Public Disclosure Authorized

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WPS6175

Policy Research Working Paper 6175

Benchmarking Financial Systems around the World

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Financial and Private Sector Development Vice Presidency
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Development Economics Vice Presidency
August 2012

Abstract

This paper introduces the Global Financial Development Database, an extensive dataset of financial system characteristics for 205 economies from 1960 to 2010. The database includes measures of (a) size of financial institutions and markets (financial depth), (b) degree to which individuals can and do use financial services (access), (c) efficiency of financial intermediaries and markets in intermediating resources and facilitating financial transactions (efficiency), and (d) stability of financial institutions and markets (stability). The authors document cross-country differences and time series trends.

This paper was prepared as part of work underlying the *Global Financial Development Report,* cosponsored by the Financial and Private Sector Development Vice Presidency and the Development Economics Vice Presidency.. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at mcihak@worldbank.org.

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Produced by the Research Support Team

Benchmarking Financial Systems around the World

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Keywords: Financial sector, financial systems, economic development

JEL Classification: G00, G01, G10, G20, O16

[1] Čihák, Demirgüç-Kunt, and Feyen: World Bank; Levine: Brown University and the NBER. Aart Kraay was instrumental in sharpening the authors' thinking on indices of financial development. The database builds on previous work within the World Bank Group, in particular Beck, Demirgüç-Kunt, and Levine (2000, 2010). The paper also benefited from comments and suggestions by Thorsten Beck, Sergio Schmuckler, Roberto Rocha, Stijn Claessens, Augusto de la Torre, Norman Loayza, and Tunc Uyanik and participants in World Bank seminars. Amin Mohseni, Mauricio Pinzon Latorre, and Subika Farazi provided research assistance. Katie Kibuuka, Diego Sourrouille, Ed Al-Hussainy, Haocong Ren, and Andrea Coppola also helped with compiling parts of the dataset. All remaining errors those of the authors.

1. Introduction

A growing body of evidence suggests that financial institutions (such as banks and insurance companies) and financial markets (including stock markets, bond markets, and derivative markets) exert a powerful influence on economic development, poverty alleviation, and economic stability (Levine 2005). For example, when banks screen borrowers and identify firms with the most promising prospects, this is a key step that helps allocate resources, expand economic opportunities, and foster growth. When banks and securities markets mobilize savings from households to invest in promising projects, this is another crucial step in fostering economic development. When financial institutions monitor the use of investments and scrutinize managerial performance, this is an additional ingredient in boosting the efficiency of corporations and reducing waste and fraud by corporate insiders. But, that is not all. When equity, bond, and derivative markets enable the diversification of risk, this encourages investment in higher-return projects that might otherwise be shunned. And, when financial systems lower transactions costs, it facilitates trade and specialization—fundamental inputs to technological innovation (Smith 1776).

But, when financial systems perform these functions poorly, they tend to hinder economic growth, curtail economic opportunities, and destabilize economies. For example, if financial systems simply collect funds with one hand, and pass them along to cronies, the wealthy, and the politically-connected with the other hand, this slows economic growth and prohibits many potential entrepreneurs from even attempting to realize their economic dreams. And, if financial institutions fail to exert sound corporate governance over the firms that they fund, this makes it easier for managers to pursue projects that benefit themselves rather than the firm and the overall economy. When financial institutions create complex financial instruments and sell them to unsophisticated investors, this might boost the bonuses of the financial engineers and executives associated with marketing the new-fangled instruments while simultaneously distorting the allocation of society's savings and impeding economic prosperity.

Although the evidence on the role of the financial system in shaping economic development is substantial and varied, there are serious shortcomings associated with measuring the central concept under consideration: the functioning of the financial system. Researchers do not have good cross-country, cross-time measures of the degree to which financial systems (a) enhance the quality of information about firms and hence the efficiency of resource allocation, (b) exert sound corporate governance over the firms to which they funnel those resources, (c) provide effective mechanisms for managing, pooling, and diversifying risk, (d) mobilize savings from disparate savers so these resources can be allocated to the most promising projects in the economy, and (e) facilitate trade. Instead, researchers have largely—though not exclusively—relied on measures of the size of the banking industry as a proxy. But, size is not a measure of quality, or efficiency, or stability. And, the banking sector is only one component of financial systems.

A key contribution of this paper therefore lies on the data front. The effort to put together, improve, and analyze data on financial systems is an important motivation for this paper, and for the associated online database tools. In recent years, substantial efforts have gone into improving various aspects of these data, and the paper makes use of these improved data. This paper is accompanied by a newly launched Global Financial Development Database, an extensive world-

wide database combining and updating several financial data sets. The database is made publicly available at www.worldbank.org/financialdevelopment and http://data.worldbank.org/data-catalog/global-financial-development.

The paper, however, goes beyond just compiling data. It aims to answer some substantive questions using the data. The questions addressed in this paper are: How can one empirically characterize different characteristics of financial systems? How can one compare financial systems across countries and regions and through time? How have financial systems been affected by the global financial crisis, and what are the key trends in the aftermath of the crisis?

To measure and benchmark financial systems, the paper develops several measures of four characteristics of financial institutions and markets: (a) the size of financial institutions and markets (financial depth), (b) the degree to which individuals can and do use financial institutions and markets (access), (c) the efficiency of financial institutions and markets in providing financial services (efficiency), and (d) the stability of financial institutions and markets (stability). These four characteristics are measured both for financial institutions and financial markets (equity and bond markets), thus leading to a 4x2 matrix of financial system characteristics. The paper then uses these measures to characterize and compare financial systems across countries and over time and to assess the relationship between these measures of the financial system and key financial sector policies.

In focusing on these four characteristics of financial institutions and markets, the paper seeks to provide empirical shape and substance to the complex, multifaceted and sometimes amorphous concept of the "functioning of financial systems." The paper recognizes that financial depth, access, efficiency, and stability might not fully capture all features of financial systems and it makes no attempt to construct a single, composite index of financial systems. Rather, the paper uses these four characteristics as a basis for describing, comparing, and analyzing financial systems around the world and their evolution over the last few decades.

The analyses presented in this paper, together with the underlying datasets, highlight the multi-dimensional nature of financial systems. Deep financial systems do not necessarily provide high degrees of financial access; highly efficient financial systems are not necessarily more stable than the less efficient ones, and so on. Each of these characteristics has an association with aspects of the broader socio-economic development, and each is in turn strongly associated with financial sector policies and other parts of the enabling environment for finance. The paper illustrates that financial systems come in different shapes and sizes, and they differ widely in terms of the 4x2 characteristics. It is therefore important to measure and evaluate each characteristic of financial systems.

The paper also documents that the global financial crisis meant not only increased financial instability: the crisis also translated into difficulties along the other dimensions, such as more people and firms finding it increasingly difficult to access financial services. Finance is not just about stability. The degree to which financial systems channel society's savings to those with the most promising investment opportunities is fundamentally important for economic growth, poverty alleviation, and the degree to which individuals have the opportunity to pursue their economic aspirations.

The remainder of this paper proceeds as follows. Section 2 discusses the role of the financial system in economic development more generally. Section 3 discusses the difficulty associated with measuring the operation of financial systems and the paper's development of indicators of financial depth, access to finance, the efficiency of financial systems, and the stability of financial systems for both financial institutions and financial markets—the 4x2 measurement framework—as a strategy for empirically characterizing financial systems around the world and tracing their development over time. The section also introduces the Global Financial Development Database, an extensive world-wide database that combines and updates several financial data sets. Section 4 uses this database and the "4x2" measurement framework to examine and compare financial systems. Section 5 summarizes the key findings.

2. The Concept of Financial Development and Its Importance

There has been a considerable debate among economists on the role of financial development in economic growth and poverty reduction, but the balance of theoretical reasoning and empirical evidence points towards a central role of finance in socio-economic development. Economies with higher levels of financial development grow faster and experience faster reductions in poverty levels. This section introduces the concept of financial development and provides a brief review of the literature on the linkages between financial development, economic growth, and poverty reduction.

2.1 Concept of Financial Development

Markets are imperfect. It is costly to acquire and process information about potential investments. There are costs and uncertainties associated with writing, interpreting, and enforcing contracts. And, there are costs associated with transacting goods, services, and financial instruments. These market imperfections inhibit the flow of society's savings to those with the best ideas and projects, curtailing economic development and retarding improvements in living standards.

It is the existence of these costs—these market imperfections—that creates incentives for the emergence of financial contracts, markets and intermediaries. Motivated by profits, people create financial products and institutions to ameliorate the effects of these market imperfections. And, governments often provide an array of services—ranging from legal and accounting systems to government owned banks—with the stated goals of reducing these imperfections and enhancing resource allocation. Some economies are comparatively successful at developing financial systems that reduce these costs. Other economies are considerably less successful, with potentially large effects on economic development.

At the most basic, conceptual level, therefore, financial development occurs when financial instruments, markets, and intermediaries mitigate – though do not necessarily eliminate – the effects of imperfect information, limited enforcement, and transactions costs. For example, the creation of credit registries tended to improve acquisition and dissemination of information about potential borrowers, improving the allocation of resources with positive effects on economic development. As another example, economies with effective legal and regulatory systems have facilitated the development of equity and bond markets that allow investors to hold more diversified portfolio than they could without efficient securities markets. This greater risk

diversification can facilitate the flow of capital to higher return projects, boosting growth and enhancing living standards.

Defining financial development in terms of the degree to which the financial system eases market imperfections, however, is too narrow and does not provide much information on the actual functions provided by the financial system to the overall economy. Thus, Levine (1997 2005) and others have development broader definitions that focus on what the financial system actually does. [2]

At a broader level, financial development can be defined as improvements in the quality of five key financial functions: (a) producing and processing information about possible investments and allocating capital based on these assessments; (b) monitoring individuals and firms and exerting corporate governance after allocating capital; (c) facilitating the trading, diversification, and management of risk; (d) mobilizing and pooling savings; and (e) easing the exchange of goods, services, and financial instruments. Financial institutions and markets around the world differ markedly in how well they provide these key services. Although this paper sometimes focuses on the role of the financial systems in reducing information, contracting, and transactions costs, it primarily adopts a broader view of finance and stresses the key functions provided by the financial system to the overall economy.

2.2 Financial Development and Economic Growth

Economists have long debated the role of the financial sector in economic growth. Lucas (1988), for example, dismissed finance as an over-stressed determinant of economic growth. Robinson (1952, p. 86) quipped that "where enterprise leads finance follows." From this perspective, finance responds to demands from the non-financial sector; it does not cause economic growth. At the other extreme, Miller (1988, p.14) argued that the idea that financial markets contribute to economic growth “is a proposition too obvious for serious discussion.” Bagehot (1873) and others rejected the idea that the finance-growth nexus can be safely ignored without substantially limiting the understanding of economic growth.

Recent literature reviews (e.g., Levine 2005) conclude that the preponderance of evidence suggests a positive, first-order relationship between financial development and economic growth. In other words, well-functioning financial systems play an independent role in promoting long-run economic growth: economies with better-developed financial systems tend to grow faster over long periods of time, and a large body of evidence suggests that this effect is causal (e.g., Demirgüç-Kunt and Levine 2008).[3]

Moreover, research sheds light on the mechanisms through which finance affects growth—the financial system influences growth primarily by affecting the allocation of society’s savings, not by affecting the aggregate savings rate. Thus, when financial systems do a good job of

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[2]This is not the only approach to classifying the functions provided by the financial system, but it is not dramatically different from other approaches (e.g., Merton 1992; Merton and Bodie 2004), and it is it an approach that fits rather well the large finance literature, including recent research.

[3] In the empirical literature, identifying the impact of finance has sometimes proved challenging. For example, some of the early empirical literature on the subject requires the problematic identifying assumption that legal origins matters for development only through their impacts on finance. But subsequent papers have tried more nuanced and more persuasive approaches to ide4ntification (e.g., Rajan and Zingales 1998).

identifying and funding those firms with the best prospects, not those firms simply with the strongest political connections, this improves the capital allocation and fosters economic growth. Such financial systems promote the entry of new, promising firms and force the exit of less efficient enterprises. Such financial systems also expand economic opportunities, so that the allocation of credit—and hence opportunity—is less closely tied to accumulated wealth and more closely connected to the social value of the project. Furthermore, by improving the governance of firms, well-functioning financial markets and institutions reduce waste and fraud, boosting the efficient use of scarce resources. By facilitating risk management, financial systems can ease the financing of higher return endeavors with positive reverberations on living standards. And, by pooling society's savings, financial systems make it possible to exploit economies of scale—getting the biggest development bang for available resources.

2.3 Financial Development and Poverty Reduction

Beyond long-run growth, finance can also shape the gap between the rich and the poor and the degree to which that gap persists across generations (Demirgüç-Kunt and Levine 2009). Financial development may affect to what extent a person's economic opportunities are determined by individual skill and initiative, or whether parental wealth, social status, and political connections largely shape economic horizons. The financial system influences who can start a business and who cannot, who can pay for education and who cannot, who can attempt to realize his or her economic aspirations and who cannot. Furthermore, by affecting the allocation of capital, finance can alter both the rate of economic growth and the demand for labor, with potentially profound implications for poverty and income distribution.

Potentially, finance can have rather complex effects on the income distribution. It could boost returns to high skilled workers or to low skilled workers. The mechanisms are complex and could be good or bad for the poor and reduce or increase income inequality.

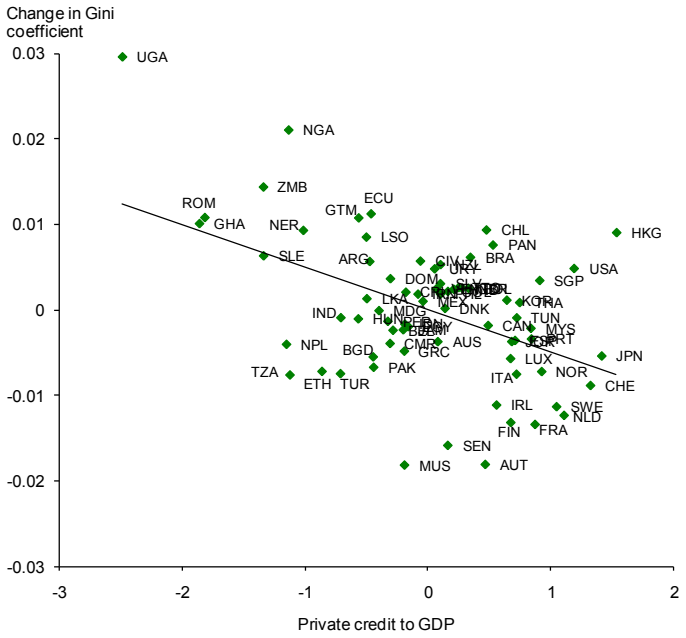
There is an emerging body of empirical research, however, suggesting that in practice, improvements in financial contracts, markets, and intermediaries actually do tend to expand economic opportunities and reduce persistent income inequality. Figure 1 provides a basic empirical illustration of the link between financial development (approximated here in a simplified way by private sector credit to GDP ratio) and income inequality (approximated by changes in the so-called Gini coefficient). The graph illustrates that higher levels of financial development are associated with declines in inequality.

More in-depth empirical research is consistent with this basic observation. For example, evidence suggests that access to credit markets increases parental investment in the education of their children and reduces the substitution of children out of schooling and into labor markets when adverse shocks reduce family income (Belley and Lochner 2007). Better functioning financial systems stimulate new firm formation and help small, promising firms expand as a wider array of firms gain access to the financial system. Moreover, better functioning financial systems will identify and fund better projects, with less emphasis on collateral and incumbency; thus, not only they allow new, efficient firms to enter, they also force old, inefficient firms to leave, as evidenced by data (Kerr and Nanda 2009).

Besides the direct benefits of enhanced access to financial services, finance also reduces inequality, particularly through indirect labor market mechanisms. Specifically, accumulating

evidence shows that financial development accelerates economic growth, intensifies competition, and boosts the demand for labor. Importantly, it usually brings relatively bigger benefits to those at the lower end of the income distribution (Beck, Demirguc-Kunt and Levine 2007; Beck, Levine, and Levkov 2010). Hence, finance, with good policies, can be both pro-growth and pro-poverty reduction.[4]

Figure 1. Financial Depth and Income Inequality



Source: Authors' update of Beck, Demirgüç-Kunt, and Levine (2007).
Note: The Gini coefficient is on a scale from 0 (total equality) to 1 (maximum inequality). The chart is a partial scatter plot, visually representing the regression of changes in the Gini coefficient between 1960 and 2005 on the private sector credit–to-GDP ratio (logarithm, 1960–2005 average), controlling for the initial (1960) Gini coefficient. Variables on both axes are residuals. The abbreviations next to some of the observations are the three-letter country codes as defined by the International Organization for Standardization.

3. The 4x2 Framework for Financial System Benchmarking

To capture the key features of financial systems, one would ideally like to have direct measures of how well financial institutions and financial markets (a) produce information ex ante about possible investments and allocate capital; (b) monitor investments and exert corporate governance after providing finance; (c) facilitate the trading, diversification, and management of risk; (d) mobilize and pool savings; and (e) ease the exchange of goods and services. So, if measurement was not an issue, one would like to be able to say that in terms of producing information about possible investments and allocate capital, the financial sector in Country A, for example, scores 60 on a scale from 0 to 100, while Country B's financial sector scores 75; in

[4] For an discussion of the linkages between financial sector outcomes and the enabling environment, see for example Beck, Feyen, Ize, and Moizeszowicz (2006)

terms of monitoring investments and exerting corporate governance after providing finance, Country A scores 90, while Country B scores only 20 on a scale from 0 to 100, and so on.

But, obtaining such direct measures of these financial functions is a major challenge. Levine (2005) points out that such empirical proxy variables often do not accurately measure the concepts emerging from theoretical models.

Thus, the goal of this paper is empirically measure four important characteristics of financial systems around the world for a broad cross-section of countries over a long time period. Specifically, this paper examines the following four characteristics of financial systems: (a) depth; (b) access; (c) efficiency, and (d) stability. The focus here is on measuring financial system characteristics.

These financial system characteristics are proxies of the services provided by the financial system. For example, "financial depth" is not a function in itself, but it is a proxy of the overall extent of services provided by the financial system. Similarly, the measures available for "access" do not directly measure how well the financial system identifies good investments, regardless of the collateral of the individual; but it provides an (imperfect, ex post) approximation of the breadth of use of particular financial institutions and instruments.

For completeness, the accompanying database includes data on broader social welfare indicators as well as the financial sector policy indicators and the other factors that define the enabling environment.

For each of the four characteristics, this paper presents measures for financial institutions (in particular banks, but also other, non-bank financial companies) and for financial markets. Table 1 provides a summary representation of this 4x2 matrix of financial system characteristics, building on a review of empirical literature on financial systems, discussed in the remainder in this section. Principal component analysis was used to double-check the choice of variables and their assignment to the 4x2 categories from the previous research.

The Global Financial Development Database is based on this 4x2 framework. It builds on, updates, and extends previous efforts, in particular the data collected for the "Database on Financial Development and Structure" by Beck, Demirgüç-Kunt, and Levine (2000, 2010). The database also incorporates data from the Financial Access Survey (http://fas.imf.org), the Global Findex (www.worldbank.org/globalfindex) and Financial Soundness Indicators (http://fsi.imf.org). Appendix I provides a further description of the data sources.

Table 1. The 4x2 Matrix of Financial System Characteristics
(with examples of candidate variables in each 'bin')

	FINANCIAL INSTITUTIONS	FINANCIAL MARKETS
DEPTH	**Private sector credit to GDP** Financial institutions' assets to GDP M2 to GDP Deposits to GDP Gross value-added of the financial sector to GDP	**Stock market capitalization plus outstanding domestic private debt securities to GDP** Private debt securities to GDP Public debt securities to GDP International debt securities to GDP Stock market capitalization to GDP Stocks traded to GDP
ACCESS	**Accounts per thousand adults** (commercial banks) Branches per 100,000 adults (commercial banks) % of people with a bank account % of firms with line of credit (all firms) % of firms with line of credit (small firms)	**Percent of market capitalization outside of top 10 largest companies** Percent of value traded outside of top 10 traded companies Government bond yields (3 month and 10 years) Ratio of domestic to total debt securities Ratio of private to total debt securities (domestic) Ratio of new corporate bond issues to GDP
EFFICIENCY	**Net interest margin** Lending-deposits spread Non-interest income to total income Overhead costs (% of total assets) Profitability (return on assets, return on equity) Boone indicator (or Herfindahl or H-statistics)	**Turnover ratio** (turnover/capitalization) for stock market Price synchronicity (co-movement) Private information trading Price impact Liquidity/transaction costs Quoted bid-ask spread for government bonds Turnover of bonds (private, public) on securities exchange Settlement efficiency
STABILITY	**Z-score** (or distance to default) capital adequacy ratios asset quality ratios liquidity ratios other (net foreign exchange position to capital etc)	**Volatility** (standard deviation / average) of stock price index, sovereign bond index Skewness of the index (stock price, sovereign bond) Vulnerability to earnings manipulation Price/earnings ratio Duration Ratio of short-term to total bonds (domestic, int'l) Correlation with major bond returns (German, US)

Source: Authors, based on literature review.
Note: This is a stylized matrix. Variables suggested for the benchmarking exercise are highlighted in bold. Private sector credit to GDP is domestic private credit to the real sector by deposit money banks to GDP. Accounts per thousand adults (commercial banks) is the number of depositors with commercial banks per 1,000 adults. For each type of institution, this is calculated as the (reported number of depositors)*1,000/adult population in the reporting country. The net interest margin is the accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets. The Z-score (or distance to default) is (ROA+equity/assets)/sd(ROA), where ROA is average annual return on end-year assets and sd(ROA) is the standard deviation of ROA. Stock market capitalization plus outstanding domestic private debt securities to GDP is defined as the value of listed shares to GDP plus amount of outstanding domestic private debt securities to GDP. Percent of market capitalization outside of top 10 largest companies is the market capitalization out of top ten largest companies to total market capitalization. Turnover ratio (turnover/capitalization) for stock market is the ratio of the value of total shares traded to market capitalization. Volatility (standard deviation / average) of stock price index is the standard deviation of the sovereign bond index divided by the annual average of that index.

3.1. Financial Depth (Size)

For financial institutions, the variable that has received much attention in the empirical literature on financial development is private credit, defined as deposit money bank credit to the private sector as a percentage of GDP.[5] There is a wide literature demonstrating the link between financial depth, approximated by private sector credit to GDP, on one hand, and long-term economic growth and poverty reduction on the other hand (e.g., Demirgüç-Kunt and Levine 2008). Indeed, cross-country regressions confirm a strong positive linkage between financial depth and economic growth. To illustrate, Table 2 shows the results of regressions of various proxies for financial depth on proxy variables for economic growth, updating an earlier analysis by King and Levine (1993b) with extended datasets.

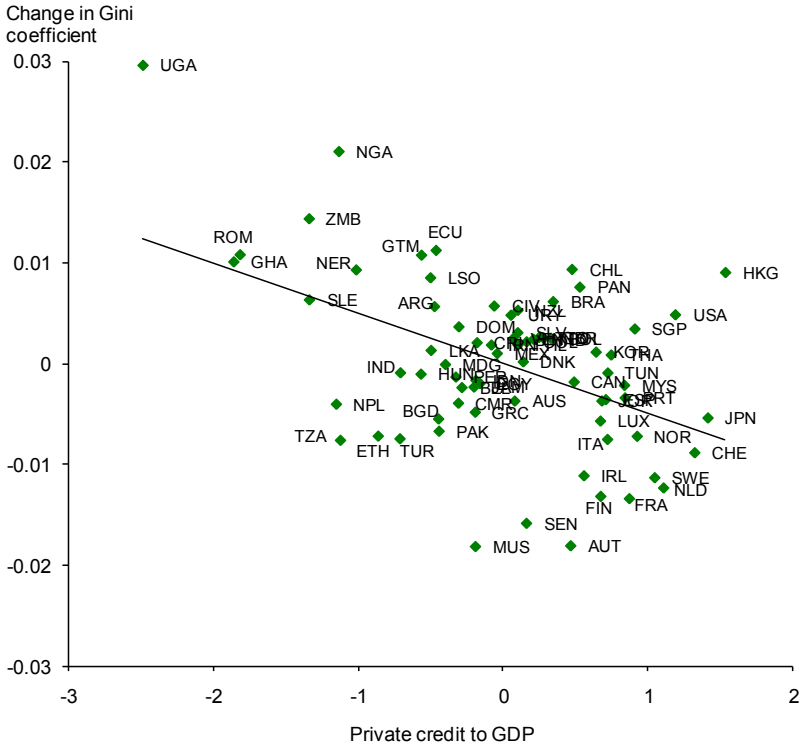
Table 2. Financial Depth and Economic Growth, 1960-2010

Dependent Variable	Depth	Bank	Privy
Real per Capita GDP Growth	2.4**	3.2**	3.2**
	(0.007)	(0.005)	(0.002)
R2	0.50	0.50	0.52
Real per Capita Capital Growth	2.2**	2.2**	2.5**
	(0.006)	(0.008)	(0.007)
R2	0.65	0.62	0.64
Productivity Growth	1.8**	2.6**	2.5**
	(0.026)	(0.010)	(0.006)
R2	0.42	0.43	0.44

Source: Authors' update on King and Levine (1993b), Table VII
Notes: King and Levine (1993b) define 2 percent growth as 0.02; here, 2 percent growth is 2.00.
* significant at the 0.10 level, ** significant at the 0.05 level, p-values in parentheses, Observations: 77
Variable definitions: DEPTH = Liquid Liabilities/GDP, BANK = Deposit bank domestic credit/(deposit bank domestic credit + central bank domestic credit), PRIVY = Gross claims on the private sector / GDP
Productivity Growth = Real per capita GDP growth - (0.3)*(Real per capita Capital growth)
Other explanatory variables included in each of the nine regression results reported above:
logarithm of initial income, logarithm of initial secondary school enrollment, ratio of government consumption expenditures to GDP, inflation rate, and ratio of exports plus imports to GDP.

[5] The data source is IMF's *International Financial Statistics*. Private credit isolates credit issued to the private sector and therefore excludes credit issued to governments, government agencies, and public enterprises. Private credit also excludes credits issued by central banks.

Figure 2. Financial Depth and Income Inequality



Source: Authors' update on Beck, Demirgüç-Kunt, and Levine (2007).
Note: The Gini coefficient is on a scale from 0 (total equality) to 1 (maximum inequality). The chart is a partial scatter plot, visually representing the regression of changes in the Gini coefficient between 1960 and 2005 on the private sector credit–to-GDP ratio (logarithm, 1960–2005 average), controlling for the initial (1960) Gini coefficient. Variables on both axes are residuals. The abbreviations next to some of the observations are the three-letter country codes as defined by the International Organization for Standardization.

There is sizeable variation in private credit across countries. For example, averaging over 1980–2010, private credit was less than 10 percent of GDP in Angola, Cambodia, and Yemen, while exceeding 85 percent of GDP in Austria, China, and United Kingdom. The annual average value of private credit across countries was 39 percent with a standard deviation of 36 percent.

An alternative to private credit is total banking assets to GDP, a variable that is also included in the Global Financial Development Database. Compared to private credit, this variable includes also credit to government and bank assets other than credit. It is arguably a more comprehensive measure of size, but it is available for a smaller number of countries and has been used less extensively in the literature on financial development. In any case, the two variables are rather closely correlated, with a correlation coefficient of about 0.9 (Figure 5), so private credit can provide a reasonably close approximation for total banking assets.

Despite the literature's focus on banks, the recent crisis has highlighted issues in non-bank financial institutions (NBFIs). The coverage of NBFIs by data is much less comprehensive than that of banks. Nonetheless, to acknowledge this point, the Global Financial Development

Database includes total assets of NBFIs to GDP, which includes pension fund assets to GDP, mutual fund assets to GDP, insurance company assets to GDP, insurance premiums (life) to GDP, and insurance premiums (non-life) to GDP.

For financial markets, it is possible to obtain cross-country data on stock and bond markets (both sovereign and corporate). To approximate the size of stock markets, the most common choice in the literature is stock market capitalization to GDP. For bond markets, the mostly commonly used proxy for size is the outstanding volume of debt securities (private and public) to GDP.

To measure "stock market" development, this paper primarily uses Stock value traded, which equals the value of stock market transactions as a share of GDP. This market development indicator incorporates information on the size and activity of the stock market, not simply on the value of listed shares. Earlier work by Levine and Zervos (1998) indicates that the trading of ownership claims on firms in an economy is closely tied to the rate of economic development. There is substantial variation across counties. While the mean value of Stock value traded is about 29 percent of GDP the standard deviation is about double this value. In Armenia, Tanzania, and Uruguay, Stock value traded annually averaged less than 0.23 percent over 1980-2008 (10th percentile). In contrast, Stock value traded averaged over 75 percent in China (both Mainland and Hong Kong SAR), Saudi Arabia; Switzerland; and Unites States (90th percentile).

The relative size of financial institutions and financial markets is an important topic in a part of the financial development literature, in particular the literature on 'financial structures' (Demirgüç-Kunt and Levine 2001; Demirgüç-Kunt, Feyen, and Levine 2012). The ratio of the size indicators for banks and financial markets, called financial structure ratio, can be used to gauge the degree to which the financial system is relatively bank-based or market-based. Financial structure differs markedly across economies. Over the full sample period, the annual average value of the financial structure ratio is 279. Countries such as Australia, India, Singapore, and Sweden have this ratio at or below 2.35 (10th percentile), while Bolivia, Bulgaria, Serbia, and Uganda are examples of countries where this ratio is over 356 (90th percentile).

3.2. Financial Access (Inclusion)

A well-functioning financial system allocates capital based on the expected quality of the project and entrepreneur, not on the accumulated wealth and social connections of the entrepreneur. A well-functioning financial system that overcomes market frictions will more effectively provide financial services to a wide range of firms and households, not just large companies and rich individuals. Thus, to develop informative proxies of financial development, it is useful to move beyond financial depth and also include indicators of financial access—the degree to which the public can access financial services. As with the other measures, both financial institutions and financial markets are examined.

Financial institutions. A common proxy variable of access to financial institutions is the number of bank accounts per 1,000 adults. Other variables in this category include the number of bank

branches per 100,000 adults (commercial banks), the percentage of firms with line of credit (all firms), and the percentage of firms with line of credit (small firms). When using these proxies, one needs to be mindful of their weaknesses. For example, the number of bank branches is becoming increasingly misleading with the move towards branchless banking. The number of bank accounts does not suffer from the same issue, but it has its own limitations (in particular, it focuses on banks only, and does not correct for the fact that some bank clients have numerous accounts).

Much of the data for the financial access dimension of the Global Financial Development Database came from the IMF's recently established Access to Finance database, which is based on earlier work by Beck, Demirgüç-Kunt and Martinez Peria (2007). A portion of the financial access data is from the newly constructed the *Global Financial Inclusion Indicators*, or "Global Findex" (Demirgüç-Kunt and Klapper 2012). The Global Findex is the first public database of indicators that consistently measures individuals' usage of financial products across countries and over time. It can be used to track the potential impact of global financial inclusion policies and facilitate a deeper and more nuanced understanding of how adults around the world save, borrow and make payments. It is based on detailed interviews with at least 1,000 people per country in some 150 countries about their financial behavior through the Gallup World Poll survey.

Financial markets. Data on access to financial markets are more scant. To approximate access to stock and bond markets, measures of market concentration are used, the idea being that a higher degree of concentration reflects greater difficulties for access for newer or smaller issuers. The variables in this category include the percentage of market capitalization outside of top 10 largest companies, the percentage of value traded outside of top 10 traded companies, government bond yields (3 month and 10 years), ratio of domestic to total debt securities, ratio of private to total debt securities (domestic), and ratio of new corporate bond issues to GDP.

3.3. Financial Efficiency

For intermediaries, efficiency is primarily constructed to measure the cost of intermediating credit. Efficiency measures for institutions include indicators such as overhead costs to total assets, net interest margin, lending-deposits spread, non-interest income to total income, and cost to income ratio (Table 1). Closely related variables include measures such as return on assets and return on equity. While efficient financial institutions also tend to be more profitable, the relationship is not very close (for example, an inefficient financial system can post relatively high profitability if it operates in an economic upswing, while an otherwise efficient system hit by an adverse shock may generate losses).

As with the other dimensions, these are relatively crude measures of efficiency. For a sub-set of countries, it is possible to calculate efficiency indices based on data envelopment analysis and other more sophisticated measures (e.g., Angelidis and Lyroudi 2006 apply data envelopment

analysis and neural networks to measure efficiency in the Italian banking industry). However, the data required for this type of analysis are available only for a sub-set of countries.

For financial markets, efficiency measures focus less on directly measuring the cost of transactions and more on measuring transactions. A basic measure of efficiency in the stock market is the turnover ratio, i.e. the ratio of turnover to capitalization in the stock market. The logic of using this variable is that the higher the turnover (the more liquidity), the more efficient the market. In the bond market, the most commonly used variable is the tightness of the bid-ask spread (with the U.S. and Western European markets showing low spreads, and Vietnam, Peru, Qatar, Dominican Republic, and Pakistan reporting high spreads) and the turnover ratio (although the measurement of the latter often suffers from incomplete data).

A range of other proxies for efficiency in financial markets has been used in empirical literature (Table 1). One of them is price synchronicity, calculated as a degree of co-movement of individual stock returns in an equity market. The variable aims to capture the information content of daily stock prices, as a market operates efficiently only when prices are informative about the performance of individual firms. Another proxy variable for efficiency is private information trading, defined as the percentage of firms with trading patterns that arise from trading conducted through privately obtained information. This calculation is based on the examination of daily price-volume patterns, and helps indicate the prevalence of trading in a stock based on private or privileged information. Finally, efficiency can be approximated by the real transaction cost. Based on daily return data of the listed stocks, this variable attempts to approximate the transaction costs associated with trading a particular security. This variable helps determine the barriers to efficiency in the market. All these indicators are constructed by compiling and statistically processing firm-level data from a variety of market sources.

3.4. Financial Stability

Last, but not the least, financial stability is an important feature of the financial sector. There is a vast literature specifically on measuring systemic risk, stress tests, and other tools for financial stability. Because of the importance of financial stability for broader macroeconomic stability, the topic is sometimes treated as a separate one.[6] But financial stability is a part of the broader financial development process. To illustrate this, imagine a country where banks' lending standards become very loose, with banks providing loans left and right, without proper risk management and loan monitoring. On the surface, one could observe the rapid growth as a sign of deepening and increased access to finance. Also on surface, the financial sector can seem efficient, for some period of time: without the loan approval process, such banks would be able

[6] For example, many central banks around the world publish reports focused almost exclusively on financial stability. Similarly, the IMF's *Global Financial Stability Report* has a clear stability focus. There are, however, many complementarities between financial stability, depth, access, and efficiency, as emphasized for instance in the World Bank-IMF's Financial Sector Assessment Program.

to lower their costs, at least until the loans turned bad. And this is the problem, of course: the system would be very unstable and ultimately would likely end in a crisis situation.

A key variable used to measure financial stability is the z-score, a variable that explicitly compares buffers (capitalization and returns) with the potential for risk (volatility of returns). The z-score has gained traction as a measure of individual financial institutions' soundness (e.g., Boyd and Runkle 1993; Demirgüç-Kunt, Detragiache, and Tressel 2008; Čihák and Hesse 2010). The z-score is defined as $z \equiv (k+\mu)/\sigma$, where k is equity capital as percent of assets, μ is return as percent of assets, and σ is standard deviation of return on assets as a proxy for return volatility. The popularity of the z-score stems from the fact that it is inversely related to the probability of a financial institution's insolvency, i.e. the probability that the value of its assets becomes lower than the value of its debt. The probability of default is given by $p(\mu < k) = \int_{-\infty}^{k} \phi(\mu) d\mu$. If μ is normally distributed, then $p(\mu < k) = \int_{-\infty}^{z} N(0,1)\, d\mu$, where z is the z-score. In other words, if returns are normally distributed, the z-score measures the number of standard deviations a return realization has to fall in order to deplete equity. Even if μ is not normally distributed, z is the lower bound on the probability of default (by Tchebycheff inequality). A higher z-score therefore implies a lower probability of insolvency.

The z-scores have several limitations, as well as advantages. Perhaps the most important limitation is that the z-scores are based purely on accounting data. They are thus only as good as the underlying accounting and auditing framework. If financial institutions are able to smooth out the reported data, the z-score may provide an overly positive assessment of the financial institutions' stability. Also, the z-score looks at each financial institution separately, potentially overlooking the risk that a default in one financial institution may cause loss to other financial institutions in the system. An advantage of the z-score is that it can be also used for institutions for which more sophisticated, market based data are not available. Also, the z-scores allow comparing the risk of default in different groups of institutions, which may differ in their ownership or objectives, but face the risk of insolvency.

For other indicators, such as the regulatory capital to risk-weighted assets and nonperforming loans to total gross loans, the Global Financial Development Database cross-refers to financial soundness indicator database available on IMF's website (fsi.imf.org). Variables such as the nonperforming loan ratios may be better known than the z-score, but they are also known to be lagging indicators of soundness (e.g., Čihák and Schaeck 2010).

One alternative indicator of financial instability is "excessive" credit growth, with the emphasis on *excessive*. A well-developing financial sector is likely to report expansion in credit growth. Without credit growth, financial sectors would lack in depth or would not be able to provide good access to financial services. Credit growth is important, and indeed may be necessary even

if it is connected with some instability.[7] But a very rapid growth in credit is one of the most robust common factors associated with banking crises (Demirgüc-Kunt and Detragiache 1997 and Kaminsky and Reinhart 1999). IMF (2004), for example, estimated that about 75 percent of credit booms in emerging markets end in banking crises. Typically, credit expansions are fueled by overly optimistic expectations of future income and asset prices, often combined with capital inflows. Over time, households and firms accumulate substantial debt while income does not keep pace. A decline in income or asset prices then leads to an increase in non-performing loans and defaults. If the problem is severe, the country experiences a banking crisis. In a recent paper, Drehmann, Borio and Tsatsaronis (2011) examine the performance of different variables as anchors for setting the level of the countercyclical regulatory capital buffer requirements for banks, finding that the gap between the ratio of credit-to-GDP and its long-term backward-looking trend performs best as an indicator for the accumulation of capital, because this variable captures the build-up of system-wide vulnerabilities that typically lead to banking crises. An advantage of the excessive credit growth variable is that it is relatively easy to observe and monitor. Also, unlike some of the other measures (e.g., those that include nonperforming loan ratios), it is a forward-looking measure of instability. A disadvantage of this measure is that it does not, by itself, capture situations where financial sector problems have already crystallized in a full-blown crisis. In such situations, credit is declining in real terms rather than growing. It is therefore important to amend the excessive credit growth indicator, as an *ex-ante* measure of financial instability, by including credit declines as *ex-post* proxies for situations of financial instability.

For financial markets, the most commonly used proxy variable for stability is market volatility, although other proxies are also included in the database (Table 1). One of these variables is the skewness of stock returns, the reason being that a market with a more negative skewed distribution of stock returns is likely to deliver large negative returns, and likely to be prone to less stability. Another variable is vulnerability to earnings manipulation, which is derived from certain characteristics of information reported in the financial statements of companies that can be indicative of manipulation It is defined as the percentage of firms listed on the stock exchange that are susceptible to such manipulation. In the United States, France, and most other high-income economies, less than 10 percent of firms have issues concerning earnings manipulation; in Zimbabwe, in contrast, almost all firms may experience manipulation of their accounting statements. In Turkey, the number is close to 40 percent.

Other variables approximating volatility in the stock market are the price/earnings ratio (P/E ratio) and duration (a refined version of the P/E ratio that takes into account factors such as long-term growth and interest rates). These variables are based on the empirical fact that market prices contain expectations of future cash flows and growth instead of current fundamentals only, and therefore stock prices may be more volatile and negatively skewed in the future.

[7] Ranciere, Tornell, and Westermann (2008), for example, find that countries that have experienced occasional financial crises have, on average, grown faster than countries with stable financial conditions.

3.5. Enabling Environment and Other Variables

The focus of the 4x2 matrix—and the Global Financial Development Database—is on financial system characteristics. It does not explicitly include variables capturing financial sector policy, such as features of financial sector regulation and supervision. The conceptual reason for focusing on financial system characteristics is that those indicators bridge the gap between policy measures and final objectives. They function as "intermediate" indicators and targets. To some extent, this is an analogy with monetary policy, where intermediate targets have a relatively clear link to the policy variable (e.g., central bank's interest rate) and an impact on the policy target (e.g., future inflation rate).

One group of the "other variables" relates to the microstructure of the financial sector. The 4x2 framework (Table 1) captures the overall broad structure of the financial sector, in particular the relative sizes of financial institutions and markets, and the relative sizes of the key segments (total assets of banks and nonbanks; outstanding volumes of stocks and bonds). Also relevant are indicators of structure within the individual financial segments, such as the concentration ratios (Herfindahl index, shares of various types of financial institutions in total assets and in GDP, shares of individual markets in total market capitalization). Some of these measures (e.g., the percent of assets of three or five largest financial institutions in GDP), are important for the stability dimension, because they provide a rough approximation for the potential for impact in the case of a major financial disruption (e.g., Čihák and Schaeck 2010). More generally, recent research suggests that structure has an impact on performance, so it is important to include these indicators as part of the 'enabling environment'.

Another relevant group of indicators relates to the degree of international integration. This includes indicators such as consolidated foreign claims of BIS-Reporting Banks to GDP or measures cross-border banking interconnectedness, such as the degree of centrality (e.g., Čihák, Muñoz. and Scuzzarella 2011). These variables have a close link to several of the 4x2 dimensions, particularly to financial stability, and can be thought of as part of the enabling environment.

Finally, another group of indicators relates to the features of the underlying financial infrastructure. This includes basic indicators on information disclosure, contract enforcement and other quantitative characteristics of financial infrastructure. Examples of variables include public registry coverage (percentage of adults), private bureau coverage (percentage of adults), procedures to enforce contract (number), time to enforce contract (days), and cost to enforce contract (% of claim).

4. Aggregation and Other Practical Issues

The 4x2 matrix of financial system characteristics (Table 1) is a useful way of visualizing the multi-dimensional nature of development in the financial sector. Each of the proxy variables is

important in capturing key features of financial systems: looking only at depth would be insufficient because deep financial sectors do not necessarily provide high levels of financial access, examining only efficiency would not be sufficient because highly efficient financial sectors are not necessarily more stable than the less efficient ones, and so on. It is therefore important to capture all the 4x2 components.

Nonetheless, to obtain a more condensed picture of financial systems, it may sometimes be useful to go one step further and compare development across the four dimensions and across the two segments (institutions and markets). Such comparisons require normalizing the individual variables.

4.1. Picking the Variables for Individual Dimensions

For most of the dimensions in the 4x2 matrix, there are several variables that could be used as proxies (Table 1). In some cases, the variables in the same dimension are complementary (and some are even additive); in other cases, the variables 'compete' to measure the similar things in slightly different ways.

'*Complementary' variables.* For example, the total assets of banks to GDP and total assets of non-bank financial institutions to GDP are expressed in the same units and complement each other, so they can be added to obtain a proxy of total assets of financial institutions to GDP.[8] A similar issue arises for measures of volatility in the stock market and volatility in the bond market: if these are measured in a similar way (as standard deviations), they can actually be added, using the capitalizations of the two markets (as proxy for their relative weights) to approximate the general volatility in the financial markets.[9]

'Competing' variables. In some cases, these are competing variables that measure similar things, but they differ in terms of their comprehensiveness. For example, private sector credit to GDP and total assets of financial institutions to GDP are both proxies for financial institutions' size, but they differ in terms of their comprehensiveness and country coverage, with private sector credit to GDP covering a smaller set of assets but being available for a large number of economies.

How should one pick among such competing variables? For the purpose of the database, it is actually not necessary to pick, and it is possible to keep all the competing variables. For the purpose of the overall measurement of financial system characteristics, however, picking one of the competing variables is needed, and this paper's general approach is to pick the one with the greatest country coverage. It is a reasonable approach because the competing indicators tend to

[8] The sum of the two variables will be only a proxy for the total aggregate assets. Some banks own non-banks and vice versa, resulting in some double-counting when doing a simple summation.
[9] For the purpose of measuring volatility in the markets, it is justifiable to sum up the proxies for the volatility in the two markets, taking into account the relative sizes of the markets (but without considering the covariance).

be highly (although not perfectly) correlated. For example, the correlation coefficient for private sector credit to GDP and banking sector's total assets to GDP is 0.9 (Figure 5).

4.2. Manipulation of the Variables and Aggregation across Dimensions

To prepare for comparisons across the proxy variables, all the key development indicators are Winsorized, truncating the top 5 and bottom 5 percent of the distribution. Specifically, this means that for each variable (a) the 95th and 5th percentile over the whole sample are calculate, (b) all observations below the 5th percentile are replaced by the value corresponding to the 5th percentile, and (c) all observations above the 95th percentile are replaced by the value corresponding to the 95th percentile. In effect, the 5th and 95th percentile become the minimum and maximum of the new (truncated) dataset.

The main reason for doing the Winsorization is that sometimes the best and worst scores are very extreme and may reflect some peculiar (idiosyncratic) features of a single jurisdiction. Note that the top 5 percent and bottom 5 percent of observations are not dropped from the sample. That way, too many valuable observations would be lost, especially considering that one missing observation for one dimension limits the ability to calculate the aggregate development index. Replacing the top 5 and bottom 5 percent observations by the 95th and 5th percentile value, respectively, retains much of the information from the original data (i.e., it still indicates that the country scores very high or very low on that particular indicator). This makes sense and is consistent with approaches used in earlier literature.

The following step is then to rescale each individual score by the maximum for each indicator, max_i and the minimum of the indicator. The rescaled indicator can be interpreted as the percent distance between "worst" and "best" practice.[10]

4.3. Cluster Analysis

Within the four financial system characteristics, cluster analysis (clustering) can be used to assign the countries into groups (clusters) so that the countries in the same cluster are more similar to each other than to those in other clusters.

An important choice in the clustering approach is to select a distance measure, which is used to approximate the "similarity" of two countries (two financial systems) in the four-dimensional space. For simplicity and transparency, this is measured using the Euclidean distance, i.e., the "ordinary" distance, *d*, between two points, given by the formula:

[10] This paper does not create a mash-up index of the various financial system characteristics, because there are no obvious choices for weights that would be robust to criticism. For a broader debate on the challenges in creating mesh-up indices, see for example Ravaillon (2011). Nonetheless, purely for illustrative purposes, the Appendix II tables include a simple (unweighted) average of the proxies

$$d(p,q) = \sqrt{\sum_{i=1}^{4}(q_i - p_i)^2}, \qquad (2)$$

where p_i and q_i are the values of the i-th indicator for country p and q, respectively. For a robustness check, the calculations also employ the Mahalanobis distance, which is a generalized version of the Euclidean distance that corrects for correlations among the variables.

Another crucial issue in this analysis is the number of clusters. Generally, the higher is the number of clusters, the higher the 'precision' of the analysis, i.e. the higher the similarity of the points within the cluster (and dissimilarity to points outside of the cluster). But with a very high number of clusters, the informational value of the analysis becomes small, and it becomes more difficult to synthesize and communicate the results in a meaningful way. For these reasons, and to examine the robustness of the results with respects to the number of clusters, results for 3, 4, and 5 clusters are examined.

Once the number is set, the clustering analysis is a relatively straightforward (but computationally demanding) exercise in finding an allocation of the world's countries into 3 (or 4 or 5) sets so as to minimize the sum of distances for all pairs of countries within the same set:

$$\min \sum_{c=1}^{k} \sum_{\forall p,q \in S_c} d(p,q), \qquad (3),$$

where k is total number of clusters and S_c denotes an individual cluster.

5. Selected Findings

Appendix II illustrates the recent country-by-country data in the Global Financial Development Database (2008–10) for the individual characteristics of financial systems. It shows individual country data in 8 columns: 4 columns for financial institutions and 4 for financial markets. [11]

Overall comparisons by levels of development and by region (Table 3[12] and Figure 3[13]) confirm that while developing economy financial systems tend to be much less deep and also somewhat less efficient and providing less access, their stability has been comparable to developed country financial systems.

[11] The Appendix II table shows not only the individual dimensions in the 4x2 matrix, but also the overall financial development indicator, which quartile do countries belong to in terms of the distribution of the respective variables. This is added for illustrative purposes and need to be interpreted with the appropriate caveats, mentioned in the appendix.

[12] Table 3 compares groups of countries by level of income across regions, or between a country and a peer group or 'benchmark'. Clustering countries by income level provides a good way of carrying out cross-country comparisons. Clustering analysis was carried out but the groupings of similar countries were very close to groupings in terms of income levels.

[13] Figure 3 uses parallel coordinates plots, with each variable plotted on a separate vertical scale and values for observations shown by connected line segments.

Financial systems are multidimensional.

One basic, yet important, observation highlighted by the Global Financial Development Database is that the four financial system characteristics are far from closely correlated across countries (Figure 4). This underscores the point that each dimension captures a very different, separate facet of financial systems. In other words, looking only at financial depth would not be sufficient. Similarly, focusing only on financial stability or on access or on efficiency would not suffice. The same applies both to financial institutions and to financial markets.

It is therefore necessary to examine not only financial depth, but also access, efficiency, and stability, to arrive at a relatively comprehensive picture of financial systems. Attempts to run a more rigorous "horse race" among the indicators from the four dimensions tend to end a tie, that is, none of the indicators is clearly superior to the others in terms of its ability to explain long-term growth or poverty reduction.

The analysis suggests that having a deep but unstable financial system is bound to create problems, as is for instance having a system that is stable but small, also having an efficient system that does not provide adequate access is also suboptimal, and so on. This is consistent with the findings of the previous literature. Repeated or protracted systemic crises are clearly detrimental to broader economic development. However, countries that have experienced occasional financial crises have, on average, grown faster than countries with stable financial conditions (Ranciere, Tornell, and Westermann 2008).

Important differences remain across regions and income groups.

A comparison at the regional level shows major differences in financial systems among the key regions (Table 3). The results are by and large in line as one could expect, with Sub-Saharan Africa scoring the lowest on average on most of the dimensions, and high income countries scoring the highest on most dimensions. A remarkable number is the relatively low score of Middle East and North Africa on access to finance (Table 3, upper panel). This resonates with the complaints heard during the unrest in the region in 2011.

Much of the differences among regions are correlated with differences in income levels. Countries that have lower income tend to also show lower degrees of financial development as approximated by the 4x2 framework (Table 3, lower panel).

Disparities in financial systems across countries are large.

Behind these regional and peer group averages are vast differences among individual countries, and in some cases also major differences among different parts of each country financial sector. The data from the Global Financial Development Database demonstrate rather strikingly the large differences in financial systems around the globe. For example, the largest financial system in the sample is more than 34,500 times the smallest one. Even if the financial systems are re-

scaled by the size of the corresponding economies (i.e., by their gross domestic product), the largest (deepest) financial system is still some 110 times the smallest (least deep) one. And even if the top and bottom 5 percent of this distribution are taken out, the ratio of the largest to the smallest is about 28 – a large degree of disparity, considering that these are not raw figures but ratios relative to the size of economy. Similar orders of magnitude are obtained for the other characteristics of financial systems. [14]In other words, when one examines country-level data, there are vast differences in financial sector depth, as well as in the other characteristics.
The cross-country differentiation along the key characteristics of financial systems can be seen from the scatter plots in Figure 4 as well as from cartograms such as the one shown for illustration in Figure 6. The scatter plots and the cartogram underscore the large cross-country differences. The measurement framework underscores that financial sectors in jurisdictions such as the United States and Korea exhibit a relatively great financial market depth, as one would expect. United States have less deep financial institutions, reflecting a less bank-centric (and more market-based) nature of the U.S. financial system. Several European countries exhibit relatively great financial depth.

Financial systems have changed substantially in the 2000s in the run-up to and during the crisis. As illustrated in Figures 7 and 8, the most visible change is the observed declines in the stability index, which in turn reflects the increased volatility in returns by financial institutions in some countries and in most financial markets. But the charts also illustrates that stability has not been the only dimension in decline and that to some extent it has been accompanied also by difficulties along other characteristics, such as reduced depth and access to finance and in some cases also reductions in efficiency, particularly in financial markets.

Overall, the data from the Global Financial Development Database suggest that the key disparities among countries in terms of the nature of their financial systems have somewhat subsided in the aftermath of the crisis, as financial sectors in many medium- and low- income countries were relatively more isolated from the global turmoil, and therefore less affected by the global liquidity shocks. In addition, financial institutions on average rebounded faster than markets, showing improvements in depth and efficiency after the crisis. This seems to have been the case so far for example for Brazil and other Latin American countries (de la Torre, Ize, and Schmukler 2011), China, and many Sub-Saharan African countries (see, for example, World Bank 2012). The medium-term effect of the crisis on financial systems still remains to be seen.

[14] To put this in a more anthropomorphic perspective, the tallest adult person on Earth is less than 5 times taller than the smallest person (www.guinessworldrecords.com).

Securities markets are relatively more important at higher income levels.

The Global Financial Development Database allows for examining the relative size of financial institutions and financial markets around the world. The issue of financial structure – usually approximated by the relative size of bank credit and stock market capitalization – has been an important topic in the policy debate.

In a recent paper, which uses data that are part of the Global Financial Development Database, Demirgüç-Kunt, Feyen, and Levine (2012) examine the issue of financial structure empirically and find that as economies develop, use of services provided by securities markets increases relative to those provided by banks. In other words, as income increases, the marginal increase in economic activity associated with an increase in bank development falls, while the marginal increase in economic activity associated with an increase in securities market development rises. This work highlights the potential economic development costs of policy and institutional impediments to the evolution of the financial system.

The existing research and policy work does not provide enough guidance to justify targeting a particular financial structure for a particular country. However, if market or bank development is too skewed compared to what one could expect given their level of economic development, the above research findings provide a reason to dig deeper: one would need to find out if taxes, regulations, legal impediments or other distortions are leading to excessive reliance on banks or markets. Facilitating a shift from a bank-centric system to a more market-based system through a policy is never an easy task. Actively intervening to "develop" markets is likely to be problematic. Interventions should be more along the lines of enabling environment and reducing impediments. Even in systems with relatively strong role of the state in the economy, shifts in financial sector structure do not occur overnight. China (Box 1.3) is a case in point: despite policy intentions and reforms aimed at promoting non-bank financial institutions and markets, the financial system remains very much dominated by large banks, and in some ways have become even more bank-centric during the recent period of rapid credit growth.

6. Conclusions

This paper has presented the Global Financial Development Database, an extensive dataset of financial system characteristics around the world since 1960s. The database is a one-stop, cleaned-up database that builds on previous efforts, in particular the data collected and the categorization of variables proposed by Beck, Demirgüç-Kunt, and Levine (2000, 2010).

The dataset can be used to illustrate cross-country and time-series patterns in financial systems. The data can be used to better assess linkages between finance and economic development and to assess the efficacy of different financial policies and regulations. The database can be used to analyze financial sector development and trends in 205 jurisdictions around the world. The

Global Financial Development Database goes back some 50 years (to 1960), although some of the indicators (e.g., the only recently defined financial stability indicators) go back only to the 1990s. The focus of much of the analysis presented here is on the more recent period, and in particular on crisis period (since 2008) compared with the pre-crisis period.

The database and this paper highlight the multidimensional nature of financial systems. Focusing on only one characteristic– say, financial depth, or financial stability – is too narrow and misses important characteristics of financial systems. And, focusing only on financial institutions, or just on banks, is too narrow and misses important components of the overall financial system.

This paper illustrates that financial sectors come in different shapes and sizes, and they differ widely in terms of their performance. The paper also emphasizes a need for humility, and for further research. Despite the remarkable progress in gathering data and intelligence on financial systems around the world in recent years, researchers and practitioners still do not have precise measures of financial systems. The data that are being made publicly available together with this paper should help country officials, researchers, and others better measure and benchmark financial systems.

Table 3. Financial System Characteristics: Summary

Financial Institutions (Mean)	High income	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Depth	69	43	37	37	33	32	17
Access	43	23	35	30	14	16	10
Efficiency	80	70	65	62	83	81	51
Stability	42	52	20	35	57	38	32

Financial Markets (Mean)	High income	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Depth	43	38	12	21	24	17	20
Access	46	80	56	40	50	85	77
Efficiency	29	40	17	8	24	49	7
Stability	66	60	43	64	81	56	54

Financial Institutions (Mean)	High income	Upper middle income	Lower middle income	Low income
Depth	84	44	28	13
Access	55	32	19	5
Efficiency	86	75	61	42
Stability	35	38	40	35

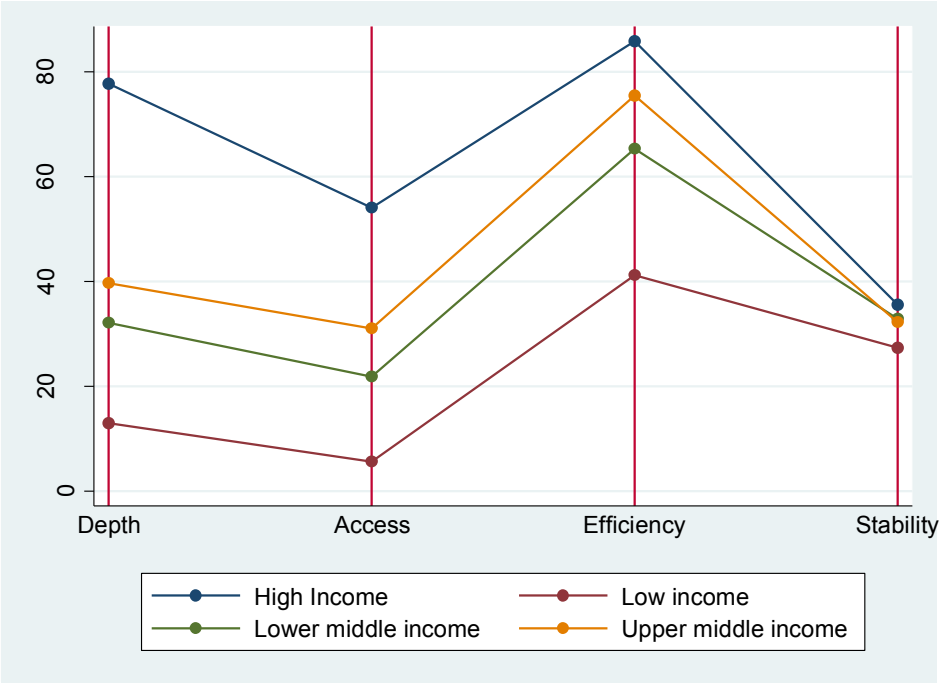
Financial Markets (Mean)	High income	Upper middle income	Lower middle income	Low income
Depth	51	27	16	10
Access	53	58	69	29
Efficiency	45	19	20	21
Stability	53	60	53	44

Source: Authors, based on the Global Financial Development Database.

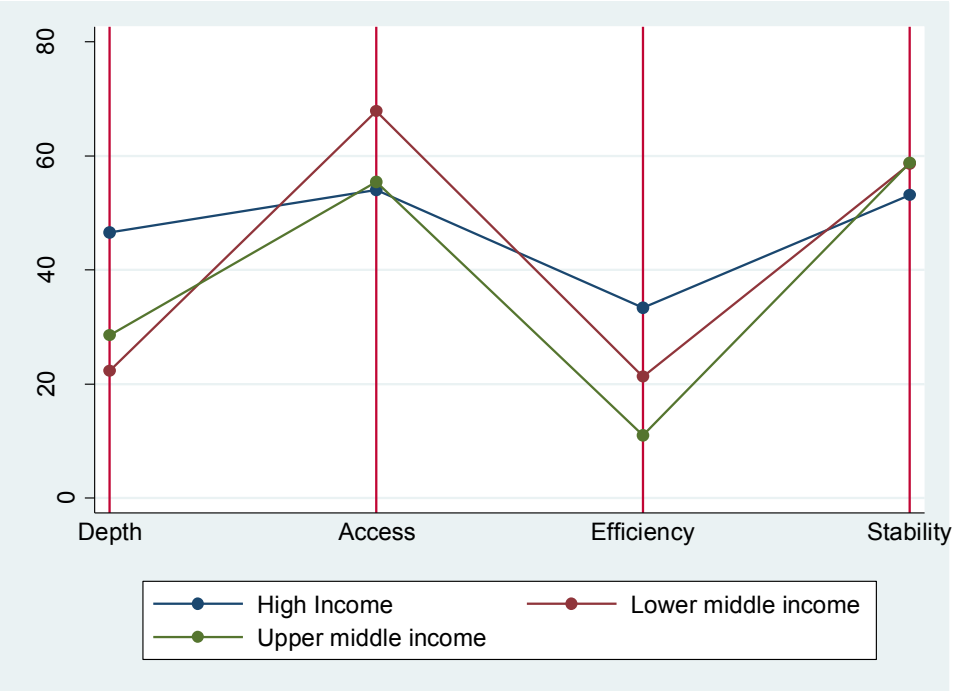
Note: The summary statistics refer to the winsorized and rescaled variables (0–100), as described in the text. Financial Institutions—Depth: Private Credit/GDP (%); Access: Number of Accounts Per 1,000 Adults, Commercial Banks; Efficiency: Net Interest Margin; Stability: z-score. Financial Markets—Depth: (Stock Market Capitalization + Outstanding Domestic Private Debt Securities)/GDP ; Access: Percent Market Capitalization Out of the Top 10 Largest Companies (%); Efficiency: Stock Market Turnover Ratio (%); Stability: Asset Price Volatility.

Figure 3. Financial System Characteristics, by Income Group, 2010

Financial Institutions



Financial Markets



Source: Authors, based on the Global Financial Development Database.
Notes: The summary statistics refer to the winsorized and rescaled variables (0-100), as described in the text. See also Table 1.

Figure 4. Correlations among Financial System Characteristics

Financial Institutions

Source: Authors, based on the Global Financial Development Database.
Notes: see Table 1.

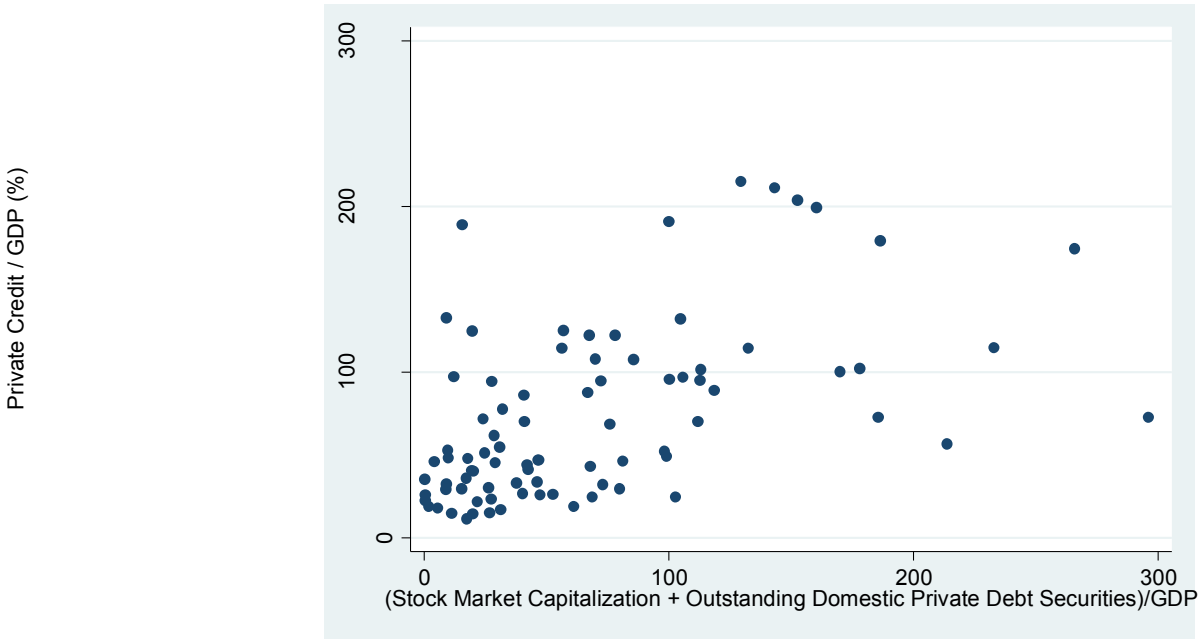
Figure 4. Correlations among Financial System Characteristics (cont'd)

Financial Markets

Source: Authors, based on the Global Financial Development Database.
Notes: see Table 1.

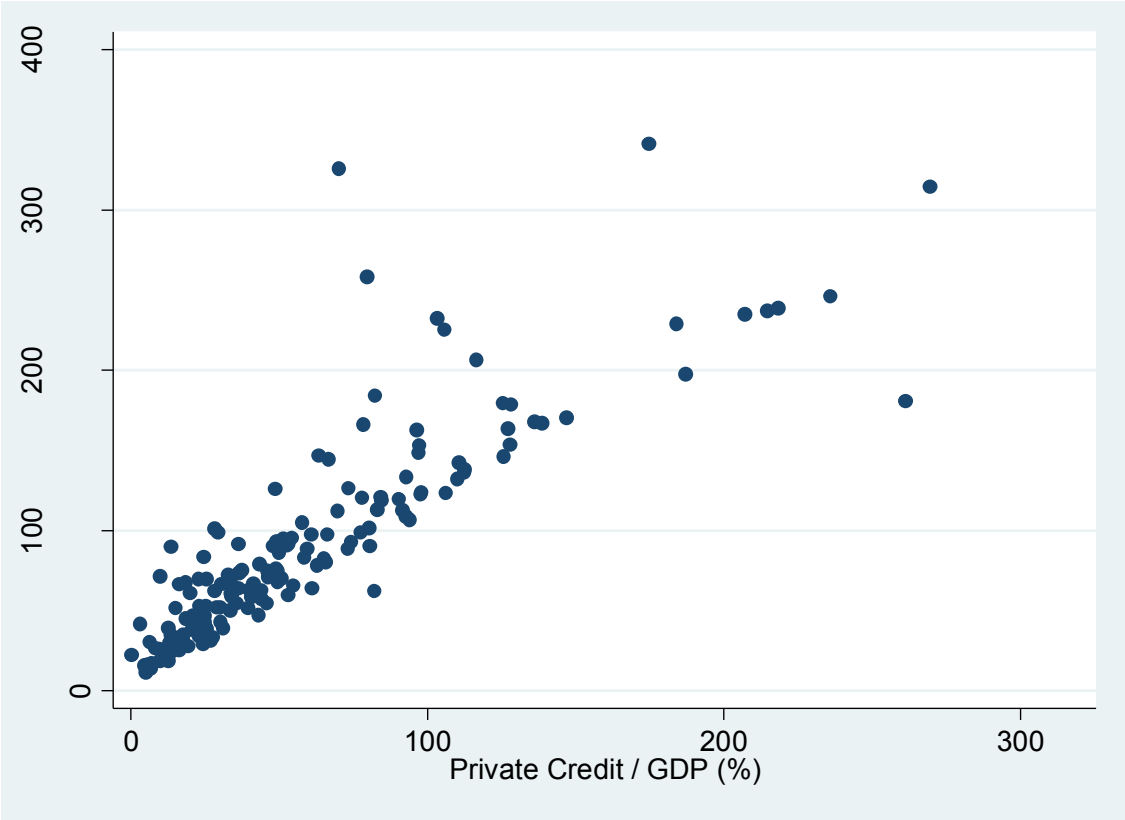
Figure 4. Correlations among Financial System Characteristics (cont'd)

Financial Sector Depth: Institutions vs. Markets



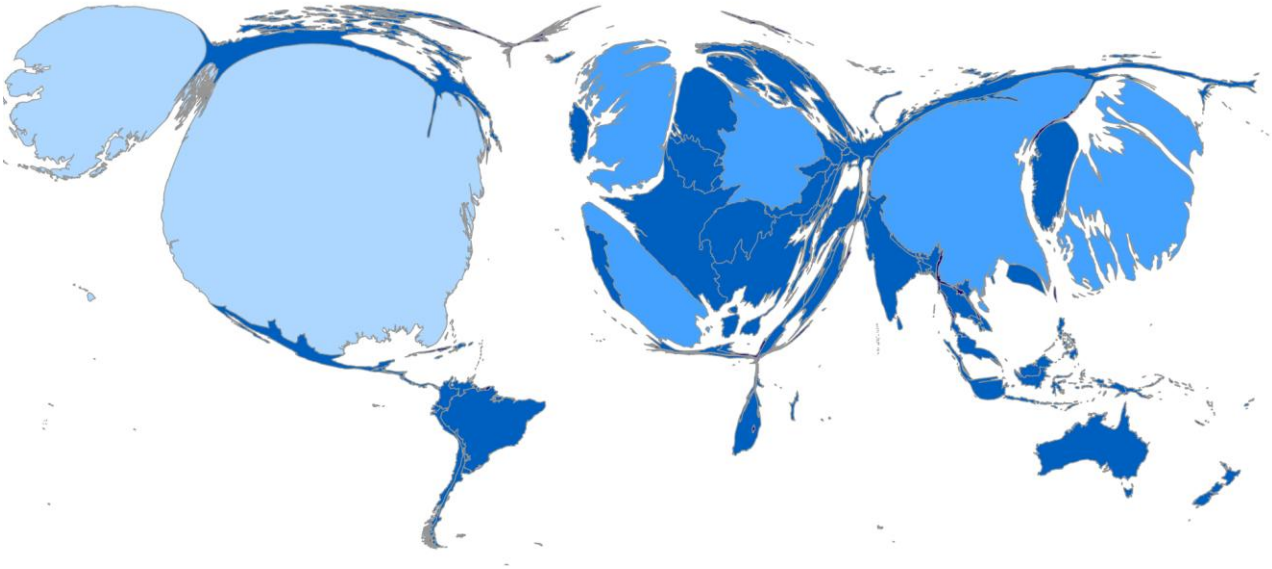
Source: Authors, based on the Global Financial Development Database.
Notes: see Table 1.

Figure 5 Correlations between Measures in Same Category Tend to Be High (example)



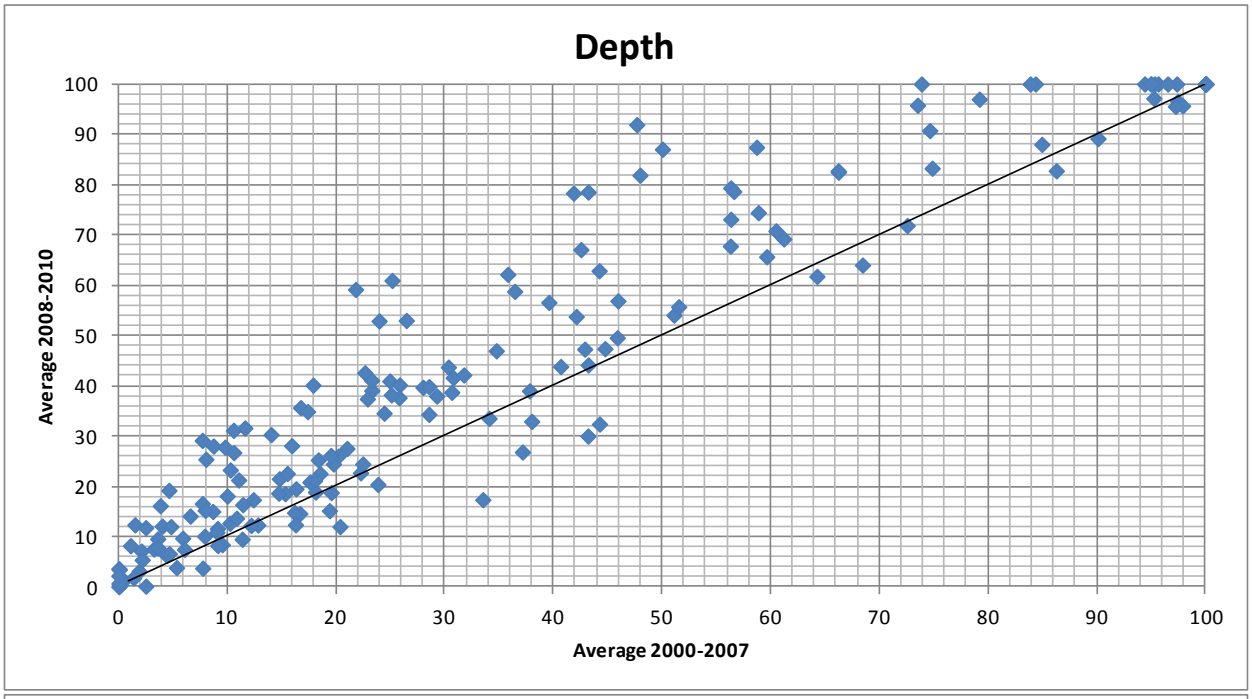
Source: Authors, based on the Global Financial Development Database.

Figure 6. The Uneven Sizes of Financial Systems (Illustration)



Source: Authors, based on the Global Financial Development Database.
Notes: The map is for illustration purposes only. Country sizes are adjusted to reflect the volume of financial sector assets in the jurisdiction, measured in U.S. dollars at the end of 2010. The image was created with the help of the MapWindow 4 and ScapeToad software.

Figure 7. Financial Systems: 2008-2010 vs 2000-2007 (Financial Institutions)



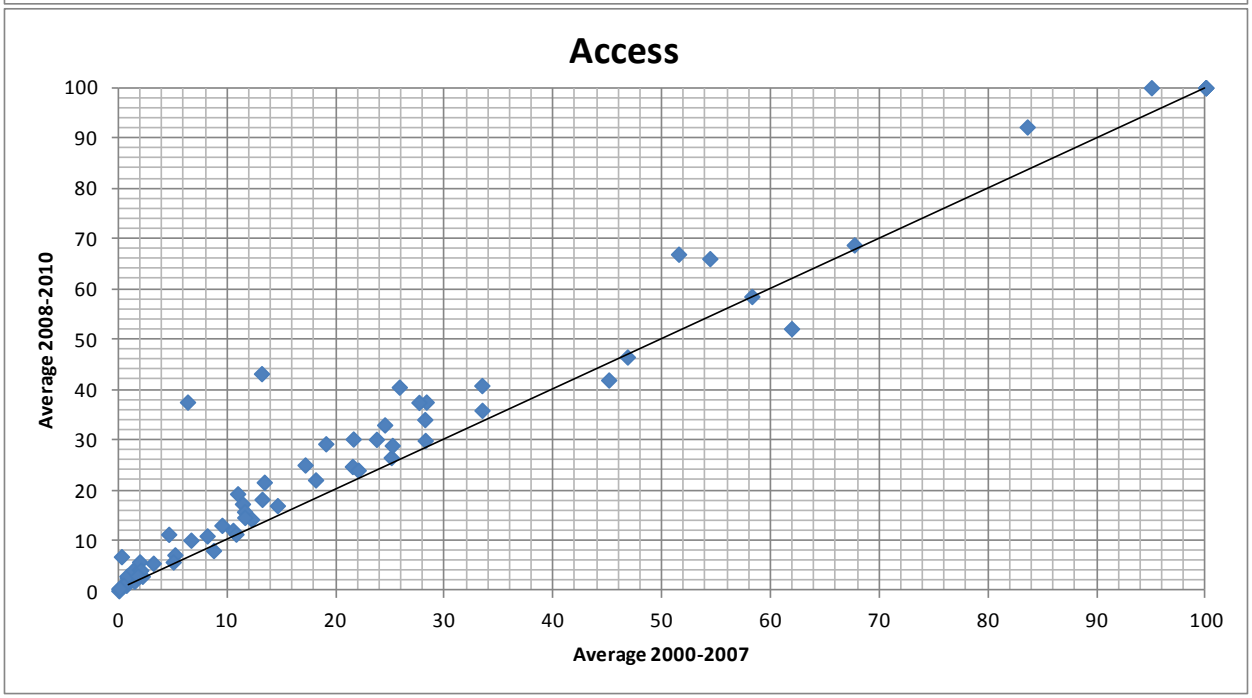
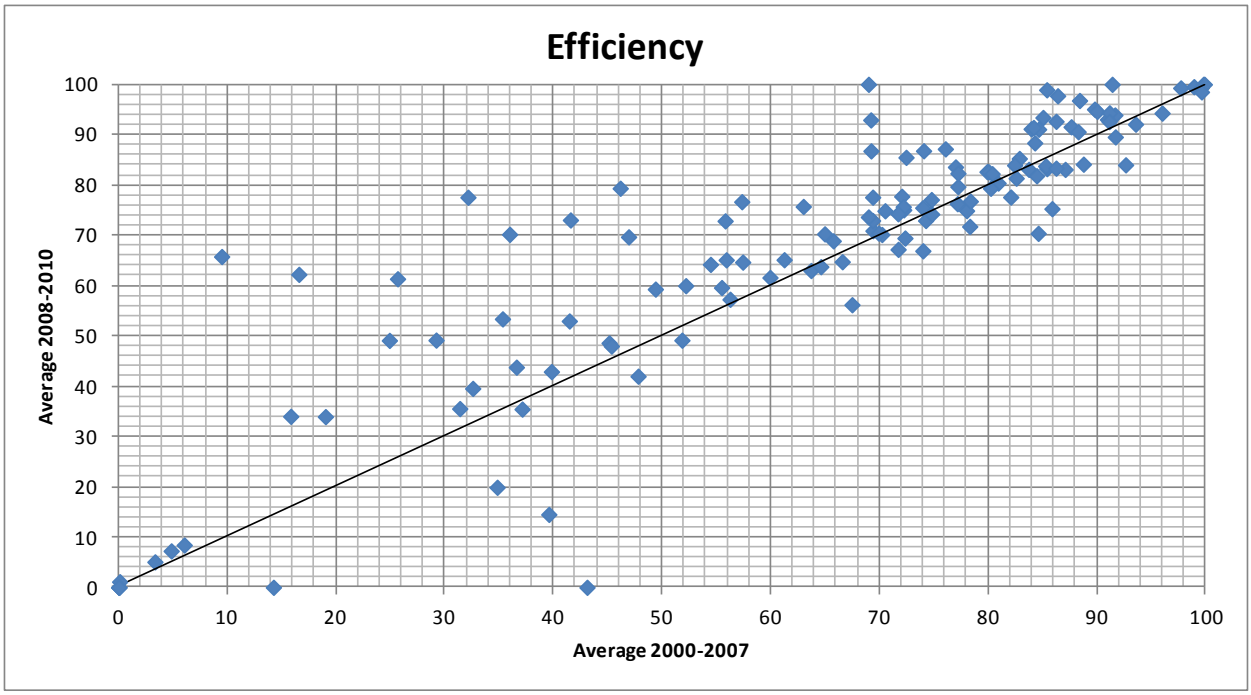
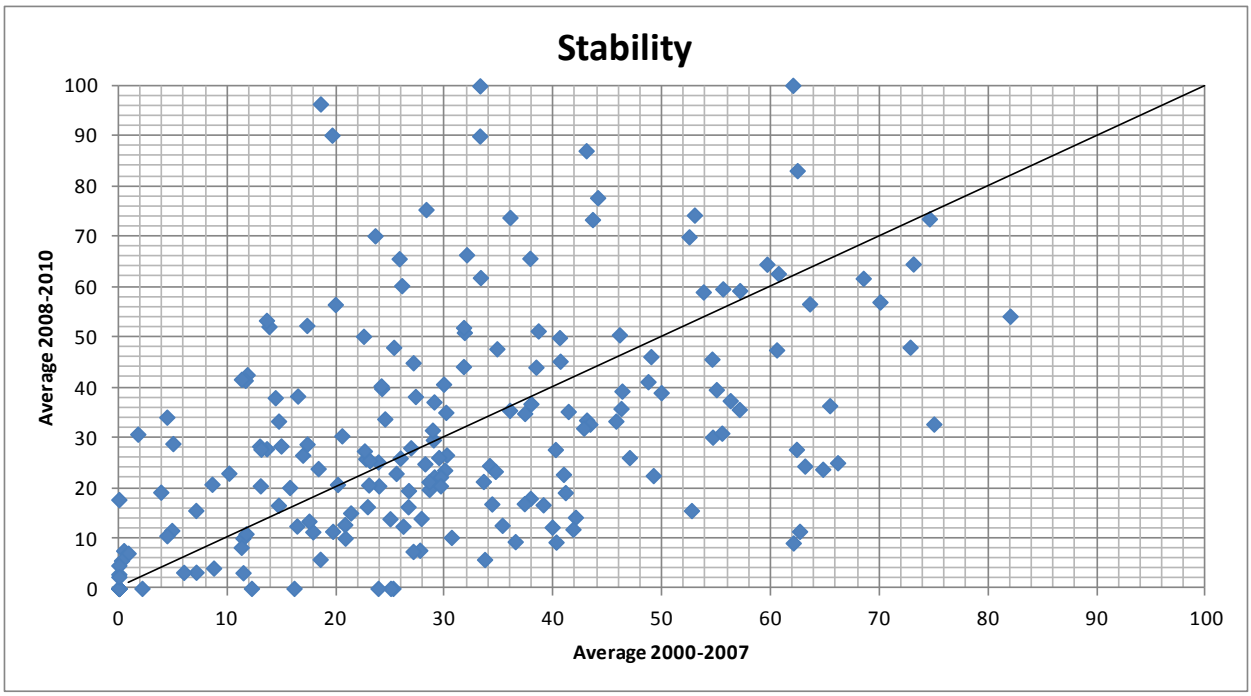


Figure 7. Financial Systems: 2008-2010 vs 2000-2007 (Financial Institutions) (cont'd)





Source: authors, based on the Global Financial Development Database.

Figure 8. Financial Systems: 2008-2010 vs 2000-2007 (Financial Markets)

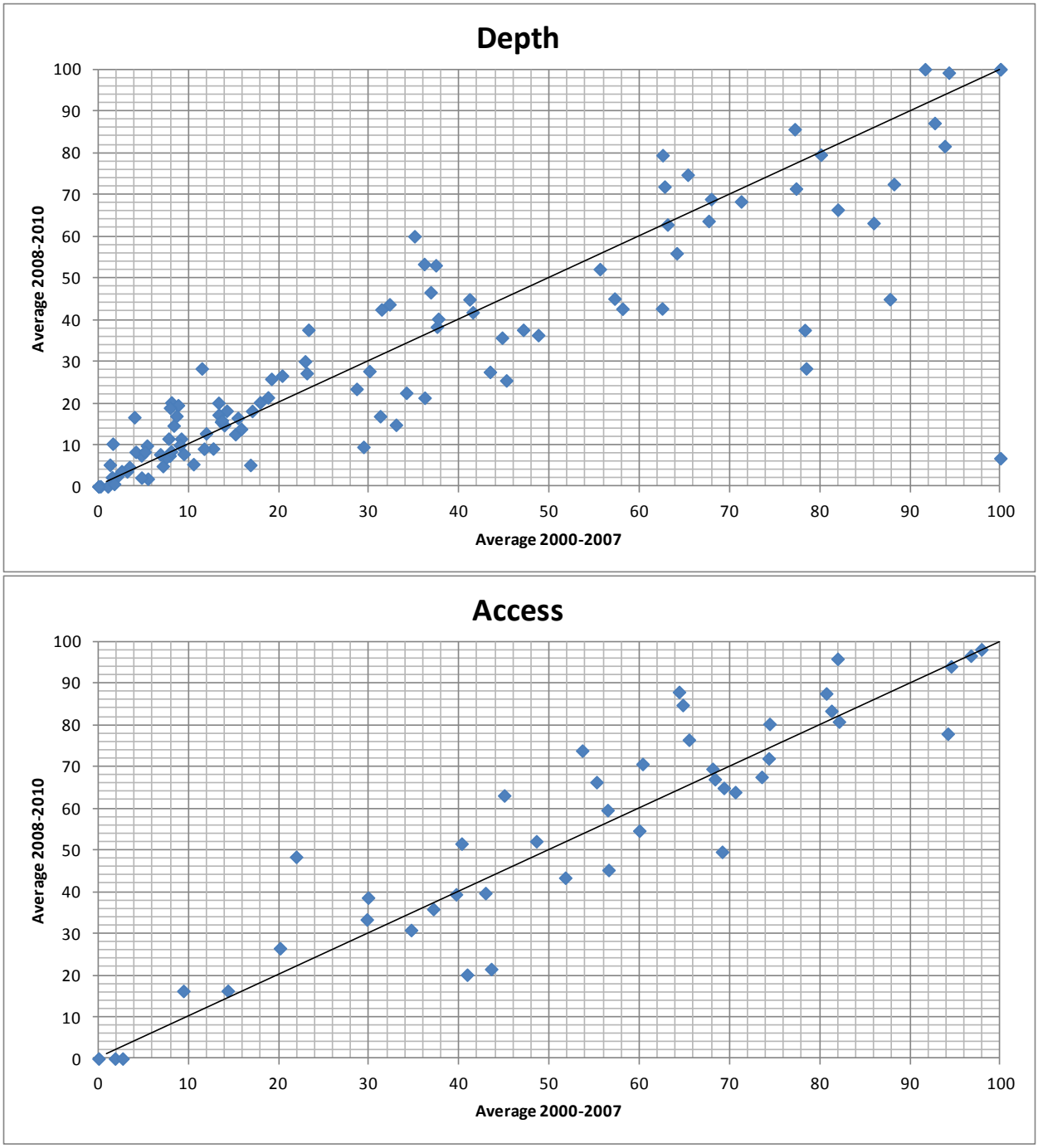
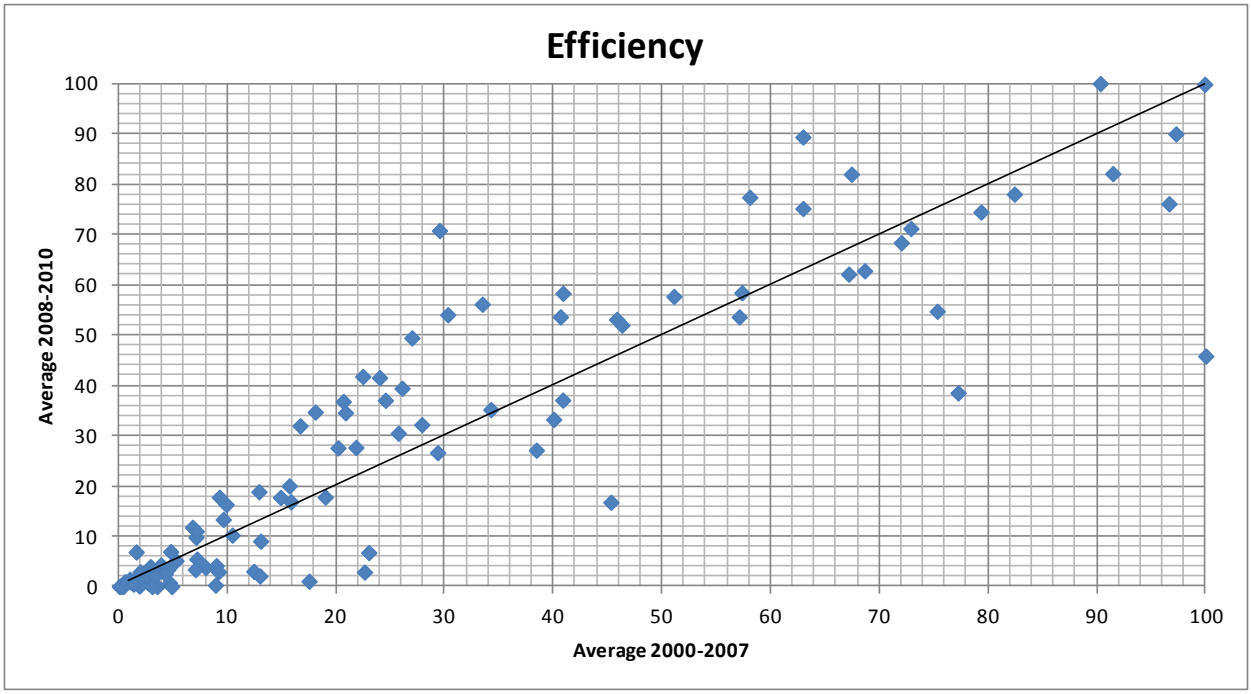
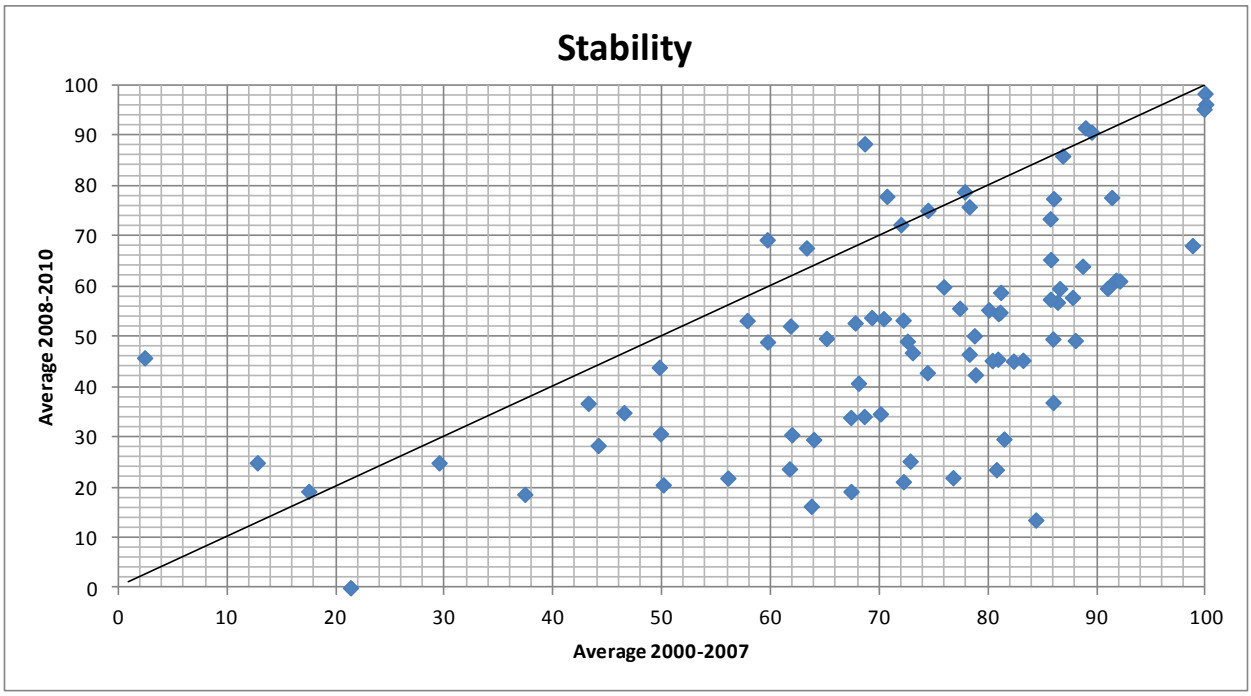


Figure 8. Financial Systems: 2008-2010 vs 2000-2007 (Financial Markets) (cont'd)





Source: authors, based on the Global Financial Development Database.

Appendix I: Overview of the Data Sources Underlying the Global Financial Development Database

This is just a summary; for more on the Global Financial Development Database, including the individual country data and meta-data, see http://www.worldbank.org/financialdevelopment and http://data.worldbank.org/data-catalog/global-financial-development.

A Database on Financial Development and Structure (updated November 2010). This database was used a starting point for many of the basic indicators of size, activity, and efficiency of financial intermediaries and markets. Beck, Demirgüç-Kunt, and Levine (2010) describe the sources and construction of, and the intuition behind, different indicators and present descriptive statistics.

Bankscope by Bureau van Dijk was used to obtain and update data on banks. Bankscope combines widely-sourced data with flexible software for searching and analyzing banks. Bankscope contains comprehensive information on banks across the globe. It can be used to research individual banks and find banks with specific profiles and analyze them. Bankscope has up to 16 years of detailed accounts for each bank.

Bloomberg, **Dealogic**, and **Thomson Reuters Datastream** were used to obtain higher frequency data on stock exchange and bond markets that were aggregate on country level.

***Doing Business* database**. This database, a part of the *Doing Business* project, offers an expansive array of economic data in 183 countries, covering the period from 2003 to the present. The data cover various aspects of business regulations, including those relevant to financial sector development issues, such as contract enforcement and obtaining credit.

IMF's access to finance database. The database aims to measure systematically access to and use of financial services systematically. Following Beck, Demirgüç-Kunt, and Martinez Peria (2007), the database measures the reach of financial services by bank branch network, availability of automated teller machines, and by four key financial instruments: deposits, loans, debt securities issued, and insurance. The website contains annual data from about 140 respondents for the six-year period, including data for all G-20 countries.

The Global Financial Inclusion Index (Global Findex) is a new database of demand-side data on financial inclusion, documenting financial usage across gender, age, education, geographic regions and national income levels. The core set of indicators and sub-indicators of financial inclusion based on the Global Findex database include *Use of bank accounts* (% of adults with an account at a formal financial institution, purpose of accounts, frequency of transactions; % of adults with an active account at a formal financial institution, mode of access), *Savings* (% of adults who saved in the past 12 months using a formal financial institution, % of adults who saved in the past 12 months using an informal savings club or a person outside the family, % of adults who otherwise saved in the past 12 months), *Borrowing* (% of adults who borrowed in the past 12 months from a formal financial institution, % of adults who borrowed in the past 12 months from informal sources, % of adults with an outstanding loan to purchase a home or an apartment), *Payments* (% of adults who used a formal account to receive wages or government

payments in the past 12 months, % of adults who used a formal account to receive or send money to family members living elsewhere in the past 12 months, % of adults who used a mobile phone to pay bills or send or receive money in the past 12 months), *Insurance* (% of adults who personally purchased private health insurance, % of adults who work in farming, forestry or fishing and personally paid for crop, rainfall or livestock insurance)

Financial Soundness Indicators database, hosted by the IMF, disseminates data and metadata on selected financial soundness indicators (FSIs) provided by participating countries.

World Development Indicators is the primary World Bank collection of development indicators, compiled from officially-recognized international sources. It presents the most current and accurate global development data available, and includes national, regional and global estimates.

International Financial Statistics (IMF) provides is a standard source of international statistics on all aspects of international and domestic finance. It reports, for most countries of the world, basic financial and economic data on international banking, money and banking, interest rates, prices, production, international transactions, international liquidity, government accounts, exchange rates, and national accounts.

Bank for International Settlements (BIS) statistics were used for the aggregate data on bond statistics, including domestic debt securities by residence and type of instrument (bonds and notes vs. money market instruments, issued by financial and non-financial corporates; based on publicly available or country reported data). Domestic debt securities (Quarterly Review Table 16) for a given country comprise issues by residents in domestic currency targeted at resident investors, whereas international debt securities (i.e. Quarterly Review Table 11) are the ones targeted at non-residents (a) in domestic currency on the domestic market, (b) in domestic and foreign currency on the international market, plus the issues (c) in foreign currency in the domestic market (further information can be found in the Guide to the international financial statistics, http://www.bis.org/publ/bppdf/bispap14.htm).

As two different collection systems are used (s-b-s for international debt securities and aggregated data for domestic debt securities), some overlap (between domestic debt securities and international debt securities) and inconsistencies (classification of issuers) might remain which differs from country to country.

Country authorities' websites were used to re-confirm and fill in some of the gaps in the data.

Appendix II: Country Data, Maps, Averages

Financial System Characteristics by Country, 2008–2010 Average

	Financial institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capitalization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Afghanistan	7.9	71.1		9.7				
Albania	33.8		6.2	22.4				
Algeria	13.7	343.3	6.3	15.5				
Andorra				21.7				
Angola	15.0	114.5	8.0	12.0				
Antigua and Barbuda	70.8		7.0					
Argentina	12.3	667.2	4.6	5.3	20.5	27.8	13.5	43.0
Armenia	19.8	524.1	10.3	16.3	1.3		0.4	
Aruba	57.1		7.7					
Australia	124.4		3.4	34.7	172.6	56.9	97.5	38.6
Austria	120.5	1,401.2		12.8	79.5	36.1	68.0	
Azerbaijan	16.0	38.0	8.1	10.0				
Bahamas, The	82.2		1.8	23.6				
Bahrain	74.0		6.3	48.6	97.7		6.6	11.7
Bangladesh	38.3	365.5	6.3	8.3	9.1		216.1	
Barbados	96.0		6.0	37.8	127.7		1.7	
Belarus	29.8		0.4	30.7				
Belgium	94.4			6.7	100.1		63.6	34.8
Belize	62.8	995.6	5.8	20.4				
Benin	20.8			20.5				
Bermuda				11.1				
Bhutan	30.8			17.8				
Bolivia	32.0		9.0	24.0	15.7		1.6	
Bosnia and Herzegovina	56.1	911.2	4.2	17.3				22.1
Botswana	22.0	477.2	6.7	10.0	32.2		4.4	16.4
Brazil	45.6		34.0	15.9	82.5	45.8	83.0	49.1
Brunei Darussalam	39.8		4.8	5.9				
Bulgaria	63.7	1,988.7	6.2	12.3	20.9		7.9	33.1
Burkina Faso	17.0			7.5				
Burundi	18.5			13.0				
Cambodia	23.3	91.6		15.2				
Cameroon	10.4	58.4		19.3				

Financial System Characteristics by Country, 2008–2010 Average (continued)

	Financial institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capitalization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Canada	126.6		2.7	19.3	139.1	74.2	97.0	35.0
Cape Verde	57.0		7.4	38.1				
Cayman Islands				28.8				
Central African Republic	6.9	2.4		7.7				
Chad	4.1	19.0		10.0				
Chile	75.9	2,015.2	4.7	8.9	125.5	53.7	20.9	30.0
China	111.1		3.1	34.8	109.9	71.6	187.8	41.3
Colombia	31.1		6.7	15.2	49.9	24.6	15.2	31.7
Comoros	10.8	61.8	8.5					
Congo, Dem. Rep.	4.9		41.5	9.7				
Congo, Rep.	3.2	16.1		4.4				
Costa Rica	46.0		12.1	20.7	5.4		3.5	21.8
Côte d'Ivoire	16.4			10.7	30.4		3.0	
Croatia	65.6		8.1	39.8	51.0		6.3	36.0
Cuba				8.0				
Cyprus	265.6			7.7	47.3	21.3	13.9	45.3
Czech Republic	50.2		4.7	27.1	38.2		50.3	39.8
Denmark	208.1			15.1	229.1		95.2	33.2
Djibouti	24.2	77.4	9.5	11.6				
Dominica	50.2		6.3	9.2				
Dominican Republic	19.9		9.1	23.6				
Ecuador	25.7			22.8	8.3		9.2	
Egypt, Arab Rep.	37.2		5.3	23.1	54.4	56.0	81.4	32.0
El Salvador	41.6			31.8	23.2		0.7	
Equatorial Guinea	3.3	121.8		16.3				
Eritrea				9.2				
Estonia	101.8	1,925.4	4.7	5.7	14.2		19.9	29.1
Ethiopia	17.2	91.7	3.3	10.3				
Fiji	46.9		3.4		32.7		0.8	
Finland	89.6			18.9	90.4		114.5	38.6
France	109.7			14.4	126.4		107.7	34.4
Gabon	9.3	91.1		14.8				
Gambia, The	16.8		12.7	7.4				
Georgia	30.5	653.1	13.7	6.7	6.6		0.7	
Germany	109.1			10.5	75.4	51.7	142.9	33.3
Ghana	14.0	298.8		15.4	9.8		5.9	

Financial System Characteristics by Country, 2008–2010 Average (continued)

	Financial institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capitalization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Greece	98.6	3,799.7		12.0	48.6	39.8	64.0	41.7
Grenada	75.6		7.2	12.0				
Guatemala	24.9		8.2	27.6				
Guinea				2.8				
Guinea-Bissau	4.9							
Guyana	27.2		12.2	18.9	14.3		0.3	
Haiti	12.8	329.4	16.2	20.5				
Honduras	49.8		8.7	29.8				
Hong Kong SAR, China	152.9		4.8	33.1	532.5	58.1	155.8	30.6
Hungary	65.2	1,027.5	2.7	14.4	27.8	4.4	123.8	51.0
Iceland	137.5			9.1	152.8		46.6	67.3
India	44.1	747.3		27.8	84.7	72.1	131.4	39.8
Indonesia	23.8		5.5	18.3	33.1	53.2	93.7	39.4
Iran, Islamic Rep.	33.9		0.1		15.3	54.0	55.6	
Iraq	5.5			21.9				
Ireland	228.2			3.7	129.6	21.3	50.6	46.0
Israel	93.9	1,055.7	2.8	26.3	91.1	42.6	65.4	20.9
Italy	108.9	1,221.2		27.3	73.5	38.9	133.0	34.9
Jamaica	26.3		10.9	23.5	56.4		4.8	15.0
Japan	103.7	7,185.2	1.2	32.9	114.3	60.7	124.9	28.6
Jordan	71.8		4.5	48.2	148.3	30.6	60.3	22.8
Kazakhstan	45.8	902.7		4.3	34.7		11.3	44.2
Kenya	29.0	328.4	9.1	19.2	38.1		13.9	26.9
Korea, Rep.	101.6	4,374.1	1.7	13.4	147.8	67.1	229.4	42.2
Kosovo	30.3	728.9						
Kuwait	65.6		2.9	24.6	98.2		92.8	15.4
Kyrgyz Republic		162.5	20.8	17.2	1.8		100.8	
Lao PDR	10.4	44.3	20.2	11.2				
Latvia	88.1	1,230.7	7.1	3.0	6.9		2.1	31.5
Lebanon	66.7	873.0	2.2	33.0	32.1		12.5	20.5
Lesotho	11.2	245.3	8.1	19.4				
Liberia	12.3		10.2	7.2				
Libya	8.0		3.5	77.3				
Lithuania	66.4		2.2	4.3	13.5		8.4	29.7
Luxembourg	184.0			24.6	189.6	3.7	0.7	35.0
Macao SAR, China	51.7		4.9	22.6				

Financial System Characteristics by Country, 2008–2010 Average (continued)

	Financial institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capitalization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Macedonia, FYR	41.1		3.1	10.8	15.9		6.6	34.3
Madagascar	10.7	36.1	35.2	19.1				
Malawi	11.7		21.5	18.9	29.7		2.1	
Malaysia	106.3	1,570.3	2.8	19.6	173.2	62.5	34.4	21.1
Maldives	66.1	1,130.0	6.4	7.8				
Mali	17.1			12.0				
Malta	127.6	3,561.8		12.6	50.1	5.8	1.3	17.4
Mauritania	25.5		10.9	23.1				
Mauritius	80.8		11.0	23.5	51.4	41.8	10.1	28.1
Mexico	17.5	1,161.2	4.9	9.9	48.0	33.8	35.6	36.9
Micronesia, Fed. Sts.			13.4	24.9				
Moldova	34.3	1,132.0	5.8	16.1				
Mongolia	38.8	1,283.3	8.6	24.4	10.3		10.1	35.0
Montenegro	77.5			5.5	84.9		5.3	
Morocco	71.8	584.2		33.0	74.6	26.8	34.1	21.0
Mozambique	19.5		6.7	22.5				
Myanmar	3.3		5.0	3.2				
Namibia	44.5	635.3	5.0	41.1	8.2		3.4	48.1
Nepal	44.7		5.2	16.3	37.2		6.2	
Netherlands	201.9	1,762.5	0.2	12.2	146.0		138.7	32.8
New Zealand	145.0		1.9	19.3	35.1	43.9	60.0	30.9
Nicaragua	34.4		8.3	17.9				
Niger	10.9			30.0				
Nigeria	31.1		6.5	13.3	26.1		24.3	24.6
Norway		513.6	1.9	22.4	81.8	32.2	138.9	48.0
Oman	38.4	1,011.5	3.1	23.3	33.2		49.7	25.1
Pakistan	24.3	219.5	5.9	10.7	22.1		121.3	31.5
Panama	78.7		4.7	22.6	31.4		2.6	11.3
Papua New Guinea	24.5	176.4	8.2	37.2	136.5		0.4	
Paraguay	27.0		24.8	19.8				
Peru	23.0	395.8	18.6	14.2	61.4	36.2	5.8	43.7
Philippines	27.2	431.6	4.8	36.8	49.7	51.2	28.8	31.3
Poland	43.2			24.4	31.5	43.8	52.9	44.2
Portugal	179.0	2,774.9		29.9	89.8		61.0	29.6
Qatar		725.3	3.7	32.4				31.4
Romania	37.7		5.8	10.3	16.6		10.5	45.1

Financial System Characteristics by Country, 2008–2010 Average (continued)

	Financial Institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capitalization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Russian Federation	41.3		6.0	18.1	58.2	34.3	129.0	52.8
Rwanda		204.2	9.7	8.9				
Samoa	42.7		7.3	54.9				
San Marino	361.7			24.6				
São Tomé and Príncipe	29.5		18.9					
Saudi Arabia	45.3	744.6		17.2	77.6	39.6	126.8	30.5
Senegal	23.6			20.2				
Serbia	41.5		7.2	10.2	31.1		6.6	28.8
Seychelles	23.6	1,132.0	7.8	19.6				
Sierra Leone	7.6	131.1	13.4	7.9				
Singapore	97.4	2,070.3	5.1	46.4	169.9	65.0	104.2	30.8
Slovak Republic	44.7		2.0	9.7	10.9		3.1	23.3
Slovenia	88.6		3.6	15.8	34.0	23.7	6.8	28.1
Solomon Islands	23.7		11.9					
South Africa	75.8	882.9	3.4	27.1	245.6	67.6	69.9	39.5
Spain	203.7	801.1		57.3	144.8	59.7	159.1	36.2
Sri Lanka	26.2		5.5	19.3	19.4	55.3	29.8	25.3
St. Kitts and Nevis	64.0		4.1	18.8	83.5		1.4	
St. Lucia	112.0		7.1	24.3				
St. Vincent and the Grenadines	48.9		6.4	10.2				
Sudan	11.0			16.8				
Suriname	24.9		5.5	16.5				
Swaziland	22.8	443.1	6.2	11.9				
Sweden	124.3			19.6	149.6		124.8	41.7
Switzerland	169.6		2.8	15.4	244.0	35.5	100.0	26.3
Syrian Arab Republic	17.4	190.3	3.1	13.6				
Tajikistan			17.2	13.0				
Tanzania	14.4	126.6	7.3	19.9				27.0
Thailand	93.7	1,082.7	4.8	4.5	75.2	52.4	109.1	33.4
Timor-Leste	17.8		11.0					
Togo	18.8	175.5		7.9				
Tonga	49.2		6.9					
Trinidad and Tobago	29.7		7.1	29.6	55.9		2.6	
Tunisia	56.5			29.2	17.3		23.3	13.4
Turkey	34.0	1,263.1		32.4	30.7	49.0	201.9	46.6
Turkmenistan				8.0				

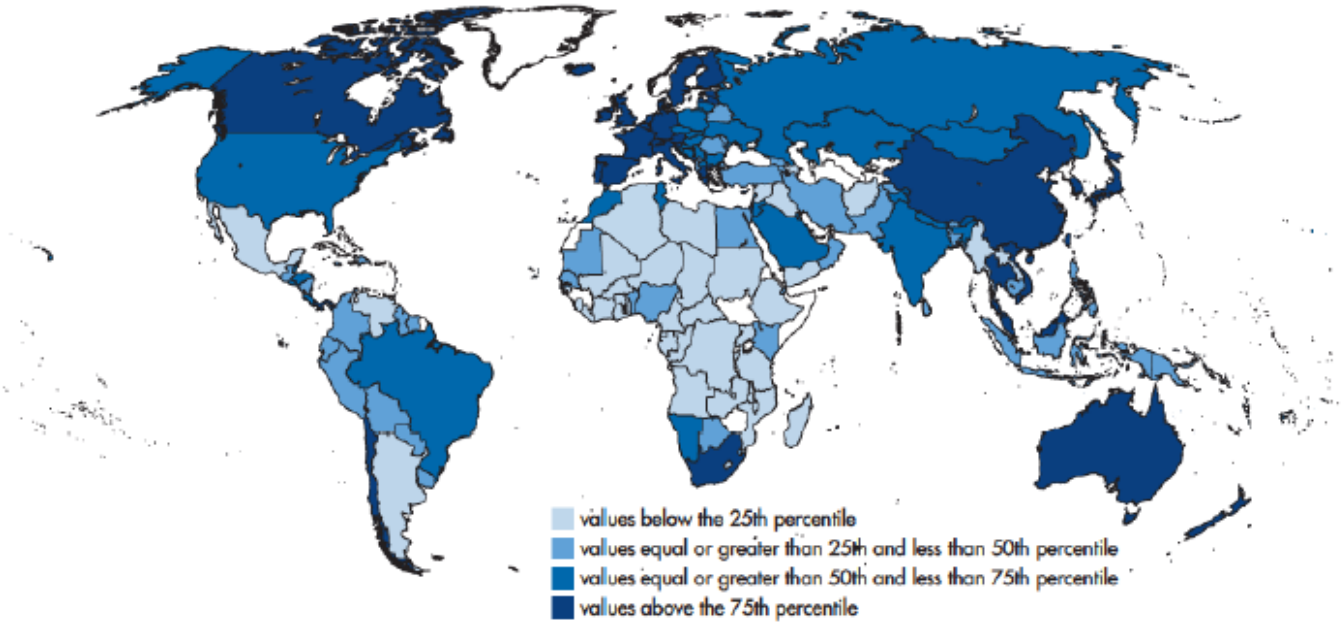
Financial System Characteristics by Country, 2008–2010 Average (continued)

	Financial institutions				Financial markets			
	Private credit to GDP (%)	Accounts per thousand adults, commercial banks	Lending-deposit spread (%)	Z-score–weighted average, commercial banks	(Stock market capitalization + outstanding domestic private debt securities)/ GDP (%)	Market capital-ization out of the top 10 largest companies (%)	Stock market turnover ratio (%)	Asset price volatility
Tuvalu				21.0				
Uganda	12.3	169.5	11.2	10.6	18.0		0.5	
Ukraine	66.0	3,176.4	6.7	6.3	25.0		8.8	58.8
United Arab Emirates				21.4				35.5
United Kingdom	205.3			18.1	126.6	62.2	183.1	33.1
United States	60.0			24.0	219.7	72.6	342.7	28.8
Uruguay	22.9	551.0	8.8	4.7	0.4		4.8	
Uzbekistan		909.2		65.8				
Vanuatu	56.6		4.1	39.2				
Venezuela, RB	18.2		4.4	8.4	1.7		1.4	57.0
Vietnam	96.8		2.4	23.2	17.1		141.6	43.7
West Bank and Gaza		543.3	6.1					
Yemen, Rep.	7.1	89.9	5.8	18.0				
Zambia	11.8		13.7	7.6	17.9		14.8	

Source: Data from and calculations based on the Global Financial Development Database.
Note: The four blue bars summarize where the country's observation is vis-à-vis the global statistical distribution of the variable in the Global Financial Development Database. Each blue bar corresponds to one quartile of the statistical distribution. So, values below the 25th percentile show only one full bar, values equal or greater than the 25th and less than the 50th percentile show two full bars, values equal or greater than the 50th and less than the 75th percentile show three full bars, and values greater than the 75th percentile show four full bars. the blue bars on the far left are based on a simple (unweighted) average of the eight financial characteristics, each converted to a 0–100 scale.

Depth—Financial Institutions, 2008–2010

Domestic private credit to the real sector by deposit money banks as percentage of local currency GDP. Data on domestic private credit to the real sector by deposit money banks is from the International Financial Statistics (IFS) line 22D published by the International Monetary Fund (IMF). Local currency GDP is also from IFS. Missing observations are imputed by using GDP growth rates from World Development Indicators (WDI), instead of substituting the levels. This approach ensures a smoother GDP series.

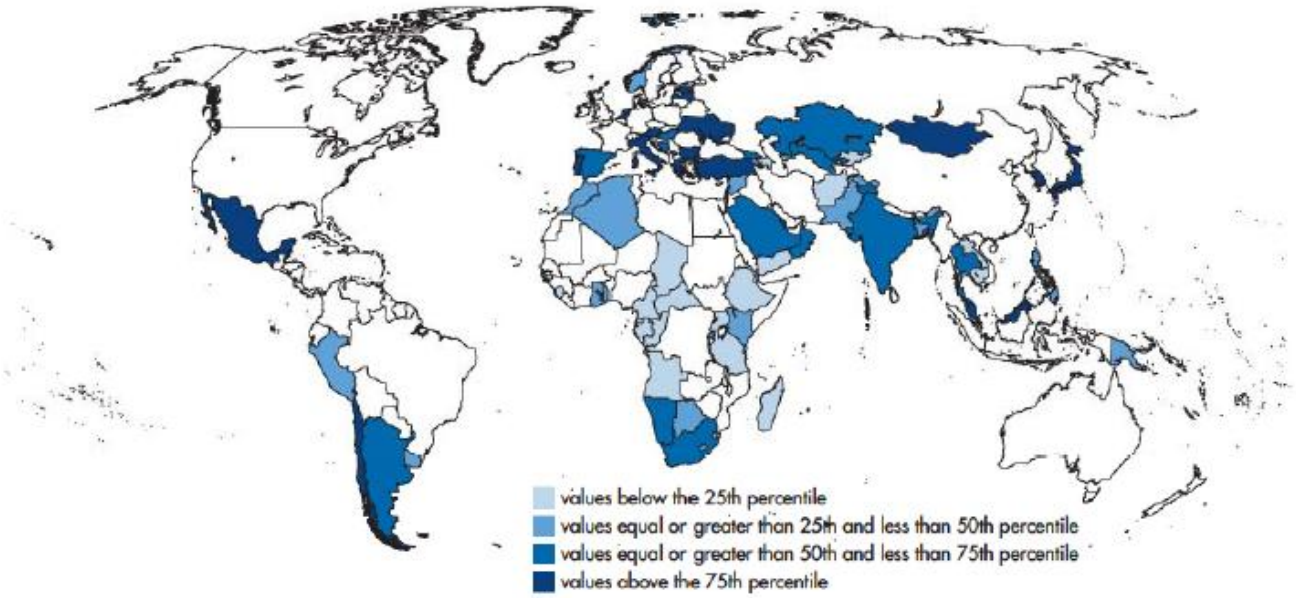


Private credit to GDP (%)		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	173	56.3	38.8	54.6	3.2	361.7	89.9
By developed/developing economies								
	Developed economies	48	113.3	100.1	68.6	3.3	361.7	103.0
	Developing economies	125	34.5	26.3	24.9	3.2	112.0	60.5
By income level								
	High income	48	113.3	100.1	68.6	3.3	361.7	103.0
	Upper middle income	49	48.6	44.5	28.0	8.0	112.0	67.8
	Lower middle income	49	30.8	27.0	18.7	3.2	96.8	36.6
	Low income	27	15.4	12.8	9.8	3.3	44.7	24.9
By region								
	High income: OECD	30	124.0	109.4	52.2	43.2	228.2	103.7
	High income: non-OECD	17	97.3	65.6	90.7	3.3	361.7	80.7
	East Asia & Pacific	17	46.8	38.8	34.6	3.3	111.1	100.1
	Europe & Central Asia	19	44.9	41.1	19.6	16.0	88.1	40.4
	Latin America & Caribbean	29	41.5	32.0	24.2	12.3	112.0	33.4
	Middle East & North Africa	12	34.5	29.1	26.0	5.5	71.8	32.1
	South Asia	8	35.3	34.6	17.3	7.9	66.1	41.1
	Sub-Saharan Africa	41	20.1	16.4	16.9	3.2	80.8	38.7

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by current GDP.

Access—Financial Institutions, 2008–2010

Number of depositors with commercial banks per 1,000 adults. For each type of institution the calculation follows: (reported number of depositors)*1,000/adult population in the reporting country. Number of depositors from Commercial Banks is from Financial Access Survey reported by the IMF. Adult population data is from WDI.

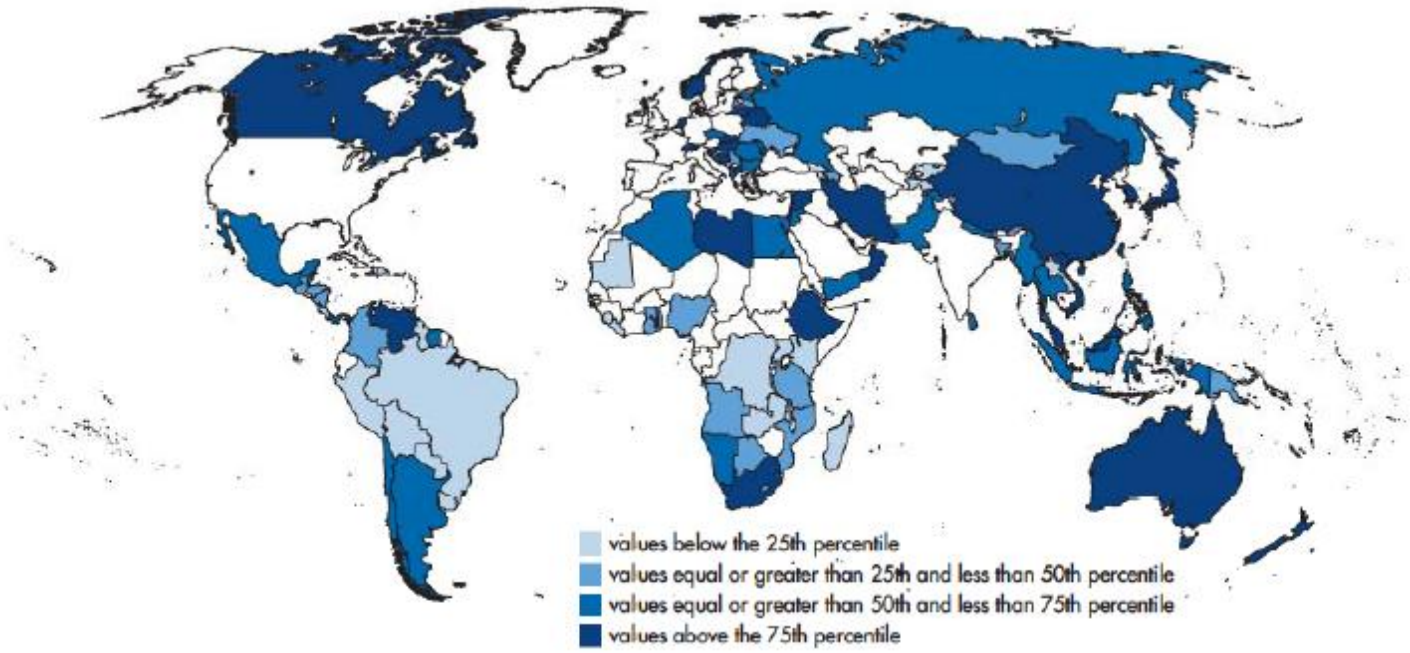


Accounts per thousand adults from commercial banks		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	79	904.7	584.2	1,147.3	2.4	7,185.2	1,339.0
By developed/developing economies								
	Developed economies	18	2,004.3	1,311.2	1,766.1	121.8	7,185.2	3,761.8
	Developing economies	61	580.2	395.8	598.2	2.4	3,176.4	691.5
By income level								
	High income	18	2,004.3	1,311.2	1,766.1	121.8	7,185.2	3,761.8
	Upper middle income	21	921.1	902.7	534.1	38.0	2,015.2	997.9
	Lower middle income	24	570.1	437.3	664.1	16.1	3,176.4	725.9
	Low income	16	147.9	128.9	112.0	2.4	365.5	222.5
By region								
	High income: OECD	12	2,320.2	1,581.8	1,945.7	513.6	7,185.2	3,933.9
	High income: non-OECD	6	1,372.5	878.1	1,248.0	121.8	3,561.8	1,082.9
	East Asia & Pacific	7	668.6	431.6	630.3	44.3	1,570.3	799.3
	Europe & Central Asia	13	1,047.8	909.2	811.2	38.0	3,176.4	1,645.5
	Latin America & Caribbean	7	873.6	667.2	587.6	329.4	2,015.2	967.0
	Middle East & North Africa	7	385.9	343.3	295.6	77.4	873.0	384.7
	South Asia	5	506.7	365.5	429.7	71.1	1,130.0	531.7
	Sub-Saharan Africa	22	261.0	150.3	294.5	2.4	1,132.0	281.1

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by total adult population.

Efficiency—Financial Institutions, 2008–2010

Lending rate minus deposit rate. Lending rate is the average rate charged by banks on loans to the private sector and deposit interest rate is the average rate paid by commercial or similar banks for demand, time, or savings deposits. Both lending and deposit rate are from IFS line 60P and 60L, respectively.

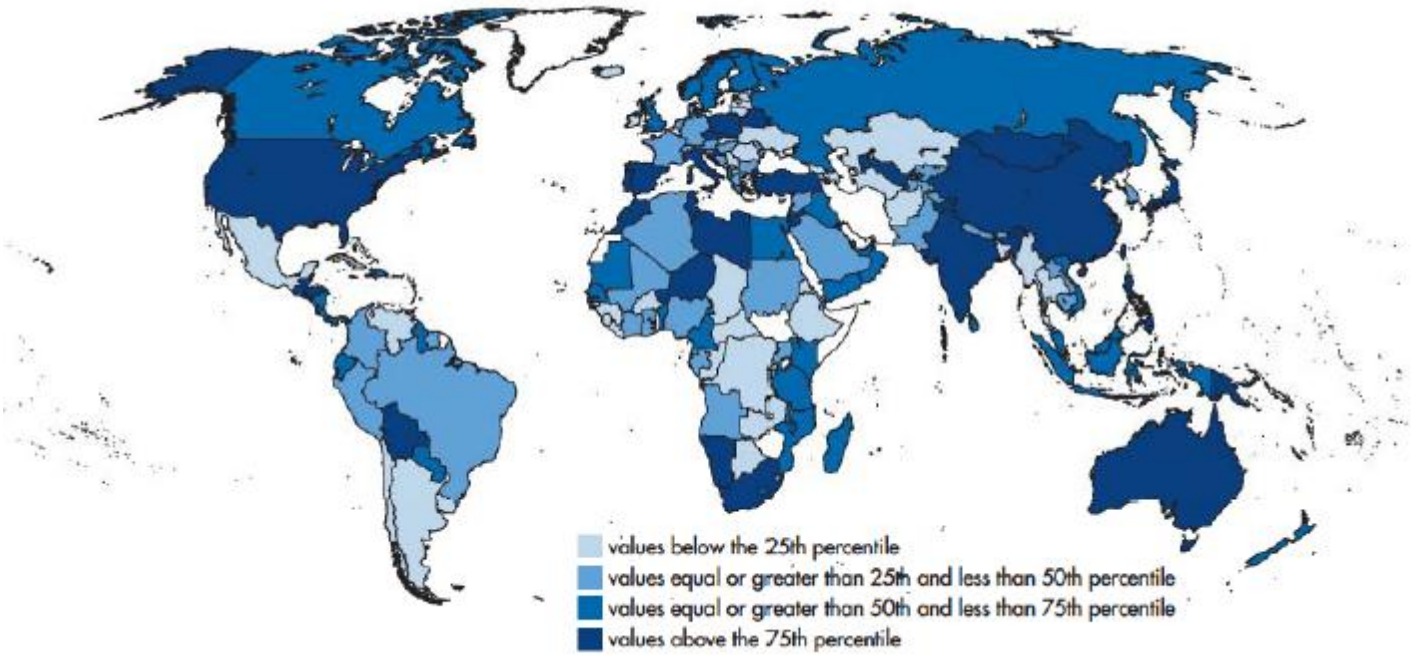


Lending-deposit spread (%)		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	129	7.7	6.3	6.4	0.1	41.5	6.9
By developed/developing economies								
	Developed economies	28	3.8	3.5	2.0	0.2	8.1	2.2
	Developing economies	101	8.8	6.9	6.7	0.1	41.5	7.3
By income level								
	High income	28	3.8	3.5	2.0	0.2	8.1	2.2
	Upper middle income	43	6.7	6.2	5.3	0.1	34.0	6.5
	Lower middle income	39	8.8	8.0	4.7	2.4	24.8	6.0
	Low income	19	13.7	10.2	10.1	3.3	41.5	13.0
By region								
	High income: OECD	14	2.6	2.7	1.2	0.2	4.7	1.9
	High income: non-OECD	13	5.1	4.9	1.9	1.8	8.1	5.1
	East Asia & Pacific	17	7.3	5.5	4.7	2.4	20.2	3.6
	Europe & Central Asia	17	7.7	6.2	5.2	0.4	20.8	6.7
	Latin America & Caribbean	27	9.6	7.2	6.8	4.1	34.0	16.9
	Middle East & North Africa	10	4.6	4.9	2.6	0.1	9.5	4.6
	South Asia	5	5.9	5.9	0.5	5.2	6.4	6.0
	Sub-Saharan Africa	26	11.7	8.8	8.9	3.3	41.5	12.8

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by total population.

Stability—Financial Institutions, 2008–2010

Indicator estimated as follows: (ROA + Equity / Assets)/(Standard Deviation of ROA). Return of Assets (ROA), Equity, and Assets are from Bankscope.

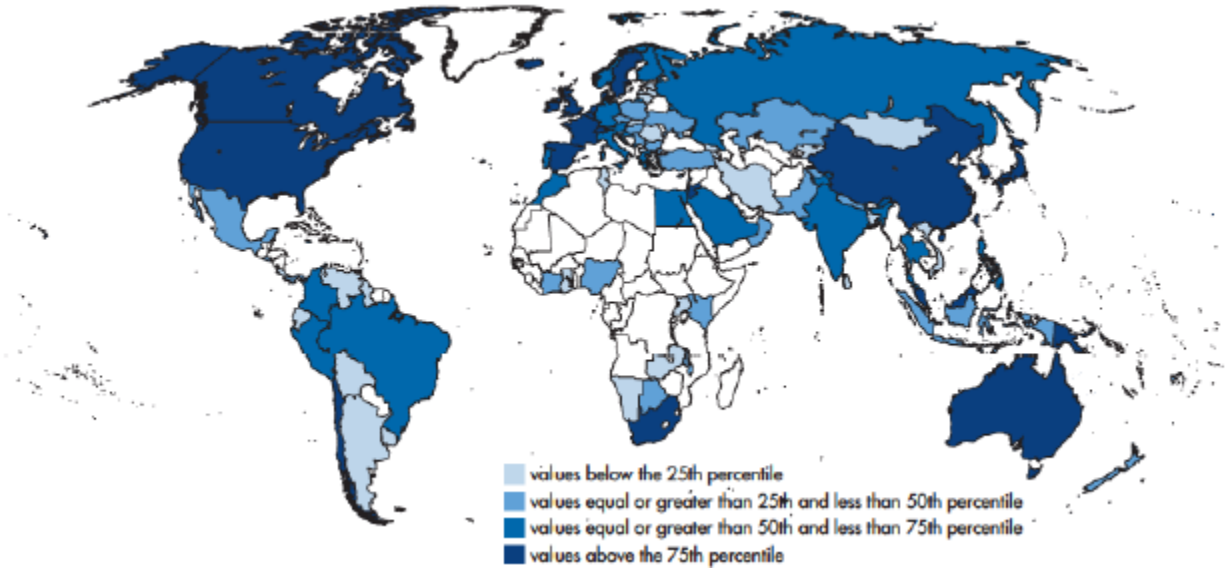


Z-score weighted average from commercial banks		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	178	19.2	17.9	11.8	2.8	77.3	23.4
By developed/developing economies								
	Developed economies	53	21.6	19.6	11.2	3.7	57.3	23.4
	Developing economies	125	18.1	16.3	11.9	2.8	77.3	23.4
By income level								
	High income	53	21.6	19.6	11.2	3.7	57.3	23.4
	Upper middle income	48	18.2	15.3	13.5	3.0	77.3	26.8
	Lower middle income	47	21.5	19.3	12.0	4.4	65.8	23.6
	Low income	30	12.8	10.5	6.3	2.8	30.0	12.1
By region								
	High income: OECD	31	19.3	18.1	10.6	3.7	57.3	23.3
	High income: non-OECD	21	25.2	23.6	11.7	5.9	48.6	25.0
	East Asia & Pacific	15	24.6	23.2	14.0	3.2	54.9	30.0
	Europe & Central Asia	22	15.5	11.5	13.7	3.0	65.8	20.9
	Latin America & Caribbean	29	17.4	18.8	7.3	4.7	31.8	14.5
	Middle East & North Africa	11	29.5	23.1	19.1	11.6	77.3	24.3
	South Asia	8	14.7	13.5	6.9	7.8	27.8	23.5
	Sub-Saharan Africa	41	15.4	13.0	8.4	2.8	41.1	14.9

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by total population.

Depth—Financial Markets, 2008–2010

Market capitalization plus the amount of outstanding domestic private debt securities as percentage of GDP. Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies does not include investment companies, mutual funds, or other collective investment vehicles. Data is from Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data, and is compiled and reported by the WDI. Amount of outstanding domestic private debt securities is from Table 16A (domestic debt amount) of the Securities Statistics by Bank for International Settlements. The amount includes all issuers except governments.

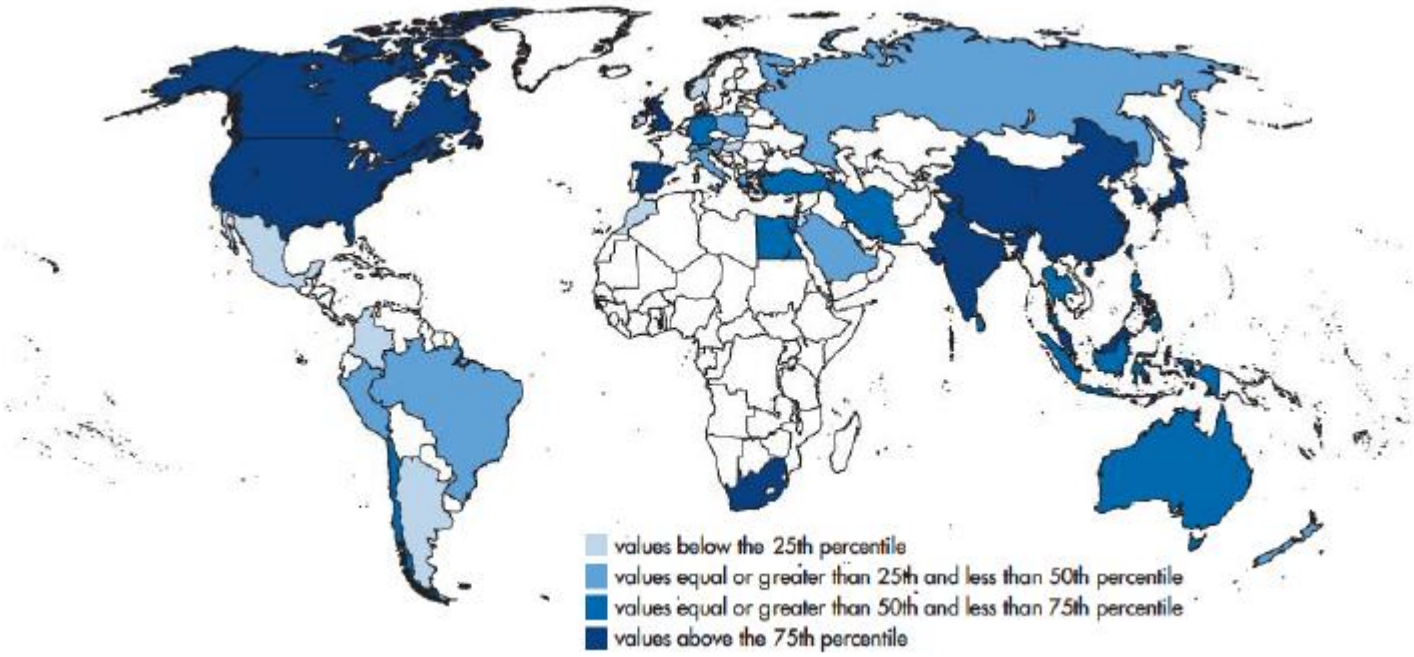


Stock market capitalization plus outstanding domestic private debt securities to GDP (%)		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	103	71.2	48.6	74.7	0.4	532.5	130.6
By developed/developing economies								
	Developed economies	43	111.1	91.1	88.0	10.9	532.5	152.1
	Developing economies	60	42.5	30.0	46.1	0.4	245.6	76.4
By income level								
	High income	43	111.1	91.1	88.0	10.9	532.5	152.1
	Upper middle income	33	51.9	32.1	55.1	0.4	245.6	82.0
	Lower middle income	21	33.6	23.2	31.8	1.3	136.5	56.7
	Low income	6	22.3	23.9	15.1	1.8	38.1	18.4
By region								
	High income: OECD	31	108.2	100.1	63.6	10.9	244.0	151.3
	High income: non-OECD	11	121.9	77.6	142.1	33.2	532.5	180.4
	East Asia & Pacific	9	70.9	49.7	57.2	10.3	173.2	100.0
	Europe & Central Asia	14	24.9	18.8	23.1	1.3	84.9	43.7
	Latin America & Caribbean	16	39.3	27.3	35.7	0.4	125.5	59.6
	Middle East & North Africa	6	57.0	43.3	50.2	15.3	148.3	42.3
	South Asia	5	34.5	22.1	29.8	9.1	84.7	72.6
	Sub-Saharan Africa	11	46.1	29.7	67.3	8.2	245.6	133.7

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by current GDP.

Access—Financial Markets, 2008–2010

Ratio of market capitalization out of top ten largest companies to total market capitalization. The World Federation of Exchanges (WFE) provides data on the exchange level. This variable is aggregated up to the country level by taking a simple average over exchanges.

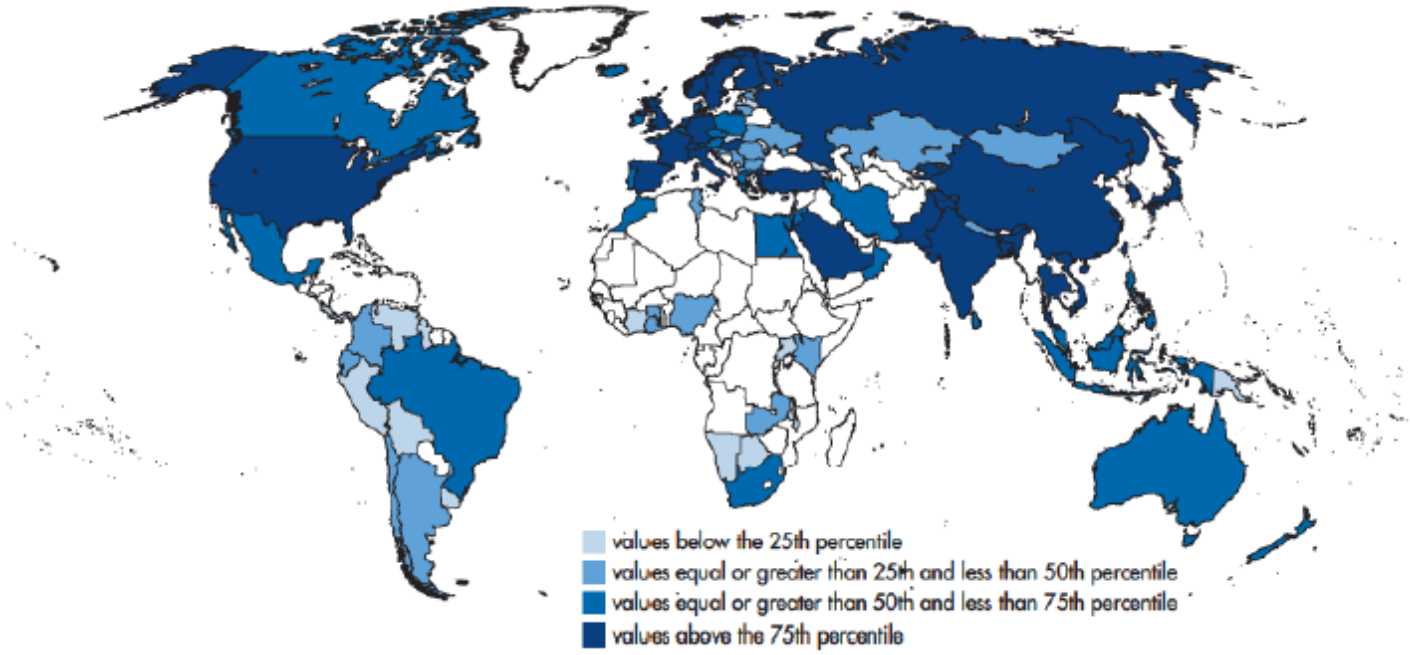


Market capitalization out of top 10 largest companies (%)		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	46	44.8	44.8	18.2	3.7	74.2	63.6
By developed/developing economies								
	Developed economies	25	42.4	42.6	20.8	3.7	74.2	64.4
	Developing economies	21	47.6	51.2	14.6	24.6	72.1	60.9
By income level								
	High income	25	42.4	42.6	20.8	3.7	74.2	64.4
	Upper middle income	15	45.7	45.8	14.6	24.6	71.6	59.9
	Lower middle income	6	52.4	54.3	14.6	26.8	72.1	66.7
	Low income	0						
By region								
	High income: OECD	20	43.5	43.2	20.2	3.7	74.2	64.9
	High income: non-OECD	5	38.0	39.6	24.8	5.8	65.0	55.2
	East Asia & Pacific	5	58.2	53.2	8.8	51.2	71.6	69.6
	Europe & Central Asia	2	41.6	41.6	10.4	34.3	49.0	37.4
	Latin America & Caribbean	6	37.0	35.0	11.0	24.6	53.7	42.1
	Middle East & North Africa	4	41.8	42.3	15.3	26.8	56.0	44.8
	South Asia	2	63.7	63.7	11.9	55.3	72.1	72.2
	Sub-Saharan Africa	2	54.7	54.7	18.3	41.8	67.6	68.4

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by stock market capitalization.

Efficiency—Financial Markets, 2008–2010

Total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. Data is from Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data, and is compiled and reported by the WDI.

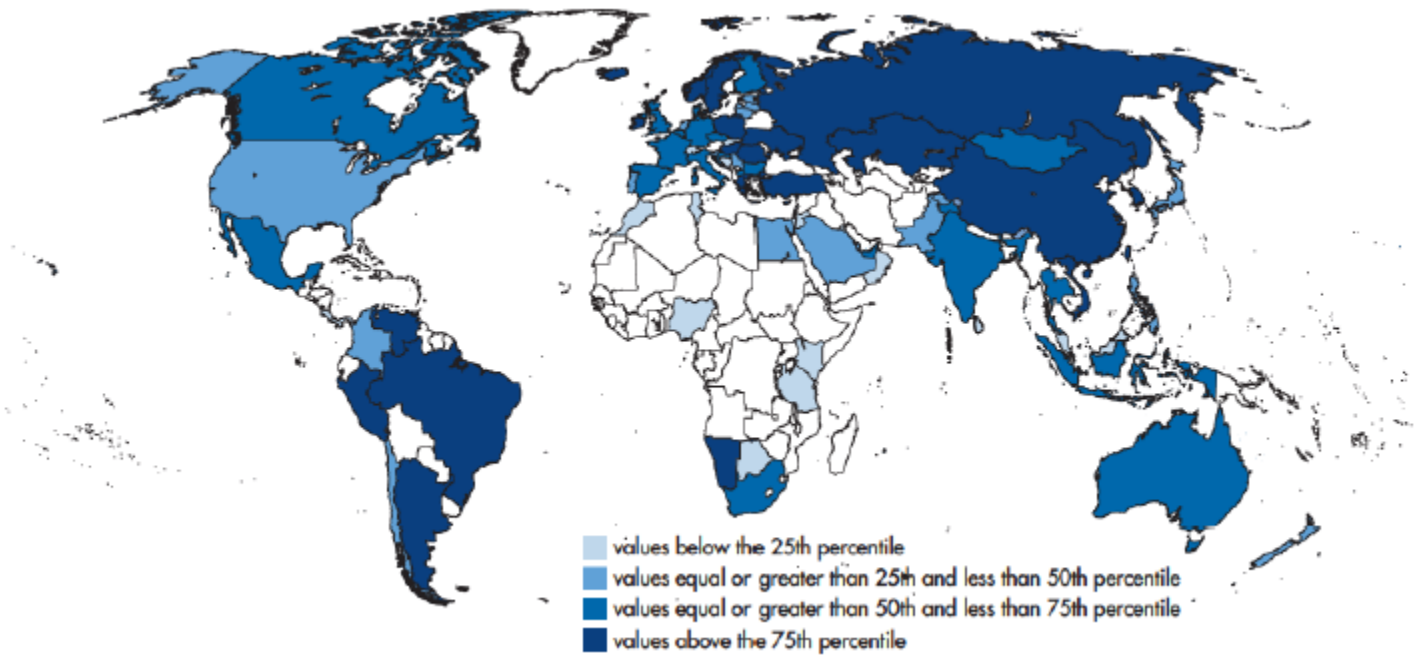


Stock market turnover ratio (%)		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	103	56.9	28.8	65.3	0.3	342.7	197.5
By developed/developing economies								
	Developed economies	43	84.4	68.0	70.0	0.7	342.7	218.5
	Developing economies	60	37.2	10.3	54.2	0.3	216.1	127.0
By income level								
	High income	43	84.4	68.0	70.0	0.7	342.7	218.5
	Upper middle income	33	35.2	10.5	52.2	1.4	201.9	131.8
	Lower middle income	21	35.0	10.1	47.8	0.3	141.6	103.6
	Low income	6	56.6	10.1	87.0	0.5	216.1	69.5
By region								
	High income: OECD	31	98.9	97.0	69.9	0.7	342.7	223.4
	High income: non-OECD	11	51.1	13.9	58.2	1.3	155.8	131.9
	East Asia & Pacific	9	67.4	34.4	68.2	0.4	187.8	166.6
	Europe & Central Asia	14	35.7	8.2	62.2	0.4	201.9	121.5
	Latin America & Caribbean	16	12.8	4.8	21.0	0.3	83.0	56.9
	Middle East & North Africa	6	44.6	44.9	25.7	12.5	81.4	58.6
	South Asia	5	101.0	121.3	84.6	6.2	216.1	126.4
	Sub-Saharan Africa	11	13.9	5.9	19.9	0.5	69.9	62.1

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by stock market capitalization.

Stability—Financial Markets, 2008–2010

Annual standard deviation of the price of a 1-year sovereign bond divided by the annual average price of the 1-year sovereign bond (both based on end-month data).



Asset price volatility		Number of countries	Average	Median	Standard deviation	Minimum	Maximum	Weighted average[a]
	World	84	33.6	33.1	10.8	11.3	67.3	38.0
By developed/developing economies								
	Developed economies	41	34.1	33.3	10.0	11.7	67.3	32.8
	Developing economies	43	33.2	31.7	11.6	11.3	58.8	39.3
By income level								
	High income	41	34.1	33.3	10.0	11.7	67.3	32.8
	Upper middle income	30	33.1	32.4	12.3	11.3	57.0	41.5
	Lower middle income	11	34.8	32.0	10.6	21.0	58.8	37.3
	Low income	2	26.9	26.9	0.1	26.9	27.0	27.1
By region								
	High income: OECD	30	36.3	34.9	9.2	20.9	67.3	33.0
	High income: non-OECD	11	28.2	30.6	10.0	11.7	45.3	30.5
	East Asia & Pacific	7	35.0	35.0	7.6	21.1	43.7	40.1
	Europe & Central Asia	11	38.8	34.3	11.4	22.1	58.8	49.0
	Latin America & Caribbean	10	34.0	34.3	14.9	11.3	57.0	42.3
	Middle East & North Africa	5	21.9	21.0	6.7	13.4	32.0	27.1
	South Asia	3	32.2	31.5	7.3	25.3	39.8	38.6
	Sub-Saharan Africa	7	30.1	27.0	10.5	16.4	48.1	28.0

Source: Global Financial Development Database, 2008–10 data.
Note: OECD = Organisation for Economic Co-operation and Development.
a. Weighted average by total population.

Notes

Private Credit to Gross Domestic Product (GDP) measures the domestic private credit to the real sector by deposit money banks as percentage of local currency GDP. Data on domestic private credit to the real sector by deposit money banks is from the International Financial Statistics (IFS) line 22D published by the International Monetary Fund (IMF). Local currency GDP is also from IFS. Missing observations are imputed by using GDP growth rates from World Development Indicators (WDI), instead of substituting the levels. This approach ensures a smoother GDP series.

Accounts per Thousand Adults from Commercial Banks is the number of depositors with commercial banks per 1,000 adults. For each type of institution the calculation follows: (reported number of depositors)*1,000/adult population in the reporting country. Number of depositors from Commercial Banks is from Financial Access Survey reported by the IMF. Adult population data is from WDI.

Lending-Deposits Spread is lending rate minus deposit rate. Lending rate is the rate charged by banks on loans to the private sector and deposit interest rate is the rate paid by commercial or similar banks for demand, time, or savings deposits. Both lending and deposit rate are from IFS line 60P and 60L, respectively.

Z- Score weighted average from Commercial Banks is estimated as follows: (ROA + Equity / Assets)/(Standard Deviation of ROA). Return of Assets (ROA), Equity, and Assets are from Bankscope. The standard deviation of ROA is estimated as a 5-year moving average.

Stock Market Capitalization plus Outstanding Domestic Private Debt Securities to GDP measures the market capitalization plus the amount of outstanding domestic private debt securities as percentage of GDP. Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies does not include investment companies, mutual funds, or other collective investment vehicles. Data is from Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data, and is compiled and reported by the WDI. Amount of outstanding domestic private debt securities is from Table 16A (domestic debt amount) of the Securities Statistics by Bank for International Settlements. The amount includes all issuers except governments.

Percent Market Capitalization out of Top 10 Largest Companies measures the ratio of market capitalization out of top ten largest companies to total market capitalization. The World Federation of Exchanges (WFE) provides data on the exchange level. This variable is aggregated up to the country level by taking a simple average over exchanges.

Stock Market Turnover Ratio is the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. Data is from Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data, and is compiled and reported by the WDI.

Asset Price Volatility is the annual standard deviation of the price of a 1-year sovereign bond divided by the annual average price of the 1-year sovereign bond (both based on end-month data).

Averaging. Each observation is an arithmetic average of the corresponding variable over the period 2008-2010. When a variable is not reported or not available for a part of this period, the average is calculated for the period for which observations are available.

Visualization. To illustrate where a country's observation is vis-à-vis the global distribution of the variable, the table includes four bars on the left of each observation. The four bar scale is based on the location of the country in the statistical distribution of the variable in the *Global Financial Development Database*: values below the 25th percentile show only one full bar, values equal or greater than the 25th and less than the 50th percentile show two full bars, values equal or greater than the 50th and less than the 75th percentile show three full bars, and values greater than the 75th percentile show four full bars. The bars are calculated using "winsorized" and "rescaled" variables, as described in the main text. To prepare for this, the 95th and 5th percentile for each variable for the entire pooled country-year dataset are calculated, and the top and bottom five percent of observations are truncated. Specifically, all observations from the 5th percentile to the minimum are replaced by the value corresponding to the 5th percentile, and all observations from the 95th percentile to the maximum are replaced by the value corresponding to the 95th percentile. To convert all the variables to a 0-100 scale, each score is rescaled by the maximum for each indicator, and the minimum of the indicator. The rescaled indicator can be interpreted as the percent distance between the 'worst' (0) and the 'best' (100) value of the respective financial system characteristic, defined by the 5th and 95th percentile of the original distribution. The four bars on the left of the country name show the unweighted arithmetic average of the "winsorized" and rescaled variables (dimensions) for each country. This average is only reported for those countries where data for 2008-2010 are available for at least three variables (dimensions).

REFERENCES

Aisen, Ari, and Michael Franken. 2010. “Bank Credit during the 2008 Financial Crisis: A Cross-country Comparison.” Working Paper WP/10/47, International Monetary Fund, Washington, DC.

Angelidis, Dimitrios and Katerina Lyroudi. 2006. “Efficiency in the Italian Banking Industry: Data Envelopment Analysis and Neural Networks.” *International Research Journal of Finance and Economics*.

Arcand, Jean-Luis, Enrico Berkes, and Ugo Panizza. 2011. “Too Much Finance?” VoxEU (see also http://www.voxeu.org/index.php?q=node/6328).

Bagehot, Walter. 1873. *Lombard Street*. Richard D. Irwin Publishers, Homewood, IL.

Beck, Thorsten, and Ross Levine. 2004. “Stock Markets, Banks and Growth: Panel Evidence.” *Journal of Banking and Finance*, pp. 423–442.

Beck, Thorsten, and Ross Levine. 2005. “Legal Institutions and Financial Development” in C. Ménard and M. M. Shirley (eds.), *Handbook of New Institutional Economics*, pp. 251–278, Springer, the Netherlands.

Beck, Thorsten, Asli Demirgüç-Kunt, and Maria Soledad Martinez Peria. 2007. *”*Reaching Out: Access to and Use of Banking Services Across Countries.” *Journal of Financial Economics* 85(1), pp. 234–66.

Beck, Thorsten, Asli Demirgüç-Kunt, and Maria Soledad Martínez Pería. 2008. “Banking Services for Everyone? Barriers to Bank Access and Use Around the World.” *The World Bank Economic Review* 22(3), pp. 397–430.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine. 2000. “A New Database on the Structure and Development of the Financial Sector.” *World Bank Economic Review*, Vol. 14, No. 3, pp. 597-605.

Beck, Thorsten, Aslı Demirgüç-Kunt, and Ross Levine. 2007. "Finance, Inequality and the Poor." *Journal of Economic Growth* 12(1), pp. 27–49.

Beck, Thorsten, Aslı Demirgüç-Kunt, and Ross Levine. 2010. “Financial Institutions and Markets across Countries and over Time.” *World Bank Economic Review* 24(1), pp. 77–92.

Beck, Thorsten, Erik Feyen, Alain Ize, and Florencia Moizeszowicz. 2006.“Benchmarking Financial Development.” Policy Research Working Paper 4638, World Bank, Washington, DC.

Belley, Philippe and Lance Lochner. 2007. “The Changing Role of Family Income and Ability in Determining Educational Achievement.” NBER Working Paper No. w13527.

Benavente José Miguel, Alexander Galetovic, and Ricardo Sanhueza. 2006. “FOGAPE: An economic analysis.” Working Paper 222, Department of Economics, University of Chile, Chile.

Bijsterbosch, M., and Tatjana Dalhaus. 2011. “Determinants of Credit-less Recoveries.” Working Paper 1358, European Central Bank.

Boyd, John H., and David E. Runkle. 1993. “Size and Performance of Banking Firms: Testing the Predictions of Theory.” *Journal of Monetary Economics* 31, pp. 47–67.

Boyd, John H., and Stanley L. Graham. 1991. “Investigating the Banking Consolidation Trend.” *Federal Reserve Bank of Minneapolis Quarterly Review*, pp. 1–15.

Boyd, John H., and Stanley L. Graham. 1996. “Consolidation in U.S. Banking: Implications for Efficiency and Risk.” Working Paper 572, Federal Reserve Bank of Minneapolis Research Department.

Čihák, Martin, and Heiko Hesse. 2010, "Islamic Banks and Financial Stability: An Empirical Analysis", *Journal of Financial Services Research*, Volume 38, Numbers 2-3 (2010), 95-113.

Čihák, Martin, and Klaus Schaeck. 2010. "How Well do Aggregate Prudential Ratios Identify Banking System Problems?" *Journal of Financial Stability*, vol. 6(3), pp. 130–144.

Čihák, Martin, Sonia Muñoz, and Ryan Scuzzarella. 2011. “The Bright and the Dark Side of Cross- Border Banking Linkages.” Working Paper WP/11/186, International Monetary Fund, Washington, DC.

Claessens, Stijn, and Enrico Perotti. 2007. “Finance and Inequality: Channels and Evidence,” *Journal of Comparative Economics* 35 (4), pp. 748–773.

Claessens, Stijn, and Luc Laeven. 2003. “Financial Development, Property Rights and Growth,” *Journal of Finance* 58(6), pp. 2401–2436.

Claessens, Stijn, and Luc Laeven. 2004. “What Drives Bank Competition? Some International Evidence.” *Journal of Money, Credit and Banking 36(3), Part 2*, pp. 563–583.

Claessens, Stijn, and Luc Laeven. 2005. “Financial Dependence, Banking Sector Competition, and Economic Growth.” *Journal of the European Economic Association 3(1)*, pp. 179–207.

Claessens, Stijn, and Neeltje van Horen. 2010. “Being a Foreigner among Domestic Banks: Asset or Liability?” Working Paper WP/09/273, International Monetary Fund, Washington,DC.

Claessens, Stijn, and NieltjeVan Horen. 2011. “Foreign Banks: Trends, Impact and Financial Stability.” Working Paper WP/12/10, International Monetary Fund, Washington, DC.

Claessens, Stijn, Asli Demirgüç-Kunt and Harry Huizinga. 2001. “How Does Foreign Entry Affect Domestic Banking Markets?” *Journal of Banking and Finance*, Vol. 25, pp. 891–911.

Cole, Shawn A.. 2009a. “Financial Development, Bank Ownership, and Growth: or, Does Quantity Imply Quality?” *The Review of Economics and Statistics 91(1)*, pp. 33–51.

de la Torre, Augusto, Erik Feyen, and Alain Ize. 2011. “Financial Development: Structure and Dynamics.” Policy Research Working Paper 5854, World Bank, Washington, DC.

de la Torre, Augusto, Alain Ize, Sergio L. Schmukler, eds. 2011. *Financial Development in Latin America and the Caribbean: The Road Ahead*. Washington, DC: World Bank.

Delis, Manthos D.. 2012. “Bank Competition, Financial Reform, and Institutions: The Importance of Being Developed.” *Journal of Development Economics 97(2)*, pp. 450–465.

Demirgüç-Kunt, Aslı and Deniz Anginer. 2011. “Has the Global Banking System Become More Fragile Over Time?” Policy Research Working Paper 5849, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı and Enrica Detragiache. 1997. "The Determinants of Banking Crises in Developing and Developed Countries." *IMF Staff Papers*, Vol. 45, pp. 81–109.

Demirgüç-Kunt, Aslı and Enrica Detragiache. 2002. “Does Deposit Insurance Increase Banking System Stability?An Empirical Investigation.” *Journal of Monetary Economics*, Vol. 49(7), pp. 1373-1406.

Demirgüç-Kunt, Asli, and Harry Huizinga. 1999. “Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence.” *World Bank Economic Review* 13(2), pp. 379–408.

Demirgüç-Kunt, Aslı, and Harry Huizinga. 2011. “Do We Need Big Banks? Evidence on Performance, Strategy and Market.” Policy Research Working Paper 5576, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı and Leora Klapper. 2012. “Measuring Financial Inclusion: The Global Findex,” Policy Research Working Paper 6025, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı, and Maria Soledad Martínez Pería. 2010. “A Framework for Analyzing Competition in the Banking Sector: An Application to the Case of Jordan.” Policy Research Working Paper 5499, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı, and Ross Levine. 2008. “Finance, Financial Sector Policies, and Long Run Growth.” M. Spence Growth Commission Background Paper, No 11, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı, and Ross Levine. 2009. "Finance and Inequality: Theory and Evidence." *Annual Review of Financial Economics* 1, pp. 287–318.

Demirgüç-Kunt, Aslı, Enrica Detragiache, and Poonam Gupta. 2006. “Inside the Crisis: An Empirical Analysis of Banking Systems in Distress.” *Journal of International Money and Finance 25*, pp. 702–718.

Demirgüç-Kunt, Aslı, Enrica Detragiache, and Thierry Tressel. 2008. "Banking on the Principles: Compliance with Basel Core Principles and Bank Soundness." *Journal of Financial Intermediation* 17(4), pp. 511–42.

Demirgüç-Kunt, Aslı, Erik Feyen, and Ross Levine. 2012. “The Evolving Importance of Banks and Securities Markets.” *World Bank Economic Review*, World Bank, Washington, DC.

Demirgüç-Kunt, Aslı. Thorsten Beck, and Patrick Honohan. 2008. “Finance for All? Policies and Pitfalls in Expanding Access.” Policy Research Working Paper, World Bank, Washington, DC.

Djankov, Simeon, Caralee McLiesh, Andrei Shleifer. 2007. “Private Credit in 129 Countries.” *Journal of Financial Economics* 84(2), pp. 299–329.

Haldane, Andrew, Simon Brennan, and Vasileios Madouros. 2010. “What is the Contribution of the Financial System: Miracle or Mirage?” in *The Future of Finance*, London School of Economics.

Jayaratne, Jith, and Philip E. Strahan. 1996. “The Finance-Growth Nexus: Evidence from Bank Branch Deregulation.” *Quarterly Journal of Economics* 111, pp. 639–670.

Jimenez, Gabriel, Jose A. Lopez, and Jesús Saurina. 2007. “How Does Competition Impact Bank Risk Taking?” Working Paper 2007–23, Federal Reserve Bank of San Francisco.

Kaminsky, Graciela, and Carmen Reinhart. 1999. “The Twin Crises: The Causes of Banking and Balance of Payments Problems.” *The American Economic Review* 89 (3), pp 473–500.

Laeven, Luc, and Fabian Valencia. 2008. “Systemic Banking Crisis: A New Database.” Working Paper 08/224, International Monetary Fund, Washington, DC.

Levine, Ross and Sara Zervos. 1998. “Stock Markets, Banks, and Economic Growth.” *American Economic Review* 88, pp. 537–58.

Levine, Ross. 2005. "Finance and Growth: Theory and Evidence." Handbook of Economic Growth, in: Philippe Aghion & Steven Durlauf (ed.), *Handbook of Economic Growth*, edition 1, volume 1, chapter 12, pp. 865–934.

Loayza, Norman, and Romain Ranciere. 2006. "Financial Development, Financial Fragility, and Growth." *Journal of Money, Credit and Banking*, Vol. 38(4), pp. 1051–76.

Lucas, Robert E.. 1988. "On the Mechanics of Economic Development.” *Journal of Monetary Economics*, 22, pp. 3–42.

Merton, Robert, and Zvi Bodie. 2004. “The Design of Financial Systems: Towards a Synthesis of Function and Structure.” NBER Working Paper Number 10620.

Merton, Robert. 1992. "Financial Innovation and Economic Performance.” *Journal of Applied Corporate Finance*, 4, pp. 12–22.

Miller, Merton. 1998. "Financial Markets and Economic Growth." *Journal of Applied Corporate Finance*, 11, pp. 8–14.

Raghuram G. Rajan, and Luigi Zingales. 1998. “Financial Dependence and Growth.” *The American Economic Review*, Vol. 88, No. 3, pp. 559–86.

Ranciere, Romain, Aaron Tornell, and Frank Westermann. 2008. “Systemic Crises and Growth.” *Quarterly Journal of Economics*, February, pp. 359–406.

Ravallion, Martin. 2011. “On Multidimensional Indices of Poverty.” Policy Research Working Paper No. 5580, World Bank, Washington, DC.

Rioja, Felix, and Neven Valev. 2004. "Finance and the Sources of Growth at Various Stages of Economic Development." *Economic Inquiry*, 42(1), pp. 127–140.

Robinson, Joan. 1952. "The Generalization of the General Theory.” In: *The Rate of Interest and Other Essays*, London: MacMillan.

World Bank. 2006. “*Financial Sector Development Indicators.”* Mimeo.

World Bank. 2010. “A New Database on Financial Development and Structure.”updated April 2010.