MARKETS AND HOUSING FINANCE

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ABSTRACT

We examine the extent to which markets enable the provision of housing finance across a wide range
of countries. Housing is a major purchase requiring long-term financing, and the factors that are associated
with well functioning housing finance systems are those that enable the provision of long-term finance.
Across all countries, controlling for country size, we find that countries with stronger legal rights for
borrowers and lenders (through collateral and bankruptcy laws), deeper credit information systems,
and a more stable macroeconomic environment have deeper housing finance systems. These same
factors also help explain the variation in housing finance across emerging market economies. Across
developed countries, which tend to have low macroeconomic volatility and relatively extensive credit
information systems, variation in the strength of legal rights helps explain the extent of housing finance.
We also examine another potential factor--the existence of sizeable government securities markets--that
might enable the development of emerging markets' housing finance systems, but we find no evidence
supporting that.

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1. Introduction

Housing is for many households around the world both the largest expense and the most important asset. For all households it is an important determinant of quality of life. For the majority in developed countries, and for some in emerging market economies, housing is adequate. But a significant proportion of the world's population does not have access to adequate and affordable housing. According to UN-Habitat (2005), roughly one billion people, or one-third of the world's urban population, live in slums. And a well-functioning housing market influences not only shelter concerns. At a basic level, a country's housing sector can help to improve public health (by reducing the likelihood of outbreaks of disease) and stimulate economic growth (through its own job creation, but also as workplaces for home-based entrepreneurs). The best housing sectors should enable the adequate provision of shelter across all segments of the population.

In this paper we focus on one important pillar of a well-functioning housing market, the extent that markets enable the provision of housing finance. While there are many aspects to the housing market (discussed below), it can be argued that the provision of housing finance is a binding constraint that must be addressed before the market can sustainably provide adequate housing. Even in the best of environments, housing is a major purchase—average home prices typically ranging from 4 times annual income in developed countries to 8 times annual income in emerging economies (Ball, 2003)—that is affordable only when payments can be spread out over time. Absent a well-functioning housing finance system, for many the market-based provision of formal housing will be neither adequate nor affordable.[1] Other housing or housing finance

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[1] In addition to the availability of housing finance, other factors that impact housing affordability include home prices and household incomes.

solutions are possible—such as subsidies and the outright provision of public housing—but these can be unsustainable (Quigley, 2000).[2]

While housing finance is a vital component of a well-functioning housing system, to date there has not been a systematic analysis of the depth of housing finance across a broad set of countries.[3] In fact, as far as we know, no formal cross-country study of the size of the housing finance market exists. Existing international housing finance studies tend to be descriptive and highly informative, but lack any formal empirical analysis and often focus on one or more country case studies. The seminal work is Boleat (1985), which includes numerous country case studies. Diamond and Lea (1992) evaluate the housing finance systems of five countries. Chiquier, Hassler, and Lea (2004) include case studies of eight emerging market economies. Low, Sebag-Montefiore, and Dübel (2003), the Mercer Oliver Wyman study, focus on eight countries in Europe. Hegedüs and Struyk (2005) present case studies on seven transition economies and Germany and tabulate housing finance statistics. Chiuri and Jappelli (2003) analyze 14 developed countries (with an emphasis on loan-to-value ratios). Allen, Chui, and Maddaloni (2004) include a short section on mortgage markets in 17 developed countries. Renaud (2005) includes a presentation of data on 45 countries, the broadest set of countries heretofore available. All of these studies are important, but none formally studies why some countries have larger mortgage markets than others and none includes formal empirical analysis.[4]

We begin to fill this void by analyzing the determinants of the extent of housing finance in a sample of 61 countries that includes both developed countries and a wide range of emerging

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[2] In general, an argument for the government as a direct provider of housing has been that the free market is unable to provide housing for the lower income households.

[3] Data limitations preclude a broad comparative study of other measures (such as reach) of the efficacy of the housing finance systems.

[4] Other studies include OECD (2002) on transition economies and BIS (2006a) on 14 developed countries and two emerging markets. In addition, Ghosh (2006) includes a description of mortgage finance in East Asia, Watanabe (1998) includes eight case studies of Asian housing finance systems, and the September 2005 special issue of *Journal of Housing Economics* includes a number of case studies (see Sanders (2005) and references therein).

economies. Across all countries, controlling for country size, we find that countries with stronger legal rights for borrowers and lenders (through collateral and bankruptcy laws), deeper credit information systems, and a more stable macroeconomic environment have deeper housing finance systems. These same factors also help explain the variation in housing finance across emerging market economies. Across developed countries, which tend to have low macroeconomic volatility and relatively extensive credit information systems, we find that variation in the strength of legal rights helps explain the extent of housing finance.

We note at the outset two things that we do not address in this paper. First, housing finance, while vital, is but one of many aspects of the overall housing market. The availability of housing is governed by supply and demand factors. According to World Bank (1993), across countries, housing supply tends to be idiosyncratic, primarily because of the housing sector's regulatory environment (especially land use policies and building regulations), but also due to the structure of the construction sector (including the material inputs into the construction process). In contrast, housing demand within and across countries is relatively predictable as it varies with income level. For a given income level, the availability of mortgage finance (and the prevailing interest rates) plays an important role. Mortgage finance is a critical factor in generating housing demand, yet in many countries it is severely limited. In the context of the overall housing market—in which factors that influence supply and demand interact to affect housing outcomes—we focus on mortgage finance as an important, binding constraint on the demand side.[5,6]

Second, our emphasis on market solutions means that our work is not immediately relevant to those in an economy's lowest income levels. Historically, for those who do not have

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[5] The complexity of the housing market system dictates that each of the other aspects of housing supply and housing demand is worthy of a complete and separate study.
[6] Certainly, housing finance also impacts the supply side through its impact on builders and developers.

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the requisite financial resources, it has been the government's role to provide housing—be it rental property or for owner occupation. While we do not dispute that there is an important role for government housing to serve the poorest sectors of the population, there are limitations such as fiscal pressures and, in many countries, the burden of long-term liabilities. Moreover, in many places government-provided housing is inadequate, potentially leading to other problems. As there is a view that the role of government has switched from that of a provider to more of a market enabler, to the extent that our study—by focusing on the basic fundamental factors necessary to enable housing finance—helps lay the groundwork for financial sector innovation and development, it will be relevant for even the poorest sectors. We also note that our study is of collateralized housing loans, so the work of housing microfinance institutions (HMFIs) is necessarily excluded. HMFIs have been providing non-collateralized loans to increase the home purchase possibilities for low income households.[7] Our emerging market results should apply to housing micro loans (HMLs)—that is, better credit information systems should improve the depth of the HML market—with the caveat that currently credit information systems are less informative for the lowest income segments. Finally, we recognize that ownership is not the answer for all. But it is often preferred to renting regardless of income level in part because of the asset properties of a home, and even affordable rental units require financing for their initial construction.

We strive in this paper to focus on basic underlying factors that can be addressed by policy and government programs to improve the reach of national housing finance systems. To make our analysis more concrete, we note one simple example. As we will show in Section 3, the Philippines lags behind many of its Asian peers in the provision of housing finance, while

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[7] See HGSD Center for Urban Development Studies (2000) for case studies, Ferguson (2004) for an overview, Daphnis and Ferguson (2004) for a collection of studies, and FinMark (2006) for an application in South Africa.

Malaysia has the preeminent housing finance system in the region. Our regression results indicate that legislation currently under consideration in the Philippine Congress—the Credit Information System Act (which would create a central credit information bureau in a country that currently has very limited consumer credit information) and the Corporate Recovery Act (which would revamp outdated bankruptcy laws)—could potentially lay the groundwork for closing much of the gap in housing finance between the Philippines and Malaysia.

The paper proceeds as follows. In the next section, we lay out a framework that highlights the underlying factors that enable (or impede) the development of housing finance systems. Section 3 presents our main empirical results on the determinants of the size of housing finance systems across 61 countries. Section 4 concludes.

2. The Housing Finance System

We can view the housing finance sector in terms of supply and demand. Demand for housing finance is in a sense a derived demand that flows from the demand for housing, which in turn depends importantly on the rate of household formation and income levels. In addition, with housing costs typically being a multiple of annual income, housing is made affordable by spreading payments over time, so adequate housing finance must be longer term in nature.

On the supply side, one way to think about the provision of housing finance is to split it into two components: (i) the provision of housing finance by a lender who has ample funds at hand, and (ii) the mobilization of funds within an economy so that lending institutions have access to funds.

For lenders with adequate funds to choose to allocate some portion to long-term housing finance, a number of preconditions should be in place:

- *Information on the Borrower.* To adequately price a loan, a lender must have information on the creditworthiness of prospective borrowers that enables the determination of the probability of default. The information could be produced by a standardized and accurate source of credit history—such as public credit registries or private credit bureaus. Best is if the source has a wide coverage of the population, and the most informative source would include negative as well as positive transactions. Absent standardized information of credit histories, standard banking relationships, in which a bank spends considerable resources acquiring information on potential borrowers, would work but would limit (at least geographically, if not in other ways) the loan-creation capabilities of the lenders and of the housing finance system as a whole.

- *Ability to Value the Property.* There should be an ability to determine the market value of the property. This is a natural outcome of a well-functioning housing market in which detailed information on housing transactions is maintained in a systematic way. For example, if data on the sales price and relevant features of the home (location, size, age, etc.) are maintained in a mandatory property registry, appraisers can more accurately value prospective homes for the lenders and borrowers.[8]

- *Ability to Secure Collateral.* The lender should to be able to secure collateral against the loan in case of default. The house itself is an obvious candidate for that collateral, providing that in the case of default the lender can seize the property. To seize the property requires that there is something resembling clear title and that the legal system allows the lender to seize collateral.

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[8] The property registry and appraisal system will also enhance the efficiency of the overall housing market, as consumers will have better information to judge the relative value of various properties.

- *Macroeconomic Stability.* The macroeconomic environment should be stable. If inflation is volatile, the lender would incur substantial interest rate risk if it lends at a fixed rate. In an unstable environment, lenders will typically pass on this risk to the borrowers—who are less likely to fully understand it—by only offering floating rate loans. Substantial interest rate risk, no matter who bears it, will retard the development of the housing finance system, as either lenders will go out of business (e.g., U.S. savings and loans in the 1980s) or borrowers will be unable to repay their loans (or both).

If the conditions for long-term lending are in place, lenders must have ample access to funds in order to lend.

- *Sources of Funds.* In the primary market, deposit-taking institutions, such as banks, can fund mortgages through deposits. However, because deposits are short term, if this is the only source of funds housing loans will tend to be short term or at variable rates.[9] Short-term loans, given that housing is expensive, are unattractive to potential borrowers. Potential borrowers might find variable rate loans attractive, but will likely not be able to gauge the substantial interest rate risk they are bearing (BIS 2006a). In addition, a reliance on deposits implies that funding sources are limited geographically, which increases risk. An important additional source of funds for the housing finance system is the secondary market, which buys the loans from the primary market and finds many ways to mobilize funds.[10] One set of participants in the secondary market is mortgage securitizers, who bundle and repackage mortgages (or parts of mortgages) to create new securities, and investors in these mortgage

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[9] More generally, a well developed housing finance system will typically have a diversity of lenders in the primary market (such as nondepository mortgage specialists, nongovernmental organizations (NGOs), microfinance institutions (MFIs), and contractual savings systems) and greater specialization within the origination process. See Follain and Zorn (2000) on the unbundling of the mortgage finance business.

[10] The development of Fannie Mae, for example, in the U.S. stemmed from illiquid or draining resources.

securities. The securitizers can be public (such as Fannie Mae, Freddie Mac, or Ginnie Mae)
or private (such as GE Capital); the investors can be domestic or foreign institutions or
individuals; and, in general, the secondary market for mortgages can be an important part of
a country's broader capital markets.

- *Additional Sources of Liquidity.* Whatever the usual sources of funds, it is important to have
  a backstop, such as a governmental liquidity window, in case of temporary liquidity
  crunches.

In summary, a basic infrastructure that can enable a well-functioning housing finance
system includes factors that promote long-term lending (the ability to value property and to seize
it in the case of default, information on the creditworthiness of potential borrowers,
macroeconomic stability) and factors that promote the mobilization of funds (be it through
savings and deposits, capital markets, a governmental liquidity window, or secondary markets).[11]

3. Scope of Housing Finance Systems

Potential Measures

The efficacy of housing finance systems can be measured along many dimensions. One
measure would be the *portion of households* that has access to housing finance products.[12] An
important determinant of access so defined is the *range of financing products* that is available.
Such products can range from interest-only loans, option ARMs, and negative amortization loans

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[11] These factors can also be recast in terms of risk mitigation (Van Order, 2005).

[12] Typically the lowest income households in any country are served (if at all) by government subsidies. In many
developing countries, a large portion of the population might have income levels that are too low to afford any type
of formal housing. While other problems in the housing system might dominate, housing finance can help or
worsen the situation. (See page 5 of Hoek-Smit and Diamond, 2003, for more on this). This is not to say that
housing finance cannot extend to the bottom of the pyramid. It can, but requires innovative products; see Melzer
(2006) for a discussion specific to South Africa.

that are currently offered in some developed countries to the Mexican conglomerate CEMEX's products Patrimonio Hoy (enabling incremental additions to housing) or Construmex (which taps remittances).[13]

Table 1, which presents partial information on features of typical mortgages in a range of countries, shows that across countries mortgages vary in their typical length, loan-to-value ratios, and whether they tend to be at fixed or adjustable rates. Very few emerging economies—Malaysia, Thailand and some transition economies in Eastern Europe—have typical maturities of 30 years. Another, non-overlapping subset of emerging economies tends to have fixed-rate mortgages. Thus, no emerging market appears to have widespread availability of long-term fixed rate mortgages. In developed countries, many have mortgages with terms of 25 years or greater, and roughly half have predominantly fixed rate products.[14]

A somewhat blunter measure of depth is the sheer *size* of the housing finance market. All else equal, larger housing finance markets likely reach a greater proportion of the population. Size is not a perfect indicator of efficacy, though, as it is also influenced by price dynamics and tax considerations. For example, a housing bubble requires, all else equal, a larger housing finance market and tax treatments in countries such as Netherlands, Switzerland, and the U.S. tend to result in a larger stock of mortgage debt. But size has one important advantage: We can construct it for a wide range of countries.

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[13] See BIS (2006a) for a description of recent innovations in housing finance products in industrial countries. On CEMEX's products, see "CEMEX: Innovation in Housing for the Poor" in Prahalad (2004) or www.cemex.com.
[14] The data in Table 1 are not complete or reliable enough to be included in our empirical analysis. We note that in any economy it is not clear a priori whether the prevalence of fixed or variable rate mortgages owes to lender or borrower preferences.

Cross-Country Data on the Size of the Housing Finance System

In this section we present data on the size of housing finance markets across a wide range of countries. There is no single source for these data, so we pool together data from different sources. As there is yet to be a standardized methodology for collecting data on housing finance, we cannot vouch for the quality of the data. Moreover, the data are not always collected at the same time, so we will focus on two measures: the annual average from 2001 to 2005 of any data we have for a particular country and the maximum value over that time period. In all cases, to compare across countries we scale the size of the housing finance sector by nominal GDP.

We gather data from a wide range of sources. Stephens (2003) and Low et al. (2003) provide information on Western European countries. IMF (2004) has data on Australia, Canada, Japan, and the United States. Zhu (2006) and Ong (2005) contain 2005 data for a handful of emerging Asian countries. BIS (2006a) has data for selected countries for 1994 and 2004. Renaud (2005) contains data on many emerging economies, as does World Bank (2005). IMF (2006) provides 2005 data for 30 countries.[15]

Bringing together all of these sources, and using them (and others) to cross-check wherever possible, we are able to compile data on mortgage debt outstanding for 62 countries for at least one year during the 2001 to 2005 period. Because we have data for selected years that vary by country, we construct two measures. The first, *MD/GDP (avg)*, is the average mortgage debt-to-GDP ratio for the 2001-2005 period. The second, *MD/GDP (max)*, is the maximum mortgage debt-to-GDP ratio for the 2001-2005 period. Throughout, because our

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[15] The IMF (2006) data underlie its Figures 2.1 and 2.7. We thank Gian Maria Milesi-Ferretti for providing us with the underlying data.

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empirical results do not hinge on which measure we use, we will refer to only *MD/GDP (max)* in our discussion.[16]

Table 2 and Figures 1 and 2 provide information on the size of housing finance systems (as a share of GDP) for 62 countries. Emerging market economies generally have far smaller housing finance systems than developed countries. Among the 38 emerging economies in our sample, housing finance averages 10 percent of GDP, with the largest housing finance systems being between 20 and 30 percent of GDP (Malaysia, Taiwan, Korea, South Africa, Estonia, and Israel).[17] In contrast, housing finance in the 24 developed countries in our sample averages 55 percent of GDP, with almost all systems exceeding 40 percent.

Figure 2 highlights the considerable variation of housing finance across countries, even those within the same region. Why is Latvia's market 14 percent of GDP but Romania's only 1.8 percent? Why is the Philippines' market 12 percent but Malaysia's 31.5 percent? Even among developed countries there is great variation. In the next section we attempt to disentangle the root causes for the variation in the size of housing finance systems across countries.

Main Explanatory Variables

We aim to explain why some countries have larger housing finance systems than others. The framework discussed in Section 2 guides the empirical analysis in this section. Two

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[16] Across countries, the correlation between the two measures is 0.995.
[17] South Africa is an example where depth does not translate into access. While it has a deep mortgage market by emerging market standards, roughly one-quarter of its households do not have access to housing finance (Melzer, 2006).

important explanatory variables, *Legal Rights* and *Credit Info*, come from the Getting Credit section of the World Bank's Doing Business reports.[18]

We noted above that for a mortgage lender to be comfortable lending long-term, it needs to be able to secure collateral against the loan in case of default, and this ability hinges on being able to seize the collateral (the property) in the case of default. To capture this ability we utilize *Legal Rights*, an index of the strength of legal rights. *Legal Rights* is composed of ten categories, seven of which pertain to collateral law and three pertain to bankruptcy law:

- general rather than specific description of assets is permitted in collateral agreements;

- general rather than specific description of debt is permitted in collateral agreements;

- any legal or natural person may grant or take security in the property;

- a unified registry operates that includes charges over movable property;

- secured creditors have priority outside of bankruptcy;

- secured creditors, rather than other parties such as government or workers, are paid first out of the proceeds from liquidating a bankrupt firm;

- secured creditors are able to seize their collateral when a debtor enters reorganization, with no "automatic stay" or "asset freeze" imposed by the court;

- management does not stay during reorganization, and an administrator is responsible for managing the business during reorganization;

- parties may agree on enforcement procedures by contract; and

- creditors may both seize and sell collateral out of court without restriction.

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[18] See www.doingbusiness.org/MethodologySurveys/GettingCredit.aspx for a complete description of the Getting Business portion of the Doing Business database. For both Legal Rights and Credit Info, we utilize annual averages through 2005. Data on the underlying components of each measure are available only for the current year (2006), so we utilize the aggregate measures. Similar variables, but in the form of zero-one dummy variables, are used in Djankov, McLiesh, and Shleifer (2006).

A score of 1 is assigned if each feature is present in the country, so that the *Legal Rights* index ranges from 0 to 10 with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit.

The framework in Section 2 also highlighted the importance of lenders' access to standardized and informative sources of credit information on potential borrowers. For this our main variable is *Credit Info*, an index of the depth of credit information, which ranges from 0 to 6, with higher values indicating the availability of more credit information. One point is added for each of the following six features of the credit information system:

- both positive (for example, amount of loan and on-time repayment pattern) and negative (for instance, number and amount of defaults, late payments, bankruptcies) credit information is distributed;

- data on both firms and individuals are distributed;

- data from retailers, trade creditors or utilities as well as financial institutions are distributed;

- more than 2 years of historical data are distributed;

- data on loans above 1% of income per capita are distributed; and

- by law, borrowers have the right to access their data.

Finally, we noted that in volatile macroeconomic environments substantial interest rate risk can impede lending; we proxy for this volatility with *Inflation Vol*, the standard deviation of quarterly CPI inflation rates (collected from the IMF's International Financial Statistics data base) over the period 1995 to 2004. As a control, we include *Country Size*, the log of the 2001-

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2003 average of gross national income (in current U.S. dollars), as reported in Djankov et al. (2006).[19]

Main Empirical Results

Table 3 shows summary statistics for the whole sample as well as the emerging and developed markets groupings. Developed countries score, on average, better than emerging economies in the outcomes (size of the housing finance system) and along most (but not all) dimensions of the underlying factors. In particular, emerging economies lag (on average) in legal rights, credit information, and macroeconomic stability. Looking at the range of the underlying factors, the range of legal rights seen in emerging economies roughly mirrors those in developed countries. The depth of credit information in developed countries is almost uniformly high (the lowest score is 4 out of 6), whereas in emerging economies there is wide dispersion in the quality of credit information.

Table 4 shows the main regression results. In the full sample, even after controlling for country size (which is highly significant), countries with stronger legal rights, better provision of credit information, and a less volatile macroeconomic environment have larger housing finance systems. In the emerging economies and developed countries samples, *Country Size* is no longer significant; within the sets of emerging economies and developed countries, larger countries do not (all else equal) have larger housing finance systems. *Legal Rights* is highly significant for developed countries, but less so for emerging economies, where it is marginally significant in some specifications and insignificant in others. In contrast, macroeconomic stability and the

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[19] We supplemented this source with data on Luxembourg and Estonia from the World Bank's *World Development Indicators*. We follow Djankov et al. (2006) in using as a control variable country size, which can be argued to be exogenous, rather than per capita income, which is influenced by financial sector development (Levine 1997; Levine, Loayza, and Beck 2000).

strength of credit information systems matter in emerging economies but not in developed

countries.[20,21]

To bring the empirical results to life, we next highlight some of the differences across

countries. In general, emerging economies lag far behind developed countries in the provision of

housing finance. The full sample results in Table 4 suggest that this is explained by a number of

reasons. First, emerging economies tend to be smaller, poorer, and have more volatile inflation.

Small and poor might be difficult to change rapidly, but many emerging economies have taken

steps to limit the macroeconomic volatility that stems from economic policy (e.g., by

implementing a policy of inflation targeting). On the legal rights index, emerging economies

lag, on average, by two full points, although some have legal rights as strong as the best

developed countries. On the depth of credit information, the emerging market average is below

the minimum level found in developed countries. The point estimates in column (1) of Table 4

suggests that bringing their legal rights and credit information systems up to the developed

country average would enable almost a 20 percentage point (of GDP) increase in the size of

emerging economies' housing finance systems. This would close the gap between housing

finance in developed and emerging economies by almost half.

Turning to particular countries, the Philippines, with housing finance totaling about 12

percent of GDP, is on par with many Latin American countries and about at the emerging

economy average, but it lags behind many of its Asian peers. Comparing it to Malaysia—with

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[20] We also constructed variables based on two other Doing Business information variables, *Public Registry* and *Credit Bureau* (the percentage of individuals or firms listed in a public credit registry or private credit bureau) with current information on repayment history, unpaid debts, or credit outstanding. Neither are informative, nor do they change our results in any way.

[21] Another potential scaling factor is overall private credit in the economy, as presented in Djankov, McLiesh, and Shleifer (2006). Scaling housing finance by private credit would not change our main results. Countries with stronger legal rights and deeper credit information systems have larger housing finance systems (as a share of overall private credit), with information being relatively more important within the set of emerging market countries and legal rights explaining differences among developed countries.

housing finance at 32 percent of GDP—shows why.[22] The Philippines scores a 3 on both legal

rights and credit information (it basically has no credit bureau to speak of), compared to an 8 and

a 6 for Malaysia. If the Philippines moved to Malaysian standards on legal rights and credit

information, the point estimates in column (5) of Table 4 suggest that it could add almost 14

percentage points (of GDP) to its housing finance sector. To put this another way, two bills

currently under review by the Philippine Congress—the Credit Information System Act

(providing for the creation of a central credit information bureau) and the Corporate Recovery

Act (to modernize the obsolete corporate rehabilitation law)—could begin the process of moving

the Philippines up to Malaysian standards.[23]

Further Analysis of Emerging Markets

In this subsection we further examine the determinants of the depth of emerging markets'

housing finance systems. There are many potential factors, but data limitations preclude most

from inclusion in our study. For example, a potential driver of mortgage finance development is

the enabling force of government-supported housing finance agencies; see, for example, Chan,

Davies, and Gyntelberg (2006). However, we have not been able to gather data on the existence

of such agencies across a substantial portion of the 38 emerging market countries in our sample.

Another potentially important enabling factor is the existence of well-developed

government securities markets. To test this we construct a variable, *Govt Mkt*, from many

sources.[24] In all cases *Govt Mkt* is the average (computed over, where available, 1996-2001) ratio

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[22] There is also a great disparity in housing outcomes between the two countries. For example, in the Philippines 44 percent of the urban population live in slums, whereas in Malaysia the corresponding figure is only 2 percent (UN-Habitat, 2005).

[23] For more on the issues impeding financial market development (particularly corporate bond market development) in the Philippines, see Espenilla (2006).

[24] The main source is data underlying BIS Quarterly Review Table 16A on outstanding domestic debt. We thank Thomas Jans of BIS for providing the portion of Table 16A coinciding with government (as opposed to private)

of government securities outstanding to GDP. Table 5 shows, however, that the size of emerging

markets' government securities markets is not related to the depth of the housing finance

system.[25] The insignificance of government securities markets could owe to high correlation with

other explanatory variables. For example, country size and creditor friendly macroeconomic

policies that produce lower inflation volatility is strongly associated with the size of government

securities markets (Burger and Warnock, 2006; Claessens, Klingebiel, and Schmukler,

forthcoming; Eichengreen and Luengnaruemitchai, 2006). However, removing country size and

inflation volatility does not impact the result. We also constructed, but do not report, regressions

that were designed to ascertain whether the countries with the smallest government securities

markets tended to have smaller housing finance systems.[26] Our results show that they do not.

Overall, it seems clear that government securities markets do not provide an additional impetus

to the development of the housing finance system above and beyond what is already provided by

deep credit information systems, strong legal rights, and low inflation (which owe in part to

creditor friendly macroeconomic policies).

4. Conclusion

In this paper we provided a picture of the extent of housing finance in 61 countries and

presented a framework for analyzing housing finance systems. Our empirical analysis showed

that across all countries, those with stronger legal rights for borrowers and lenders (through

collateral and bankruptcy laws), deeper credit information systems, and a more stable

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issuance. We increase the coverage by using IMF Country Reports 04/31, 03/194, 03/258, 02/179, 03/134, 04/173, 03/112, 03/163, 01/116, and 03/109. For 6 countries (Bulgaria, Estonia, Iran, Kazakstan, Saudi Arabia, and Tunisia) we were not able to find evidence of a government bond market and so assume zero; our results are not significantly affected if we omit those 6 countries.

[25] For completeness, Table 5 also reports results for the full and developed country samples.

[26] Specifically, we created three dummies that capture whether a country's government bond market was small, medium, or large (i.e., in the first, second, or third tercile) and included them in our models from Table 5 (omitting the constant). Statistically, one cannot reject that the coefficients on the three dummies are identical.

macroeconomic environment have deeper housing finance systems. These same factors also help explain the variation in housing finance across emerging economies. Across developed countries, which tend to have low macroeconomic volatility and relatively extensive credit information systems, variation in the strength of legal rights helps explain the extent of housing finance.

Our results will not surprise experts in housing finance. For example, a decade ago Gallardo (1998, page 216) wrote: "Rationalizing the legal framework; improving loan information, underlying, and asset quality; and redefining the role of government in the primary market will be crucial to improving the management of risk and transaction costs in the housing finance market and priming that market to become an integral part of the capital markets." Our study shows that across a wide range of countries, the basic underlying factors that any housing finance expert would list as necessary preconditions for a well-developed housing finance system do indeed help to explain variations in development levels.

In many emerging market economies, the time is ripe for further development of the capital markets that will foster the provision of housing finance. On the supply side, bond market development is proceeding, and the conditions for its further development are well understood. Domestic institutions with long-dated liabilities naturally have demand for long-dated assets. Increased supply of and demand for long-dated assets can spur the emergence of derivatives that enable investors to offload risk to those interested in bearing it, further increasing the supply of capital. Our work suggests that if, alongside these potentially positive developments in the availability of long-term finance, countries also take the steps necessary to foster housing finance (strengthening legal rights and deepening credit information systems), a meaningful expansion in the provision of housing finance is quite possible.

It should be noted that while the unit of study in this paper is the country, we fully recognize that there can be considerable variation in housing finance systems within countries. For example, of the twelve million households in South Africa, roughly three million do not currently qualify for any sort of traditional mortgage product (FinMark 2006, Melzer 2006). Even within the well-developed U.S. housing finance system, great disparities in access persist. Our broad, cross-country study can hint at, but not directly address, reasons for these within-country variations.

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Table 1. Characteristics of Mortgage Products

	Typical length of contract, years	Estimated Average LTV (%)	Max LTV (%)	Mostly Fixed or Variable?
Emerging Market Economies				
Africa				
Algeria	Max 30		90	
Ghana	Max 20-25		80	
Morrocco	Max 25		70-100	
South Africa	10-20			
Tunisia				
Eastern Europe				
Bulgaria				
Croatia	up to 20 or 30			Fixed/Variable
Czech Republic	Less than 20	30-50	100	Fixed (Mixed)
Estonia				Variable
Hungary	5-35		70	Variable (Mixed)
Kazakhstan	3-20		70	Variable
Latvia				
Poland	5-32.5		100	Variable
Romania	10-20			Variable
Russia	10-15			Fixed/Variable
Slovakia				
Slovenia	10	50		Variable
Emerging Asia				
Bangladesh	less than 15	50-70		
China	10-15 typical; max 30		80	Variable
India	max 20		85	Mixed
Indonesia	8, 10, or 15 (max 20)	75-80	90	Variable
Korea	typical 3; max 20	56	70	Variable
Malaysia	Max 30		80	Variable
Pakistan				
Philippines	Max 20-30	70-80		
Taiwan				
Thailand	typical 10-20; max 30	70-80	90-100	Variable
Latin America				
Argentina	12-20 (max 20)	80-90		
Bolivia				
Brazil	Max 20		75-100	Variable
Chile	8-20		75	
Colombia	Max 30		70	
Costa Rica				
Ecuador				
Guatamala				
Honduras	20 typical; 30 max		70	Variable
Mexico	10-15	80-90	100 (payroll)	
Panama				
Paraguay				
Peru				
Uruguay	Max 25		70	
Venezuela	Max 20		70-75	
Middle East				
Iran	Max 18		70-80	
Israel				
Jordan	max 20	80-90		
Saudi Arabia				
Turkey	10		75-80	

Table 1. Characteristics of Mortgage Products (continued)

	Typical length of contract, years	Estimated Average LTV	Max LTV	Mostly Fixed or Variable?
Developed Countries				
Europe				
Austria	25	60		Fixed
Belgium	20	80-85	100	Fixed
Denmark	30	max 80	80	Fixed
Finland	15-20 (variable)	75-80		Variable
France	15-20	78	100	Fixed?
Germany	20-30 w. initial fix of 5-10	67	80	Fixed?
Greece	15	55		Variable
Ireland	20	80	100+	Variable
Italy	5-20	55	80	Variable (Mixed)
Luxembourg	20-25	80		Variable
Netherlands	30	87	125	Fixed
Norway				
Portugal	25-30	83	90	Variable
Spain	15-20	70	100	Variable
Sweden	30-45 years	80-95		Variable
Switzerland	15-20		80	
UK	25	69	110	Variable
North America				
Canada	25	60	75 or 95 (w/ins)	Fixed/Variable
US	30	76		Fixed
Pacific				
Australia	25	60-70	90-100	Variable
Hong Kong	15		70	
Japan	20-30	70-80		Fixed (Mixed)
New Zealand				
Singapore	30-35		80	Variable

Sources: Scanlon and Whitehead (2004), Calhoun (2005), Hoek-Smit (2005), Zhu (2006), Low et al. (2003), Ong (2006), Hegedüs and Struyk (2005), BIS (2006a), Brounen, Neuteboom, and van Dijkhuizen (2006), Green and Wachter (2005), Tiwari and Moriizumi (2003), National Association of Realtors (2000a, 2000b), IMF (2006), and Sheppard (2007).

Table 2. The Depth of Housing Finance

		MD/GDP (avg)	MD/GDP (max)			MD/GDP (avg)	MD/GDP (max)
Emerging Market Economies			10.2	**Developed Countries**			54.8
Africa			15.7	**North America**			67.7
DZA	Algeria	1.3	1.5	CAN	Canada	42.9	43.0
GHA	Ghana	0.5	0.5	USA	US	67.4	69.4
MAR	Morrocco	7.0	7.0	**Pacific**			40.2
ZAF	South Africa	22.0	26.1	AUS	Australia	61.9	71.0
TUN	Tunisia	6.0	6.0	HKG	Hong Kong	41.5	44.0
Eastern Europe			3.9	JPN	Japan	35.7	36.4
BGR	Bulgaria	4.7	4.7	NZL	New Zealand	78.2	78.2
HRV	Croatia	10.0	10.0	SGP	Singapore	60.2	61.3
CZE	Czech Rep.	4.6	5.5	**Europe**			48.3
EST	Estonia	22.0	22.0	AUT	Austria	26.1	26.1
HUN	Hungary	8.6	11.0	BEL	Belgium	27.7	28.3
LVA	Latvia	12.1	14.0	DNK	Denmark	79.0	87.9
POL	Poland	4.4	5.2	FIN	Finland	32.4	35.7
ROM	Romania	1.8	1.8	FRA	France	24.1	29.0
RUS	Russia	0.5	0.6	DEU	Germany	47.4	54.0
SVK	Slovakia	4.9	5.9	GRC	Greece	14.8	17.6
SVN	Slovenia	3.5	3.5	IRL	Ireland	45.4	59.2
Emerging Asia			14.3	ITA	Italy	13.1	15.0
BGD	Bangladesh	2.5	2.5	LUX	Luxembourg	32.3	33.5
CHN	China	10.0	12.0	NLD	Netherlands	82.7	100.0
IND	India	4.9	5.8	NOR	Norway	45.0	45.0
IDN	Indonesia	2.1	2.1	PRT	Portugal	48.9	50.7
KOR	Korea	20.8	25.0	ESP	Spain	36.3	40.2
MYS	Malaysia	28.3	31.5	SWE	Sweden	50.2	50.3
PAK	Pakistan	0.7	0.7	CHE	Switzerland	130.0	130.0
PHL	Philippines	6.8	12.0	GBR	UK	61.5	64.0
TWN	Taiwan	26.0	26.0				
THA	Thailand	15.5	16.0				
Latin America			6.8				
ARG	Argentina	1.7	1.7				
BOL	Bolivia	9.5	9.5				
BRA	Brazil	2.6	5.0				
CHL	Chile	14.8	16.0				
COL	Colombia	10.0	12.0				
MEX	Mexico	9.8	11.0				
PER	Peru	2.2	2.5				
VEN	Venezuela	0.7	0.7				
Middle East			5.6				
IRN	Iran	2.8	3.0				
ISR	Israel	22.0	22.0				
SAU	Saudi Arabia	1.0	1.0				
TUR	Turkey	2.5	2.5				

Notes. The table presents data on mortgage debt outstanding expressed as a share of nominal GDP. All data are for the 2001 to 2005 period, but not all years are available for all countries. *MD/GDP (avg)* and *MD/GDP (max)* are the average and maximum mortgage debt-to-GDP ratios (expressed as a percentage) for the 2001-2005 period. See text for sources.

Table 3. Summary Statistics

	N	Mean	Stdev	Min	Max
All Countries					
MD/GDP (avg)	61	23.5	26.8	0.3	130
MD/GDP (max)	61	25.5	28.4	0.5	130
Legal Rights	61	5.2	2.2	2	10
Credit Info	61	3.9	1.8	0	6
Inflation Vol	61	15.4	52.6	.5	391
Country Size	61	25.6	1.5	22.6	29.9
Developed Markets					
MD/GDP (avg)	23	50.2	26.1	13	130
MD/GDP (max)	23	53.8	27.3	15	130
Legal Rights	23	6.5	2.1	3	10
Credit Info	23	4.9	1.0	3	6
Inflation Vol	23	1.3	1.2	0.5	29.9
Country Size	23	26.6	1.3	24.7	29.9
Emerging Market Economies					
MD/GDP (avg)	38	7.4	7.4	0.3	28
MD/GDP (max)	38	8.4	8.1	0.5	31.5
Legal Rights	38	4.5	1.9	2	9
Credit Info	38	3.3	1.9	0	6
Inflation Vol	38	24.0	65.5	1.3	391
Country Size	38	24.9	1.3	22.6	27.7

MD/GDP (avg) and *MD/GDP (max)* are the average and maximum mortgage debt-to-GDP ratios (expressed as a percentage) for the 2001-2005 period. *Inflation Vol* is the standard deviation of quarterly CPI inflation rates over the period 1995 to 2004. *Country Size* is the log of the 2001-2003 average of gross national income (in current U.S. dollars), as reported in Djankov et al. (2006) (with EST added from WDI). The rest of the variables are from the World Bank's Doing Business reports. *Legal Rights* is the 2004-2005 average of the index of the strength of legal rights; each year it ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit. *Credit Info* is the 2003-2005 average of the index of the depth of credit information; each year it ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau. In this and all subsequent tables, the maximum sample size is 61; Luxembourg is dropped because it is not in the Doing Business data.

Table 4. Main Regression Results

The dependent variables are *MD/GDP (max)*, the maximum mortgage debt-to-GDP ratio for the 2001-2005 period, in the first two columns of each panel, and *MD/GDP (avg)*, the average mortgage debt-to-GDP ratio for the 2001-2005 period, in the last two columns of each panel; each is expressed as a percentage. *Legal Rights* is the 2004-2005 average of the index of the strength of legal rights; each year it ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit. *Credit Info* is the 2003-2005 average of the index of the depth of credit information; each year it ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau. *Inflation Vol* is the standard deviation of quarterly CPI inflation rates over the period 1995 to 2004. *Country Size* is the log of the 2001-2003 average of gross national income (in current U.S. dollars). Constants are included but not reported. The absolute values of *t*-statistics computed using robust standard errors are in parentheses. Significance at the 1%, 5%, and 10% levels, respectively, is denoted by [a], [b], and [c].

	All Countries		Emerging Market Economies		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Legal Rights	6.70^a	6.30^a	1.80^b	1.62^b	7.78^a	7.11^a
	(6.12)	(6.16)	(2.36)	(2.26)	(4.42)	(4.60)
Credit Info	2.87^a	2.72^a	1.95^a	1.79^a	-2.39	-1.96
	(2.81)	(2.76)	(3.32)	(3.28)	(0.54)	(0.47)
Inflation Vol	-0.05^b	-0.04^b	-0.02^b	-0.02^b	-6.32	-5.36
	(2.28)	(2.15)	(2.27)	(2.10)	(1.15)	(0.96)
Country Size	4.96^a	4.61^a	0.47	0.17	-2.41	-2.07
	(3.82)	(3.70)	(0.46)	(0.17)	(0.60)	(0.63)
N	61	61	38	38	23	23
Adj. R^2	0.460	0.451	0.319	0.316	0.146	0.114

Table 5. Additional Regression Results

The dependent variables are *MD/GDP (max)*, the maximum mortgage debt-to-GDP ratio for the 2001-2005 period, in the first two columns of each panel, and *MD/GDP (avg)*, the average mortgage debt-to-GDP ratio for the 2001-2005 period, in the last two columns of each panel; each is expressed as a percentage. *Legal Rights* is the 2004-2005 average of the index of the strength of legal rights; each year it ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit. *Credit Info* is the 2003-2005 average of the index of the depth of credit information; each year it ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau. *Inflation Vol* is the standard deviation of quarterly CPI inflation rates over the period 1995 to 2004. *Country Size* is the log of the 2001-2003 average of gross national income (in current U.S. dollars). *Govt Mkt* is the 1996-2001 average of the size of government securities markets (expressed as a share of GDP). Constants are included but not reported. The absolute values of *t*-statistics computed using robust standard errors are in parentheses. Significance at the 1%, 5%, and 10% levels, respectively, is denoted by [a], [b], and [c].

	All Countries		Emerging Market Economies		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Legal Rights	6.65^{a}	6.25^{a}	1.74^{b}	1.60^{b}	6.09^{c}	5.30^{c}
	(6.24)	(6.24)	(2.27)	(2.22)	(1.94)	(1.82)
Credit Info	2.47^{b}	2.37^{b}	1.88^{a}	1.77^{a}	-1.64	-1.16
	(2.30)	(2.26)	(3.04)	(3.00)	(0.29)	(0.21)
Inflation Vol	-0.04^{c}	-0.03^{c}	-0.16^{c}	-0.02^{c}	-6.19	-5.22
	(1.99)	(1.86)	(1.81)	(1.80)	(1.07)	(0.89)
Country Size	4.14^{a}	3.90^{a}	0.40	0.14	-1.70	-1.30
	(2.93)	(2.83)	(0.38)	(0.14)	(0.68)	(0.31)
Govt Mkt	0.16	0.14	0.05	0.02	-0.24	-0.26
	(1.36)	(1.29)	(0.50)	(0.18)	(0.80)	(0.84)
N	61	61	38	38	23	23
Adj. R^{2}	0.464	0.452	0.304	0.296	0.132	0.108

Figure 1. The Depth of Mortgage Markets: Regional Aggregates

The Depth of Mortgage Markets
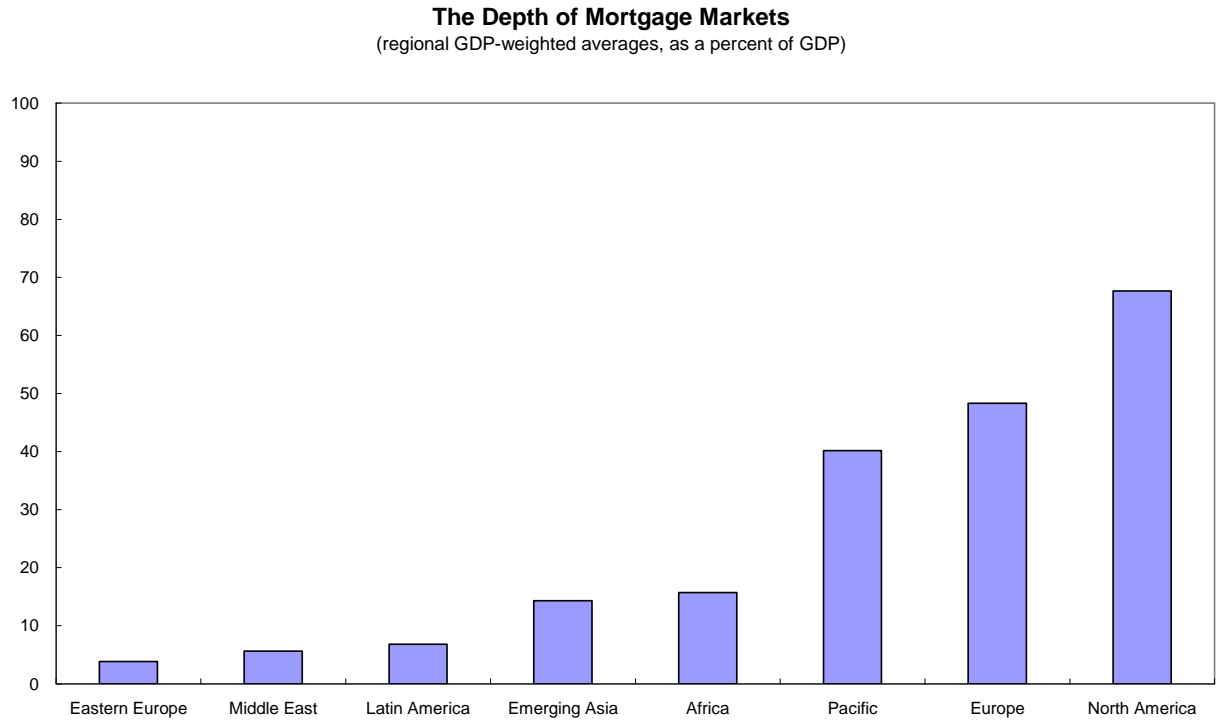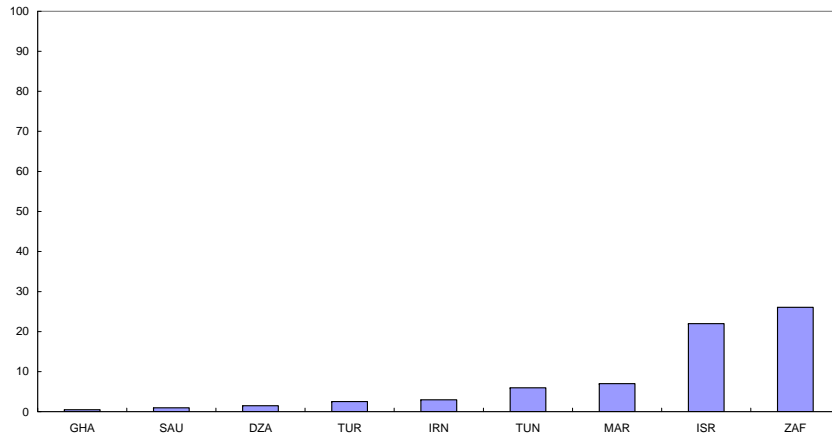(regional GDP-weighted averages, as a percent of GDP)
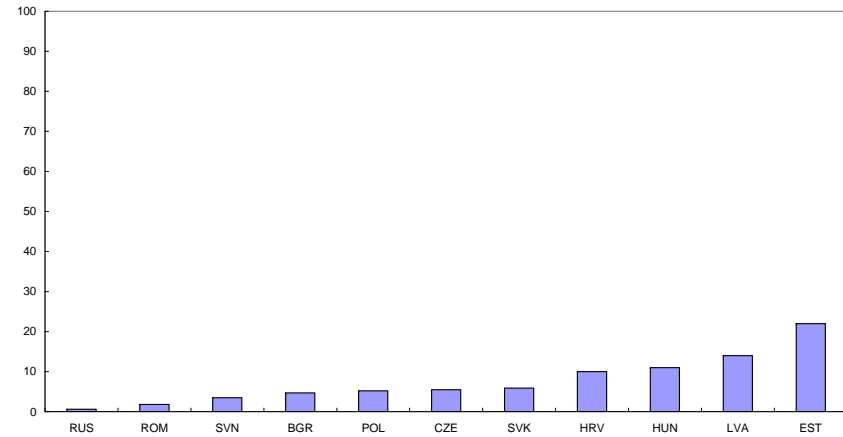
Figure 2. The Depth of Mortgage Markets: Individual Countries
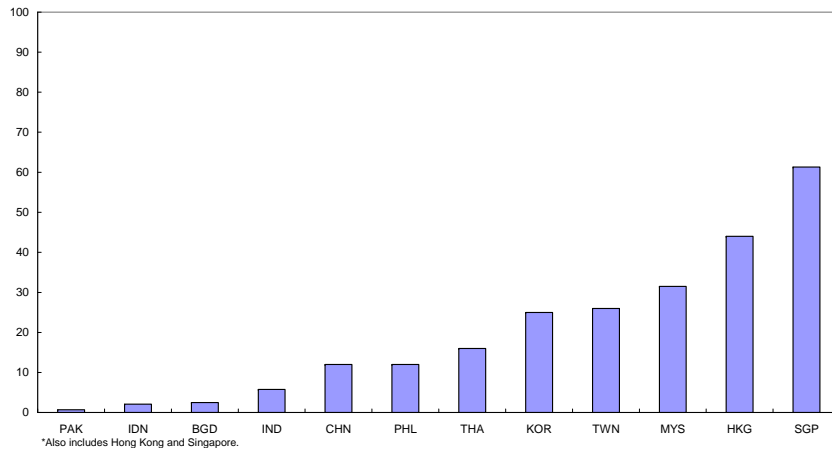
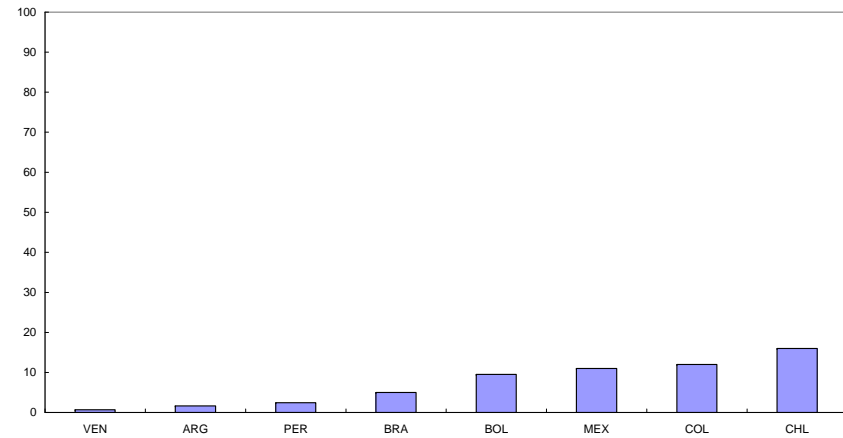**The Depth of Mortgage Markets: Africa and Middle East**
(as a percent of GDP)

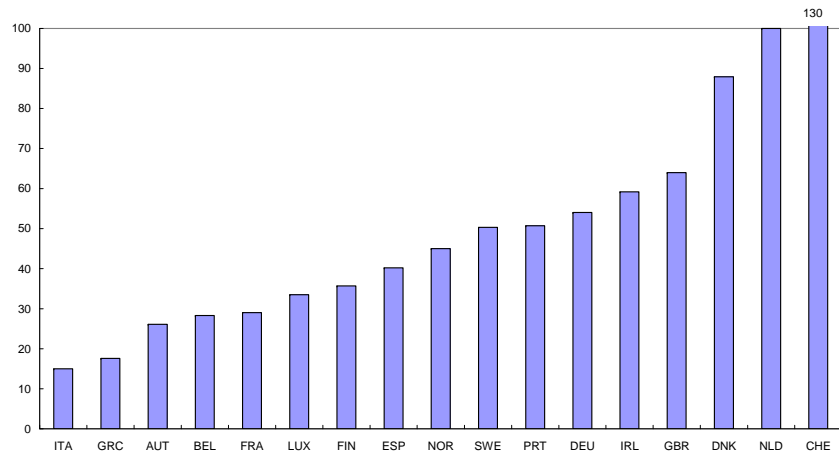**The Depth of Mortgage Markets: Eastern Europe**
(as a percent of GDP)

The Depth of Mortgage Markets: Emerging Asia*
(as a percent of GDP)

*Also includes Hong Kong and Singapore.

The Depth of Mortgage Markets: Latin America
(as a percent of GDP)

The Depth of Mortgage Markets: Europe
(as a percent of GDP)

The Depth of Mortgage Markets: North America and Pacific
(as a percent of GDP)