banks. It is also the first to include indicators of the size of primary equity markets and primary and secondary bond markets. In constructing the database, we carefully deflate measures and match stock and flow variables.[3] This effort produces a unique set of indicators that capture the development and structure of the financial sector across countries and over time along many different dimensions (table 1).

I. THE SIZE AND ACTIVITY OF FINANCIAL INTERMEDIARIES

The first group of measures compares the size and activity of central banks, deposit money banks, and other financial institutions relative to each other and relative to GDP. The IMF's *International Financial Statistics* covers the period from 1960 to 1997 for up to 175 countries.

Groups of Financial Institutions

The indicators in this section distinguish between three groups of financial institutions.[4] The first group—central banks—comprises the central bank and other institutions that perform the functions of the monetary authorities.[5] The second group—deposit money banks—comprises all financial institutions that have "liabilities in the form of deposits transferable by check or otherwise usable in making payments" (IMF 1984: 29). The third group—other financial institutions—comprises other bank-like institutions and nonbank financial institutions.

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3. We deflate the end-of-period stock variables by end-of-period deflators, and we deflate the flow variables by deflators measured over the period. Then we use the average of the real stock variable in years *t* and *t* − 1 and the real value of the flow variable in year *t*. We use the consumer price index from the *International Financial Statistics* as the deflator. Since we detail the raw data at the website, researchers can easily reconstruct our indicators using alternative deflators.

4. For a detailed description see IMF (1984). The three groups correspond to lines 12, 22, and 42 of the *International Financial Statistics*.

5. Exchange stabilization funds are the most typical case of monetary authority functions that are performed separately from the central banks' balance sheets. Furthermore, the central bank might perform commercial banking tasks. Where possible, we exclude these from the central bank balance sheets when they are reported in the *International Financial Statistics*.

Table 1. *Coverage of the Variables Included in the Database*

Variable	Time span	Number of countries	Number of observations
Ratio of central bank assets to total financial assets	1960–97	79	2,177
Ratio of deposit money bank assets to total financial assets	1960–97	79	2,177
Ratio of other financial institutions' assets to total financial assets	1960–97	79	2,177
Ratio of deposit money bank assets to central bank and deposit money bank assets	1960–97	169	4,651
Ratio of liquid liabilities to GDP	1960–97	159	3,873
Ratio of central bank assets to GDP	1960–97	153	3,671
Ratio of deposit money bank assets to GDP	1960–97	160	3,912
Ratio of other financial institutions' assets to GDP	1960–97	80	2,008
Ratio of private credit by deposit money banks to GDP	1960–97	160	3,901
Ratio of private credit by deposit money banks and other financial institutions to GDP	1960–97	161	3,923
Net interest margin	1990–97	129	721
Overhead costs	1990–97	129	719
Concentration	1990–97	137	822
Foreign bank share (assets)	1990–97	111	673
Foreign bank share (number)	1990–97	111	673
Public share	1980–97	41	213
Ratio of total assets of bank-like institutions to GDP	1980–97	54	766
Ratio of total assets of life insurance companies to GDP	1980–97	24	333
Ratio of total assets of insurance companies to GDP	1980–97	40	547
Ratio of total assets of private pension and provident funds to GDP	1980–97	16	185
Ratio of total assets of pooled investment schemes to GDP	1980–97	27	295
Ratio of total assets of development banks to GDP	1980–97	46	634
Ratio of private credit by bank-like institutions to GDP	1980–97	43	652
Ratio of private credit by life insurance companies to GDP	1980–97	17	258
Ratio of private credit by insurance companies to GDP	1980–97	19	275
Ratio of private credit by private pension and provident funds to GDP	1980–97	11	126
Ratio of private credit by pooled investment schemes to GDP	1980–97	10	106
Ratio of private credit by development banks to GDP	1980–97	38	555
Life insurance penetration	1987–96	85	682
Life insurance density	1987–96	85	682
Ratio of stock market capitalization to GDP	1976–97	93	1,171
Ratio of stock market total value traded to GDP	1975–97	93	1,264
Stock market turnover ratio	1976–97	93	1,154
Ratio of private bond market capitalization to GDP	1990–97	37	287
Ratio of public bond market capitalization to GDP	1990–97	37	287
Ratio of equity issues to GDP	1980–95	42	586
Ratio of long-term private debt issues to GDP	1980–95	40	508

Source: Database was constructed by the authors from data in IMF (various years), International Finance Corporation (various years), and other sources.

These are institutions that serve as financial intermediaries, while not incurring liabilities usable as means of payment.

We distinguish between two different balance sheet items: total claims on domestic nonfinancial sectors (lines a through d) and claims on the private sector (line d).[6] In this article we denote total claims on domestic nonfinancial sectors as "assets" and claims on the private sector as "private credit." Assets refer to total domestic financial intermediation that the respective intermediary performs, and private credit captures financial intermediation with the private nonfinancial sector. For both measures we exclude claims on central banks, deposit money banks, and other financial institutions (lines e through g)—and therefore any cross-claim that one financial sector has on another.

Measures of the Size of Financial Intermediaries

We construct relative size indicators that measure the importance of the three financial sectors relative to each other, and we construct absolute size indicators that measure size relative to GDP.

The relative size measures are *the ratio of central bank assets to total financial assets, the ratio of deposit money bank assets to total financial assets,* and the *ratio of other financial institutions' assets to total financial assets,* where total financial assets are the sum of the assets of the central bank, deposit money banks, and other financial institutions. Since we calculate these measures only if data are available for all three categories, we construct an alternative indicator that measures the relative importance of deposit money banks relative to central banks: the *ratio of deposit money bank assets to central bank and deposit money bank assets.*

Three indicators measure the size of the three financial sectors relative to GDP: *the ratio of central bank assets to GDP, the ratio of deposit money bank assets to GDP,* and *the ratio of other financial institutions' assets to GDP.* The assets include claims on the whole nonfinancial real sector, including government, public enterprises, and the private sector. The sum of the three measures equals the total claims that financial intermediaries have on nonfinancial domestic sectors, relative to GDP, and thus constitutes a comprehensive measure of financial intermediation.

Since many researchers have focused on the liability side of the balance sheet, we include a measure of absolute size based on liabilities: *the ratio of liquid liabilities to GDP.* Liquid liabilities equal currency plus demand and interest-bearing liabilities of banks and other financial intermediaries. This is the broadest available indicator of financial intermediation, since it includes all three financial sectors. Liquid liabilities are a typical measure of financial depth, and thus of the overall size of the financial sector, that does not distinguish between the financial sectors or between the use of liabilities.

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6. In the case of other financial institutions we also include line h—claims on real estate—in total claims on domestic nonfinancial sectors and in private credit.

Measures of the Activity of Financial Intermediaries

Two indicators focus on intermediary claims on the private sector: *the ratio of private credit by deposit money banks to GDP* and *the ratio of private credit by deposit money banks and other financial institutions to GDP*. Both measures isolate credit issued to the private sector as opposed to credit issued to governments and public enterprises. Furthermore, they concentrate on credit issued by intermediaries other than the central bank. They measure one of the main activities of financial intermediaries: channeling savings to investors.

II. Efficiency and Market Structure of Commercial Banks

We collected data on the efficiency and market structure of commercial banks from individual banks' balance sheets, provided by Fitch IBCA's Bankscope database, and from individual country sources, such as central bank and supervisory body publications.[7] We first present two efficiency measures of commercial banks. Then we define several indicators of market structure, in terms of concentration, foreign bank penetration, and public versus private ownership.

Measures of Efficiency

One of the main functions of financial intermediaries is to channel funds from savers to investors. We construct two measures of the efficiency with which commercial banks perform this function. The *net interest margin* equals the accounting value of a bank's net interest revenue as a share of its total assets. The net interest margin also can be used as an indicator of the financial sector's competitive structure, although many factors may influence interest margins. *Overhead costs* equals the accounting value of a bank's overhead costs as a share of its total assets. We construct both measures as unweighted averages across all banks in a country for a given year.

Measures of Market Structure

The *concentration* of commercial banks equals the ratio of the three largest banks' assets to total banking sector assets. A highly concentrated commercial banking sector might reflect a lack of competition. We use two measures of foreign bank penetration: *foreign bank share (number)* equals the number of foreign banks in total banks, and *foreign bank share (assets)* equals the share of foreign bank assets in total banking sector assets.[8] A bank is defined as foreign if at least 50 percent of the equity is owned by foreigners.

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7. The classifications "commercial" and "deposit money banks" are close, but not exactly the same. Whereas the IMF database defines deposit money banks consistently across countries, Bankscope uses country-specific definitions of commercial banks. Unfortunately, Bankscope's coverage is less than 100 percent for most countries' banking sectors. This poses relatively few problems for the efficiency measures, but poses more for the measures of market structure, as discussed below.

8. There are important measurement problems with these shares. The Bankscope coverage is less than 100 percent. To the extent that foreign and large banks are more likely to be included in the Bankscope

Public versus private ownership has become an increasingly important issue for both researchers and policymakers, not only in the banking sector, but also in the whole economy (Demirgüç-Kunt and Levine 1996). Our database compiles panel data on the public ownership of commercial banks. The measure *public share* equals the share of publicly owned commercial bank assets in total commercial bank assets. A bank is defined as public if at least 50 percent of the equity is held by the government or a public institution. Separately, La Porta, Lopez-de-Silanes, and Shleifer (2000) put together data on public ownership of commercial banks using detailed assessments from each country.[9]

III. OTHER FINANCIAL INSTITUTIONS

This section presents measures of bank-like institutions, insurance companies, private pension and provident funds, pooled investment schemes, and development banks. We collected data from the IMF (various years), individual country sources (central banks, bank and insurance supervisory publications, statistical yearbooks), and *SIGMA*, a monthly publication from the reinsurance company Swiss Re.

Categories of Other Financial Institutions

Bank-like institutions comprise intermediaries that accept deposits without providing transferable deposit facilities and intermediaries that raise funds on the financial market mainly in the form of negotiable bonds. Examples of the first group are savings banks, cooperative banks, mortgage banks, and building societies. An example of the second group is finance companies. These institutions are often specialized in very specific activities, for historic, legal, or tax reasons.[10]

Within the category of *insurance companies* we can distinguish between life insurance companies and other insurance companies. We do not include insurance funds that are part of a government social security system.

Like life insurance companies, *pension and provident funds* serve for pooling risk and accumulating wealth. We do not include pension funds that are part of a government social security system.

Pooled investment schemes include financial institutions that invest on behalf of their shareholders in a certain type of asset, such as real estate investment schemes or mutual funds.

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database, then both foreign bank indicators and the concentration measure will be biased upward. This might be particularly relevant in developing countries. Also, a bank is defined as foreign if it was foreign in 1998. Thus takeovers of domestic banks by foreign banks are not taken into account. Given these problems, these indicators have to be used with caution in cross-country comparisons.

9. Their country coverage is broader, but their measure considers the largest 10 banks of a country and is only available for two points in time.

10. This definition is more restricted than the definition of other bank-like institutions given in the *International Financial Statistics*.

And, lastly, *development banks* are financial institutions that derive their funds mainly from the government, other financial institutions, and supranational organizations. On the asset side they are often concentrated on specific groups of borrowers. Most development banks were set up after World War II or after independence, in the case of developing countries, in an effort to foster economic development.

Measures of the Size and Activity of Other Financial Institutions

For all five groups constituting other financial institutions we construct measures of their size relative to GDP by calculating the ratio of total assets to GDP. Unlike in section I, here total assets refer to total assets of balance sheets.[11] We also construct activity indicators by measuring claims on the private sector relative to GDP.

For the insurance sector we include additional measures: *assets and private credit of the life insurance sector,* where disaggregated data are available; *life insurance penetration,* measured by the ratio of premiums to GDP; and *life insurance density,* measured by the ratio of premiums to population size. Life insurance penetration provides evidence on the importance of the life insurance sector relative to the total economy, and life insurance density provides evidence on the expenditure per capita on life insurance provision.[12]

IV. STOCK AND BOND MARKET DEVELOPMENT

The database includes measures of the primary and secondary stock and bond markets. By including bond markets and primary equity markets, this database significantly improves on previous work. Most of the data on the secondary stock market come from the International Finance Corporation's *Emerging Market Database.* Data on the secondary bond market are from the Bank for International Settlements' *Quarterly Review on International Banking and Financial Market Development.* Data on the primary equity and debt markets come from country-specific sources, which were collected by Aylward and Glen (1998), and from the Organisation for Economic Co-operation and Development's (OECD) *Financial Statistics Monthly.*

Indicators of Stock Market Size, Activity, and Efficiency

The ratio of stock market capitalization to GDP indicates the size of the stock market relative to the size of the economy. Stock market capitalization equals the value of listed shares.

11. Using the total assets of balance sheets is problematic because they might include cross-claims within a category of other financial institutions and claims on other groups of financial intermediaries. A size measure, such as the measure in section I that includes only claims on the nonfinancial sector, is therefore preferable, but not available for most countries.

12. Life insurance density is constructed as premiums in local currency divided by the purchasing power parity conversion factor (obtained from World Bank 1997) and the population. To obtain the real density, we adjust these numbers by the annual consumer price index of the United States.

The ratio of stock market total value traded to GDP measures the trading volume of the stock market as a share of national output and should reflect the degree of liquidity that stock markets provide to the economy. Total value traded equals the value of total shares traded on the stock market exchange.

The stock market turnover ratio is the ratio of the value of total shares traded to market capitalization. It measures the activity or liquidity of a stock market relative to its size. A small, but active, stock market will have a high turnover ratio, whereas a larger, but less liquid, stock market will have a low turnover ratio.

Indicators of Bond Market Size

As indicators of the size of the domestic bond market we use the ratios of *private* and *public bond market capitalization to* GDP. Bond market capitalization equals the total amount of outstanding domestic debt securities issued by private or public domestic entities. These two indicators thus measure the size of the market for public and private bonds relative to the real economy.

Indicators of the Size of Primary Stock and Bond Markets

For the indicator of size we use *the ratio of equity issues to* GDP for primary stock markets and *the ratio of long-term private debt issues to* GDP for bond markets. While the indicators of bond and stock market capitalization measure the outstanding publicly traded equity and debt, equity and long-term debt issues indicate the extent to which enterprises use these vehicles to raise external finance.

V. CONCLUDING REMARKS

This article introduced new indicators of the size, activity, and efficiency of financial intermediaries and markets across countries and over time. The database is part of a broader research project that tries to understand the determinants of financial development and its importance for economic development. These indicators can be used to investigate a wide range of financial issues (see Beck, Demirgüç-Kunt, and Levine 2000; Beck and Levine 2000; Demirgüç-Kunt and Levine 1999; Demirgüç-Kunt and Maksimovic 2000; and Levine 2000).

REFERENCES

The word "processed" describes informally reproduced works that may not be commonly available through library systems.

Aylward, Anthony, and Jack Glen. 1998. "Emerging Primary Markets." International Finance Corporation, Washington, D.C. Processed.

Bank for International Settlements. Various years. *Quarterly Review on International Banking and Financial Market Development.* On-line at www.bis.org.

Beck, Thorsten, Aslı Demirgüç-Kunt, and Ross Levine. 2000. "Politics, Law, and Finance." World Bank, Development Research Group, Washington, D.C. Processed.

Beck, Thorsten, and Ross Levine. 2000. "New Firm Formation and Industry Growth: Does Having a Market- or Bank-Based System Matter?" Policy Research Working Paper 2383. World Bank, Development Research Group Washington, D.C. Processed.

Beck, Thorsten, Ross Levine, and Norman Loayza. 2000. "Finance and the Sources of Growth." *Journal of Financial Economics* (forthcoming).

Demirgüç-Kunt, Aslı, and Ross Levine. 1996. "The Financial System and Public Enterprise Reform: Concepts and Cases." In Niels Hermes and Robert Lensink, eds., *Financial Development and Economic Growth*. London and New York: Routledge.

———. 1999. "Bank-based and Market-based Financial Systems: Cross-Country Comparisons." Policy Research Working Paper 2143. World Bank, Development Research Group, Washington, D.C. Processed.

Demirgüç-Kunt, Aslı, and Vojislav Maksimovic. 1998. "Law, Finance, and Firm Growth." *Journal of Finance* 53(6):2107–37.

———. 2000. "Funding Growth in Bank-based and Market-based Financial Systems: Evidence from Firm-level Data." World Bank, Development Research Group, Washington, D.C. Processed.

IMF (International Monetary Fund). 1984. " A Guide to Money and Banking Statistics in International Financial Statistics." Washington, D.C.

———. Various years. *International Financial Statistics*. Washington, D.C.

International Finance Corporation. Various years. *Emerging Market Database*. Washington, D.C.

King, Robert G., and Ross Levine. 1993a. "Finance and Growth: Schumpeter Might Be Right." *Quarterly Journal of Economics* 108(3):717–38.

———. 1993b. "Finance, Entrepreneurship, and Growth: Theory and Evidence." *Journal of Monetary Economics* 32(3):513–42.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2000. "Government Ownership of Commercial Banks." NBER Working Paper 7620. National Bureau of Economic Research, Cambridge, Mass. Processed.

Levine, Ross. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35(2):688–726.

———. 2000. "Bank-based or Market-based Financial Systems: Which Is Better?" University of Minnesota, Department of Economics, Minneapolis. Processed.

Levine, Ross, Norman Loayza, and Thorsten Beck. 2000. "Financial Intermediation and Growth: Causality and Causes." *Journal of Monetary Economics* 46(1):31–77.

Levine, Ross, and Sara Zervos. 1998. "Stock Markets, Banks, and Economic Growth." *American Economic Review* 88(June):537–58.

Neusser, Klaus, and Maurice Kugler. 1998. "Manufacturing Growth and Financial Development: Evidence from OECD Countries." *Review of Economics and Statistics* 80(November):636–46.

OECD (Organisation for Economic Co-operation and Development). Various years. *Financial Statistics Monthly*. Paris.

Rajan, Raghuram G., and Luigi Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88(June):559–86.

Rousseau, Peter L., and Paul Wachtel. 1998. "Financial Intermediation and Economic Performance: Historical Evidence from Five Industrial Countries." *Journal of Money, Credit, and Banking* 30(4):657–78.

Swiss Re. 1998. *SIGMA*. Monthly. Zurich, Switzerland.

World Bank. 1997. *World Development Indicators 1997*. Washington, D.C.