

Financial Institutions and Markets across Countries and over Time: The Updated Financial Development and Structure Database

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This article introduces the updated and expanded version of the Financial Development and Structure Database. The database includes indicators on the size, efficiency, and stability of banks, nonbank financial institutions, and equity and bond markets over 1960–2007. It also contains indicators of financial globalization. JEL codes: G1, G2

The current financial crisis has moved the financial sector yet again to the top of the policy agenda. A large literature shows that the financial sector affects the rate of economic growth and the distribution of income. When the financial system goes awry and fails, it can devastate the lives of many people, as the world is currently experiencing.¹ As proper measurement is essential for analyzing causes and designing solutions, indicators measuring the size, activity, efficiency, and stability of the financial system are important for analysts, researchers, and policymakers alike.

This article introduces the updated and expanded version of the Financial Development and Structure Database. It provides statistics on the size, activity, efficiency, and stability of banks, nonbanks, equity markets, and bond markets across a broad spectrum of countries over time. It also contains several indicators of financial globalization, including statistics on international bond issues, international loans, off-shore deposits, and remittance flows.

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1. For an overview of the extensive literature on the finance and growth relationship, see Levine (2005) and Beck (2009). For more recent evidence on the relationship among finance, income equity, and poverty reduction, see Beck, Demirgüç-Kunt, and Levine (2007), World Bank (2007), and Demirgüç-Kunt and Levine (2009).

THE WORLD BANK ECONOMIC REVIEW, VOL. 24, NO. 1, pp. 77–92
Advance Access Publication January 11, 2010

doi:10.1093/wber/lhp016

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The database draws on a wide array of primary sources to cover different dimensions of the financial system. The database and further details on its construction are available at <http://econ.worldbank.org/financialstructure>.

First published in 1999, the Database of Financial Development and Structure has sparked considerable cross-country analytical work, inside and outside the World Bank.² The database has also sparked further efforts within the Bank to collect financial sector indicators, on both a global and a regional level, and to benchmark countries.

The revised database contains a select number of financial system indicators that are readily available for a large number of countries over 1960–2007. This necessarily excludes certain indicators that are available only for a small number of countries (such as detailed stock market liquidity or primary bond indicators) or for a few points in time (such as most indicators of how much individuals access the formal financial system). Compared with the original version of the database (as described in Beck, Demirgüç-Kunt, and Levine 2000), the revised version leaves out several indicators that were rarely used in the literature and can easily be constructed as ratios of other variables and several indicators for which it is difficult to access raw data across a large number of countries and a long period. Finally, the data are available annually and thus do not capture shorter-term trends.

This article uses the database to illustrate global financial system trends over recent decades. It shows that financial systems have continued to deepen along many dimensions, with rising values for standard indicators of financial intermediary and market development. However, progress has been uneven across income groups and regions. The deepening has been concentrated in high-income countries, with much less deepening in middle- and low-income countries.

Since the data end in 2007, they do not fully capture the recent crisis. However, indicators of banking efficiency, profitability, and stability match the trends in the boom period leading up to the recent global financial crisis. Specifically, the lower margins for traditional lines of business and the search for higher returns were possible only through high-risk taking, especially in high-income countries.

Integration into global financial markets has also increased, though the driving forces have differed for different income groups. While the increase in international lending and bond issues has been concentrated in high-income countries, low- and lower middle-income countries have benefited from higher remittance flows. Also, the ratio of off-shore deposits to domestic deposits is higher in low-income countries than in middle- and high-income countries,

2. The working paper version (Beck, Demirgüç-Kunt, and Levine 1999) is among the top 1 percent of papers cited in Research Papers in Economics (Repec), and the published version in the World Bank Economic Review is among the top 10 cited articles of the journal (Beck, Demirgüç-Kunt, and Levine 2000).

perhaps reflecting a lack of trust in domestic banking systems, though the ratio has halved over the past 12 years.

Any cross-country data collection effort is subject to biases due to different degrees of measurement quality across countries, as well as different accounting standards. However, such concerns are reduced by the fact that the raw data all come from one source, such as the International Monetary Fund's (IMF various years) International Financial Statistics, the BankScope database (Bureau van Dijk Electronic Publishing various years), and Swiss Re (various years). There are also concerns about coverage, especially for indicators based on the raw data from individual banks, as the coverage is incomplete. While this might result in certain measurement errors, internal World Bank comparisons with individual country data have mostly confirmed the reliability of the data.

Indicators of the size of financial systems are in section I; indicators of the structure, efficiency, and stability of commercial banks are in section II; indicators of the size and activity of capital markets and insurance sectors are in section III; and indicators of financial globalization are in section IV. Section V points to areas requiring additional research to provide data on important missing indicators. The working paper version of the article provides more detailed discussion of individual data series and their development across income groups and over time (Beck, Demirgüç-Kunt, and Levine 2009).

I. THE SIZE OF THE FINANCIAL SYSTEM

This section on the size of the financial system focuses on banks, bank-like financial institutions, equity markets, and private bond markets. (Table 1 lists the variables in the database and their coverage periods.) The indicators on financial intermediary development are based on the raw data from the International Financial Statistics from the IMF (various years), the equity market indicators on raw data from the Emerging Market Database (Standard & Poor's various years), and the bond market indicators on raw data from the Bank for International Settlements (BIS).

Liquid liabilities to GDP is a traditional indicator of financial depth. It is the ratio of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries to GDP. *Liquid liabilities* is the broadest available indicator of financial intermediation; it includes all banks and bank-like and nonbank financial institutions.³ There is wide cross-country variation in liquid liabilities to GDP, ranging from 395 percent in Luxembourg to less than

3. The International Financial Statistics of the IMF distinguish three groups of financial institutions. The first group comprises the central bank and other monetary authorities. The second group, deposit money banks, comprises all financial institutions with "liabilities in the form of deposits transferable by check or otherwise usable in making payments" (IMF 1984, p. 29). The third group, other financial institutions, comprises other bank-like institutions and nonbank financial institutions that serve as financial intermediaries, while not incurring liabilities usable as means of payment.

TABLE 1. Time Coverage of Variables

Variable	Coverage
Deposit money/central bank assets	1960–2007
Liquid liabilities/GDP	1960–2007
Central bank assets/GDP	1960–2007
Deposit money bank assets/GDP	1960–2007
Other financial institutions assets/GDP	1960–2007
Private credit by deposit money banks/GDP	1960–2007
Private credit by deposit money banks and other financial institutions/GDP	1960–2007
Bank deposits/GDP	1960–2007
Financial system deposits/GDP	1960–2007
Bank credit/bank deposits	1960–2007
Currency outside banking system/base money	1960–2007
Liquid liabilities (millions of 2000 U.S. dollars)	1960–2007
Overhead costs	1987–2007
Net interest margin	1987–2007
Bank concentration	1987–2007
Bank return on assets	1987–2007
Bank return on equity	1987–2007
Bank cost–income ratio	1987–2007
Bank z-score	1987–2007
Life insurance penetration	1960–2007
Nonlife insurance penetration	1987–2007
Stock market capitalization/GDP	1976–2007
Stock market total value traded/GDP	1975–2007
Stock market turnover ratio	1976–2007
Number of listed companies per 10,000 people	1975–2007
Private bond market capitalization/GDP	1990–2007
Public bond market capitalization/GDP	1990–2007
International debt issues/GDP	1988–2007
Loans from nonresident banks (net)/GDP	1993–2007
Loans from nonresident banks (amt outstanding)/GDP	1995–2007
Offshore bank deposits/domestic bank deposits	1995–2007
Remittance inflows/GDP	1970–2007

Source: See text for details.

1 percent in Sudan. Variation in the absolute size of financial systems is even greater, as illustrated by *liquid liabilities in USD*. On the one extreme, there are financial systems with trillions of U.S. dollars, such as Japan or the United States. On the other extreme, there are small and poor countries with financial systems not even as large as a single small bank in a developed country.

Currency outside banking system to base money is the share of base money that is not held as bank deposits. The level and change in currency outside the banking sector are frequently used as an estimate of the underdevelopment of the formal financial system (Schneider and Ernste 2000).

Financial system deposits to GDP is the ratio of all checking, savings, and time deposits in banks and bank-like financial institutions to economic activity and is a stock indicator of deposit resources available to the financial sector for

its lending activities. The database also contains an indicator limited to deposits of deposit monetary institutions, *bank deposits to GDP*.

While the previous indicators measure the liability side of financial intermediaries' balance sheets, indicators of the asset side capture credit allocation, one of the most important functions of financial intermediaries. *Private credit by deposit money banks and other financial institutions to GDP* is the ratio of claims on the private sector by deposit money banks and other financial institutions to GDP. It is a standard indicator in the finance and growth literature; countries with higher levels of private credit to GDP have been shown to grow faster and experience faster rates of poverty reduction (King and Levine 1993; Beck, Levine, and Loayza 2000; Beck, Demirgüç-Kunt, and Levine 2007). A somewhat narrower indicator—limited to deposit money banks—is *private credit by deposit money banks to GDP*.⁴

The size of equity markets is captured by *stock market capitalization to GDP*, or the ratio of the value of listed shares to GDP. It indicates the size of the stock market relative to the size of the economy. An indicator of the importance of private bond markets, *private bond market capitalization to GDP* is the ratio of the total amount of outstanding domestic debt securities issued by private or public domestic entities to GDP. Because of limited underlying raw data, this indicator is available for only 42 countries and only since 1990.

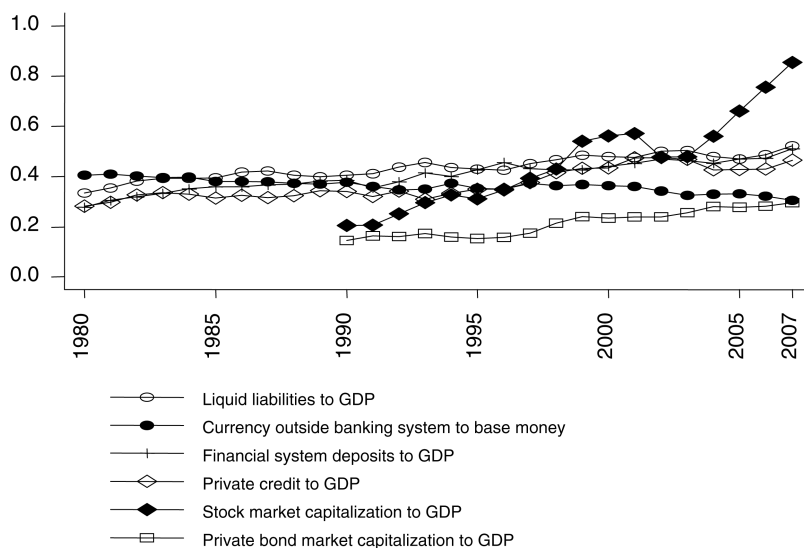
Figure 1 shows the development of these indicators between 1980 and 2007 for the sample of countries for which each indicator is available. While currency outside the banking system has decreased over time across countries, the indicators of the size of the financial system all show a positive trend line, with a rapid increase starting in 2005. Most notably, the ratio of stock market capitalization to GDP almost doubled between 2003 and 2007.

While these size indicators have been popular in the academic literature and with analysts, it is important to recognize that they are only proxies for financial sector development and that bigger is not always better, as the recent crisis has shown. Demirgüç-Kunt and Detragiache (1998, 2002) show that credit growth is a good crisis predictor, and Loayza and Ranciere (2006) show that while higher levels are associated with higher growth in the long term, there is a short-term negative relationship between credit levels and growth in GDP per capita. Critically, Beck and Levine (2002) show that the component of private credit to GDP explained by legal fundamentals is associated with economic growth, while Demirgüç-Kunt and Maksimovic (2002) show that credit beyond the level predicted by legal system efficiency and macroeconomic stability is not associated with faster firm growth.

Another important caveat is that these size measures are only proxies for the financial sector's function of allocating savings to their best uses. The size indicators do not capture directly the efficiency with which financial institutions

4. This measure does not distinguish between banks of different ownership types. Also, it does not include securitized loans, as it refers only to loans on the balance sheet of banks.

FIGURE 1. Financial System Size Indicators, Median Value over Time, 1980–2007



Source: Authors' analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

and markets undertake this role. Some indicators presented in the next sections measure the efficiency of financial institutions and markets, which in turn can proxy for allocation efficiency.

II. THE BANKING SYSTEM—SIZE, STRUCTURE, EFFICIENCY, AND STABILITY

The banking system constitutes the largest part of the financial system in most countries, especially in emerging and developing market economies. The database therefore includes an array of indicators measuring the size, structure, efficiency, and stability of banks across countries and over time. Additional indicators have been added that gauge the efficiency, profitability, and stability of banking sectors.

Based on the raw data from the International Financial Statistics, three indicators measure the claims on the whole nonfinancial real sector (including government, public enterprises, and the private sector) by three types of financial institutions: *central bank assets to GDP*, *deposit money banks assets to GDP*, and *other financial institutions assets to GDP*. Also included is a measure of the importance of commercial banks relative to the central bank, *deposit money to central bank assets*. Countries where deposit money banks have a larger role in financial intermediation than do central banks are considered to have higher levels of financial development (King and Levine 1993).

Several indicators of intermediation efficiency are included. First, bank credit to bank deposits is the ratio of claims on the private sector to deposits in deposit money banks. It gauges the extent to which banks funnel credit to the private sector. The variation in 2007 was large—between 21 percent in the Republic of Congo and 307 percent in Denmark. Obviously, deposits are not the only funding source of banks, and credits are not the only assets that banks hold, so a ratio much above one suggests that private sector lending is also funded with nondeposit sources, which could result in funding instability such as that experienced recently by many banks and countries in Central and Eastern Europe.

Second, *net interest margin* is the accounting value of a bank's net interest revenue as a share of its total earning assets, while *overhead cost* is the accounting value of a bank's overhead costs as a share of its total assets. Unlike the previous banking system indicators, these two variables are constructed from raw bank-level data from the BankScope database. Both measures are unweighted averages across all banks of a country for a given year.⁵ Higher levels of net interest margins and overhead costs indicate lower levels of banking efficiency, as banks incur higher costs and there is a higher wedge between lending and deposit interest rates. Net interest margins have declined over time, with margins in high-income countries recently falling from already low levels (figure 2).⁶

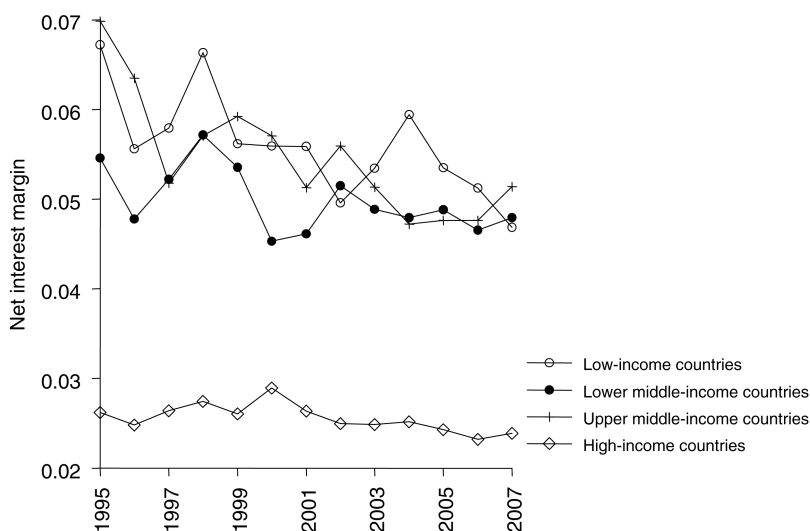
The final indicator of banking efficiency, *cost-income ratio*, measures overhead costs relative to gross revenues, with higher ratios indicating lower levels of cost efficiency. As in the case of net interest margins and overhead costs, data on cost-income ratios are based on the bank-level data. Banks in richer countries typically have lower cost-income ratios.

Concentration, an indicator of banking market structure, is the ratio of the three largest banks' assets to total banking sector assets. The indicator is based on the bank-level data from BankScope, which raises measurement concerns. Since BankScope's bank coverage is not complete, variation across countries and time might be driven by differences in coverage rather than differences in the market structure. There is no clear correlation between concentration and income levels of countries. The median country in the upper middle-income category has the lowest concentration ratio, while the median country in the low-income category has the highest ratio. Concentration is frequently used as an indicator of the lack of banking system competitiveness, though Claessens and Laeven (2004) find a very low correlation between concentration and other measures of banking competitiveness. Nevertheless, in the absence of more

5. BankScope coverage is less than 100 percent of most countries' banking sector. This poses relatively few problems for efficiency measures but causes greater difficulty for measures of market structure, as discussed later.

6. Spreads denote the difference between *ex ante* contracted loan and deposit interest rates, while margins are the interest (and noninterest) revenue actually received on loans minus the interest costs on deposits (minus noninterest charges on deposits). The main difference between spreads and margins is lost interest revenue on nonperforming loans, so spreads are normally higher than margins.

FIGURE 2. Net Interest Margin, Median Values by Income Group over Time, 1995–2007



Source: Authors' analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

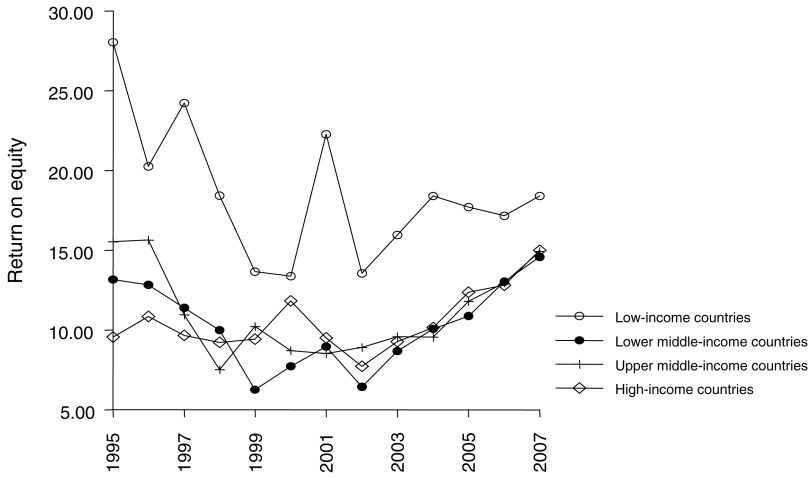
detailed banking level data, concentration ratios are still the most readily available market structure indicator across countries and over time.⁷

Two indicators of profitability, *return on assets* and *return on equity*, are computed as unweighted averages across all banks in a given year. While banks in the median country in high- and middle-income countries have a return on equity of around 15 percent, with little variation between high-, upper middle-, and lower middle-income countries, the median return on equity was more than 20 percent in 2007 in low-income countries. Return on equity shows considerable variation over time, declining from 12 percent in 1995 to 8 percent in 2002, before rising again to pass 15 percent in 2007 (figure 3). Similarly, returns on assets first declined then rose, a trend repeated across median countries of all income groups.

Finally, the *z*-score, an indicator of banking stability, was added to the database. The *z*-score is the ratio of return on assets plus the capital–asset ratio to the standard deviation of return on assets. If profits are assumed to follow a normal distribution, the *z*-score is the inverse of the probability of insolvency. Specifically, *z* indicates the number of standard deviations below the expected value of a bank's return on assets at which equity is depleted and the bank is insolvent (Roy 1952; Hannan and Henwick 1988; Boyd, Graham, and Hewitt

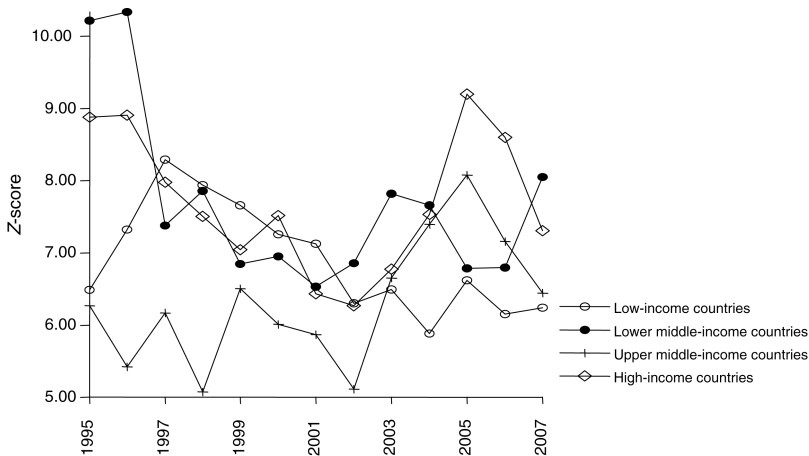
7. The original version of this database also contained indicators of foreign and government ownership of banks. However, the ownership information provided by BankScope was found to be inaccurate in many cases, so these indicators are not included. Barth, Caprio, and Levine (2008) provide ownership information on a less than annual frequency.

FIGURE 3. Bank Return on Equity, Median Values by Income Group over Time, 1995–2007



Source: Authors’ analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

FIGURE 4. Bank z -Score, Median Values by Income Group over Time, 1995–2007



Source: Authors’ analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

1993; De Nicolo 2000). Thus, a higher z -score indicates that the bank is more stable. As measured by the z -score, the bank stability varies across income groups and even more over time. The z -score has been declining since 1995, and following some increases in early 2000s, the declines since 2005 have been substantial for high- and upper middle-income countries (figure 4).

The banking trends documented in recent years through 2007 match those of a boom period leading up to a global financial crisis, especially in high-income countries. Among them were low and declining net interest margins (forcing banks to look for alternative income sources); rising profitability, as proxied by higher returns on assets and equity; and declining stability, evidenced by lower *z*-scores. With increasing returns on assets, the lower *z*-scores in the years leading up to 2007 can be explained either by lower capital—likely in the context of the transition toward Basel II standards in many high- and middle-income countries—or higher volatility of returns. Low- and lower middle-income countries have not shown similar banking trends, but they have also not experienced the same degree of financial deepening as high-income countries. In hindsight, these recent trends of low banking margins, a search for higher profits, and declining stability in high-income countries illustrate the circumstances surrounding the financial sector boom that led to the 2007 financial crisis.

III. CAPITAL MARKETS AND THE INSURANCE SECTOR

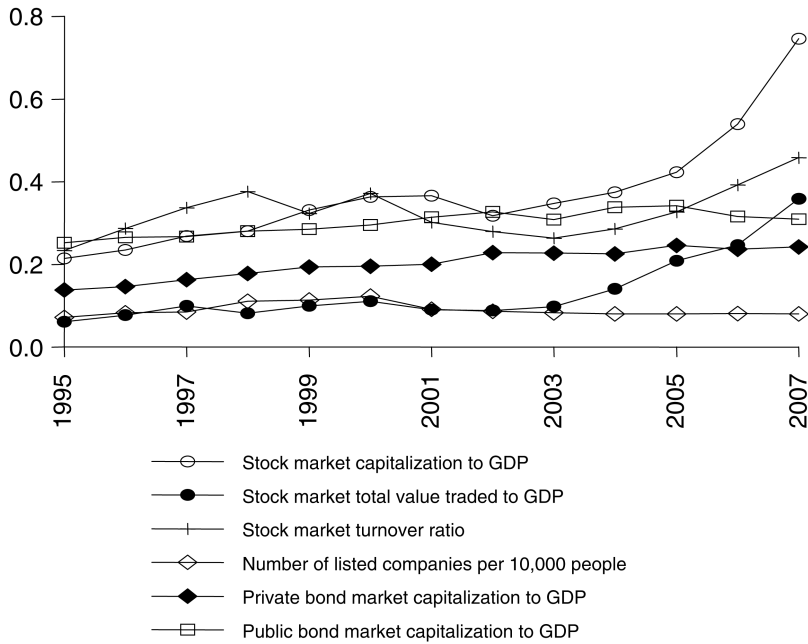
As did the original database, the new database includes several indicators of capital market development and the size of the insurance sector. The equity market indicators are based on the raw data from Standard & Poor's Emerging Markets Database; the bond market indicators are based on raw data from the Bank for International Settlements banking statistics, and the insurance data are based on the raw data from Swiss Re.

As discussed, *stock market capitalization to GDP* is the ratio of listed shares to GDP, an indicator of the size of the stock market relative to the size of the economy. *Stock market total value traded to GDP* is the ratio of total shares traded on the stock exchange to GDP, a measure of the degree of liquidity that stock markets provide to the economy. *Stock market turnover ratio* is the ratio of the value of total shares to market capitalization, a measure of 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 large but less liquid stock market will have a low turnover ratio. Finally, the ratio of *listed firms to population* is the share of listed companies divided by total population.

Both stock market capitalization and value traded have been increasing since 1995, while the ratio of listed firms to population does not show a clear trend (figure 5). The turnover ratio has risen slightly since 2003, but the rise has been less pronounced than the increases for the ratios of capitalization and trading to economic activity. Thus, the prices of existing stocks rather than the listing of new enterprises or greater stock market liquidity have driven stock market development in recent years. This is an important observation, as cross-country comparisons have shown that it is stock market liquidity rather than its size that matters for economic growth (Levine and Zervos 1998; Beck and Levine 2004).

Indicators of the size of the domestic bond market, *private bond market capitalization to GDP* and *public bond market capitalization to GDP*, are the

FIGURE 5. Stock, Bond, and Insurance Market Indicators, Median Values over Time, 1995–2007



Source: Authors' analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

ratio of total outstanding domestic debt securities issued by private and public domestic entities to GDP. These indicators measure the size of the market for public and private bonds relative to the real economy. While private bond market capitalization is positively correlated with country income levels, there is no clear correlation for public bond markets. There has been an upward trend in both indicators since 1995, although emphatically less than for stock markets. This is not surprising, as bonds are typically traded around their nominal value, unlike shares whose prices can be many times the original book value (see figure 5).

Indicators of the size of the insurance sector are *life insurance penetration*, the ratio of life insurance premiums to GDP, and *nonlife insurance penetration*, the ratio of nonlife insurance premiums to GDP. Both indicators measure total premium revenue in life and nonlife insurance business lines relative to economic activity. As the premium volume is the quantity of insurance coverage times its price, higher volumes can indicate either a deeper insurance market or less competition or efficiency. Both indicators increase with the income level of a country. This correlation is much stronger for life than for nonlife insurance, which is not surprising as life insurance is typically considered more income elastic than is nonlife insurance, such as motor vehicle or business

insurance policies.⁸ Nonlife insurance and especially life insurance products have experienced an upward trend in recent years.

IV. INDICATORS OF FINANCIAL GLOBALIZATION

Unlike previous versions, the updated database includes several indicators of how well a country's financial system is linked to international financial markets. All these indicators are outcome variables, unlike those in much of the literature, which are *de jure* indicators of capital account or equity market liberalization. The new dataset includes only a select number of indicators of financial globalization that are not included in other datasets.⁹

International debt to GDP measures the stock of outstanding international bonds relative to a country's economic activity, while *international debt issues to GDP* measures the net flow of international bond issues relative to a country's economic activity. Both outstanding and new issues of international debt increase with countries' income level. Outstanding debt has risen annually since 1995, driven mostly by high-income countries; there have been fewer increases in middle- and low-income countries (figure 6).

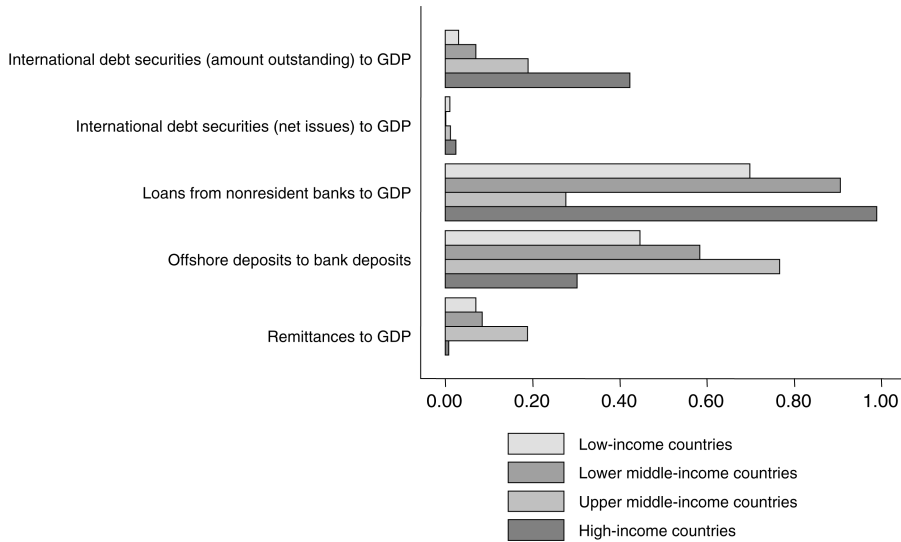
International loans from nonresident banks to GDP is the ratio of a country's loans of Bank for International Settlements reporting banks to the country's economic activity.¹⁰ *Off-shore deposit to domestic deposits* is the ratio of deposits held by a country's nationals in off-shore banks to deposits in domestic banks. International loans increase with the country income level, while the ratio of off-shore deposits to domestic deposits is highest for low-income countries and decreases with the country income level. This can be partly explained by the lack of confidence that households and enterprises have in domestic banking systems, a phenomenon especially pronounced in Sub-Saharan Africa (Honohan and Beck 2007). International loans have been increasing in high-income countries, while remaining relatively stable in middle- and low-income countries. Off-shore deposits relative to domestic deposits have been low and stable in high- and middle-income countries, while

8. Different taxation of life insurance policies might explain variations in the size of the insurance markets even across countries at similar levels of economic development. For an in-depth study of the cross-country determinants of life insurance consumption, see Beck and Webb (2003). For an exploration of the relationship between insurance sector development and economic growth, see Arena (2008).

9. See, for example, Lane and Milesi-Ferretti (2008) on international asset and liability positions across countries; Chinn and Ito (2006) on *de jure* measures of capital account openness, and Bekaert and Harvey (2000) on equity market liberalization.

10. Bank for International Settlements reporting banks include banks residing in Australia, Austria, the Bahamas, Bahrain, Bermuda, Brazil, Cayman Islands, Chile, Denmark, Finland, Greece, Guernsey, Hong Kong (China), India, Ireland, Isle of Man, Jersey, Korea, Luxembourg, Macao (China), Malaysia, Mexico, the Netherlands Antilles, Norway, Panama, Portugal, Singapore, Spain, Taiwan (China), and Turkey.

FIGURE 6. Financial Globalization Indicators, Mean Values by Income Group, 2003–07



Source: Authors' analysis of Financial Development and Structure Database (<http://econ.worldbank.org/financialstructure>).

falling by half (from 4.9 to 2.4 percent) in low-income countries between 1997 and 2007.

Finally, *remittance inflows to GDP* are the flow of official remittances relative to economic activity. As migration has increased, remittance flows have become an important source of capital inflows in many developing countries, rising from less than 1 percent in 1995 to almost 2 percent in 2007. In some countries, including Moldova, Tajikistan, and Tonga, remittance inflows are more than 30 percent of GDP; in Liberia, they are 94 percent of GDP. On average, however, the lower middle-income countries have the highest ratio of remittances to GDP. The rise in remittances is driven by the doubling of remittance flows to low- and lower middle-income countries. Remittance flows to upper middle- and high-income countries have not shown a clear trend in recent years. Remittance patterns also reflect increasing migration flows from developing to developed countries. These statistics likely underestimate remittance flows, however, as they exclude informal flows (captured by the omitted category in balance of payments statistics).¹¹

In summary, the trend toward globalization in financial services has been uneven across income groups. While this globalization trend has been especially pronounced in international lending and bond issues in high-income

11. According to estimates, at least a third of remittances are sent through informal channels (Freund and Spatafora 2008).

countries, low- and lower middle-income countries have benefited from increased remittance flows. The current global financial crisis could alter these trends, but it is too soon to know what the effects will be.

V. CONCLUDING REMARKS

The expanded and updated version of the Financial Structure Database will facilitate rigorous research that can enhance policy recommendations.

The current crisis has exposed the need for additional data collection, both to better understand the causes of the crisis and to design policies to mitigate the impact of financial sector fragility. For example, future research should collect information on cross-border links among banks, nonbanks, and financial markets to obtain better measures of international financial links. Understanding the asset and funding structure of the financial institutions is similarly important, as recent research has shown how balance sheet structure can affect both the profitability and the stability of banks (Caprio, Laeven, and Levine 2007; Demirgüç-Kunt and Huizinga forthcoming; Laeven and Levine forthcoming).

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