Chapter 8

Risk Management and Regulation

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All lending involves a variety of risks that must be allocated, managed, and priced, but the 10- to 30-year maturities and the legal aspects of mortgage lending pose unique risks. Risk taking by lenders and investors should be regulated and supervised—by both regulatory authorities and market participants. The principal risks associated with financial intermediation are well known: credit, market, liquidity, foreign currency, operations (or business), and political. Mortgage value depends on a host of factors, including house prices, interest rates, and the legal environment for enforcing the mortgage lien. Mortgage lenders establish risk measures and methods for mitigating risk that reflect these characteristics. In many cases, measures appropriate for mortgage lenders differ from risk measures and tolerances for shorter-term and unsecured lending.

In addition to product-specific issues, real estate lending can be a source of systemic risk, as banking and real estate crises are frequently correlated. The fact that inappropriate lending, pricing, and risk management can create problems for the broader financial system and macro economy presents special challenges for regulators.

By definition, emerging markets suffer from a lack of public, detailed financial information, and they lack liquidity in both the financial and real estate markets. The lack of information and liquidity, along with the cyclical nature of the property markets, can lead lenders and regulators to restrict the flow of credit to housing, to the detriment of the market and economy—in particular, to moderate- and lower-income borrowers. Yet effective risk management techniques and enlightened regulatory policies can create a climate for safe lending.

In this chapter, we review the major risks present in mortgage lending, review how they are managed in an emerging-markets context, and highlight the way regulations shape the market. We end the chapter with a concise summary of the factors that led to the subprime crisis in the United States as a case study in risk management and regulatory issues.

The Risks of Housing Finance

Like all lending, housing finance is exposed to a number of risks. These risks can be classified into seven categories:

1. *Credit risk:* the risk that the money will not be returned, with whatever interest or other charges are due, in a timely manner;
2. *Liquidity risk:* the risk that the money will be needed before it is due;
3. *Market risk:* the risk that changes in market conditions will alter the scheduled cash flows (real or nominal) among the parties involved in intermediation. This includes interest rate risk, prepayment risk, inflation risk, and exchange rate risk;
4. *Agency risk:* the risk that a divergence of interests will cause an intermediary to behave in a manner other than that expected;
5. *Operations or business risk:* the risk that the organization, controls, information systems and technologies are inadequate for safeguarding the institution;
6. *Systemic risk:* the risk that a crisis at one institution or in one part of the system will spread to the rest of the system;
7. *Political risk:* the risk that the legal and political framework within which the lending takes place will change.

The ability to manage and price these risks is a major determinant of the availability and cost of housing finance, as well as the provision of credit for affordable housing. The ability to do so in turn depends on the soundness of the economic, primary market, and regulatory infrastructure. The two most important prerequisites for managing risk in housing lending are macroeconomic stability and an effective legal framework for property ownership and mortgage lending.

Macroeconomic stability is very important for several reasons. First, it has a major effect on the demand for mortgages. High rates of inflation and nominal interest rates are typical features of many emerging economies. These features have the effect of reducing mortgage affordability. A volatile economy also affects the supply of funds and the characteristics of mortgages offered by lenders. In a volatile environment, lenders are concerned about liquidity risk and reluctant to offer long-term loans. This may lead them to not offer mortgages or only offer short maturity loans that in turn are less affordable for consumers. Lenders and investors may prefer short-term assets, in part because of the difficulties of forecasting inflation and interest rates and thus the cash flows of their portfolios. FRMs create substantial cash-flow risk for lenders in volatile environments.[1] Variable rate mortgages are riskier for borrowers in a volatile environment, as interest rate change causes payment shock. In turn, this increases the credit risk of mortgage lending (for example, Colombia, Mexico from the early 1990s).

The distinguishing characteristic of mortgage finance is the use of the mortgage lien to secure the loan. As a result, credit risk depends on (1) the borrower's ability to pay the loan from income or other resources; (2) the risk that, in case of default, the collateral sale price will be less than the outstanding balance on the loan plus costs of foreclosure; and (3) the risk that the collateral cannot be seized in a reasonably rapid manner.

The inability to foreclose and repossess the collateral in the event of default is a major source of risk in many emerging markets.[2] The time and expense in foreclosure deter lending, particularly for lower-income households, and raise the cost of borrowing. Extensive research shows that banks provide a greater supply of larger mortgages at lower rates of interest in regions and countries

1. See chapter 3 on mortgage instruments.
2. See chapter 5 on legal issues.

that have shorter and more dependable foreclosure processes (Pence 2006; Jappelli, Pagano, and Bianco 2002; Clauretie and Herzog 1990).

Many of the same factors that restrain the growth of mortgage finance also create challenges for regulators: legislatures may not fund regulators at adequate levels, and courts may not support regulatory actions. Difficulties in enforcing the mortgage pledge increase the cost of resolving failed institutions when public authorities are forced to take them over. Special foreclosure powers for public authorities may reduce the cost of resolving crises, but in the long run serve to enforce market distortions.[3]

In many developing countries, issues related to land title remain a major barrier to housing finance. An accurate and comprehensive land registration system is a necessary condition for effective property rights. The lack of an effective title registration system is a major barrier to the development of markets in used housing, which are often more affordable than new construction. It is also a barrier to lending, as borrowers that cannot establish clear title to their property cannot pledge it as collateral for a loan.

Credit Risk

The two primary measures of credit risk are 1) probability of default and 2) loss given default. Probability of default measures the likelihood that the borrower will fail to make payments over the life of the loan. Loss given default measures the net cost that the lender will suffer in the event of default and foreclosure. Loss given default is termed as a loss because lenders usually lose when they have to foreclose and sell a property. Losses from foreclosures arise primarily when house prices overall have declined, but they may also stem from the costs of maintaining the house if it remains vacant for a period after foreclosure, and from the legal fees and other costs of foreclosure.

Mortgage lenders underwrite credit risk in three broad areas: 1) the ability and willingness of the borrower to repay the loan; 2) the value of the collateral relative to the loan amount; and 3) the lender's ability to efficiently

3. For example, Colombia created a company to dispose of the assets of failed banks in the wake of the 1998 crisis. This company, Central de Inversiones S.A., was given legal powers to foreclose and evict borrowers that reduced its cost, but did nothing to create confidence on the part of private-sector lenders that lacked such special powers and so faced much longer average recovery periods and costs.

enforce the mortgage lien in case of default. Each of these is assessed at the time the loan is originated, and periodically throughout the life of the loan.

Lenders gauge the borrower's ability to pay by comparing monthly debt payments to income, and by assessing the presence of liquid reserves, savings, and investments. The most common measure for ability to pay is the ratio of the monthly debt service or the mortgage payment to monthly income, also known as the effort ratio. The debt service-to-income ratio is calculated by dividing total monthly debt (including mortgage loan payment, monthly installment payments, and minimum payments on all revolving debt) by gross monthly income. The higher the ratio, the greater the stress that debt payment places on the household.

In the past, average acceptable debt service-to-income ratios ranged between 25 and 35 percent. In recent years, there has been an upward drift in maximum (and average) ratios. This reflects the generally benign conditions associated with relative macro stability in many countries. It also reflects the frequent underreporting of income in emerging economies. Thus, in Egypt lenders are by law permitted to lend up to 40 percent for normal loans and 25 percent for social housing loans. The same maximum applies in Thailand (despite the fact there was a major market downturn in the mid-1990s); however, in Indonesia and Argentina, two countries with recent bouts of instability, the maximums are only 30 percent, and in Romania the maximum is 35 percent. Lenders may vary permissible debt sevice-to-income ratios to take into account compensating factors, such as the presence of liquid reserves after closing of the purchase transaction, low LTV, or the presence of mortgage insurance.

Lenders generally assess willingness to pay by collecting information on the borrower's historical record of payment of other debts, such as consumer loans and auto loans. Increasingly, the technology of credit scoring is spreading as a way to collect a range of information to predict the performance of a given borrower and express in a single number their willingness to pay the mortgage.[4] Credit scores reflect the borrower's payment history on all debt over a given period of history. Although credit scoring has been introduced in some emerging markets (Brazil, Mexico) a lack of data (particularly through a complete cycle), and the unwillingness of many lenders

4. See chapter 4.

to share proprietary performance data, limits its usefulness as an underwriting tool.

The amount of equity the borrower has in the property is a major factor underlying willingness to pay. Thus, one of the simplest means to manage mortgage credit risk is to set a maximum acceptable LTV. The less certain lenders are regarding future house-price trends or the legal support for enforcing the mortgage lien, the less likely that high-LTV lending will emerge. In emerging markets, with limited experience in lending, relatively volatile property markets, and less certain legal environments, regulators tend to establish a ceiling on LTV. In Korea, the limit is 60 percent for nonspeculative and 40 percent for speculative areas. In China and Russia, the limit is currently 70 percent; in Romania, 75 percent; whereas in Egypt and Mexico it is 90 percent. There is a 100 percent limit in Thailand and no maximum LTV in Poland. In other countries, limits are imposed by covered bond legislation (Hungary, 70 percent; Chile, 75 percent).

Mortgage lenders set thresholds for the credit risk of loans that they will originate based on their risk tolerance as lenders and on the financial return that is available in their market if they bear different levels of credit risk. To estimate probability of default and loss given default at origination, lenders require information on the property, primarily an appraisal of its market value and information on the borrower, such as the amount and stability of monthly income, other assets the borrower may hold, the source of the down payment, and the borrower's credit history.

The lack of credit information is a significant barrier in most emerging markets, as borrowers often do not have a credit history or ability to prove their income. Many emerging-market borrowers are employed in the informal sector, so their income is often more volatile and difficult to substantiate. Still other borrowers systematically underreport income to avoid taxes. Lenders have begun using nonstandard ways to underwrite or qualify borrowers. The experience of Thailand (box 8.1) is instructive.

Credit risk management takes place through servicing as well as the original underwriting of a loan. Effective servicing involves more than payment collection but also active monitoring of repayment performance and corrective actions once delinquency begins.

Lenders can reduce the credit risk of mortgage lending by securing the repayment stream; for example, through payroll deduction (as does Mex-

Box 8.1. Innovative Underwriting in Thailand

The Government Housing Bank (GHB) of Thailand has developed a number of innovative ways to underwrite loans to lower-income households (Khan 2004). These include the following:

- Hire purchase prior to mortgage: House purchasers lease for three to five years, after which they can become mortgagors upon record of regular monthly installment payments;
- Regular payment incentives: borrowers that save regularly prior to obtaining a mortgage benefit from a lower interest rate.

GHB spearheaded the creation of a credit bureau to share the credit histories of their 700,000 borrowers, 90 percent of which are low to moderate income (loans below $25,000).

ico's Institute of the National Housing Fund for Workers, known by its Spanish acronym INFONAVIT), or direct debits of borrower's current bank accounts (as do South African banks). Collections are a challenge for borrowers with informal incomes. Mexico's SOFOLs place repayment offices in the developments they finance to allow the borrowers to repay the loans in cash near their homes (boxes 2.1 and 8.2). This is more effective than asking them to come into a lending or bank branch, which may be inconvenient or time consuming, and works in a country in which the mail services are not reliable.

Lending to lower-income households generally involves greater risks for lenders than higher-income loans. The income of poorer households is less stable and more difficult to document. Such households typically have short or negative credit histories and fewer resources to withstand shocks. In addition, the transaction costs of making housing loans—particularly smaller, affordable loans—often make them unattractive for lenders. Relatively small loans to low- or moderate-income households require more work (that is, higher transaction costs) and usually result in less revenue than larger loans to middle- and upper-income households.

Box 8.2. Proactive Servicing in Mexico

Since 1996, the SOFOLs have been providing mortgage loans to low- and moderate-income households (incomes two to eight times minimum wage) in Mexico. As of mid-2004, they had an outstanding portfolio of approximately $4.5 billion (Babatz 2006). Their delinquency rates are below 2.5 percent. They have pioneered innovative underwriting and servicing techniques for the affordable housing market in Mexico, including point-of-sale servicing and use of nontraditional measures such as rent and utility payments for informal borrower credit histories. Without subsidies, SOFOLs serve households earning between the median income and the 75th percentile, where banks traditionally served households earning more than the 75th percentile.

In Mexico, SOFOLs arose after the banking crisis of the mid-1990s to provide affordable housing finance. They have been highly successful in managing the risks and costs of servicing this market.

Other Risks

Liquidity Risk

Liquidity risk refers to the risk that money will be needed before it is due. A lender faced with short-term and unstable sources of funds (for example, sight deposits, short-term bank loans) may not make mortgages because of the risk that it cannot meet its cash outflow needs. Assets that cannot be pledged as collateral for short-term borrowing also increase liquidity risk.

Liquidity risk is not unique to housing finance but is rather a broader financial sector stability issue. In modern financial markets, central banks provide the ultimate backstop for liquidity. In addition, deposit insurance reduces the likelihood of massive withdrawals from depository institutions; however, the long-term nature of mortgages creates greater liquidity risk than other types of lending. This is frequently cited as a reason why banks will not provide housing finance in emerging markets. Lenders manage liquidity risk through funding diversification and planning.

Liquidity risk is subject to regulatory constraints such as ratios of long-term assets to long-term liabilities or liquid-to-total assets. Such regulations can be deleterious to the mortgage market, however. The West African Economic and Monetary Union sets a minimum of 70 percent for the ratio of long-term assets to long-term liabilities and does not include core deposits in its long-term liability definition. In countries with no bond markets and little long-term finance, the inability to provide long-term mortgage loans out of core deposits effectively precludes lending.

One way for government to improve the liquidity of mortgage assets is to accept mortgage securities as collateral at the discount window—a solution massively used by the central banks of countries affected by the subprime crisis to maintain some liquidity in the mortgage backed securities market.[5] Nevertheless, independent central banks may not wish to provide specific sector support or may be uncomfortable with the credit quality of the securities. Government can take a limited and targeted role in reducing liquidity risk for primary lenders by backing a liquidity facility.[6]

Liquidity risk is especially apparent for non-depository lenders, as shown in the current U.S. subprime mortgage crisis. Many such lenders funded their inventory held for sale with commercial paper or warehouse loans from banks. When investors became nervous about the credit risk of the lender and collateral, the lenders found themselves without access to short-term funding, leading to forced asset sales into a depressed market and bankruptcy.

Market Risk

Market risk stems from uncertainty with respect to expected inflation, actual inflation, real interest rates, and exchange rates. Lending for a longer term, as for housing, greatly increases these risks. The macroeconomic environment and the characteristics of the mortgage instrument are the principal determinants of cash flow risk. For example, a low-cost prepayment option may be a desirable feature of the mortgage instrument for the consumer, but it significantly increases the cash-flow risk to the lender. Environments that

5. Central banks widened for this purpose normal eligibility criteria of MBS to their rediscount window.
6. See chapter 15 on mortgage securities.

are more volatile generate greater risk, which reduces the affordability and availability of funds. FX-denominated mortgages may have attractive rates at a particular point in time but exchange-rate fluctuation can lead to significant cash-flow risk for mismatched lenders and borrowers. In Mexico, the government has created an innovative risk management program to cushion the risk of macroeconomic shock for borrowers and investors.

There are a wide range of metrics and methods to understand and mitigate market risk by both lenders and investors. Well-run institutions employ a range of tools to understand their market-risk position and manage risk within the tolerances set by management and the board.

Managers of deposit-funded lenders have to trade off stability of net income with stability or growth in the estimated market value of equity. Net income measures the periodic income available as a result of the lender's operations. Changes in the market value of equity reflect the value that management creates for shareholders. While it is management's primary task to maximize the value of shareholder's equity, that overall goal has to be bal-

Box 8.3. Managing Market Risk

Since 1999 in Mexico, mortgages have been originated with a market-risk hedge that is intended to cope with extraordinary or permanent decreases in real minimum wages. This swap allows borrowers to make payments that are linked to the minimum wage index while the loan principal is indexed to consumer price inflation, protecting lenders (Babatz 2006). The swap is implemented under the administration of Sociedad Hipotecaria Federal (SHF), a government-owned mortgage development bank. The borrower and the government share the cost of the swap. The former pays a 71-basis-point fee that, in conjunction with a credit line backed by the government, creates a fund intended to meet a temporary lack of payment flows to securities issued by the lender. The fund is arranged to be able to support a 25 percent deterioration in real wages over a 30-year period. If the fall is higher (lower) the SHF would incur losses (gains). The swap allows borrowers, particularly lower-income borrowers, to have a loan with payments better matched to their incomes, while lenders get payments that more closely conform to investor requirements.

Box 8.4. Polish Foreign Exchange Lending Requirements

Polish authorities have been concerned about the rising proportion of FX-denominated loans among their residential mortgages—62 percent by the end of 2005. This trend resulted from the low nominal rate of Swiss franc mortgages relative to zloty-denominated loans. While the Swiss franc loans are initially more affordable, borrowers earning zlotys are exposed to FX fluctuations, which can create greater credit risk. A ban was considered but abandoned as market unfriendly. The Commission for Banking Supervision instead issued recommendations in 2006 related to mortgage lending, including for FX-denominated loans. Banks are expected to adjust their underwriting policy (notably through a lower LTV), and assess the creditworthiness of clients by assuming the higher credit rate of a Polish Zloty New (PLN) loan, and a loan principal augmented by 20 percent to simulate the impact of a devaluation. Banks are expected to periodically assess the quality of their mortgage portfolio, and particularly exposed banks are expected to conduct periodic stress tests assuming a devaluation of 30 percent persisting for 12 months. The stress test results are reported to the National Bank of Poland. Banks must also improve their credit information to clients in a comprehensible way. They should first offer PLN loans, obtain from the client a written consent of being aware of the FX risk, and simulate loan repayments in a negative devaluation case (rate as of PLN credit loan, and a principal higher by 20 percent).

anced with the need to maintain relatively stable net income and the capacity to pay dividends.

The financial terms of a mortgage loan (that is, fixed or floating rate, constant or price-level-adjusting principal) allocate market risk between borrowers, lenders, and, in many markets, investors. FRMs place market risk in the hands of the lender, and require matched funding and protection from prepayment risk. Floating rate and inflation indexed loans place at least some market risk in the hands of the borrower, and require attention to payment shock (treated above under credit risk), and to any mismatch between the nature and timing of the indices to which the loans and the liabilities that fund them are linked (basis risk). Economies that have less liquid

fixed-income markets may have difficulty in establishing a reliable index for floating rate mortgages.

An increasing source of market risk in Central and Eastern European countries arises from the heavy use of mortgages denominated in or indexed to foreign currencies. In Poland, 62 percent of the outstanding loans were FX linked at the end of 2005, with even higher percentages of 80 percent in Ukraine and 82 percent in Romania. The regulators in these countries have expressed concern about the borrower credit risk associated with currency devaluation, as well as the lender market risk stemming from unhedged positions. The National Bank of Romania has adopted a basic capital adequacy ratio of 6 percent for mortgage loans, instead of the 4 percent rate applied in most European countries under Basel I. As part of the effort to encourage lending in local currency, the National Bank of Romania raised the basic capital required for FX-denominated assets to 130 percent of the basic ratio. Additionally, banks are restricted to an absolute lending ceiling for FX loans of 300 percent of their capital. The National Bank of Poland has recently adopted tough disclosure and risk management guidelines for FX lending (box 8.4).

Agency Risk

Agency risk occurs when there is a separation in the functions of lending. Agency risk occurs at the primary-market level, where lenders may depend on brokers to market and process loans and appraisers to value the collateral. In secondary markets, investors depend on third-party originators and servicers to underwrite, collect, and remit payments. It is also a major concern in government guarantee programs, as the government is exposed to a moral hazard (use of guarantees leading to more risky behavior). The presence of agency risk increases the cost of lending and securitization. Lenders and investors manage agency risk with contract terms, quality controls, and technology. Nevertheless, this risk materialized at various levels of the lending chain in the United States, from unscrupulous bankers and appraisers to moral hazard in securitized portfolios, and was a driver fo the subprime crisis.

Operational Risk

Operational risk is a broad, catch-all topic, including risk of loss from incomplete documentation, automated system failures, data entry errors, rogue traders, and computer security breaches. The transaction intensity of the mortgage business makes mortgage lenders particularly subject to operational risk. The documents that establish the mortgage lien are usually long and complex. The long term to maturity of mortgages increases the likelihood of error. Mortgage originators need effective controls, systems, and business processes to manage the credit underwriting process and all of the associated paperwork. Mortgage servicers need robust automated systems and controls to efficiently process the monthly payments on the thousands of relatively small, long-term loans that they make. Banks that issue mortgage bonds or mortgage-backed securities need robust and sophisticated systems to administer the monthly cash flows to investors for maturities of 10 years or more.

While it may seem obvious that mortgage lenders should employ effective operational systems and internal controls, the lack of such systems has magnified losses in most mortgage-related financial crises. In credit booms, lenders have often loosened control of processing legal requirements in the press to compete for loan volume. This was the case in Mexico, Indonesia, Thailand, and Colombia in the 1990s, and in the United States in the 1980s and in the recent subprime lending boom. In the wake of each of these crises, it was found that many banks lacked the basic documentation to enforce mortgage liens.

Operational risk can become more important as the mortgage value chain is "unbundled" through securitization. As separate participants specialize in elements of the process (for example, origination, servicing, securitization), there are more actors involved and additional chances for operational error, as control over separate steps moves from one organization to another. Traditional bank regulators may not have authority or responsibility for regulating servicers. In the United States, Europe, and Mexico, the industry has come to rely at least in part on rating-agency evaluations of the capacity of servicers. In Colombia, the mortgage securitization firm Titularizadora Colombiana sets the industry standards for servicer capability, and rates the

separate servicers as a way of indicating the firms eligible for servicing loans it will purchase.

Systemic Credit Risk

Systemic credit risk can arise if there is a sudden and sharp decline in property values. The decline may be local in nature (for example, a large firm leaves the area or goes bankrupt) or national (for example, because of a large, unanticipated change in the inflation rate). A market failure may exist if lenders cannot diversify mortgage credit risk. For example, U.S. S&L associations were forced by regulation to operate on a narrowly defined geographic basis until the 1980s, and were exposed to significant concentration risk (for example, the oil-producing states in the Southwest). Mortgage insurance can diversify risk and increase the supply of mortgage credit.[7]

Real estate prices move in cycles, sometimes with tremendous volatility, which creates risk for lenders and for the stability of financial systems.[8] Volatile real estate prices make it difficult to value the collateral underlying the mortgage, and to assess the credit risk of mortgage portfolios. During Colombia's real estate bubble of the 1990s, residential real estate prices rose 28 percent between 1992 and 1994, and then fell 30 percent between 1994 and 1999.[9] Because of this and other factors, including rising unemployment and the structure of the inflation index of the loans, defaults rose to a third of the system-wide mortgage portfolio, and the resulting collapse of several specialized mortgage banks lay at the core of the financial system crisis. Similar stories can be told for real estate lending in Japan in the 1980s, in the oil-patch states of the United States in the 1980s, in the East Asian crisis of the 1990s, and in the rise and decline of subprime lending in the United States.

The subprime crisis demonstrates how real estate bubbles can be propagated across the global financial system. A real estate bubble created in part by loose monetary policy in the United States was intensified by a mortgage bubble that became a mortgage and real estate bust affecting all types of lenders in the United States and abroad.

7. See chapter 13.
8. Wheaton 1999.
9. Cardenas and Badel 2003.

Research shows that real estate bubbles may result from co-movement with the overall economy, from policy choices such as changes to tax law, or from myopia on the part of economic actors.[10] Policy makers in both developed and emerging markets make policy choices that produce or deflate price bubbles.[11] It can be argued, however, that myopia is worse in emerging markets, where information is scarcer and markets are less efficient. Real estate markets in developed economies generally enjoy greater price transparency, more efficient markets for urban land, and better market infrastructure, including efficient property and lien registry systems, lower transaction costs, stronger legal frameworks for ownership and contract enforcement, and more sophisticated financial systems. These features can mute the effects of a bubble and provide for a more rapid adjustment to a collapse in prices.

Political Risk

The political risks of mortgage lending relate to events that reduce earnings from mortgage lending because of political intervention in the selection of borrowers, the rate adjustment process, the mortgage terms and conditions, or the foreclosure and eviction process. For example, the Colombian Supreme Court invalidated the index used on mortgage contracts in the middle of a severe economic downturn, leading to substantial losses for mortgage lenders. A new government in Nicaragua forgave the mortgage loans of the state housing bank upon assuming power in 1979, only to have the bank attempt to reinstate the loans at a later date when the financial implications of this action became clear (Mathey 1990).

The Role and Tools of Regulation

Effective regulation can foster the creation of more stable and resilient lenders and financial markets. These can support the extension of housing finance, contributing to economic growth and individual welfare. The long history of

10. Wheaton 1999.
11. See for example, DiPasquale and Wheaton (1992) on the effect of tax code changes in the United States on real estate prices during the 1980s.

Box 8.5. Keystone Bank

On September 1, 1999, the U.S. Office of the Comptroller of the Currency closed the First National Bank of Keystone, saying investigators were unable to account for some $515 million of the $1.1 billion assets recorded on the books of the 85-year-old bank. The bank had long been the economic mainstay of Keystone, a small town in a depressed coal-mining region of West Virginia. It soon became clear, however, that bank officer fraud, risky bank strategies, and poor oversight had turned Keystone's only financial institution into one of the costliest failures for the Federal Deposit Insurance Corporation since the Great Depression. Losses to the Federal Deposit Insurance Corporation (which compensates depositors for insured deposits when a bank fails) rose from that early estimate of $515 million to estimates in spring 2002 of $780–$820 million.

Keystone's failure at the height of the late 1990s economic boom sent shock waves through the regulatory and banking community. It concentrated attention on bank exposure to subprime loans and securitization risks, and on the need for regulatory bodies to act decisively when they suspect that management might be obstructing regulatory scrutiny.

Keystone's business centered on providing high LTV home equity loans, including home improvement and debt consolidation loans. It was feted as one of the most profitable small banks in the country and in 1999 it reported assets of $1.1 billion. Beginning in 1993, the small-town bank began to purchase ever-larger volumes of low-quality loans from third parties to repackage into asset-backed securities that could be sold to investors in the financial markets. By 1999, it had processed some $2.6 billion of loans in nearly 20 major deals. On the liability side of its balance sheet, it took advantage of the emerging wholesale deposit market to an unusual degree. This market allowed banks to collect deposits in chunks of millions of dollars from brokers, as opposed to the traditional route of gaining new funds by attracting larger numbers of individual, local depositors.

Concern about its rapid growth led the U.S. Office of the Comptroller of the Currency in 1997 to transfer responsibility for reviewing Keystone to a unit that focused on problem banks, and in 1998 the bank was banned from accepting any further brokered deposits. In July 1999, examiners discovered by means of direct

(continued)

Box 8.5. Keystone Bank *(continued)*

verification with the bank's loan servicers that $515 million in loans carried on the bank's books were not owned by the bank. On September 1, 1999, regulators closed the bank. Investigators found that loans recorded on the bank's books had been sold and the value of certain residual interest grossly inflated. Bank officers engaged in extensive fraud, siphoning off loan payments to personal accounts.

At an industry level, the collapse revealed the level of losses that can be incurred when a small bank begins to take advantage of innovations in banking and financial markets such as wholesale brokerages and securitization. Some commentators blamed the authorities for not closing the bank sooner, citing a lack of cooperation between regulatory agencies, particularly the Federal Deposit Insurance Corporation and the U.S. Office of the Comptroller of the Currency. For its part, the U.S. Office of the Comptroller of the Currency said that the case had helped to alert it to the risks in subprime lending and the complexities of asset securitization and residual valuations.

Source: Sunguard Bankware Erisk 2002.

financial bubbles and panics shows that financial market participants have not always been willing to hold adequate capital, to disclose fully the risks they engage in, or to manage risk effectively. The challenge for authorities is to balance the faster economic growth that can follow from lighter regulation against the costs that may result from the failure of lenders. In general, regulation should provide positive incentives for a variety of competitive institutions to deliver financial services to those who demand them. On specific technical issues, such as financial reporting, disclosure of risk, and appropriate levels of risk-based capital, authorities can look to international standards for guidance.

Research shows that incentives for prudent banking through transparency and market discipline are more effective than regulations based primarily on rules and checklists.[12] Emerging market financial-disclosure rules are often below international standards for best practice, security trading

12. Barth, Caprio, and Levine 2001 and 2006.

tends to be infrequent and illiquid, and audit rules are often weak. In such an environment, regulators can contribute significantly to economic growth by improving disclosure regimes and by instilling greater market discipline.

Effective supervisors in any market depend on a variety of tools, including risk-based examinations, off-site monitoring using reports, statistics, analytical models, monitoring of housing and financial markets, and dialogue with management. As financial institutions in sophisticated markets have engaged in increasingly complex businesses, some of the largest and most costly bank failures have resulted from a lack of understanding of risk on the part of management, investors, and regulators (box 8.5). As a result, in all markets, it is essential that regulators examine financial institutions, verify the accuracy of their disclosures, assess their financial health, assess the quality of their financial risk management, and monitor the effectiveness of external auditors and credit rating agencies.

International Standards for Reporting and Capital

Globalization of financial markets has brought with it the promulgation of international standards for safety and soundness regulation and for financial disclosures that seek to better address the risks of new technologies. The Basel Committee on Banking Supervision of the Bank for International Settlements (BIS) has set standards for bank safety and soundness regulation (the Basel Core Principles)[13] and for risk-based capital requirements (the Basel I and Basel II accords).[14] The International Accounting Standards Board has promulgated International Accounting Standards (IAS). All of these efforts have involved extensive consultations between regulatory and other authorities in developed countries, and to a lesser extent, emerging markets.

Although its terms and shortcomings pose challenges, more than 50 emerging markets are moving to adopt Basel II, albeit on country-specific schedules that are slower than that established for internationally active banks from G-10 countries.[15] The weakness of financial regulation in many emerging markets is a source of ongoing concern. Financial regulators in

13. Basel Committee on Banking Supervision 1997. See http://www.bis.org.
14. For the source documents describing the Basel accords, see the BIS Web site, www.bis.org.
15. Fratzscher 2004.

many emerging markets have yet to implement many of the central tenets of the Basel Core Principles, potentially leading to material weaknesses in the implementation of Basel II. Some aspects of Basel II are inappropriate for emerging markets that lack well-developed capital markets. Basel II fails to directly address market risk in the banking book, an omission that is particularly important for the regulation of mortgage lenders. There is a risk that implementing Basel II in the absence of an adequate infrastructure would lead to results that would at best be misleading, and at worst could lead to regulatory arbitrage and a material misunderstanding of the risks that banks face.

Finance companies, mortgage bankers, and securitization companies often fall outside of the purview of prudential bank regulation because they are not thought to affect the integrity of the payments system, and because they do not capture deposits. So long as they are supposed not to pose a systemic risk to the financial system, it has been widely considered in most countries that non-depository lenders should enjoy lighter regulation. This consensus was challenged in the case of Thailand, where bank lending to lightly regulated finance companies help precipitate the 1997 crisis. The approach has been challenged again in the subprime crisis, where the vast majority of the riskier subprime lending was carried out by lightly regulated subsidiaries of depository institutions or effectively unregulated non-bank lenders. The issue is to determine whether the greater economic growth that may result from lighter regulation outweighs the risks to the system that may result from institutional failure or from having unregulated entities create assets that are traded in the broader system.[16] The subprime crisis has changes the terms of this trade-off (see the last section of this chapter).

Provisions

A provision is a reserve that the lender establishes against expected losses on its portfolio of residential mortgage loans. As part of managing risk, banks should regularly review the quality of their loan portfolios. The supervisor

16. Carmichael and Pomerleano 2002, 190.

should assess the bank's ability to identify, classify, monitor, and address loans with credit quality problems in a timely manner.

Supervisors generally set provision requirements for lending institutions, and the content of these regulations varies widely among countries. Where data is available and loans are standardized enough to calculate expected loss, lenders should base the *general provision* on the estimated expected losses of the portfolio. For instance, in Canada, the United States, Hong Kong, and Mexico, for portfolios of homogenous loans, such as residential mortgages of a given cohort, interest rate, and loan maturity, the general reserve reflects the statistically expected lifetime loss on the portfolio.[17] Thus, the general reserve will be equal to the average default and loss rates experienced for loans of the type that make up the portfolio. Distinct from the general provision, *specific provisions* represent likely losses on individually identified loans, and are created as loans actually default, generally as a growing percentage of the outstanding balance as time in default passes.

IAS 39, "Financial Instruments: Recognition and Measurement," determines provisioning requirements for loans held on balance sheet. From an accounting perspective, a loan should be fully provisioned (that is, 100 percent) once the lender believes it will not be able to collect. In practice, the definitions and thresholds for provisioning vary widely among countries. Provisions can be used to manipulate earnings. In good times, since provisions are tax deductible, banks have an incentive to excessively provision in order to reduce taxes and reserve income for later periods. In a time of crisis, lenders may preserve earnings by failing to provision against rising defaults, postponing the harm to profits and shareholders' dividends. Alternatively, provisions have been a source of regulatory forbearance in times of crisis. As defaults grow during a crisis, regulators may allow lenders to postpone the recognition of loss, as they did during the S&L crisis in the United States during the 1980s.

Provisions are a matter of judgment informed by available information. Supervisors should develop regulations for general and specific provisions that reflect the best estimate of the quality of the loan. In mortgage lending, it is possible to generate such estimates in markets that have an adequate data history. Where data is inadequate, supervisors should prescribe provisioning

17. Laurin and Majnoni 2003 and Poveda 2000.

Box 8.6. Spain's Statistical Provision

One of the historical shortcomings of loan provisions has been their procyclicality. Banks have a tendency to reduce provisioning levels as time passes from a credit crisis. In the event of a new shock, they are forced to quickly raise provisions to compensate for rising defaults. In an attempt to counter this procyclicality, since 1999, Spain has imposed what they call a statistical provision that is designed to be countercyclical by using statistical expectations of loss to determine the provision. Provisioning is based on (statistically) expected losses. When loan specific provisions are low, a "dynamic" component is added to them and accrues. When the need for specific provisioning exceeds expected losses and statistical provisions, the previously accumulated surpluses are used to cover the gap.

In the Spanish system, Banks may estimate risk using a standard methodology provided by the Bank of Spain, or they may use their own estimates of expected risk, given demanding requirements for the data and quality of their models, including the requirement that data cover at least one full credit cycle. In the standard methodology, residential mortgages are considered to be low-risk assets, and carry a 0.1 percent coefficient for the purposes of the statistical provision, versus 0 percent for risk-free assets, and 1 percent for consumer loans.

rules that reflect what is known of local performance, and of performance in other countries with similar characteristics but better data.

For instance, Argentine banks are required to hold a 1 percent provision against all current loans, with escalating percentages as delinquencies advance. The required provision for delinquent or doubtful collateralized loans is roughly that of uncollateralized loans at each stage. Therefore, a collateralized loan that suffers from "inadequate compliance" requires a 3 percent provision, while an uncollateralized loan in a similar condition requires a 5 percent provision. Interest accruals for loans in excess of 90 days of delinquency must be completely provisioned against. Loans considered unrecoverable must be completely provisioned, whether collateralized or not. Mortgage loans in default may benefit from a provision of less than

100 percent if the bank obtains a letter from a lawyer attesting to the value of the collateral.[18]

In terms of international standards, the Basel Committee has issued a consultative paper that provides principles that are in line with IAS 39.[19] Neither the consultative paper nor IAS 39, however, provide uniform loan classification techniques, nor a standard procedure to assess loan risk.[20] Thus, regulators have to balance prudential considerations against somewhat vague accounting requirements.

Capital Requirements for Primary Lenders

Capital is the reserve held against any kind of unexpected or extreme financial risk. The capital requirement should reflect risk—it should change as the risk level of the institution changes, and so reward better risk management. Capital should represent a bright line for the regulator and for the regulated. Capital requirements should provide a signal to the markets of the risk that the institution bears.

Over the past 20 years, many lenders and regulators have revolutionized their approach to managing capital, moving from a static, historic approach to one that is risk-based and forward-looking. Large, internationally active banks have moved the farthest, adopting sophisticated, quantitative approaches to risk management and capital allocation.

Mortgage lenders in the United States and Europe have led the development of quantitative models for credit and interest rate risk, involving options-based approaches to address issues particular to mortgage lending. Mortgages present specific credit-risk issues for managing capital: dependence on local real estate market dynamics; dependence on the appraised value of the collateral; and dependence on the ability to execute the mortgage pledge in case of default. The long term to maturity of mortgages can add volatility to the value of capital.

It is management's responsibility to measure, monitor, and mitigate risk in its business. Minimum capital requirements exist as reserves against

18. Banco Central de la República 2005.
19. Basel 1998.
20. Laurin and Majnoni 2003, 2.

extreme events. They are created under the assumption that management does its job correctly. Supervisors can use examinations and disclosures to prove that management is sound, and when they reveal problem circumstances, supervisors can take action, such as requiring additional capital. Each lender's management and board should have a plan for managing capital in terms of the risk appetite and risk profile of the institution. Supervisors should review the adequacy of the bank's risk assessment and the capital requirement that follows. There should be active dialogue between the lender and supervisor on the risks the lender takes and the means that it employs to mitigate those risks.

Basel II Capital Standards and Mortgage Lending

Basel I created a preference for mortgage lending, according a 50 percent risk weight for low LTV loans. This was done under the assumption that mortgage lending was demonstrably safer than other forms of lending. This has not always been the case, particularly in emerging markets.

Many issues particular to mortgage lending are addressed in the Basel II standards.[21] Several are not, including geographic diversification and the market risk of mortgages held in the banking book. Basel II capital standards that are directly relevant to mortgage lending address: the credit risk of loans held in the banking book, credit enhancements, and investments in mortgage-backed securities.

In applying Basel II capital standards, the lender and supervisors may choose between two broad levels of sophistication. The choice depends on the technical capabilities of the lender, the complexity of their business, and the capacities of the supervisor:

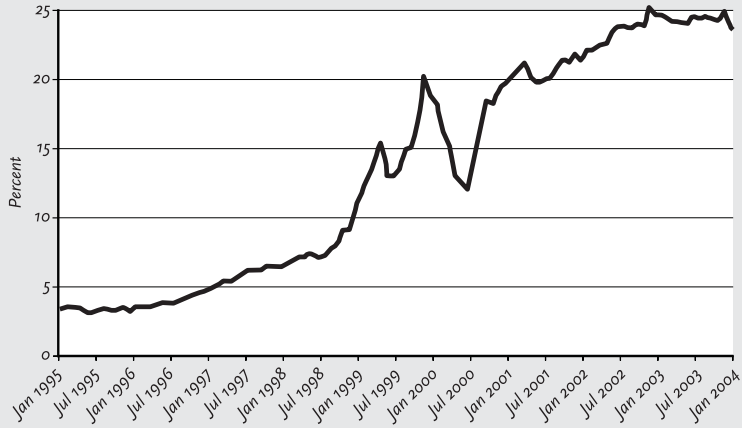
- The standardized approach is an extension of Basel I with additional risk categories that allow for selected refinement of the risk sensitivity of capital requirements. It is likely to be the approach of choice for less sophisticated banks, and for emerging markets that

21. The chapter focuses on the applicability of Basel II to mortgage lending in emerging markets. It does not address many of the equally important challenges that face emerging market implementation of Basel II in other asset classes.

Box 8.7. Colombia Crisis

By contrast, to some developed economies, the regulatory authorities in emerging economies may have reasons to consider that residential mortgage markets should not be treated as a low-risk class of assets, if the legal framework is inhospitable to lenders and if the macroeconomic environment is instable. This concern is acute after experiencing a brutal crisis often preceded by a long period of good performance. Most Latin American countries went through such an ordeal with significant fiscal impacts in order to bail out borrowers or lenders (Brazil, Colombia, Mexico, Argentina, Uruguay, and so forth). The recent crisis of the mortgage sector in Colombia (1997–2002) was severe, as shown below. It was caused by a macro crisis (GDP contraction, higher market rates, unemployment, fall in housing prices) and by a legal and regulatory instability (long foreclosure delays, but also legal changes to the whole portfolio, which was made of hazardous indexed loans). The portfolio quality has recovered since (less than 5 percent nonperforming loans [NPLs]) thanks to debt restructuring programs and to the securitization of NPL mortgage portfolios.

Mortgage Loans 90 Days Delinquency Rate



Source: Titularizadora Colombiana, March 2006.

move to Basel II. The most important issue for mortgage lenders under the standardized approach is the risk weight for mortgages retained in the banking book. For large internationally active banks, this will fall from 50 percent under Basel I to 35 percent under the Basel II standardized approach in the case of residential mortgages. Also important for mortgage finance, the standardized approach allows for the use of external credit-rating agency ratings of credit enhancers (such as mortgage default insurers), and of asset-backed securities, including MBSs. Use of credit rating agencies presents challenges for emerging markets, which often have no such firms, or lack the practical ability to enforce standards for credit ratings.

- The internal-ratings-based (IRB) approach permits banks to hold capital according to their own estimates of risk parameters such as the probability of default and the expected loss given default of their credit portfolios. In efficient mortgage markets, where mortgage lending represents the safest business lines of many banks, the IRB approach will result in a dramatic lowering of risk weights, to as little as 10 percent.[22] IRB requires sophisticated technology and technical staff on the part of both lenders and supervisors. Lenders must demonstrate that their models and the procedures for using them are well developed and robust, and their data adequate to assess risk. In general, Basel II requires at least five years of detailed data history for a given asset class to establish default and loss statistics. This is inadequate for mortgage lending, given the long cycles of real estate prices. Supervisory agencies need budget to employ, train, and retain staff with the capacity to evaluate the lenders' models and methods.

The reduced risk weight for mortgages in the banking book recognizes the high value of the mortgage pledge in countries with liquid real estate markets, well-defined valuation rules, and efficient contract enforcement. In well-developed mortgage markets, foreclosure may take as little as three months. In emerging markets, however, foreclosure generally takes years, and expected losses rise quickly with the length of time required to foreclose.

22. The risk weight for residential real estate has a 10 percent floor that will be imposed for at least the transition period to adoption of Basel II, defined as the first three years of effectiveness of the accord. (Basel 2004, paragraph 266, page 58).

As a result, the Basel committee notes that the 35 percent weight should be applied only when valuation criteria establish the security of the collateral, and where the default experience of mortgages justifies the lower weight. Otherwise, supervisors should require a higher risk weight.

Unless they can demonstrate lower risk, emerging market regulators should not adopt a 35 percent risk weight for mortgages. Few emerging market regulators have the resources to supervise the IRB approach to capital standards, and none of these will adopt it within the time frame of wealthy countries. For example, Russia and Colombia will continue to require a 100 percent risk weight as they move to adopt Basel II according to their own schedules. Thailand, on the other hand, is applying a 35 percent risk weight for loans below 3 million baht, despite the fact that the regulators are not adopting any other part of Basel II.

Basel II also asks regulators to determine capital requirements for operational risk. Operational risk is measured in terms of the likelihood of processing errors and associated expected losses, and the likelihood of incidents such as undesired access to proprietary systems by computer hackers. There is, however, a scarcity of data on operational risk in every market, be it well developed or not, and the methodology for developing assessments of operational risk is immature. Given the lack of data and research for G-10 internationally active banks, it is likely to be some time before extensive quantification of operational risk is available in emerging markets.

Capital Requirements—Supervisory Standards

Basel II calls on regulators to evaluate the quality and accuracy of each bank's risk assessment, risk management, and internal controls. Pillar 2 places responsibility on banks to improve their risk management practices. Supervisors are responsible for judging the efforts of banks to assess and mitigate risk. Supervisors are to intervene where necessary, including by requiring additional capital. The Basel committee expects regulators to use Pillar 2 to determine the regulatory and capital treatment of risks that are not explicitly included in the capital adequacy requirements of Pillar 1. Three of these risks are particularly important for mortgage lenders:

Credit Concentration Risk

Basel II is silent on the topic of geographic diversification, an important omission with respect to mortgage markets. Real estate values are driven by local economic and regulatory factors, so geographic diversification plays an important role in mitigating credit risk in mortgage lending. One estimate showed that the economic capital required for a portfolio of regionally concentrated loans to highly rated borrowers in the United States would be two-and-a-half times that of a diversified portfolio to similarly rated borrowers (Calem and LaCour-Little 2004). This is intuitive for countries with large, economically diverse territories such as the United States or China. Even in small countries, however, house-price levels and trends can vary dramatically between the centers of major cities and the surrounding countryside. For instance, in Armenia, the price per square meter for housing in the center of the capital is more than three times that of the country's second city. Further, Armenia is a good example of another emerging-economy phenomenon, where rapid residential real estate price increases in the most economically active region of the country are driven by speculation more than by the need for shelter.[23]

Supervisors should gather and publish data on house price trends in local and national markets. They can use this data to estimate default and loss rates, and so gauge the risk of regionally concentrated loan portfolios. Supervisors may also simulate stresses to lender portfolios using historically based worst-case scenarios. In concentrated markets, and particularly where there is a risk of speculative bubbles, regulators should be wary of overexposure to a single region or location, and should raise capital requirements for riskier portfolios. Supervisors should encourage mortgage lenders to diversify their portfolios.

Market and Liquidity Risk

Portfolios of 15- or 20-year mortgages require similar term funding. While floating rate mortgages may reduce interest rate risk, they still present

23. Like many emerging economies, Armenia lacks viable individual savings vehicles aside from real estate. Banks pay less than the inflation rate on deposits, there is no public market for equity or debt securities, and there is no private pension system.

liquidity risk. Banking supervisors generally use ratios to monitor liquidity risk as described above. Some, however, have adopted more involved stress test requirements. While Basel II does not include standards for market risk in the loan portfolio, many countries require lenders to apply industry best practice for asset liability management, and some impose capital requirements for the lending portfolio. In 2002, India's National Housing Bank, promulgated guidelines for asset-liability management at India's specialized housing lenders, which are known as housing finance companies (HFCs). HFCs are permitted to take deposits and make residential mortgage loans. The National Housing Bank guidelines reflect the specific risks of longer-term mortgage lending funded by short-term deposits. The rules include guidance for the development of financial indicators of risk and management information systems to monitor term mismatch and liquidity on the balance sheet. At the time they were promulgated, they were flexible in that they recognized the lack of management and automated systems at many HFCs. The guidelines envisioned an evolution from simple techniques such as categorizing cash flows by maturity buckets or bands, to calculating duration of equity and risk-adjusted return on capital. Importantly, they also address the governance aspects of market risk management, calling for HFCs to establish risk committees for both management and boards of directors.

Argentina's standard is demanding in that it expects all banks to be able to estimate value at risk for every asset class in both domestic and foreign currency. At the same time, it necessarily requires a number of assumptions about the structure of the balance sheet. Risk capital for interest rate risk of non-quoted assets such as loans is based on the estimated maximum expected loss of the value of the net asset position at a 99 percent confidence interval over a three-month time horizon. Capital requirements for net asset positions are defined in terms of assumptions about which liabilities fund which assets. The Argentine regulation allows banks with strong capital, assets, management, earnings, and liquidity (CAMEL) ratings to recognize that a large part of their deposit base is effectively permanent, even if contractually short term in nature. These banks are permitted to assign up to 50 percent of short-term deposits to fund long-term fixed rate assets. Adjustable rate loans that have a rate linked to an external index are considered to have a maturity equal to the reset frequency of the index. For adjustable rate loans with administra-

tive variation, where the bank has the contractual ability to vary the rate, 40 percent are considered to be fixed rate, reflecting the experience in most countries that, in case of crisis, banks are not able to raise the rate on such loans as quickly and as high as market conditions might dictate. This inability to adjust rates in time of crisis reflects the heightened credit risk that results from such moves, as well as political pressure to keep rates stable.[24]

Mortgage Loan Design

In many markets, lenders have employed loan design techniques to reduce the initial payments required on a mortgage, and so make it possible for the borrower to initially afford the payment. These may include "teaser" interest rates that start out lower than market, but escalate with time, or "negative amortization" features that trade off a lower initial payment with a growing principal amount. Such loan designs may lead to higher defaults if house prices fall or interest rates rise unexpectedly. A proliferation of exotic loan designs contributed to the high default rates in the Colombian crisis and led to a reaction by the Supreme Court to ban the designs and allow only fixed-rate lending (real and peso). Likewise, after the devaluation shock and banking crisis in Turkey in 2001 all indexed and variable rate loans were outlawed. The mortgage law passed in 2007 allows these instruments but requires life-of-loan caps and detailed disclosure to borrowers.

Supervisors should require lenders to provide stress test results for all portfolios of loans, and they should pay particular attention to the assumptions and results for complex product designs.

Other Regulator Actions

Regulators can encourage or require other actions to strengthen the mortgage lending systems of individual countries. Such actions can be particularly important to reduce the probability and severity of housing cycles.

24. Banco Central de la República 2005.

Real Estate Market Information

One step is to actively foster the development and publication of accurate, detailed information on real estate prices and transactions. In any market, speculative price bubbles are hard to spot until after the fact; however, the task of detection is made more difficult if there is a lack of consistent information on the prices themselves, and on the factors that lead to changes in real estate prices. Regulators in many markets track the performance of real estate markets. Central banks and regulators in China, the United Kingdom, and many other countries monitor real estate markets. Thailand (GHB) set up a Real Estate Information Center in 2004 to provide real-time price and transaction data—in part to help policy makers spot bubbles that preceded the Asian financial crisis of 1997. SHF is doing the same in Mexico. The U.K. Financial Services Authority (FSA) discusses the impact that a possible fall in house prices would have on consumer wealth and expenditures, on the health of lenders, and on the economy as a whole in its risk outlook for U.K. financial markets (FSA 2006).

Management and Reporting Standards

Regulators should produce management standards and reporting requirements for lenders, and include adherence to these standards as part of examination criteria. Lenders should be able to articulate a coherent and reasonable strategy for lending to a given real estate market and their means for mitigating risk in that market. Riskier products should have limits in terms of total assets or total capital. Examiners should review plans for credit risk, market risk, and operational risk, and compare performance of lender portfolios and of management against the plans.

Examples of such rules in the United States include three interagency regulations:

- On real estate lending, U.S. regulators require that each lender establish and maintain written policies that establish appropriate limits and standards for real estate lending, and that these be reviewed by the board of directors at least annually. These standards must establish

portfolio diversification standards, prudent underwriting standards, and loan administrations standards. The regulation requires lenders to monitor conditions in real estate markets where they operate. [25]

- On lending for residential real estate construction, regulations require that lenders demonstrate understanding of and expertise regarding real estate construction lending. The rules set LTV requirements for construction loans, and for the use of appraised values in establishing LTVs. For instance, the value used for a construction loan must take into account not only the assumed price of the final units to be sold, but the remaining costs that would be incurred to complete the project and market the units.[26]
- Guidelines were recently proposed for offering nontraditional mortgage products such as interest-only loans. These set requirements for the underwriting of riskier adjustable rate loans, such as those that have built-in rate increases. They also would impose additional reporting requirements to the regulator for lenders that offer such products.[27] These guidelines proved to be of little effectiveness, and have been replaced by more forceful prescriptions since 2007 (see the section on the subprime crisis).

Taking Corrective Actions

In markets that are very rapidly rising, regulators may be compelled to take action to reduce speculation. Such actions could include raising capital requirements for real estate loans, lowering the permitted LTV level for mortgages, requiring lower payment-to-income ratios for new loans, or imposing taxes on sales of properties held for less than some threshold period considered longer than the time horizon of a short-term speculator. Such actions, however, could intensify real estate cycles if timed wrong.

In some markets, such as Shanghai, anecdotal information indicated that in 2004 and 2005, speculative investment surged with many buyers who were

25. Federal Reserve 1998.
26. Appendix C to Part 208 of the Code of Federal Regulations (CFR)—Interagency Guidelines for Real Estate Lending Policies.
27. Federal Reserve 2005.

holding properties for less than a month or two. The Chinese government undertook a number of short-term responses, such as lowering required LTVs for loans in Shanghai and imposing taxes on owners that held properties for less than five years. While these measures appear to have had an effect in slowing down price increases, they had a negative effect on the mobility of middle-class households via the five-year minimum hold to avoid tax. In considering such measures, it could be possible to limit transactions to the upper end of the market, where price speculation is likely to be greater since valuations are already higher, by definition.

The U.S. regulators face a challenge with the weakness in the subprime mortgage market. Underwriting was clearly relaxed and inappropriate loan products sold to borrowers in this market segment. There is active discussion of tightening underwriting guidelines and determining product "suitability" (See Consumer Protection, chapter 6), but regulators must be careful in promulgating these rules, as a sudden contraction in credit availability will exacerbate the foreclosure problem.

Financial Reporting and Disclosures by Primary Lenders

Accurate and thorough financial reporting contributes to market discipline and efficiency. Accounting standards provide detailed rules for reporting balance sheet values and periodic income and expense. Pillar 3 of Basel II provides standards for information disclosure that help investors and regulators to better understand the risks carried in a lender's portfolio. In addition, lenders should disclose indicators of the level of market risk that they incur in funding long maturity mortgages.

Developed market mortgage lenders should face little challenge in complying with IAS standards for loan accounting or with Pillar 3 core quantitative and qualitative disclosure requirements for credit risk and market risk. In many emerging countries, however, more detailed disclosures for credit and market risk will have to await the development of improved systems and management methods.

In most emerging markets, the move to regulation based on market discipline is constrained by the lack of a supporting infrastructure of financial reporting practices. Many emerging markets have not yet adopted IAS

or clear rules for audit practice and auditor independence. Most emerging market regulators lack the budgets to hire enough technically qualified staff at salaries that are competitive with the private sector. As a result, they are often unable to supervise rapidly innovating business processes in detail. For example, neither Colombia nor Russia has fully implemented IAS, and regulators in each face substantial challenges in enforcing existing standards.

In an efficient market, investors penalize lenders that fail to comply with disclosure standards. In less efficient markets, regulators and auditors have a greater role in promoting and enforcing disclosure standards. Beyond reporting of operational risk parameters, the difficulties with Pillar 3 in emerging markets are likely to lie in obtaining legal authority to require financial disclosures, and in obtaining regulatory resources to enforce such standards. Further, markets will have to develop more depth to accurately value assets such as mortgage servicing rights.

Regulation of Secondary Mortgage Institutions

As discussed in the mortgage securities chapter (see chapter 12), secondary market institutions have been created in a number of emerging markets. These include both liquidity facilities and mortgage securitization companies. Many of the former have been created with extensive involvement of the Central Bank, which directly or indirectly supervises their activities (for example, Egypt, Jordan, India, Malaysia, Trinidad). In Mexico, the liquidity facility is subject to prudential regulation by the unified banking and securities regulator. Sound prudential regulation of liquidity facilities is in keeping with their principal function of supplying liquidity and capital market access to mortgage lenders. Their security issuance is regulated and supervised by domestic security regulators and local rating agencies.

Case Study: The U.S. Subprime Crisis

The United States' crisis in subprime mortgage lending revealed a number of failings in industry risk management and regulation. Emphasizing the importance of good risk management and regulation, the subprime crisis has

disrupted international financial markets to an extent exceeding all expectations. Even though riskier subprime ARMs made up no more than 8 percent of all U.S. mortgages in 2006 (MBA 2007), the ripple effect of the unexpected rise in subprime defaults has already led to the failure of several U.S. non-bank lenders, a well-regarded U.K. lender, and a German Landesbank. Uncertainty about the exposure of highly rated European and U.S. banks to subprime defaults revealed fundamental weaknesses in international credit markets, and created an international credit crunch.

The Property Boom and Loose Credit Underwriting

The recent real estate boom and the decline in long-term interest rates were important contributors to the rise of subprime lending. National average property prices rose 86 percent between 1996 and 2006 (Shiller 2007). While all mortgage lending grew rapidly with rising house prices, subprime lending came of age in this most recent boom. Subprime originations rose from 9 percent of total mortgage lending in 2001 to 20 percent in 2006. Property speculation grew as the boom persisted. Lenders came to rely more on the rising value of collateral to secure the loan than the borrower's ability to repay from income. The quality of loans deteriorated and underwriting criteria were relaxed (Demyanyk and Van Hemert 2007). In 2006, 38 percent of subprime loans had a combined LTV of 100 percent or more. Half of all subprime loans had low or no documentation of borrower income or assets. As property prices began to decline between 2005 and 2007, many of the more highly leveraged borrowers found themselves in negative equity, with the value of the debt exceeding the value of the house, making it impossible to refinance these loans. Speculative borrowers with negative equity are much more likely to default than other borrowers. By the third quarter of 2007, serious delinquencies (90 or more days delinquent or in foreclosure) for subprime loans rose to 11.38 percent from 6.78 percent in 2006 (and about 18 percent for ARM subprime loans) By comparison, serious delinquencies on prime conventional mortgages rose to 1.31 percent from 0.79 percent in the same period a year earlier (MBA 2007).

Reduced Reliance on Credit Enhancements

Loosened underwriting contributed to decreased use of mortgage insurance (MI). MI provides an important third-party review of underwriting quality, and a credit enhancement that facilitates securitization. Lenders encouraged low- and moderate-income borrowers to take out more profitable subprime ARMs instead of FHA or privately insured FRMs by offering faster disbursement and reduced documentation requirements. Until 2006, federal tax rules favored 100 percent "piggyback" financing with a combination of an 80 LTV first lien and a 20 percent second lien piggyback mortgage at a higher rate of interest. The market share for loans originated with MI fell from 26 percent in 1997 to 11.5 percent in 2006.

Risky Loan Design

The design of many subprime loans exacerbates the effects of declining house prices and rising interest rates, leading to increased defaults. Riskier designs include ARMs with complex features, interest-only mortgages, and more complex designs. For instance, to make loans initially more affordable, many subprime ARMs featured low interest rates for a relatively short period of two or three years ("teaser" rates) that subsequently adjusted sharply higher. These loans were termed 2/28 or 3/27 because the initial fixed-rate period could be two or three years, but the loan amortized over 30 years. Other loans, known as "option ARMs," enabled borrowers to pay a variable amount each month, allowing for minimal or no amortization and capitalizing any unpaid interest into the principal outstanding. Even option ARMs, however, eventually require the borrower to adhere to a minimum payment schedule. So long as house prices were rising quickly, borrowers could wait two or three years and then use property appreciation and their recent payment history to refinance out of risky loans. Once house prices began to fall, however, many highly leveraged borrowers found themselves unable to either refinance or to make the new, higher payments. At the end of September 2007, serious delinquencies for subprime ARMs reached 15.63 percent, 4.25 percent higher than the serious delinquency rate for all subprime loans (MBA 2007).

Lack of Consumer Information

The poor credit quality of subprime loans is exacerbated by poor levels of consumer information. U.S. laws require detailed disclosure at the time of purchase or refinance, but in a format that is difficult to understand with many details extraneous to their understanding the risk of the loan (Guttentag 2002, 2004). This is a particular concern when lending to households with limited levels of financial education. Some subprime lenders have engaged in aggressive marketing and predatory lending behaviors (FTC 2007). This is symptomatic of the fee-based compensation system and a breakdown in the historic incentives for solid underwriting in the securitization market.

Breakdowns in the Behavior of Participants in the Securitization Value Chain

The subprime crisis revealed weaknesses in the incentive structure of the securitization model. Historically, the incentive to maximize volume and reduce costs by loosening underwriting standards has been countered outside of the subprime market by the need to maintain a good reputation with servicers and securitizers, and contractual requirements to buy back loans that default too early. The reputation incentive was attenuated by cost and market pressures. There has been strong demand for high-yield securities with little attention paid to due diligence by investors. Rating-agency default models have not adequately reflected default risk, and the expectation of rising house prices reduced lender concerns about possible defaults. The difficulty of enforcing contractual loan repurchase requirements became clear in the early part of 2007, as early payment defaults rose, and many non-bank lenders were driven into bankruptcy by demands that they take back the defaulting loans. Thinly staffed servicers lack the capacity to handle a large volume of loss mitigation efforts, and so move quickly to foreclosure, further depressing housing markets.

The Influence of Trends in International Capital Markets

Capital market trends contributed to the growth in subprime lending, the loosening of underwriting standards, and to the subsequent international liquidity crisis. First, since the financial crises of 1998, there has been an accumulation of liquidity on the part of international investors. As inflation, sovereign risk spreads, and nominal interest rates fell in most countries after 2000, investors have increasingly struggled to find opportunities to earn returns greater than inflation. Securities backed by subprime mortgages offered such an opportunity, given the high nominal interest rates paid by the underlying collateral and the high credit ratings conferred by product structuring and third-party credit enhancements, such as by monoline credit insurers. Between 2001 and 2006, the portion of subprime originations that were securitized rose from 46 percent to 75 percent (Ashcraft and Schuermann 2007). Unable to evaluate rating agency models and unable or unwilling to model increasingly complex structures, international investors relied on credit rating agency analysis instead of their own research. Rating agency models of subprime loan performance, however, did not take into account the declining underwriting standards, house price declines, or interest rate increases that became evident in 2007. As subprime defaults rose above rating agency expectations, the performance of lower-rated subprime securities deteriorated.

Reduced Transparency Resulting from Complex Security Structures and Incomplete Information on Exposures

The subprime crisis was worsened by the complexity of subprime securitizations, the fact that they are not traded on exchanges, and a lack of clarity as to which investors are exposed to potential losses. Many subprime transactions involved successively packaging subordinated bonds to create highly rated securities, which are in greatest demand. Subordinate bonds from several deals were often packaged and structured to create a highly rated bond. In the absence of exchange-based market makers, it becomes difficult to obtain quotes when there is uncertainty about the value of the underlying collateral. In addition, privately placed securities are not sub-

ject to specific disclosure rules. Furthermore, comprehensive data does not exist on the holdings of subprime-backed securities by hedge funds or other special investment vehicles. Nor is there public data on the exposure of major banks to these funds. As performance of subprime collateral worsened, it became difficult to price subprime-backed bonds, to trace the potential performance of structures, or to assess the effect on investors. As a result, many market participants stopped transacting as they waited for the picture to clear. The lack of disclosures and due diligence was made worse when banks created leveraged investment funds known as structured investment vehicles that issued short-term debt against higher-yield, long-maturity subprime securities.

Regulatory Failures in the United States Contributed to the Growth of Risky Subprime Lending Practices

There are multiple national and state regulators involved in mortgage lending, all of which were slow to address the well-publicized risks of relaxed subprime credit underwriting. Many non-bank U.S. lenders are not subject to prudential regulation. In all, 30 percent of subprime loans were made by lightly regulated subsidiaries of banks and 50 percent were made by independent mortgage companies that are not subject to prudential regulation (Gramlich 2007). While several federal regulatory guidance notes were issued on subprime lending, they did not apply to the unregulated non-depository lenders. Beyond the issue of unregulated lenders, prudential regulators and legislators have been reluctant to impose suitability requirements on mortgage lenders.

The Risks of Subprime Practices and Those of Lending to Moderate- and Low-income Households Should Not Be Confused

It is important to note that problems with low-income subprime mortgage borrowers resulted primarily from failures by lenders and investors, and not from low borrower income. FHA loans to households with income levels

similar to lower-income subprime borrowers have not defaulted in unusually large numbers during the past two years. The success of microfinance in emerging markets has demonstrated that low-income households can manage debt, and that lending to low-income households can be profitable.

The Subprime Crisis Was Avoidable

Many U.S. policy makers raised issues about the boom in subprime lending for a number of years prior to 2007. The crisis resulted from a disregard of basic credit precepts, such as the need for robust loan underwriting standards, the need for financial transparency, and the risks of excessive leverage. Developing-country policy makers can avoid these mistakes by ensuring that lenders follow long-established rules for credit management and consumer protection, and that capital market access is provided with a variety of tools in the context of reasonable standards for transparency.