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Benchmarking Financial Development

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Abstract

Capitalizing on recent improvements in the availability of cross-country financial sector data, this paper proposes a standard methodology for benchmarking the policy component of financial development. Systematic controls are introduced to isolate main structural country characteristics and a principal components analysis is used to help identify a parsimonious set of ten “core” outcome indicators from a broader set of twenty seven

potential indicators covering different dimensions of development in both financial institutions and financial markets. Such a broad-based approach helps reveal important determinants and regularities of the process of financial development. The paper also identifies some of the main data gaps that will need to be filled to allow further progress in financial benchmarking looking forward.

This paper—a product of the Financial Policy Development Unit, Financial and Private Sector Development Vice Presidency—is part of a larger effort in the department to understand the process of financial development. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at tbeck@worldbank.org, efeijen@worldbank.org, fmoizeszowicz@worldbank.org and aize@worldbank.org.

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BENCHMARKING FINANCIAL DEVELOPMENT¹

Thorsten Beck, Erik Feyen, Alain Ize, and Florencia Moizeszowicz

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I. INTRODUCTION

For almost 10 years, the World Bank and the IMF have been undertaking the Financial Sector Assessment Programs (FSAP) across the developed and developing world, with the objective of evaluating the stability and efficiency of financial systems. Some of the most significant potential benefits of FSAP-type studies of financial systems derive from viewing a country's performance in the light of international experience. Financial development benchmarking can give policy makers a better sense of how different components of their financial system are performing relative to other countries. This can help countries identify lagging areas possibly in need of policy reform. Inversely, good performance may be the result of sound and creative policies that other countries might wish to learn from and emulate.

Yet, the use of quantitative benchmarks on financial development has been thus far generally limited and of uneven quality and usefulness. Most often, the country is compared to a limited and arbitrary set of comparator countries that may be at very different stages of economic development or have very different structural characteristics. Hence, the policy implications of cross-country differences are unclear. Moreover, benchmarking is neither systematic across sectors or dimensions of financial development nor supported by a consistent and uniform set of good quality data that facilitates comparisons.

These shortcomings result only in part from data limitations on financial development indicators (FDIs). While important gaps no doubt remain in FDI data coverage (for example as regards bank outreach, non-bank institutions, or bond market indicators), the availability and sophistication of financial sector data, both from official sources and private sources, has increased abruptly in recent years. Substantial efforts have been made, by official agencies (including the Fund and the World Bank) as well as private organizations, to collect and produce financial indicators of increasing variety across large samples of countries through a number of primary or secondary databases.²

This paper intends therefore to capitalize on these initiatives and help fill in some of the benchmarking gap by:

- proposing a standard methodology for financial development benchmarking;
- narrowing down the set of possible FDIs, based on current data availability, to ten core indicators;
- identifying some of the main remaining information and analytical gaps and possible ways to fill these up looking ahead.

The paper starts by discussing the rationale for using outcome indicators that measure features such as size, efficiency and outreach. The use of such "intermediate" indicators

² In particular, the World Bank has made, through the interconnected DECRG, FSDI and Financing Growth databases, important progress in putting together a comprehensive set of financial indicators across different sectors and dimensions of development.

is contrasted to that of primary indicators that measure the quality of inputs underlying financial development, or final indicators that measure its welfare impact.

The paper then discusses the benefits of expanding comparisons across the broadest possible set of countries and the rationale for systematically controlling for those country characteristics that have an important bearing on financial development but can be taken as given in the short-term. This may be because these features are policy invariant or, if partly endogenous (as is the case, for example, of per capita income and poverty), respond to policy only with a lag. In either case, policy should remain at least partially embedded into the residuals. Hence, the regression residuals (even though they are not meant to explain or predict) can help countries compare themselves to others in a way that is informative about the relative quality of their underlying policy environment.

The paper applies the same filtering methodology to a broad set of 27 possible indicators pre-selected on the basis of the information currently available. In addition to helping assess the quality of the underlying data, such a broad-based approach also helps reveal important determinants and regularities of the process of financial development. For example, it helps identify the dimensions or sectors that are most affected by returns to scale, population density or other country-specific features (such as whether the country is an offshore center or an oil producer). At the same time, the correlations of residuals across indicators help highlight the extent to which different indicators are inter-linked (possibly reflecting underlying constraints of financial development) or respond similarly to changes in the policy environment. The comparison of income elasticities across a broad spectrum of indicators also provides revealing clues about the order with which different features of financial development are likely to emerge as economic development proceeds.

A methodology for selecting from this broader array of possible indicators a more parsimonious and efficient set of core indicators is then presented. The core set is chosen based on the general quality and coverage of the underlying data, as well as a principal components analysis that identifies its significance for mapping key dimensions of financial development.

For the sake of brevity, this paper does not present the more user-oriented components of the benchmarking analysis undertaken in the context of the FSAP review project that motivated this study. These include in particular a methodology to rank countries within comparable peer groups and a standardized template (to be posted on the web) that presents the core financial indicators for a large sample of countries over the period 1980-2006. Interested readers are referred to the companion paper (Beck et al, 2008) that discusses these aspects more fully.

The rest of the paper is organized as follows. Section II discusses methodological issues. Section III presents the results. Section IV concludes by emphasizing ways to overcome the data limitations of this exercise and discussing possible extensions.

II. METHODOLOGICAL ISSUES

a. Why look at FDIs?

A large empirical literature has shown the importance of financial sector development for economic growth and poverty reduction. Countries with higher levels of financial development grow faster and experience faster reductions in poverty levels.³ Finance is thus not only pro-growth, but also pro-poor. This calls for policy makers' attention towards policies that promote financial development, which in turn requires that the latter be defined and measured properly.

The core activity of financial systems is to engage into *financial contracts* through which individual agents exchange money today for the promise of money or risk coverage tomorrow. To facilitate this enormous leap of faith into an uncertain future, financial institutions and markets provide two key accompanying services: i) by acquiring and processing *information* about borrowers (including enterprises) and possible investment projects, they help allocate society's savings and risk absorption capacity to their most productive use; and ii) by helping monitor the use of funds and exerting *corporate governance*, they limit the scope for moral hazard and a wasteful use of resources. At the same time, financial institutions also provide *transactional* (payment and trading) services that ease the preparation, trading and payment of financial contracts, as well as the exchange of goods and services.

Financial systems do not function in a vacuum, however. Instead, their performance depends on a proper *enabling environment*, whose key components include: i) a sound and effective contractual framework that appropriately defines and enforces creditor and debtor rights; ii) a smooth information framework, including accounting and auditing standards, and effective arrangements for debtor and collateral information sharing; iii) adequate macroeconomic management, including a sound fiscal policy, a transparent and credible monetary policy, and deep government bond markets; iv) competitive and contestable markets; and v) effective prudential oversight, including a well-functioning safety net.⁴ Indeed, it is the enabling environment, rather than financial development in itself, which is directly influenced by policy. The chain of causality goes therefore from policy to the enabling environment to financial sector development to economic development and welfare, with clear feedback processes along the chain (Figure 1).

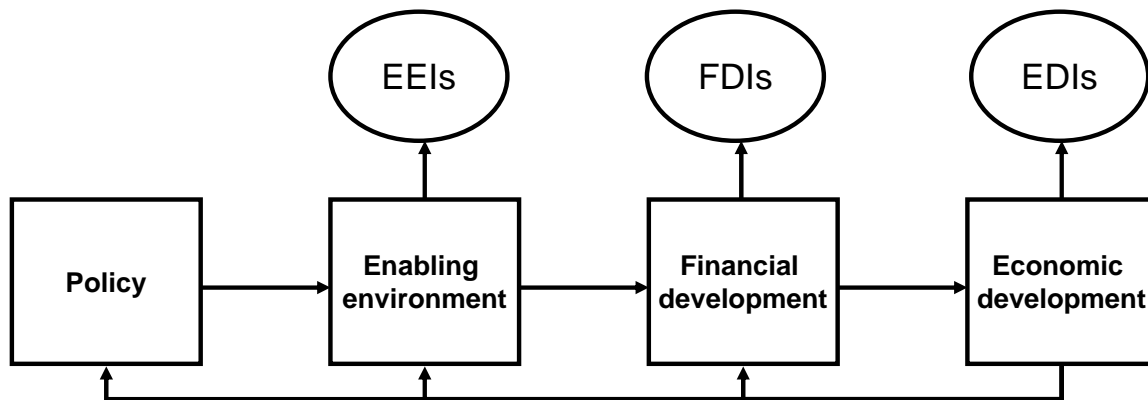
Given that financial development is one step removed from policy, the question arises as to why benchmarking it matters for policy purposes. Indeed, the alternative would be to focus exclusively on measuring and benchmarking progress in improving the enabling environment, perhaps using indicators such the Doing Business indicators or other enabling environment indicators (EIs). The policy process could then limit itself to improving those indicators irrespective of how well or how poorly the financial system is doing.

³ See for example, Beck, Levine and Loayza (2000) and Beck, Demirguc-Kunt and Levine (2007).

⁴ See Beck (2006) for a literature survey on policies associated with financial sector deepening.

However, the links between policy, the enabling environment, financial development, and welfare are complex. Moreover, although a legal framework, say creditor rights, may look adequate on paper, it may be ineffective in practice due to poor enforcement or because it does not reflect well some peculiar characteristics of the local environment or does not fit well with other idiosyncratic elements of the legal framework. Thus, identifying the key policy inputs (the weakest linkages in the enabling environment) is not a straightforward exercise. Assessing the possible final welfare impact of reforming them is even less trivial.

Figure 1: The Process and Measurement of Financial Development



FDIs can thus help bridge the gap between policy and final objectives. Unlike in monetary policy where Taylor rules directly and unequivocally link policy (the interest rate) to welfare (inflation), there are no such rules in the case of financial development. Instead, given the rather complicated links between policy, the enabling environment, financial development, and welfare, FDIs can function as “intermediate” indicators and targets, much as in the case of monetary intermediate targets before the advent of modern inflation targeting. They can help detect what functions may be under-provided and sectors or instruments under-developed. This in turn can provide revealing clues as to where to look for in identifying possible gaps and key under-performing components of the enabling environment. At the same time, FDIs can help isolate and assess the impact of policy over time. As in the case of monetary policy, however, the intermediate (FDI) indicators are most effective when used in conjunction with the more operational (EEI) indicators.

b. Why compare across time and countries?

Financial development is a time-bound process. While there are a few cases where shocks exogenous to the economy or disastrous government policies have resulted in a lowering of financial development, in most cases, financial sectors become more developed over time. However, the pace of development can vary substantially from country to country and from segment to segment of the financial market, depending in part of course on economic growth, but also on the specific progress made in any particular country in

reforming and improving the enabling environment. Monitoring how financial indicators evolve (i.e., benchmarking the country's progress over time) can therefore provide key inputs towards assessing the adequacy of the policy environment.

This dynamic benchmarking becomes more revealing when supported by systematic cross-country comparisons that allow policy makers to assess how well they are doing relative to other countries with similar structural characteristics and at a similar stage of economic development. One approach is to compare countries only against their immediate peers, i.e., countries that have the most similar characteristics. However, this can severely restrict the scope of the benchmarking exercise, thereby hindering its significance and statistical validity. Instead, because financial systems across countries fulfill *similar functions and face similar constraints*, one would expect the process of financial development to be broadly comparable across all countries and stages of development once proper controls are introduced.⁵

Despite its endogeneity, we include per capita income as a key structural control. Economic development should clearly affect financial development, both due to demand-side effects (the volume and sophistication of financial activity increases with income levels) and supply-side effects (larger, richer economies can achieve economies of scale and benefit from more competition and better infrastructure). Thus, richer countries have deeper, more efficient and broader financial systems, a relationship that holds both across countries and over time.⁶ However, economic development is itself endogenous to financial development, creating a problem of identification.⁷

As long as the impact of financial development on economic development is lagged (so that policy improvements affect financial development *before* financial development affects economic development), policy should not be already fully captured by the

⁵ Notice that the need for controls is more acute for FDIs, as the volume of financial activity is clearly process-dependent (i.e., influenced by demand), than for EEIs, which are instead mostly *supply-based* (one would expect some feedback from financial development to the quality of the enabling environment but these effects should be relatively less dominant).

⁶ Notice however that not all dimensions of financial development may grow linearly with economic development. For example, the volume of banking activity, as measured by on balance sheet credit, may actually decline as financial systems become more sophisticated, reflecting the growth of new instruments (securitization) or new forms of (non-bank) intermediation. Provided there is enough data (i.e., a sufficient number of countries is already on the declining portion of the curve), the estimations can be adjusted for such non-linearities.

⁷ Granger causality tests, exploiting high-frequency data, help analyze the causality direction between financial and economic development. Using data for different countries and different sample periods, no unambiguous consensus has arisen from this literature. Most papers find that financial development predicts GDP per capita, with some papers finding that GDP per capita also predicts financial development. Comparing the strength of the relationships between financial and economic development, Calderon and Liu (2003) find a stronger effect from financial to economic development than vice versa. However, they also find that the strength of the finance-GDP per capita link increases as the time horizon increases, suggesting that the feedback from economic to financial development is stronger for shorter than for longer time horizons.

income term and remain instead at least partially embedded into the residual.⁸ To see this, consider the following simple canonic representation:

$$X_t = \alpha Y_t + \beta P_t + \varepsilon_t \quad (1)$$

$$Y_t = \alpha' P_{t-1} + \varepsilon_t' \quad (2)$$

$$P_t = \alpha'' P_{t-1} + v_t \quad (3)$$

Where X is a financial indicator, Y is per capita income, and P is the policy environment. Hence, (1) indicates that the level of financial development at time t is a function of the level of economic development, the quality of the policy environment, and a stochastic residual. On the other hand, (2) accounts for the fact that economic development at time t is affected by policy at time $t-1$. Finally, (3) reflects the fact that good policies today are probably rooted in good policies yesterday but may incorporate a policy innovation term v . Substituting P in (1) using (2) and (3) leads to the following reduced form expression:

$$X_t = (\alpha + \beta\alpha''/\alpha')Y_t + [\beta v_t + (\varepsilon_t - \beta\alpha''/\alpha'\varepsilon_t')] \quad (4)$$

Thus, the total impact of policy on financial development should exceed that embedded in the residuals (e.g., there is an omitted variables bias that should translate into an over-estimation of the income coefficient and an under-estimation of policy). However, the residual term of a regression in which policy is not accounted includes the policy innovation term. Moreover, provided the dynamics of transmission of policy on income are similar across countries (a reasonable assumption, at least for countries with similar characteristics), the stochastic component of the residual, $\varepsilon_t - \beta\alpha''/\alpha'\varepsilon_t'$, should be comparable across countries. Hence, comparing across countries the residuals obtained from (4) should provide, within some confidence interval reflecting the underlying stochastic noise, a measure of the quality of a country's policies.

We also systematically control for differences across countries as regards poverty and income distribution. Indeed, reflecting access constraints, one would expect countries where income is less evenly distributed, resulting in more poverty, to have relatively less developed financial systems. The relationship between poverty and financial development is also a two-way street, however, with financial development also helping to overcome poverty. But, as for per capita income, the impact of poverty on financial development should be mostly contemporaneous while that of financial development on poverty would be expected to be lagged. Hence, one would expect financial development to precede reductions in poverty. If so, as in the case of economic development,

⁸ While financial development has a supply-side impact on economic growth over the medium-term, the reverse link from GDP per capita to financial activity is mostly demand-based and shorter term. Notice also that, should we have sufficient instrumental variables to perfectly isolate the endogenous component of income, it might be better to use these rather than income to isolate the impact of policy. However, the standard set of instrumental variables that is usually utilized (legal origin, distance from the equator, etc.) is only of limited help in this respect.

controlling for poverty should help neutralize its direct impact on financial development, thereby enhancing the link between the regression's residuals and policy.

Some additional controls are needed to control for key structural characteristics such as size (as determined by population), population density, or cross-border operations. More densely populated countries have deeper financial systems, reflecting lower infrastructure costs, such as communications and branch networks. On the other hand, reflecting scale and networking effects, key components of financial development may be lagging in smaller economies, relative to larger countries at comparable levels of economic development. A substantial exception needs to be made, however, for offshore financial centers whose financial systems are comparatively larger than would be warranted in relation to the size of their economy. Inversely, oil exporters tend to have smaller financial sectors than non oil exporters with similar levels of income, reflecting the fact that: i) oil exports can boost GDP without requiring a proportional increase in economic and financial activity; and ii) the heavier reliance on international trade enhances cross-border financial activity at the expense of domestic intermediation.

Finally, the question arises as to whether regional controls should also be introduced. To the extent that regional differences reflect deeply ingrained cultural or sociological characteristics, there is a good argument in favor of introducing such controls. However, regional differences may also reflect policy differences. As the latter are not necessarily set in stone, there are clear benefits to comparing countries across regions without adjusting for regional effects. In practice, it is most informative to provide both types of benchmarks (with and without regional controls).

c. Which benchmarks?

The most natural way of measuring a financial system's performance would be along functional lines, i.e., how well it fulfills each of the key functions (underlined above) that it is supposed to deliver. In particular, where one form of intermediation may gradually replace another but the timing of the transition is uncertain, functional indicators should be more stable and predictable than institution or market-based indicators. In some cases, functions can arguably be measured in a meaningful way. For example, the financial system's capacity to provide effective transactional services could be assessed based on key statistics on payment services or core broker systems.

However, functions such as the ability to contract away resources from lenders to borrowers, efficiently allocate risk among market participants, exert appropriate governance, or ensure an adequate extraction and use of information, are hard to define, and much harder if not impossible to measure, at least based on the information currently available. Should sufficient micro data be available at the firm and household level, one could attempt to measure financial performance based on the level of services agents are provided with (i.e., whether they have access to the services they need at a fair price). But the availability of such data at this time is too sparse to be used meaningfully.

In turn, the use of institutional and market data confronts one with hard choices as to whether and how to separate or aggregate the data. In particular, the question arises of whether the claims on the private sector by non-bank financial intermediaries, such as finance and leasing companies or institutional investors, are sufficiently close substitutes to those of banks that they can simply be added.⁹ A related question is whether data across different types of institutional investors should be aggregated or considered separately. The fact that pension funds, insurance companies, and investment funds all contribute to storing and managing long term savings, with their relative importance largely reflecting different regulatory and institutional settings across the world, would argue in favor of aggregation. On the other hand, however, mutual funds assets are usually of shorter maturities and rotate more than those of contractual savings institutions, which tend to buy and hold. Ultimately, these are empirical issues that should be resolved based on the data, i.e., on whether aggregating the data provides a more stable and predictable construct than considering individual components separately.

Within each channel (institution or market) of financial intermediation, one would also ideally wish to differentiate according to the most relevant “qualities” of financial development, such as size, reach, efficiency (or liquidity), and soundness. *Size* can be measured in terms of deposits, credit or total assets.¹⁰ *Reach* refers to the availability of services across geographic areas and income segments. *Efficiency*, as measured by spreads, refers to the efficient use of resources in intermediation. *Liquidity* is a closely related dimension that is particularly important to assess market development. *Soundness* refers to the sustainability of financial services, institutions and markets and their resilience to exogenous shocks. While soundness is of course an essential feature of sustainable development, much work has already been invested in developing a battery of financial soundness indicators (FSIs). This paper will therefore restrict itself to the three other dimensions of developmental performance, on which much less has been written.¹¹

Finally, criteria are needed to select the most meaningful indicator for each potential channel of intermediation and quality of development. A key feature of the core set is that it should be *parsimonious and information-efficient*. We will use the following five selection criteria:

1. Where available, any empirical evidence of *direct linkages between a particular FDI and final welfare*. For example, the fact that private credit to GDP performs best in predicting growth provides an important prior in favor of including this indicator in the core set.¹²

⁹ Institutional investors (pension funds, insurance companies, investment funds) should in principle constitute a category on their own, both because the contracts they provide are substantially different from those provided by banks (in particular, they are generally of a much longer term nature and often contingent contracts) and because they do not invest their resources on a borrower basis but do it instead in the market or by placing the funds with banks and bank-like institutions.

¹⁰ Notice that size is not necessarily synonymous of quality and diversity. Some countries could have relatively large financial systems but with limited services while others could be smaller but offer a more sophisticated and complete array of services.

¹¹ On FSIs, see IMF (2007).

¹² The finance and growth literature has relied mostly on financial sector indicators with longer time series. Specifically, Beck, Levine and Loayza (2000) show a robust link between financial sector development and

2. The *goodness of fit* of the structural regression estimates, as reflected in the overall R-square. Since the policy component should affect indicators that are meant to measure the same underlying quality of financial development in a broadly similar way, differences in fit should mostly reflect differences in data quality or unexplained structural characteristics. In either case, the indicator with the best fit (i.e., with less background noise) is likely to be the one providing the better policy benchmark.
3. The *factor loading* of the indicator along the principal component that measures the specific channel of intermediation and quality of development one wishes to assess. A higher loading in the principal component analysis (PCA) can be taken as an indication that a particular indicator does a better job at summing up the information relevant to that dimension.
4. The *coverage* (in years and countries) of each potential indicator. The broader the coverage, the better.
5. The *ratio* of within sample variance to between sample variance. An indicator that is stable from year to year for any given country, but varies substantially across countries, is better than one that does the opposite.¹³

III. DATA ANALYSIS

a. Potential FDIs

Based on current data availability, we pre-selected 27 potential core FDIs (the list, with sources and coverage, is provided in Table 1). In the absence of available indicators capturing the functionality of the financial system, we follow the commonly accepted breakdown by i) institutions (*Banks* and *Institutional investors*); and ii) markets (*Equity* and *Bonds*). Institutional Investors are broken down into pension funds, insurance companies and mutual funds, bond markets into private and public.

Where possible, we distinguish three potential dimensions of financial development: i) *Size*, which captures financial depth; ii) *Efficiency*, which captures the efficiency or liquidity with which financial services are delivered to the marketplace; and iii) *Reach* which measures the extent to which the financial system is accessible for the population (people or firms) as a whole. A two-dimensional matrix of sectors and dimensions is thus obtained. For each cell, we tried to identify at least three potential indicators. However,

economic growth and productivity growth, using Private Credit to GDP, Liquid Liabilities (M3) to GDP and other intermediation measures such as the ratio of commercial bank assets to the sum of commercial and central bank assets and total domestic commercial bank assets to GDP. Levine and Zervos (1998) and Beck and Levine (2004) show that the stock market turnover ratio and stock market value traded to GDP are robustly linked to GDP per capita growth, while stock market capitalization to GDP is not. Other papers using cross-country, industry-level and firm-level data have used the same or similar indicators proxying for total intermediation of the banking system or the size and liquidity of the stock market. Other indicators such as bank efficiency or outreach indicators have not been used by the growth literature due to the lack of long-term data series.

¹³ High within-country variation may reflect measurement errors or high co-movements with the business cycle. Since it may be difficult to isolate the two and since FDIs are meant to measure longer-term differences across countries rather than fluctuations along the cycle for any given country, a lower ratio of between to within variance is preferable.

some of the cells have less than three indicators or are outright empty, due to data limitations. This is the case in particular for institutional investors and the bond markets where current data limitations sharply restrict the scope for measuring efficiency and reach.

Information on *bank size* indicators is generally good and a variety of possible indicators may be used. We included deposits, credit, and total (domestic) assets (all divided by GDP).¹⁴ While credit and deposits would be expected to be fairly highly correlated, they measure conceptually different aspects of financial development (banking systems may be able to attract deposits without being able to channel them into credit). In the case of credit, we included both a narrow definition (claims on the private sector by deposit taking institutions) and a broad definition (claims on the private sector by deposit taking and other financial intermediaries). However, while the narrow definition has a very broad coverage (155 countries from 1960 to 2006), the broad definition is only currently available for a subset of 62 countries over a much more limited time period.¹⁵

On *bank efficiency*, three broadly available potential indicators were pre-selected: i) net interest margins to total earning assets; ii) operating costs to total assets; and iii) bank spreads. They measure closely related yet different dimensions of efficiency.¹⁶ Spreads measure marginal efficiency, interest margins average efficiency.¹⁷ Moreover, while operating costs are a pure measure of operational efficiency that includes all aspects of banking activity (including savings and payments), spreads and margins focus on intermediation exclusively and also include the profit margin of banks, thereby capturing elements of competitiveness. All three indicators are prone to significant measurement error.¹⁸

As regards *bank reach*, we retained the following three indicators: i) number of ATMs; ii) number of bank deposits; and iii) number of bank branches, all relative to total population.¹⁹ Again, these various indicators measure similar yet somewhat different features of access. Bank branches and ATMs per capita have a broader coverage across

¹⁴ The data is drawn from IFS but ratios are corrected for possible inflationary distortions reflecting stock-flow problems. See Beck, Demircuc-Kunt and Levine (2000).

¹⁵ Work by the Fund's Statistics Department to expand the coverage of this series is ongoing.

¹⁶ Notice also that all three indicators are *in-efficiency* indicator rather than efficiency indicators (they all decline as banking systems become more efficient).

¹⁷ Because deposit and lending rates are not averaged over all types of liabilities and assets, spreads measure the efficiency with which a *marginal* dollar is being intermediated. Hence, a bank whose funding relies primarily on unremunerated demand deposits could have a high net interest margin yet a low spread.

¹⁸ The consistency of reporting standards on spreads is questionable across countries, particularly for older measurements. On the other hand, the bank sample on which margins and operating costs are drawn typically does not comprise all banks in a country.

¹⁹ We also considered including in our study a synthetic measure of access that extrapolates to a broad sample of 138 countries survey data (available for 32 countries) on the percent of the adult population with access to some financial intermediary account, whether bank-based or microfinance-based (see Honohan, 2006). This index has the substantial advantage of being closer to measuring the ultimate indicator, i.e., actual access to a financial account, and has a much broader coverage. However, while the approach appears to be promising, the index did not perform well in the principal components analysis, perhaps reflecting the need for some methodological fine tuning.

countries than the number of bank deposits but are more transactions-oriented, may be more influenced by technological changes, and do not capture alternative forms of distribution such as correspondent banking, retail store cards, or internet-based services. On the other hand, an important potential drawback of the bank deposits indicators is its inability to discriminate between existing customers with multiple accounts and new customers. In any event, coverage in all three cases is currently limited to a single observation.²⁰

Table 1: Descriptive Statistics

Sector	Dimension	Definition	Source	Countries	Average number of obs. per country
Banks	SIZE	Private Credit by Deposit Money Banks to GDP	Beck 2000 (IFS)	160	31
		Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	Beck 2000 (IFS)	160	31
		Bank Deposits to GDP	Beck 2000 (IFS)	160	31
		Bank Domestic Assets to GDP	Beck 2000 (IFS)	160	31
	EFFICIENCY	(Interest Income – Interest Expense) / Earning Assets	Beck 2000 (BankScope)	160	12
		Lending minus deposit rate	IFS	152	6
		Overhead Costs to Total Assets	Beck 2000 (BankScope)	161	13
	REACH	Synthetic Access Percentage	Honohan (2006)	162	1
		ATMs per 100,000 People	Beck 2007 (Custom Survey)	89	1
		Deposits per 1,000 People	Beck 2007 (Custom Survey)	54	1
Branches per 100,000 People		Beck 2007 (Custom Survey)	98	1	
Capital Market	SIZE	Stock Market Capitalization to GDP	Beck 2000 (EMDB, IFS)	114	16
		Stock Market Value Traded to GDP	Beck 2000 (EMDB, IFS)	113	16
		Value of Public Offerings to GDP	WFE, IFS	47	6
		Stock Return Synchronicity	FSDI (Datastream, EMDB)	61	5
	EFFICIENCY	Stock Market Turnover Ratio	Beck 2000 (EMDB, IFS)	112	16
	REACH	Share Market Capitalization in Top 10 Firms	FSDI (Datastream, EMDB)	76	5
		Percentage of Closely Held Shares	FSDI (Worldscope, EMDB)	49	6
		Number of Listed Firms	WDI	122	14
Bond Market	SIZE	Private Bond Market to GDP	Beck 2000 (BIS, IFS)	42	15
		Public Bond Market Capitalization to GDP	Beck 2000 (BIS, IFS)	49	15
		Value of New Domestic Private Bonds to GDP	WFE, IFS	43	5
	EFFICIENCY	Private Domestic Bond Market Turnover Ratio	WFE, IFS	32	2
		Public Domestic Bond Market Turnover Ratio	WFE, IFS	31	2
Institutional Investors	SIZE	Pension Fund Assets to GDP	AIOS, ECB, FIAP, FSAP, OECD, WB Report, Various Central Bank Websites	79	4
		Insurance Companies Assets to GDP	ASSAL, Axco, ECB, FSAP, OECD, Various Central Bank Websites	97	4
		Mutual Fund Assets to GDP	ECB, FSAP, ICI, Various Central Bank Websites	61	8
		Total Institutional Investors Assets to GDP	AIOS, ASSAL, Axco, ECB, FIAP, FSAP, ICI, OECD, WB Report, Various Central Bank Websites	104	3

²⁰ What is available was only recently obtained by the World Bank's Research Department through a one-time survey (Beck, Demirguc-Kunt and Martinez Peria, 2007). An important effort is currently underway to improve the database on access to finance (see Barr, Kumar and Litan, 2007).

As regards *institutional investors' size*, all indicators are based on the share of financial assets to GDP. Surprisingly, coverage is very uneven. While it is generally good for OECD countries, for other countries it is very spotty, particularly in the case of pension funds. However, by putting together data from a variety of sources, including data collected during FSAPs, we obtained a data set with reasonable coverage as regards the number of countries (103) albeit fairly limited in time (only one year for about half the sample).

In the case of *equity market size* indicators, the pre-selected FDIs (all divided by GDP) included: i) market capitalization; ii) value traded; and iii) new issues. Market cap has the advantage of being more directly comparable to bank credit (both are stock variables); yet it is not robustly associated with cross-country variations in economic growth, possibly because it does not provide a good proxy of underlying market activity (some markets have large listings that never trade). Further, market cap does not reflect actual funding for companies, but rather the discounted expected future returns of shareholders, which may fluctuate widely over time. Hence value traded and new issues were also pre-selected because they are flow variables that better reflect primary and secondary market activity. The new issues indicator, on the other hand, has the shortcoming that numbers might vary significantly over the years, especially in small markets.

As regards *equity market efficiency/liquidity*, two indicators were pre-selected: i) turnover; and ii) price synchronicity. Turnover (value traded over market cap) has the advantage of a much broader coverage. However, it is a measure of market liquidity rather than market efficiency (while one would expect close correlations between the two, they are conceptually distinct). Price synchronicity (i.e., the extent to which all equity prices co-vary) is a more direct measure of market efficiency (in efficient markets, idiosyncratic information on individual prices should result in less synchronicity). However, it is much more information-intensive (hence prone to coverage limitations) and could be substantially affected by macroeconomic conditions.

The set of potential equity market reach indicators was narrowed down to three: i) number of listed firms, divided by population;²¹ ii) percent of total market capitalization accounted for by the 10 largest firms; and iii) percent of market capitalization accounted for by closely held shares. The first indicator measures reach in terms of breadth of use and could also be interpreted as a size indicator;²² the last two are more closely related to measures of market concentration. For the listed-firms indicator, coverage is quite good (across both time and countries).

Finally, as regards *bonds market size* indicators, the best available information (the stock of public and private bond issues, divided by GDP) comes from Bank of International Settlements (BIS). However, coverage is low (about 40 countries and 15 years of data). A flow indicator for new private bonds (new corporate issues) is also available. To reflect *bond market liquidity (and efficiency)*, information on private and public bonds turnover

²¹ Should reliable information be available, the total number of firms (rather than the number of people) would be a better deflator.

²² However, the correlation of listed firms with market capitalization is rather low (see Table 4).

was also obtained from the World Federation of Exchanges. However, coverage is even more limited (only 32 countries and 4 years of data).

b. Controls

The raw correlations between potential FDIs (shown separately for institutions and markets in Tables 2 and 3) are quite high. This reflects the fact that the development of different markets and dimensions is affected by similar underlying determinants (both structural and policy-based) and proceeds on broadly parallel tracks as economies mature. This underlines the need for introducing structural controls. After some experimentation, the following set of controls was retained:

- *GDP per capita*
- *Poverty gap*²³
- *Population size*
- *Population density*
- *Fuel exports to GDP*²⁴
- *An offshore dummy* (i.e., whether the country was defined by the IMF as an offshore center in 2007)

In view of the high correlation between income and poverty, the poverty gap was first regressed against per capita income. The residual of this regression was then substituted for the poverty variable. We also included an interacted term between country income level (GDP per capita) and country size (population). Except for the interacted term, all variables are expressed in logs, reflecting broadly constant elasticities.²⁵ We test a pooled OLS model, which for reasons of data availability, we restrict to the period 2000-05. The model is thus specified as:

$$\begin{aligned} \text{Log}Y_{it} = & \alpha + \beta_1 \times \text{Log}(GDPCAP_{it}) + \beta_2 \times \text{Log}(1 + POVERTY_{it}) + \beta_3 \times \text{Log}(POP_SIZE_{it}) + \\ & \beta_4 \times \text{Log}(POP_DENSITY_{it}) + \beta_5 \times OFFSHORE_{it} + \beta_6 \times \log(1 + FUEL_{it}) + \\ & \beta_7 \times POP_SIZE_{it} \times GDPCAP_{it} + YEAR_DUMMIES + \varepsilon_{it} \end{aligned}$$

Where Y_{it} is the FDI for country i at time t . The benchmark indicator is the residual. The regionally adjusted benchmark is obtained by adding regional dummies.²⁶

²³ This variable measures the proportion of the population under the poverty line, times the average distance from the poverty line. A value of zero was adopted for all high income countries (Source: Povcal Net, WorldBank)

²⁴ The alternative of using a broader index that included all mining exports was also explored but the fit was found to be inferior, suggesting that the impact of oil exports on financial development is sector specific.

²⁵ As a robustness check, we also estimated, for those indicators for which we have sufficient data, an alternative model based on the transformation of all variables into 25 quintiles and taking the inverse normal distribution to make the new variable normal. Results (see Appendix Table 1) are very close to those obtained with our standard specification.

²⁶ We dealt with the outliers using an iterative algorithm that gradually eliminates outliers within the one-percent tails.

Table 2: Raw correlations between institutional indicators

	Log private credit to GDP	Log total private credit to GDP	Log deposits to GDP	Log total bank assets to GDP	Log net-interest margin	Log interest spread	Log bank overhead to total assets	Log ATMs per 100,000 people	Log deposits per 1,000 people	Log number of bank branches per 100,000 people	Log assets of mutual funds	Log assets of insurance companies	Log assets of pension funds
Log private credit to GDP	1.00												
Log total private credit to GDP	0.97	1.00											
Log deposits to GDP	0.85	0.84	1.00										
Log total bank assets to GDP	0.94	0.92	0.89	1.00									
Log net-interest margin	-0.68	-0.67	-0.71	-0.69	1.00								
Log interest spread	-0.64	-0.64	-0.57	-0.64	0.68	1.00							
Log bank overhead to total assets	-0.55	-0.55	-0.61	-0.58	0.77	0.55	1.00						
Log ATMs per 100,000 people	0.71	0.72	0.59	0.71	-0.47	-0.44	-0.21	1.00					
Log deposits per 1,000 people	0.68	0.68	0.60	0.65	-0.57	-0.41	-0.35	0.75	1.00				
Log bank branches per 100,000 people	0.74	0.73	0.61	0.72	-0.54	-0.43	-0.21	0.78	0.78	1.00			
Log assets of mutual funds	0.69	0.71	0.70	0.71	-0.64	-0.43	-0.46	0.67	0.60	0.69	1.00		
Log assets of insurance companies	0.75	0.75	0.73	0.77	-0.61	-0.52	-0.34	0.63	0.57	0.63	0.78	1.00	
Log assets of pension funds	0.51	0.54	0.40	0.47	-0.31	-0.33	-0.18	0.37	0.19	0.31	0.35	0.47	1.00
Log assets of institutional investors	0.78	0.79	0.76	0.77	-0.65	-0.48	-0.45	0.65	0.53	0.64	0.84	0.84	0.70

Table 3: Raw correlations between market indicators

	Log stock market capitalization to GDP	Log stock market value traded	Log listed firms per mln. inhabitants	Log market cap. of 10 largest firms	Log of closely held shares	Log total public offerings to GDP	Log stock price synchronicity	Log stock market turnover	Log private bonds to GDP	Log private bonds turnover	Log new private bonds to GDP	Log public bonds to GDP	Log public bonds turnover to GDP
Log stock market capitalization to GDP	1.00												
Log stock market value traded	0.78	1.00											
Log listed firms per mln. inhabitants	0.50	0.40	1.00										
Log market cap. of 10 largest firms	-0.15	-0.25	-0.14	1.00									
Log of closely held shares	-0.44	-0.49	-0.45	0.28	1.00								
Log total public offerings to GDP	0.37	0.13	0.35	-0.04	-0.14	1.00							
Log stock price synchronicity	0.09	0.22	-0.19	-0.13	0.33	-0.17	1.00						
Log stock market turnover	0.30	0.83	0.16	-0.25	-0.15	-0.09	0.24	1.00					
Log private bonds to GDP	0.47	0.46	0.53	-0.34	-0.41	0.02	-0.17	0.25	1.00				
Log private bonds turnover	-0.18	0.15	-0.13	0.07	0.09	-0.26	0.16	0.33	-0.21	1.00			
Log new private bonds to GDP	0.28	-0.01	0.30	0.17	-0.31	0.46	-0.31	-0.21	0.15	-0.27	1.00		
Log public bonds to GDP	0.29	0.19	0.27	-0.12	-0.25	-0.05	0.01	0.05	0.41	-0.05	0.11	1.00	
Log public bonds turnover to GDP	-0.05	0.18	0.00	-0.19	-0.34	-0.25	0.32	0.34	0.21	0.44	0.25	0.06	1.00

5-percent significance levels in bold

c. Correlations of the residuals

The correlations of the residuals are reported in Table 4.²⁷ Notice first that while they are now much lower than for the raw indicators, correlations remain quite substantial in most cases. This suggests that performance is to a large extent systemic. Good performance in one sector goes together with good performance in another. This in turn may reflect the fact that good financial sector policies cut across all aspects of financial activity (e.g., there is a *substantial underlying common policy component*), or else, that good performance in one area is necessary for good performance in another.

More specifically, the following correlations are particularly noteworthy:

- Bank size indicators are highly (and positively) correlated among themselves and substantially (albeit to a lower extent) negatively correlated with efficiency. That larger deposits lead to larger credit and better efficiency enhances intermediation is hardly surprising. Interestingly, however, deposits are more responsive to bank efficiency than credit.
- Remarkably, bank size and bank reach exhibit positive but much lower correlations, suggesting that reach and size are different dimensions following their own dynamics. At the same time, the ATM indicator exhibits a substantially positive correlation with the (in)efficiency indicator, suggesting that higher reach comes at a price (a similar result is obtained for bank branches).
- Institutional investors' assets are highly correlated with the size of banks, equity markets and private bond markets, suggesting that institutional investors need well developed banks and markets for private instruments in order to thrive. Remarkably, on the other hand, the correlations with equity turnover and public bonds are negative. The former is consistent with the fact that institutional investors tend to buy and hold. The latter may reflect the fact countries with larger fiscal imbalances (hence a higher public debt) have a harder time developing private financial intermediaries, perhaps in part because in these countries the state plays a more important direct role in providing pensions or insurance.
- The otherwise very low correlations between the size of public bond markets and other financial indicators is consistent with the fact that the issue of public bonds is largely determined by fiscal policy, rather than financial sector policy. Hence, it is largely orthogonal to other financial indicators. Interestingly, however, the correlation between public debt and bank deposits is positive, suggesting the existence of some demand-pull effect.
- While banking and stock market size indicators are positively and significantly correlated with each other, private bond market size is positively and significantly correlated only with private credit, but insignificantly (albeit positively) with the stock market indicators. This suggests that private bonds substitute for private

²⁷ To economize on space, we report only the ten core indicators.

credit but not for equity, which is consistent with a functional view of intermediation in which what matters is the type of instrument (debt versus shares) rather than the channel of intermediation (banks versus markets).²⁸

- Finally, the low correlation between equity turnover and all other core financial indicators (except for listed firms) is quite remarkable. It supports the view that equity market size does not necessarily breed liquidity. Moreover, the policies that may help an equity market become more liquid are not directly related to other financial sector policies. This, in turn, suggests that there are probably no easy, fail-proof ways to address this issue.

d. Regression results

Regression results for the non-regionally adjusted indicators appear in Tables 5a-d (basic descriptive statistics are reported in Table 6). Main highlights in terms of the significance of each of the controls are as follows:

- With minor exceptions as regards bonds' turnover and new issues, *GDP per capita* is always positive and highly significant, confirming that the process of financial development closely accompanies that of economic development. Ordering all size-oriented FDIs according to their "income elasticity" produces an interesting ranking (see Table 7), linked with the degree of sophistication of the underlying market and the order with which it develops as the economy matures. Thus, public bonds "precede" bank deposits which, in turn, precede bank credit. All bank size indicators precede equity market development which in turn precedes private bond market development. Pension funds precede insurance companies, which in turn, precede mutual funds. The low elasticities of public bonds and pension funds perhaps reflect the fact that they are mostly policy driven (in that sense they may have a particularly important role to play as "precursors" of financial development).²⁹

²⁸ The non substitutability of debt and shares, which disproves the Modigliani-Miller irrelevance theorem, is of course consistent with the fact that firm leverage is well predictable and consistent across countries. See for example Hart (2001) for a good theoretical review of underlying issues.

²⁹ A recent paper by Perotti and Schwienbacher (2007) argues that wealth redistribution due to inflation shock in the early half of the 20th century can explain why some countries adopted a pay-as-you-go public pension scheme, while other maintained a capital accumulation scheme.

Table 4: Correlations between core indicators-raw and residual

Raw correlations

	Log private credit to GDP	Log deposits to GDP	Log net-interest margin	Log ATMs per 100,000 people	Log private bonds to GDP	Log public bonds to GDP	Log assets of institutional investors	Log stock market capitalization to GDP	Log number of listed firms per mln. inhabitants
Log private credit to GDP	1.00								
Log deposits to GDP	0.85	1.00							
Log net-interest margin	-0.68	-0.71	1.00						
Log ATMs per 100,000 people	0.71	0.59	-0.47	1.00					
Log private bonds to GDP	0.66	0.55	-0.49	0.69	1.00				
Log public bonds to GDP	0.29	0.40	-0.33	0.43	0.41	1.00			
Log assets of institutional investors	0.78	0.76	-0.65	0.65	0.78	0.15	1.00		
Log stock market capitalization to GDP	0.61	0.63	-0.45	0.58	0.47	0.29	0.70	1.00	
Log number of listed firms per mln. inhabitants	0.51	0.52	-0.44	0.54	0.53	0.27	0.46	0.50	1.00
Log stock market turnover	0.34	0.27	-0.30	0.40	0.25	0.05	0.27	0.30	0.16

Correlations of residuals

	Log private credit to GDP	Log deposits to GDP	Log net-interest margin	Log ATMs per 100,000 people	Log private bonds to GDP	Log public bonds to GDP	Log assets of institutional investors	Log stock market capitalization to GDP	Log number of listed firms per mln. inhabitants
Log private credit to GDP	1.00								
Log deposits to GDP	0.69	1.00							
Log net-interest margin	-0.40	-0.48	1.00						
Log ATMs per 100,000 people	0.21	0.19	0.21	1.00					
Log private bonds to GDP	0.32	0.19	-0.19	0.11	1.00				
Log public bonds to GDP	0.00	0.17	-0.14	0.20	0.10	1.00			
Log assets of institutional investors	0.45	0.50	-0.29	-0.04	0.30	-0.24	1.00		
Log stock market capitalization to GDP	0.36	0.41	-0.19	0.10	0.20	0.16	0.49	1.00	
Log number of listed firms per mln. inhabitants	0.16	0.21	-0.12	0.10	0.14	0.08	0.02	0.34	1.00
Log stock market turnover	0.01	-0.05	-0.04	0.06	0.04	-0.15	-0.17	0.12	0.20

Table 5-a: Bank Regression Results (2000-2006)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
		Log total		Log total				ATMs per	Log deposits	Log bank
	Private credit	private credit	Deposits to	money banks	Net-interest	Log interest	Log overhead	100,000	per 1,000	branches per
	to GDP	to GDP	GDP	to GDP	margin	spread	to total assets	people	people	100,000
Log GDP per capita	0.487	0.48	0.35	0.441	-0.25	-0.239	-0.17	1.016	0.787	0.708
	[0.013]***	[0.014]***	[0.011]***	[0.012]***	[0.010]***	[0.011]***	[0.012]***	[0.065]***	[0.113]***	[0.051]***
Offshore	0.259	0.274	0.454	0.375	-0.014	-0.316	-0.144	0.141	0.388	0.52
	[0.085]***	[0.087]***	[0.069]***	[0.074]***	[0.063]	[0.059]***	[0.075]*	[0.509]	[0.784]	[0.376]
Log fuel	-0.049	-0.044	-0.047	-0.017	0.012	0.002	-0.013	0.061	-0.027	-0.064
	[0.009]***	[0.009]***	[0.007]***	[0.007]**	[0.008]	[0.006]	[0.010]	[0.048]	[0.075]	[0.038]*
Log poverty gap	-0.054	-0.078	-0.047	-0.023	0.099	0.094	0.078	0.09	-0.286	-0.165
	[0.029]*	[0.030]***	[0.023]**	[0.025]	[0.021]***	[0.020]***	[0.024]***	[0.118]	[0.154]*	[0.095]*
Log population density	0.088	0.08	0.146	0.106	-0.077	-0.042	-0.079	-0.043	0.059	0.066
	[0.013]***	[0.013]***	[0.010]***	[0.011]***	[0.009]***	[0.010]***	[0.011]***	[0.056]	[0.079]	[0.046]
Log population size	0.028	0.017	-0.006	0.046	-0.006	-0.08	-0.013	-0.061	0.067	0.04
	[0.012]**	[0.013]	[0.010]	[0.011]***	[0.009]	[0.009]***	[0.011]	[0.058]	[0.094]	[0.046]
GDP per capita *	-0.006	0.004	0	-0.006	0.004	-0.003	0.003	0.003	-0.066	-0.008
population size	[0.002]***	[0.002]*	[0.002]	[0.002]***	[0.002]**	[0.003]	[0.002]	[0.007]	[0.057]	[0.006]
Year-fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	986	985	981	984	984	815	993	88	54	97
Adjusted R-squared	0.65	0.65	0.66	0.68	0.5	0.48	0.3	0.8	0.61	0.71

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5-b: Stock Market Regression Results (2000-2006)

	Model (11)	Model (12)	Model (13)	Model (14)	Model (15)	Model (16)	Model (17)	Model (18)
	Stock market capitalization	Log value traded	Number of listed companies	Stock market cap. of 10 largest firms	Percentage of closely held shares	Value public offerings to GDP	Stock price synchronicity	Stock market turnover
Log GDP per capita	0.565 [0.027]***	1.311 [0.045]***	0.548 [0.029]***	0.02 [0.011]*	-0.099 [0.028]***	0.36 [0.117]***	0.047 [0.024]**	0.689 [0.034]***
Offshore	0.694 [0.206]***	0.272 [0.338]	0.572 [0.185]***	-0.468 [0.081]***	-0.481 [0.148]***	0.613 [0.550]	0.389 [0.134]***	-0.208 [0.226]
Log fuel	0.003 [0.022]	-0.097 [0.038]**	-0.072 [0.024]***	-0.003 [0.012]	0.075 [0.031]**	0.169 [0.088]*	-0.027 [0.029]	-0.075 [0.028]***
Log poverty gap	0.165 [0.053]***	-0.507 [0.088]***	-0.4 [0.056]***	0.077 [0.023]***	-0.159 [0.072]**	0.271 [0.305]	-0.193 [0.053]***	-0.52 [0.066]***
Log population density	0.121 [0.022]***	0.155 [0.037]***	0.105 [0.024]***	-0.016 [0.009]*	0.049 [0.015]***	0.158 [0.049]***	0.084 [0.016]***	0.062 [0.028]**
Log population size	0.138 [0.023]***	0.696 [0.039]***	-0.327 [0.024]***	-0.016 [0.010]	0.071 [0.024]***	0.038 [0.075]	0.15 [0.021]***	0.535 [0.029]***
GDP per capita * population size	-0.004 [0.004]	-0.017 [0.006]***	0.007 [0.004]*	-0.017 [0.001]***	-0.015 [0.002]***	-0.007 [0.007]	-0.009 [0.002]***	-0.012 [0.005]***
Year-fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	665	670	704	362	264	282	292	676
Adjusted R-squared	0.5	0.64	0.6	0.49	0.47	0.15	0.34	0.53

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5-c: Bond Market Regression Results (2000-2006)

	Model (19)	Model (20)	Model (21)	Model (22)	Model (23)
	Private bond market capitalization	Turnover private bond market	Value of new private bonds to GDP	Public bond market capitalization	Turnover public bond market
Log GDP per capita	1.2 [0.074]***	0.192 [0.367]	0.168 [0.239]	0.197 [0.044]***	-0.469 [0.586]
Offshore	2.424 [0.372]***	-1.122 [1.223]	-0.44 [0.980]	0.492 [0.228]**	-5.805 [3.353]*
Log fuel	-0.353 [0.070]***	-0.071 [0.403]	0.149 [0.174]	-0.184 [0.039]***	0.121 [0.770]
Log poverty gap	-0.932 [0.228]***	0.953 [0.968]	2.228 [0.560]***	-0.137 [0.127]	-0.579 [1.021]
Log population density	-0.066 [0.032]**	-0.156 [0.219]	-0.003 [0.100]	0.133 [0.022]***	-0.461 [0.300]
Log population size	0.168 [0.058]***	0.084 [0.224]	-0.263 [0.141]*	0.047 [0.032]	-0.534 [0.476]
GDP per capita * population size	-0.002 [0.005]	-0.032 [0.018]*	0.024 [0.014]	0.001 [0.003]	0.196 [0.138]
Year-fixed effects?	Yes	Yes	Yes	Yes	Yes
Observations	242	55	173	280	52
Adjusted R-squared	0.72	0.07	0.24	0.28	0

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5-d: Institutional Investors Regression Results (2000-2006)

	Model (24)	Model (26)	Model (26)	Model (27)
	Assets of mutual funds to GDP	Assets of insurance companies to GDP	Assets of pension funds to GDP	Assets of instit. investors to GDP
Log GDP per capita	0.876 [0.073]***	0.671 [0.061]***	0.453 [0.101]***	0.774 [0.073]***
Offshore	-1.204 [0.653]*	0.437 [0.553]	0.214 [0.927]	0.196 [0.659]
Log fuel	-0.16 [0.059]***	-0.131 [0.051]**	-0.129 [0.083]	-0.171 [0.059]***
Log poverty gap	0.055 [0.134]	0.291 [0.115]**	0.23 [0.190]	0.171 [0.135]
Log population density	0.03 [0.066]	0.146 [0.057]**	-0.163 [0.091]*	-0.006 [0.065]
Log population size	0.232 [0.070]***	0.054 [0.060]	0.05 [0.096]	0.054 [0.069]
GDP per capita * population size	-0.006 [0.009]	0.001 [0.008]	0.008 [0.013]	0.002 [0.009]
Year-fixed effects?	Yes	Yes	Yes	Yes
Observations	99	98	100	99
Adjusted R-squared	0.64	0.63	0.2	0.58

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Descriptive Statistics for the Residuals

Variable	Max	Min	Mean	SV	CV	SD within	SD between	Number of countries	Total observations	Avg. number of obs. per country
Log private credit to GDP	1.44	-1.61	0.00	0.59	0.31	0.18	0.59	155	986	6.36
Log total private credit to GDP	1.39	-1.67	0.00	0.60	0.30	0.18	0.60	155	985	6.35
Log deposits to GDP	1.33	-1.31	0.00	0.47	0.24	0.12	0.48	155	981	6.33
Log total bank assets to GDP	1.44	-1.50	0.00	0.51	0.29	0.15	0.51	154	984	6.39
Log net-interest margin	1.17	-1.09	0.00	0.43	0.43	0.17	0.40	158	984	6.23
Log interest spread	1.29	-1.21	0.00	0.42	0.50	0.19	0.39	150	815	5.43
Log bank overhead to total assets	1.36	-1.43	0.00	0.52	0.44	0.21	0.48	157	993	6.32
Log ATMs per 100,000 people	1.56	-1.67	0.00	0.68	0.00	0.00	0.68	88	88	1.00
Log of synthetic access	0.87	-1.05	0.00	0.37	0.00	0.00	0.37	157	157	1.00
Log deposits per 1,000 people	1.49	-1.77	0.00	0.71	0.00	0.00	0.71	54	54	1.00
Log number of bank branches per 100,000 people	1.39	-1.36	0.00	0.60	0.00	0.00	0.60	97	97	1.00
Log stock market capitalization to GDP	2.29	-2.63	0.00	0.85	0.32	0.28	0.87	109	665	6.10
Log stock market value traded	3.93	-4.22	0.00	1.43	0.49	0.67	1.37	111	670	6.04
Log number of listed firms per mln. inhabitants	2.72	-2.63	0.00	0.93	0.37	0.35	0.93	117	704	6.02
Log market cap. of 10 largest firms	0.42	-0.72	0.00	0.24	0.36	0.09	0.24	76	362	4.76
Log of closely held shares	0.76	-1.17	0.00	0.38	0.33	0.13	0.39	49	264	5.39
Log total public offerings to GDP	2.46	-4.66	0.00	1.33	0.75	0.83	1.11	45	282	6.27
Log stock price synchronicity	1.04	-1.09	0.00	0.39	0.96	0.27	0.28	61	292	4.79
Log stock market turnover	3.10	-3.02	0.00	1.06	0.59	0.57	0.97	112	676	6.04
Log private bonds to GDP	1.75	-2.41	0.00	0.79	0.23	0.19	0.82	41	242	5.90
Log private bonds turnover	2.72	-5.31	0.00	1.73	0.68	0.99	1.46	31	55	1.77
Log value new, dom. private bonds to GDP	4.69	-6.10	0.00	1.86	0.59	1.02	1.74	38	173	4.55
Log public bonds to GDP	1.19	-1.64	0.00	0.50	0.35	0.18	0.53	48	280	5.83
Log public bonds turnover	3.75	-7.15	0.00	2.83	0.17	0.49	2.93	31	52	1.68
Long minus short government yield	7.56	-11.43	0.00	2.19	0.81	1.50	1.86	45	224	4.98
Log assets of mutual funds	2.24	-1.72	0.00	0.88	0.00	0.00	0.88	99	99	1.00
Log assets of insurance companies	2.01	-1.90	0.00	0.74	0.00	0.00	0.74	98	98	1.00
Log assets of pension funds	2.67	-2.86	0.00	1.25	0.00	0.00	1.25	100	100	1.00
Log assets of institutional investors	2.14	-1.83	0.00	0.89	0.00	0.00	0.89	99	99	1.00

- Return to scale effects, as proxied by *population size*, are present in some, albeit not all, banking indicators. They affect credit and total assets but not deposits, bank spreads but not interest margins or overheads. However, they strongly affect mutual funds' assets and nearly all equity market indicators. This overwhelming evidence of strong returns to scale effects as regards capital markets and some of the more developed financial institutions that feed them is consistent with the observation often found in the literature that *capital markets have a much harder time to develop and attain critical mass in the smaller countries*.³⁰
- The *interaction of income and size* is highly significant for those indicators that exhibit scale effects, including bank credit, bank efficiency, and equity market liquidity (turnover), with a sign indicating a dampening effect. Thus, while both income and size affect important dimensions of financial development, particularly efficiency and liquidity, their impact is not fully cumulative. The fact that the interacted terms is in natural magnitudes rather than logs, as the rest of the model, suggests strong nonlinearities at the higher end of the scale, i.e., when both income level and size are large. Natural limits to efficiency gains seem to be eventually reached past some threshold level.
- *Population density* also has a remarkably important and consistent impact on many (albeit not all) aspects of financial development. It clearly promotes the size of both banks and institutional investors, and raises bank efficiency. Surprisingly, however, it does not seem to affect bank reach. It also has an important impact on the equity market, both as regards the size of primary issues and secondary market activity (as determined by value traded and turnover). Interestingly, it affects public bond capitalization but not private bonds.
- The *poverty gap* is also highly significant for many bank and capital markets size and efficiency indicators, with a sign that is consistent with poverty dampening financial development or, alternatively, financial development reducing poverty. According to the first interpretation, a higher poverty gap limits the size of the financial system, thereby also constraining its efficiency.³¹ While this effect could reflect barriers to access, it is surprising, however, that the impact of poverty on access, as determined by the number of bank branches and bank deposits, is only mildly significant.³²

³⁰ This matches earlier findings; see Bossone, Honohan and Long (2002).

³¹ Poverty could also hinder financial development through higher political risk, hence higher risk premia. Further work is needed to sort out endogeneity issues and fully uncover these linkages.

³² The lack of a clear linkage, which is consistent with earlier findings (see Honohan, 2006), may reflect the fact that existing bank indicators reflect bank density (i.e., the increased proximity of banking services for already connected customers) rather than bank reach (the increased availability of banking services to thus far marginalized customers).

Table 7: Income Elasticities

Variable	Ranking	Income elasticity
Public Bonds	1	0.20
Bank Deposits	2	0.35
Bank Assets	3	0.44
Pension Funds	4	0.45
Bank Credit	5	0.49
Stock Market Cap.	6	0.56
Insurance Assets	7	0.66
Inst. Inv. Assets	8	0.77
Mutual Funds	9	0.88
Private Bonds Cap.	10	1.20
Value Traded	11	1.30

- *Offshore effects* are also very strong and consistent across the board. Offshore centers have larger (and, as a result, more efficient) banking systems (particularly as regards deposits). Their banking systems also have better reach. While their equity markets are larger in size (this is also true for bonds) and less concentrated, they are neither more liquid nor more efficient.
- Finally, *oil-based economies* have smaller financial institutions and smaller, less liquid, and more concentrated markets. This also agrees well with what one would expect.

As regards *quality of fit* (as determined by the adjusted R-squared), main highlights are as follows:

- All bank size indicators and (surprisingly enough) all reach indicators have very good fit. Efficiency indicators are also reasonably good, except for operating expenses.
- In the case of *institutional investors*, the fit is quite good for insurance companies and mutual funds, but very poor for pension funds. As already noted, the latter is not that surprising given the importance of the policy component and its wide possible variance across countries.³³ However, it may also reflect in part poorer data quality. Interestingly, however, the fit of the sum of all three types of institutional investors is nearly as good as that of the top performer in the group (insurance companies), suggesting that pension funds can indeed be largely viewed as complements for other forms of long-term savings and collective investment vehicles.

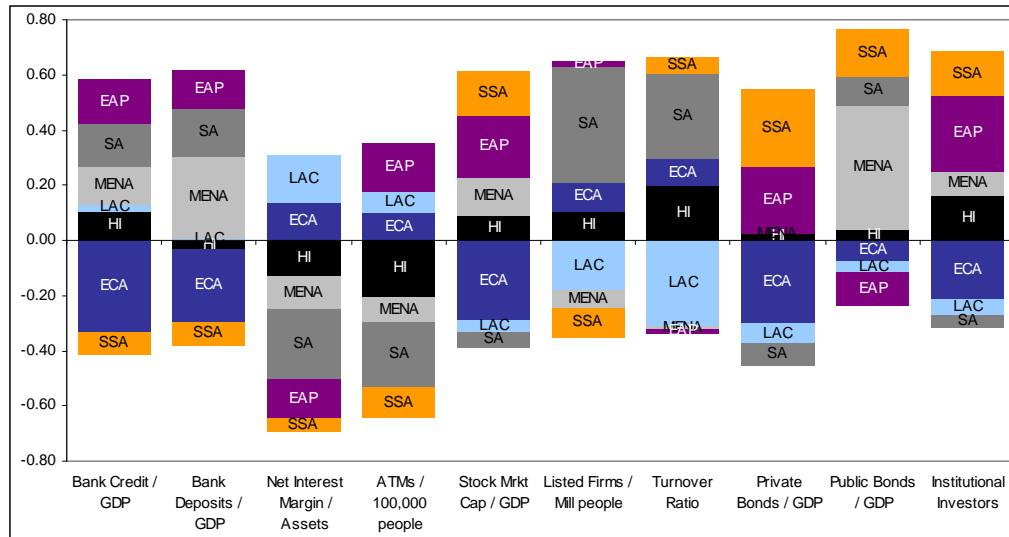
³³ The importance of private pension funds assets should reflect, among other things, whether there is a mandatory second pillar system (and, if so, the date at which it was introduced) and the size of contributions, which in turn depend on the existence and coverage of a first pillar, pay-as-you-go system.

- For the *equities markets*, value traded (and, surprisingly, listed companies) perform better than market cap, which tends to confirm the reluctance to use market cap. Yet, the latter has a reasonably high fit, the same as turnover. All other equity market indicators (including concentration, efficiency, and new offerings) have low fits.
- As regards the *bond market*, private bonds capitalization has a surprisingly good fit. However, the fit for other private bonds indicators and public bonds is much lower (the latter is again hardly surprising given the importance of policy).

Results for the regionally adjusted specifications are reported in Appendix Tables 2a-d. With very minor exceptions, the coefficients of the structural control variables are not significantly altered, which shows that the results are robust. However, as summarized in Figure 2 and Appendix Table 3 for the ten core indicators, there are substantial regional effects:

- These are particularly evident in the case of *size*, with high income countries and countries in the far east (both in South Asia and in East Asia and the Pacific) having relatively larger financial markets than the rest of the world. Middle Eastern and Northern African countries also have larger than average banking systems (particularly as regards deposits), as well as larger public bond markets. Inversely, countries in Eastern Europe and Central Asia have substantially smaller financial systems perhaps reflecting their transition status.
- As regards *efficiency and liquidity*, high income and Asian countries' financial systems are more efficient, which is consistent with being larger. Instead, Latin America lags behind substantially as regards both banking system and equity market efficiency, even though its financial systems are not much smaller.
- As regards *reach*, the Sub-Saharan region underperforms compared to the rest of the world, which is consistent with the more difficult challenges it faces in terms of access. However, the high income countries, the Middle East, and South Asia, which all have bigger banking systems, also underperform, while some regions with relatively less developed banking systems, such as the Latin American and transition countries, overperform. This suggests some substitution between cash-based and bank-based activity. At the same time, it underlines some of the limitations of our core reach indicator. In addition to being technology dependent, it is also affected by the relative development of other banking indicators.

Figure 2: Overview of regional effects



e. Principal components analysis

Factor analysis was used to help order and sort out the indicator sets for institutions and markets (but only for equities).³⁴ For each sector a first analysis was conducted with all the pre-selected indicators for the sector. A second analysis was then run with the more limited number of indicators that have broader country coverage. Results appear in Table 8 for institutions, and Table 9 for equities. A final analysis combines key banking and equity indicators (Table 10). Highlights are as follows:

- Starting with Table 8, three clearly distinct dimensions appear, ranked by order of importance: i) size; ii) efficiency; and iii) reach.³⁵ As regards size, total assets have the highest loading, credit the lowest, which is not surprising (some banking systems may be large but have a hard time to channel resources into loans).
- As regards efficiency, net interest margin has the highest loading while the spread has the lowest. Furthermore, the latter has a very high uniqueness factor, suggesting that spreads may be reflecting an altogether different dimension. Notice also that while size and efficiency exhibit clearly negative cross-correlations, the size indicators do not show up in the reach dimension, suggesting that reach and size are largely orthogonal to each other.

³⁴ Underlying dimensions are constructed by a weighting of indicators, the indicator that is more associated with the dimension receiving a higher weight (so-called factor loading). Conversely, every indicator can be thought of as being a weighted sum of the dimensions or factors. The factor loadings, are computed using the squared multiple correlations as estimates of the communality, the part of the variance of the indicator that is captured by the factors. To arrive at factor loadings that are more intuitively interpretable, we use the varimax technique which maximizes the squared loadings for each factor.

³⁵ The columns are placed in the order of decreasing variability in the indicators. Hence, Size contains more information than Efficiency which contains more information than Reach.

Table 8: Factor Analysis on Institutional Indicators (2000-2006)

Variable	Size	Reach	Efficiency	Uniqueness
Log private credit via deposit money banks to GDP	0.86	0.19	-0.18	0.19
Log deposits to GDP	0.88	0.08	-0.28	0.14
Log total assets of deposit money banks to GDP	0.95	0.07	-0.19	0.06
Log net interest margin	-0.48	-0.02	0.70	0.28
Log interest spread	-0.09	-0.03	0.48	0.76
Log overhead to total assets	-0.54	0.13	0.65	0.26
Log assets of institutional assets to GDP	0.77	-0.05	0.02	0.40
Log ATMs per 100,000 people	0.07	0.67	0.23	0.48
Log deposits per 1,000 people	0.14	0.73	-0.14	0.44
Log branches per 100,000 people	0.10	0.59	0.06	0.63

Number of observations: 36. Number of parameters: 27.

Variable	Size	Efficiency	Uniqueness
Log private credit via deposit money banks to GDP	0.84	-0.15	0.27
Log deposits to GDP	0.84	-0.21	0.25
Log total assets of deposit money banks to GDP	0.94	-0.15	0.09
Log net interest margin	-0.23	0.80	0.30
Log interest spread	-0.20	0.50	0.71
Log overhead to total assets	-0.16	0.81	0.32

Number of observations: 113. Number of parameters: 11.

- As regards reach, the deposit account indicator has the highest loading, branches the lowest. While this would argue in principle in favor of deposits, notice that all three have high uniqueness factors, suggesting the presence of substantial “unexplained” components. Notice also the significant positive loading of ATMs per capita in the efficiency column, reflecting again the cost of providing access.
- Going now to Table 9, the size and liquidity dimensions appear clearly, with market cap being the main size indicator and turnover the main liquidity indicator. Interestingly, market cap is unrelated to liquidity. Not surprisingly, value traded is instead the main bridge between size and liquidity (turnover being the key liquidity indicator).
- The third dimension in the equity market PCA analysis yields a somewhat blurred picture. It brings together measures of efficiency (as determined by price synchronicity), reach (as determined by market concentration), and size (as determined by new issues). As would be expected, a higher price synchronicity (less efficiency) is related to smaller size (less issues) and a higher share of closely held shares. However, less efficient markets also appear to be less concentrated in terms of the top ten capitalization share, which is somewhat

counterintuitive.³⁶ In any event, all these indicators have a high degree of uniqueness, suggesting that there is more than meets the eye, or else that quality or coverage leaves to be desired.

Table 9: Factor Analysis on Stock Market Indicators (2000-06)

Variable	Liquidity	Size	Efficiency	Uniqueness
Log stock market capitalization	0.10	0.94	0.02	0.12
Log value traded	0.83	0.53	0.02	0.03
Log number of listed firms	0.29	0.66	-0.06	0.48
Log market capitalization of 10 largest firms	-0.12	-0.37	-0.35	0.73
Log of closely held shares	-0.41	-0.12	0.30	0.72
Log total public offerings to GDP	-0.13	0.45	-0.33	0.67
Log stock price synchronicity	0.00	0.02	0.46	0.79
Log turnover	1.00	-0.05	0.00	0.01

Number of observations: 40. Number of parameters: 21.

Variable	Liquidity	Size	Uniqueness
Log stock market capitalization	0.07	0.97	0.06
Log value traded	0.76	0.64	0.02
Log number of listed firms	0.29	0.22	0.87
Log turnover	0.98	0.02	0.05

Number of observations: 111. Number of parameters: 6.

- The number of listed firms is most highly related to the size dimension. However, it has a high uniqueness factor (this is particularly evident in the second analysis with broader coverage but less indicators), which suggests that it accounts for an altogether distinct dimension.
- Table 10 confirms the main conclusions above on a cross-sector basis. Four clear dimensions appear (bank reach variables were not included): i) bank size; ii) stock market liquidity; iii) bank efficiency; and iv) stock market size. Listed firms pops up as a largely unexplained variable (the same as bank spreads), confirming that it captures an additional dimension which we will label as reach. Interestingly enough, stock market size (i.e., market cap) ranks last by order of importance, confirming the need to look at other equity indicators besides market cap in order to assess market development.

³⁶ The somewhat conflicting story in terms of market concentration may be linked to estimation problems. In a scatter diagram analysis of predicted versus actual values, the indicators of equity market concentration appear to bifurcate (they are the only indicators among our list of 27 for which this occurs).

Table 10: Factor Analysis on Banks and Equity Markets (2000-2006)

Variable	High			Low	
	Banking/Size	Stocks/Liquidity	Banking/Efficiency	Stocks/Size	Uniqueness
Log stock market capitalization	0.33	0.14	-0.04	0.91	0.04
Log value traded	0.15	0.78	-0.09	0.59	0.01
Log number of listed firms	0.25	0.38	-0.01	0.10	0.78
Log turnover	-0.04	0.98	-0.12	0.01	0.03
Log private credit via deposit money banks to GDP	0.89	0.10	-0.22	0.15	0.12
Log deposits to GDP	0.86	-0.08	-0.21	0.23	0.17
Log total assets of deposit money banks to GDP	0.94	0.05	-0.10	0.20	0.07
Log net interest margin	-0.37	-0.13	0.71	0.00	0.34
Log interest spread	-0.07	-0.11	0.59	-0.09	0.63
Log overhead to total assets	-0.37	-0.20	0.70	-0.09	0.32

Number of observations: 87. Number of parameters: 34.

f. Core indicators

Table 11 provides a synopsis of relevant criteria (described in the previous section) for narrowing our core set of indicators. Main steps followed in the selection process were as follows:

- As regards bank size indicators, they rank very similarly as regards all criteria except that of linking up with final welfare objectives (where credit variables are better) and coverage (total claims on the private sector has a much lower coverage). Hence, *narrow credit* is a clear winner on account of both coverage and welfare linkages.
- In addition to narrow credit, however, we also retained *deposits* in our core list on account of the fact that attracting and placing funds can have different dynamics, particularly in incipient systems or in systems that are undergoing systemic stress.
- As regards bank efficiency, the net interest margin dominates operating costs on account of its goodness of fit and the spread on account of its higher factor loading and lower year-to-year variability. The fact that its definition (and construction) is clearer than that of bank spreads (where there are some questions as regards the consistency with which rates are being picked across countries and time periods) is an important further argument in favor of *net interest margins*.
- As regards bank reach, the number of deposit accounts dominates the other two indicators as regards factor loadings and its more limited dependence on idiosyncratic and perhaps rapidly evolving technological factors. It would naturally be the indicator of choice, except for the fact that its coverage is severely more limited (its goodness of fit is also a bit lower, which might suggest

lower data quality). On the other hand, ATMs per capita slightly dominates bank branches per capita on account of a better fit and somewhat lower uniqueness factors in the principal components analysis. Hence, until better information is collected, we picked *ATMs per capita* as our choice reach indicator for banks.

Table 11: Selecting the Core Indicators

	Dimension	Variable	Empirical link with welfare/growth	Goodness of fit	Factor loading	Coverage	Within to between variation	Final indicator?	
BANKS	SIZE	Log private credit via deposit money banks to GDP	DIRECT	HIGH	HIGH	EXCELLENT	HIGH	YES	
		Log total private credit to GDP	DIRECT	HIGH	HIGH	POOR	HIGH	NO	
		Log deposits to GDP	INDIRECT	HIGH	HIGH	EXCELLENT	HIGH	YES	
	EFFICIENCY	Log total assets of deposit money banks to GDP	INDIRECT	HIGH	HIGH	GOOD	HIGH	NO	
		Log net interest margin	INDIRECT	MEDIUM	HIGH	GOOD	HIGH	YES	
		Log interest spread	INDIRECT	MEDIUM	MEDIUM	GOOD	LOW	NO	
		Log overhead to total assets	INDIRECT	LOW	HIGH	GOOD	HIGH	NO	
	REACH	Log ATMs per 100,000 people	INDIRECT	HIGH	MEDIUM	LOW	NA	YES	
		Log deposits per 1,000 people	INDIRECT	HIGH	HIGH	LOW	NA	NO	
		Log branches per 100,000 people	INDIRECT	HIGH	LOW	LOW	NA	NO	
INST. INVESTORS	SIZE	Log assets of institutional assets to GDP	INDIRECT	MEDIUM	-	LOW	NA	YES	
		Log assets of pension funds to GDP	INDIRECT	LOW	-	LOW	NA	NO	
	EFFICIENCY	Log assets of insurance companies to GDP	INDIRECT	HIGH	-	LOW	NA	NO	
		Log assets to mutual funds to GDP	INDIRECT	HIGH	-	LOW	NA	NO	
STOCK MARKETS	SIZE	Log stock market capitalization	INDIRECT	MEDIUM	HIGH	GOOD	HIGH	YES	
		Log number of listed firms	INDIRECT	HIGH	MEDIUM	GOOD	HIGH	YES	
	LIQUIDITY	Log turnover	DIRECT	MEDIUM	HIGH	GOOD	MEDIUM	YES	
		Log value traded	INDIRECT	HIGH	LOW	GOOD	HIGH	NO	
	REACH	Log market capitalization of 10 largest firms	INDIRECT	MEDIUM	MEDIUM	LOW	HIGH	NO	
		Log of closely held shares	INDIRECT	MEDIUM	MEDIUM	LOW	HIGH	NO	
		Log total public offerings to GDP	INDIRECT	LOW	MEDIUM	LOW	HIGH	NO	
		Log stock price synchronicity	INDIRECT	LOW	MEDIUM	LOW	HIGH	NO	
	BOND MARKETS	SIZE	Log private bonds to GDP	INDIRECT	HIGH	-	LOW	HIGH	YES
			Log public bonds to GDP	INDIRECT	LOW	-	LOW	HIGH	YES
EFFICIENCY		Log turnover domestic private bonds	INDIRECT	LOW	-	LOW	HIGH	NO	
		Log turnover domestic public bonds	INDIRECT	LOW	-	LOW	LOW	NO	
REACH	Log value new issues domestic private bonds to GDP	INDIRECT	LOW	-	LOW	LOW	NO		

- As regards institutional investors, *total assets* in the sector is a clear winner on account of the fact that it incorporates information on pension funds that otherwise would be lost due to the fact that the pension fund assets on their own are basically “all over the place”, reflecting the great variety of institutional arrangements and dates of introduction. However, the good fit of insurance companies and mutual funds suggests that a breakdown by sub-sectors would also serve a useful purpose.³⁷
- As regards the equity market size indicators, we picked *market capitalization* over value traded notwithstanding the former’s lackluster performance in terms of fit and linkages with welfare objectives. The higher factor loadings of market cap as regards size and the high correlation between value traded and turnover suggests that market cap provides more additional value in terms of understanding the level of development of the equity market than value traded, which basically replicates the information already provided in turnover.

³⁷ For this reason, although we do not include these indicators in the core set, we report their values separately in the benchmarks template.

- Turnover, on the other hand, is a clear winner as regards market liquidity on account of its high factor loading and coverage.
- As regards equity market reach, we retained the *number of listed firms* over the two market concentration indicators on account of a much better coverage, much better fit, and lower intra-country variance, which all suggest that the concentration indicators, while possibly important, are harder to pin down and require more effort to broaden their coverage.
- Finally, as regards the bond markets, *private bonds capitalization* and *public bonds capitalization* emerge as natural choices, one on account of its goodness of fit and the other on account of the fact that, while more difficult to benchmark given the variety of policy choices, public bonds markets are a key underlying component of financial market development.

g. Variance decomposition

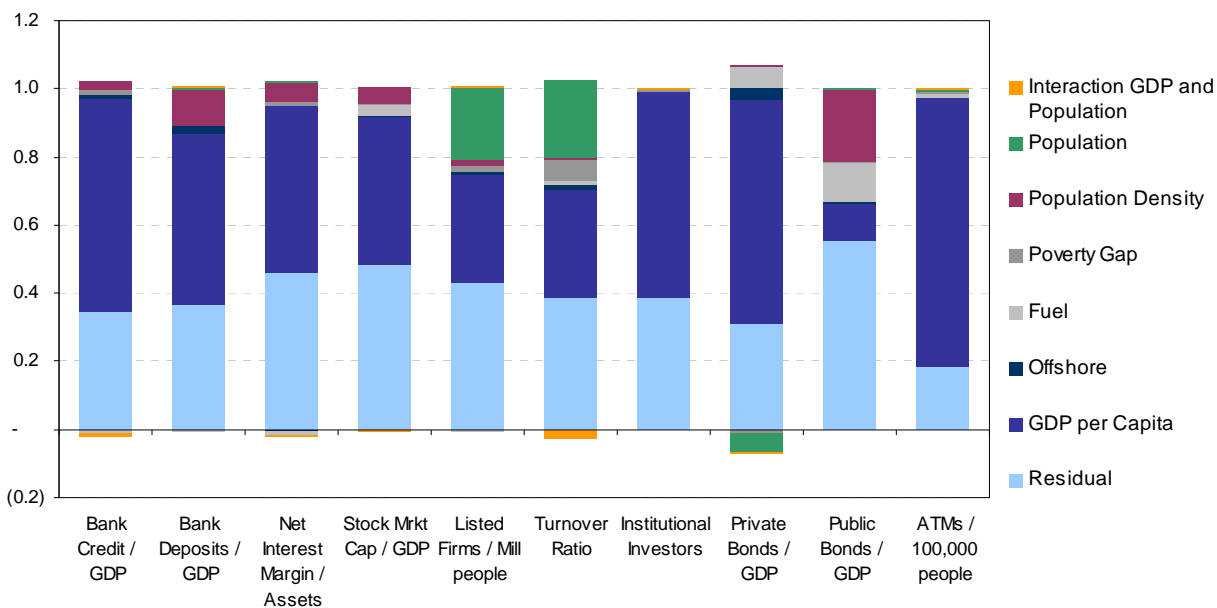
The relative importance of our set of controls in explaining cross-country differences is summarized in Appendix Table 4 and Figure 3, based on a variance decomposition of each of the core indicators.³⁸ It shows that:

- *Per capita income* (i.e., economic development) accounts for the lion's share of cross-country differences.
- *Scale effects* are only important as regards equity market development.
- *Density* plays an important role as regards the collection of deposits and, remarkably enough, the sale of public bonds.
- Consistent with expectations, public bond issues are smaller in oil exporting countries, as governments have less need for financing.
- Other explanatory variables (the offshore dummy, poverty, and the interaction between income and size) do not play an important role overall (they still can play an essential role for specific countries, however).
- The share explained by the residual is quite sizable in all cases, except for ATMs, which suggests that *policy has an important role to play*.³⁹

³⁸ The following identity is used: $VarY = \sum \beta_i Cov(Y, X_i) + Cov(Y, \varepsilon)$ where Y is a dependent variable linearly estimated over a set of independent variables X_i with regression coefficients β_i and a residual ε .

³⁹ Part of the residuals could also of course be non-policy related, reflecting measurement errors or important remaining structural determinants unaccounted for in our controls. However, as already stressed, the fact that correlations across indicators are generally substantial would argue against interpreting the residuals entirely as measurement error. While missing structural factors cannot be of course ruled out

Figure 3: Variance Decomposition



h. Dynamic analysis

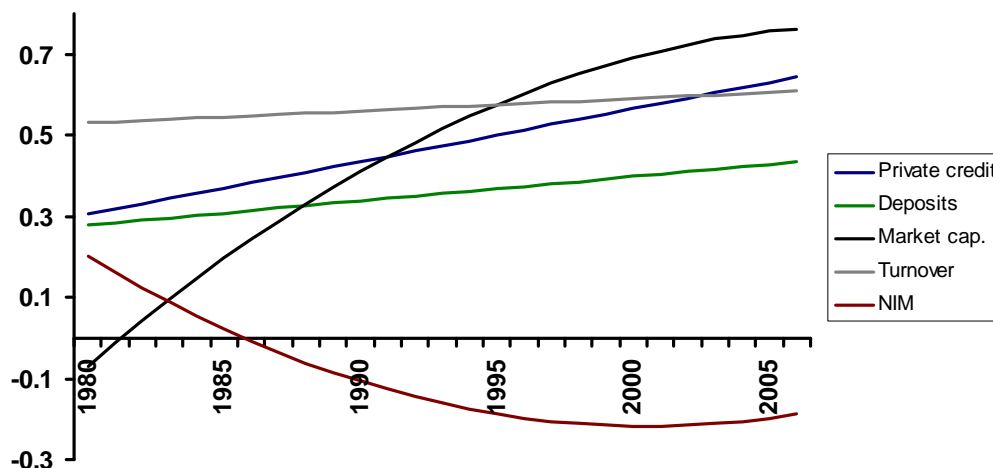
For the indicators for which long series are available (mainly bank and equity market size and efficiency), it is possible to estimate structural regressions based on a panel with time varying coefficients. These allow for a deeper look into the more distant past, thereby providing a fuller perspective on historical trends and bumps along the way (results are shown in Appendix Table 5). The evolution through time of the income elasticities appears in Figure 4.

- Except for equity market capitalization, changes over time, while statistically significant, are economically not very large. This suggests that the process of financial development, at least from a sufficiently aggregated perspective, is fairly stable and predictable.
- It is also very remarkable, however, that all elasticities (except for the net interest margin, because it is an inefficiency indicator) trend upwards, suggesting that economic development plays an increasingly crucial role over time in determining financial development.

either, it seems also improbable that they could be sizable enough to account for more than a small fraction of the residuals. Moreover, as emphasized in Section II, the residuals share is likely to under-estimate the impact of policy, which is already captured by the per capita income and poverty terms. Ultimately, of course, interpreting benchmarks remains a matter of judgment and should be done with caution. Benchmarking is only meant to provide initial guidance, not final answers.

- In the case of market capitalization, the link with economic development was not initially significant, thus even low income countries could have large capital markets. However, this is no longer the case.

Figure 4: Changes in Income Elasticities over Time for Several Financial System Components*



* Based on coefficients of pooled OLS regressions for the period 1980-2006 with the logarithm of X as a dependent variable. The independent variables include the logarithms of GDP per capita, population size and density, the value of fuel exports to GDP, the poverty gap, and a dummy that indicates whether the country is an offshore financial center or not (see <http://www.imf.org/external/np/ofca/ofca.asp>). To allow for time-varying coefficients of these indicators, two interactions are added for each of these indicators: one interaction with a time indicator (where 1980 is $t=0$) and another with the square of the time indicator. The time indicator and its square are also both included as independent variables on their own.

IV. LOOKING AHEAD

Important gaps in the currently available cross-country information on financial sector development will need to be filled:

- While information on *banks* is far more thorough than for other sectors (thanks in large part to the Fund's IFS), it is nonetheless far from complete, even for very basic bank size indicators. In particular, as regards *access and reach*, efforts are also needed to collect more systematically data on accounts originating from the variety of non-bank institutions that cater more directly to the lower income groups (coops, savings and loans, postal banks, microfinance institutions, etc.).⁴⁰ Further efforts are also needed to perfect the links between survey data on the percentage of households with access to a financial account and institutional data on the number of accounts.⁴¹ Filling up this gap is particularly important in view

⁴⁰ Christen et al. (2004) and Peachey and Roe (2006) have already made important contributions in this direction.

⁴¹ Honohan (2006) provides a key first step in this direction.

of the strong shortcomings of the ATM indicator, which has a very limited policy component and is dependent on both financial development and technology.

- As regards *non-bank financial institutions*, a substantial effort will be needed to put together a more comprehensive data set. For institutional investors, information on asset size is still quite dispersed and incomplete; on efficiency (for example fees) and reach (number of customers), it is essentially non-existent. On other non-bank financial institutions (factoring and leasing companies, finance companies, coops, housing finance, etc...), there is even less. Yet, some of these activities (for example factoring and leasing) can play a key role in helping promote intermediation in environments with imperfect informational or contractual frameworks.⁴²
- Information on *bond markets*, another key component of financial development, is also severely deficient. While cross-country information on bond market size (public and private) has improved, mostly thanks to BIS efforts, country coverage remains limited. Information on secondary markets' efficiency and liquidity (for example bid-ask spreads by transaction size) is even more deficient. Nor is there sufficient standardized information to assess the completeness and scope of the public bonds yield curve. Last but not least, current information does not break down private bonds by origin, corporate or housing. In this context, the lack of information on asset-backed securities is another key shortcoming which prevents assessing the growth of the securitization and structured products industry.
- The lack of information on *risk-based instruments* (except for insurance products on which the Swiss-Re database provides a wealth of information) is a final major gap in the existing financial information. In particular, there is very little information on derivative markets, a key component of financial development in middle-income countries.
- Last but certainly not least, in view of the ever more important impact of financial globalization, it is also crucial to incorporate information on financial transactions that originate *offshore*. This applies of course to banking but also, and increasingly so, to bond and equity markets. In many countries, the welfare impact of small domestic financial systems is offset by large offshore transactions. While much progress has already been made, mainly by BIS, in gathering information on offshore holdings by (and liabilities from) non-residents, more efforts are needed to collect this type of information, particularly as regards equity markets (ADRs and the like).

⁴² The Fund's ongoing efforts to expand IFS data to include non-bank institutions could play a key role in this respect, provided it becomes available soon enough and can be broken down by sectors and functions. As the same activities can be developed by different institutions, the data should ideally be collected in a way that can be sorted out by functions (for example, factoring products offered by general purpose banks would need to be added to those offered by specialized institutions). Data on fees (particularly for mutual and pension funds) would also be highly desirable.

More and better information will of course allow both to extend the scope of the analysis and to improve its quality. However, even with the currently available information, much more can be done to systematically enhance our understanding and assessment of financial development. The analysis can be pushed in at least three directions: i) deepening the analysis of FDIs to provide a more complete and thorough assessment; ii) linking FDIs to EEIs to better understand the policy transmission mechanism; and iii) linking FDIs to EDIs so as to improve the assessment of final impact.

As regards the deepening of the analysis of FDIs, the following areas readily come to mind:

- In many cases, FDIs can be broken down and decomposed in revealing ways. Take for example the case of banks' interest margins. Using basic accounting information, these can be broken down into operating costs, profit margins, taxation and reserve requirements, margins for asset provisioning, etc. Benchmarking each of these components can help identify key constraints and bottlenecks to banking efficiency.⁴³ Once the information becomes available, similar decompositions could conceivably be carried out to analyze the efficiency of non-bank or capital market intermediaries.
- More generally, much more can be done to deepen the analysis and benchmarking of financial development (the analysis of core FDIs provided in this paper only scratches the surface). For example, one may wish to benchmark the development of more specific markets and instruments such as those related to housing or corporate finance. The analysis of key market development aspects, such as liquidity and efficiency, can also be furthered beyond that of simple turnover ratios. In the case of financial institutions, one would wish to review more specific aspects of competition and efficiency such as at the product level, rather than the overall market level.

As regards linking FDIs to EEIs, the first step would be to expand the analysis and benchmarking of the enabling environment.⁴⁴ More efforts seem to be called for in analyzing more systematically the transmission from the enabling environment to financial development. For example, how soon should one expect progress in improving the macroeconomic, contractual, or informational frameworks to trickle down into an expansion of credit? Or how much improvement in access can be expected from relaxing some of the underlying key costs and constraints? A first step in this analysis would be to explain FDIs based on EEIs.

Improving the benchmarking of the linkages between FDIs and EDIs would further help fill in the dots as regards the process of financial development. While important research has been produced in recent years to demonstrate the existence of these linkages, more

⁴³ While important progress has already been made at the Bank in this direction, particularly in the context of FSAPs, these have been mostly isolated efforts. See Beck and Fuchs (2004) and Hauner and Peiris (2005). See Beck (2007) for a more general discussion.

⁴⁴ This is of course an area where the Bank has already achieved much progress, particularly as regards the Doing Business Indicators. Further progress in the financial area is already on the way with the pilot program on the Getting Finance Indicators.

work would be needed to provide the detail required for benchmarking purposes. In particular, more could be done to locate a country's financial development within the broader process of economic development. For this purpose, the leads and lags, sequencing and complementarities of sectors, instruments and markets need to be analyzed in greater detail.

References

- Barr, Kumar and Litan (2007): *Building Inclusive Financial Systems*, World Bank, Brookings Institute .
- Beck, T. (2006): “Creating an Efficient Financial System: Challenges in a Global Economy”, in: *Economic Growth*, edited by South African Reserve Bank, Banco de México and The People’s Bank of China.
- Beck, T. (2007): “Efficiency in Financial Intermediation: Theory and Empirical Measurement” in: *Microfinance and Public Policy: Outreach, Performance and Efficiency*, edited by Bernd Balkenhol, Palgrave, MacMillan
- Beck, T. and M. Fuchs (2004): “Structural Issues in the Kenyan Financial System: Improving Competition and Access.” Policy Research WP 3363
- Beck, T., and R. Levine (2004), ‘Stock markets, banks and growth: Panel evidence’, *Journal of Banking and Finance* 28, 423-442.
- Beck, T., Asli Demirgüç-Kunt and Ross Levine (2000) “A New Database on Financial Development and Structure” *World Bank Economic Review* 14, 597-605.
- Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine (2007). “Finance, Inequality, and the Poor.” *Journal of Economic Growth* 12, 27-49.
- 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, 234-66.
- Beck, T., Levine, R., and Loayza, N. (2000): “Finance and the Sources of Growth.” *Journal of Financial Economics* 58, 261-300.
- Beck, T., E. Feyen, A. Ize, and F. Moizeszowicz (2008). “Core Financial Development Indicators”, Background Paper for the project Developmental Issues in FSAPs: Taking Stock and Looking Forward, World Bank
- Bossone, B., Honohan, P and Long, M. (2002); *Policy for Small Financial Systems*, in: Caprio, G., Honohan, P and Vittas, D. (Eds.): *Financial Sector Policy for Developing Countries: A Reader*, World Bank. Washington, DC
- Calderon, C and L. Liu, 2003. “The Direction of Causality between Financial Development and Economic Growth.” *Journal of Development Economics* 72, 321-334.
- Christen, Robert Peck, Veena Jayadeva, and Richard Rosenberg (2004): “Financial Institutions with a Double Bottom Line: Implications for the Future of Microfinance”, Occasional Paper No. 8. Washington DC: CGAP

Hart, O. (2001), “Financial Contracting”, *Journal of Economic Literature*, Vol. 39, No. 4, 1079-1100.

Hauner, David and Periris, Shanaka (2005): Bank Efficiency and Competition in Low-Income Countries: The Case of Uganda, IMF WP 05/240.

Honohan, P. (2006): “Household Financial Assets in the Process of Development”, WPS3965, The World Bank.

IMF (2007), “Financial Soundness Indicators: Experience with the Coordinated Compilation Exercise and Next Steps”, STA Dept.

Levine, R. and S. Zervos (1998), ‘Stock markets, banks and economic growth’, *American Economic Review*, 88, 537-58.

Peachey, Stephen and Alan Roe (2006): “Access to Finance; Measuring the Contribution of Savings Banks”, World Bank Savings Institute.

Perotti, E and A. Schwienbacher (2007): “The Political Origin of Pension Funding.” University of Amsterdam mimeo.

APPENDIX

Table 1: Robust regression results (2000-2006)*

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
	Private credit to GDP	Deposits to GDP	Net-interest margin	Stock market capitalization	Number of listed companies	Stock market turnover
Log GDP per capita	0.748 [0.018]***	0.641 [0.017]***	-0.585 [0.024]***	0.707 [0.031]***	0.601 [0.027]***	0.613 [0.031]***
Offshore	0.265 [0.075]***	0.75 [0.073]***	-0.119 [0.094]	0.71 [0.158]***	0.483 [0.113]***	-0.124 [0.137]
Log fuel	-0.177 [0.020]***	-0.148 [0.020]***	-0.004 [0.025]	0.05 [0.031]	-0.075 [0.026]***	-0.053 [0.030]*
Log poverty	-0.05 [0.019]***	-0.08 [0.019]***	0.126 [0.024]***	0.076 [0.030]**	-0.178 [0.026]***	-0.22 [0.030]***
Log population density	0.165 [0.019]***	0.309 [0.018]***	-0.221 [0.024]***	0.176 [0.027]***	0.109 [0.024]***	0.116 [0.027]***
Log population	0.045 [0.022]**	-0.018 [0.022]	0.039 [0.028]	0.202 [0.033]***	-0.438 [0.029]***	0.606 [0.033]***
Year-fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	987	978	988	674	706	681
Adjusted R-squared	0.68	0.7	0.48	0.49	0.6	0.5

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

* These are the usual pooled OLS regressions, except that all the variables (except Offshore) have been transformed. The transformation consists of breaking up the values into 25 quantiles and taking the inverse normal distribution of this uniform distribution.

Table 2-a: Regionally adjusted regression results for banks (2000-2006)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
		Log total private credit to GDP	Deposits to GDP	Log total assets of deposit money banks to GDP	Net-interest margin	Log interest spread	Log overhead to total assets	ATMs per 100,000 people	Log deposits per 1,000 people	Log bank branches per 100,000 people
Log GDP per capita	0.471 [0.026]***	0.491 [0.026]***	0.4 [0.021]***	0.46 [0.023]***	-0.244 [0.017]***	-0.25 [0.020]***	-0.152 [0.019]***	1.186 [0.119]***	0.986 [0.175]***	0.649 [0.098]***
Offshore	0.147 [0.082]*	0.146 [0.082]*	0.338 [0.065]***	0.255 [0.072]***	0.077 [0.055]	-0.285 [0.060]***	-0.021 [0.061]	-0.399 [0.532]	-0.102 [0.916]	0.511 [0.398]
Log fuel	-0.043 [0.008]***	-0.038 [0.008]***	-0.046 [0.007]***	-0.016 [0.007]**	0.008 [0.007]	0.004 [0.006]	-0.016 [0.008]**	-0.007 [0.053]	-0.026 [0.082]	-0.055 [0.042]
Log poverty gap	-0.145 [0.039]***	-0.213 [0.039]***	-0.071 [0.031]**	-0.117 [0.034]***	0.049 [0.026]*	0.041 [0.032]	-0.018 [0.029]	-0.05 [0.199]	-0.23 [0.267]	0.062 [0.153]
Log population density	0.082 [0.013]***	0.074 [0.013]***	0.149 [0.010]***	0.108 [0.011]***	-0.041 [0.008]***	-0.041 [0.010]***	-0.034 [0.009]***	-0.028 [0.057]	0.065 [0.086]	0.032 [0.049]
Log population size	0.015 [0.012]	0.007 [0.012]	-0.013 [0.009]	0.028 [0.010]***	0.033 [0.008]***	-0.078 [0.009]***	0.032 [0.009]***	-0.086 [0.060]	0.042 [0.106]	0.031 [0.050]
GDP per capita * population size	-0.006 [0.002]***	0.004 [0.002]*	0 [0.002]	-0.005 [0.002]***	0.003 [0.001]**	-0.002 [0.003]	0.002 [0.002]	0.004 [0.007]	-0.041 [0.060]	-0.008 [0.006]
Region==EAP	0.172 [0.106]	0.285 [0.106]***	0.428 [0.082]***	0.275 [0.092]***	-0.287 [0.075]***	-0.157 [0.080]*	-0.481 [0.084]***	1.199 [0.447]***	1.115 [0.664]	-0.11 [0.379]
Region==ECA	-0.559 [0.082]***	-0.601 [0.082]***	-0.257 [0.064]***	-0.383 [0.071]***	0.276 [0.053]***	0.026 [0.067]	0.342 [0.059]***	0.63 [0.317]*	0.98 [0.494]*	0.06 [0.278]
Region==LAC	-0.014 [0.082]	0.103 [0.082]	0.121 [0.064]*	0.076 [0.071]	0.526 [0.054]***	0.157 [0.066]**	0.579 [0.061]***	0.785 [0.353]**	0.619 [0.522]	-0.251 [0.298]
Region==MENA	0.058 [0.102]	0.098 [0.102]	0.558 [0.080]***	0.318 [0.088]***	-0.206 [0.062]***	-0.297 [0.077]***	-0.57 [0.069]***	0.138 [0.432]	0.778 [0.591]	0.161 [0.376]
Region==SA	0.134 [0.126]	0.176 [0.126]	0.46 [0.096]***	0.16 [0.107]	-0.584 [0.092]***	-0.318 [0.106]***	-0.643 [0.102]***	-0.588 [0.603]	1.081 [0.950]	0.316 [0.496]
Region==SSA	-0.117 [0.120]	0.029 [0.121]	0.159 [0.094]*	0.095 [0.104]	0.113 [0.078]	0.025 [0.095]	0.256 [0.086]***	0.573 [0.540]	0.896 [0.840]	-0.597 [0.463]
Year-fixed effect?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	983	980	981	983	985	819	992	89	54	97
Adjusted R-squared	0.69	0.7	0.72	0.71	0.66	0.51	0.57	0.83	0.6	0.71

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2-b: Regionally adjusted regression results for stock markets (2000-2006)

	Model (11)	Model (12)	Model (13)	Model (14)	Model (15)	Model (16)	Model (17)	Model (18)
	Stock market capitalization	Log value traded	Number of listed companies	Stock market cap. of 10 largest firms	Percentage of closely held shares	Value public offerings to GDP	Stock price synchronicity	Stock market turnover
Log GDP per capita	0.777 [0.051]***	1.357 [0.081]***	0.482 [0.054]***	-0.03 [0.027]	0.048 [0.055]	-0.138 [0.234]	-0.013 [0.056]	0.539 [0.058]***
Offshore	0.306 [0.201]	0.285 [0.319]	0.862 [0.188]***	-0.428 [0.087]***	-0.645 [0.144]***	1.131 [0.641]*	0.284 [0.146]*	-0.047 [0.201]
Log fuel	0.004 [0.023]	-0.028 [0.037]	-0.03 [0.024]	-0.015 [0.013]	0.034 [0.028]	0.065 [0.094]	-0.018 [0.031]	-0.011 [0.025]
Log poverty gap	-0.283 [0.077]***	-0.553 [0.127]***	-0.126 [0.081]	0.142 [0.035]***	-0.062 [0.078]	0.822 [0.368]**	-0.241 [0.079]***	0.018 [0.089]
Log population density	0.109 [0.022]***	0.079 [0.035]**	0.057 [0.024]**	-0.011 [0.010]	0.067 [0.015]***	0.109 [0.050]**	0.078 [0.018]***	-0.016 [0.025]
Log population size	0.104 [0.023]***	0.659 [0.038]***	-0.37 [0.025]***	-0.01 [0.011]	0.044 [0.023]*	0.035 [0.072]	0.123 [0.024]***	0.509 [0.026]***
GDP per capita * population size	-0.004 [0.003]	-0.018 [0.006]***	0.008 [0.004]**	-0.017 [0.001]***	-0.015 [0.002]***	-0.009 [0.006]	-0.007 [0.002]***	-0.014 [0.004]***
Region==EAP	0.994 [0.189]***	0.402 [0.309]	-0.113 [0.207]	-0.096 [0.086]	0.62 [0.163]***	-1.024 [0.646]	-0.047 [0.164]	-0.328 [0.218]
Region==ECA	-0.459 [0.139]***	-0.471 [0.225]**	0.131 [0.152]	0.002 [0.060]	0.554 [0.119]***	-1.919 [0.464]***	-0.216 [0.118]*	0.032 [0.156]
Region==LAC	0.429 [0.146]***	-1.267 [0.236]***	-0.619 [0.153]***	-0.079 [0.066]	0.637 [0.118]***	-1.534 [0.454]***	-0.057 [0.123]	-1.68 [0.163]***
Region==MENA	0.408 [0.163]**	-0.073 [0.264]	-0.14 [0.173]	-0.01 [0.073]	0 [0.000]	0.045 [0.730]	-0.353 [0.195]*	-0.192 [0.182]
Region==SA	0.584 [0.248]**	1.029 [0.396]***	0.723 [0.264]***	-0.3 [0.105]***	0.355 [0.206]*	-1.614 [0.806]**	-0.107 [0.207]	0.515 [0.278]*
Region==SSA	1.119 [0.219]***	0.574 [0.356]	-0.573 [0.234]**	-0.21 [0.105]**	0.262 [0.184]	-0.305 [0.644]	-0.224 [0.202]	-1.008 [0.252]***
Year-fixed effect?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	666	667	700	362	263	282	292	671
Adjusted R-squared	0.58	0.7	0.64	0.5	0.56	0.23	0.35	0.65

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2-c: Regionally adjusted regression results for bond markets (2000-2006)

	Model (19)	Model (20)	Model (21)	Model (22)	Model (23)
	Private bond market capitalization	Turnover private bond market	Value of new private bonds to GDP	Public bond market capitalization	Turnover public bond market
Log GDP per capita	1.638 [0.190]***	0.366 [0.678]	1.04 [0.376]***	0.319 [0.114]***	-0.014 [1.199]
Offshore	1.463 [0.446]***	-0.512 [1.230]	-0.83 [1.172]	0.421 [0.277]	-5.437 [3.287]
Log fuel	-0.372 [0.069]***	0.191 [0.412]	0.179 [0.172]	-0.021 [0.042]	0.059 [0.765]
Log poverty gap	-1.125 [0.323]***	0.692 [1.143]	1.579 [0.612]**	-0.491 [0.166]***	-0.654 [2.113]
Log population density	-0.05 [0.033]	-0.115 [0.250]	0.237 [0.111]**	0.08 [0.024]***	-0.636 [0.314]**
Log population size	0.121 [0.059]**	0.24 [0.232]	-0.318 [0.139]**	0.162 [0.035]***	-0.618 [0.619]
GDP per capita * population size	-0.002 [0.004]	-0.038 [0.016]**	0.026 [0.014]*	-0.002 [0.003]	0.293 [0.169]*
Region==EAP	1.669 [0.503]***	-1.316 [2.000]	1.622 [1.134]	-0.262 [0.304]	-2.225 [3.991]
Region==ECA	-0.167 [0.326]	1.049 [1.256]	-0.369 [0.772]	-0.002 [0.178]	0.977 [2.554]
Region==LAC	0.754 [0.368]**	-0.525 [1.588]	2.391 [0.763]***	-0.263 [0.219]	-0.568 [2.723]
Region==MENA	0 [0.000]	-0.133 [2.774]	3.369 [1.665]**	1.316 [0.280]***	2.308 [5.173]
Region==SA	1.763 [0.815]**	0.599 [2.341]	2.847 [1.310]**	0.277 [0.411]	4.741 [4.379]
Region==SSA	1.661 [0.456]***	0 [0.000]	3.306 [1.286]**	0.248 [0.286]	2.25 [6.103]
Year-fixed effect?	Yes	Yes	Yes	Yes	Yes
Observations	242	54	172	282	52
Adjusted R-squared	0.75	0.1	0.35	0.38	0.06

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2-d: Regionally adjusted regression results for institutional investors (2000-2006)

	Model (24)	Model (25)	Model (26)	Model (27)
	Assets of mutual funds to GDP	Assets of insurance companies to GDP	Assets of pension funds to GDP	Assets of instit. investors to GDP
Log GDP per capita	0.685 [0.134]***	0.795 [0.122]***	0.585 [0.195]***	0.908 [0.125]***
Offshore	-1.342 [0.657]**	0.225 [0.563]	-0.797 [0.895]	-0.537 [0.561]
Log fuel	-0.176 [0.061]***	-0.17 [0.054]***	-0.147 [0.083]*	-0.222 [0.053]***
Log poverty gap	-0.197 [0.199]	-0.083 [0.188]	-0.269 [0.285]	-0.478 [0.181]***
Log population density	-0.004 [0.064]	0.149 [0.055]***	-0.154 [0.084]*	0.009 [0.053]
Log population size	0.185 [0.069]***	0.034 [0.060]	-0.078 [0.091]	-0.017 [0.057]
GDP per capita * population size	-0.007 [0.008]	0.001 [0.007]	0.01 [0.011]	0.002 [0.007]
Region==EAP	-0.003 [0.587]	0.659 [0.513]	1.815 [0.813]**	1.578 [0.514]***
Region==ECA	-1.325 [0.377]***	-0.343 [0.337]	-1.179 [0.518]**	-1.115 [0.327]***
Region==LAC	-0.946 [0.397]**	-0.064 [0.356]	0.154 [0.563]	-0.097 [0.354]
Region==MENA	-0.868 [0.482]*	0.067 [0.425]	0.319 [0.659]	0.021 [0.416]
Region==SA	-1.329 [0.677]*	-0.339 [0.589]	0.287 [0.938]	-0.318 [0.589]
Region==SSA	-0.527 [0.604]	1.069 [0.573]*	0.875 [0.912]	1.198 [0.585]**
Year-fixed effect?	Yes	Yes	Yes	Yes
Observations	99	98	99	98
Adjusted R-squared	0.69	0.68	0.37	0.75

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Overview of Regional effects Relative to the Rest of the World

	Bank Credit / GDP	Bank Deposits / GDP	Net Interest Margin / Assets	ATMs / 100,000 People	Stock Mrkt Cap / GDP	Listed Firms / Mln. People	Turnover Ratio	Private Bonds / GDP	Public Bonds / GDP	Assets Institutional Investors / GDP
HI	0.18 <i>2.52</i>	-0.05 <i>-0.90</i>	-0.34 <i>-6.52</i>	-0.76 <i>-2.72</i>	0.23 <i>1.82</i>	0.25 <i>1.85</i>	0.73 <i>4.80</i>	0.08 <i>0.30</i>	0.09 <i>0.63</i>	0.94 <i>2.72</i>
SSA	-0.14 <i>-2.23</i>	-0.16 <i>-3.13</i>	-0.12 <i>-2.49</i>	-0.41 <i>-1.22</i>	0.40 <i>2.98</i>	-0.24 <i>-1.65</i>	0.23 <i>1.30</i>	0.84 <i>2.47</i>	0.37 <i>1.72</i>	0.96 <i>2.45</i>
EAP	0.28 <i>4.24</i>	0.25 <i>4.80</i>	-0.37 <i>-6.10</i>	0.65 <i>1.98</i>	0.58 <i>4.44</i>	0.04 <i>0.28</i>	-0.06 <i>-0.34</i>	0.71 <i>3.07</i>	-0.27 <i>-2.10</i>	1.58 <i>3.24</i>
MENA	0.23 <i>2.63</i>	0.54 <i>7.70</i>	-0.33 <i>-5.84</i>	-0.32 <i>-0.92</i>	0.35 <i>2.65</i>	-0.15 <i>-1.10</i>	-0.03 <i>-0.18</i>	0.00	0.99 <i>4.25</i>	0.54 <i>1.39</i>
SA	0.26 <i>2.68</i>	0.32 <i>4.32</i>	-0.67 <i>-8.29</i>	-0.88 <i>-1.79</i>	-0.14 <i>-0.76</i>	0.98 <i>5.05</i>	1.15 <i>5.18</i>	-0.24 <i>-0.55</i>	0.24 <i>1.28</i>	-0.25 <i>-0.44</i>
LAC	0.04 <i>0.89</i>	0.01 <i>0.26</i>	0.46 <i>11.94</i>	0.27 <i>1.31</i>	-0.11 <i>-1.13</i>	-0.43 <i>-4.33</i>	-1.18 <i>-10.67</i>	-0.22 <i>-1.25</i>	-0.09 <i>-0.78</i>	-0.36 <i>-1.50</i>
ECA	-0.57 <i>-9.22</i>	-0.48 <i>-9.71</i>	0.36 <i>8.55</i>	0.37 <i>1.60</i>	-0.74 <i>-7.69</i>	0.25 <i>2.30</i>	0.39 <i>3.13</i>	-0.90 <i>-3.45</i>	-0.16 <i>-1.49</i>	-1.25 <i>-5.00</i>

The table displays the coefficients of the basic regressions where a single region dummy (1 if in the region, 0 otherwise) was added. The number in italics under the coefficient is the t-statistic.

Table 4: Variance decomposition

Variance of:	Fraction accounted for:							
	Residual	GDP per capita	Offshore	Fuel	Poverty	Population density	Population	GDP per capita *population
Private credit to GDP	0.35	0.63	0.01	-0.01	0.01	0.03	0.00	-0.01
Deposits to GDP	0.37	0.50	0.02	0.00	0.00	0.10	0.01	0.00
Net-interest margin	0.46	0.49	-0.01	-0.01	0.01	0.05	0.01	-0.01
Stock market capitalization	0.48	0.43	0.00	0.03	0.00	0.05	0.00	0.00
Number of listed firms	0.43	0.32	0.01	0.00	0.02	0.02	0.21	0.00
Stock market turnover	0.39	0.32	0.02	0.01	0.07	0.01	0.23	-0.03
Assets institutional investors to GDP	0.39	0.60	0.00	0.00	0.01	0.00	0.00	0.00
Private bonds to GDP	0.31	0.66	0.03	0.06	-0.01	0.01	-0.05	-0.01
Public bonds to GDP	0.55	0.11	0.01	0.11	0.01	0.21	0.00	0.00
Number of ATMs per 100,000 people	0.18	0.79	0.00	0.02	0.00	0.00	0.01	0.01

Table 5: Dynamic Analysis (1980-2006)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
	Log private credit via deposit money banks to GDP	Log deposits to GDP	Log stock market capitalization	Log turnover	Log net-interest margin
Time (t=0 in 1960)	-0.205	-0.041	-2.09	0.405	0.354
	[0.059]***	[0.050]	[0.261]***	[0.310]	[0.325]
Time squared	0.005	-0.001	0.055	-0.015	-0.008
	[0.002]**	[0.002]	[0.008]***	[0.009]	[0.008]
Log GDP per capita	0.305	0.278	-0.069	0.53	0.203
	[0.021]***	[0.017]***	[0.103]	[0.125]***	[0.163]
Log GDP/capita * time	0.013	0.006	0.058	0.003	-0.041
	[0.004]***	[0.003]**	[0.014]***	[0.016]	[0.018]**
Log GDP/capita * time squared	0	0	-0.001	0	0.001
	[0.000]*	[0.000]	[0.000]***	[0.001]	[0.000]**
Offshore	0.112	0.183	3.969	1.363	-2.003
	[0.127]	[0.106]*	[0.522]***	[0.598]**	[1.057]*
Offshore * time	-0.008	-0.006	-0.307	-0.087	0.182
	[0.022]	[0.018]	[0.077]***	[0.086]	[0.115]
Offshore * time squared	0.001	0.001	0.007	0.001	-0.004
	[0.001]	[0.001]	[0.003]***	[0.003]	[0.003]
Log fuel	-0.103	-0.094	-0.556	-0.292	-0.421
	[0.026]***	[0.021]***	[0.096]***	[0.111]***	[0.172]**
Log fuel * time	0.003	0.006	0.05	0.017	0.039
	[0.004]	[0.003]**	[0.012]***	[0.014]	[0.018]**
Log fuel * time squared	0	0	-0.001	0	-0.001
	[0.000]	[0.000]	[0.000]***	[0.000]	[0.000]**
Log population density	0.019	0.075	0.322	0.394	-0.485
	[0.022]	[0.018]***	[0.093]***	[0.106]**	[0.153]***
Log population density * time	0.007	0.006	-0.019	-0.036	0.043
	[0.004]**	[0.003]**	[0.012]	[0.014]***	[0.017]***
Log population density * time squared	0	0	0	0.001	-0.001
	[0.000]	[0.000]	[0.000]	[0.000]**	[0.000]**
Log poverty	-0.137	-0.159	0.878	0.172	0.623
	[0.050]***	[0.042]***	[0.196]***	[0.249]	[0.416]
Log poverty * time	-0.003	-0.006	-0.087	-0.05	-0.058
	[0.008]	[0.007]	[0.026]***	[0.032]	[0.044]
Log poverty * time squared	0	0.001	0.002	0.001	0.002
	[0.000]	[0.000]**	[0.001]***	[0.001]	[0.001]
Log population	-0.02	-0.031	-0.786	0.544	0.098
	[0.018]	[0.015]**	[0.093]***	[0.109]***	[0.138]
Log population * time	0.004	-0.002	0.098	-0.02	-0.011
	[0.003]	[0.003]	[0.012]***	[0.014]	[0.015]
Log population * time squared	0	0	-0.003	0.001	0
	[0.000]	[0.000]	[0.000]***	[0.000]*	[0.000]
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	3424	3436	1676	1663	1932
Adjusted R-squared	0.6	0.62	0.52	0.49	0.45
Standard errors in brackets					
* significant at 10%; ** significant at 5%; *** significant at 1%					