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FINANCIAL INFRASTRUCTURE POLICY AND RESEARCH SERIES

FINANCIAL INFRASTRUCTURE

Building Access Through Transparent and Stable Financial Systems



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Foreword

How do financial institutions process payments, check a potential borrower's past experiences with credit or evaluate the suitability of a security interest to be used for a loan? For many consumers in the financial marketplace, the answers to these questions are taken for granted, just part of the "black box" of tools and technologies used by lenders as they transfer funds between institutions or decide on credit applications. In this "black box" are the different elements of a country's financial infrastructure.

The World Bank Group is a leader in financial infrastructure development in emerging markets, including payment systems and remittances, credit reporting and secured lending. Moreover, the Bank Group is intensifying its commitment to promote and disseminate the policy and research debate on these and other topics within the scope of financial infrastructure, including corporate governance, auditing and accounting standards and practices, and financial literacy.

For this purpose, the Financial Infrastructure Series was launched in mid-2008 to host original contributions in the form of policy notes, studies, and essays led by World Bank Group experts, as well as initiatives carried out in cooperation with or by other experts and relevant institutions in the various fields of financial infrastructure.

The report, *Financial Infrastructure. Building Access Through Transparent and*

Stable Financial Systems draws largely on the Bank Group's efforts in the following key areas: payment and securities settlement systems, remittances, credit reporting, and secured transactions and collateral registries. It defines the space, and presents a literature review, an estimate of the size of the market, develops an index for benchmarking financial infrastructure, and discusses the implications of financial infrastructure for access, transparency, better governance and stability in financial markets. This report is aimed at policy makers, regulators, practitioners, academics as well as other interested parties.

Financial Infrastructure broadly defined comprises the underlying foundation for a country's financial system. It includes all institutions, information, technologies, rules and standards that enable financial intermediation. Poor financial infrastructure in many developing countries poses a considerable constraint upon financial institutions to expand their offering of financial services – credit, savings and payment services – to underserved segments of the population and the economy. It further creates risks for the financial system as a whole, as poor payment and settlement systems may exacerbate financial crises, while the absence of credit bureaus in conjunction with strong credit growth may lead to one. Key financial infrastructure elements that every developed market can rely on, such as credit

bureaus, enforcement of collateral and functioning payment, securities settlement, and remittance systems, often do not exist or are underdeveloped in emerging markets. These key elements are vital to facilitating greater access to finance, improving transparency and governance, as well as safeguarding financial stability in global financial markets.

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Overview

Financial Infrastructure (FI) is a core part of all financial systems. The quality of financial infrastructure determines the efficiency of intermediation, the ability of lenders to evaluate risk and of borrowers to obtain credit, insurance and other financial products at competitive terms. Strengthening financial infrastructure takes time, resources and political will, however, and so important differences persist across countries.

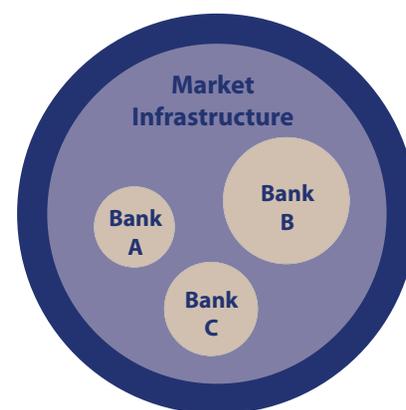
Access to finance is the result of a complex interplay of different financial intermediaries, the right kinds of financial infrastructure, and a sound legal and regulatory framework. Expanding access to finance and financial services to those at the bottom of the pyramid entails a two-pronged strategy – (i) firstly that of creating and improving the different financial infrastructure elements, such as credit bureaus, payment and securities settlement systems, remittances and collateral registries, as well as creating an enabling legal and regulatory framework to allow the proper functioning of these various financial infrastructure elements; and (ii) working with the various financial institutions themselves (retail/SME banks, microfinance, housing, leasing), and developing institutional capacity within. Today's financial market economy abounds with innovations in both products and delivery channels that defy the traditional boundaries within which financial markets operated. Innovations in branchless banking, mobile banking, and correspondent banking models, are all thriving

today and promise to lead the way in defining the landscape of financial markets going forward. These innovations usher in new benefits through increased access points that make products and services more affordable and available to all. Along with the benefits are the inherent risks involved with the development of new products and delivery channels, some of which have culminated in today's crisis, and the inherent need for adequate regulation and oversight.

Credit Bureaus

In the Philippines, just 5% of the population is included in the private credit bureau. The corresponding figures for India and the Russian Federation are double that of the Philippines—10%—but still quite low. Credit bureau coverage is substantially higher, however, in some developing countries including Slovakia (40%), South Africa (65%), Mexico (71%), El Salvador (83%) and Argentina (100%). While Argentina's full coverage of the population is unusual for developing countries, it is not unusual for developed ones. Australia, Canada, Iceland, Ireland, New Zealand, Norway, Sweden, the U.K., and the U.S. all have private credit bureau systems which cover their entire populations.¹

FIGURE 1



Credit bureaus, collateral registries, and payment, remittance and securities settlement systems are all vital parts of a country's financial infrastructure. When financial infrastructure is available, efficient and reliable, the cost of financial intermediation falls. Financial products and services become accessible to greater numbers of citizens and lenders and investors have greater confidence in their ability to evaluate and guard against risk.

Definition of financial infrastructure

The underlying foundation for the financial system including the institutions, information, technologies and rules and standards which enable financial intermediation.

Payment, Remittance and Securities Settlement Systems

The development of payment systems infrastructure also varies greatly between countries. Large value (typically inter-bank) payments handled on real time gross settlement (RTGS) payment systems are typically many multiples of GDP in developed countries. In the U.K. the multiple is 91 times GDP, in France 75, in Japan 50 and in the U.S. 43. These figures plummet for most developing countries with many below 10 times GDP and some around one including Bolivia (1.2 times), Georgia (1.4) and Lesotho (0.9). Other payment system indicators show similar divergence across countries including availability of ATMs and POS terminals and numbers of payment cards in circulation.² Payment system development and reforms also directly impact the efficiency and cost of remittances. The cost of sending remittances to Latin America, South Asia, and the Commonwealth of Independent States (CIS) countries falls below the international average (10.5% for US\$200, and 6.5% for US\$500), whereas costs to Africa are relatively high.³

Institutional arrangements for securities settlement reflect the extent of capital market (and broader economic) development. Most high-income countries have depositories for securities immobilization (83% globally, including all but one country in the EU), whereas for low-income countries, the figure is only slightly more than half (57%). Wealthier countries with more developed capital markets also tend to have one depository for all types of securities (as compared to fragmented systems with multiple depositories), have shorter settlement cycles, and are more likely to have a real-time interface with the payment system.⁴

Collateral

The ability of lenders to use movable collateral as security for a loan also depends on the country. Data from Doing Business show that borrowers can, at least theoretically, use movable collateral to secure a loan while retaining possession of the assets in most countries (170/181). A much smaller percentage, however, have the requisite legal framework and functioning modern collateral registries that are necessary to make lending against movables truly viable for creditors, and most of these are found in developed economies. Of the 80 countries with the least developed legal rights index in Doing Business, which relates to the use of collateral, only 10 have a unified national registry organized by asset type and borrower's name or identification number. Fewer than half of all countries (about 40%) give secured creditors preference during bankruptcies or reorganizations, and again most of these countries have more developed economies.⁵

Why Financial Infrastructure Is Important

Why is financial infrastructure so important? Financial markets have a critical role in economic development and stability because they provide an efficient mechanism for evaluating risk and return to investment, and then managing and allocating risk and resources across the economy.⁶ Credit bureaus provide the information needed for accurate and timely risk analysis, especially for consumer credit. Collateral systems provide information to alert lenders to the potential existence of prior interests in collateral and give creditors who register assurance of their priority in the collateral, reducing risk to lenders and facilitating access to credit. Payment, remittance and securities settlement systems facilitate the discharge of financial obligations and the safe transfer of funds across distances and institutions.

Financial Infrastructure and the Current Crisis

Financial infrastructure can help to reduce risk and increase efficiency in financial markets, but it can also sometimes contribute to situations where excessive risks are taken. This seems to have been the case in the current financial crisis. Think of FI as the system of roads upon which financial intermediation occurs. Better roads reduce the time and cost of travel but they also increase the potential speed, which has inherent risks. For example, fixed collateral can contribute to a "leverage cycle" where assets are used to increase lending which increases asset prices, causing a bubble. Credit bureau data and other financial information have made possible increasingly complex models of consumer behavior. These types of models were behind many of the derivative products which helped to create the current crisis.

Financial Infrastructure Reforms Needed Today—Developing "Rules of the Road"

The current crisis is not a reason to stop building financial infrastructure. In fact, the importance of transparency and disclosure, of a sound framework for secured lending, and of modern payment systems is especially great today as countries face severe economic challenges. FI strengthens financial markets which in turn support business investment and consumption expenditures and help reignite economic growth.

The lessons of the current crisis, however, show the importance of establishing clear "rules of the road"—the legal and regulatory framework—and oversight—for finance. Regulators have limited resources and limited reach, so market participants must also help to enforce the traffic rules. Investors and borrowers need to be educated and pro-active in seeking information on the products they buy. Technology can also be enlisted to strengthen financial infrastructure, but it must be used sensibly, not to justify—or hide—excessive risk-taking as was the case with some of the derivatives modeling. For example, technology solutions could include

stability enhancing features such as risk monitoring and could promote diversification of assets and providers.

This Report

Financial Infrastructure discusses the importance of credit bureaus, collateral frameworks, and payment, remittance, and securities settlement systems for financial intermediation. However, this report does not touch on all elements of financial infrastructure. Some important sources of financial information are not discussed, such as credit rating agencies, business credit reports, and corporate registries. Other important omissions include corporate governance and auditing and accounting practices and standards. As more data become available, this analysis will be able to be extended to a broader spectrum of financial infrastructure.

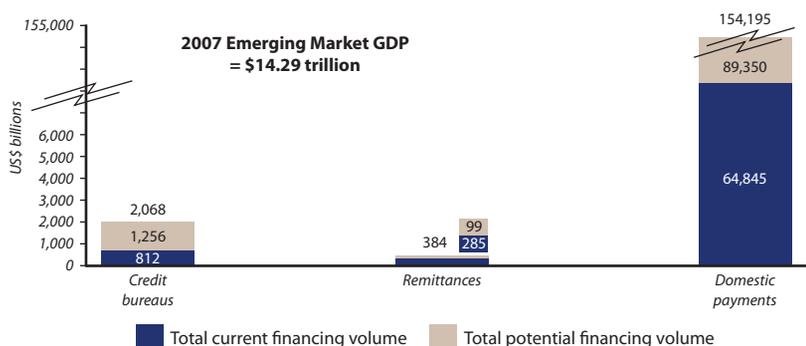
The elements of financial infrastructure offered here are typically out of view but support a majority of financial transactions. Literally billions of people are affected as they interact with the financial system, sending remittances, requesting a loan or opening a savings account. *Financial Infrastructure* provides estimates of number of consumers affected and transactions value for credit bureaus, payment systems and remittances. The report also presents an FI Index for benchmarking progress. The FI Index also includes elements of the legal framework and is used to evaluate the relationship between financial infrastructure and development goals such as stability, depth, efficiency, and access for financial markets. Finally, the report looks at financial infrastructure in the context of the current crisis, to better understand the reform priorities going forward.

NOTES

1. Data on credit bureaus from the “Getting Credit” section of Doing Business 2009 (World Bank).
2. World Bank, Payment Systems Worldwide: A Snapshot 2008.
3. Cirasino and Watson 2008.
4. World Bank, Payment Systems Worldwide: A Snapshot 2008.
5. Data on collateral registries and legal rights from the “Getting Credit” section of Doing Business 2009 (World Bank).
6. Demirgüç-Kunt and Levine 2008.

The Reach of Financial Infrastructure

FIGURE 2
Total potential financing volumes to be supported in emerging markets by financial infrastructure



Financial infrastructure supports every formal financial transaction from paying a bill, to buying a house, to saving for retirement. How significant is financial infrastructure in terms of transaction volume and number of people affected? Unfortunately there are no cross-country comprehensive data available on all elements of financial infrastructure so

it is not possible to provide a precise measure.

Estimates of financial infrastructure impact have been developed here based on data from several sources including the Doing Business project at the World Bank, the Global Payment Systems Survey (also World Bank), the Remittance Prices Worldwide Database

(World Bank) and the IFC's lending portfolio. These "back of the envelope" calculations, presented here, are based on raw data from these recent surveys and, when available, from empirical research on the impact of financial infrastructure. For example, the estimate of credit bureau impact uses an estimate of reductions in defaults taken from empirical studies using actual credit bureau data.⁷

Studies of financial infrastructure impact

Financial infrastructure is a part of many financial sector transactions as the above estimates show on a global level for emerging markets. Demonstrating the reach of financial infrastructure is just one step, however, in assessing its contribution to financial markets. Previous research has used country-specific data or, in some cases cross-country data, to analyze the impact of specific types of financial infrastructure (credit bureaus, payment systems, etc.) on access to credit, defaults or economic growth. Relatively few studies, however, have taken a comprehensive view of financial infrastructure and its role in financial markets.

One paper which addresses financial infrastructure more broadly is by Bossone, Mahajan and Zahir (2003). The authors find that in environments with weak FI, banks substitute for some of its roles such as information gathering, monitoring and contract enforcement. In exchange they collect quasi-monopoly rents from captive customers who find it difficult to reveal their quality to other lenders and funders. As financial infrastructure develops it promotes financial market growth and competition which leads to more efficient capital allocation and more options for consumers.

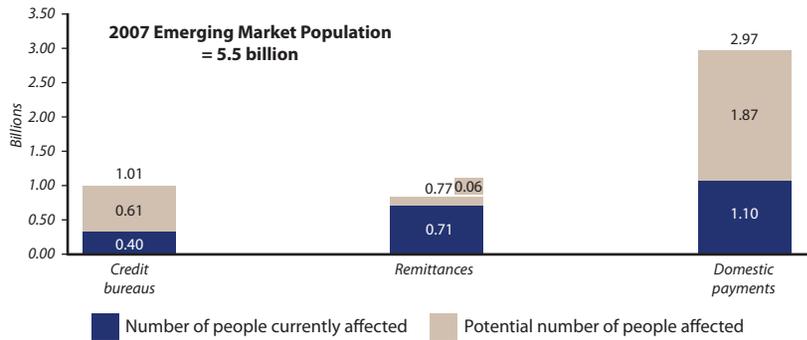
The methodology used in this document is based upon de Serres, Kobayakawa, Slok and Vartia (2006). The authors use data from Doing Business to demonstrate the relationship between elements of financial infrastructure

discussed here (credit bureaus and collateral frameworks) and financial development and growth. They also include legal and regulatory variables related to contract enforcement and bankruptcy, as well as measures of investor protection or corporate governance in their analysis.

The authors take a similar approach to Rajan and Zingales (1998) and evaluate whether firms that depend more on external finance are more prevalent in countries with better financial infrastructure. Their findings indicate that financial infrastructure significantly impacts both value-added and productivity growth by increasing finance for these firms. They find that approximately one percentage point of an industry's annual growth rate can be explained by financial development—a sizeable figure given that annual growth rates are only a few percentage points (2–4%) on average.

This brief extends the analysis in de Serres, et al., and uses the same variables from Doing Business. However, it also creates an index to capture the general level of financial infrastructure in a country. It then relates the level of financial infrastructure (using the index) with key indicators of financial sector performance such as default rates, interest rate spreads, and domestic credit to GDP. As such, it extends the earlier analysis to a wider range of financial performance measures.

FIGURE 3
Total numbers of people affected in emerging markets



The estimates in figure 2 show the tremendous size of financing and transactions volumes supported by financial infrastructure. The largest figure by far is that for payment systems, which refers to retail transactions.

In emerging markets, payments infrastructure supports flows of more than US\$64 trillion annually—nearly 6 times combined GDP in these markets—and this figure could more than double in the medium term. The values associated with the other types of FI are of a different magnitude, because they relate to credit provided, not transaction volumes, or to a specific segments of the payment system, for remittances. These figures are sizeable: credit bureaus, US\$812 billion and remittances, US\$285 billion. While remittances are projected to decline in the near term, financing volumes are projected to grow in the medium to long-term across all FI types.

Financial infrastructure is underdeveloped in many emerging markets, and non-existent in others. Potential financing volumes shown in figure 2 are the estimated amount of credit or transactions that will be supported by financial infrastructure if it is expanded to emerging markets where it does not currently exist or if the efficiency of existing financial infrastructure is further improved. The estimates are developed for the medium to long-term (a five to ten-year horizon).

The impact of financial infrastructure is also significant in terms of the number of people affected. To illustrate

this, figure 3 shows the current reach of financial infrastructure, including about 390 million people in emerging markets who are covered by credit bureaus, over 700 million who are affected by remittances, and over 1 billion by payment systems. Again, estimates of the number of people in emerging markets who have the potential to be positively affected are based on expected growth of financial infrastructure where it does not currently exist, and expected increases in the reach of existing financial infrastructure. Future growth is likely to increase these figures in some cases by 100% or more. Financial infrastructure is likely to support financial transactions for a majority of the world's population in the future.

NOTES

7. Credit bureau impact data based in part from findings reported in Barron and Staten (2003). Please see Data Notes for a more detailed explanation of the methodology.

Measuring Financial Infrastructure

FIGURE 4
FI Index components

Contract Enforcement	Access to Credit	Investor Protection	Bankruptcy Procedures
<ul style="list-style-type: none"> • Procedural efficiency of the judicial system • Time efficiency of dispute resolution • Cost efficiency of court procedures 	<ul style="list-style-type: none"> • Coverage of public/private registry • Credit information scope • Legal rights of borrowers and secured transactions infrastructure 	<ul style="list-style-type: none"> • Extent of disclosure • Extent of director liability • Ease of shareholder suits 	<ul style="list-style-type: none"> • Time efficiency of bankruptcy procedures • Cost efficiency of bankruptcy procedures • Recovery rate

An adequate legal framework, efficient enforcement mechanisms, availability of credit information and developed payment systems all contribute to the stability, depth, efficiency, and access in a financial system. This report develops a composite indicator to estimate the overall role of financial infrastructure across countries using data available in the World Bank Doing Business database.

Consistent data on the specific elements of financial infrastructure for a large number of countries are limited. Definitions and methodology for the assessment of various aspects of financial infrastructure is also an area open for research. As a first step, this report builds upon work done by de Serres, Kobayakawa, Slok, and Varita (2006), and uses indicators of financial infrastructure already collected in the Doing Business report to compile a Financial Infrastructure Index (FI Index) as shown in figure 4.⁸ While these indicators are limited in their ability to measure the full scale of financial infrastructure development and omit important areas such as payment systems, their main advantage is in providing a consistent methodology and availability of indicators for a large number of countries.

In this framework, the contract enforcement element measures the efficiency of the judicial system in resolving a commercial dispute. It covers the number of procedures, time, and cost of resolving a dispute. While the indicator is based on a case study of a reso-

lution of a commercial dispute it serves as a good proxy for enforcing creditor rights in cases of non-payment. The access to credit component measures the availability and scope of credit information and the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. The investor protection (IP) component (following the Doing Business lead we use IP here instead of corporate governance but the issues measured are the same) provides measures for the extent of disclosure, extent of director liability, and the extent to which shareholders can challenge transactions, including minority shareholder rights. This indicator is a good proxy for the corporate governance aspect of financial infrastructure. The last element is bankruptcy procedures reflecting the time, cost, and outcomes of bankruptcy proceedings. As more data become available the index can be expanded to include other

aspects of financial infrastructure such as payment systems, the status of auditing and accounting and securities market infrastructure.

The FI Index numbers provide a good first look at the status of financial infrastructure in countries and regions around the world (figure 5). Interestingly, emerging market regions do not show a significant variation in the value of the FI Index. Compared to the high income developed countries, all emerging markets fall into the .45–.55 band with Eastern Europe and Central Asia having the highest value of the Index and Sub-Saharan Africa the lowest. However most differences in the regional averages are statistically insignificant. A deeper look into the components of the Index reveals variation among the countries. The larger differences are found for the access to finance component, but even here, the difference is only significant between the top two regions (Eastern

Testing the impact of financial infrastructure using the FI Index

The next four sections use the FI Index to analyze the impact of financial infrastructure on stability, depth, efficiency and access, using proxy variables for these policy objectives such as percent of non-performing loans in the financial system for stability or domestic credit as a percentage of GDP for depth. Each section also discusses the potential

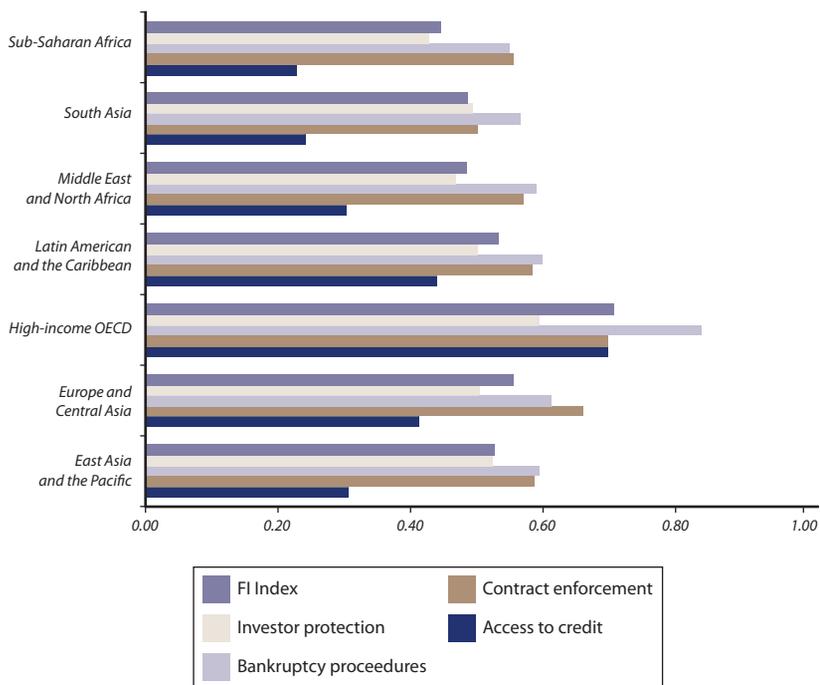
transmission mechanisms behind these results and the way that specific types of financial infrastructure contribute to the observed relationships in the FI Index regressions. When available, empirical studies of financial infrastructure components such as credit bureaus, collateral, etc., are cited.

Europe and Central Asia and Latin America and the Caribbean) as opposed to the other emerging market regions. The two indicators with more variation—credit information and creditor rights and bankruptcy procedures—are also the two indicators which are more focused on outcomes. While the Investor Protection indicator relies fully on the assessment of existing legal provisions, and contract enforcement combines legal provisions with outcomes (time and cost), credit information and bankruptcy are based on the outcomes of an implemented framework. The lack of variation that is found then is attributable in part to the anecdotal evidence that while many countries may have good laws on the books these laws may not be effectively enforced. To be better able to analyze the actual level of financial infrastructure on development, more data collection on outcomes is necessary.

NOTES

8. A more detailed discussion of the methodology used to create the Financial Infrastructure Index can be found in the Data Notes section at the end of this publication.

FIGURE 5
FI Index components by region



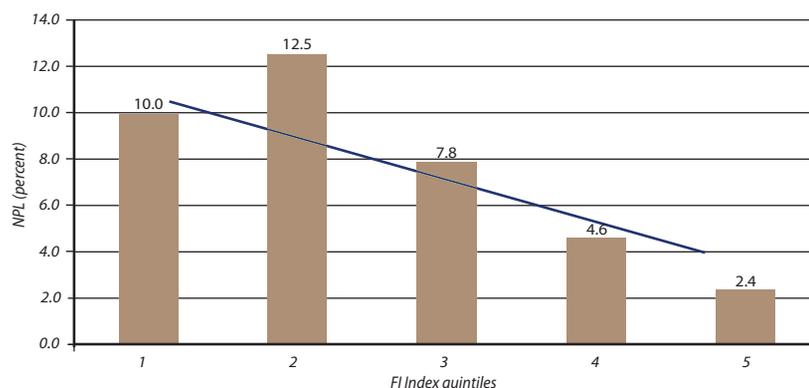
Financial System Soundness and Financial Infrastructure

The level of development of financial infrastructure is closely correlated with financial system soundness as measured by percent of non-performing loans (NPLs) in the financial system (figure 6) using NPL data through 2006. By improving the security and efficiency of the system and protecting investors' and creditors' rights, financial infrastructure promotes stability. And yet, the current financial crisis demonstrates that financial infrastructure alone is not sufficient to create stability. In fact, as will be discussed later in this brief in the section on financial infrastructure and the crisis, by enabling financial intermediation financial infrastructure may have contributed, in some cases, to excessive risk taking by financial market participants. The rest of this section will, however, discuss the ways in which financial infrastructure supports stability in financial markets.

Payment and securities settlement systems in particular have a strong bearing on financial stability. A sound payment system can mitigate financial crises by reducing or eliminating settlement risks related to financial markets transactions, in particular credit, liquidity and operational risks. The development of real time gross settlement (RTGS) systems, which eliminate counterparty risk, is one of the key responses to the growing awareness of the need for sound risk management.

Equally important is the soundness of the legal framework, in particular as it concerns settlement finality and protec-

FIGURE 6
Financial system soundness and financial infrastructure



tion of collateral arrangements. When the payment system functions properly, risk sharing among agents is more equitable, financial resources are distributed more efficiently, and there is greater confidence in the financial system—and in the very use of money.

Credit information systems and collateral registries reduce information asymmetries in the system. By pooling data in an efficient institutional mechanism they also support efficient credit allocation and strengthen risk management capabilities. Ideally, in modern financial markets such systems should serve three main functions: (i) to support credit underwriting and portfolio risk management by financial institutions; (ii) to serve as a basis for model development/scoring, including scores eventually used in securitizing assets; and (iii) to provide regulators with the information necessary for monitoring systemic risks including for capital adequacy standards under Basle II.

There are numerous studies using credit bureau data which provide evidence of the effectiveness of information sharing. For example, Barron and Staten (2003) show that comprehensive credit bureau data can reduce default rates significantly. In their study, default rates fell by more than 30% when credit bureau data included both bank and retail payment histories and both positive and negative information on borrowers.

There is also evidence that credit information promotes stability in the microfinance market. A study by Luoto,

McIntosh and Wydick (2007) related to the introduction of credit reporting in the Guatemalan microfinance sector found that default rates fell at one institution by 1–3 percentage points in the six months after operations of the bureau began. This is significant and in a competitive market, this would correspond to a reduction in interest rates of more than 2.5%.

Other areas of financial infrastructure are also important for financial sector stability and soundness. Adequate creditor rights and investor protections build confidence among creditors and investors in stable times and allow for effective resolution of disputes following a crisis. Better corporate governance has also been linked to less volatility in stock returns and higher average share prices.

Financial Market Depth and Financial Infrastructure

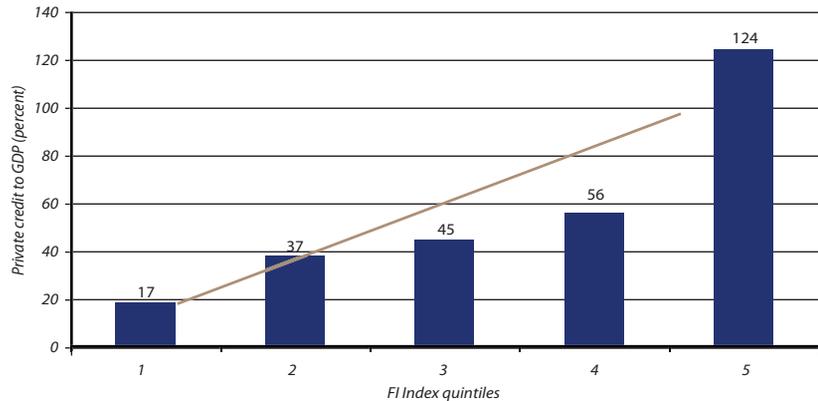
Better financial infrastructure is closely correlated with deeper financial markets, even after controlling for income per capita and other country-level characteristics (figure 7). Countries with weak financial infrastructure tend to have lower levels of credit as measured by the ratio of private credit to GDP. Each element of financial infrastructure has a potential to contribute to the deepening of the financial markets.

In the case of payment systems and securities clearing and settlement services, more modern infrastructure can improve the ability of the financial system to mobilize savings and increase the pool of assets available for investment. Moreover, new technologies, such as mobile banking, provide opportunities to capture funds digitally which can contribute to the monetary base in the economy.

Credit bureaus promote deeper financial systems by helping to overcome adverse selection and moral hazard related to asymmetric information in credit markets. As a result of cost savings through more efficient and accurate credit analysis and lower expected losses, lenders can increase their credit extension.

A recent study by Djankov, et. al. (2007) using data from Doing Business analyzes the relationship between information sharing and credit in 129 countries. It finds that the existence of credit registries is positively correlated with the depth of the financial market measured by private credit to GDP. The study also

FIGURE 7
Private credit to GDP and financial infrastructure

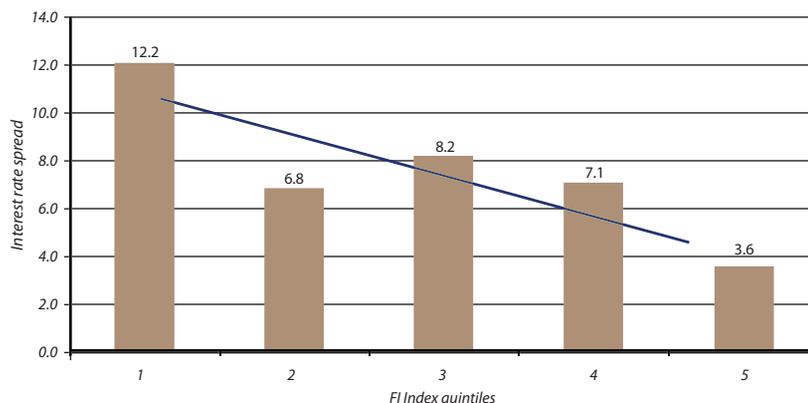


estimates that the private credit to GDP ratio is higher three to five years after the establishment of a credit registry and the difference is statistically significant.

In the case of collateral registries, they eliminate information asymmetries about collateral and thereby reduce the risk of lending secured by movables of all classes, including those not available in traditional systems. By making more effective use of existing classes of collateral and opening new classes of collateral to use by lenders, collateral registries promote financial deepening.

Efficiency of Financial Services and Financial Infrastructure

FIGURE 8
Interest rate spread and financial infrastructure

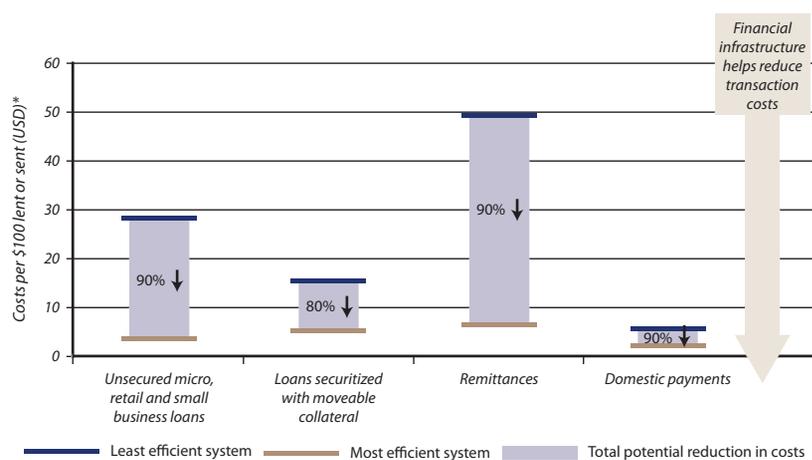


Financial infrastructure is critical for the efficient provision of financial services. The efficiency issue is especially evident in the case of payments, where the per-transaction cost is relatively easy to compare and savings from modernization efforts can be calculated. Efficiency improvements from the introduction of credit bureaus and/or credit scoring are also highly significant. Lenders armed

with these data can automate or semi-automate certain market segments (such as credit cards and small business loans) and can substantially reduce other procedures such as verifying identification, securing co-signers, and visiting homes or businesses, which reduces both the time and cost of extending credit. In the case of collateral registries, they can also increase efficiency by facilitating

credit evaluation for easily-valued assets such as new cars, computer equipment, and even commodities. In the case of non-payment, collateral registries and the systems which support them can help liquidate the asset and reduce loan losses. Similarly, good corporate governance and strong accounting and auditing standards promote more efficient evaluation of companies.

FIGURE 9
The potential for lower transaction costs using efficient financial infrastructure



Notes:

The chart serves to illustrate the range of possible reductions in transactions costs with the use of more efficient financial infrastructure. These ranges are meant to be indicative only. Actual cost reductions are contingent ultimately on the efficiency of the system and the level of competition in the market.

All costs are per \$100 lent or sent, except for remittance costs, which are per \$200 sent.

Credit Bureaus: Illustrates the range of costs associated with unsecured lending by micro and small business lenders and the potential for reduction from using credit reporting technologies. The upper limit indicates average lending costs for microfinance institutions based on 2006 MIX Market data for 798 MFIs in 96 countries. Lower limit is based on average small business lending costs in developed markets. Graph does not suggest that the entire reduction in costs is attributable to the use of credit bureaus alone.

Collateral: Lending costs on secured credit and leases. Based on World Bank expert estimates.

Remittances: Cost of sending remittances to remitter's home country. Estimates reflect the costs for sending \$200 in the most expensive corridor (South Africa to Zambia) and least expensive corridor (Saudi Arabia to Pakistan). Based on the World Bank Remittance Price Database.

Domestic payments: Cost of sending payments in country. Based on World Bank expert estimates.

Improvements in payments infrastructure can result in significant cost savings and efficiency improvements. Taking a sample of 12 European countries, Humphrey, Willeson, Bergendhal and Lindblom (2003) estimate that bank operating costs fell by about 24% between 1987 and 1999 due to payment system reforms, resulting in savings of US\$32 billion. Looking at the U.S. market, Bauer and Hancock (1995) and Bauer and Ferrier (1996) estimate that technological change was responsible for a reduction of about 10% per year in the cost of automatic clearing house (ACH) transfers since 1989 and for an annual reduction of about 8% for annual Fedwire processing costs in the early 1990s. These figures again correspond to massive savings for the system.

World Bank estimates suggest reductions in transactions costs of nearly 80 percent when starting from the highest cost margins for credit evaluations, collateralizing loans, remittances, and payments. Figure 9 presents these data. For example, one of the least efficient remittance corridors, according to the World Bank Remittance Price Website⁹ is South

Africa to Zambia which costs US\$49.81 per US\$200 sent. Compare this to sending money to Pakistan from nearby Saudi Arabia where the fee is only US\$5.00 per US\$200—a difference of 90%.

Overall, better financial infrastructure, such as efficient bankruptcy and contract enforcement mechanisms and more available credit information, reduce intermediation costs, stimulate competition, and lead to narrowing interest spreads.¹⁰ As figure 8 shows, countries with more developed financial infrastructure as measured by the FI Index exhibit higher levels of intermediation efficiency as demonstrated by lower interest rate spreads.

NOTES

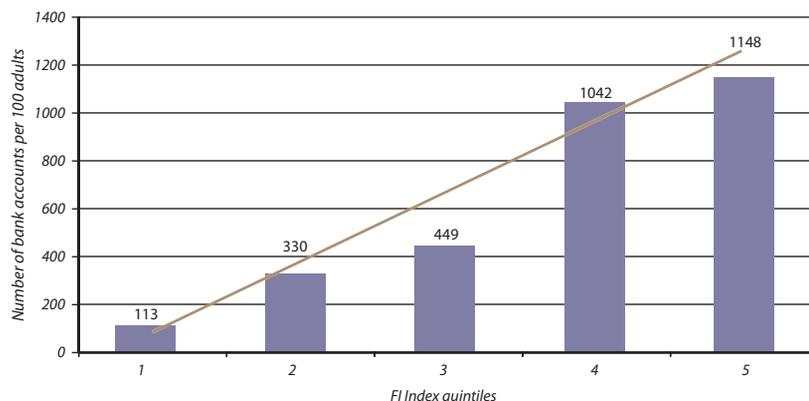
9. <http://remittanceprices.worldbank.org/>

10. See Beck, Demirgüç-Kunt, and Maksimovic (2004). The authors show that efficient credit registries reduce the impact of concentration in banking and increase access to finance.

Access to Financial Services and Financial Infrastructure

FIGURE 10

Access to financial services and financial infrastructure



Financial infrastructure is also critical for improving access to finance. First, financial infrastructure provides the framework for growth of the financial system. For example, innovations in payment systems can help reach customers where bank branches do not exist, as with mobile banking and other point-of-sale (POS) arrangements. Since the number of people with cell phones in many economies far exceeds the number of those with bank accounts, this new distribution mechanism offers great potential.

Financial infrastructure can also reduce transactions costs, allowing private lenders to serve more people, profitably. For example, strong creditor rights reduce the time and expense lenders face in dealing with delinquent or defaulted loans, and credit bureaus reduce the time and cost required for loan processing and due diligence. As

the costs of financial intermediation fall, smaller loans and account sizes become more attractive, allowing greater penetration of rural and low income communities by credit providers and financial services firms.

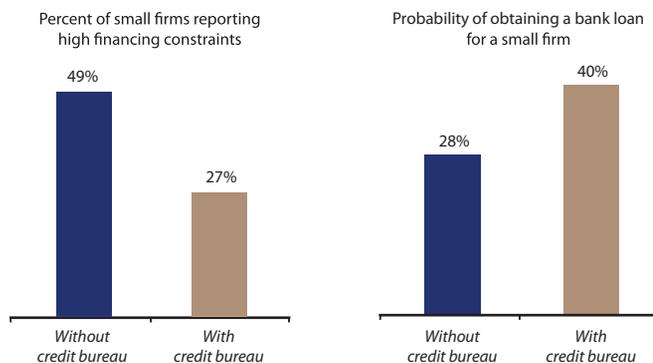
Credit bureaus, by reducing information asymmetries and stimulating competition in the market, are also supporting improved access to finance for good borrowers. Firms report fewer obstacles to financing where credit bureaus are more developed. Galindo and Miller (2001) and Galindo and Schiantarelli (2002) find that firms have improved access to finance where credit information is available. Credit information is also highly significant as a predictor of the level of factoring in an economy (weighted for GDP) and much stronger than creditor rights (Klapper 2006).

Another study by Love and Mylenko (2003) uses firm-level information to assess the correlations between the existence of credit registries and use of finance, and perceptions of financing constraints by borrowers. Using information on 5,000 firms in 51 countries the study finds that firms are less likely to report access to finance as a major problem in countries with credit bureaus. The study also finds that usage of credit is higher in countries with credit bureaus (see figure 11).

Collateral registries and collateral reform have also been shown to improve financial system performance, especially access to finance for SMEs. For example, in Romania in the five years after secured transactions reform the number of annual filings increased from only 95 in 2000 to 359,000 in 2005. While some of these were related to the 177,000 borrowers in the formal financial system,¹¹ many more were obtaining credit from non-bank lenders who further opened access to finance—especially for small firms. Research on the financing patterns of Spanish SMEs showed that firms pledging collateral had better access to long-term bank loans and young firms (which lacked credit histories) used collateral pledges to signal their quality. One of the most dramatic cases of improvement of financial system performance is the case of the registry for security in accounts receivable in the People's Republic of China. According to reports from the People's Bank of China, twenty months after the

FIGURE 11

Access to finance is easier in countries with credit bureaus



Love and Mylenko (2003).

on-line registry began operation, there had been nearly 75,000 lending transactions using receivables as collateral registered in the registry. These loans had a cumulative value of over 5 trillion Yuan (1 USD = 6.83 Yuan). Well over half of these transactions were made to SME borrowers. Nearly all middle and large lenders have developed receivables lending products. The success of the registry has been so dramatic that it is now being expanded to include notices of finance leases, which amount to a variation of secured lending. In general, in industrial countries borrowers with collateral get nine times the level of credit given their cash flow compared to borrowers without collateral. They also benefit from longer repayment periods (11 times longer) and significantly lower interest rates (50% lower).^{12,13}

At the same time, it is important to keep in mind the larger economic context for financial services. For example, a recent World Bank study showed that a critical factor in becoming “banked” was having a salaried job and regular income.¹⁴ Understanding the motivations for people to engage with the financial system or to use alternatives—both formal and informal—is important for making progress toward financial inclusion.

NOTES

11. Chaves, de la Peña, and Fleisig 2004.
12. Gonzalez, Lopez, and Saurina 2007.
13. Jimenez, Salas, and Saurina 2006.
14. World Bank *Banking the Poor*, 2008.

Financial Infrastructure and the Crisis

The financial crisis facing the world has complex roots, but some lessons about the causes are already emerging. Gaps in regulation and oversight were a critical factor in the crisis but are not our focus here. Rather, this section discusses the unintended role played by financial infrastructure in the development of the crisis. The following section then provides suggestions for financial infrastructure reforms.

Financial infrastructure can help to reduce risk and increase efficiency in financial markets, but it can also sometimes contribute to situations where excessive risks are taken. This seems to have been the case in the current financial crisis. Earlier, financial infrastructure was compared to a system of roads upon which financial intermediation occurs. Better roads reduce the time and cost of travel but they also increase the potential speed so accidents, when they happen, are more severe.

The role of collateral, and especially fixed collateral, in the current crisis is of particular importance. Fixed collateral can contribute to a “leverage cycle” where assets are used to increase lending which in turn feeds back into increases in asset prices, causing a bubble. Also, credit risks and the assets that are designed to mitigate these risks are correlated in a crisis, further adding to the potential for loss when a default occurs.

The efficiency of financial infrastructure related to contract enforcement and bankruptcy—the two legal/regulatory variables in the FI Index—may also have contributed to a lax lending environment. If lenders believe that foreclosure is relatively quick and low-cost then they will be more willing to lend to riskier borrowers. This positively affects access to credit but at the same time increases the level of risk in the system. When widespread failures occur and asset prices (and demand) fall, lenders can find themselves with illiquid assets and capital shortfalls.

Credit information and the empirical models based on these data also played a part in the current crisis. In some cases, such as “low-documentation” loans made to borrowers with little or no credit histories, the data (or lack of them) in credit bureaus was ignored. In other instances, however, there was overreliance on the ability of sophisticated empirical models to predict future risks. The very complexity of some of these models also contributed to the crisis, as they obscured the risks lenders were taking and discouraged scrutiny by professionals embarrassed to admit they didn’t understand them.

Finally, payment systems played a role in the extent of the current crisis by facilitating the increasingly global and complex web of financial intermediation.

These insights should not reduce enthusiasm for financial infrastructure. However, they do present challenges for policy makers who seek to increase the “speed” and efficiency of their “FI roads” while still protecting the safety of the financial system. The final section on reforms suggests ways to balance these sometimes competing objectives.

How to Reform

The reform agenda for financial infrastructure relates to a broad set of issues, including responding to the financial crisis with adequate measures for supervision and oversight, promoting the development of access to financial services as measured by the number of people served, the types and affordability of products and services delivered and the types of delivery channels and technologies leveraged. At a global level, the reform agenda entails the development of various standards and guidelines for the different areas of financial infrastructure that do not currently have any specific standards and consistent application of standards in cases where they do exist. At the country level, policy makers and regulators need to pay heed to reforming individual components of financial infrastructure, such as credit reporting, remittances, and payment systems, to meet global best practice standards. It is important to emphasize that this section is not advocating for the development of new regulatory institutions in all instances, but more importantly, a more consistent application of existing principles governing financial markets in general.

The various issues for consideration on the reform agenda are listed below:

Developing global standards and guidelines for financial infrastructure areas

Various standards and guidelines have already been developed over the course of time to cover different areas of finan-

cial infrastructure. These were developed based on proven best practices in countries with more developed financial infrastructure systems, and can often serve as a good sounding board for policy makers and regulators looking to reform in their own countries. Some of the financial infrastructure areas, such as payment, securities settlements, remittances, and secured transactions, are fairly advanced in this regard, and already have a wealth of standards and best practice guidelines to rely upon. These provide useful guidance for policy makers and regulators looking to reform these key financial infrastructure areas and include:

- Committee on Payment and Settlement Systems (CPSS): Core Principles for Systemically Important Payment Systems (Large-value payment systems)
- CPSS: Settlement risk in FX transactions (on foreign exchange settlement risks)
- CPSS-International Organization of Securities Commissions (IOSCO) Recommendations for Securities Settlement Systems
- CPSS-IOSCO Recommendations for Central Counterparties
- CPSS: Central Bank Oversight of Payment and Settlement Systems
- CPSS-World Bank General Principles for International Remittance Services
- CPSS: The Interdependencies of Payment and Settlement Systems
- CPSS: General Guidance for National Payment System Development

- CPSS: New Developments in Clearing and Settlement Arrangements for OTC Derivatives
- CPSS: Cross-border Collateral Arrangements
- United Nations Commission on International Trade Law (UNCITRAL): Legislative Guide on Secured Transactions

Other areas of financial infrastructure, on the other hand, including credit reporting, are yet to develop their own set of standards. Reform efforts in the area of financial infrastructure, going forward, require the development of standards for each of the key financial infrastructure areas.

Regulation and oversight in response to the crisis

The current crisis has focused attention on gaps and failures in regulation and oversight of financial markets. There is widespread agreement that more effective oversight could have identified problems earlier and potentially reduced the extent of the current crisis. In broad terms, priorities for regulatory reform for FI are the same as those for the financial sector as a whole: increasing transparency and disclosure; limiting conflicts of interest and incentives problems; and establishing authority for oversight of complex systems which may include unified supervision.

There are some valid questions, however, about the ability of regulations and regulators to stay ahead of innovation in the financial marketplace. Regulations

and oversight are a critical part of the reform agenda but must be accompanied by other important changes in the system involving both providers and consumers. These changes include enhanced transparency and disclosure, strengthening business ethics and developing financial capability in the population to create more informed and critical financial consumers.

The crisis also provides a learning opportunity for even the most developed markets that have been shown to be no less susceptible to it. Past crises have taught us, however, to exercise caution while advocating for new laws and regulations that threaten to overburden the financial sector and stifle innovation and the development of financial markets in general. In other words, regulators and policy makers should strike a fine balance between the two competing objectives of oversight and supervision on the one hand, and making financial services affordable and available to all on the other hand.

Reforming access to financial services

Ultimately, financial infrastructure in any given country should aim to maximize the coverage of financial products and services in terms of the numbers of people reached, and through efficiency and reduced transactions costs promote the development of a wider range of client-focused and affordable products. Reforms on financial infrastructure should keep in mind the need for simultaneous reform in existing systems that enable access to financial products and services.

Keeping these broader objectives in mind, from the perspective of policy makers and regulators, reforming access to financial services include the following:

- Developing more inclusive legal and regulatory frameworks. Reforms to existing credit reporting laws or secured transactions frameworks, for instance, can enhance the information base upon which lenders make lending decisions, and expand the provision of financial products

and services to the underserved and unbanked;

- As in other areas of regulation, ensuring proportionate policies on financial integrity. For example, proportionate regulatory policies should aim to reduce the burden of reporting and compliance on smaller transactions, and thereby ensure competitiveness in markets;
- Leveraging new technologies. The most prominent example of a new technology that has implications for greater financial inclusion, is that of mobile banking applications. In some markets today, cell phones far outnumber the number of banks accounts. Policy makers and regulators should leverage this and other technologies as a means to expanding the number of access points to provide financial products and services, and thereby the reach of financial infrastructure. This includes putting in place appropriate rules and oversight for agent banking, and leveling the playing field between bank and non-bank players, while at the same time maintaining a high level of operational security and sufficient interoperability across systems and networks;
- Enabling bundling of financial services. The practice of bundling produces efficiencies through economies of scale and lowered transaction costs, which are passed on to the final consumer. Policy makers and regulators should also emphasize the need for transparency and more disclosure on bundled financial services, which relates to the promotion of responsible financial practices;
- Actively promoting more responsible financial practices. In the fallout of the crisis, more emphasis is being placed on responsible finance. Responsible lending practices have already stimulated some of the dialogue on financial markets reform in the more developed markets, like the U.S. for instance, and will largely be driven by the supervisory authorities. Reform in this area would entail the provision of full disclosure on the

part of lenders and financial services providers, and potentially the development of consumer education as a natural extension of financial services and products.

- Educating the consumer. The onus of creating responsible consumers lies in part on lenders and in great part on the ultimate consumer him- or herself. Reforms to instill greater consumer awareness and education have been instigated on the part of the government in several countries, such as in Canada, Mexico, and the UK, through, for instance school education, the development of national commissions on financial education and awareness and other such activities. Given the sheer number of consumers, reform efforts in this area should emphasize the development of as many delivery channels as possible for the education of the consumer.

Reforming the key Financial Infrastructure areas

Credit bureaus

Credit bureaus are critical elements of financial infrastructure that serve to reduce informational asymmetries between lenders and borrowers. They are only as useful as the level of detail of information, and quality of information available in them. The key priorities for reform in this area for emerging markets, therefore, entail the development of comprehensive credit reporting systems with an emphasis on the following:

- Promoting the development of full-file or positive and negative reporting;
- Enabling comprehensive credit reporting and the inclusion of data from financial and non-financial institutions, such as retailers, utilities, and telecoms;
- Coverage of retail, microfinance, and SME sectors;
- Strengthening prudential supervision capacity through the use of credit information data; and
- Encouraging the development of a financial education offering through bureaus themselves.

Remittances

The priorities for reform under remittance services are to expand outreach and the number of access points to consumers at affordable rates. This can be done by encouraging competition and leveling the playing field between bank and non-bank providers of remittance services. Public policy makers and regulators looking to reform remittance services are often faced with conflicting objectives of providing adequate safeguards against money laundering and terrorist financing activities, and the need to encourage more competition, transparency and greater consumer choice. The General Principles on Remittances provide the general framework for public policy objectives with respect to remittance services and can guide policy makers and regulators with respect to the key priority areas for reforms in this area (see Box below).

Payment and securities settlement systems

Reforms to payment and securities settlement systems traditionally begin with the development of a national payment system strategy. Key priorities under this strategy would include:

- Strengthening of both organized markets and central bank facilities for liquidity provision;
- Settlement of securities transactions in a true delivery-versus-payment basis;
- Settlement of foreign exchange transactions in a payment-versus-payment basis (e.g. CLS Bank);
- Design of safe settlement mechanisms for financial derivatives (both exchange-traded and OTC);
- Application of international standards for central counterparties; and
- Design of better oversight and coordination mechanisms by the authorities.

For a more in-depth review of what can be done to reform the payment and settlement systems infrastructure in a country, policy makers, and regulators can consult the numerous standards and best practice guidelines already established in this area. The World Bank Group's Payment System web site hosts these and other related information.¹⁶

The realm of payment and settlement systems have expanded beyond traditional access points and now involve new delivery channels such as branchless banking, mobile banking and the

introduction of e-money. With these new access points come new concerns as regulatory and supervisory authorities now have to look beyond their traditional regulatory perimeters and collaborate with other supervisory agencies having a purview of other industries that are now involved in the business of providing financial services. Branchless banking, for instance, cuts across a number of regulatory domains and industries, and enforcement will only be effective if there is greater coordination between the various supervisory agencies involved. In addition, regulators are grappling with issues of providing adequate consumer protection as these new agents and technologies bring with them a host of issues such as agent liability issues, excessive service fees, inadequate or non-existent customer service, fraudulent practices and others to name a few.

Collateral

Reforms for collateral extend from the establishment of a sound legal and regulatory framework for collateral to the creation of a unified collateral registry system in a country. The legal framework for collateral should provide for the creation, perfection, and enforce-

The General Principles and Related Roles¹⁵

The General Principles on Remittances are aimed at the public policy objectives of achieving safe and efficient international remittance services. To this end, the markets for the services should be contestable, transparent, accessible and sound.

Transparency and consumer protection

- **General Principle 1.** The market for remittance services should be transparent and have adequate consumer protection.

Payment system infrastructure

- **General Principle 2.** Improvements to payment system infrastructure that have the potential to increase the efficiency of

remittance services should be encouraged.

Legal and regulatory environment

- **General Principle 3.** Remittance services should be supported by a sound, predictable, nondiscriminatory, and proportionate legal and regulatory framework in relevant jurisdictions.

Market structure and competition

- **General Principle 4.** Competitive market conditions, including appropriate access to domestic payment infrastructures, should be fostered in the remittance industry.

Governance and risk management

- **General Principle 5.** Remittance services should be supported by appropriate governance and risk management practices.

Roles of remittance service providers and public authorities

- **Role of remittance service providers.** Remittance service providers should participate actively in the implementation of the General Principles.
- **Role of public authorities.** Public authorities should evaluate what action to take to achieve the public policy objectives through implementation of the General Principles.

ment of security interests. In particular these entail:

- Creation of a security interest by simple agreement of the parties (“creation”);
- Establishment of priority of a security interest against third parties (commonly known as “perfection”);
- Use of notice registration (also known as “filing”) and creation of a notice registration system; and
- Simple and expeditious enforcement of a security interest upon default by the debtor (“enforcement”).

A well-developed collateral framework also has synergies with important aspects of the legal framework such as contract enforcement and insolvency / bankruptcy. When creditor rights are clearly established, contracts are more easily enforced and disposition of assets of distressed borrowers can proceed more efficiently and systematically.

NOTES

15. Committee on Payment and Settlement Systems and Bank for International Settlements, 2007.

16. World Bank Group Payment Systems and Remittances. <http://www.worldbank.org/paymentsystems>.

Data Notes

Data and methodology used to estimate reach of FI

Several different data sources were used to develop the impact measurements for financial infrastructure including the World Bank Doing Business Database, the World Bank Global Payment Systems Survey and IFC and World Bank data on securities markets, collateral registries, and remittances. This section briefly describes how the estimates presented in this document were developed.

Credit Bureaus

Doing Business data indicate that approximately 396 million individuals have files in credit bureaus. We assume that 50% (198 million) actually receive financing, as not every credit bureau file results in access to credit or is tied to a loan. This number (198 million) is then multiplied by the average small enterprise loan (US\$4,100) as per data from Doing Business surveys. This gives us total financing volume of approximately US\$812 billion.

The number of people positively affected by credit reporting is estimated to roughly double over the next five years, to reach a total of nearly 1 billion people worldwide. This figure is based on growth in emerging markets which already have credit bureaus as well as the establishment of credit reporting in countries where it doesn't already exist. For these estimates we take the economically active population in countries with (1.23 billion) and without (1.28 billion) credit reporting and then make

some assumptions: 40% of the economically active population would be credit worthy and only half of these would get credit. Volume of credit is again estimated by multiplying by US\$4,100 for each additional person receiving credit (totaling US\$1.3 trillion) and the borrower as well as at least one other person (their household) are expected to benefit from each of these loans (610 million).

Remittances

The estimates for remittances rely on extensive research done by the Inter-American Development Bank (IADB), World Bank, and International Organization for Migration on the global remittance market. The IADB estimates that 75% of the approximately 190.6 million migrants worldwide send remittances. Since remittances typically support families, the IADB multiplies this number by four to get the total number of people impacted by remittances—about 715 million. Growth of 1.5% per annum for migration is used as the basis for future remittance flows, as lower levels of economic growth are likely to impact migration patterns. This yields another 55 million people who would be affected in the next five years (and includes both the migrants and their families).

The value of remittance flows is now being tracked by international organizations. The World Bank estimates that in 2007, remittances to developing countries were approximately US\$285 billion. The World Bank is projecting the remittance market to be US\$384 bil-

lion in the next five to ten years, using average growth of 3% per annum which accounts for some slowdown due to the global economic downturn. On the one hand, given the current economic climate and possible decrease in remittance flows on an annual basis in 2009, this figure may be too large. At the same time, increasing efforts to move remittances into the formal system will contribute to higher figures as a greater share of the total flows are captured by formal statistics.

Payment Systems

The World Bank's Global Payment Systems Survey provides the first source of comparable data on payment systems. The survey covered 142 countries, of which 96 are developing countries. The estimate of number of people currently impacted assumes that slightly more than 60% of the economically active population in these countries is directly using the payment system—to some extent. This number is multiplied by 2 to account for the household impact (as was also done for credit bureaus) yielding 1.1 billion participating in payment systems.

The volume of retail payment system transactions is reported to be approximately US\$65 trillion in the survey. A little more than half of this amount (US\$36 trillion) is processed as checks, followed by direct credits (US\$19 trillion) and debit cards (US\$9 trillion).

Estimates for growth in payment systems start with the assumption that

60% of the economically active population will be using the payment system in developing countries in the medium term. This means that an additional 1.5 billion will ultimately be affected in countries for which survey data are available. In non-survey countries, taking the assumption that 60% of the economically active population will be affected results in an additional 390 million people. (These figures include people both directly and indirectly affected; as before, the indirect affect still assumes a doubling of the number.)

In terms of transaction volumes, some expert assumptions are used to develop growth estimates. For surveyed countries annual growth rates of 24, 18, and 16% are used for low-income, lower-middle and upper-middle income countries respectively. The result is an additional US\$86.5 trillion in transactions volume in the surveyed countries over the next five years—which includes the largest emerging market countries. Based on BIS statistical information collected on payment systems in developed countries, it is estimated that the average value of a payment system transaction per inhabitant is approximately US\$250,000. Using this figure as a benchmark, we estimate that the average value of payment system transactions in upper-middle income countries is approximately US\$25,000 (10%); in lower-middle income countries, US\$10,000 (4%); and in low income countries, US\$2,500 (1%). Applying these per inhabitant averages to the respective countries' population, we get a total financing volume facilitated by payment systems of approximately US\$2.9 trillion in non-survey countries. Taken with the additional US\$86.5 trillion growth in the surveyed countries, the total estimated growth in transactions volume is US\$89.4 trillion.

The FI Index

The FI Index aims to measure the state of development of financial infrastructure at a country level. The index currently covers three areas of financial infrastructure:

- credit reporting
- creditor rights and movable collateral
- corporate governance

The index will be expanded in the future, and existing measures will be refined to better capture the scale and scope of financial infrastructure development.

The FI Index represents quintile rankings of a simple average of financial infrastructure component indexes and ranges on scale of 1 to 5. A country with a ranking of 5 on the FI Index has a more developed financial infrastructure and is in the top 20% globally. A country with a ranking of 1 is in the bottom 20%.

The average financial infrastructure component index is calculated as a simple average of credit reporting, creditor rights, and payment system indexes. All of these indexes are rescaled to 10 to allow equal weight for each component.

The credit reporting index captures both scale and scope of information sharing. It is calculated as a product of credit registry coverage and the credit information index from Doing Business. The calculations are based on the information published in the DB 2008 report. Credit registry coverage measures the scale of credit reporting infrastructure and is calculated as a maximum of private and public registry coverage. The Credit Information Index measures the scope and quality of information and ranges from 1 to 6. Please see Doing Business 2008 for the methodology of the credit information index, private bureau, and public registry coverage.

The Strength of Legal Rights Index available in the Doing Business Report is used to measure the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. The index ranges from 1 to 10. Please see Doing Business 2008 for the methodology.

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