INTERNATIONAL MONETARY FUND

ENHANCING FINANCIAL SECTOR SURVEILLANCE IN LOW-INCOME COUNTRIES—BACKGROUND PAPER

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FIGURES

BOXES

I. CHALLENGES POSED BY SHALLOW FINANCIAL MARKETS[1]

This note provides an overview of the literature on the challenges posed by shallow financial systems for macroeconomic policy implementation. Countries with shallow markets are more likely to choose fixed exchange rates, less likely to use indirect measures as instruments of monetary policy, and to implement effective counter-cyclical fiscal policies. But causation appears to work in both directions, as policy stances can themselves affect financial development. Drawing on recent FSAP reports, the note also shows that shallow financial markets tend to increase foreign exchange, liquidity management, and concentration risks, posing risks for financial stability

A.   Implications of Shallow Markets for Policy Effectiveness

1.   The issue. Deeper domestic financial markets can expand the range of policy instruments available and increase the effectiveness of policy implementation. Recent research suggests that a country's choice of macroeconomic policy regimes (exchange-rate and monetary regimes) as well as the cyclicality of fiscal policy and the efficacy of policy implementation can be explained, inter alia, by the level of financial development. At the same time, there may be feedback loops between policies and the level of financial development, with policy stances dependant on the depth and breadth of financial systems, and the process of financial deepening determined by the choice of macroeconomic policies.

Exchange Rate

2.   De facto vs. de jure. De facto exchange rate regimes in both emerging market and LICs show that more countries fix their exchange rates than indicated by de jure classifications (Figure I.1). LICs were more likely than emerging market countries (EMs) to claim to have floating exchange rates while operating as pegs in practice. For example, 36 percent of LICs in 2008 claimed to be fixed whereas the IMF classified 55 percent as fixed (gap of almost 20 percent). In emerging markets, 47 percent claimed to have fixed exchange rates while the IMF classified 60 percent as fixed (gap of 13 percent). While also reflecting other policy concerns and objectives, one important constraint to free-floating exchange rate regimes is the absence of markets to hedge exchange rate movements (Gulde et al., 2006). Among LICs, 30 percent of those claiming to float but operating fixed exchange rates report the absence of forward markets for exchange rates, compared with zero percent in emerging markets. Forward markets, if they exist, often tend to be underdeveloped, illiquid, and shallow (Canales-Kriljenko, 2004).

Figure I.1 De Jure and De Facto Exchange Rate Regimes in Emerging Markets and Low-Income Countries

Emerging Market Countries: De Jure Exchange Rate Regimes

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Float	51	50	47	49	49	49	50	50	49	49
Intermediate	3	3	1	1	3	3	4	3	4	4
Fixed	46	47	51	50	49	49	46	47	47	47

Low Income Countries: De Jure Exchange Rate Regime

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Float	63	62	62	60	60	55	55	53	53	53
Intermediate	1	3	3	4	5	10	10	10	10	10
Fixed	36	36	36	36	35	35	35	36	36	36

Emerging Market Countries: De Facto Exchange Rate Regime

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Float	31	31	34	36	36	37	34	31	30	33
Intermediate	13	11	9	6	6	3	6	4	7	7
Fixed	56	57	57	59	59	60	60	64	63	60

Low Income Countries: De Facto Exchange Rate Regime

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Float	50	51	54	49	51	49	51	36	38	39
Intermediate	9	8	7	5	5	5	4	4	5	6
Fixed	41	41	39	45	44	45	45	60	57	55

Source: ARREAR.
De facto exchange rates determined according to the IMF's exchange rate classification system. Floats include pure and managed floats. Fixed exchange rates include countries with no independent currency, currency boards, pegs to single currencies and baskets. Intermediate includes pegs within a band, crawling pegs, and crawling bands. The survey includes 70 emerging market and 72 LICs.

3.   **Regime choice.** Research has also shown that financial depth has a significant impact on a country's choice of exchange rate regime. Schmidt-Hebbel (2010) finds that countries with less financial openness and lower financial development are more likely to choose pegs. Lin and Ye (2011) find that the less developed a country's financial markets is, the greater the likelihood it will adopt a fixed exchange rate regime. Moreover, this effect is large: a one standard deviation increase in the measure of financial development leads to a 20 percentage point decline in the probability of choosing a fixed exchange regime. They also find that the more developed a country's financial markets, the more likely it is to exit from a fixed exchange rate regime. For instance, a 10 percent increase in the measure of financial development leads to a 20 percent increase in the probability of leaving a peg. These findings are consistent with the view that institutional capacity and developed financial markets are needed to deal with the volatility of flexible exchange rate regimes.

4. **Macroeconomic volatility.** Exchange rate flexibility in the presence of deep financial markets is associated with lower aggregate macroeconomic volatility. Limited exchange market flexibility can hamper adjustment by restricting the economy's ability to reallocate resources in response to external shocks (Broda, 2004). Similarly, well-developed financial markets and institutions can help dampen the negative impact that exchange rate volatility has on firm liquidity and investment capacity, and thus volatility and growth (Aghion et al., 2006). This effect is more pronounced for natural-resource dependent economies, which are subject to high terms of trade and real exchange rate volatility.

Monetary Policy

5. **Stages.** Countries typically go through several stages of monetary policy implementation based on the level of development of financial markets (see IMF, 2004, and Figure I.2). In Stage I, monetary policy relies on rule-based instruments (e.g., reserve ratios, statutory liquidity ratios, and/or standing facilities). In Stage II, money market instruments can be introduced as the interbank market develops. But there may still be reliance on rule-based instruments. In Stage III, monetary policy relies fully on money market instruments as financial markets are well-developed, diversified, and deep.

Figure I.2 Stages of Development in Implementing Monetary Policy
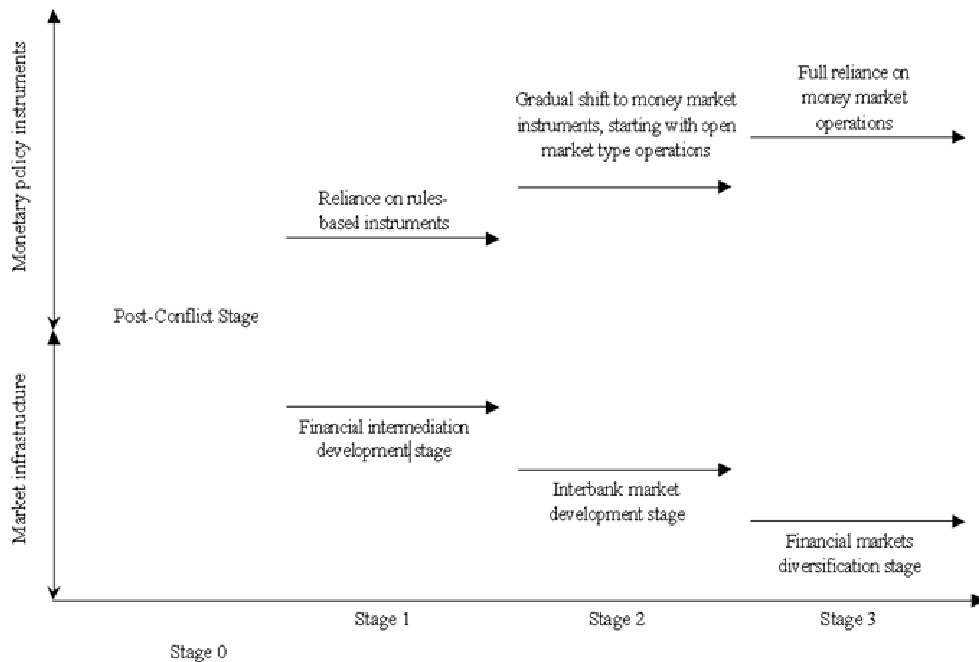
Source: IMF, Monetary Policy Implementation at Different Stages of Market Development. October 26, 2004.

6.   Instrument choice. The lack of development of financial markets in some LICs affects their use of monetary policy instruments. Figure I.3 shows the use of various instruments in advanced, emerging, and low-income countries in 2010. LICs used more direct instruments (e.g., interest rate and credit controls) than other countries. Reflecting the weakness in financial markets, LICs were also more likely to use rule-based monetary policy instruments as opposed to market-based instruments. For example, LICs were more likely to use reserve requirements and statutory liquidity ratios as policy instruments compared with other economies. LICs were also more likely to intervene in primary government bond markets and less likely to use foreign exchange swaps as instruments of monetary policy. The limited use of these instruments can also reflect lack of liquid secondary markets for government bonds and foreign exchange markets in LICs. Box I.1 examines the case of Zambia using a small structural model to examine the impact of monetary policy in a LIC with shallow financial markets. It finds that increasing risk aversion and low level of financial development can explain the basic features of monetary conditions during the financial crisis.

Figure I.3 Use of Monetary Policy Instruments
(by Income Group)

2010

Direct = direct controls, RR = reserve requirement, SLR = statutory liquidity requirements, SF = standing facilities, GB = operations in primary government bond markets, OMO = open market operations, Repo = repurchase operations, FXSwap = foreign exchange swaps.

Source: IMF, Information System for Instruments of Monetary Policy (ISIMP), a database containing the results of a biannual survey of monetary policy instruments covering 140 countries. See also Buzenecas and Maino (2007).

Box I.1 Monetary Policy and Financial Sector Linkages during the Crisis: The Case of Zambia

The example of Zambia during 2008-2009 illustrates the relationship between the financial system, financial shocks, and monetary policy. The IMF's African and Research Departments built a small structural model to analyze monetary policy in low-income countries. The model was used to understand the nature of the external shocks hitting Zambia, how they were transmitted through the financial system and the economy, and how their effects were shaped by the monetary policy response. The main results include:

- Models that account for risk aversion in the financial system explain events in Zambia better than models with a financial accelerator.

- Monetary policy transmission depends on the structure of the financial system.

- Shocks originating within the financial system may themselves complicate monetary policy.

The global financial crisis hit Zambia with three related shocks: (i) a large deterioration in the terms of trade; (ii) an increase in the country's external risk premium; and (iii) a financial sector shock inside Zambia, as banks risk appetite fell in response to the crisis. Nonetheless, the sector weathered the 2008 global crisis reasonably well, despite a doubling of NPLs and sharp currency depreciation. Increased NPLs and less risk appetite led to a sharp decline in credit to the private sector. Most banks remained financially solid, although profits and capital-ratios declined.

Staff used a small macro model that accounts for declining interest rates on government bank debt and rising lending rates to simulate events in Zambia. During the crisis, lending rates rose substantially, despite a loosening of credit. One possible explanation is the "financial accelerator:" Negative shocks to the terms of trade reduced real activity and thus the implied value of firms. This made bank loans riskier, leading banks to demand higher spreads for a given quantity of lending to the private sector. This is consistent with the rise in NPLs observed in Zambia over this period. However, the data indicate that real output did not fall sharply and that the contraction of loan volumes was far higher than expected. A relatively parsimonious explanation for the behavior of lending volumes and rates, output, and the activity in the money market is to assume that there was an increase in risk aversion by banks. This reduced the supply of loans to the private sector and induced banks to move into more liquid and safer government securities and central bank deposits. As a result, lending rates rose and rates on government paper fell. The higher lending rates depressed domestic demand and inflation declined.

Results from the model suggest that had policy been loosened earlier—through higher initial money growth—the increase in lending rates would have been diminished relative to the baseline and the decline in domestic demand mitigated, at a cost of slightly higher but still declining inflation.

The model contains a number of features designed to capture the shallowness of the financial sector. Most notably, staff experimented with having a large share of consumers with no access to financial markets and who thus consume all their income. Such consumers respond more to fiscal shocks and less to interest rate shocks than those with access to financial markets. The model was calibrated based on the Finscope surveys that suggest a large fraction of such consumers, above 50 percent, consume all their income in many SSA LICs. LIC-specific features such as the importance of terms of trade shocks and price-inelastic demands for imports also were important. Other key features had more of an emerging market flavor, such as the role of the "sudden stop" in the capital account and the risk appetite shock in the banking system.

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Prepared by: Andy Berg (RES), Alfredo Baldini and Nils Oeyvind (AFR).

7.   Facilitating monetary policy. According to the credit channel view, monetary policy impacts the real economy through its effects on the credit market, and thus demand. Through their impact on borrowers' profitability, asset values and thus collateral, interest rate changes directly affect borrowers' ability to borrow (balance sheet effect).[2] The supply of loanable funds is affected if banks cannot easily replace deposit liabilities and if banks' assets are not perfectly substitutable (bank lending channel). Both channels work because of financial frictions and the imperfect supply of external finance for firms and banks. In countries with flexible exchange rates, interest rates influence the exchange rate, which directly affects prices of imported goods and indirectly affects demand via the trade balance and (in countries with capital mobility) capital flows. On the other hand, if firms rely less on bank finance due to the absence of a sound banking system or because banks have trouble identifying firms with good projects, monetary policy becomes less effective. Similarly, if banks have excess liquidity, the central bank will be less able to influence credit supply.

8.   Impediments to monetary transmission. In LICs, the conditions required for effective policy implementation are often not fulfilled and many potential obstacles arise to the standard transmission mechanisms. LICs' lower level of financial development suggests that changes in interest rates may have a smaller impact on demand. Similarly, interest margins are often higher in LICs and banks may invest in government bonds rather than providing credit due to the perceived higher risk of private sector investments (Saxegaard, 2006). It may also be more profitable for banks to hold government securities than to undertake the screening costs of lending to the private sector. In addition, if markets for longer-term assets are underdeveloped, bank credit and lending rates may be less sensitive to changes in short-term interest rates. Moreover, in countries with pegged exchange rates, shallow foreign exchange markets, and/or low capital mobility, interest rates may have limited impact on the exchange rate. Finally, financial systems in some LICs are characterized by fiscal dominance so that interest rates and credit available to the private sector are influenced primarily by government financing needs rather than policy targets of the central bank. Empirical evidence suggests that many of these effects are present in LICs. For example, Misra et al. (2011) find that changes in the money market rate are significantly less correlated with changes in the discount rate in LICs than in emerging markets and advanced countries in both the short and long-term. Similarly, changes in the lending rate are less correlated with changes in the money market rate in LICs than in other countries.

9.   Inflation targeting. Schmidt-Hebbel (2010) finds that countries with developed financial markets are more likely to choose money growth or a fixed exchange rate as a nominal anchor compared to inflation targeting. Nonetheless, recent research suggests that shallow financial markets do not preclude adoption of inflation targeting. For instance, Batini et al. (2005) and subsequent work suggest that in some cases inflation targeting can be effective without well developed bond and foreign exchange markets. Ball (2010) suggests that inflation targeting may be more helpful in emerging markets than in advanced economies because the policy regime does not

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[2] Most of the literature on the balance sheet effect use data for the U.S. and show that liquidity constraints become binding for small firms in the U.S., which depend more on bank loans than large firms, after the Fed tightens its monetary policy. See Kashyap and Stein (1994) for a survey.

matter as much when economic institutions are more developed. However, underdeveloped financial markets can make the operation of inflation targeting more challenging.

10.   Feedback loops. Just as greater financial depth helps improve the implementation of monetary policy, policy reforms can promote the development of financial markets. For example, flexibility in the exchange rate can drive the development of new products and expertise in foreign exchange markets. Similarly, when a central bank targets short-term interest rates, these rates can stabilize and send clearer messages about the stance of monetary policy. This promotes the development of financial markets. Similarly, as interbank and short-term bond markets develop and as confidence grows in macroeconomic management, maturities can lengthen and long-term bond markets develop. Thus, regulatory measures and institutional reforms go hand in hand with more modern, forward-looking monetary policy frameworks.

Fiscal Policy

11.   Thin debt markets. While a number of LIC governments now issue domestic securities, these markets tend to be thinner than in emerging and advanced markets. For example, Ferhani et al. (2009) present evidence that in LICs secondary government securities market trading in relation to GDP is quite low, and market trading volumes remain a fraction of the amount in emerging market countries.

12.   Crowding out. LIC financial markets may be dominated by the financing needs of government, which, in turn, has implications for private sector borrowing. For example, Aisen and Hauner (2008) consider the impact of budget deficits on lending rates. Using a panel dataset of 60 advanced and emerging economies, they find a highly significant positive effect of budget deficits on interest rates of about 26 basis points per 1 percent of GDP. Their findings suggest that fiscal policy is more effective when the initial budget deficit and level of debt are lower and when financial openness and financial depth are greater, because the effect of deficits on interest rates is smaller under these conditions, implying less crowding out and a greater multiplier.

13.   Policy constraints. Shallow domestic debt markets can constrain fiscal policy in a number of ways. For example, Arvai and Heenan (2008) find that countries with deep and liquid government securities markets are less vulnerable to changes in availability of foreign financing and donor flows. Deep government securities markets help ensure stable government financing and budgeting by providing a broad range of maturities. As secondary markets develop, transaction costs are lowered and liquidity increases, increasing investor confidence in long-term government securities. The lengthening of the maturity of the government debt stock reduces the frequency of new issuance and assists in the budget planning process. Moreover, deep markets lower the debt-servicing cost of government financing in the long run since investors will accept lower yields if they are able to easily unwind their positions. Market depth and liquidity also reduce transaction costs and improve risk allocation, and result in a lower liquidity premium on government securities. Further, deep securities markets can enhance fiscal discipline by providing signals of the market's views on government policy. Finally, the ability of government to quickly finance large deficits in response to unexpected developments/large external shocks is enhanced by deep markets.

14.   Fiscal pro-cyclicality. Both theoretical and empirical studies identify a range of factors, including financial development, that explain why shallow financial markets may lead to more pro-cyclical fiscal policy. Using a large cross-section of developed and developing countries, Calderon and Schmidt-Hebbel (2008) find that poor institutions or lack of access to international and domestic credit markets hinders the conduct of counter-cyclical fiscal policies. In particular, they show that low levels of external financial openness, domestic financial depth, institutional quality, and political openness are associated with a more pro-cyclical budget balance. In general, the evidence suggests that countries with shallower financial systems tend to exhibit more pro-cyclical policy stances (IMF, 2007).

15.   Constrained policy response. Caballero and Krishnamurthy (2004) show that lack of financial depth constrains fiscal policy in a way that can overturn standard Keynesian policy prescriptions. In particular, they show that (i) limited financial depth during crises constrains fiscal policy and limits its use as a counter-cyclical policy instrument; and (ii) shallow financial markets prevent governments from reaching higher government debt to GDP ratios and weaken the disciplining effect of markets. Moreover, they show that expansionary fiscal policy results in greater crowding out of private sector lending when investors demand a higher liquidity premium or investors' fear accumulation of government debt. This evidence points clearly in the direction of a crowding-out mechanism that is more severe in developing economies than in advanced ones.

B.   Risks for Banking Sector Soundness and Stability

16.   Challenges. In many LICs, financial markets are shallow, with underdeveloped or missing segments. This shallowness, as evidenced by a narrow range of instruments, short maturities, low market turnover, and high transaction spreads, usually contributes to volatility. It exposes banks to potentially large shocks and complicates their risk management, particularly in the area of foreign exchange and liquidity management. It also affects banks' resource allocation and fuels concentration risk. The absence of liquid money markets can also add to banks transaction costs, exerting pressure on commercial banks profitability and heightening credit risk.[3] This sub-section examines implications of shallow financial markets for financial sector stability in LICs, drawing on IMF-World Bank financial sector stability assessments (FSAPs) conducted between 2007-2011 in 19 LICs.

Foreign exchange risk

17.   Direct and indirect risks. In shallow financial markets, both exchange rate volatility and realized risks to LIC banks and their customers tend to be higher because of limited hedging

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[3] In the environment of illiquid or poorly functioning money markets, banks have to maintain higher level of liquidity, usually in a form of unremunerated cash on their balance sheets with resulting opportunity costs. Alternatively, if the amount of liquid assets is insufficient in case of unexpected obligations, banks can have recourse to the lender-of-last-resort facility. But this solution also incurs additional costs as central banks' credit window is typically offered at a penalty rate. In both instances, banks may pass those costs on to their customers by increasing lending rates for borrowers. This would expose borrowers to higher payments and heighten banks' credit risk.

transactions available to market participants. Foreign exchange (FX) risk can affect banks either directly (through currency mismatches between the value of their assets and liabilities) or indirectly by increasing credit risk from lending to borrowers that have mismatches in FX on their balance sheets and income streams. In a large majority of LICs, direct FX risk is relatively well contained, while indirect FX risk tends to be high. In countries with high degree of financial dollarization, both direct and indirect FX risks appear to be much greater and central bank' function as a lender-of-last- resort significantly weakened.

18.   Managing direct risks. Effective prudential measures in LICs play a major role in limiting direct FX risk. With the exception of a few countries, banks' net open foreign exchange positions are tightly regulated and banks maintain their currency exposures within prudential limits (e.g., Kenya, Tanzania, Uganda, Rwanda and Zambia). In some countries, selectively imposed capital controls help limit banks' exposure to direct FX risk (e.g., in Bangladesh). Only in two LICs, mainly due to weaknesses in enforcement of banks' net open positions, FX risk was found to be considerable for some individual institutions. In these countries, large movements in the exchange rate (which often reflect thin FX markets), expose commercial banks to potentially substantial losses, threatening soundness and stability of the financial sector. Moreover, a poor regulatory environment can exacerbate risks. For example, in Moldova, the banking sector's exposure to foreign currency risk was increased by asymmetry in the regulatory treatment of transactions with banks' customers. Banks were allowed to lend in foreign currency to one group of customers (importers), but were banned from making such loans to others (exporters). This led to a surge in mismatches on banks' balance sheets, increasing their direct FX risk.

19.   Indirect risks. In view of the regulatory limits imposed on banks through net open foreign exchange positions, it is mainly the indirect effects on credit risk that increase the vulnerability of LIC banks to FX risk. Rapid fluctuation of the exchange rate can quickly worsen customers' repayment capacity, particularly those who are not naturally hedged by FX earnings. This has implications for banks' NPLs, which can increase, especially when coupled with declines in loan quality in FX denominated loans. This was found to be the case in a number of LICs (e.g., Ghana, Honduras, Mongolia, Tajikistan, Tanzania, and Zambia). However, in some LICs, indirect risk is relatively limited, reflecting additional prudential requirements and customers' FX loans are fully covered by their earnings in FX**.** For example, in Mozambique, the stringent requirement of 50 percent provisioning on foreign currency loans to non-exporters reduced indirect foreign exchange credit risk by inducing banks not to lend to un-hedged borrowers.

20.   Dollarization and FX risks. In LICs with a significant level of dollarization, and no market for foreign exchange derivatives, exposure of financial institutions to FX risks tends to be much greater. Banks with large domestic-sourced FX deposits need to balance their foreign exchange positions by either extending FX loans to customers earning local currency, or by holding their foreign currency assets abroad. For instance, in Bolivia, the high degree of dollarization in the economy makes the banking system vulnerable to FX rate risk, not only through mismatches in the assets and liabilities in particular currencies, but also through the possibility of re-dollarization of deposits. In Cambodia, where dollar deposits at banks are only partially covered by liquid dollar

assets, banks are exposed not only to FX risk, but also to liquidity risk. Similarly, in Mongolia, about a third of deposits are denominated in foreign currency, adding to liquidity pressure and limiting the ability of the central bank to act as a lender-of-last-resort.

Liquidity management risks

21.   Excess liquidity. Large and seasonal flows can result in all banks operating on the same side of the financial market. This was found to be the case in a number of LICs (e.g., The Gambia, Zambia, Uganda, and Tanzania). Inability to find counterparties taking opposite positions in the money market deprives banks of a mechanism to smooth their intraday liquidity and to efficiently manage unexpected financing needs. As a result, banks maintain excess liquidity on their balance sheets to meet sudden obligations. These liquid assets (e.g., cash and short-term government or central bank bills) make banks structurally liquid, with liquidity positions well above the statutory requirements imposed by regulators. For instance, in 2009 and 2010 the average liquidity ratio for banks in 38 LICs was 41 percent (Beck et al., 2011). In a number of countries, the liquidity ratio exceeded 60 percent (e.g., CAR, Congo DRC, Congo R., Lesotho, Niger, and Papua New Guinea). A downside to holding large liquid assets on the balance sheet is increased banking costs and lower profitability.

22.   Reliance on deposits. Although liquidity is high, banks in LICs rely on customer deposits for funding. Among LICs in Sub Saharan Africa (SSA) for which data were available, checking accounts constituted the majority of total deposits, ranging from 46 percent (Nigeria) to 83 percent (Guinea Bissau). Checking accounts are perceived as the most volatile type of deposits, as they are primarily held for transaction purposes. At the same time, savings accounts, which typically constitute the most stable source of bank funding in advanced economies, often, tend to be less stable in LICs. For example, small businesses hold large amounts of physical cash in savings accounts, depositing and withdrawing funds several times a week (Bald, 2008). A related factor, which makes deposits in LICs a less stable source of funding, is that incomes of most depositors are low, resulting in high deposit turnover.

23.   Implications for liquidity management. The high turnover of LICs bank deposits combined with limited alternative sources of funding challenges liquidity management. This also contributes to greater liquidity pressures than in more developed countries where banks can more efficiently smooth their intraday liquidity positions. The implied risk may help to explain the high levels of liquidity maintained by LIC commercial banks. As a result, the role required of LIC central banks in providing additional liquidity support is much greater than in advanced and emerging market economies.

Credit concentration risks[4]

24.   Credit and interest rate risks. Undiversified financial markets do not provide banks' corporate customers with the opportunity to diversify their funding sources (though equity and bond markets), thus contributing to a build-up of banks' exposures to certain sectors and/or customers. As such, shallow financial markets amplify credit and interest rate risks and exert pressure on bank profitability and solvency, should external factors deteriorate (e.g., during an economic downturn or the default of a large customer). Historically, concentration of credit risk in banks' loan portfolios has been a major source of bank distress in LICs. The buildup of exposures to a few sectors can also result in asset price inflation and expose financial institutions to risks associated with potential reversals.

25.   High sectoral and name concentration risks. This reflects both the relative sectoral concentration of economic activity in these countries and the limited availability of credit-worthy customers. Although the concentration of banks' asset portfolios varies across LICs and individual banks, among the 24 SSA LICs for which data were available, sectoral concentration of loans ranged from 50-70 percent in 20 countries, with the majority of loans being provided to just one or two economic sectors (Beck et al., 2011). Banks' whose portfolios are not well-diversified at the sectoral level are also more vulnerable to sector-specific shocks.

26.   Collateral requirements. High and rigid loan collateral requirements may contribute to banks' excessive exposures to a few borrowers, increasing name concentration risks. Lack of market-based funding sources implies that established firms must seek capital funding from the banking system rather than from equity or debt markets. This, in turn, makes loans larger than they would otherwise be, inducing banks to set higher collateral requirements. For instance, collateral requirements range from 150 to 200 percent of the loan value in a number of SSA LICs and are limited to certain types of assets (e.g., land), significantly constraining the pool of customers that qualify for credit. Similarly, thin property markets create difficulties in the valuation and sale of collateral, a process likely to increase the value of required collateral. Further, lack of adequate information about customers' credit histories often constrains effective credit supply. All these factors lead to a build-up of excessive exposures by banks to a small number of customers, including the sovereign, increasing credit risk in event of a default by a borrower.

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[4] There are two types of credit concentration risk depending on the sources of risk. Sectoral concentration risk stems from excessive lending exposure to particular sectors, industries or products, and name concentration risk, which arises from excessive credit exposure to customers.

27.   Name concentration risk. Name concentration risks in LIC banking sectors are excessively high in a number of LICs. In one country, stress test results confirmed that, if the five largest debtors were to fail, the banking system would be in crisis. In a second country, a high degree of borrower concentration was found to be a major risk for the domestic banking system. In yet another country, two banks had a highly concentrated loan portfolio, with around a quarter of all lending to only five borrowers. In some LICs, financial sector assessments found that the high credit risk dissuades banks from lending to SMEs, resulting in all banks competing for a few prime borrowers.

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II. FINANCIAL DEPTH AND MACROECONOMIC VOLATILITY[5]

This note provides new empirical evidence on the relationship between financial depth and aggregate macroeconomic volatility for a sample of emerging market and low-income countries (LICs). The analysis suggests that countries with more developed financial systems experience smaller fluctuations in real per capita output, consumption, and investment growth. The empirical analysis also points to a U-shaped relationship between financial depth and volatility. Beyond a certain level, financial depth results in greater volatility of consumption and investment.

28.   Theoretical and empirical underpinnings. A large body of theoretical and empirical evidence suggests that financial institutions and markets help diversify risk and reduce the vulnerability of enterprises, industries, and households to external shocks, thus smoothing volatility.

- The theoretical literature outlines various mechanisms through which financial development can affect macroeconomic volatility. Aghion et al (1999) develop a theoretical model which combines financial market imperfections and unequal access to investment opportunities. They show that economies with poorly developed financial systems tend to be more volatile as the demand for and supply of credit tends to be more cyclical. Acemoglu and Zilibotti (1997) highlight the role that diversification plays in reducing risk and dampening cyclical fluctuations. Financial market imperfections and underlying informational asymmetries can also play a role in propagating real sector shocks through the credit channel. For instance, shocks to the net worth of borrowers can amplify macroeconomic fluctuations in the presence of credit market imperfections (Bernanke and Gertler, 1990). Similarly, Kiyotaki and Moore (1997) and Greenwald and Stiglitz (1991) show that asymmetric information in financial markets can increase temporary effects of shocks and contribute to their persistence.

- Empirically, Aghion et al. (2010) find that deep financial systems can alleviate liquidity constraints on firms and facilitate long-term investment, reducing the volatility of investment and growth. Raddatz (2006) finds that sectors with larger liquidity needs are more volatile and experience deeper crises in financially underdeveloped countries. Similarly, access to bank finance dampens output volatility at the industrial level due to countercyclical borrowing by financially constrained sectors (Larrain, 2006). Evidence at the household level suggests that access to financial services allows for greater risk smoothing (i.e., deviations of realized income from mean income). Savings access may also facilitate asset purchases and other large expenses when credit is unavailable or too costly (Kaboski and Townsend, 2005), and alleviate credit constraints in the long-run.

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[5] Prepared by Era Dabla-Norris (SPR) and Srivisal Narapong (summer intern, SPR).

29.   Ambiguous macro-level evidence. Evidence at the aggregate level, however, offers a somewhat more ambiguous account since deep financial systems can also amplify shocks. For instance, Obstfeld (1994) argues that if the financial sector provides tools to hedge against risks (e.g., through savings instruments and insurance products), it could be pareto optimal for entrepreneurs to invest in high-risk-high-return projects rather than low-risk-low-return projects. This could fuel volatility. Using panel data for a large number of countries, Easterly et al. (2000) find that the level of private credit to GDP has a significant smoothing effect on output volatility, but only up to a threshold (of around 100 percent of GDP), beyond which volatility is increased. Similarly, Denizer et al. (2002) find a negative relation between various measures of banking system depth and consumption and investment volatility, but not with output volatility. Beck et al. (2006), however, show that more developed financial systems dampen fiscal shocks but can amplify monetary shocks. Evidence from the recent global financial crises also suggests that while financial depth can help reduce the impact of real sector shocks, it can propagate financial sector shocks, thus amplifying macroeconomic volatility.

30.   This note. This note provides new evidence on the relationship between financial depth and macroeconomic volatility in developing countries. Unlike previous studies, we employ dynamic panel-data system GMM analysis to control for the potential reverse causality between financial depth and volatility. Further, previous studies pool data for countries at different levels of development (e.g., advanced and developing), which could lead to incorrect inferences. Our analysis focuses only on LICs and emerging market countries (EMs), which historically have tended to exhibit greater volatility.

A. Specification and Methodology

31.   Benchmark specification. The baseline regression estimated relates macroeconomic volatility ($V_{i,t}$) at time t for country i to financial depth ($FD_{i,t}$), and a set of controls ($X_{i,t}$).

$$V_{i,t} = \beta X_{i,t} + \gamma FD_{i,t} + \mu_i + u_{i,t} \tag{1}$$

To control for the possibility of reverse causality between volatility and financial depth, we run dynamic panel regressions using a two-equation (system) GMM procedure as in Arellano and Bover (1995). Our sample covers 78 LICs and EMs during the 1974-2008 periods. To smooth out cyclical fluctuations, all continuous variables are averaged over consecutive non-overlapping five-year periods.

32.   Variables. Alternative measures of volatility and financial system depth are used to assess the robustness of the empirical results. We distinguish between overall macroeconomic volatility (real per-capita output growth) and sectoral volatility (real per-capita consumption and investment growth). Following convention, volatility is measured as the simple (unconditional) standard deviation of the relevant variable. Given the multidimensional nature of financial deepening, four alternative measures of banking system depth (measured in percent of GDP) are utilized: (i) total liquid liabilities (Liability), (ii) depository banks' assets (Asset), (iii) private credit provided by depository banks and other financial institutions (Credit), and (iv) deposits in financial institutions

(Deposit). The vector of control variables includes initial real GDP per capita (to control for economic size); growth rates of real per-capita GDP, consumption, or investment; inflation; central government balance; trade openness; financial openness; a dummy for financial crises; an index of political environment (to control for institutional quality); and volatility of the real exchange rate.

33.   Bivariate relationships. Simple bivariate regressions show a negative correlation between financial depth and volatility. Figure II.1 plots each financial depth measure against real per capita GDP, consumption, and investment growth volatilities over the horizon covered in dataset. The linear fitted lines and 95-percent confidence interval band are also displayed in the figures, indicating that countries with higher levels of banking system depth experience less volatility. These results are robust to alternative time periods (not shown here).

B. Empirical Results

34.   Smoothing volatility. Consistent with the bivariate regressions, Table II.1 reports a large and statistically significant impact of banking system depth in smoothing macroeconomic volatility. This relationship holds across the various proxies of banking system depth and volatility of GDP (columns 1-4), consumption (columns 5-9), and investment per-capita (columns 10-12). With the exception of banking system assets in the GDP and investment volatility regressions (columns 2, 10), the coefficients on the banking depth indicators are negative and statistically significant in all regressions, suggesting that countries that have deeper banking systems experience less volatility, even after controlling for financial crises. In addition, the point estimates are economically significant, particularly for the consumption and investment regressions, suggesting that financial depth has a particularly pronounced effect in smoothing consumption and investment volatility in developing countries.

35.   Control variables. The control variables generally enter with the expected signs. Trade openness is associated with higher variability of consumption and, to some extent, investment, but not GDP. Greater exchange rate volatility is associated with higher GDP and investment volatility, but not consumption volatility. There is also evidence that countries with stronger fiscal positions experience lower economic volatility. Stronger institutional quality is associated with lower variability of consumption, but not GDP and investment. Finally, financial crises are associated with greater fluctuations in GDP and investment growth.

36.   Augmented regression. The baseline regression is augmented to investigate the presence of non-linearities in the impact of financial depth on macroeconomic volatility. In particular, we allow for possible non-linear effect of financial depth on macroeconomic volatility by using a second-degree polynomial approximation for financial depth:

$$V_{i,t} = \beta X_{i,t} + \gamma_1 FD_{i,t} + \gamma_2 FD_{i,t}^2 + \mu_i + u_{i,t} \tag{2}$$

Figure II.1 Average Financial Depth and Macroeconomic Volatility, 1974-2008
(linear fitted lines and 95-percent confidence interval bands)
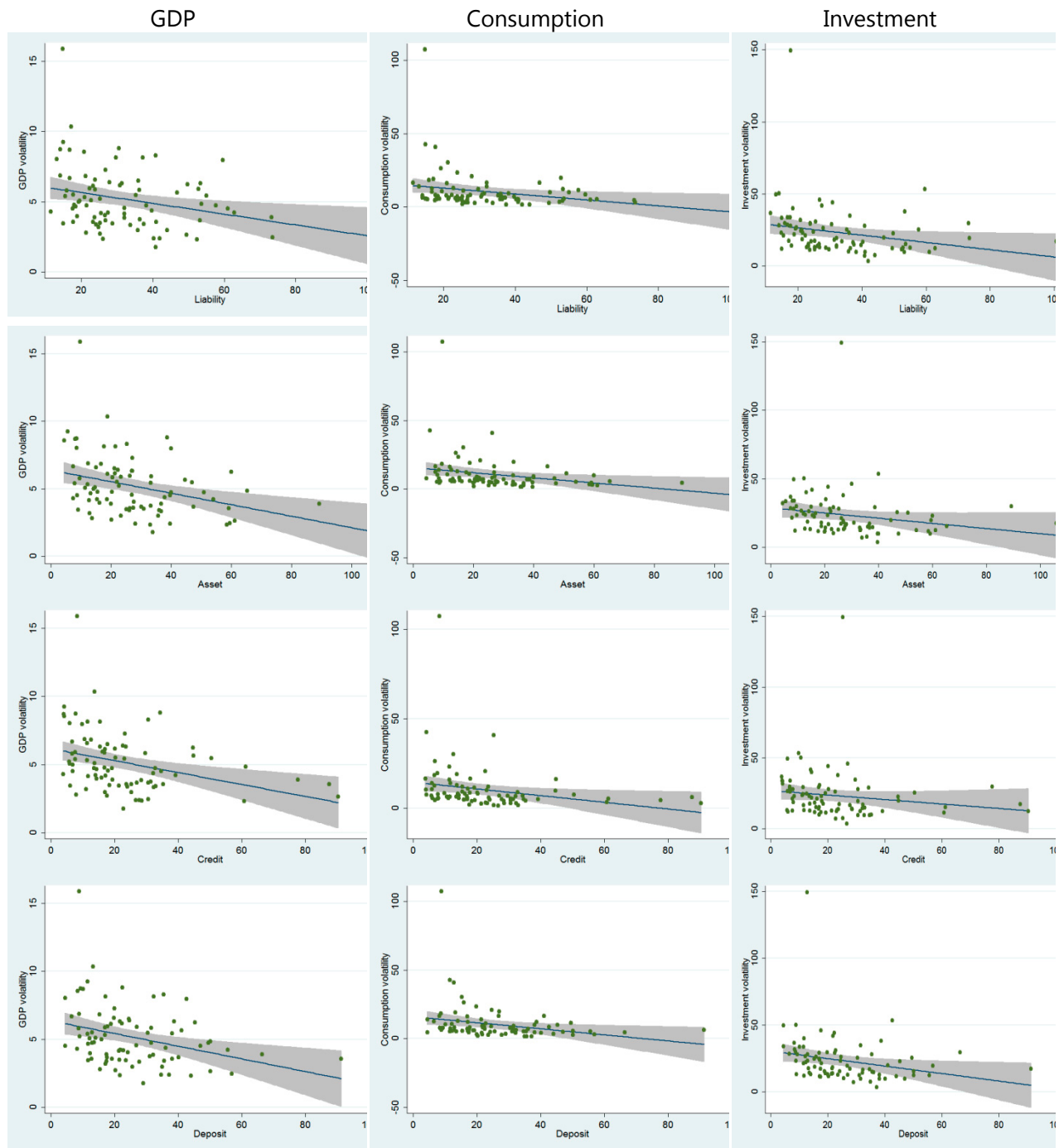
Source: Authors calculations.

Table II.2 reports the system GMM estimates of the extended baseline model. In general, the results suggest a U-shaped effect of financial depth on macroeconomic volatility. Deep financial systems seem to reduce volatility of macroeconomic aggregates, but only up to a certain threshold. From the above equation the impact of financial development on volatility is given by $\gamma_1+2\gamma_2$ $FD_{i,t}$. Therefore, the threshold, at which the impact of financial development on volatility changes from negative to positive (i.e. amplifies volatility) is

$$Threshold = -\frac{\gamma_1}{2\gamma_2} \tag{3}$$

37. **Threshold effects**. Estimated thresholds for banking system depth above which consumption and investment volatility are magnified can be calculated using equation (3). We conduct joint F-tests for the coefficients of the first and second degrees of financial depth measures (The null hypotheses that γ_1 and $\gamma_2 \neq 0$) and Wald Test for the thresholds. The thresholds for bank assets and private credit are estimated to be above 100 percent of GDP for consumption, and above 70 percent of GDP for investment. Above these levels, consumption and investment volatility increases with the level of financial depth. For GDP volatility regressions, either the joint test fails, or the 95-percent confidence interval band for the threshold is larger than the maximum level of banking system depth in the dataset for most financial sector variables. Further, this result is sensitive to model specification. Thus, we cannot robustly conclude that there is a threshold beyond which greater financial depth amplifies GDP growth volatility.

38. **Macrostability benefits of financial depth in LICs**. Estimated thresholds above which financial depth magnifies volatility exceed levels observed in most LICs. The following table presents the basic statistical summary (of the 5-year average) of financial system depth for LICs in our dataset. Interestingly, all these countries have lower levels of financial depth than the point estimates of the thresholds, suggesting that the non-linear impact on volatility is driven by experiences of EMs. This suggests that financial deepening can play a beneficial role in smoothing macroeconomic volatility in LICs.

VARIABLES	Unit	Mean	SD	Minimum	Maximum
Liability	Percent of GDP	23.721	10.553	0.653	70.301
Assets	Percent of GDP	17.199	10.294	2.704	64.205
Credit	Percent of GDP	13.529	8.395	1.393	40.038
Deposits	Percent of GDP	16.096	9.403	2.896	55.466

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Table II.1 System GMM Estimates for the Baseline Model
(Dependent variable: Standard Deviations of GDP, Consumption, and Investment Growth)

VARIABLES	GDP				Consumption				Investment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Banking system depth												
Liability	-0.0289*				-0.127**				-0.195**			
	(0.0149)				(0.0606)				(0.0778)			
Asset		-0.0119				-0.0900*				-0.0915		
		(0.0119)				(0.0517)				(0.0630)		
Credit			-0.0155*				-0.0756**				-0.117*	
			(0.00805)				(0.0367)				(0.0608)	
Deposit				-0.0365**				-0.147***				-0.208***
				(0.0142)				(0.0482)				(0.0733)
Controls												
Initial GDP per capita	0.0188	0.0214	0.0373	-0.0664	-0.123	-0.0321	0.0345	-0.120	0.266	0.330	0.520	0.253
	(0.0902)	(0.0998)	(0.0894)	(0.113)	(0.276)	(0.260)	(0.262)	(0.230)	(0.390)	(0.333)	(0.485)	(0.470)
Trade openness	0.0135	0.0111	0.0153	0.0141	0.0749**	0.0662**	0.0644**	0.0785**	0.0679*	0.0460	0.0607	0.0661
	(0.00903)	(0.0102)	(0.00957)	(0.0111)	(0.0371)	(0.0300)	(0.0260)	(0.0325)	(0.0380)	(0.0391)	(0.0485)	(0.0545)
Financial openness	0.0123	0.000528	-0.00902	0.00564	0.271	0.320	0.312	0.271	0.00868	-0.0134	-0.0667	0.0464
	(0.0327)	(0.0326)	(0.0384)	(0.0317)	(0.168)	(0.213)	(0.213)	(0.196)	(0.226)	(0.246)	(0.242)	(0.221)
Institutional quality	-0.0133	-0.0174	-0.0179	-0.0169	-0.0736*	-0.0765*	-0.0769*	-0.0699	-0.0822	-0.0965	-0.109	-0.0880
	(0.0175)	(0.0128)	(0.0136)	(0.0141)	(0.0428)	(0.0432)	(0.0427)	(0.0489)	(0.128)	(0.0983)	(0.113)	(0.130)
CPI	-0.00372	-0.00619	-0.000793	0.00575	0.0974	0.107	0.130	0.108	-0.0518	-0.0785	-0.0225	-0.0406
	(0.0145)	(0.0168)	(0.0175)	(0.0141)	(0.0808)	(0.0992)	(0.101)	(0.0964)	(0.105)	(0.0882)	(0.120)	(0.116)
Government balance	-0.165	-0.155*	-0.163*	-0.173*	-0.462**	-0.365	-0.428*	-0.407	-0.733*	-0.484	-0.570*	-0.679
	(0.106)	(0.0879)	(0.0958)	(0.0949)	(0.208)	(0.242)	(0.237)	(0.250)	(0.423)	(0.364)	(0.303)	(0.448)
Exchange rate volatility	0.0882*	0.114**	0.113**	0.0806*	0.132	0.219	0.195	0.137	0.513	0.546**	0.500	0.483
	(0.0447)	(0.0455)	(0.0449)	(0.0432)	(0.226)	(0.267)	(0.275)	(0.234)	(0.331)	(0.279)	(0.329)	(0.363)
Banking crisis (dummy)	1.323	1.643**	1.625**	1.283*	-2.032	-2.123	-1.714	-2.027	8.610	11.07***	10.42*	8.609
	(0.799)	(0.631)	(0.703)	(0.721)	(2.062)	(2.389)	(2.271)	(2.203)	(5.898)	(4.022)	(5.815)	(7.010)
Lagged volatility	-0.0903	-0.116	-0.171**	-0.118*	0.0465	0.0542	0.0786	0.0468	0.0806	0.105	0.0105	0.0324
	(0.0899)	(0.0711)	(0.0788)	(0.0692)	(0.0697)	(0.0659)	(0.0904)	(0.0746)	(0.187)	(0.151)	(0.182)	(0.189)
GDP growth per capita	-0.136*	-0.167*	-0.141	-0.147*								
	(0.0777)	(0.0848)	(0.0866)	(0.0825)								
Consumption growth per capita					-0.304	-0.256	-0.268	-0.266				
					(0.291)	(0.261)	(0.251)	(0.253)				
Investment growth per capita									0.0398	-0.0218	0.108	0.0328
									(0.222)	(0.182)	(0.221)	(0.204)
Observations	428	429	431	429	320	320	321	320	320	320	321	320
Number of countries	78	78	78	78	78	78	78	78	78	78	78	78
Hansen test p-value	0.686	0.794	0.850	0.700	0.767	0.764	0.749	0.718	0.899	0.916	0.625	0.847
A-B AR(2) test p-value	0.233	0.271	0.182	0.283	0.398	0.402	0.382	0.399	0.851	0.789	0.912	0.936

Windmeijer (2005)-corrected standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Period dummies and a constant were included but not reported.

Table II.2 System GMM Estimates for the Extended Model
(Dependent variable: Standard Deviations of GDP, Consumption, and Investment Growth)

VARIABLES	GDP				Consumption				Investment			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Liability	-0.0261				0.000696				-0.264			
	(0.0426)				(0.0914)				(0.164)			
Square of Liability	-9.29e-06				-0.000863				0.00104			
	(0.000340)				(0.000814)				(0.00132)			
Asset		-0.0384				-0.145*				-0.385***		
		(0.0368)				(0.0837)				(0.138)		
Square of Asset		0.000245				0.000570				0.00247**		
		(0.000274)				(0.000650)				(0.00106)		
Credit			-0.0558				-0.133*				-0.504***	
			(0.0338)				(0.0791)				(0.123)	
Square of Credit			0.000381				0.000640				0.00350***	
			(0.000262)				(0.000625)				(0.000992)	
Deposit				-0.0590				-0.0788				-0.330*
				(0.0399)				(0.121)				(0.174)
Square of Deposit				0.000305				-0.000397				0.00185
				(0.000325)				(0.00111)				(0.00163)
p-value for FD joint	0.0528	0.493	0.227	0.0580	0.0321	0.0192	0.0406	0.0187	0.0224	0.0148	0.000355	0.0231
Threshold	-1408	78.49	73.22	96.56**	0.403	127.6*	103.8**	-99.16	127.1	78.05***	72.03***	89.19***
Threshold SE	53723	21.53	13.91	42.75	52.61	79.97	46.00	424.2	90.17	10.84	7.262	37.43
Threshold t-statistic	-0.0262	3.645	5.262	2.259	0.00766	1.596	2.256	-0.234	1.410	7.202	9.920	2.383
Observations	428	429	431	429	320	320	321	320	320	320	321	320
Number of country_code	78	78	78	78	78	78	78	78	78	78	78	78
Hansen test p-value	0.968	0.934	0.926	0.967	0.812	0.709	0.932	0.772	0.861	0.712	0.712	0.772
A-B AR(2) test p-value	0.222	0.315	0.192	0.314	0.426	0.378	0.426	0.472	0.906	0.995	0.728	0.839

Windmeijer (2005)-corrected standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Controls, period dummies and a constant were included but not reported.

III. FINANCIAL DEEPENING: A COMPARISON ACROSS TIME AND DIMENSIONS[6]

This note provides stylized facts on recent patterns in financial deepening across LICs and EMs, and within LICs. Looking at markets as well as financial institutions, it sheds light on how funds are intermediated, the efficiency of their allocation, and how broadly they can be accessed.

39.   **Financial deepening.** Financial deepening is a multidimensional process, involving a range of markets (e.g., primary, secondary, and retail markets), instruments (e.g., deposits, loans, foreign exchange, equity, and debt securities), and players (e.g., banks, contractual savings institutions, corporate). It can be defined as a process whereby financial institutions and markets (i) ease the exchange of goods and services (e.g., payment services), (ii) mobilize and pool savings from a large number of investors, (iii) acquire and process information about enterprises and possible investment projects, thus allocating society's savings to its most productive use, (iv) monitor investments and exert corporate governance, and (v) diversify and reduce liquidity and inter-temporal risk (Levine, 2005; King and Levine, 1993). In other words, financial deepening can be understood as a process through which the range of products and players is expanded, maturities are lengthened, and services provide for hedging and risk diversification.

40.   **Indicators.** While the concept of financial deepening is defined through services provided to the economy, it is gauged using quantitative indicators referring to the size, efficiency, liquidity, and reach of financial systems. These indicators are usually specific to different segments of the financial sector, which specialize in the provision of different financial services.[7] Accordingly, financial depth indicators capture the size and liquidity of banking systems, insurance companies, pension funds and capital markets. In addition, indicators on the use of financial services provide information on access to financial services by households and firms.

A. Sectoral Trends

41.   **Financial structure.** LIC financial systems remain largely bank-based. Banks are the main players in the chain of payments, money and foreign exchange markets, and play an important role in the government securities market. Based on two indicators of financial structure for which data are available for LICs, structure-size (stock market capitalization to GDP divided by bank credit to GDP) and structure-activity (stock market value traded to GDP divided by bank credit to GDP), Figure III.1 shows the larger weight of the banking sector in the median LIC relative to markets as compared with EMs.

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[6] Prepared by Marco Arena, Sarwat Jahan, Mwanza Nkusu and Ke Wang (all SPR). Research assistance from Di Wang (SPR) is greatly acknowledged.

[7] For instance, each type of market provides a different set of opportunities for investment and risk, and each requires pre-requisites.

Figure III.1 Relative Importance of Banking Systems in LICs and EMs
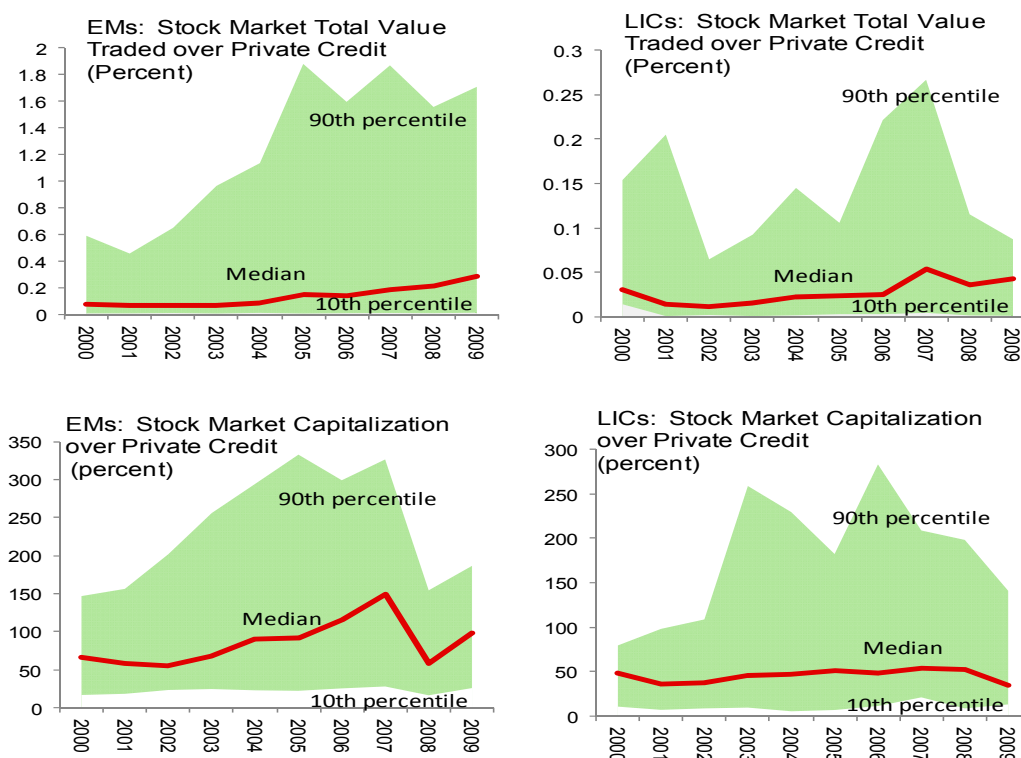
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset. and staff calculations.

Banking systems

42. **Deepening.** LICs have deepened their banking systems over the past two decades, but remain small relative to EMs (Figure III.2).

- The median expansion of credit to the private sector in LICs has occurred at a faster pace than in EMs, doubling since the mid-1990s. However, the median ratio of deposits to GDP has shown an even more rapid increase, rising from 16 percent of GDP to 33 percent of GDP between 1995-2009. This has resulted in a declining loan-to-deposit ratio (from 85 percent in 2000 to 73 percent in 2009), pointing to low intermediation efficiency in banking. This low efficiency is consistent with the observation that banks in many LICs prefer to invest in government securities rather than private sector loans. It also reflects access constraints and structural excess liquidity in some LICs (Ferhani, et al. 2009).

- While the growth rate of liquid liabilities is similar for both EMs and LICs over the last decade, the median value of the ratio of liquid liabilities to GDP in 2009 is around 45 percent for EMs, compared to almost 30 percent for LICs. However, this median performance masks substantial variation within LICs. For instance, the ratio of bank liquid liabilities for the top 10th percentile of LICs was almost twice the EM median.

43.   Heterogeneity. There is considerable heterogeneity in observed patterns of banking sector deepening across LICs. Examining trends in the ratios of private credit and deposit to GDP across regions, and by country characteristics over 2000-2009, the following patterns emerge (Figure III.3):

- Across regions, the median LIC in Latin America and the Caribbean (LAC) and in Asia exhibits levels of banking system depth comparable to the EM median. By contrast, LICs in SSA and Middle East and North Africa (MNA) tend to have significantly smaller banking systems.

- By country characteristics, non-oil exporters tend to have deeper banking systems compared to oil exporters. In particular, the median ratio of private credit to GDP in oil exporters (most of which are in SSA and MNA), is only one fourth the ratio for an economy with a more diversified export base. This is consistent with findings by Beck (2011) who points to a natural resource curse in financial development. This stems from supply-side constraints (e.g., a lower reliance on external financing by enterprises) and poor intermediation quality in these countries.

44.   Wide interest margins. Banks in LICs not only lend less than in other countries, but also charge more (Figure III.4). One striking characteristic of banking in LICs is high interest rate spreads and margins, which are an indication of banking system inefficiencies. While net interest margins, which measure the gap between what banks pay the provider of funds and what they get from firms and other users of bank credit, have declined since the mid-1990s, they remain high in comparison to emerging markets. Within LICs, however, there are differences, with Asian LICs typically showing significantly lower cost structures than LICs in SSA.

45.   Short maturity structure. Banking is mostly short term in LICs, as evidenced by the maturity structure on the asset and liability sides of bank balance sheets. While data on the maturity structure of bank deposits and loans are not available for all LICs, data for 12 SSA LICs suggests that there is a bias towards shorter maturities (Beck et al., 2011). For instance, more than 80 percent of deposits had a maturity of less than one year, and less than 2 percent of deposits had a maturity of more than 10 years. The maturity distribution is not as extreme on the loan side, though it is also biased toward the short end. On average, 56 percent of loans had a maturity below one year in 2009, and 27 percent of between 1 and 3 years. By contrast, the share of short-term credit in total credit was, on average, 37 percent and 28 percent in middle-income and advanced countries, respectively.

Non-bank Segments

46.   Stock markets. Less than half of LICs have a stock market. For the 16 countries for which data are available, the median ratio of stock market capitalization to GDP has more than doubled since the early 2000s, led largely by the frontier markets (Figure III.5). Liquidity, however, remains low and access to equity markets concentrated in a few enterprises, with banks and nonbank financial institutions constituting a large share of listings. By comparison, median EM capitalization was around three times that of LICs, with significantly higher turnover. Stock markets in EMs are not only larger, but also have significantly higher turnover and liquidity.

Figure III.2 Banking System Depth in EMs and LICs
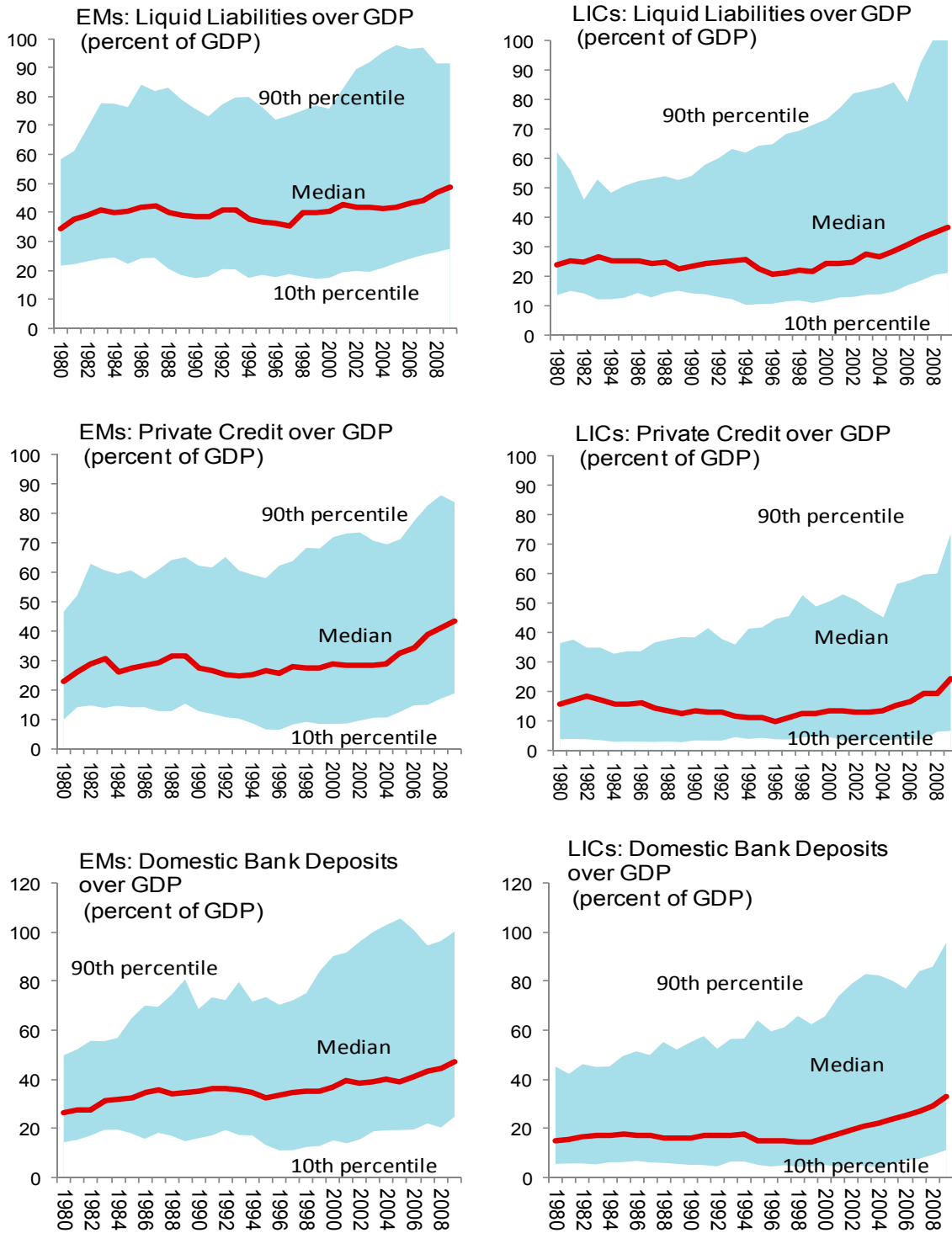
EMs: Liquid Liabilities over GDP (percent of GDP)

LICs: Liquid Liabilities over GDP (percent of GDP)

EMs: Private Credit over GDP (percent of GDP)

LICs: Private Credit over GDP (percent of GDP)

EMs: Domestic Bank Deposits over GDP (percent of GDP)

LICs: Domestic Bank Deposits over GDP (percent of GDP)

Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset and staff calculations.

Figure III.3 Heterogeneity in Patterns of Deepening Across LICs, 2000-2009
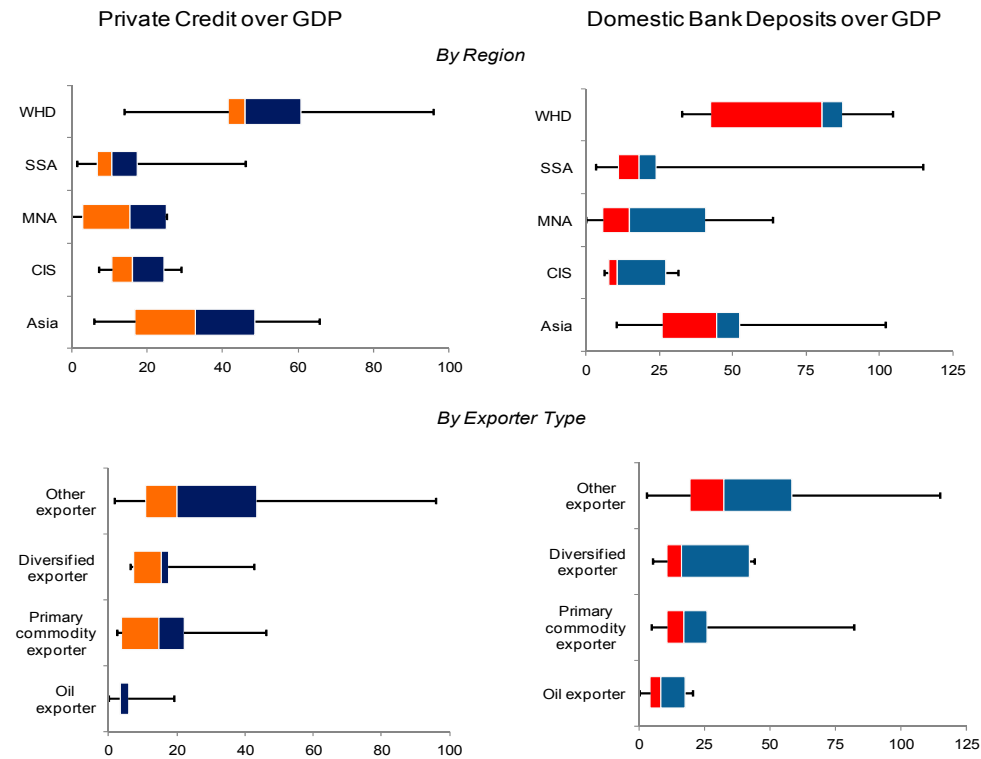
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset and staff calculations.

Note: The figures show the min, max, median, and inter-quartile range for the relevant variables.

Figure IIII.4 Net Interest Margins in EMs and LICs
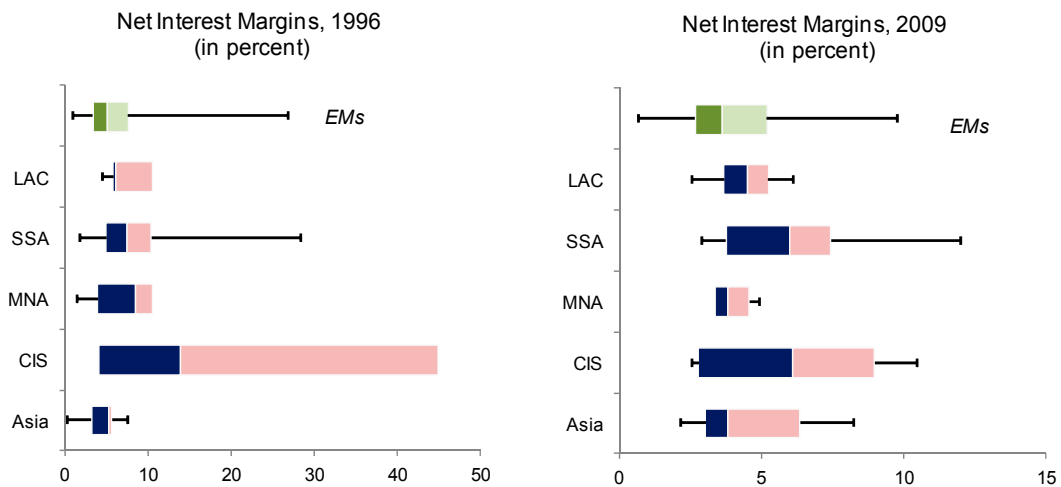
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset and staff calculations.

Figure III.5 Financial Deepening in Stock Markets

EMs: Stock Market Capitalization over GDP
(percent of GDP)

LICs: Stock Market Capitalization over GDP
(percent of GDP)
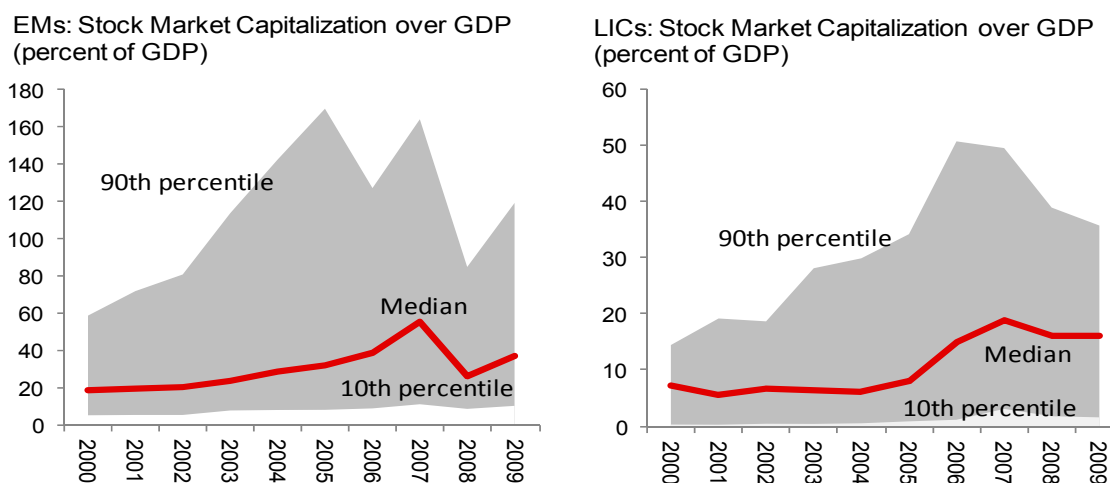
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset and staff calculations.

47. **Institutional investors (insurance and pension funds).** As providers of financial services for long-term savings and risk sharing (e.g., health, life, property, and employment), insurance and pension funds can facilitate the growth of capital markets. Contractual savings institutions are, however, in their infancy in most LICs. Based on available data for the period 2007-2009, Figure III. 6 shows that most LICs exhibit insurance asset ratios of less than 2 percent of GDP. Nevertheless, for a small group of LICs (e.g., Kenya, Vietnam, and Bolivia), insurance assets exceed the median value for EMs (3.5 percent of GDP). However, insurance companies in LICs are typically focused on non-life segments of business, while the life segment typically constitutes a small share of their business. In the case of pension funds, a small number of LICs (e.g., Bolivia, Kenya, Nepal, and Madagascar) have pension fund assets that exceed the median values for EMs. However, even in these countries, pension funds typically do not match their long-term liabilities with investment strategies.

48. **Bond markets.** The small size and liquidity of equity and contractual savings institutions is mirrored on the bond side of capital markets. While LICs have generally increased primary government bond issuances during the last two decades, private bond issuance is limited to only a few frontier markets (e.g., Vietnam and Nigeria). However, the number of issuances is much lower in LICs than in EMs (22 sovereign issuances in LICs during the last decade as compared to 4116 in EMs). Moreover, most LICs do not have secondary bond markets, or markets tend to be illiquid if they exist.

Figure III.6 Insurance and Pension Funds

Pension Fund Assets,
(Median, in percent of GDP, 2000-09)

Insurance Company Assets,
(Median, in percent of GDP, 2007-09)
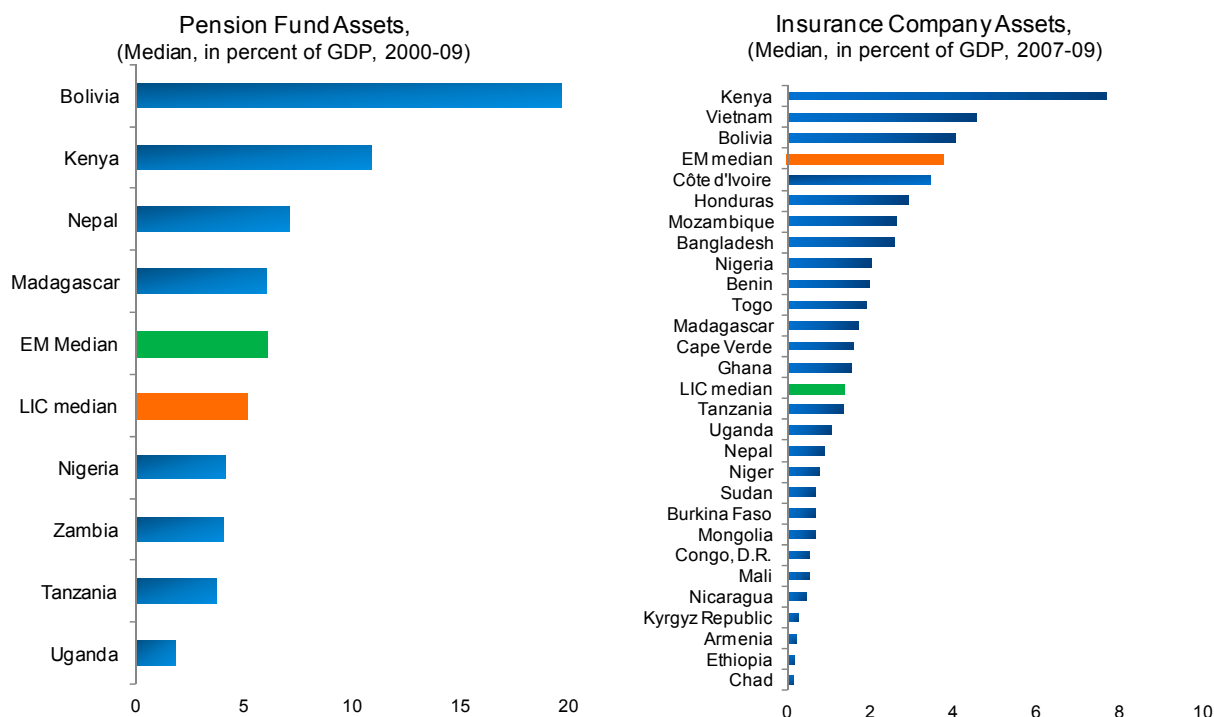
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset.

B. Exploring Heterogeneity

49. **Backdrop for deepening.** Institutional, legal and regulatory characteristics of an economy provide the backdrop against which financial institutions and markets operate. These characteristics critically influence the degree of financial deepening. Below, we examine how patterns of deepening across LICs have varied depending on the strength of four variables: governance, investment protection, bank capital regulation, and the degree of financial integration. For each variable, we split the sample for both EMs and LICs by the top 33rd and the bottom 66th percentile. The sample of countries in the top 33rd percentile of the relevant variable then represents countries with stronger institutional and regulatory characteristics (Figure III.7).

- **Governance quality.** A low degree of governance undermines not only the market-based provision of financial services, but also reform attempts and government interventions aimed at fixing market failures (Beck, et al., 2011). In addition, a, low degree of governance could affect the ability of financial institutions and markets to manage idiosyncratic and systemic risks. As shown in Figure III.7, LICs with better governance quality, as proxied by the Kaufmann, et al. (2010) measure, exhibit higher levels of banking sector deepening over the period 2000-2009, mirroring the performance of EMs with strong governance, as compared to EMs and LICs with low levels of governance.

- **Protection of private contracting rights**. Figure III.7 shows that LICs with higher standards of investor protection,[8] exhibit higher levels of credit to the private sector and bank deposits to GDP, compared to LICs with lower investor protection standards. Similarly, LICs with more stringent bank capital regulations exhibit higher levels of financial deepening than LICs with less stringent bank capital regulations, but the median values are lower than those observed in EMs with less stringent bank capital regulations.

- **Financial integration.** Through the process of integration with international financial markets, countries can benefit from a broad range of both investment and risk sharing instruments, and financing and risk management institutions, thus increasing the depth and breadth of domestic financial systems (de Gregorio 1996). Using de facto indicators of the degree of financial integration,[9] more financially integrated LICs exhibit higher levels of banking sector deepening compared to both LICs and EMs with lower degrees of financial integration.

C. Access to Financial Services in LICs

50.   Access and use of financial services. Access to and use of financial services by a large share of households and enterprises is an important dimension of financial development. Conceptually, there is a need to distinguish between access and use. Access refers to the supply of reasonable quality of financial services at reasonable costs, where reasonable quality and reasonable costs are defined relative to some objective standard (Claessens, 2006). As such, access is a supply notion. The observed use of financial services reflects the intersection of supply and demand schedules. Against this backdrop, availability is a necessary, but not sufficient condition for widespread use of financial services.

51.   Measurement. Measuring access is difficult because what is observed is use of financial services rather than access per se. Nonetheless, researchers have tried to examine availability via quantitative indicators, including the geographic accessibility (captured by branch or ATM penetration), documentation requirements (captured by the number of documents required to open an account) and affordability (captured by account fees for instance). These dimensions have a bearing on the use of financial services. We examine access at the level of both households and firms by comparing indicators of the use of deposit and lending services across countries and income groups. While financial deepening and access occur through several markets or service providers, we restrict our analysis to microfinance institutions (MFIs) and banks. As LIC financial systems are predominantly bank-based, access to banking services should provide a good picture of access to financial services.

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[8] The strength of investor protection index (ranges from 0 to 10) distinguishes between 3 dimensions of investor protection: transparency of related-party transactions (extent of disclosure index), liability for self-dealing (extent of director liability index) and shareholders' ability to sue officers and directors for misconduct (ease of shareholder suits index). The data is from the World Bank's Doing Business Database.

[9] Integration is measured as gross private capital flows (sum of inflow and outflows) in percent of GDP (Lane and Milesi-Ferretti, 2010).

Figure III.7 Measures of Financial Deepening and Governance, Investor Protection, and Financial Integration
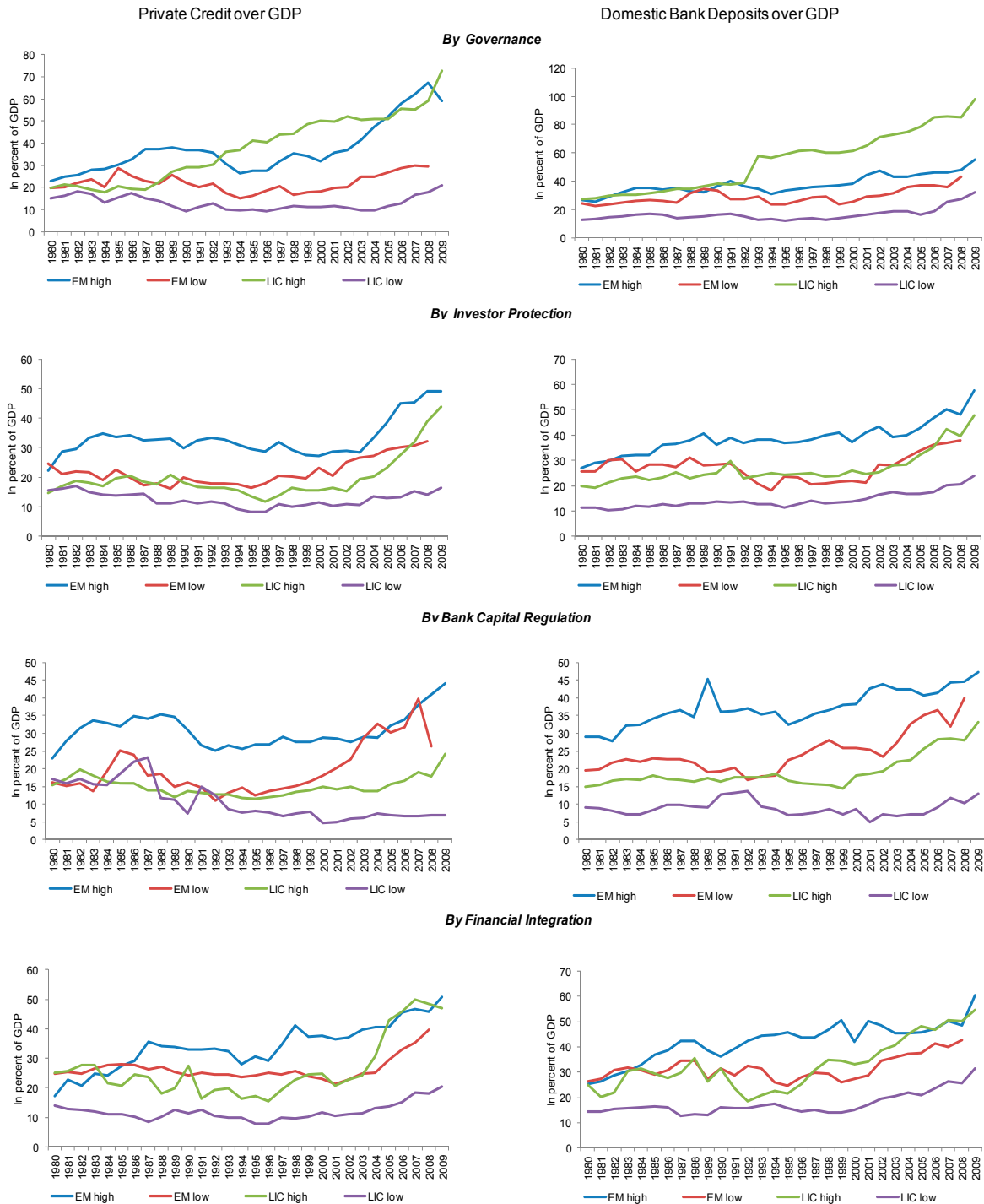
Source: Updated Beck, Demirguc-Kunt, and Levine (2010) dataset, Kaufmann, et al., (2010), World Bank, Lane and Milesi-Ferretti,

(2010), and staff calculations.

Note: High (low) represents the top 33rd percentile (bottom 66th percentile) of the relevant policy variable using data from 2002-09.

D. Households Access to Financial Services

52.   Limited household access. Use of banking services in LICs has improved notably over the period 2004–09, but LICs continue to lag EMs, albeit with substantial variation within LICs. Over this period, the median number of commercial banks' deposit accounts per thousand adults as well as bank branches per 100,000 adults broadly doubled in LICs (Figure III.8). However, gaps between LICs and EMs widened in absolute terms as LICs started from a very low base. On almost all indicators of use of banks' deposit or loan services, medians for LICs in 2009 are roughly half of the EM median in 2004.

53.   Role of MFIs. MFIs help ease access to deposit and credit services in LICs, but are far from filling the gaps observed in the use of banking services. Over the period 2004–09, households' use of MFIs' deposit and loan services increased more in LICs compared with EMs (Figure III.9). However, as of end-2009, even after combining the rates of deposit ownership in banks and MFIs, LICs had less than a quarter of the deposit accounts of EMs per 1000 people. Also, LICs have nearly one-third as many borrowers per 1000 people as do EMs. The wide gaps between EMs and LICs are driven by differences in the use of banking services rather than MFIs.

54.   Heterogeneity. The general characterization of differences in access to banking services between EMs and LICs masks substantial variation across regions and countries. For instance, across regions, the average number of deposits per 1000 adults for LICs in the Commonwealth of Independent States (CIS) exceeds that of EMs. LICs in SSA and MNA trail all regions for both deposit accounts and loans per capital. At the country level, some LICs have greater access to and use of banking services than the median EMs. Within LICs, Asia, LAC, and SSA are the top three users of MFIs' deposit accounts while LAC, the CIS, and Asia are the top three users of MFIs lending services. MNA LICs lag all country groups and regions with very little use of both MFI deposit and lending services (Figure III.9).

- *Deposits.* Medians for LICs in LAC and Asia are roughly twice and one and half time as much as the median for all LICs, respectively. LICs in CIS are lagging their peers in all regions, except MNA where the use of MFIs' services is marginal.

- *Loans.* LICs in LAC and CIS lead all regions, with median loans per 1000 people of 75½ and 52, respectively. SSA trails all regions, surpassing only MNA.

- *Cross-country heterogeneity.* Although LICs as a group use more MFIs services than do EMs, LICs such as Congo DRC and Nigeria have very low rates of MFI penetration. By contrast, in Sri Lanka and Mexico, rates of penetration of MFI services exceed the LIC median.

Figure III.8 Households' Access to and Use of Banking Services, 2004–09
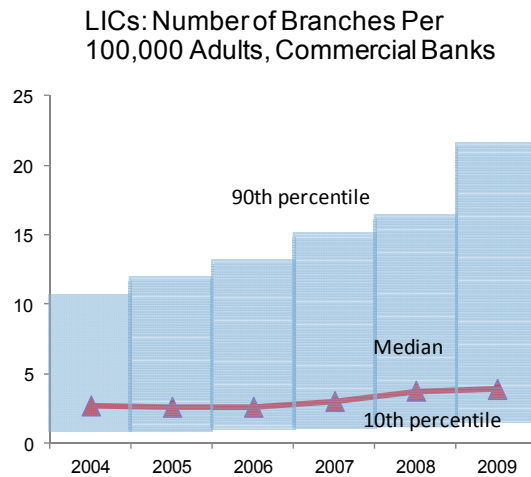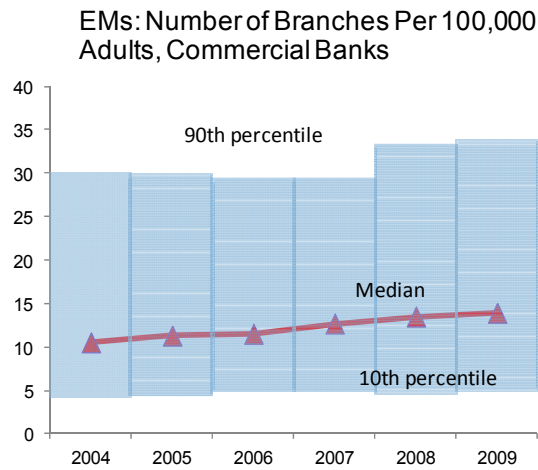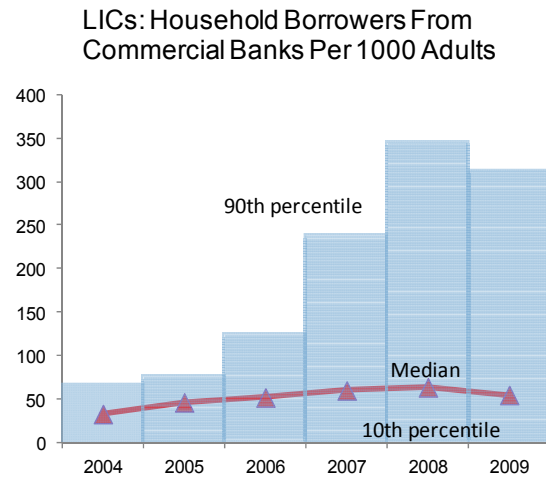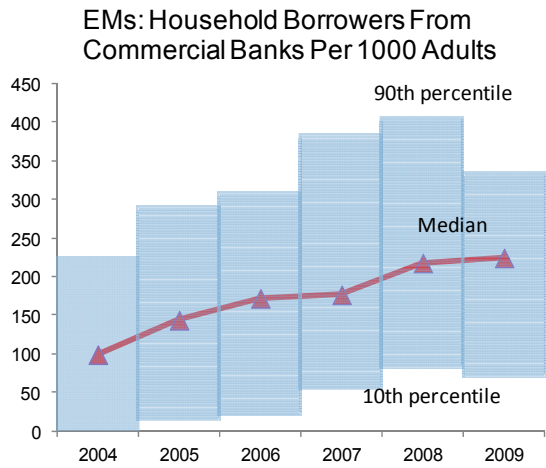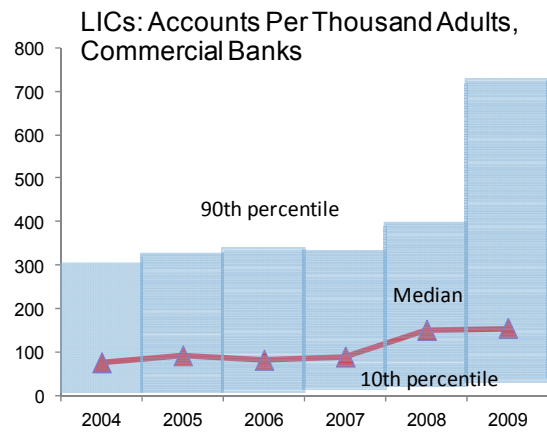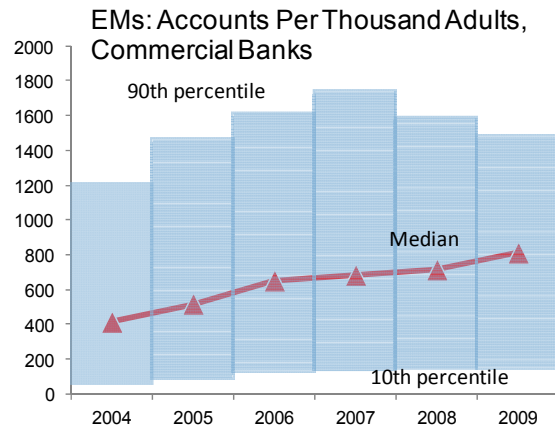
Source: Financial Access Survey (FAS) and staff estimates

Figure III.9 Households' Use of MFIs' Loan and Deposit Services, 2004 and 2009
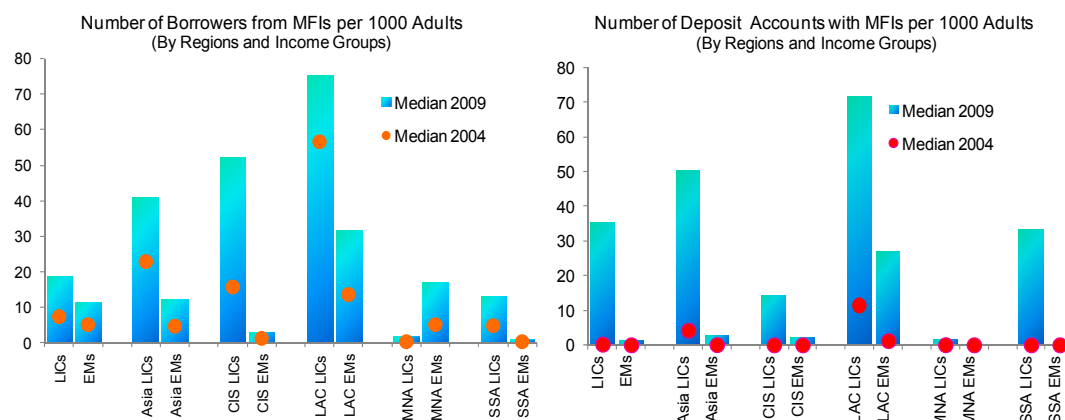
Source: CGAP database and Mixmarket database.

55.   Barriers to access. The literature points to wide-ranging barriers to access to financial services in LICs. These include physical distance, discrimination, lack of education, and high fees and minimum balances (Claessens, 2006). Other relevant factors include high transaction costs and the number of documents required to open an account or get a loan. Physical distance limits financial institutions' ability to penetrate remote areas when the transportation and communication infrastructures are underdeveloped. Poor quality of institutions and the associated high transaction costs discourage banks from engaging in transactions that are too small to be profitable. These barriers may limit access to services from both banks and MFIs, and explain why informal financial systems (e.g., lending/borrowing among neighbors or village funds) are entrenched in many LICs (Townsend, 1994).

56.   Empirical evidence. Outreach indicators have been found to be positively associated with the overall level of economic development, the quality of the institutional environment, the degree of credit information sharing, and the development of the physical infrastructure (Beck et al., 2007). At the same time, outreach indicators are negatively correlated with the cost of enforcing contracts and the degree of government ownership of banks. Similarly, Beck et al. (2008) find that barriers are higher in countries with more stringent restrictions on bank activities and entry, less disclosure and media freedom, and poorly developed physical infrastructure. Studying the case of Mexican savings banks, Aportela (1999) confirms that physical distance is an important impediment to the use of formal savings services by the poor.

E.   Firms Access to Financial Services

57.   Imperfect information. Distinguishing whether the use of credit or external finance by firms stems from voluntary or involuntary exclusion is complex, particularly in countries with highly imperfect information. When information is imperfect, external financing bears high information costs (Stiglitz, 2000). Against this backdrop, limited use of formal credit may reflect firms' preference

in light of potentially high credit costs. Information asymmetries can also make lenders unwilling to lend to some firms. Therefore, limited use of credit can reflect voluntary exclusion as well as credit rationing à la Stiglitz and Weiss (1981).[10]

58.   Firm-level evidence. To gain insights into firms' access to finance, we distinguish firms by different characteristics using the World Bank's Enterprise Surveys (WBES). The WBES provides firms' responses to questions of whether credit is a constraint to their operations or if they use bank credit to finance working capital or fixed assets. The country averages are given by year and by type of firms. Firms are distinguished by sector of involvement—exports/non-exports, and also by size— small, medium, and large.[11] There is substantial evidence that small firms are more credit-constrained than larger ones. It is widely believed that exporters have relatively easy access to bank finance compared with non-exporters as banks act as intermediaries through which they receive export proceeds. The firm-level data confirms expectations, but with a few surprises (Figure III.10).

- *Access by income groups.* Firms in LICs are more credit-constrained than their peers in other income groups. Further, within LICs, small and medium-size enterprises and non-exporting firms are more credit-constrained.

- *Access by firms' size.* In almost all the regions, large firms face lower credit constraints than medium and small ones, except in MNA where surveys suggest large firms are more constrained than even small ones.

- *Access by firms' sector of activity.* Exporters are less credit-constrained than non-exporters, except in the CIS and MNA EMs.

- *Use of bank credit to finance working capital or fixed assets.* Across income groups, there is a larger share of firms using bank credit to finance working capital than fixed assets. Exporters tend to rely more on bank credit to finance fixed capital than non-exporters. Also, the smaller the firm, the lower is the share of bank credit in firm financing of fixed assets.

59.   Heterogeneity. LICs in the LAC region have greater use of bank credit than LICs in other regions (and even EMs), while firms in MNA and SSA LICs are the most credit-constrained. Across countries, firms in some LICs seem to be less credit-constrained or to have greater use of bank credit than their EM peers. For instance, in Bolivia, Cambodia, and Laos, the share of firms that report access to credit as a constraint is lower than in Argentina and Lebanon. Moreover, a larger share of firms in Bangladesh, Cameroon, and Ethiopia use bank financing compared with Mexico, Philippines, and Jordan, where the share of firms that use bank credit is close to the LIC average. The lower share of firms that use bank credit in some EMs compared with LICs may simply reflect the

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[10] Owing to information asymmetries and associated costs, firms' prefer less information-sensitive sources of finance leading to a pecking order in finance, according to which firms use internal funds first, followed by issuance of short-term debt, and long-term debt, leaving equity issuance as the last resort (Myers and Majluf, 1984).

[11] A firm is classified as exporter if exports account for more than 10 percent of its sales. The classification by size is based on the number of employees. Small, medium, and large firms have 5 to 19 employees, 20 to 99 employees, and 100 employees or more, respectively.

fact that financial systems in the former are more market-oriented, allowing for greater use of arm's length finance.

Figure III.10 Firms' Access to Finance

Share of Firms that Report Access to Finance as a Constraint
(By firms' size, average, in percent, 2002–2010)

Share of Firms that Report Access to Finance as a Constraint
(By firms' sector of activity, average, in percent, 2002–2010)

Share of Firms that Use Bank Credit to Finance Capital
(By Firms' Size and Type of Capital Financed,
average, in percent, 2002–10)

Share of Firms that Use Bank Credit to Finance Capital
(By Firms' Sector of Business and Type of Capital Financed,
average, in percent, 2002–10)

Share of Firms that Report Access to Finance as a Constraint
(By firms' size and region, average, in percent, 2002–2010)

Share of Firms that Report Access to Finance as a Constraint
(By firms' sector of activity and region, average, in percent, 2002–2010)

Source: The World Bank's Enterprise Surveys and author's calculations.

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IV. FINANCIAL POSSIBILITY FRONTIER[12]

This note presents a conceptual framework to examine the potential scope for financial deepening in a country, drawing on the notion of a financial possibility frontier. It introduces a statistical benchmarking exercise developed by the World Bank that allows for unpacking the role of structural vs. policy and institutional factors in driving deepening. The note also presents some initial considerations in assessing when deepening is sustainable or presents risks.

60.   Conceptual framework. How far can and should countries go in facilitating financial deepening? How realistic is it to expect low-income countries (LICs) to deepen and diversify financial systems to the levels observed in emerging market countries? Should access to the formal financial system reach 100 percent of the population or all LICs necessarily have bond markets? The analytical concept of a *financial possibility frontier* is utilized to frame the discussion on the potential scope for deepening in LICs. In reality, financial deepening in a country reflects the ease with which market frictions are ameliorated. This is critically influenced by country characteristics, which often lie outside the purview of policies (at least in the short-run), policy choices, and institutions. At the same time, the move from relationship-based (characteristic of banking) to arms-length finance (critical for capital markets) reflects a natural sequencing in market development, as well as the importance of scale and scope effects.

61.   Role of market frictions. The typical market frictions that interact to affect the process of financial deepening are associated either with information, enforcement, or transactions costs (Levine, 2004; Merton and Bodie, 2004; de la Torre et al., 2011). For simplicity of exposition, we bundle them into two broad categories:[13]

- *Transactions costs.* Fixed transaction costs in financial service provision (at the level of a transaction, institution, and even the system as a whole) result in decreasing unit costs as the number or size of transactions increase.[14] For instance, processing an individual payment or savings transaction entails costs that, in part, are independent of the value of the transaction. Fixed costs also arise at the level of the financial system (e.g., regulatory costs and the costs of payment, clearing, and settlement infrastructure) which are, up to a point, independent of the number of institutions regulated or participating in the payment system. The resulting economies of scale at all levels explain why, for instance, smaller economies can typically only

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[12] Prepared by Professor Thorsten Beck (Tilburg University), Era Dabla-Norris (SPR), and Adolfo Barajas (SPR) with input from Enrico Berkes (RES).

[13] For the following, see a similar discussion in Beck and de la Torre (2007) and Bond (2004) for a comprehensive treatment of transactions costs.

[14] The effect of fixed costs on financial service provision can be reinforced by network externalities, where the marginal benefit to an additional customer is determined by the number of customers already using the service (Claessens et al., 2003). This is especially relevant for the case of payments systems and capital market development where benefits and thus demand (or participation) increases as the pool of users expands.

sustain small financial systems (even in relation to economic activity), and why there are binding constraints to broadening financial access in remote areas. Further, scale effects in payments and settlement infrastructure and regulation (and network effects) tend to be even stronger in the case of capital markets, suggesting that not all countries will find it possible to develop local capital markets.

- *Systemic and idiosyncratic risks.* The depth, diversity, and reach of financial systems is constrained by risks, both systemic (e.g., non-diversifiable within a given economy and, thus, affecting all financial contracts) and contract-specific/idiosyncratic (e.g., agency frictions arising from information asymmetries between debtors and creditors; costly contract enforcement; limits to the possibility of diversifying risks). Systemic risk also influences the ability of financial institutions to manage idiosyncratic risks. For instance, high macroeconomic uncertainty and deficient contract enforcement exacerbate agency problems. At the same time, the easing of agency frictions in the absence of adequate oversight can create incentives for excessive risk-taking by market participants (by failing to internalize externalities), fueling financial instability (see de la Torre et al., 2011, for a discussion of the "dark side" of finance).

62.   State variables. The efficiency with which financial institutions and markets can overcome market frictions is critically influenced by a number of state variables—factors that are invariant in the short-term—that affect provision of financial services on the supply-side and can constrain participation on the demand-side. State variables, thus, impose an upper limit of financial deepening in an economy at a given point in time. These include a large array of factors identified in the empirical literature as drivers of financial deepening across a range of institutions and markets[15]: (i) structural variables (income, savings, market size, population density, and age dependency ratios); (ii) macroeconomic management and credibility (degree of fiscal discipline, level of inflation); (iii) legal, contractual, and information frameworks (e.g., enforceability of contracts, credit registries, accounting and auditing standards, effective arrangements for debtor and collateral information sharing); (iv) prudential oversight; (v) available technology and infrastructure (e.g., quality of the transportation and communications infrastructure); and (vi) socio-economic factors (e.g., conflict, financial illiteracy). As such, financial deepening is a complex process characterized by feedback effects between the various state variables as well as lags.

63.   Financial possibility frontier. Using the concept of state variables allows us to define the financial depth frontier as a rationed equilibrium of realized demand and supply variously affected by market frictions. In other words, this is the maximum *sustainable* depth (e.g., credit or deposit volumes), outreach (e.g., share of population reached) or breadth of a financial system (e.g., diversity of domestic sources of long-term finance) that can be realistically achieved at a given point in time. Conceptually, the frontier can vary for different types of financial services, depending on the sources

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[15] See, among others, Demirguc-Kunt (2006) and Beck (2006) for a literature survey; Beck et al. (2008) for an analysis of relevant structural determinants of financial development across different institutions and markets; Garcia and Liu (1999) and Chami et al. (2009) for stock market development, Feyen et al. (2011), and Enz (2000) for insurance markets; Eichengreen, and Luengnaruemitchai (2004) for bond markets; Beck et al. (2007) and Claessens (2006) for access to financial services.

of market frictions. For instance, the frontier for payment and savings services and equity markets, where transaction costs are the decisive constraint, can be different from that for credit and insurance services, where risk is an additional important component.

64. **Taxonomy of challenges faced in deepening.** Below, we provide a broad taxonomy of challenges faced by LICs in broadening and deepening financial systems, generalizing from the above discussion. Box IV. 1 provides an illustration of this taxonomy in the case of access to payment services.

- *The financial possibility frontier may be low* relative to countries at similar levels of economic development due to deficiencies in state variables. Here we can distinguish between the role played by structural and other state variables. Among structural variables, low population density, and small market size increase the costs and risks for financial institutions, excluding large segments of the population from formal financial services. In addition, economic informality of large parts of the population lowers demand for as well as supply of financial services. Second, absence of an adequate legal, contractual and institutional environment or persistent macroeconomic instability can explain a low frontier. For instance, limited capacity to enforce contracts and, more generally, poor protection of property rights can discourage long-term investments and arms-length financial contracting. Similarly, persistent macroeconomic instability can prevent deepening of markets for long-term financing.

- *There is the possibility that a financial system lies below the frontier*, i.e. below the constrained maximum defined by state variables due to demand and/or supply-side constraints. Demand-side constraints can arise if, for instance, the number of loan applicants is too low due to self-exclusion (e.g., due to financial literacy) or on account of a lack of investment projects in the economy (e.g., as a result of short-term macroeconomic uncertainty). Supply-constraints influencing idiosyncratic risks or those artificially pushing up costs of financial service provision might also serve to hold the financial system below the frontier.[16] For instance, lack of competition or regulatory restrictions might prevent financial institutions and market players from reaching out to new clientele or introducing new products and services. Similarly, regulatory barriers could prevent deepening of certain market segments as can weak creditor information or opacity of financial information about firms.

- *The financial system can move beyond the frontier*, indicating an unsustainable expansion of the financial system beyond its fundamentals. For instance, "boom-bust" cycles in economies can occur in the wake of excessive investment and risk taking (often facilitated by loose monetary policy) by market participants. Experience from past banking crises suggests that credit booms and subsequent busts typically occur in environments characterized by poorly defined regulatory and supervisory frameworks. Financial innovation and regulatory ease can also foster rapid deepening (e.g., proliferation of non-bank financial intermediaries in many LICs), but poses

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[16] It should be noted that lack of private sector participation could also result from other frictions in the economy. For instance, barriers to doing business, tax distortions that discourage firm growth, directed subsidies to industries and sectors, among others, are examples of distortions complementary to credit market frictions which serve to constrain participation.

challenges for financial stability. Finally, fragility in many LICs is often linked to governance problems, so that an overshooting of the financial depth frontier may also be related to limited supervisory and market discipline.

Box IV.1 Access Possibility Frontier

Figure 1 illustrates the demand and supply for a standardized payment service for which the fee is independent of the amount to be transferred (see Beck and de la Torre, 2007). The horizontal axis represents the share of the population (households and firms) engaging in payment and savings transactions. The population is ordered along this axis starting with agents engaging in transactions that are large in value (and number) and moving toward agents engaging in transactions of increasingly lower value (and number). The downward sloping demand curve D* reflects the willingness to pay and the assumption that customers with a demand for large-value, high-volume transactions have a higher marginal willingness to pay than

customers relying on transactions that are fewer and smaller. The upward sloping supply curve S* reflects financial institutions' potential to reach out to a larger share of the population as the fee increases. The intersection of the supply and demand curves (point I) constitutes the access possibilities frontier, or the maximum commercially viable share of the population with access to formal payment and savings services (point A on the horizontal axis), given state variables. Note that the access possibility frontier can shift as a result of changes in state variables (e.g., higher level of income can increase potential demand; similarly, improvements in infrastructure or institutional environment can result in an expansion of the bankable population).

The Access Possibilities Frontier of Payment and Savings Services
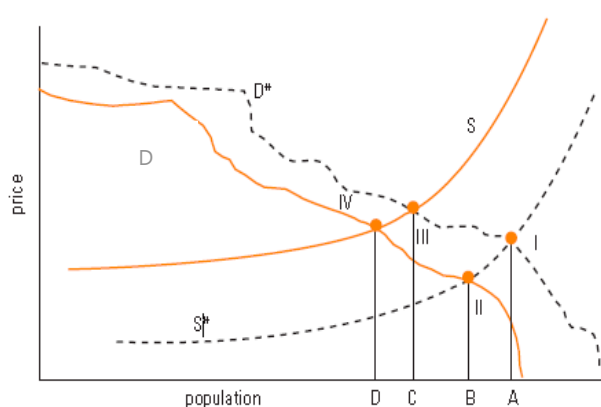
Source: Beck and de la Torre

The access possibilities frontier can be used to identify several types of problems in access to financial services:

- Supply sub-optimization, whereby financial institutions and markets settle at a point below the access possibilities frontier (curve S, point III). This might reflect, for instance, regulatory distortions or entry barriers that lead financial institutions to avoid exploiting outreach opportunities fully.

- A second type of access problem originates in demand. For instance, the number of loan applicants may be low because of the self-exclusion resulting from financial illiteracy (curve D, point II). Similarly, there might be a lack of demand for payment and savings services because these products may be accessed indirectly through family and friends or due to of lack of knowledge about the advantages of certain financial products.

- A final access problem pertains to an access possibilities frontier that is too narrow (curves S* and D*, point I) and thus reaches out to a very small bankable population on account of deficiencies in state variables relative to countries at similar levels of economic development.

- A different access problem that arises primarily in credit markets is associated with problems of excess supply (i.e., an equilibrium above the access possibilities frontier), whereby loans are granted to a larger share of loan applicants than is prudent based on the lending interest rate and the state variables.

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65. **Practical considerations**. The concept of the possibility frontier provides a useful framework to assess factors holding back or fueling too rapid a financial deepening. However, the question remains as to how we can discern a country's standing relative to its possibility frontier or in relation to other countries with similar characteristics in practice. Empirically estimating the financial possibility frontier for each type of financial activity in a country, let alone for the financial system as a whole, is a challenging endeavor given the large number of state variables that influence financial deepening. An important first step is to unpack the role of structural vs. other factors in deepening. As a second step, understanding the factors spurring deepening could provide insights into whether the observed deepening is sustainable or poses risks. Below, we provide a stylized example of what this unbundling implies in the context of the possibility frontier framework.

66. **Unbundling structural and other state variables.** A stylized example can help unpack the role of structural and other state variables in determining the level of deepening that can be realistically achieved (see text figure). Consider a LIC (country A) with a small and dispersed population ($STRUCT_A$). Financial depth, as proxied by the ratio of bank deposits to GDP, in this country will necessarily be low. In fact, historical analysis shows that, on average, countries matching A's structural characteristics tend to have a level of depth equal to SD_A. On the other hand, country B, richer and with a larger, more urban population ($STRUCT_B$), can be expected to have a higher level of depth, given by SD_B. The structural depth line therefore represents the expected level of depth given a country's *structural* characteristics.

Stylized Financial Possibility Frontier
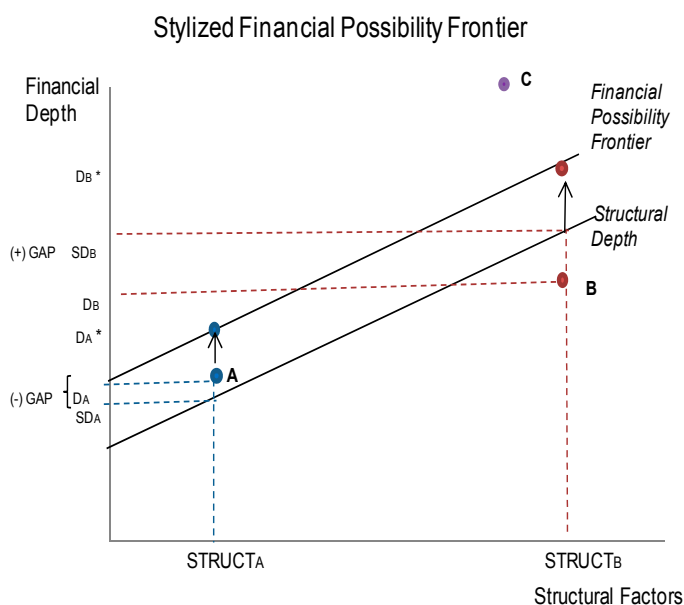
67. **Position relative to the frontier.** By improving their macroeconomic and financial policies, thus, providing an environment more conducive to financial deepening, countries can outperform their expected structural levels. For instance, country A, by enhancing competition in the banking sector, arrives at an actual financial depth DA, above its expected level (SD_A) in the figure above. Similarly, although country B has a noticeably higher absolute level of depth (DB) than does country A, it is actually underperforming relative to its peers with similar structural characteristics ($DB < SD_B$), suggesting room for improvement on the policy front. If both countries continue to improve their policies, they will eventually reach the possibility frontier, with levels of depth of DA* and DB*, respectively. However, some policy mixes may lead to levels of apparent depth that surpass the frontier (e.g., credit boom-bust cycles). For example, country C may temporarily outperform its possibility frontier, but this expansion will be unsustainable in the long-run. This stylized example suggests that assessing where countries stand relative to the structural depth frontier can provide information about the relative quality of their underlying policy and institutional environments.

68. **Benchmarking.** Because financial systems across the world fulfill similar functions and face similar market frictions, the financial deepening process should be broadly comparable empirically across countries and stages of development once appropriate controls are introduced (Beck et al., 2008). As such, using a broad statistical approach that controls for country-specific structural (non-policy) differences that have a bearing on financial deepening can help establish "benchmarks"— expected values of financial indicators against which actual performance can be assessed.[17] This empirical exercise constitutes an approximation to the *structural depth* line in the stylized example above, and can point to which financial services are underprovided, and which sectors or instruments are under-developed, helping identify possible gaps in the policy and institutional environment. Further, monitoring how financial indicators evolve (i.e. benchmarking a country's progress over time) can help in assessing the adequacy of the policy environment over time.

69. **Regression model.** A statistical benchmarking methodology developed by the World Bank (Feyen et al., 2011) relies on a worldwide financial database (FinStats, 2011), covering a large number of financial indicators for the period 1980-2010. The benchmarks are derived as the predicted values from quantile (median) regression analysis that accounts for income (GDP per capita as a proxy for economic development)[18] as well as its square (to account for non-linearities in the relationship between income and finance), country size (log of population to capture scale effects), population density (to capture the infrastructure costs of outreach), the age dependency ratio (to capture differences in savings trends and demand for financial service products,) other structural characteristics that have a bearing on financial development (dummies to capture status of a country as an offshore center, an oil exporter, or a country in transition), and year fixed effects.[19] Note that the regression model does not account for factors that directly capture financial policy. Instead, the objective is to account for factors that lie outside the policy purview (at least in the short-term). Deviations of the actual from the expected level of financial development can then be explained by the impact of policies and institutional quality in a country.

70. **Deepening—how much?** How can we discern whether the observed deepening in a country is sustainable or poses risks? Although empirical studies have yet to establish conclusively the levels above which financial deepening becomes unsustainable, two related pieces of evidence suggest that the initial level of depth matters. First, a recent paper finds that at very high levels of financial

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[17] When using benchmarking, two important considerations apply. First, the benchmark is a relative, and not an absolute, measure. In other words, it depends on the distribution within the sample used for benchmarking. Second, model specification (the explanatory variables included in the model) can be critical for the findings.

[18] Economic development should 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. As long as the impact of financial development on economic development is lagged, policy should not be already fully captured by the income term.

[19] Further refinements to the benchmarking model could include a measure of wealth or income inequality, to the extent that these reflect demand-side constraints to deepening. Further, the benefits of financial deepening tend to vary across households, suggesting that aggregate measures such as GDP per capita or total population can only partially capture demand-side constraints (Townsend and Ueda, 2007).

depth (between 80-100 percent of GDP) more finance is associated with less growth (Arcand, et al., 2012; Box IV. 2). Second, an analysis of credit booms by Barajas et al. (2007) shows that the likelihood that they are followed by a banking crisis within three years increases significantly with the initial level of depth. A forthcoming paper indicates that the probability that a credit boom ends badly is almost three times as large in a country with an initial credit-GDP ratio above 60 percent as compared to a country with an initial ratio of 30 percent (Dell'Ariccia et al., 2012).

71. **Initial considerations for LICs.** In LICs, in view of the low existing levels of financial depth and large developmental gaps, one implication of the above analyses is that the "frontier" is less binding. However, taking this view too strongly would be unwise, given weaker regulatory and supervisory frameworks, and growing interconnectedness of LIC financial systems. Research suggests that rapid acceleration of credit or sharp increase in stock market valuations can portend potential risks. For instance, Mendoza and Terrones (2008) propose a method which identifies country-specific credit booms as episodes during which real credit is not only growing at a high rate, but also is surpassing its long-run trend by a "large enough" amount. While historical trends may not always be the best predictors of what constitutes sustainable deepening in LICs today, monitoring broad trends in credit growth (including in the nonbank sector) alongside changes in prices of key assets (e.g., house and equity prices), would be important. Further, thresholds for what is sustainable depend not only on the level of financial depth, but also on country characteristics such as the quality of institutions—including the regulatory framework and financial supervision. This puts the spotlight on focusing attention on the policy and regulatory environment underpinning financial deepening. Looking ahead, further research is warranted to identify what constitutes sustainable financial deepening across different income groups to better inform policy making.

Box IV.2 Can the Financial Sector Become Too Large?

A recent paper finds that at high levels of financial depth, more finance is associated with less growth (Arcand, Berkes, and Panizza, 2012). The point estimates suggest that the marginal effect of financial depth on output growth becomes negative when credit to the private sector reaches 80-100% of GDP (see text figure). This result holds across different types of estimators (simple cross-sectional and panel regressions as well as semi-parametric estimators) and data (country-level and industry-level). The presence of a non-monotonic relationship between financial depth and economic growth is robust to controlling for macroeconomic volatility, banking crises, institutional quality, and bank regulation.
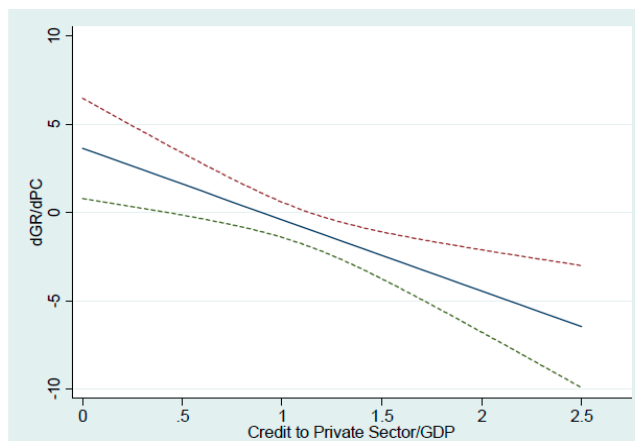
The paper offers two possible explanations for the existence of a threshold above which financial development has a negative effect on economic growth.

- The first relates to a potential misallocation of resources. Tobin (1984), for instance, suggested that the social returns of the financial sector are lower than its private returns and worried about the fact that a large financial sector may "steal" talents from the productive sectors of the economy, and therefore be inefficient from society's point of view.

- The second explanation has to do with the fact that large financial systems may be associated with greater economic volatility and the increased probability of large economic crashes (Minsky, 1974). Rajan (2005) and de la Torre et al. (2011) provide numerous insights on the dangers of excessive financial development.

In their discussion of the "Dark Side" of financial development, de la Torre et al. (2011) point out that the "Too much finance" result may be consistent with positive but decreasing returns of financial depth which, at some point, become smaller than the cost of instability brought about by the dark side. While this may be true, it is important to note that the results of Arcand et al. (2012) are robust to restricting the analysis to tranquil periods. This suggests that volatility and banking crises are only part of the story. Of course, it could be possible that in the presence of decreasing returns to financial development, the marginal cost of maintaining financial stability becomes higher than the marginal return of financial development (de la Torre et al., 2011, make this point). In this case, however, the explanation for the "Too Much Finance" result would not be one of financial crises and volatility (which do not necessarily happen in equilibrium) but one of misallocation of resources.

Another possible explanation for the "Too much finance" result has to do with the fact that the relationship between financial depth and economic growth could depend upon the manner through which finance is provided. In the discussions that followed the recent crisis it has been argued that derivative instruments and the "originate and distribute" model in advanced economies, which by providing hedging opportunities and allocating risk to those better equipped to take it were meant to increase the resilience of the banking system, actually reduced credit quality and increased financial fragility (UNCTAD, 2008). Distinguishing between traditional bank lending from non-bank lending could perhaps reveal whether these types of financial flows have differing effects on economic growth.

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Prepared by: Jean Louis Arcand, Enrico Berkes (RES) and Ugo Panizza.

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V. FINANCIAL DEEPENING AND AGGREGATE GAPS IN DEEPENING[20]

Against the backdrop of the discussion on the possibility frontier and statistical benchmarking, this note assesses the depth of LIC financial systems in relation to their structural benchmarks, and examines how gaps between actual levels of financial depth and benchmark levels have evolved over time. Empirical analysis points to the role of explicit policy actions (e.g., financial liberalization), features of the broader policy environment (e.g., inflation, exchange rate regime, openness) and the market structure (e.g., market concentration/competition), ownership, and financial crises in explaining both the levels and changes in gaps over time and across countries.

A. Benchmarking Financial Deepening in LICs

72.   Deepening and structural characteristics. To what extent is the observed lack of deepening in some LICs simply a product of their structural characteristics? To address this question, we systematically compare (and benchmark) financial deepening in LICs, after controlling for a number of possible economic and structural determinants (e.g., income per capita, size, demographic variables). In particular, we track the behavior of the three financial indicators in relation to a "structural benchmark" level described in the previous note. We define a "Gap" for each financial depth indicator in country *i* and year *t* as the difference between the benchmark FD^B and the actual level FD. A positive (negative) gap value thus indicates under (over) performance:

$$Gap_{it} = FD^B_{it} - FD_{it}$$

73.   Low expected values in LICs. The benchmarking exercise reveals the relevance of structural characteristics in explaining the shallowness of LICs' financial systems in relation to other countries. For instance, in 2009, private credit in the median LIC was expected to be 19 percent of GDP, less than one-sixth the level predicted for high-income countries, or less than one-third the level predicted for the non-LIC median country. Similarly, stock market capitalization was expected to be less than one third, and turnover less than a quarter of the levels predicted for the median non-LIC country, respectively.

74.   Median LIC performance. Surprisingly, LICs have deepened by more than would have been expected from their structural characteristics. The median gap in private credit for the median LIC was very small in 1990 (just over 1 percentage point of GDP). Over the subsequent three decades, this gap became negative. Indeed, by 2009 the median LIC was outperforming its benchmark by about 2 percentage points (Figure V.1). Increases in stock market capitalization appear even more impressive: from positive gaps of 4 percentage points in 1990, the median LIC reached a negative gap of 7 percentage points by 2009. Deepening with respect to stock market turnover was more

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[20] Prepared by Adolfo Barajas (INS), Ralph Chami (MCD), and Reza Yousefi (former intern, MCD).

modest. By 2009, a positive gap of almost 3 percentage points remained.[21] Note that the global crisis appeared to have a visibly larger impact on non-LICs, particularly high-income countries, where large positive gaps emerged in 2009 in private credit (15 percentage points of GDP) and stock market turnover (over 6 percentage points), reversing the large gains achieved earlier in the decade.

75. **Heterogeneity across income groups.** Looking beyond group medians, financial deepening was heterogeneous across countries, although somewhat less so among LICs than in higher-income countries. Changes in gaps in private credit over the 1990-2007 periods ranged between -40 and +30 percentage points of GDP for LICs, with several countries lowering gaps by up to 20 percentage points (Figure V.2).[22] This range was much larger for non-LICs, where some gaps were even closed or widened by over 100 percentage points of GDP. Overall, more LICs lowered than increased their gaps in private credit. Some over-performance is also in evident in the case of stock markets (not shown here), but the relatively small number of LICs with this type of data limits direct comparisons to non-LICs.

Figure V.1 Gaps in Financial Depth Relative to Benchmarks
(Percentage points: difference between the benchmark and the observed level of depth, medians by income group)

Source: World Bank FinStats (2011).

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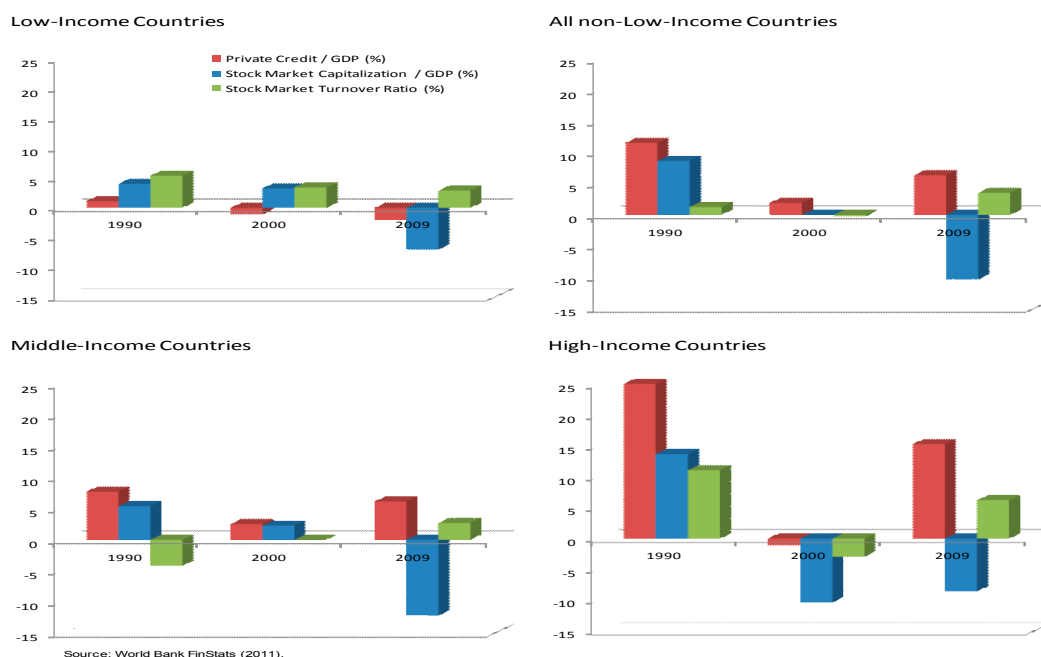
[21] However, the stock market indicators should be viewed with some caution, particularly as LICs are greatly underrepresented in both measures: only five countries reported in 1990, increasing to 20 by 2006. Coverage subsequently dropped slightly in 2007-09.

[22] For this analysis we have chosen the period up to 2007 in order to exclude the global crisis, and thus focus our attention on the longer-term deepening process.

Figure V.2 Change in Gaps in Private Credit, 1990 to 2007
(percentage points)
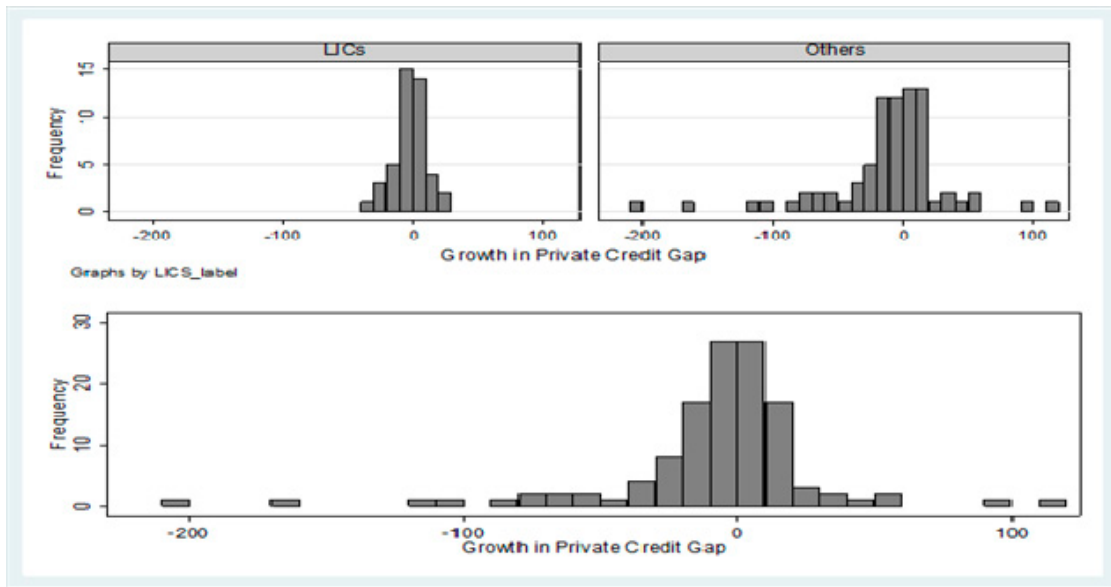
76.   Variation within LICs. A substantial number of LICs have continued to underperform their already-low structural benchmarks. For the two key indicators of financial sector activity—private credit and stock market turnover—over 38 percent of LICs remained below their benchmarks throughout 2005-09 (Figure V.3). Performance of LICs also varied widely across regions. For instance, the median LIC in Asia and Latin America and the Caribbean (LAC) exceeded its banking depth benchmarks, while that in the SSA and CIS regions lagged behind its benchmark levels, particularly with regard to private credit in 2009 (Figure V.4). These regional and cross-country differences are also evident for gaps across different financial system indicators of size, liquidity, and outreach.

Figure V.3 Share of Underperforming LICs
(Percentage of LICs with positive financial depth gaps in each year)
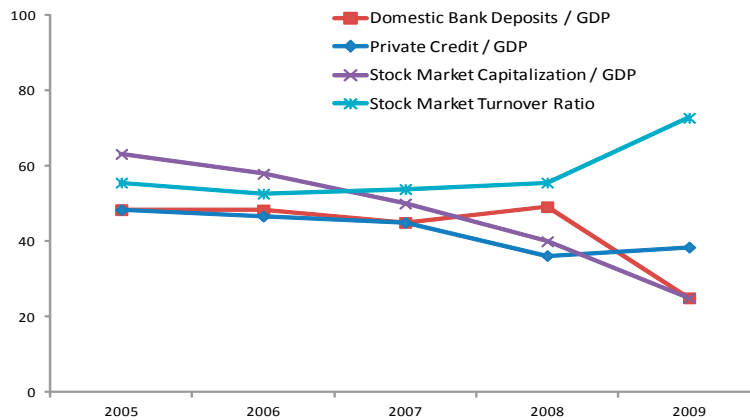
Source: World Bank FinStats.

Figure V.4 Private Credit to GDP: Actual vs. Expected Value, by LIC Region
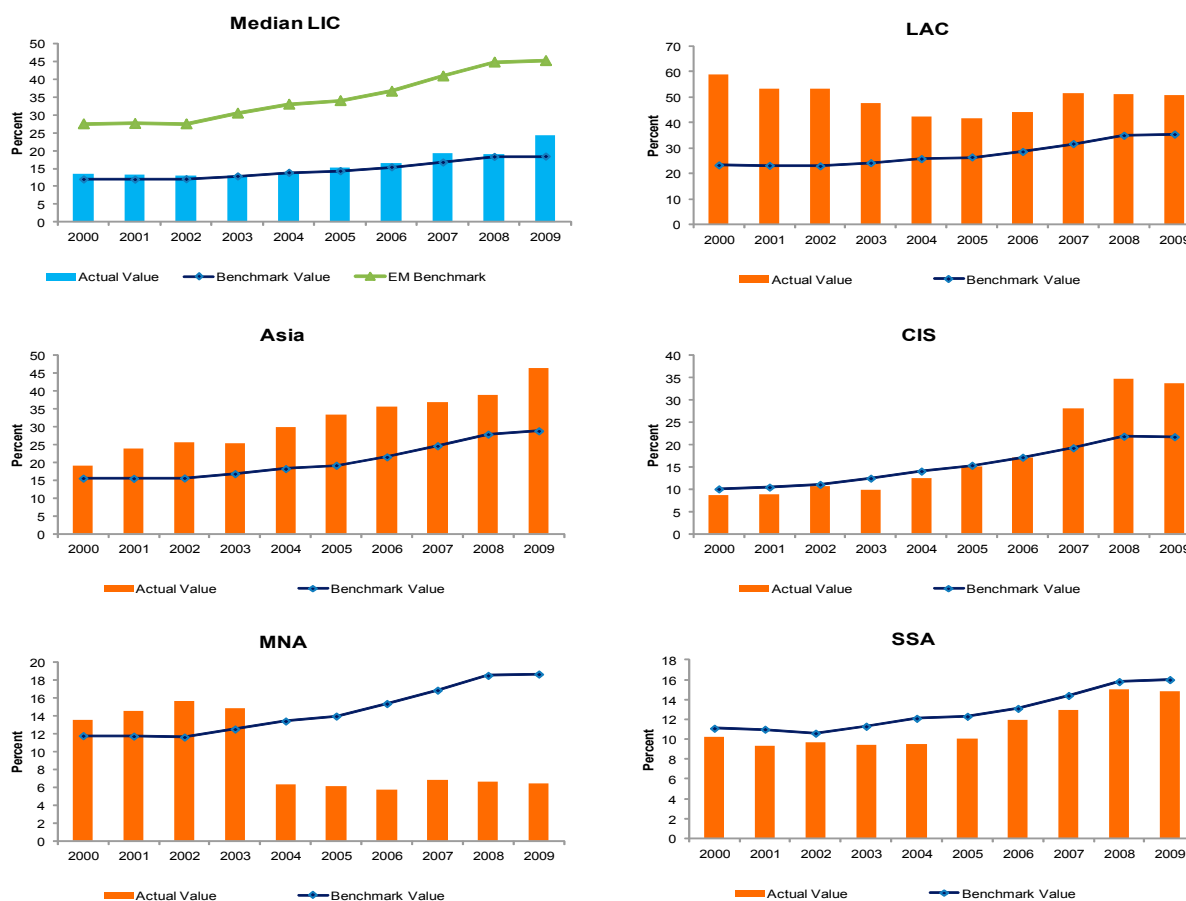
Source: World Bank FinStats

B. Explaining Gaps

77.   Policy and institutional gaps. Once the structural characteristics have been accounted for, the remaining gap between observed and benchmark levels of depth may reflect economic performance and/or differences in financial sector policy. The preceding section identified general levels and trends in financial system gaps, but did not ascertain whether these gaps are significant in a statistical sense. In this section, we estimate cross sectional regressions to examine the determinants of both the level of gaps in 2005 as well as factors associated with the closing of credit gaps over time (1995-2005).[23] The empirical analysis drew on a large set of explanatory variables from the literature (see Demirguc-Kunt, 2006, for a literature survey) encompassing aspects of economic performance, institutional factors, and financial sector policies. Our regression results are

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[23] Due to the limited coverage of LICs in stock market data prior to 2000 and after 2007, we conducted the analysis of changes in gaps solely on the private credit-GDP ratio. For the regressions explaining the level of gaps, we chose 2005 so as to maximize the coverage of LICs in the sample. In this section, we use the shorthand "credit gaps" to refer to the gaps in the private credit-GDP ratio relative to benchmarks.

shown in Tables V.1-2. De la Torre et al. (2011) also provide empirical evidence on the role of the informational and contractual frameworks in driving banking gaps across countries.

78.   Explaining cross-country variation in levels. A number of macroeconomic and financial sector variables are associated with the level of gaps in private credit to GDP, net interest margins, stock market capitalization to GDP, and the stock market turnover ratio (Table V.1). Given multicollinearity between the dependent variables, they are both introduced one at a time and all together in the specifications reported in Table V.1.

- Countries with more flexible exchange rate regimes tended to have larger credit gaps and higher intermediation spreads relative to their peers, while lower inflation was associated with smaller credit gaps and tighter spreads.[24]

- Large remittance inflows were associated with greater bank intermediation and lower spreads; there is some evidence that more open economies had lower gaps on private credit and stock market capitalization.

- Regarding financial variables, a greater state bank presence (a larger share of publicly-owned banks in total banks) was associated with greater gaps in private credit as well as measures of stock market depth and liquidity. Bank concentration, while having a negligible effect on the level of banking and stock market gaps, tended to be associated with greater intermediation spreads.

- Greater progress in overall financial sector reforms[25] was related to lower private credit gaps. For example, restrictions on bank lending (e.g., geographic diversity requirements) were associated with larger private credit gaps but lower intermediation spreads.

- Finally, there is some evidence of tradeoffs/competition between bank and stock market activity. Greater state bank presence and credit controls, while present in countries with larger credit gaps, were also related to lower stock market gaps.

79.   Factors closing gaps over time. We also identified factors that could explain success in closing private credit gaps over time (Table V.2). A number of the variables that explained the level of gaps were also associated with changes in gaps, but with some key differences.

- While low inflation was significant in explaining both changes and level of gaps, financial crises and lower systemic risk are statistically significant factors explaining changes in gaps over time.[26]

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[24] Note that, in contrast to the other three financial variables analyzed, a positive gap for the net interest spread denotes over-performance, that is, the country's spread is below that which would be predicted from its structural characteristics.

[25] The variables, constructed by Abiad et al. (2008), summarize progress with financial reforms with respect to the following dimensions: credit controls, interest rate controls, entry barriers, state ownership in the banking sector, capital account restrictions, prudential regulation and supervision, and securities market policy. The lack of significance of this variable suggests that not all of these aspects of financial reform are related to greater depth.

[26] The risk variable is a composite measure obtained from ICRG. It summarizes aspects of financial, political, and economic risk, and is defined in such a way that an increase denotes less risk.

Although countries with more flexible exchange rate regimes exhibited larger gaps on average in 2005, they were more likely to have reduced them over time. Moreover, the degree of trade openness did not seem to exert an influence on changes in the gaps.

- As in the level regressions, a greater state bank presence was associated with failure to close gaps over time. Further, better banking supervision, greater ease of entry of new domestic and foreign institutions[27] and fewer restrictions on bank lending,[28] were all related to larger reductions in gaps.

- Interestingly, the closing of credit gaps was also associated with greater concentration in the banking sector: the five-bank concentration ratio for assets is positively and significantly related to greater reduction of gaps. Concentration, however, is not the same as competition as even oligopolistic markets can show a certain degree of competitiveness. Greater competition in the domestic banking system, as measured by the H-Statistic (Anzoategui et al. 2010), however, appears to be negatively related to progress in reducing gaps, although not significantly. The former result could be a reflection of the fact that low income levels and small size constrain the space for a large number of banks in the banking systems. Further, in recent years, there has been an increasing trend toward consolidation in some banking markets, as regulatory authorities have increased minimum capital requirements.

- Finally, greater generosity of deposit insurance (the maximum coverage as a ratio to per capita GDP) and overall progress in financial reform tended to be associated with greater gap reduction, although not significantly so.

80.   Our analysis shows that the countries that were able to deepen the most over time—reduce their private credit gaps—tended to display one or more macroeconomic and financial sector characteristics: they avoided financial crises and had lower overall political and economic risk; allowed greater entry into banking activities; had limited direct government ownership of banks; did not place too many restrictions on bank lending; and had stronger regulatory and supervisory frameworks in place. Finally, concentration in the banking sector was associated with closing of credit gaps over time, but also with larger intermediation spreads. Although many of these characteristics tend to be correlated—and thus including a large number of them at once in the regressions resulted in lack of significance—the overall policy picture that emerges is one of a balance between market-friendly actions that encourage intermediation and lending, and appropriate oversight to avoid instability that can reverse hard-won gains in deepening over time.

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[27] Ease of entry is measured as the percentage of license applications accepted for new domestic banks (Dom_acceptrate); and as the sum of prohibitions on the types of foreign entry into banking (Prohibfor_sum). Both measures are obtained from the World Bank Survey on Bank Regulation.

[28] This is captured by two variables: Credit controls, obtained from the Abiad, et al (2008) database on financial reform, and Geogr_divers, a dummy variable obtained from the World Bank Survey on Bank Regulation, expressing whether banks are subject to geographical diversity requirements in their lending.

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Table V.1 Regressions Explaining the 2005 GAP Between Benchmark and Actual Financial Indicators of Depth and Efficiency

Financial depth variable:	Private credit/GDP			Net Interest Margin			Stock market capitalization/GDP			Turnover ratio		
(-ve sign denotes overperformance)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Macroeconomic variables												
Financial crisis	1.335			-0.521	-0.454	-1.090 *	-4.282		20.283	-10.353		
	(0.192)			(-1.513)	(-0.633)	(-1.841)	(-0.490)		(1.099)	(-0.862)		
Exchange rate regime	2.139 **			-0.223 **	-0.372 *	-0.375 *	1.716		0.904	-0.590		
	(2.134)			(-2.501)	(-1.763)	(-1.749)	(1.121)		(0.266)	(-0.362)		
Inverse of inflation	-15.122			3.290 ***	5.285 *	4.024	13.281		-37.227	-10.188		
	(-1.040)			(2.877)	(1.765)	(1.528)	(0.362)		(-0.601)	(-0.477)		
Remittances	-0.721 **			0.035	0.437 **	0.415 *	0.892		2.149	0.030		
	(-2.206)			(0.744)	(2.062)	(1.843)	(1.220)		(0.506)	(0.062)		
Risk	0.124			-0.007	0.014	0.068	0.609		1.492	-0.196		
	(0.325)			(-0.218)	(0.188)	(1.104)	(1.005)		(1.348)	(-0.404)		
Trade openness	-9.626			-0.216	0.839	0.236	-13.541 *		-18.000	-6.931		
	(-1.632)			(-0.447)	(0.898)	(0.307)	(-1.716)		(-1.529)	(-0.824)		
Financial sector structure and policies												
Banking supervision			-3.189		0.698			4.184	0.322		5.563	
			(-0.572)		(1.061)			(0.562)	(0.036)		(0.855)	
Privatization			-9.772 **		-0.378			-1.858	1.144		11.856 *	
			(-2.385)		(-0.876)			(-0.292)	(0.148)		(2.007)	
Credit controls			-0.476		0.913			9.196	16.110 *		-9.090 *	
			(-0.094)		(1.508)			(1.138)	(1.798)		(-1.717)	
Prohibfor_sum		-9.862 ***	-8.651 **		1.050	1.335 *		-6.363	6.213		4.702	2.754
		(-3.246)	(-2.667)		(1.487)	(1.759)		(-1.409)	(0.360)		(0.945)	(0.371)
Concent_assets		-11.277	-16.955		-5.240 *	-4.073 *		-35.202	-23.494		-28.847	-37.827
		(-0.574)	(-0.797)		(-1.931)	(-1.799)		(-1.123)	(-0.445)		(-1.120)	(-1.288)
Gov_numshr		18.315 ***	9.964		-0.686	-0.216		42.814 ***	52.709 ***		48.077 ***	35.261 ***
		(2.940)	(1.322)		(-1.539)	(-0.497)		(4.554)	(3.622)		(4.674)	(6.277)
Geogr-divers		37.827	33.332		2.033 **	2.434 **		14.563	9.867		9.427	5.908
		(1.461)	(1.672)		(2.337)	(2.358)		(0.587)	(0.307)		(0.769)	(0.744)
Dis_limit_gdppc												
Financial reform_n		-61.976 **				3.212						25.518
		(-2.268)				(0.881)						(0.653)
Constant	24.401	54.280 **	36.806 **	1.480	-4.122	-5.357	3.805	-7.663	-80.337	53.159	-14.703	-12.950
	(0.829)	(2.350)	(2.073)	(0.579)	(-0.975)	(-1.417)	(0.078)	(-0.458)	(-0.994)	(0.918)	(-0.997)	(-0.491)
Observations	95	55	55	95	40	40	69	49	37	67	47	47
R-Squared	0.140	0.243	0.296	0.164	0.404	0.337	0.104	0.254	0.437	0.031	0.319	0.150

This table shows the results of OLS regressions explaining the 2005 gap between the benchmark median and its observed level for each financial depth variable (private credit/GDP, net interest margin, stock market capitalization/GDP, and turnover ratio). The regressors are classified into two major groups, the first of which is *Macroeconomic and insitutional variables,* including: *Financial crisis* (a dummy variable expressing whether the country experienced at least one financial crisis as defined in Laeven and Valencia, 2008, in the previous decade); *Exchange rate regime* (measured as a number between 0 (hard peg) and 8 (completely floating)); *Inverse of inflation*; *Remittances* (the ratio of remittance inflows to GDP); *Risk* (a composite risk indicator from ICRG, summarizing financial, political, and economic risk measures); and *Trade openness* (the sum of imports and exports as a percentage of GDP). The second group of regressors encompasses *Financial sector structure and policies*: four variables from the Abiad, et al (2008) database of financial reform: *Banking supervision*, *Privatization*, *Credit controls*, and a summary variable, *Financial reform_n*, which is normalized to be between 0 (low liberalization) and 1 (highly liberalized). *H-statistic* is a measure of banking competition as estimated by Anzoategui, et al (2011). Finally, a series of variables drawn from the World Bank Survey on Bank Regulation: *Dom_acceptrate* (the percentage of license applications accepted for new domestic banks); *Prohibfor_sum* (a variable expressing restrictions on foreign bank entry); *Concent_assets* (the share in total assets of the five largest banks); *Gov_numshr* (the percentage of banks that are government-owned); and *Geogr_divers* (a dummy variable showing whether there are geographical diversity requirements in lending). Robust t-statistics are shown in parentheses, with significance levels at the 10 percent (*), 5 percent (**), and 1 percent (***) levels indicated.

Table V.2 Regressions Explaining the Change over 1995-2005 in the Gap between Benchmark and Actual Financial Depth

Dependent Variable: Private credit/GDP				
Financial depth variable:	Coefficient	Constant	Observations	R-Squared
Macroeconomic variables				
Financial crisis	7.168 **	-2.861	149	0.034
	(2.381)	(-1.482)		
Exchange rate regime	-0.688	3.238	149	0.005
	(-0.847)	(0.746)		
Inverse of inflation	-19.873 *	2.318	130	0.04
	(-1.946)	(0.984)		
Remittances	-0.131	-0.325	125	0.001
	(-0.467)	(-0.189)		
Risk	-0.477 **	31.653 ***	121	0.069
	(-2.559)	(2.662)		
Trade openness	3.418	-14.324	143	0.009
	(0.885)	(-0.957)		
Financial sector structure and policies				
Banking supervision	-11.030 ***	15.312 ***	83	0.127
	(-3.216)	(3.008)		
Privatization	-2.413	1.937	83	0.012
	(-0.982)	(0.494)		
Credit controls	-3.911	7.084	83	0.014
	(-1.074)	(0.848)		
H-Statistic	11.308	-5.151	68	0.016
	(1.249)	(-0.945)		
Dom_acceptrate	-13.985 **	5.721	52	0.048
	(-2.390)	(1.426)		
Prohibfor_sum	6.456 *	-3.950 *	108	0.058
	(1.968)	(-1.777)		
Concent_assets	-26.482 **	17.438 **	91	0.061
	(-2.601)	(2.385)		
Gov_numshr	11.149 **	-2.212	81	0.018
	(2.188)	(-0.837) **		
Geogr-divers	12.116 *	-2.405	109	0.018
	(1.799)	(-1.275) **		
Dis_limit_gdppc	-2.714	4.527	30	0.026
	(-1.433)	(0.849)		
Financial reform_n	-23.942	15.330	83	0.033
	(-1.429)	(1.341)	-2.073	-0.579

Dependent Variable: Private credit/GDP							
Financial depth variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Macroeconomic variables							
Financial crisis	9.713 ***						11.500 **
	(2.635)						(2.101)
Exchange rate regime	-0.138						
	(-0.117)						
Inverse of inflation	5.499						
	(0.333)						
Remittances	-0.280						
	(-1.014)						
Risk	-0.532 **						
	(-2.071)						
Trade openness	-2.857						0.172
	(-0.726)						(0.398)
Financial sector structure and policies							
Banking supervision		-7.958 *	-9.816 **				-10.784 **
		(-1.939)	(-2.530)				(-2.237)
Privatization		2.619	-0.324				-0.087
		(1.491)	(-0.135)				(-0.039)
Credit controls		-0.474					
		(-0.121)					
H-Statistic		10.795					
		(1.049)					
Dom_acceptrate				-14.773 **			
				(-2.082)			
Prohibfor_sum			5.349	7.339 **	5.413		4.801
			(1.191)	(2.237)	(1.016)		(1.434)
Concent_assets			-41.703 ***	-43.315 ***	-38.147 ***		-35.041 ***
			(-3.221)	(-2.977)	(-2.786)		(2.871)
Gov_numshr			13.602 ***		10.893 ***	19.276	
			(3.014)		(3.133)	(0.435)	
Geogr-divers			12.586		20.077 ***	20.581 ***	
			(1.619)		(4.070)	(3.926)	
Dis_limit_gdppc						-1.644	
						(-0.598)	
Financial reform_n					-26.310	-45.751	
					(-1.341)	(-0.894)	
Constant	42.485 *	3.436	40.335 ***	36.223 ***	41.501 ***	34.638	22.441
	(1.920)	(0.292)	(3.736)	(2.745)	(2.716)	(0.952)	(0.852)
Observations (Countries)	94	50	53	50	53	23	61
R-Squared	0.153	0.075	0.336	0.252	0.273	0.171	0.378

This table shows the results of OLS regressions explaining the change from 1995 to 2005 in the gap between the benchmark median for private credit/GDP and its observed level. The regressors are classified into two major groups, the first of which is *Macroeconomic variables*, including: *Financial crisis*, a dummy variable expressing whether the country experienced at least one financial crisis (as defined in Laeven and Valencia, 2008) in the previous decade; *Exchange rate regime*, measured as a number between 0 (hard peg) and 8 (completely floating); *Inverse of inflation*; *Remittances*, the ratio of remittance inflows to GDP; *Risk*, a composite risk indicator from ICRG, summarizing financial, political, and economic risk measures; and *Trade openness*, the sum of imports and exports as a percentage of GDP. The second group of regressors encompasses *Financial sector structure and policies*: including four variables from the Abiad, et al database of financial reform: *Banking supervision*, *Privatization*, *Credit controls*, and a summary variable, *Financial reform_n*, which is normalized to be between 0 (low liberalization) and 1 (highly liberalized). *H-statistic* is a measure of banking competition as estimated by Anzoategui, et al (2011). Finally, a series of variables drawn from the World Bank Survey on Bank Regulation: *Dom_acceptrate*, the percentage of license applications accepted for new domestic banks; *Prohibfor_sum*, a variable expressing restrictions on foreign bank entry; *Concent_assets*, the share in total assets of the five largest banks; *Gov_numshr*, the percentage of banks that are government-owned; *Geogr_divers*, a dummy variable showing whether there are geographical diversity requirements; and *DIS_limit_gdppc*, the maximum coverage of deposit insurance, measured as a ratio to per capita GDP. Robust t-statistics are shown in parentheses, with significance levels at the 10 percent (*), 5 percent (**), and 1 percent (***) levels indicated.

VI. DETERMINANTS OF INTEREST MARGINS IN LICS[29]

This note utilizes bank-level data to examine the determinants of persistently high interest rate margins in LICs using two complementary approaches: (i) a decomposition of the interest margin into profit and cost components, and (ii) regression analysis based on the dealership model. The analysis suggests that while a number of bank-specific factors (e.g., scale) are relevant, limited bank competition remains a key driver of high interest margins in LICs.

81.   High margins as proxy for intermediation costs. The net interest margin, measured as the difference between lending and deposit rates, is a commonly accepted measure of how costly banking intermediation services are for a society. Research shows that the cost of financial intermediation has important repercussions for economic performance (Jayaratne and Strahan, 1996; Rajan and Zingales, 1998). High financial intermediation costs may constitute an important impediment for financial deepening in LICs. The persistence of high margins could reflect a number of systemic problems: lack of competition, perceived market and credit risks, bank unsoundness, scale diseconomies constrained by small markets, high operating costs due to low efficiency, unfavorable institutional environment, and existence of various regulatory constraints distorting financial markets.

82.   Analysis. To examine the determinants of persistently high interest margins in LICs as compared to EMs, a panel data set of 359 commercial banks in 48 LICs and 2535 commercial banks in 67 EMs for the period 1996-2010 is used. The analysis suggests that lack of bank competition remains the key impediment that prevents financial intermediation costs from declining in LICs. Low institutional capacity also plays a prominent role. Taken together, these findings provide strong evidence that LICs could reduce interest margins via policies that foster bank competition, relax restrictions on bank entry, and improve institutional capacity.

A. Interest Margin Decomposition

Framework

83.   Decomposition. We decompose the interest margin based on the methodology proposed by Randall (1998). The income statement of banks defines profit as interest income (II) plus non-interest income (NII) minus interest expense (IP), operating costs (OC), and loan loss provisions (Prov). Assuming that the banks invest interest bearing liabilities (minus the reserve requirement ratio, ρ) in interest bearing assets, and defining the interest margin as the difference between the implicit rate of interest on assets (*II/L*) and deposits (*IP/D*), we derive the following expression:

$$i_L - i_D = \rho * i_L + \frac{OC}{D} + \frac{\mathrm{Pr}\,ov}{D} + ROA * \frac{A}{D} - \frac{NII}{D} + \varepsilon \qquad (1)$$

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[29] Prepared by Tigran Poghosyan (FAD).

where D is interest bearing liabilities, L is interest bearing assets, A is total assets, $ROA = P/A$ denotes bank profitability, and ε represents an error term arising from other factors not captured by the model.

84. **Results**. Figure VI.1 reports the percentile distribution of interest margins in EMs and LICs. The figure shows that the median spread in LICs (11 percent) is about one percentage point higher than the median spread in EMs. The Mann-Whitney test statistic of -6.36 suggests that the difference in medians is significant at the one percent confidence level. Moreover, both the 25th and 75th percentiles of the interest margin in LICs exceed those for EMs by about one percentage point. This implies that the whole distribution of margins in LICs is shifted upwards relative to the distribution for EMs, suggesting that financial intermediation costs in LICs as a whole exceed those in EMs.

85. **Determinants.** To explore the key determinants driving higher intermediation costs in LICs, Figure VI.1 also reports the percentile distribution of selected interest margin determinants from the decomposition (equation 1). The charts suggest that the key factor driving margins in LICs compared to EMs is the higher profitability of LIC banks. One possible explanation for this is differences in the degree of bank competition. Another factor is the higher share of loan-loss reserves, which suggests that LIC banks operate in an environment characterized by higher credit risk. Interestingly, median operating costs in LICs are slightly lower than those in EMs. This finding could indicate that the median bank in LICs is not significantly less efficient than its EMs comparator. Alternatively, this result could indicate that LIC banks possess higher market power and are able to reduce operating costs (e.g., employee salaries) to secure higher profits. LICs banks also earn slightly higher non-interest revenues. According to specification (1), this should lower margins.

B. Econometric Analysis

Framework

86. **Analysis.** Although the accounting framework described above allows for a decomposition of the determinants of the interest margin into cost and profit components, it is not based on a model of a profit maximizing bank. Consequently, it does not explicitly incorporate the role of competitiveness and other country-specific variables, and cannot predict how the spread responds to changes in relevant determinants at the margin. Therefore, we complement our analysis with econometric methods.

87. **Empirical specification.** The empirical specification of the augmented dealership model (Maudos and Fernandez de Guevara, 2004; Poghosyan, 2010; Fungacova and Poghosyan, 2011) takes the following form:[30]

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[30] Inclusion of the lagged dependent variable in the above specification produces a relatively low persistence coefficient (about 0.3), suggesting that dynamic effects are modest. In light of this result and to avoid technical

(continued)

$$\text{Margin}_{ijt} = \alpha_i + \sum_{n=1}^{N} \beta_n B_{nijt-1} + \sum_{m=1}^{M} \gamma_m M_{mijt} + \sum_{k=1}^{K} \lambda_k I_{kijt} + \sum_{l=1}^{L} \eta_l R_{lijt} + TE_t + \varepsilon_{ijt} \qquad (2)$$

where the *i, j* and *t* indices stand for bank, country, and time, respectively, *Margin* is the interest margin, *B* is a vector of bank-specific (theoretically-motivated) determinants, while *M, I,* and *R* are vectors of macroeconomic, institutional, and regulatory determinants, respectively, and ε_{ijt} is an i.i.d. random error. Individual bank heterogeneity is captured by the fixed effects intercept term, α_i, and time-specific variation is captured by a vector of time dummies, *TE*. Bank-specific explanatory variables are taken with a lag to alleviate simultaneity problems. Table VI.1 provides definitions of variables and sources. The analysis is performed on a panel of 359 commercial banks in 48 LICs and 2535 commercial banks in 67 EMs for the period 1996-2010.

88.   **Results.** Table VI.2 presents estimation results for LICs, while Table VI.3 presents results for EMs.

- *Bank-specific determinants* (columns 1-2). With very few exceptions, the signs and significance of coefficient estimates is remarkably similar across LICs and EMs, but the economic magnitudes differ. Estimation results suggest that *larger banks* tend to have lower margins. This finding is consistent with theories emphasizing the importance of scale effects for financial intermediation costs. The economic magnitude of this variable is the largest among the bank-specific determinants, suggesting that a one standard deviation increase in bank size reduces margins by 1.9 and 5.0 percentage points in LICs and EMs, respectively. Consistent with the opportunity costs hypothesis, a higher fraction of *liquid assets* boosts bank margins, as banks compensate for the extra costs associated with holding liquid funds by charging higher margins on other assets. *More risk averse/better capitalized* banks tend to have lower margins. This can be explained by the reluctance of risk-averse banks to get involved in more profitable but riskier lending activities. As expected, higher *credit risk* is associated with larger margins, as banks require higher profits to compensate for higher risk. Finally, less efficient banks with higher *operating costs* charge higher margins.

- *Market share* enters positively and significantly in all specifications for LICs, but is insignificant for EMs once country-level variables are included in the regressions. This finding implies that lower market competition results in higher costs of financial intermediation, primarily in LICs. The economic magnitude of this variable is large, suggesting that a one standard deviation increase in the market share of a bank raises its interest margin by 2.5-4.0 percentage points, depending on the specification.

- *Macroeconomic variables* have no significant impact on interest margins in LICs, either individually or jointly (columns 3-5). This result suggests that risks associated with macroeconomic fluctuations in LICs are already factored into bank-specific determinants of

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problems associated with estimating dynamic panel models (e.g., weak instruments and small sample bias), we follow the previous literature and use the fixed effects panel estimator without a lagged dependent variable.

margin. This is in stark contrast with EMs, where higher inflation has a significant and positive impact on margins, while higher output growth tends to reduce margins.

- *Institutional environment.* Countries with an *institutional environment* more conducive to business activity tend to have lower margins (columns 6-9). All four proxies for institutional quality – the composite *KKZ index*, *rule of law*, *control of corruption*, and *regulatory quality* – have a negative and significant impact on margins in both LICs and EMs. Interestingly, the economic impact of the institutional characteristics is sizable compared to bank-specific determinants. In particular, once institutional characteristics are controlled for, bank-specific measures of efficiency and scale economies are no longer important in explaining interest margins.

- *Regulatory variables.* Among regulatory variables, we find a strong positive association between the fraction of bank entries denied and the interest margin for both country groups (column 10). But restrictions on non-traditional banking activities, such as securities underwriting, insurance, real estate, and ownership in non-financial firms, and reserve requirements, unlike in the case of EMs, do not have a significant impact on bank interest margins in LICs (columns 11-12). This latter result could be driven by the embryonic state of the stock market and other segments of the non-bank financial sector in LICs, which makes the impact of these restrictions negligible.

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Figure VI.1 Interest Margin Decomposition
(Medians, in percent)
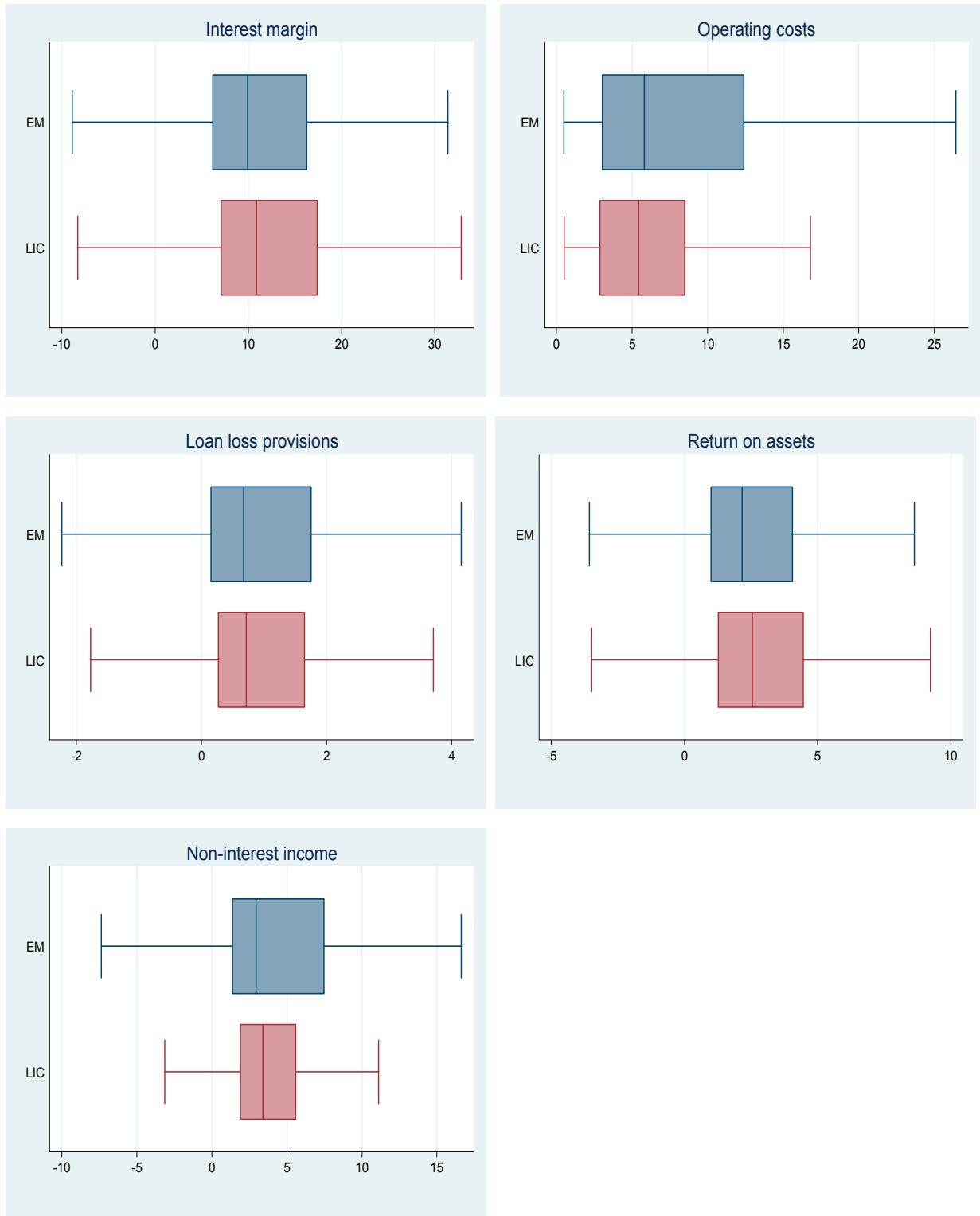
Table VI.1 Variable Definition and Sources

Variables	Definition	Source
Net interest margin	Difference between the ratio of total interest revenues and interest bearing assets, and the ratio of total interest expenditures and interest bearing liabilities	BankScope
Market concentration	Herfindahl index (total assets)	BankScope
Operating costs	Ratio of total operating expenses to total assets	BankScope
Risk aversion	Ratio of total equity to total assets	BankScope
Credit risk	Ratio of loan loss provisions to total loans	BankScope
Liquidity	Ratio of liquid reserves to total assets	BankScope
Size of operations	Logarithm of total loans	BankScope
Real GDP growth	Real GDP growth rate	IMF, WEO
Inflation	Percentage change in consumer price index	IMF, WEO
KKZ index	Composite of country scores in the areas of voice and accountability, political stability, government effectiveness, regulatory burden, rule of law, and freedom from graft.	Kaufmann et al. (2002)
Rule of law	Index covers areas of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Kaufmann et al. (2002)
Control of corruption	Index covers areas of petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	Kaufmann et al. (2002)
Regulatory quality	Index covers general aspects of government regulation in all areas of economy (not only banking) that permit and promote private sector development.	Kaufmann et al. (2002)
Fraction of entries denied	Fraction of bank entry applications denied.	Barth et al. (2001, 2004)
Activity restrictions	Composite of restrictions across four types of activities: securities markets, insurance, real estate, and shares in non-financial firms.	Barth et al. (2001, 2004)
Reserve requirements	Dummy taking the value of 1 if a country has reserve requirements.	Barth et al. (2001, 2004)

Table VI.2 Estimation Results: Determinants of Interest Margins in LICs

	Bank-specific		Macro			Institutions				Regulation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Market share	0.1172***	0.1120***	0.1404***	0.1401***	0.1404***	0.0992***	0.0938***	0.0968***	0.0866***	0.1568***	0.1089***	0.1121***
	[0.018]	[0.018]	[0.020]	[0.020]	[0.020]	[0.025]	[0.022]	[0.022]	[0.022]	[0.026]	[0.018]	[0.018]
Operating costs	0.1351	0.2400**	0.2345**	0.2373**	0.2348**	-0.0601	-0.011	-0.027	-0.0022	0.1971	0.2454**	0.2391**
	[0.094]	[0.098]	[0.101]	[0.102]	[0.102]	[0.117]	[0.103]	[0.103]	[0.103]	[0.136]	[0.099]	[0.098]
Risk aversion	-0.0248***	-0.0337***	-0.0328***	-0.0330***	-0.0328***	-0.011	-0.0151*	-0.0147*	-0.0152**	-0.0323***	-0.0338***	-0.0337***
	[0.007]	[0.008]	[0.008]	[0.008]	[0.008]	[0.009]	[0.008]	[0.008]	[0.008]	[0.011]	[0.008]	[0.008]
Credit risk	0.3115***	0.2893***	0.2952***	0.2948***	0.2951***	0.3151***	0.3145***	0.3116***	0.3176***	0.3404***	0.2884***	0.2884***
	[0.034]	[0.034]	[0.035]	[0.035]	[0.035]	[0.036]	[0.034]	[0.033]	[0.033]	[0.043]	[0.034]	[0.034]
Liquidity	0.0506***	0.0631***	0.0611***	0.0609***	0.0611***	0.0600***	0.0623***	0.0651***	0.0622***	0.0749***	0.0619***	0.0631***
	[0.013]	[0.013]	[0.014]	[0.014]	[0.014]	[0.016]	[0.014]	[0.014]	[0.014]	[0.020]	[0.014]	[0.013]
Size	-1.6759***	-1.1589***	-1.2491***	-1.2354***	-1.2493***	-0.5918	-0.5038	-0.689	-0.2276	-0.6895	-1.1445***	-1.1568***
	[0.262]	[0.416]	[0.432]	[0.429]	[0.432]	[0.565]	[0.493]	[0.475]	[0.499]	[0.606]	[0.423]	[0.417]
GDP growth			-0.0173		-0.0174							
			[0.059]		[0.060]							
Inflation				0.0000	-0.0003							
				[0.012]	[0.012]							
KKZ index						-8.8885***						
						[1.698]						
Rule of law							-2.7831**					
							[1.157]					
Control of corruption								-4.1712***				
								[1.055]				
Regulatory quality									-3.5589***			
									[0.942]			
Fraction of entries denied										0.0344***		
										[0.010]		
Activity restrictions											1.2024	
											[0.747]	
Reserve requirements												-0.3613
												[0.657]
Constant	29.4961***	21.6368***	22.8305***	22.5573***	22.8362***	10.3111	12.9854*	14.3830**	9.7247	11.3847	19.8995***	21.8707***
	[3.475]	[5.650]	[5.905]	[5.832]	[5.911]	[7.809]	[6.836]	[6.415]	[6.785]	[8.318]	[5.870]	[5.667]
Observations	2,187	2,187	2,050	2,050	2,050	1,397	1,684	1,684	1,684	1,366	2,155	2,187
R-squared	0.119	0.137	0.145	0.145	0.145	0.167	0.145	0.151	0.15	0.161	0.14	0.137
Number of banks	341	341	317	317	317	308	335	335	335	278	341	341

Notes: Dependent variable is the net interest margin. All explanatory variables (except regulatory) are taken with a lag. All specifications include bank and time fixed effects. *, **, and *** denote significance at 1, 5, and 10 percent confidence levels, respectively.

Table VI.3 Estimation Results: Determinants of Interest Margins in EMs

	Bank-specific		Macro			Institutions				Regulation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Market share	0.1144***	0.0601***	0.0339	0.0052	-0.0045	0.0050	0.0376	0.0388	0.0537*	0.0756***	0.0660***	0.0647***
	[0.019]	[0.021]	[0.023]	[0.023]	[0.023]	[0.030]	[0.028]	[0.028]	[0.029]	[0.026]	[0.021]	[0.021]
Operating costs	0.1191***	0.1295***	0.1432***	0.1173***	0.1144***	0.0536**	0.0568***	0.0529**	0.0570***	0.0986***	0.1215***	0.1292***
	[0.020]	[0.020]	[0.022]	[0.022]	[0.022]	[0.023]	[0.021]	[0.021]	[0.021]	[0.022]	[0.020]	[0.020]
Risk aversion	-0.0651***	-0.0657***	-0.0927***	-0.0796***	-0.0876***	-0.0493***	-0.0438***	-0.0433***	-0.0444***	-0.0692***	-0.0664***	-0.0663***
	[0.010]	[0.010]	[0.019]	[0.019]	[0.019]	[0.011]	[0.010]	[0.010]	[0.010]	[0.011]	[0.010]	[0.010]
Credit risk	0.1264***	0.1158***	0.1181***	0.1044***	0.1019***	0.0568**	0.0604***	0.0622***	0.0625***	0.0509**	0.1340***	0.1175***
	[0.018]	[0.018]	[0.020]	[0.020]	[0.020]	[0.022]	[0.020]	[0.020]	[0.020]	[0.020]	[0.021]	[0.018]
Liquidity	0.0266***	0.0319***	0.0659***	0.0572***	0.0630***	0.0287***	0.0261***	0.0263***	0.0262***	0.0391***	0.0345***	0.0325***
	[0.007]	[0.007]	[0.009]	[0.009]	[0.009]	[0.008]	[0.007]	[0.007]	[0.007]	[0.008]	[0.007]	[0.007]
Size	-2.1042***	-0.8083***	-1.8109***	-0.9875***	-1.6004***	0.1948	0.1527	-0.0997	-0.1092	-0.4298	-0.4132	-0.8040***
	[0.211]	[0.297]	[0.369]	[0.362]	[0.368]	[0.429]	[0.364]	[0.355]	[0.364]	[0.363]	[0.300]	[0.297]
GDP growth			-0.4771***		-0.3893***							
			[0.046]		[0.046]							
Inflation				0.1615***	0.1455***							
				[0.012]	[0.012]							
KKZ index						-13.3954***						
						[1.775]						
Rule of law							-6.4397***					
							[1.258]					
Control of corruption								-9.0661***				
								[1.190]				
Regulatory quality									-1.5583*			
									[0.929]			
Fraction of entries denied										0.0488***		
										[0.008]		
Activity restrictions											5.0435***	
											[0.665]	
Reserve requirements												2.5087***
												[0.593]
Constant	39.4845***	24.1725***	40.7254***	26.3662***	36.9224***	13.3886**	8.0703	9.3795*	13.3590***	19.7097***	11.7780***	22.5833***
	[2.959]	[3.913]	[5.193]	[5.061]	[5.186]	[5.607]	[5.142]	[4.999]	[5.074]	[4.674]	[4.138]	[3.928]
Observations	11,446	11,446	9,054	9,040	9,039	7,403	9,019	9,019	9,019	8,079	11,097	11,446
R-squared	0.038	0.060	0.081	0.090	0.098	0.061	0.053	0.058	0.050	0.056	0.064	0.062
Time effects	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of banks	2,069	2,069	1,230	1,230	1,230	1,873	1,945	1,945	1,945	1,760	2,055	2,069

Notes: Dependent variable is the net interest margin. All explanatory variables (except regulatory) are taken with a lag. All specifications include bank and time fixed effects. *, **, and *** denote significance at 1, 5, and 10 percent confidence levels, respectively.

VII. WHY DO LIC BANKS NOT LEND?[31]

This note sheds light on the reasons why banks in LICs lend so little by examining the determinants of loan-to-asset ratios using bank-level data. The empirical analysis suggests that while scale effects and default risk constitute key impediments to bank lending, the overall institutional environment plays a crucial role in driving intermediation in LICs.

89.   **The issue.** Despite considerable privatization and liberalization efforts over the past two decades, banks in many LICs lend less than in other economies (Figure VII.1), pointing to low intermediation efficiency (Beck et al., 2009). Typically, private-sector financing problems do not arise from a lack of savings that can be channeled into investment activities. Rather, banks in many LICs are excessively liquid. Deposits by customers are not always recycled in the form of loans, because banks choose to cover their liabilities either by acquiring government securities or by investing abroad.

Figure VII.1 Distribution of Loan-to-Asset and Loan-to-Deposit Ratios in LICs and EMs
(Percentage frequency)

Source: Bankscope; staff calculations.

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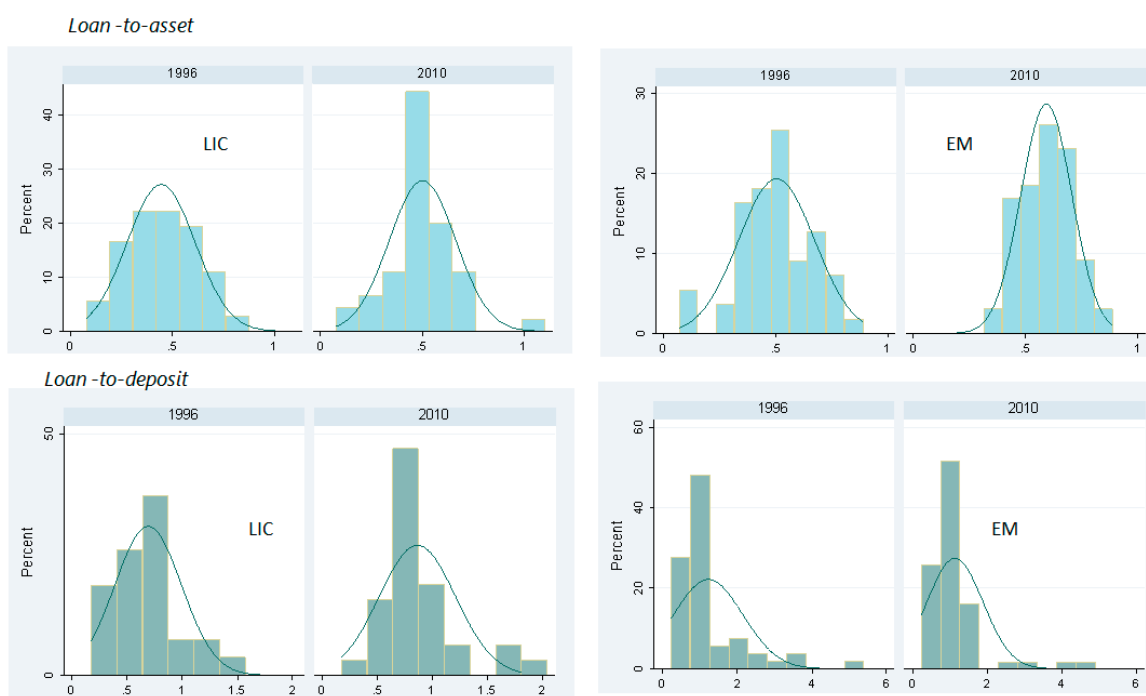
[31] Prepared by Jookyung Ree (APD), and Ke Wang (SPR).

90.   Plausible factors. A number of factors driving low bank lending in LICs have been posited in the literature. Andrianova et al. (2011) develop a theoretical model which shows that lower lending by banks could reflect unchecked moral hazard (strategic loan defaults) or adverse selection (a lack of good projects). Applying a dynamic panel estimator to a large sample of African banks, they show that loan defaults are a major factor inhibiting bank lending when the quality of regulation is poor. Rashid (2011) points to greater foreign bank penetration as a plausible factor. In particular, he shows that increased foreign bank presence in developing countries is associated with greater reliance on non-deposit-based funding, which contributes to higher interest spreads, and lower levels of credit to the private sector. Beck et al. (2011) point to the absence of a sound contractual and informational framework, weak governance, and small size of banking systems in many Sub-Saharan African countries as possible factors. This note revisits the importance of both bank-level and county characteristics in driving intermediation in LICs.

A. Methodology

91.   Specification. Various panel data specifications were used to estimate the following regression:

$$y_{i,t} = c_i + \alpha y_{i,t-1} + \beta x_{i,t} + \gamma z_{i,t} + u_{i,t} \tag{1}$$

$$u_{i,t} = v_i + e_{i,t} \tag{2}$$

where $i \in I_t \subseteq I = \{1, 2, \dots N\}$ refers to an individual bank, and $t = 1, \dots T$ the time period. The dependent variable is the ratio of loan-to-assets; $x_{i,t}$ is a vector of country-specific variables and $z_{i,t}$ is a vector of time variant bank-specific variables (e.g., size, capital, liquidity, default risk, market share. See Table VII.1 for details). Two econometric issues arise in estimating the above equation. First, some independent variables may be endogenous because of potential simultaneity or reverse causality. Second, we introduce the lagged dependent variable as a right hand side variable. With a fixed-effect estimator, this variable is, by construction, correlated with the error term and is, therefore, endogenous. As a result, we also employ a dynamic (two-step) GMM estimator suggested by Blundell and Bond (2000).

92.   Data. Bank-level data consists of annual bank balance sheet observations from 1996 to 2010 from BankScope. The dataset consists of 366 banks in 49 LICs and 2005 banks in 67 emerging market countries (EMs). All country-specific macro economic variables are from the IMF's World Economic Outlook database.[32] As a proxy for the institutional quality, we used Kaufmann-Kraay-Mastruzzi Worldwide Governance Indicators (KKM) from the World Bank, (ranging from -2.5 to 2.5, with higher values denoting better institutional quality), survey data on bank regulations from Barth

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[32] Several filtering rules were constructed to rule out outliers: a bank year when total assets more than doubled was eliminated regardless of the source of growth; a bank year when gross loans more than tripled or contracted by more than two thirds was eliminated; non-positive observations in total assets, total equities, and gross loans were removed; banks from very large emerging markets (i.e. China and India) were excluded.

et al. (2001, 2004), and an index of financial freedom from the Heritage foundation. The latter provides a measure of banking efficiency as well as a measure of independence from government control and interference in the financial sector.

B. Empirical Results

93.   Bank-level variables. Table VII.2 presents the regressions results for all developing countries, and separate results for LICs and EMs using fixed effects and GMM estimators. Turning first to bank-level variables (columns 1-3, 7-9 in Table VII.2), the empirical results suggest that bank size is positively and significantly associated with lending, i.e., larger banks tend to have higher loan-to–asset ratios. This finding is consistent with theories emphasizing the importance of scale effects for financial intermediation activity. A higher fraction of liquid assets boosts loan-to asset ratios in both LIC and EM banks. However, market share enters negatively and significantly only in regressions for EMs, although this results is not robust across specifications. Importantly, bank lending is negatively and significantly associated with credit risk (as proxied by loan loss provisions) across both country groups. This result is robust across specifications, and highlights the important role of credit risks in reducing incentives for bank lending.

94.   Macroeconomic variables. To examine the role of country-level characteristics in influencing banks willingness to lend, we augment the bank-specific variables with macroeconomic variables (column 4-6, 10-12 in Table VII.2). As can be seen from Table VII.2, the loan-to-assets ratio depends on the aggregate level of economic activity, which proxies for the presence of profitable investment opportunities in a country. Economic growth enters positively and significantly in all regressions. Moreover, higher inflation is negatively and significantly associated with bank lending, particularly in the case of EMs. Further, with the exception of bank size (only in the fixed effects regressions) and credit risks, most bank-level variables become insignificant once macroeconomic variables are included in the regressions.

95.   Institutional quality. To examine the role of the institutional environment in driving bank lending in LICs, we augment the baseline GMM regressions with a number of proxies capturing the quality of institutional and regulatory frameworks. These are introduced one at a time on account of strong multi-collinearity between the variables. The empirical results (reported in Table VII.3) suggest that banks in countries with stronger informational, contractual and enforcement frameworks tend to lend more. Several proxies for institutional quality – the composite KKZ index, as well as sub indices capturing the strength of rule of law, and control of corruption– have a positive and significant impact on loan-to-asset ratios in LICs. The results also suggest that greater financial freedom—lower degree of state intervention in banks and other financial firms through direct and indirect ownership, greater financial and capital market development, limited government influence on the allocation of credit, and openness to foreign competition —have a positive and significant effect on lending. Finally, among regulatory variables, we find a strong negative association between the fraction of bank entries denied and propensity to lend, highlighting the role of competition in spurring bank lending.

Table VII.1 Variable Definition and Sources

Variables	Definition	Data Source
Loan	Gross loans, in millions of US dollars for each bank.	BankScope
Asset	Total asset, in millions of US dollars for each bank.	BankScope
Loan to Asset	The ratio of loan to asset, in percent.	BankScope
Size	Size of asset, in natural log term.	BankScope
Capital	The ratio of asset to equity of a bank, in percent.	BankScope
Liquidity	Ratio of liquid reserves to total assets, in percent.	BankScope
Market Concentration	Herfindahl index (total assets).	BankScope
Default Risk	Ratio of loan loss provisions to total loans.	BankScope
GDP Growth	Real GDP growth rate, in percent.	IMF, WEO
Inflation	Percentage change in consumer price index.	IMF, WEO
KKZ Index	Composite of country scores in the areas of voice and accountability, political stability, government effectiveness, regulatory burden, rule of law, and freedom from graft. Range from -2.5 to 2.5.	Kaufmann et al. (2002)
Rule of Law	Index covers areas of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Kaufmann et al. (2002)
Control of Corruption	Index covers areas of petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	Kaufmann et al. (2002)
Regulatory Quality	Index covers general aspects of government regulation in all areas of economy (not only banking) that permit and promote private sector development.	Kaufmann et al. (2002)
Bank Entry Denied	Fraction of bank entry applications denied, in percent.	Barth et al. (2001, 2004)
Bank Activity Rrestrictions	Composite of restrictions across four types of activities: securities markets, insurance, real estate, and shares in non-financial firms. Dummy equals 0 if there are no retrictions.	Barth et al. (2001, 2004)
Financial Freedom	Index measures financial freedom with restrictions on bank and investment with range from 0 to 100. It is an indicator of investment climate.	Heritage Foundation and Wall Street Journal

Table VII.2 Effects of Bank-Specific and Macro Variables on Loan-to-assets Ratio, 1960-2010
(Fixed-Effects Model and GMM Model)

	Fixed-Effects Model						GMM Model					
	Bank-specific			Macro			Bank-specific			Macro		
	All	EM	LIC	All	EM	LIC	All	EM	LIC	All	EM	LIC
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Loan_Asset (-1)	0.585***	0.575***	0.621***	0.624***	0.624***	0.620***	1.041***	1.112***	0.892***	0.915***	0.859***	1.107**
	[53.00]	[47.36]	[23.28]	[56.14]	[51.17]	[22.42]	[9.239]	[7.858]	[3.649]	[6.494]	[5.581]	[2.505]
Size	2.528***	2.749***	1.256**	2.315***	2.536***	1.327**	6.754***	8.886***	8.981**	0.0589	0.0802	6.412
	[9.976]	[9.814]	[2.096]	[8.804]	[8.670]	[2.153]	[2.585]	[2.820]	[2.092]	[0.0158]	[0.0179]	[0.980]
Capital	-0.00692	0.0118	-0.0817	-0.0253	-0.00398	-0.0966*	0.00708	0.0770	0.292	0.0750	0.0452	0.129
	[-0.327]	[0.503]	[-1.642]	[-1.131]	[-0.159]	[-1.902]	[0.0433]	[0.372]	[0.858]	[0.421]	[0.228]	[0.284]
Liquidity	0.0464***	0.0471***	0.0363	0.0216**	0.0190*	0.0334	0.200**	0.223**	0.341*	0.113	0.0513	0.386
	[4.390]	[4.075]	[1.373]	[2.050]	[1.664]	[1.220]	[2.131]	[1.978]	[1.669]	[0.966]	[0.424]	[1.096]
Market Concentration	-0.0383**	-0.0679***	-0.00654	-0.0314**	-0.0518***	-0.00649	-0.000718	0.0534	-0.0520	-0.00186	0.0473	-0.0571
	[-2.572]	[-3.463]	[-0.291]	[-2.136]	[-2.741]	[-0.272]	[-0.0259]	[1.593]	[-1.116]	[-0.0716]	[1.542]	[-1.031]
Default Risk	-0.105***	-0.0955***	-0.185***	-0.0950***	-0.0848***	-0.191***	-0.125***	-0.108**	-0.225*	-0.115***	-0.100***	-0.235*
	[-5.158]	[-4.447]	[-2.815]	[-4.729]	[-4.008]	[-2.853]	[-3.040]	[-2.457]	[-1.852]	[-3.020]	[-2.756]	[-1.864]
GDP Growth				0.0702***	0.0734**	0.132*				0.129***	0.110**	0.181**
				[2.605]	[2.440]	[1.893]				[2.829]	[2.054]	[2.052]
Inflation				-0.0490***	-0.0482***	-0.0456				-0.0648**	-0.0884***	0.0488
				[-3.669]	[-3.366]	[-1.136]				[-2.346]	[-2.760]	[0.773]
Observations	9,721	8,022	1,699	7,902	6,316	1,586	7,394	6,062	1,332	6,319	5,072	1,247
Number of Banks	2,033	1,718	315	1,318	1,025	293	1,593	1,338	255	1,121	883	238
Pseudo R-squared	0.374	0.372	0.407	0.441	0.452	0.406	0.476	0.418	0.517	0.81	0.818	0.562
Hansen test p-value	-	-	-	-	-	-	0.406	0.289	0.116	0.760	0.659	0.463
A-B AR(2) test p-value	-	-	-	-	-	-	0.104	0.123	0.157	0.139	0.184	0.493
Sargan test p-value	-	-	-	-	-	-	0.756	0.475	0.373	0.879	0.619	0.545

t-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1

Note: Windrejec (2005) two-step robust standard errors for GMM estimators. All regressions include year fixed effect.

Table VII.3 Effects of Institution Quality on Loan-to-assets Ratio in LICs, 1960-2010
(GMM Model)

VARIABLES	Coefficient	Observations	Number of Banks	Hansen test p-value	A-B AR(2) test p-value	Sargan test p-value
Institutional Variables						
KKZ Index	10.97**	989	250	0.427	0.487	0.424
	[2.392]					
Rule of Law	6.591**	1,137	273	0.482	0.438	0.571
	[2.342]					
Control of Corruption	4.019*	1,137	273	0.466	0.605	0.589
	[1.765]					
Regulatory Quality	3.547	1,137	273	0.407	0.594	0.463
	[1.345]					
Banking Regulation						
Bank Entry Denied	-0.0555*	246	71	0.456	0.322	0.534
	[-1.683]					
Bank Activity Restrictions	-5.108	940	193	0.648	0.0904	0.769
	[-0.887]					
Financial Freedom	7.453*	1,485	263	0.702	0.314	0.742
	[1.737]					

t-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Note: All regressions include bank-specific variables and year fixed effect.

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VIII. REVISITING THE FINANCE-GROWTH NEXUS FOR LOW-INCOME COUNTRIES[33]

This note examines the extent to which the growth benefits resulting from financial deepening are quantitatively different for low-income countries (LICs). We estimate growth regressions following the specifications and techniques commonly used in the empirical growth-finance literature with some modifications to capture cross-country heterogeneity. The analysis suggests that the growth dividend from financial deepening is lower for LICs relative to other countries, varies continuously with the income level, and is lower for oil exporters. The analysis further indicates that the lower growth dividends from financial deepening in LICs can be mitigated by improving financial sector policies (e.g., quality of regulation and supervision).

96.   Context. A rich theoretical and empirical literature spanning over four decades has shown convincingly that deep and well-functioning financial systems produce a wide range of favorable economic outcomes, including higher long-run growth. Until recently, however, there has been little investigation into whether this link between financial deepening and growth holds across all countries. Given that in carrying out their essential economic functions, financial institutions and markets are sensitive to the underlying macroeconomic and regulatory/supervisory environments, it seems plausible that the degree of financial sector depth might not produce the same growth benefits in all countries.[34]

97.   This note. In this note we empirically examine whether the standard result—greater financial depth is associated with higher long-run growth[35]—applies equally to LICs relative to other countries, varies continuously according to income level, and whether more open LICs or those more dependent on oil exports obtain different benefits from financial deepening than other countries. In particular, we run five sets of these regressions. The first three incorporate measures of depth in the banking system: (i) liquid liabilities/GDP, (ii) bank deposits/GDP; and (iii) private sector credit/GDP; while the remaining two include measures of stock market activity: (iv) stock market capitalization/GDP; and (v) the stock market turnover ratio.

A. Specification and Methodology

98.   Baseline specification. The basic regression equation relates real per capita GDP growth g to financial depth f, a set of controls X, initial income per capita y_0 (to control for the convergence

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[34] It should be recognized that there may be a two-way causation between economic development and financial deepening. A number of studies address the two-way causation explicitly (see Buera et al., 2011), whereas the approach followed in this section isolates a one-way causation between finance and growth based on the presumption that the impact is likely to occur with a lag.

[35] See Beck (2008), Beck (2011), and Beck and Levine (2004), and Rousseau and Wachtel (2011).

effect), country fixed-effects c, and common time effects λ. In addition, as in Rousseau and Wachtel (2011), we include an interaction term between financial depth and a crisis dummy indicating whether a given country i is undergoing a banking crisis at time t.[36] These authors show that, particularly in regressions using data after 1990, the growth impact of financial depth is weakened substantially if the occurrence of banking crises is not accounted for. To the baseline specification used in existing studies, we add interaction terms between the given financial depth variable and (i) a LIC dummy variable; (ii) the level of income per capita; and (iii) the LIC dummy further interacted with variables z (*Bank supervision,* an indicator of the quality of regulation and supervision, which ranges from 1 to 3; *Openness*, measured as the ratio of total exports plus imports to GDP; *Oilexp*, a dummy variable for oil exporters; and *Oildep*, the share of oil in total GDP).

$$g_{it} = \alpha + \beta f_{it} + \beta_1 f_{it} \cdot CRISIS_{it} + \beta_2 f_{it} \cdot LIC_i + \beta_3 f_{it} \cdot LIC \cdot z_{it}$$
$$+ \gamma X_{it} + \delta y_{i,t0} + c_i + \lambda_t + \varepsilon_{it}$$

99.   Estimation method. We run a set of dynamic panel regressions using a two-equation GMM procedure as in Arellano and Bover (1995). Our sample covers up to 146 LICs and non-LICs during the 1975-2005 period. To smooth out cyclical fluctuations, all continuous variables are averaged over consecutive non-overlapping five-year periods. The detailed results are presented in Tables VIII.2-7, and the qualitative results of the interactions with LIC dummy variables, income levels and other country characteristics are summarized in Table VIII.1.

B. Results

100.   Main results. First, we verify the validity of the baseline specification, shown in the column (1) in each of the Tables VIII.2-6. Each financial depth variable is positively and significantly (at least at the 5 percent level) related to real per capita GDP growth and the financial crisis interaction term is always negative and significant at the 1 percent level. The control variables perform as expected, with education attainment and FDI both positively related to growth, and with a highly significant convergence effect as well. Interestingly, financial crises appear to have a larger impact on the growth benefits of stock market depth in comparison to those of banking depth. In the baseline specification, an occurrence of financial crisis virtually erases all of the direct growth impact of stock market depth (Column 1, Tables VIII.5 and VIII.6), whereas it reduces the growth effect of banking depth by between a third and one-half (Column 1, Tables VIII.2-4).

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[36] We use the Laeven and Valencia (2008) definition and timing of banking crises.

101.   Lower growth dividends in LICs. In general, the growth benefits emanating from higher financial depth tend to be smaller for LICs. The interaction term with the LIC dummy is negative in all regressions, and is statistically significant in most specifications, whether included on its own or further interacted with other country-specific variables. In addition to the simple comparison of LICs vs. non-LICs which the interaction with the dummy variable provides, we also find that growth impact of depth increases continuously with income level, a relationship that is statistically significant across all measures except stock market turnover (Column 7, Tables VIII.2-6).

Table VIII.1 The Finance Growth Nexus: Cross-Country Heterogeneity							
		Financial Depth Variable					
Interaction of financial depth with:	*A positive value indicates…*	Liquid liabilities	Deposits-GDP	Credit-GDP	Market capitalization	Turnover	Results from:
LIC Dummy Only	LICs obtain higher growth from financial depth	(—)	(—)	(—)	(—)	(—)	Column (2), Tables 2-6.
Income per capita	Richer countries obtain higher growth from financial depth	(+)	(+)	(+)	(+)	(+)	Column (3), Tables 2-6.
LIC Dummy and other variables							
LIC Dummy	LICs obtain higher growth from financial depth	(—)	(—)	(—)	(—)	(—)	Column (7), Tables 2-6.
LIC Dummy and Supervision	…and more so as the quality of supervision increases	(+)	(+)	(+)	(+)	(+)	
LIC Dummy	LICs obtain higher growth from financial depth	(—)	(—)	(—)	(—)	(+)	Column (9), Tables 2-6.
LIC Dummy and Trade Openness	…and more so the more open they are to trade	(+)	(+)	(+)	(+)	(—)	
LIC Dummy	LICs obtain higher growth from financial depth	(—)	(—)	(—)	(—)	(—)	Columns (4), (8), (12), (16), and (20), Table 7.
LIC Dummy and Oildep	…and more so the more dependent they are on oil	(—)	(—)	(—)	(+)	(—)	
LIC Dummy	LICs obtain higher growth from financial depth	(—)	(—)	(—)	(—)	(—)	Columns (3), (7), (11), (15), and (19), Table 7.
LIC Dummy and Oilexp	…and more so if they are oil exporters	(—)	(—)	(—)	(—)	(+)	

Source: Regression results shown in Tables 2-7.

This table shows the sign and significance of interaction terms between each of the financial depth variables and the following: (i) the LIC dummy variable alone, as well as (ii) interacted further with the degree of openness; the quality of supervision; Oildep, the ratio of oil GDP to total GDP; Oilexp, a dummy variable for oil-exporting countries; and income per capita. A red bold entry indicates that the corresponding coefficient was significant at least at the 10 percent level , whereas a black entry indicates lack of significance.

102.   Partial influence functions. Looking further at the quantitative results, we see from Figure VIII. 1 that the estimated impact of bank deposits and liquid liabilities on growth is actually negative at very low levels of income, and becomes nonnegative at a per capita income level of $140–$190 (in constant US 2000 dollars), or between the 4th and 12th percentile for LICs in 2008.[37] For private sector credit, the impact is nonnegative at even the lowest income levels. For banking deposits and credit, the conventional result—a positive growth impact of financial depth—occurs above an income of $770–$810, or roughly at the 73rd percentile for LICs in 2008, whereas for liquid liabilities the growth benefits become statistically significant at an income of just over $1,000, or at about the 81st percentile for LICs. For stock market capitalization, nonnegative growth effects are present at even the lowest income levels, and become positive and significant at about $830 (Figure VIII.1, bottom panel).

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[37] Note that Figure 1 expresses the horizontal axis in log form (as estimated in the regressions), and therefore an exponential transformation is required to translate the thresholds from the plot into income levels. Also, the levels at which the marginal growth impact of financial depth becomes nonnegative and positive are evaluated using the 95 percent confidence bands as shown. These confidence bands were constructed using the Fieller method, as described in Hirschberg and Lye (2010).

Figure VIII.1 Partial Influence Functions of Banking Depth and Market Capitalization on Growth at Different Levels of Income

(95 percent confidence bands indicated by dotted lines)
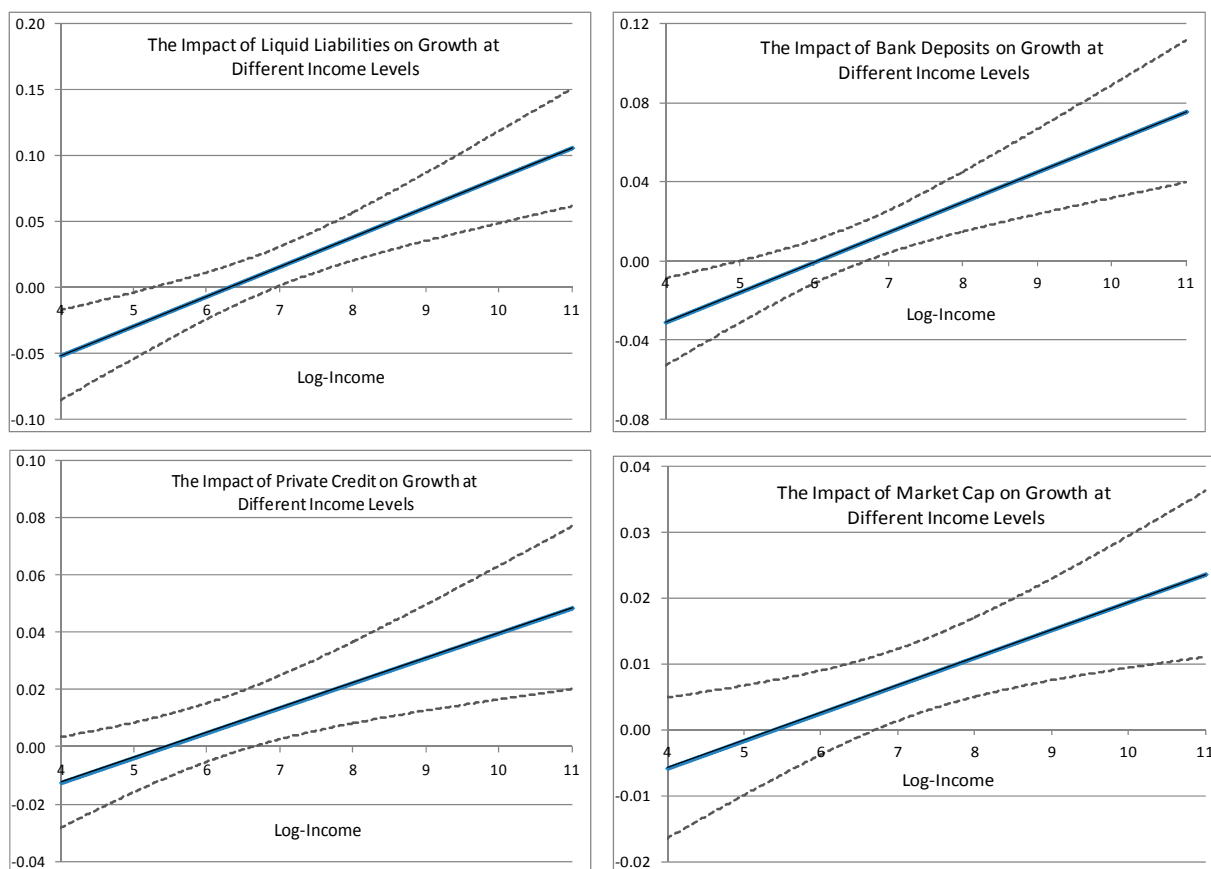
103.   Importance of country characteristics. Further interactions reveal the relevance of certain institutional characteristics. For instance, the quality of regulation and supervision appears to be a mitigating factor: LICs with better quality of supervision and regulation tend to display a higher growth impact of depth, particularly on the banking side. Partial influence functions suggest that LICs can achieve the gains from banking depth as other countries by introducing significant improvements in supervision and regulation (Figure VIII.2). The banking supervision variable is obtained from Abiad, et al. (2008), and, as mentioned above, is scaled from 1 to 3. Its level depends on the degree to which the country has adopted risk-based capital adequacy ratios based on the Basel I Accord; the supervisor is independent from the executive and has sufficient legal powers; supervision covers a wide range of institutions; and on- and off-site examinations of banks are effective. As of 2005, LICs were lagging in this regard: for a sample of 18 of these countries, the average value for this indicator was 1.4, compared to 1.8 for middle-income countries and over 2.5 for high-income countries.

Figure VIII.2 Partial Influence Functions of Banking Depth on Growth in LICs at Different Levels of Supervisory Quality
(95 percent confidence bands indicated by dotted lines)
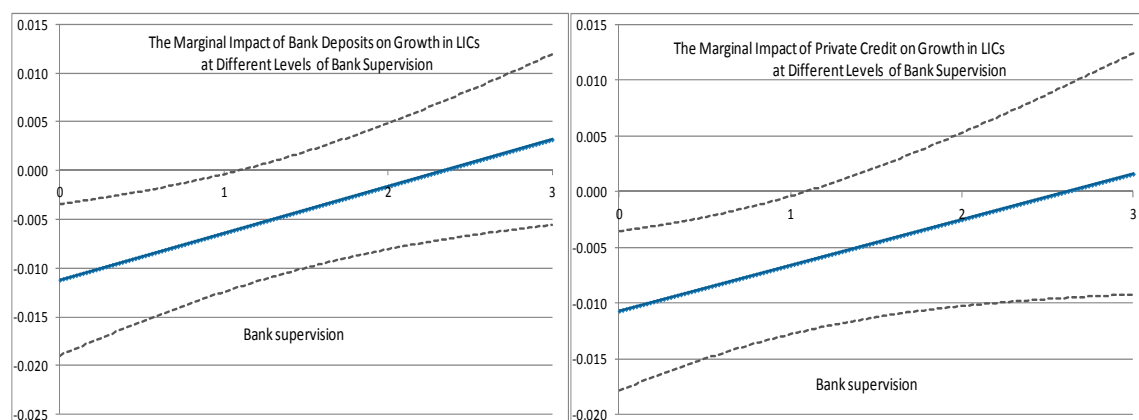
104.   Natural resource curse. Recent research (Barajas, et al., 2011; Beck, 2011) has also examined whether there is a discernable financial sector channel associated with the so-called "resource curse", whereby the presence of a large resource-based export sector generates negative externalities to the rest of the economy via distorted incentives and weakened institutions. Using the same GMM approach as in this paper, Barajas et al. (2011) find evidence of such an effect across all countries. This result continues to hold in our current analysis where we introduce a LIC dummy to control for differences across income groups. All three measures of banking depth show evidence that LICs who are also oil exporters (and/or are more dependent on oil) are subject to a particularly weak growth impact of depth. However, the opposite result arises for stock market depth, where oil exporters tend to perform better than peers within their income group. Finally, there is some weaker evidence that openness might be associated with better financial sector performance in LICs. The lower growth impact of depth in LICs is mitigated by the degree of trade openness of these countries, although such an effect is only statistically significant in the case of private credit.

C. Concluding Comments

105.   Challenges for LICs. The empirical results show that, in addition to the observed shallowness of financial systems, LICs also tend to obtain less of a growth benefit from their existing levels of depth than do their higher-income counterparts. Our analysis shows that this result not only holds when comparing LICs as a group to non-LICs, but also as income is increased continuously over the country sample. Therefore, while increasing financial depth should continue to be a critical component of a pro-growth strategy, our analysis suggests that the *quality* of financial intermediation, and the efficiency with which funds are put to productive uses, can play an important part in the growth process as well. Thus, the challenge for LICs is twofold: along with actions aimed at increasing depth, these countries should undertake policies that enhance the quality of finance. Our analysis shows that supervision and regulation constitute one area in which LICs have scope to introduce improvements which could serve to lessen their disadvantage relative to higher-income countries.

106. **Plausible explanation.** It seems plausible that the observed differences in the growth impact of financial depth are related to differences in financial access, which reflect how widely the benefits of financial activity are disseminated throughout the economy. As it turns out, the differences in access between LICs and other countries are strikingly larger than the respective differences in depth. For example, while banking depth (private credit-GDP) in the average high-income country was 4½ times the level of the average LIC in 2008, the degree of coverage of banking services (deposits and loans) among the adult population was about 7 times as large, and that of non-bank institutions was 6-9 times as large. Therefore, to gain a better understanding of the types of policies that will most benefit LICs, future work should focus on the interplay between supportive policies, financial access, and the growth impact of depth.

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Table VIII.2 Heterogeneity in the Link Between Liquid Liabilities and Growth: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent variable: Growth rate of real per capita GDP								
Liquid liabilities	0.021 ***	0.024 ***	-0.142 ***	0.018 ***	0.019 **	0.024 ***	0.021 **	0.013	0.020
	(2.623)	(2.717)	(-3.753)	(2.459)	(2.264)	(2.802)	(2.612)	(1.303)	(1.591)
Liquid liabilities x Financial crisis	-0.006 **	-0.006 ***	-0.005 ***	-0.005 **	-0.007 ***	-0.006 ***	-0.005 ***	-0.005 ***	-0.005 ***
	(-2.546)	(-4.517)	(-2.718)	(-2.579)	(-3.093)	(-2.879)	(2.958)	(-3.184)	(-3.006)
Interactions with LIC dummy and other indicators									
Liquid liabilities x LIC		-0.010 ***		-0.023 ***	-0.004	-0.011 ***	-0.010 ***	-0.007 **	-0.021
		(-2.744)		(-2.284)	(-1.290)	(-3.765)	(3.418)	(-2.397)	(-1.413)
Liquid liabilities x Income			0.022 ***						
			(4.239)						
Liquid Liabilities x Openness								0.001	(0.001)
								(0.503)	(0.213)
Liquid liabilities x LIC x Openness				0.004					0.004
				(1.338)					(0.932)
Liquid liabilities x Bank Supervision						0.001	0.002 *		
						(0.845)	(1.785)		
Liquid liabilities x LIC x Bank Supervision						0.003 **	0.004 ***		
						(2.445)	(2.810)		
Control variables									
Education	0.021 ***	0.015 *	0.039 ***	0.016 **	0.023 **	0.010 ***	0.017 ***	0.012	0.012
	(2.884)	(1.868)	(5.373)	(2.225)	(2.065)	(2.174)	(2.793)	(1.324)	(1.487)
Initial GDP per capita	-0.016 ***	-0.022 ***	-0.110 ***	-0.019 ***	-0.019 ***	-0.017 ***	-0.021 ***	-0.016 ***	-0.016 ***
	(-3.033)	(-3.165)	(-5.066)	(-3.150)	(-2.868)	(-3.062)	(-3.461)	(-3.177)	(-3.841)
FDI	0.372 ***	0.359 ***	0.139 **	0.362 **	0.327 ***	0.394 *	0.283	0.388 ***	0.377 ***
	(2.827)	(2.781)	(2.080)	(3.499)	(1.352)	(1.810)	(1.459)	(3.252)	(3.132)
Constant	-1.739 ***	-1.603 ***	-0.066	-1.635 ***	-1.511	-1.791 ***	1.278	-1.753 ***	-1.710 ***
	(-2.874)	(-2.701)	(-0.171)	(-3.520)	(-1.355)	(-1.767)	(-1.403)	(-3.278)	(-3.182)
Observations	659	659	658	636	409	409	409	636	636
Number of countries	142	142	142	139	80	80	80	139	139
AR2	0.885	0.927	0.764	0.786	0.195	0.233	0.093	0.786	0.816
Hansen	0.242	0.071	0.309	0.259	0.330	0.199	0.279	0.249	0.342
Number of instruments	83	96	96	109	68	68	71	109	122

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover(1995). The explanatory variables are: Liquid liabilities, the ratio of banking system liquid liabilities to GDP; Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some specifications also include interactions between liquid liabilities and either a dummy variable for LICs, Income, the level of income per capita; Openness, the ratio of exports plus imports to GDP; or the quality of bank supervision. All specifications include an interaction term between liquid liabilities and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies and Supervision) are expressed their mean values over non-overlapping five year-periods during 1975-2005, and the explanatory variables are expressed in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.

Table VIII.3 Heterogeneity in the Link Between the Bank Deposits-GDP Ratio and Growth: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent variable: Growth rate of real per capita GDP								
Deposits-GDP	0.016 **	0.020 ***	-0.092 ***	0.018 ***	0.016 ***	0.019 ***	0.016 ***	0.014	0.017
	(2.609)	(3.235)	(-3.481)	(2.741)	(2.561)	(3.162)	(3.291)	(1.406)	(1.566)
Deposits-GDP x Financial crisis	-0.007 **	-0.007 ***	-0.006 ***	-0.007 ***	-0.008 ***	-0.007 **	-0.006 ***	-0.007 ***	-0.007 ***
	(-2.546)	(-6.923)	(-5.611)	(-3.642)	(-3.076)	(-2.625)	(-3.147)	(4.124)	(-3.962)
Interactions with LIC dummy and other indicators									
Deposits-GDP x LIC		-0.009 ***		-0.019 *	-0.005	-0.011 ***	-0.011 ***	-0.006 *	-0.016
		(-2.997)		(-1.932)	(-1.641)	(-3.238)	(-2.827)	(-1.887)	(-1.249)
Deposits-GDP x Income			0.015 ***						
			(3.855)						
Deposits-GDP x Openness								0.001	0.000
								(0.452)	(-0.052)
Deposits-GDP x LIC x Openness				0.003					0.003
				(1.065)					(0.759)
Deposits-GDP x Bank Supervision						0.001	0.005		
						(0.779)	(1.486)		
Deposits-GDP x LIC x Bank Supervision						0.004 ***	0.005 **		
						(2.227)	(2.461)		
Control variables									
Education	0.023 ***	0.020 ***	0.038 ***	0.016 ***	0.017	0.010 *	0.015 *	0.014	0.014 *
	(2.672)	(2.637)	(4.918)	(2.163)	(1.406)	(1.780)	(1.678)	(1.642)	(1.860)
Initial GDP per capita	-0.017 ***	-0.023 ***	-0.079 ***	-0.019 ***	-0.017 ***	-0.016 ***	-0.018 ***	-0.017 ***	-0.017 ***
	(-3.183)	(-3.328)	(-4.535)	(-3.442)	(-2.517)	(-2.712)	(-2.833)	(-3.157)	(3.799)
FDI	0.357 ***	0.351 ***	0.188 ***	0.362 ***	0.334	0.359	0.300	0.312 ***	0.342 ***
	(2.654)	(3.141)	(2.647)	(2.737)	(1.420)	(1.649)	(1.425)	(2.699)	(2.792)
Constant	-1.649 ***	-1.568 ***	-0.499	-1.625 ***	-1.517	-1.611	-1.349	-1.405 ***	-1.543 ***
	(-2.668)	(-2.979)	(-1.297)	(-2.690)	(-1.398)	(-1.577)	(1.367)	(-2.670)	(2.766)
Observations	673	673	672	651	409	409	409	651	651
Number of countries	144	144	144	141	80	80	80	141	141
AR2	0.978	0.972	0.709	0.929	0.278	0.317	0.130	0.941	0.906
Hansen	0.153	0.290	0.354	0.313	0.259	0.188	0.289	0.252	0.403
Number of instruments	83	96	96	109	68	63	71	109	122

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover(1995). The explanatory variables are: The ratio of bank deposits to GDP; Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some specifications also include interactions between liquid liabilities and either a dummy variable for LICs, Income, the level of income per capita; Openness, the ratio of exports plus imports to GDP; or the quality of bank supervision. All specifications include an interaction term between the deposit-GDP ratio and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies and Supervision) are expressed their mean values over non-overlapping five year-periods during 1975-2005, and the explanatory variables are expressed in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.

Table VIII.4 Heterogeneity in the Link Between the Credit-GDP and Growth: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent variable: Growth rate of real per capita GDP								
Credit-GDP	0.012 ***	0.017 ***	-0.047 **	0.017 ***	0.011 **	0.013 ***	0.013 **	0.019 *	0.027 **
	(2.477)	(2.471)	(-2.593)	(3.262)	(2.389)	(2.879)	(2.571)	(1.783)	(2.410)
Credit-GDP x Financial crisis	-0.006 ***	-0.006 ***	-0.006 ***	-0.006 ***	-0.010 ***	-0.010 ***	-0.009 ***	-0.006 ***	-0.006
	(-2.744)	(-4.046)	(-4.090)	(-3.905)	(-3.847)	(-3.303)	(-3.435)	(-4.029)	(-3.944)
Interactions with LIC dummy and other indicators									
Credit-GDP x LIC		-0.006		-0.033 ***	-0.006	-0.011 ***	-0.011 ***	-0.006 *	-0.041 ***
		(-1.483)		(-2.395)	(-1.280)	(-2.795)	(-2.929)	(-1.721)	(-2.627)
Credit-GDP x Income			0.009 ***						
			(3.092)						
Credit-GDP x Openness								-0.001	-0.003
								(-0.262)	(-1.019)
Credit-GDP x LIC x Openness				0.006 ***					0.009 **
				(1.867)					(2.222)
Credit-GDP x Bank Supervision					0.001		0.001		
					(0.493)		(0.632)		
Credit-GDP x LIC x Bank Supervision						0.003	0.004 *		
						(0.314)	(1.929)		
Control variables									
Education	0.025 ***	0.028 ***	0.035 ***	0.024 **	0.023 **	0.017 ***	0.019 *	0.021 **	0.019 **
	(3.163)	(3.142)	(5.056)	(3.118)	(2.178)	(2.259)	(1.873)	(2.609)	(2.509)
Initial GDP per capita	-0.017 ***	-0.024 ***	-0.054 ***	-0.023 ***	-0.020 ***	-0.019 ***	-0.019 ***	-0.020 ***	-0.020 ***
	(-2.987)	(-2.673)	(-4.055)	(-3.644)	(-2.891)	(-3.362)	(-2.935)	(-3.828)	(-4.343)
FDI	0.361 ***	0.298 **	0.275 ***	0.362 **	0.225	0.270	0.227	0.389 ***	0.373 ***
	(3.028)	(2.479)	(2.653)	(2.775)	(1.089)	(1.348)	(1.138)	(2.895)	(2.633)
Constant	-1.664 ***	-1.331 ***	-1.051 **	-1.625 ***	-0.993	-1.180	-1.000	-1.765 ***	-1.680 **
	(-3.020)	(-2.347)	(-2.051)	(-2.708)	(-1.036)	(-1.270)	(-1.076)	(-2.865)	(-2.580)
Observations	678	678	677	652	407	407	407	652	652
Number of countries	146	146	146	142	80	80	80	142	142
AR2	0.857	0.920	0.812	0.985	0.492	0.492	0.467	0.882	0.926
Hansen	0.382	0.453	0.301	0.679	0.100	0.100	0.161	0.483	0.707
Number of instruments	83	96	96	109	63	63	71	109	122

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover(1995). The explanatory variables are: The ratio of bank credit to the private sector to GDP; Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some specifications also include interactions between liquid liabilities and either a dummy variable for LICs, Income, the level of income per capita; Openness, the ratio of exports plus imports to GDP; or the quality of bank supervision. All specifications include an interaction term between the credit-GDP ratio and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies and Supervision) are expressed their mean values over non-overlapping five year-periods during 1975-2005, and the explanatory variables are expressed in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.

Table VIII.5 Heterogeneity in the Link Between Market Capitalization and Growth: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent variable: Growth rate of real per capita GDP								
Market capitalization	0.100 ***	0.011 ***	-0.023 **	0.011 ***	0.009 ***	0.011 ***	0.009 ***	0.008	0.008
	(3.420)	(3.922)	(-2.048)	(3.752)	(3.498)	(3.145)	(3.241)	(1.218)	(1.240)
Market capitalization x Financial crisis	-0.012 ***	-0.011 ***	-0.010 ***	-0.010 ***	-0.014 ***	-0.015 ***	-0.014 ***	-0.009 ***	-0.009 ***
	(-5.352)	(-4.817)	(-3.918)	(-3.852)	(-4.868)	(-4.211)	(-3.949)	(-3.666)	(-4.009)
Interactions with LIC dummy and other indicators									
Market capitalization x LIC		-0.014 ***		-0.016	-0.011 ***	-0.016 **	-0.015 **	-0.014 ***	-0.026
		(-3.362)		(-0.450)	(-2.677)	(-2.003)	(-2.066)	(-3.561)	(-0.864)
Market capitalization x Income			0.004 ***						
			(2.807)						
Market capitalization x Openness								0.001	0.001
								(0.434)	(0.406)
Market capitalization x LIC x Openness				0.000					0.003
				(0.048)					(0.421)
Market capitalization x Bank Supervision					-0.001		-0.001		
					(-0.916)		(0.583)		
Market capitalization x LIC x Bank Supervision						0.004	0.003		
						(0.923)	(0.925)		
Control variables									
Education	0.027 *	0.018 *	0.038 **	0.017	0.015 *	0.012	0.150	0.016	0.015
	(1.705)	(1.686)	(2.192)	(1.415)	(1.690)	(1.321)	(1.617)	(1.118)	(1.365)
Initial GDP per capita	-0.016 ***	-0.019 ***	-0.033	-0.018 ***	-0.014 ***	-0.016 ***	-0.015 ***	-0.017 ***	-0.017 ***
	(-3.583)	(-4.746)	(-4.575)	(-4.135)	(-3.412)	(-4.415)	(-2.848)	(-4.837)	(-5.415)
FDI	0.198	0.192	0.139	0.426 ***	0.298	0.237	0.277	0.399 ***	0.387 ***
	(1.586)	(1.546)	(1.259)	(4.269)	(1.518)	(1.265)	(1.512)	(3.649)	(3.667)
Constant	-0.904	-0.821	-0.554	-1.906 ***	-1.318	-1.018	-1.219	-1.776 ***	-1.726 ***
	(-1.560)	(-1.423)	(-1.084)	(-4.274)	(-1.447)	(-1.162)	(-1.435)	(3.705)	(-3.857)
Observations	360	360	360	345	289	289	289	345	345
Number of countries	105	105	105	100	74	74	74	100	100
AR2	0.807	0.860	0.753	0.717	0.602	0.570	0.634	0.708	0.696
Hansen	0.524	0.811	0.616	0.953	0.434	0.268	0.443	0.956	0.988
Number of instruments	83	96	96	101	68	63	71	108	114

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover(1995). The explanatory variables are: Market capitalization, the ratio of stock market capitalization to GDP; Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some specifications also include interactions between liquid liabilities and either a dummy variable for LICs, Income, the level of income per capita; Openness, the ratio of exports plus imports to GDP; or the quality of bank supervision. All specifications include an interaction term between Market capitalization and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies and Supervision) are expressed their mean values over non-overlapping five year-periods during 1975-2005, and the explanatory variables are expressed in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.

Table VIII.6 Heterogeneity in the Link Between Stock Market Turnover and Growth: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent variable: Growth rate of real per capita GDP								
Turnover	0.007 ***	0.007 ***	0.006	0.007 ***	0.013 ***	0.011 ***	0.012 ***	0.002	0.004
	(3.024)	(2.771)	(0.563)	(2.458)	(2.799)	(3.768)	(3.409)	(0.225)	(0.446)
Turnover x Financial crisis	-0.009 ***	-0.009 ***	-0.008 ***	-0.007 ***	-0.015 ***	-0.011 ***	-0.014	-0.008 ***	-0.007 ***
	(-3.832)	(-3.628)	(-3.374)	(-3.207)	(-4.106)	(-3.628)	(-4.371)	(-3.840)	(-2.916)
Interactions with LIC dummy and other indicators									
Turnover x LIC		-0.003		0.019	-0.004	-0.011 **	-0.010 *	-0.002	0.024
		(-0.884)		(0.668)	(-1.761)	(-2.463)	(-1.904)	(-0.674)	(0.930)
Turnover x Income			0.000						
			(0.066)						
Turnover x Openness								0.002	0.001
								(0.848)	(0.432)
Turnover x LIC x Openness				-0.006					-0.007
				(-0.743)					(-1.002)
Turnover x Bank Supervision					-0.001		-0.001		
					(-0.718)		(-0.910)		
Turnover x LIC x Bank Supervision						0.007 *	0.007		
						(1.970)	(1.407)		
Control variables									
Education	0.014	0.009	0.012	0.012	0.022 **	0.021 **	0.019 ***	0.003	0.009
	(0.834)	(0.748)	(0.889)	(1.330)	(2.026)	(2.626)	(2.653)	(0.220)	(0.754)
Initial GDP per capita	-0.010 *	-0.011 **	-0.010	-0.011 ***	-0.017 ***	-0.017 ***	-0.016 ***	-0.010 **	-0.011 ***
	(-1.977)	(-2.187)	(-1.597)	(-3.082)	(-4.721)	(-4.889)	(-4.605)	(-2.128)	(-2.880)
FDI	0.293 *	0.312 **	0.299 *	0.612 ***	0.008	0.283 *	0.296	0.533 ***	0.557 ***
	(1.866)	(2.008)	(1.799)	(5.396)	(1.165)	(1.727)	(1.381)	(4.734)	(5.470)
Constant	-1.327 *	-1.389 *	-1.342 *	-2.787 ***	0.000	-1.265 *	-1.327	-2.397 ***	-2.523
	(-1.854)	(-1.931)	(-1.755)	(-5.337)	(0.000)	(-1.661)	(-1.341)	(-4.638)	(-5.449)
Observations	363	363	363	349	292	292	292	349	349
Number of countries	104	104	104	100	74	74	74	100	100
AR2	0.884	0.890	0.820	0.930	0.950	0.978	0.943	0.840	0.891
Hansen	0.769	0.793	0.834	0.868	0.014	0.638	0.653	0.963	0.975
Number of instruments	83	96	96	103	68	63	71	108	116

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover(1995). The explanatory variables are: Turnover, the ratio of stock market value traded to capitalization; Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some specifications also include interactions between liquid liabilities and either a dummy variable for LICs, Income, the level of income per capita; Openness, the ratio of exports plus imports to GDP; or the quality of bank supervision. All specifications include an interaction term between Turnover and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies and Supervision) are expressed their mean values over non-overlapping five year-periods during 1975-2005, and the explanatory variables are expressed in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.

Table VIII.7 Financial Depth and Growth Across Income Groups and Between Oil Exporters vs Non-Oil Exporters: Dynamic Panel Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
									Dependent variable: Growth rate of real per capita GDP											
Financial Depth Variable:	Liquid liabilities/GDP				Bank deposits/GDP				Private credit/GDP				Market capitalization/GDP				Stock market turnover ratio			
Financial Depth	0.022 *	0.021 **	0.021 **	0.016 *	0.022 ***	0.020 ***	0.021 ***	0.017 ***	0.015 **	0.013 **	0.016 ***	0.011 **	0.011 ***	0.009 ***	0.011 ***	0.010 ***	0.007 ***	0.007 **	0.008 ***	0.007 **
	(1.957)	(2.341)	(2.359)	(1.766)	(3.352)	(3.199)	(3.284)	(2.662)	(2.555)	(2.320)	(2.811)	(2.010)	(3.835)	(2.779)	(3.777)	(3.205)	(2.682)	(2.490)	(3.011)	(2.125)
Financial Depth x Financial crisis	-0.005 **	-0.007 ***	-0.006 ***	-0.008 ***	-0.007 ***	-0.008 ***	-0.007 ***	-0.008 ***	-0.006 ***	-0.007 ***	-0.007 ***	-0.007 ***	-0.011 ***	-0.011 ***	-0.011 ***	-0.011 ***	-0.010 ***	-0.010 ***	-0.009 ***	-0.009 ***
	(-2.468)	(-4.176)	(-3.946)	(-3.533)	(-3.640)	(-4.813)	(-3.959)	(-4.132)	(-4.403)	(-3.751)	(-3.989)	(-4.132)	(-5.195)	(-5.572)	(-6.007)	(-4.758)	(-3.695)	(-3.926)	(-3.715)	(-3.051)
Interactions with LIC dummy and other indicators																				
Financial Depth x LIC	-0.010 **	-0.005	-0.010 *	-0.010 ***	-0.011 ***	-0.010 **	-0.013 ***	-0.008 **	-0.007	-0.005	-0.007 **	-0.004	-0.015 ***	-0.014 ***	-0.015 ***	-0.014 ***	-0.007 *	-0.007 *	-0.007 *	-0.007 *
	(-2.259)	(-1.268)	(-1.973)	(-2.675)	(-2.755)	(-2.584)	(-3.393)	(-2.266)	(-1.602)	(-1.268)	(-1.991)	(-1.001)	(-3.193)	(-4.314)	(-3.204)	(-4.185)	(-1.733)	(-1.910)	(-1.815)	(-1.826)
Financial Depth x Oilexp			-0.007 ***				-0.006 ***				-0.001				-0.001				-0.004 *	
			(-3.295)				(-3.371)				(-0.428)				(-0.589)				(-1.724)	
Financial Depth x Oildep				-0.015 *				-0.011				-0.009				-0.004				-0.010
				(-1.684)				(-1.120)				(-0.996)				(-0.474)				(-1.045)
Financial Depth x LIC x Oilexp	-0.005		0.007		-0.002		0.006		-0.007		-0.005		0.002		0.003		0.015 ***		0.018 ***	
	(-1.024)		(1.569)		(-0.467)		(1.655)		(-1.621)		(-0.982)		(0.646)		(0.620)		(2.658)		(3.020)	
Financial Depth x LIC x Oildep		-0.003		0.012		0.000		0.006		-0.015 **		-0.004		0.018 **		0.021 *		0.030 ***		-0.039 ***
		(-0.233)		(1.144)		(0.022)		(0.624)		(-2.005)		(-0.375)		(2.199)		(1.810)		(4.438)		(3.293)
Control variables																				
Education	0.015 **	0.014 *	0.014 **	0.015 *	0.019 ***	0.017 **	0.015 **	0.017 ***	0.025 ***	0.024 ***	0.026 ***	0.023 ***	0.017 *	0.021 *	0.018 *	0.019	0.012	0.018	0.009	0.015
	(2.164)	(1.821)	(1.985)	(1.684)	(2.637)	(2.388)	(2.256)	(2.190)	(3.119)	(3.254)	(3.522)	(3.078)	(1.863)	(1.897)	(1.677)	(1.449)	(0.720)	(1.443)	(0.731)	(1.138)
Initial GDP per capita	-0.023 ***	-0.022 ***	-0.023 ***	-0.020 ***	-0.025 ***	-0.023 ***	-0.024 ***	-0.021 ***	-0.024 ***	-0.021 ***	-0.026 ***	-0.019 ***	-0.018 ***	-0.017 ***	-0.019 ***	-0.016 ***	-0.011 **	-0.013 ***	-0.011 ***	-0.011 **
	(-2.845)	(-3.469)	(-3.908)	(-3.118)	(-3.862)	(-3.847)	(-4.399)	(-3.367)	(-2.996)	(-2.850)	(-3.892)	(-2.712)	(-4.891)	(-5.063)	(4.690)	(-4.369)	(-2.118)	(-2.786)	(-2.694)	(-2.148)
FDI	0.348 **	0.312 **	0.336 ***	0.312 **	0.323 ***	0.312 **	0.309 ***	0.309 **	0.350 ***	0.301 **	0.311 ***	0.307 ***	0.182	0.118	0.169	0.158	0.312 *	0.281 **	0.323 **	0.242 *
	(2.552)	(2.251)	(2.773)	(2.394)	(2.667)	(2.439)	(2.944)	(2.512)	(2.827)	(2.742)	(2.979)	(2.853)	(1.500)	(1.122)	(1.528)	(1.586)	(1.979)	(2.019)	(2.280)	(1.876)
Constant	-1.540 **	-1.374 **	-1.463 ***	-1.374 **	-1.418 **	-1.377 **	-1.336 ***	-1.367 **	-1.561 ***	-1.347 **	-1.368 ***	-1.378 ***	-0.770	-0.502	-0.704	-0.678	-1.396 **	-1.264 *	-1.437 **	-1.087 *
	(-2.512)	(-2.175)	(-2.675)	(-2.329)	(-2.560)	(-2.347)	(-2.760)	(-2.426)	(-2.702)	(-2.633)	(2.818)	(-2.757)	(-1.361)	(-1.043)	(-1.366)	(-1.484)	(-1.934)	(-1.972)	(-2.197)	(-1.826)
Observations	659	617	659	617	673	632	673	632	678	637	678	637	360	340	360	640	363	343	363	343
Number of countries	142	140	142	140	144	142	144	142	146	144	146	144	105	102	105	102	104	101	104	101
AR2	0.869	0.778	0.920	0.742	0.970	0.728	0.986	0.738	0.864	0.881	0.990	0.852	0.855	0.442	0.820	0.520	0.708	0.735	0.613	0.780
Hansen	0.204	0.311	0.274	0.475	0.267	0.396	0.363	0.509	0.537	0.799	0.538	0.616	0.893	0.926	0.964	0.929	0.928	0.884	0.993	0.964
Number of instruments	109	109	122	122	109	109	122	122	109	109	122	122	101	101	114	110	103	103	116	112

This table shows the results of dynamic panel regressions for real per capita GDP growth, using a GMM procedure following Arellano and Bover (1995). Each specification includes one of five financial depth variables as an explanatory variable: ratios to GDP of banks' liquid liabilities, deposits, and credit; the ratio of stock market capitalization to GDP; and Turnover, the ratio of stock market value traded to capitalization. Other explanatory variables include Education, percentage of gross secondary school enrollment; Initial GDP per capita; and FDI expressed as a percentage of GDP. Some interactions are also included: between the respective financial depth variable and a dummy variable for LICs; and either a dummy variable for oil exporters or Oil dependence, the ratio of oil to total GDP. All specifications include an interaction term between the financial depth variable and a dummy variable expressing whether the country experienced a financial crisis during each five-year period. The dependent variable as well as the explanatory variables (except the dummies) are expressed their mean values over non-overlapping five year-periods during 1975-2005 and are in logs. Robust t-statistics are shown in parentheses, and significance at the 1 percent (***), 5 percent (**), and 10 percent (*) levels are indicated.
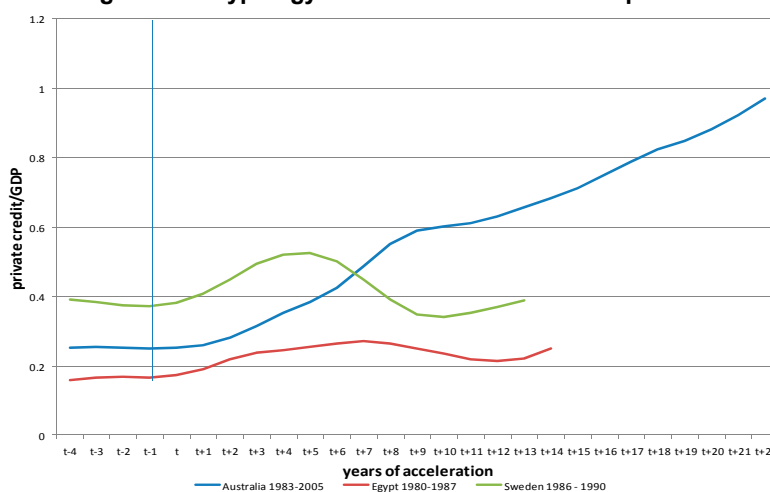
IX. AN ANATOMY OF FINANCIAL ACCELERATIONS CREDIT BOOMS, BUSTS AND FINANCIAL DEEPENING[38]

This chapter sketches out an anatomy of financial intermediation across countries and over time. How frequently do financial accelerations occur? How long do they last? In which economic and institutional environments do they take place? How often do they end in crisis or in soft landings? Answers to these questions could help policymakers identify conditions that lead to successful financial deepening.

107.   Anatomy, A close analysis of developments in the credit-to-GDP ratio over a longer period of time (1960–2009) for a sample of 142 countries reveals that the development of financial systems around the world broadly evolves along three distinct patterns: periods of sustained stagnation, episodes of sustained financial deepening, and rapid and short-lived accelerations. In stagnation episodes, there are no significant movements in financial intermediation for long periods of time (sometimes for the entire 50-year period covered by our analysis). At the other extreme, in countries experiencing sustained deepening, the ratio of credit to GDP picks up in a specific year and growth is sustained for a decade or more. The experience of Australia, with deepening starting in 1983, is taken as the stylized example in Figure IX.1. The third pattern refers to countries where we observe a pick up—often a very rapid pick up—in credit-to-GDP growth, but this growth is not sustained for a long time. After a number of years (typically less than 10), growth comes to a halt. This halt can either be a 'soft landing'—growth rates decelerate to pre-growth levels, as for example in Egypt in 1980-87—or a 'hard landing'— a financial crisis, as in Sweden

Figure IX.1 Typology of Financial Acceleration Episodes

Source: authors' calculations and WDI.

in the early 1990s. The latter types of events are generally known as episodes in credit boom-bust cycles (Gourinchas et al., 2001).

A. Methodology

108.   Criteria. We characterize the various episodes of financial deepening according to two defining criteria: the growth rate of credit to GDP and the length of the growth episode.[39] Let $\Delta \frac{C_k}{Y_k}$ denote country k's three-year moving average of its credit-to-GDP ratio's annual growth rate. Financial accelerations are defined and characterized as follows:

i.   Country k is experiencing a financial takeoff if $\Delta \frac{C_k}{Y_k} \geq 2$ %;

ii.   This episode of financial acceleration lasts at least 5 years and is labeled "sustained financial deepening" if it lasts at least 10 years.

The applied threshold for the annual growth is 2 percent. It is low for credit booms during which annual growth rates of 30–40 percent are not unthinkable. However it seems reasonable for longer periods of sustained deepening. This threshold—applied to a centered three-year moving average—allows us to exclude "accidents" or fluke one-year changes. For example, real GDP growth could accelerate in a given year while credit growth catches up the next year. This could incidentally push the growth rate below two percent for one year, a problem that is resolved by using a moving average.[40]

109.   Duration. The second criterion concerns the duration of an episode. We set the minimum length at 5 years in order to eliminate 'incidental' short-lived accelerations. Secondly, an acceleration period qualifies as sustainable if it lasts longer than 10 years. This cut-off is based on the lending-boom literature.[41] Thus, we present our results for episodes lasting between 5 and 10 years (short accelerations), and for episodes lasting more than 10 years (episodes of sustained financial development). Finally, stagnation episodes are defined as periods of at least four consecutive years with growth not exceeding the two-percent threshold defined above. From this we exclude stagnation periods that follow periods of sustained growth.

B. An Overview of Acceleration and Stagnation Episodes

110.   Episodes. With these criteria at hand, we identify 174 episodes of short acceleration between 1960 and 2009, and 66 periods of sustained growth (Table IX.1). We also identify 230 stagnation episodes. While growth and stagnation episodes are evenly represented over the years, sustained growth periods are less common. They represent less than one-third of the overall episodes. Short acceleration and stagnation episodes are evenly distributed over the five decades covered in our analysis. The occurrence of short acceleration episodes peaked in the 1990s, driven

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[39] We closely follow the methodology developed in Quintyn, M. and G. Verdier (2010).

[40] Our approach differs from methodologies developed in related lines of research, e.g., dating or deviation-from-trend methodologies (for example Gourinchas et al., 2001). This approach would not allow us to detect periods of sustained development.

[41] Gourinchas et al. (2001) estimate the average lifetime of a lending boom to be 6.7 years, with a standard deviation of 3.6. Hilbers et al. (2005) find that credit booms ending in a crisis last on average 6.8 years, while those ending without a crisis have a lifetime of, on average, 9.6 years.

by developments in Africa, Asia and Western Hemisphere. The emergence of sustained growth episodes culminated during the 1990s as well, driven by Europe. However, long episodes were also well-represented in the 1960s and 1980s.[42] Overall, the Middle East and North Africa region have gone through the least number of growth episodes (barring the Central Asia and Eastern Europe and CIS and Mongolia regions, which only appear in the sample during the last two decades). Africa had the most stagnation episodes during the 1980s and 1990s.

111.   Differences across income groups. There are clear differences in the occurrence of episodes across income groups (Table IX.2). In absolute numbers, the middle-income countries (MIC) group is clearly the "center of the action" with a relatively even distribution across lower and upper MICs. This group accounts for most short and long periods, with the 1990s as the most populated decade. The 1960s and 1990s also witnessed a large number of long episodes in MICs. High income countries (HICs) represent over a third of the long episodes and just under a third of the short growth episodes, with a concentration in the 1980s and 1990s. LICs only have seven sustained episodes and just over one fifth of the short growth episodes. Stagnation episodes are relatively evenly spread among income groups. In relative terms, deepening and stagnation episodes are fairly evenly divided (Figure IX.2). If we compare the episodes in percentage of the years per income group, we notice that LICs had marginally more short growth period years, but the smallest amount of long episodes. Seen from that angle, HICs have had the most years of sustained growth.

112.   Concentration of sustained episodes. Episodes of sustained growth have occurred relatively more often in countries that have now highly developed financial systems (Figure IX.2). The concentration ratio for sustained periods of financial deepening is, at 1.6, higher than the 1.11 for short episodes, implying that the latter have taken place more or less in every country, while sustained episodes are more concentrated in countries that now have more

Figure IX.2 Credit-to-GDP Ratios and Dispersion across Countries for two Types of Acceleration Episodes
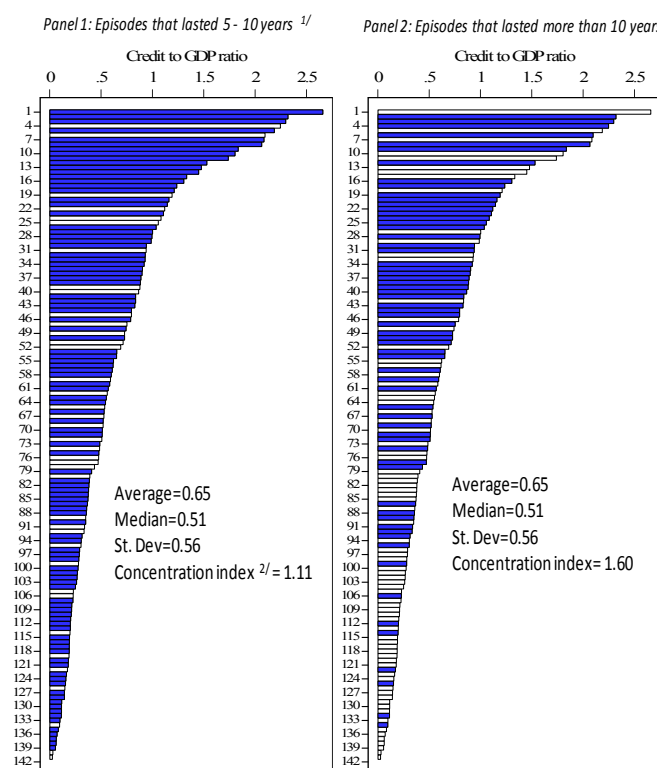
Source: authors' calculations and WDI.
1/ Shaded bars denote countries with at least one episode of acceleration
2/ Concentration index greater than one implies the average of shaded bars is greater than average of all observations

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[42] The absence of long episodes in the 2000s is due to the cut-off in 2009. So, some of the shorter periods that started in or after 1999, could still "graduate" into sustained periods.

developed financial systems.[43] This suggests that sustained deepening episodes—rather than a series of short 'soft-landing' episodes—are more important for financial development.

C. An Anatomy of Financial Development

Initial conditions

113.   Characteristics. The literature has identified three types of country characteristics that might help jumpstart financial development:[44] macroeconomic and structural conditions, financial liberalization, and institutional factors. In this section we examine whether initial conditions have an impact on financial development outcomes.

114.   Macroeconomic environment. Our analysis covers a number of variables that characterize the macroeconomic environment. We include GDP growth, inflation, the fiscal position, the current account, and the level of real interest rates. On the structural side, we examine the degree of openness of the economy, as well as the presence of natural resources.

- Inflation and real interest are important initial conditions. Figure IX.3 and IX.4, respectively, show that the average inflation rate and the average real interest rates in the five years preceding acceleration were higher in countries that experienced a short-lived financial acceleration that ended in a crisis compared to the other two types of episodes.[45] In contrast, there were no significant differences among the three types of episodes with respect to GDP growth and fiscal balances in the years leading up to accelerations (not shown in the figures).

- Openness spurs sustained accelerations while the presence of natural resources does not. Figure IX.5 indicates that the degree of openness (exports plus imports as a percentage of GDP) seems to favor accelerations, while there is no significant difference between the impacts on the two types of short episodes. Table IX.2 suggests that natural resource-rich environments are not solid grounds for financial development. Resource-rich countries only account for 11 long episodes (one sixth of the total), although these countries represent 39 percent of the entire sample.[46]

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[43] The concentration ratio compares the average level of credit-to-GDP ratio of the countries that had an episode with the average level of the sample. The ratio can go from zero to infinity. A ratio of 1 means the episodes are evenly spread within the sample (same average).

[44] For a detailed overview of this literature, see Quintyn and Verdier (2010).

[45]Some of the evidence in this paper is provided by way of box plots, which depict distributions of variables through five essential statistics. The lines in a box plot, from the lowest to the highest, represent the sample minimum, lower quartile, median, upper quartile, and the sample maximum. The spacing between the different parts of the box can help to analyze the degree of dispersion and skewness in the data.

[46] These findings are in line with Beck (2011).

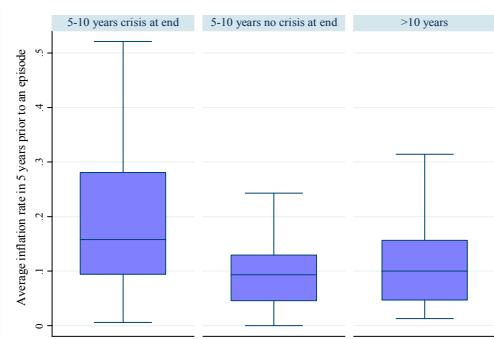Figure IX.3 Episodes and Average Inflation Rate in Five Preceding Years

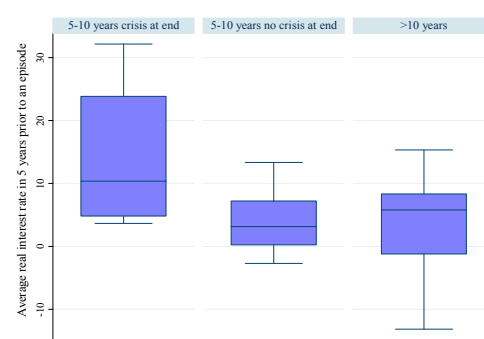Figure IX.4 Episodes and Average Real Interest Rate in Five Preceding Years

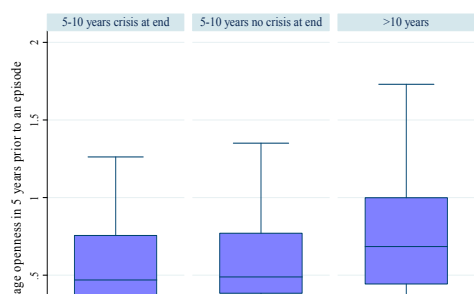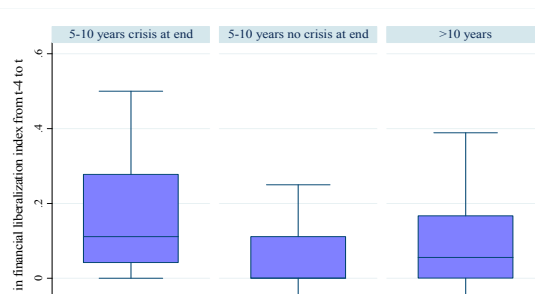Figure IX.5 Episodes and Degree of Openness in Five Preceding Years

Figure IX.6 Episodes and Financial Liberalization in Five Preceding Years

115.   Financial liberalization emerges as a driving force for both short and sustained deepening episodes. Table IX.3 indicates that a third of the 5–10 year periods were preceded by a significant move toward financial liberalization. This share rises to over 50 percent for longer episodes.[47] In addition, more long episodes were accompanied by improvements in banking supervision than the short periods. This is true across income levels. However, as noted below, rapid financial liberalization may adversely affect the probability of a crisis. In addition, if liberalization is accompanied by improvements in supervision, chances for a long acceleration increase. If we look at the intensity of liberalization, we observe that short periods ending in a crisis liberalized more intensely (Figure IX.6).

116.   Institutional factors. There is a growing consensus that the quality of institutions also plays a role in financial development. Some authors have argued that a country's legal origin plays a key role in explaining differences in financial development across countries (La Porta et al., 1998). Others emphasize the role of effective enforcement of property rights (Acemoglu and Johnson, 2005;

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[47]The construction of indices of financial liberalization (e.g., Abiad and Mody, 2005) has recently opened the door to more detailed analyses of the effect of liberalization in panel data. This paper uses the financial liberalization index computed by Abiad et al. (2008) (relying on the Abiad and Mody (2005) earlier index).

Tressel and Degatriache, 2008). Finally, it has also been argued that the ultimate source of such protection stems from the quality of the political institutions (Haber, et al, 2008).[48]

117. **Significant role of institutional factors.** Table IX.3 suggests that in general, long acceleration periods are more likely to occur in environments where more constraints on the executive prevail, and in democratic environments. Only six percent of the long episodes took place in autocratic environments. LICs are the exception to this finding (LICs also had the smallest number of long episodes). Further, Figure IX.7 shows that long episodes tend to take place in political environments with more checks and balances (median just above 5).

Figure IX.7 Episodes and Political Institutions in Five Preceding Years
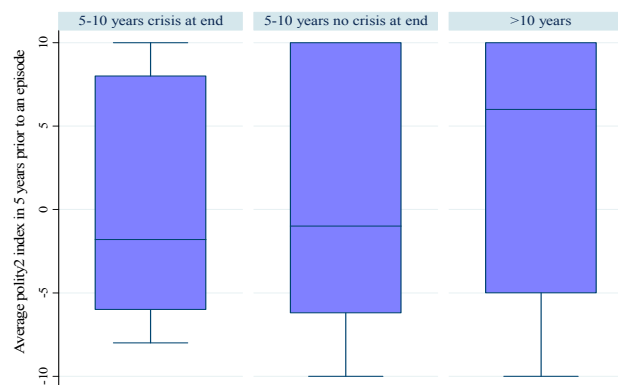
Source: Authors' calculations and Polity IV.

Duration

118. **Duration of episodes.** The descriptive statistics in Table IX.4 shed some light on the duration of episodes. The average duration of short periods is 7 years. Sustained periods last on average twice as long. Stagnation episodes last on average 8 years. The average credit-to-GDP ratio at the beginning of a sustained period is 20 percent, markedly lower than for short periods, and reaches an average of 67 percent at the end of an episode. After a sustained growth period, countries have on average tripled their level of financial development, while shorter growth spurs only show an increase of the level by a factor 1.5. So-called stagnation periods in fact boil down to negative growth episodes. The level of financial development falls on average by a bit more than 10 percentage points. Average growth and peak growth indicators do not show decisive differences between the two types of financial growth episodes.

119. **Stagnation episodes** are long-lasting (5-10+ years) and are very common across countries. Stagnation episodes cover 28 percent, short episodes 22 percent and long episodes 17 percent of all episodes.[49] Considered by income group, we observe that LICs have had somewhat more stagnation episodes, and significantly fewer deepening periods (long episodes).

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[48] Property rights, the argument goes, are only effective when there is a government strong enough to enforce them. However, when a government is strong enough to enforce laws, it is also strong enough to break them (in the absence of checks and balances on the government's power). As a result, financial development is best served by a government that puts constraints on its own power.

[49] The grey area, labeled "none" aggregates all the years that do not correspond to any of our stagnation or acceleration episodes.

Terminal conditions

120.   Hard landings. Short episodes often end in crises. This result—as shown in Table IX.5—is in line with results from the lending boom literature.[50] For the entire sample, the table indicates that the likelihood that an episode ends in a crisis (banking, currency or debt crisis—or a combination of these) is twice as high for short episodes as for long episodes (and five times as higher in the case of debt crises). Only three percent of sustained episodes end in a banking crisis. Currency crises are the most common, followed by banking crises.[51]

121.   Crises propensity in MICs. MICs seem to be most prone to accelerations ending in crises. Table IX.5 indicates that the likelihood that short or long episodes in HICs end in a banking or currency crisis is close to 4 percent. Between 9 and 18 percent of short-term growth episodes in MICs end in a crisis, with the greatest likelihood for currency crises. In addition, 13 percent of the long episodes came to an end in the midst of a currency crisis. The long episodes in LICs (seven in the sample) always ended in a soft landing. However, short episodes in LICs are also prone to currency crises (13 percent).

122.   Terminal conditions not independent from initial conditions. Crisis and crisis-free episodes can have markedly different initial conditions. First, rapid and far reaching financial liberalization is associated with a greater probability that an episode will end in a crisis (Figure IX.6). In addition, countries with weak constraints on the executive and less democratic institutions also tend to experienced more hard landings than others. On the macroeconomic side, we find that countries with initially higher inflation and higher real interest rates are more crisis-prone than their peers (Figures IX.3 and IX.5). Finally, openness of the economy seems to have a mitigating effect, although this is marginal (Figure IX.5). In the run-up to acceleration, other economic variables, such as the fiscal and the current account balance, do not seem to play an important role.

123.   Importance of institutional environment. Whether an acceleration episode turns into a long sustained episode or a short-run event with a soft landing depends crucially on the institutional environment. In the run-up to acceleration, macroeconomic conditions or the intensity of financial liberalization are not significantly different for short episodes with a soft landing or for sustained episodes. As shown in Figure IX.9, however, the political environment is markedly different: countries in which the political system has more checks and balances are not only more likely to avoid crises but also to enjoy longer episodes of financial deepening.

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[50] The identification of crisis types and episodes is based on Laeven and Valencia, (2008).

[51] In this table, the crises as listed are not mutually exclusive. So it is possible that a given country experience a combination of two or even three types of crises.

D. Conclusion

124.   Financial liberalization and accelerations. The analysis suggests that there is a strong link between financial liberalization and financial accelerations. However, financial liberalization emerges as a necessary but not sufficient ingredient for financial deepening. Several stagnation episodes have been preceded by major liberalization efforts, but with no identifiable effects. In addition, financial liberalization, in an environment of strong institutions (proxied by the presence of checks and balances in the political system) is more likely to lead to sustained periods of financial deepening. Moreover, if accompanied by improvements in supervision, chances for a long acceleration increase in the wake of financial liberalization. Short accelerations can take place in a wide variety of institutional settings. This finding is consistent with the "political institutions" school according to which political systems with checks and balances are more likely to generate financial growth than others because of the central role of confidence in government as an engine for financial transactions.

125.   Terminal conditions not independent of initial conditions. Our evidence suggests that the likelihood that a period of financial growth ends in a crisis is greater when (i) financial liberalization is too rapid; (ii) the institutional environment has limited checks and balances; and (iii) the macroeconomic environment is unstable (as measured by high inflation and real interest rates). The evidence also suggests that sustained deepening episodes are more likely to emerge in systems with political checks and balances.

126.   Lower sustained episodes in LICs. The fact that episodes of financial deepening are less prevalent in LICs could be the result of a combination of factors. First, macroeconomic stability was elusive in many LICs during the seventies and eighties. Second, the weak institutional environment remains a challenge in many LICs, a challenge which may be more acute in resource-rich countries. A lack of sustained growth prospects may also be at the root of the problem.

127.   Implications. For LICs, our results suggest a number of avenues for fostering financial development and preventing crises.

- Fostering good governance;

- Implementing financial liberalization at a measured pace;

- Preserving the gains from macroeconomic stability.

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Table IX.1 Episodes of Financial Deepening and Stagnation by Region
(1960-2009)

Region	Episode	Period 60-69	70-79	80-89	90-99	00-09	Total
Africa	5-10 years	3	13	6	11	10	**43**
	> 10 years	2	1	4	2	0	**9**
	stagnation	3	8	20	17	10	**58**
Asia	5-10 years	4	4	6	10	7	**31**
	> 10 years	5	3	5	3	0	**16**
	stagnation	2	5	8	11	4	**30**
Central Asia and Eastern Europe	5-10 years	1	0	1	2	6	**10**
	> 10 years	0	0	1	5	0	**6**
	stagnation	0	1	2	5	2	**10**
CIS and Mongolia	5-10 years	0	0	0	2	2	**4**
	> 10 years	0	0	0	4	0	**4**
	stagnation	0	0	0	1	0	**1**
Europe	5-10 years	6	4	10	3	4	**27**
	> 10 years	3	0	3	8	0	**14**
	stagnation	10	11	7	9	2	**39**
MENA	5-10 years	2	2	4	5	2	**15**
	> 10 years	1	2	0	1	0	**4**
	stagnation	4	1	6	5	2	**18**
Western Hemisphere	5-10 years	4	8	11	16	5	**44**
	> 10 years	7	1	3	2	0	**13**
	stagnation	6	6	19	9	14	**54**
Total	**5-10 years**	**20**	**31**	**38**	**49**	**36**	174
	> 10 years	**18**	**7**	**16**	**25**	**0**	66
	stagnation	**25**	**32**	**62**	**57**	**34**	210

Source: Authors' calculations and WDI.

Table IX.2 Episodes of Financial Deepening and Stagnation by Income Level and According to the Presence of Natural Resources (1960-2009)

Region	Episode	Period					Total
		60-69	70-79	80-89	90-99	00-09	
High Income	5-10 years	9	6	18	12	9	**54**
	> 10 years	6	3	6	10	0	**25**
	stagnation	13	17	12	19	5	**66**
Upper Middle Income	5-10 years	3	3	7	13	8	**34**
	> 10 years	4	2	4	6	0	**16**
	stagnation	3	5	17	11	9	**45**
Lower Middle Income	5-10 years	5	12	9	15	7	**48**
	> 10 years	6	2	4	6	0	**18**
	stagnation	7	5	19	12	11	**54**
Low Income	5-10 years	3	10	4	9	12	**38**
	> 10 years	2	0	2	3	0	**7**
	stagnation	2	5	14	15	9	**45**
Total	**5-10 years**	**20**	**31**	**38**	**49**	**36**	**174**
	> 10 years	**18**	**7**	**16**	**25**	**0**	**66**
	stagnation	**25**	**32**	**62**	**57**	**34**	**210**
of which							
resource rich countries	*5-10 years*						*43*
	> 10 years						*11*
	stagnation						*53*
non resource rich countries	*5-10 years*						*131*
	> 10 years						*55*
	stagnation						*157*

Source: author's calculations and WDI; resource rich countries are according to FAD database on revenue from natural resources.

Table IX.3 Anatomy of Financial Acceleration and Stagnation Episodes
in Percent of Number of Episodes (1960-2009)

	5-10 years	> 10 years	Stagnation
All countries			
Financial liberalization , 4 years prior to start /1	33.30	51.40	33.10
Improvements in supervision, 4 years prior to start /2	31.20	45.90	26.30
Constraints on Executives, 5 years prior to start /3	33.10	54.20	34.40
Democratic regime, 10 years prior to start /4	36.80	50.00	42.90
Autocratic regime, 10 years prior to start /5	11.50	6.10	14.30
Positive regime change, 5 years prior to start /6	10.90	7.60	11.90
Negative regime change, 5 years prior to start /7	10.90	6.10	6.70
HIC			
Financial liberalization , 4 years prior to start /1	28.10	50.00	18.20
Improvements in supervision, 4 years prior to start /2	62.50	81.30	57.80
Constraints on Executives, 5 years prior to start /3	76.90	79.20	78.80
Democratic regime, 10 years prior to start /4	81.50	72.00	81.80
Autocratic regime, 10 years prior to start /5	3.70	8.00	4.50
Positive regime change, 5 years prior to start /6	3.70	0.00	6.10
Negative regime change, 5 years prior to start /7	0.00	0.00	1.50
MIC			
Financial liberalization , 4 years prior to start /1	40.90	52.90	41.80
Improvements in supervision, 4 years prior to start /2	54.50	61.10	55.40
Constraints on Executives, 5 years prior to start /3	27.00	46.40	24.40
Democratic regime, 10 years prior to start /4	23.20	44.10	34.30
Autocratic regime, 10 years prior to start /5	14.60	2.90	16.20
Positive regime change, 5 years prior to start /6	11.00	11.80	12.10
Negative regime change, 5 years prior to start /7	13.40	8.80	7.10
LIC			
Financial liberalization , 4 years prior to start /1	23.50	50.00	42.10
Improvements in supervision, 4 years prior to start /2	35.30	75.00	47.40
Constraints on Executives, 5 years prior to start /3	0.00	0.00	2.20
Democratic regime, 10 years prior to start /4	2.60	0.00	4.40
Autocratic regime, 10 years prior to start /5	15.80	14.30	24.40
Positive regime change, 5 years prior to start /6	21.10	14.30	20.00
Negative regime change, 5 years prior to start /7	21.10	14.30	13.30
Total Number of episodes	**174**	**66**	**210**

Source: Authors' calculations, WDI, Abiad et al. (2008), and Polity IV.

1/ Defined as an increase in financial liberalization index of at least 0.13 basis points in the 4 years before start of epis

2/ Defined as an increase in the bank supervision index of at least 0.13 basis points in the 4 years before start of epis

3/ Defined as average "constraint on executive" index greater than 6 in 5 years before start of episode.

4/Defined as polity 2 index greater than 6 for 10 consecutive years before start of episode.

5/ Defined as polity 2 index less than -6 for 10 consecutive years before start of episode.

6/ Defined as a positive jump in the polity 2 index of at least 3 points w ithin 5 years before start of episode.

7/ Defined as a negative jump in the polity 2 index of at least 3 points w ithin 5 years before start of episode.

Table IX.4 Episodes of Financial Deepening and Stagnation
Descriptive Statistics (1960-2009)

	5-10 years	> 10 years	Stagnation
Average episode duration (in years)	7.07	14.64	8.36
Average credit/GDP at the beginning of an episode	0.34	0.21	0.43
(standard deviation)	*-0.34*	*-0.17*	*-0.35*
Lowest credit/GDP ratio at the start of an episode	0.01	0.01	0.02
Country with lowest credit/GDP ratio at start of episode	*Congo,DR*	*Rwanda*	*Uganda*
Highest credit/GDP ratio at the start of an episode	1.83	0.73	2.01
Country with hightest credit/GDP at start of episode	*U.States*	*Spain*	*Japan*
Average credit/GDP growth rate during an episodes (in pct)	11.16	11.25	-5.49
(standard deviation)	*-12.57*	*-13.75*	*-10.03*
Peak credit/GDP growth rate during episodes (in pct)	109.57	165.31	22.54
Country with peak credit/GDP growth rate during episodes	*Lao PDR*	*C.Verde*	*Lesotho*
Average Credit/GDP ratio at the end of episode	0.53	0.67	0.33
(standard deviation)	*-0.46*	*-0.47*	*-0.31*

Source:Authors' calculations and WDI.

Table IX.5 Incidence of Crises During and at the end of Episodes (1960-2009)
(in percent of episodes)

	5-10 years	> 10 years	Stagnation
All countries			
Banking crisis, within an episode	12.0	16.7	16.1
Banking crisis, last year or year after the end	6.3	3.3	2.1
Currency crisis, within an episode	10.1	21.7	33.3
Currency crisis, last year or year after the end	12.7	6.7	3.6
Debt crisis, within an episode	5.7	5.0	7.8
Debt crisis, last year or year after the end	5.7	1.7	0.0
HIC			
Banking crisis, within an episode	8.7	13.0	6.8
Banking crisis, last year or year after the end	4.3	4.3	1.7
Currency crisis, within an episode	4.3	8.7	13.6
Currency crisis, last year or year after the end	4.3	0.0	1.7
Debt crisis, within an episode	0.0	0.0	1.7
Debt crisis, last year or year after the end	0.0	0.0	0.0
MIC			
Banking crisis, within an episode	17.6	16.7	19.3
Banking crisis, last year or year after the end	9.5	3.3	1.1
Currency crisis, within an episode	12.2	30.0	40.9
Currency crisis, last year or year after the end	17.6	13.3	1.1
Debt crisis, within an episode	9.5	10.0	12.5
Debt crisis, last year or year after the end	8.1	3.3	0.0
LIC			
Banking crisis, within an episode	5.3	28.6	22.2
Banking crisis, last year or year after the end	2.6	0.0	4.4
Currency crisis, within an episode	13.2	28.6	44.4
Currency crisis, last year or year after the end	13.2	0.0	11.1
Debt crisis, within an episode	5.3	0.0	6.7
Debt crisis, last year or year after the end	7.9	0.0	0.0

Source: Authors' calculations and WDI. The timing of crises is based on Laeven and Valencia (2008).

X. FINANCIAL SURVEILLANCE (FRAMEWORK) IN SHALLOW FINANCIAL SYSTEMS[52]

This note presents elements of a diagnostic framework for financial sector surveillance in low-income countries (LICs). Building on the analysis in the preceding notes and drawing on operational experience, it provides a summary of some key considerations to be examined, or questions to be raised, in the context of surveillance. Given considerable heterogeneity across LICs, the framework could be usefully tailored to capture country-specific circumstances.

128.   Needed—a framework. Greater attention needs to be paid in surveillance to the macro-stability impact of shallow and undiversified financial systems. This calls for going beyond a narrow set of financial soundness indicators to consider and understand how the absence of or limitations for financial intermediaries and markets can affect macro-stability and effective policy implementation in LICs. At the same time, a careful evaluation of required developments in regulatory and supervisory frameworks is warranted to both support and keep pace with financial deepening. As such, the benefits and risks arising from the financial deepening process must inform the Fund's policy advice.

129.   Challenges in LICs. Although heterogeneous, LICs face common challenges in conducting financial surveillance. Compared with more developed countries, the financial system infrastructure underpinning macroeconomic policies is often weaker, regulatory and prudential institutions frequently underdeveloped or subject to capacity constraints, and data limitations more pervasive, rendering financial sector surveillance more challenging. These specificities call for a more customized diagnostic framework for financial surveillance in LICs. The attached matrix proposes some elements of such a framework, drawing on the preceding policy notes and operational experience from financial surveillance in shallow and undiversified markets.

130.   Elements of framework. The framework proposed in the matrix covers five key areas: (i) monetary operations and transmission mechanism; (ii) government financing instruments and markets; (iii) access to financial services; (iv) banking supervision and risk management in banking activities; and (v) the legal and accounting infrastructure. It also provides examples and proposes avenues to assess how financial deepening may be taken into account in financial surveillance in LICs. The framework addresses the key areas from four perspectives: (i) implications of shallow markets; (ii) the causes and consequences of shallow markets; (iii) the main implications for financial surveillance; and (iv) key qualitative and quantitative indicators that could usefully be monitored

131.   Considerations. The framework does not pretend to be comprehensive in terms of addressing all issues that could be pertinent across all financial services/markets and countries. Instead, it is meant as a summary reference that could be tailored to country-specific circumstances.

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[52] This note was prepared by Mauro Mecagni, Cheik Gueye, and Yibin Mu (all AFR).

Financial Surveillance in Shallow Markets

Key Areas	Implications of Shallow Markets	Causes	Impact on Surveillance	Monitoring (suggested indicators)
Monetary operations and the transmission mechanism	• Lending rates and deposit rates do not react to the central bank's (CB's) policy rates. • Credit volume does not react to the CB's policy rates. • Lack of hedging instruments for exchange rate and interest rate risk. • Ineffective control of aggregate demand and inflationary pressures.	• Shallow money markets (weak interest rate channel) • Limited secondary markets (weak asset channel) • Limited competition in the banking system (weak interest rate channel) • Excess structural liquidity in the banking system and insufficient lending opportunities. • Liquidity controlled via FX operations, more so than in deeper systems.	In **deeper markets**, surveillance often focuses on: • CB's monetary goals and intermediate targets. • CB's liquidity management tools (open market operations, standing facilities, repos). In **shallow markets**, financial surveillance should focus on: • The infrastructure that supports monetary transmission (e.g., government securities auctions, interbank & secondary markets). • The quality of the institutional and regulatory environment (e.g., property rights, enforceability of contracts, credit information on borrowers). • Depth of markets to hedge FX and interest rate risk.	• Money market activity indicators and the interest rate term structure. • Secondary market activity indicators/ volumes of trading. • The level of excess liquidity in the banking system (e.g., excess reserves at the CB). • Concentration of credit, by size of borrower and sector. • Bank holdings of government securities as a percent of total domestic credit. • Creditor and property rights, disclosure standards.

Key Areas	Implications of Shallow Markets	Causes	Impact on Surveillance	Monitoring (suggested indicators)
Government financing instruments and markets	• Illiquid government debt market. • Limited term structure, typically concentrated in short maturities. • Fiscal buffers need to be higher, which conflicts with higher spending needs and narrow tax bases. • Budget financing is impaired and vulnerable to external financing shocks and rollover risks. • Issuance is typically more expensive than in deeper markets, because of ad hoc private placements. • Limited financial contagion from foreign markets.	• The investor base is undifferentiated, largely concentrated in banks. • Secondary markets are limited, and investors must hold securities to maturity. • Local currency government financial instruments do not appeal to foreign investors due to FX or administrative barriers to capital movements. • The government may be unwilling to accept market interest rates.	In **shallow markets**, surveillance should focus on: • Treasury management capacity (government cash management, government debt issuance procedures). • Shallow markets & weak public finance management may result in domestic arrears. Large government suppliers may constitute a systemic vulnerability for the banks and restrict the credit to other borrowers (particularly SMEs). • Quality and size of market infrastructure (settlement systems, central securities depositories) should match the volumes. • Limited hedging instruments for FX may deter foreign investors. • Preconditions (e.g., supervisory capacity) for opening the capital account.	• Size of fiscal buffers (e.g., the ratio of freely available government deposits at the CB, in months of government expenditures and % of debt maturing (liquidity & rollover risks). • Stock and flow of financial institutions' investments in government securities (balance sheet risks) and requirements for banks to hold government securities. • Counterparts of government arrears and implications for banking system risk. • Pricing mechanism for government securities' private placements and auctions.

Key Areas	Implications of Shallow Markets	Causes	Impact on Surveillance	Monitoring (suggested indicators)
Access to financial services	• Relatively undiversified financial products and a bank- dominated financial system. • Small share of enterprises have bank lines of credit, low private credit to GDP, low saving rates. • Low level of financial literacy. • Financial innovations, such m-payments and m-banking, may not grow at a rate commensurate with the diffusion of available instruments (e.g., mobile phone, e-banking, electronic devices). • Reduced growth, employment, and economic diversification that contribute to poverty.	• High banking sector concentration, limited competition. • Unwillingness of banks to lend because of perceived insufficient lending opportunities. • High account maintenance fees and costs of transferring remittances, high interest spreads. • Documentation requirements (e.g., lack of ID/picture cards). • Consumers, small enterprises and banks reluctant to adopt m-banking and m-payments because of risks of failure of the payments system and coordination among regulators (e.g., for banks, payments, competition, telecommunications & anti-money laundering).	• Check regulatory biases, adequacy of legislative tools to protect customers, and other factors that could hamper development of the financial system (e.g., poor payment infrastructure). • Consider obstacles to sound and effective contract enforcement mechanisms. • Regulatory approach to consumer protection. • Availability and functioning of credit registries. • Existence of coordination among supervisors and regulators in m-banking and m-payments. • Consider stability implications for the banking system of e/m-payments. • Consider impact of AML/CFT regulations on account opening and cash transactions.	• Proportion of population with bank accounts. • Cost of opening or maintaining bank accounts/micro-accounts. • Indicators of virtual banks activities, mobile banking, and access to microfinance institutions (MFN). • Legal framework for depositors/consumer protection in various financial sectors and incentives for interaction between formal banking, MFN, and informal institutions.

Key Areas	Implications of Shallow Markets	Causes	Impact on Surveillance	Monitoring (suggested indicators)
Banking supervision and risk management	• Weak risk management capacity in banks. • High likelihood of NPL problems and high bank spreads. • Banks are owned or controlled by small group of powerful individuals or families, often politically connected. • Bank capital and liquidity buffers may be overstated.. If problems are not timely recognized, risks to financial stability are greater. • Frameworks for bank resolution are typically weak or nonexistent.	• Weak supervisory capacity—insufficient number of bank supervisors; under-funded supervisory bodies; poor legal protection for bank supervisors. • Poor standards for supervisions and troubled assets recognition. • Poor corporate governance, high loan concentration, weak internal risk management capacity in banks.	In **deeper markets**, financial surveillance focuses on: • CAMEL (capital adequacy, asset quality, management, earnings, liquidity). • Consolidated supervision and information disclosure. • Commercial bank's internal risk management systems. In **shallow markets,** should also focus on assessing: • Adequacy of capitalization, loan loss recognition and provisioning guidelines (distance to best practices). • Standards for lending limits to related parties (distance to conformity to best practice). • FSIs taking into account country circumstances (e.g., economic constraints). • Checking for significance of channels for systemic risk such as common large borrowers, or excess lending to related parties.	• Number of supervisors per operating bank, and frequency of on-site bank inspections. • Presence of legal framework for protection of bank supervisors. • Check whether relevant information on bank ownership, loans, and investments has been adequately disclosed to supervisors. • Monitor asset quality, credit concentration risks and connected lending (lending to related parties in percent of total credit and of bank capital).

Key Areas	Implications of Shallow Markets	Causes	Impact on Surveillance	Monitoring (suggested indicators)
Legal and accounting infrastructures	• Legal infrastructure less supportive of evaluating the financial condition of borrowers.	• Lack of transparency and governance problems. • Poor accounting and auditing practices, doubtful implementation of standards.	In **deeper markets**, financial surveillance focuses on: • Implementation of international accounting and auditing standards. • Soundness of legal framework supporting financial activities. In **shallow markets**, financial surveillance should also focus on: • Sufficient public disclosure of bank information including prudential and liquidity ratios (which often indicate solvency risks when accounting lacks transparency).	• Available information (e.g., from the World Bank ROSCO assessment results) on accounting and corporate governance.