The Structure of Mortgage Markets in Mexico and Prospects for Their Securitization

by Christopher B. Barry, Gonzalo Castañeda, and Joseph B. Lipscomb*

**Abstract**

This article examines the current state of the Mexican housing finance market, a market characterized by high real interest rates and a severe deficit in the housing stock. The article describes the institutional structure of the Mexican housing finance markets. It notes obstacles to the free flow of capital into the market, points out high relative risks encountered within the market, and describes the relative lack of competition in the banking system. Finally, it considers prospects for the expansion of capital via securitization and observes impediments that restrict the development of mortgage securitization in Mexico.

The article concludes that there remain in Mexico severe impediments to the securitization of mortgage credits but that these impediments are surmountable. The worst impediments relate to the infrastructure of the credit markets. Other limitations of the market can be or are being overcome.

**INTRODUCTION**

The Mexican housing market is characterized by severe shortage. According to Zealley (1993a), Mexico today suffers a shortage of approximately 3,000,000 units, and the shortage grows by 200,000 units annually. Real mortgage interest rates are high, and much of the housing that is constructed is not developed within the formal housing or credit markets. Mortgages are typically made at relatively low loan-to-value ratios and with relatively short maturities. Mortgage rates appear to reflect a substantial premium over the cost of funds into the mortgage finance system. Our purpose is to examine the Mexican housing finance system and to consider prospects for expanding capital into that system through the vehicle of national or international offering of mortgage-backed securities. This article introduces the housing finance environment in Mexico and initiates a discussion about creating a secondary mortgage market in that country.

In a competitive and efficient capital market that is fully integrated into the global financial system, real mortgage interest rates will—on a risk-adjusted basis—be constant across national boundaries, as will other investment opportunity costs. We find that from January 1989 through July 1993 real mortgage rates in Mexico averaged about 16.5 percent on floating-rate mortgages. This rate compares with real interest rates in the United States of approximately 6 percent over the same period and with more recent U.S. fixed rates of around 4 percent. Houses facing each other across the Rio Grande, literally within a stone's throw of each other, can be financed at real mortgage rates that have differed recently by a factor of four. Further, the level of the housing deficit in Mexico suggests that in a likely scenario, two to four times as many persons will live in the much smaller house on the southern bank of the river.

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In an efficient and integrated market, capital would tend to flow to high real-rate opportunities unless there were economic reasons for the differences in the relative real mortgage rates. Such differences might consist of institutional frictions, or they might reflect differential risks that are priced. We observe both sources of differences in the institutional structure and infrastructure of the Mexican banking system in general and the housing finance system in particular. One way to expand the market and facilitate the inflow of new capital is to package mortgages into securitized portfolios—which tend to reduce the risk of a given commitment to the market—and sell the resulting securities in global financial markets. There are impediments to the development of such a market, but they appear to be surmountable, and efforts are under way in Mexico to develop a mortgage-backed securities market.

A relatively small fraction of Mexico's housing is financed through formal credit markets. Accordingly, an important part of President Salinas's social and economic policies centers on housing and housing finance. The foundation of Mexico's housing policy goals is a 33 percent increase in the production of conventional housing, to be achieved by allowing the market to work. To accomplish this goal, the government has deregulated and privatized banks, modified national pension funds involved in housing finance, cut regulatory red tape and costs, and legislated land reforms. Ancillary goals include increasing the number of houses financed with mortgages from the current 14 percent of the existing stock to 28 percent and reducing mortgage interest rates and other costs of buying a home. Expanding mortgage financing to 28 percent of the existing housing stock would require a dramatic increase in the funds available to the housing sector.

The government's plan for increasing the availability of mortgage credit includes establishing a secondary mortgage market based on the securitization of mortgages.

Mortgage securitization is an effort to integrate mortgage markets with domestic and international capital markets through the sale of mortgage-backed securities. The aim is to attract capital seeking to benefit from Mexico's high real mortgage rates. The expected results include an increased availability of mortgage financing, an increase in competition, and ultimately more affordable housing finance. We will examine the prospects for such a securitization process.

**MEXICAN HOUSING FINANCE: INSTITUTIONAL STRUCTURE AND INFRASTRUCTURE**

Formal housing finance in Mexico comprises a combination of social programs, union pension funds, and commercial bank lending. Recent evolutions in Mexican housing finance have been a response to a decade of economic instability followed by a return to relative stability. Mortgage loan terms typically offered by banks in Mexico are very different from traditional mortgage loans available in the United States. Since Banco Nacional de México (Banamex) introduced its middle-income lending program in 1984, mortgage terms have been financially engineered to cope with double-digit inflation, floating interest rates, and a recent history of declining real incomes. Because of the pent-up demand for housing credit caused by the lack of mortgage credit for middle-income home buyers from 1979 to the mid-1980s, lenders have been compelled to extend credit under circumstances that would seem implausible in the United States.

**Mexican Dual-Index Mortgages**

Mexican mortgage loans are commonly dual-index loans. The essence of the dual-index mortgage (DIM), as its name implies, is the simultaneous use of two rates: the payment rate and the debiting rate. The payment rate is used to calculate the installments; this rate is generally linked to the inflation rate as a way to track the service capacity of the mortgagors. The debiting rate, which is short term, is used to calculate the interest that the borrower owes on the outstanding balance. Consequently, in each month that the nominal interest debited exceeds the nominal payment, the excess interest is accrued and capitalized into the loan principal. The Mexican mortgage industry refers to this process as "refinancing" the loan. Therefore, it is possible for mortgage loans to require refinancing every month during periods when loan debit amounts exceed the payments. However, as long as the nominal payment exceeds the real interest component of the debit amount, the principal of the refinanced loan is being reduced in real terms. With regard to the maturity of the debt, the term is ordinarily variable within a maximum specified maturity.

One of the problems of lending in a high-inflation environment is that traditional amortization schedules require initial payment amounts that tend to exceed the borrower's ability to pay. This situation is referred to as the tilt effect. With DIM financing, the tilt effect can be eliminated. With a DIM, affordable initial payments are calculated by considering a long-term real rate and a desired maturity term in the formula of traditional amortization. Subsequent payments are adjusted for inflation, creating a schedule of level payments in real terms. This practice gives borrowers some confidence that they can meet their obligations in the future.

Most banks in Mexico now offer their own version of the DIM. The interest rate index most often used is called the tasa líder (leader rate). The leader rate is either the CETE (Certificados de la Tesorería de la Federación) rate (the 28-day Mexican treasury bill rate) or the CPP (Costo Porcentual Promedio de Captación, the average cost of funds for banks in Mexico), whichever is higher that month. The actual debit rate for interest is typically determined by adding a mortgage loan premium of 500 to 1,000 basis points to the leader rate or by multiplying the leader rate by a factor between 1.25 and 1.37 (Fondo de
Operación y Financiamiento Bancario a la Vivienda [FOVI], private communication, 1992).

We have computed the average interest rates and inflation statistics from January 1989 through July 1993. The 90-day government CETE rate was 27.36 percent. The cost of funds (CPP) was 29.43 percent. The Consumer Price Index (CPI) was 18.51 percent. The nominal mortgage rate was 37.23 percent, and the real mortgage rate was 16.51 percent. Data sources include the publication Indicadores Económicos del Banco de México for the CETE, CPP, and inflation data and a compilation of Banamex mortgage loan data from Softec. We computed the real mortgage rates from the monthly inflation figures and nominal mortgage rates.

Note that real mortgage rates have averaged 16.51 percent from January 1989 through July 1993. This average compares with a U.S. real rate in the vicinity of 6 percent over the same period. The data are depicted across time in figures 1 and 2. Note the high seasonality in the inflation figures, which are not seasonally adjusted (figure 1). The seasonality reflects high inflation rates around the turn of the year, when the government normally adjusts wages and a number of regulated prices.

Seasonality in inflation is accompanied by seasonality in the real mortgage rate figures (figure 2). The banks do not appear to adjust the monthly amortization rate for concurrent inflation, resulting in low or negative real rates around the turn of the year.

The index that controls the nominal payment amount depends on a measure of inflation. In the earlier DIMs, the minimum wage was the basis of the payment index, but minimum wages have lost 50 percent of their real value since 1987, so other measures are used today. The Mexican government typically resets the minimum wage rate every January but may do so more frequently if inflation is high. Most of the major banks reset payments semiannually; some do so once a year.

Negative amortization will occur whenever the amount of interest debited exceeds the total payment amount. However, as long as the payment covers the real interest, the amount of accrued interest capitalized into the loan by refinancing will not increase the real value of the loan principal. The principal amount of the loan will grow in real terms if the payment amount does not cover the real interest rate.
multiplied by the loan balance. Otherwise, the real loan balance will decrease.

To the extent that the nominal principal amount grows at a faster rate than nominal payments, the amortization schedule is recalculated to reflect a longer term for the loan. The principal may grow at a rate that causes the term of the loan to exceed the maximum permitted under the agreement. A divergence between market rates and inflation rates could even become large enough to cause the value of the principal to grow beyond the borrower's ability to amortize the loan. Under these economic conditions, housing prices may or may not increase enough to maintain loan-to-value ratios needed to provide security against the loan.

The DIM system has functioned well during periods of high inflation and economic instability in Mexico. As of this writing (March 1994), inflation rates have remained in single digits for more than a year, and interest rates have fallen as well. For example, the CETE rate fell to single digits (9.72 percent) for the first time in history on February 10, 1994. The economy has experienced a period of sustained stability, and expectations are favorable. It is an election year, and uncertainty remains in the market, but significant changes are occurring. Recently, fixed-rate mortgages have appeared for the first time in more than two decades. Change is occurring rapidly in the entire financial system of Mexico, and we anticipate significant new developments during 1994 if the economy remains stable.

In summary, the DIM contract makes it feasible for borrowers to take on long-term mortgage loans in a highly inflationary environment at debt rates that should be profitable for lenders in the long term. However, the dual indexation does leave room for a significant risk that loan balances can rise out of control in an especially severe economic scenario. The risk in an unstable economy is that real incomes can decline by such a large amount that negative amortization in real terms could make loans impossible to repay. If the economy of Mexico remains stable and confidence in the continued stability of the market improves, the rate of the DIM in the Mexican market can be expected to diminish.

**Mortgage Lending and Its Infrastructure**

The infrastructure for obtaining information on credit risk for individual borrowers and default history of populations is not developed. Credit history on individuals is difficult and expensive to obtain. Credit reporting agencies have personal credit information for credit card payment history only. That information can be obtained quickly for a reasonable fee (approximately U.S.$4 in July 1993). If more information is needed, a credit agency will perform a custom investigation and attempt to gain additional insight into a borrower's credit history. Custom credit investigations cost U.S.$100 to $200. There is no reporting of credit information, other than credit card information, to a central source. Consequently, credit information is inadequate by U.S. standards. As a result, a lender is unable to make an informed judgment about the credit quality of a prospective mortgage, particularly one who is not a long-time customer of the bank.

Default rates and prepayment history are also not reliably reported in Mexico. Traditionally, mortgage default in Mexico has been thought to be very low, less than 1 percent. Part of the reason is cultural and pertains to Mexican's attitude toward their homes. Also, most mortgages in Mexico require larger down payments than are typically required in the United States, which means that foreclosure would create larger equity losses for Mexican homeowners than for Americans. Banking officials have reported to us in private conversations that defaults appear to be increasing. Since the mortgage market has developed largely since 1997, comparatively few data would be available even if all banks reliably and regularly reported their default experiences.

Banks also do not report prepayment data, although with a floating-rate mortgage, prepayment to refinance at a lower interest rate is unlikely. Mortgage interest on a personal residence is not tax deductible, and the banks are charging interest rates that are significantly more than the average homeowner can earn on safe short-term investments. Therefore, there are incentives to prepay, and financing sources other than traditional mortgages may be a less expensive alternative for buyers with access to such sources.

**Legal Environment for Mortgage Lending**

Title to property in Mexico conveys almost unrestricted use except for the normal limitations imposed by zoning and building codes. Property may be sold, passed by devise and descent, or mortgaged to secure financing. Notaries public play a very important role in property conveyance in Mexico, performing many of the same functions as title company escrow agents and lawyers in the United States.

The transfer of title is expensive. The country has few notaries, and competition is further reduced because the notaries belong to an association that sets fees for notary services. Adding to the expense are taxes, costs of building permits when new construction is involved, and notary fees for title transfer and documentation. In the state of Puebla, for example, such costs recently totaled 18 percent of the cost of construction. Recent agreements initiated by the state have reduced those costs to 3 percent, suggesting that the costs were previously excessive.

The Public Registry of Property maintains a record of ownership interests in a system similar to the Torrens system in the United States. Its record of land ownership goes back to the Spanish conquest. Evidence of ownership is achieved by registration of the conveyance from seller to buyer with the Public Registry of Property. When property is sold,
the notary public must verify the seller's ownership and right to convey clear title by examining the public record. Once satisfied with the seller's title, the notary will register the transaction in the name of the buyer.

Security interests for mortgages are created by perfecting a lien against property. Like ownership interest, security interests are registered with the Public Registry of Property. The notary public searches the public registry to determine whether there are liens against the property. In Mexico, if mortgage loans are sold, it takes three to six months for the transfer of the lien on the underlying real estate to be registered in the name of the new mortgage owner. In addition, the borrower must be notified of the transfer. This situation is unlike the transfer of mortgage notes in the United States, where security interest is more easily passed to an assignee of the note. Securitization is a process that requires ease of transfer of the security interest. The difficulty of transferring a security interest with the conveyance of a note poses a problem for mortgage securitization.

The process of dealing with default in Mexico is similar to that in the United States. A borrower who is behind by three payments or fewer is considered to be in administrative default, and the lender tries to work with the borrower. After four payments in arrears, the borrower is in legal default, and foreclosure proceedings are begun. One of the shortcomings of the mortgage market is the lack of a sufficient history or reliable information on the rate of default among the different borrower profiles.

Foreclosure is a lengthy process. It generally takes five months of default and attempts by the lender to revive a borrower before the foreclosure suit is filed. After the foreclosure suit is filed, it usually takes one to two years for the court to order a foreclosure sale and eviction of the owner. Obviously, such a delay is very costly in terms of legal fees, lost interest, and possible loss of capital.

Furthermore, in the Mexican system, borrowers are not liable for deficiency judgments when the foreclosed property sells for less than the amount owed. Legislation has been proposed to shorten the foreclosure process.

**Mortgage Lending Activity by Commercial Banks**

The recent history of commercial banking in Mexico has been turbulent. During 1982, Mexico experienced two major devaluations of the peso. On August 18, 1982, the government stopped allowing the transfer of dollar-denominated accounts from Mexico in an effort to stem capital flight. Dollar deposits were converted to pesos at the rate of 70 pesos to the dollar at a time when the market exchange rate was 100 pesos to the dollar. On September 1, 1982, President López Portillo nationalized the banks. The de la Madrid government, which came into office soon afterward, repurposed many of the nonbank assets of banking companies (see Gruben, Welch, and Gunther 1993 for more details).

The government set very high noncash reserve requirements, which forced banks to invest heavily in Mexican government securities. After nationalization, the banks were required initially to place 70 percent of their assets in government securities (Shreve 1992). Extensive regulation limited asset growth of the banking sector to 9 percent during 1982 to 1988. The nonbank financial sector experienced asset growth of 32.1 percent during the same period. Banking companies, which had numbered 50 before nationalization, consolidated to 18 banks that were eventually repurposed. From 1979 to 1988, very few mortgage loans were available from banks in Mexico.

The Salinas government, which came into office in 1988, removed restrictions, including those regarding asset allocation. Mortgage lending began to reappear at commercial banks. Subsequently, the government passed a constitutional amendment to repurpoze the commercial banking system. The process of selling the banks to the private sector began in 1991. Additionally, legislation aimed at strengthening management and improving services and safety was passed to permit the creation of bank holding companies.

Commercial banks provided 70.5 percent (U.S.$8.56 billion) of the U.S.$9.31 billion in new mortgage loans in Mexico in 1992. Today, all banks participate in the conventional mortgage market in Mexico, but a few dominate. The two largest banks, Banamex and Bancomer, combined provide approximately 65 percent of the mortgages granted by commercial banks. Together with the two next largest banks, Serfin and Comerrex, the four banks provide approximately 80 percent of the conventional residential mortgages. The relative market share of the top four banks making residential mortgage loans is shown in figure 3.

**Figure 3. Housing Market Shares of Commercial Banks**

![Figure 3: Housing Market Shares of Commercial Banks](image-url)

The government has recently established a retirement saving system (similar to the Chilean system) that requires private employers to deposit 2 percent of a worker's wages into pension funds administered by commercial banks. This system will result in a substantial increase in savings and in long-term bank deposits available for housing finance.

**Housing Finance Provided by Nonbank Institutions**

FOVI (Housing Fund for Commercial Banks), a fund of the Central Bank (Banco de México), provides low-interest mortgage financing to low- to moderate-income home buyers earning between three and six times the monthly minimum wage. FOVI obtains loans from Banco de México and the World Bank and provides the funds to the banking system to be offered to individual home buyers at the CPP rate (the average cost of funds for the commercial banking system). The banks earn their spread by paying FOVI a discounted rate. Also, FOVI shares the risk of these loans with the banks by reimbursing the banks for 55 to 60 percent of losses caused by default on these loans. Allocation of these below-market funds was once based on patronage, which created problems until a market solution was established. Now builders and developers bid for FOVI funds through an auction process. Bids are transmitted to FOVI through a commercial bank chosen by the bidder. Funds awarded by auction are transferred to the commercial bank and loaned to the home buyers designated by the bid-winning home builder. One effect of this plan has been to favor new housing finance over preowned housing. Since the below-market funds are allocated by builder/developer bids, only new housing sold by the successful builders has FOVI's below-market funds available for home buyers. FOVI has phased out financing for houses costing more than U.S.$18,000 in an effort to encourage banks to use their own funds to make loans on more expensive houses, thus preserving FOVI funds for the smaller home buyer. Financing by FOVI accounted for only 3.5 percent of the market in 1992 (SEDESOL 1993).

INFONAVIT and FOVISSSTE, two workers' pension funds, provide the second-largest source of housing finance in Mexico. According to SEDESOL, pension funds provided U.S.$1.9 billion in housing finance during 1992. INFONAVIT's operations are supported by a mandatory 5 percent payroll contribution from private employers, and it is Mexico's largest housing fund (Martin Group 1992; Nihill 1992; Zearley 1993b). INFONAVIT is the primary delivery system for government-sponsored affordable housing. It was created in 1970 and evolved into a builder/developer of housing for unionized workers. Because of inefficiencies, patronage, and a lack of accountability, it was reorganized and brought under the control of SEDESOL. Today its mission is to be a financial institution, providing financing for housing construction and purchases, in no longer functions as a builder/developer. INFONAVIT provides financing at rates that ensure INFONAVIT a fixed spread relative to an index of inflation. The agency is the only available source of housing finance for some individuals. It also provides construction financing to developers who can contribute substantial equity to their projects. Home buyers earning between 2.8 and 5 times the official minimum wage, acquiring housing typically priced between U.S.$11,000 and U.S.$20,000, are the target clientele for INFONAVIT (SEDESOL 1993).

FOVISSSTE is the public sector counterpart of INFONAVIT. A 5 percent payroll tax paid into a pension fund for public sector employees is invested in housing programs for government workers. FOVISSSTE follows the INFONAVIT model.

FONHAPO is the federal government's primary low-income housing agency. This agency, together with state and local agencies, delivers housing to the poorest segment of the population. FONHAPO targets nonsalaried workers earning less than 2.5 times the monthly minimum wage, which was U.S.$160 in May 1993.

In table 1, prepared by SEDESOL, is a summary of the contribution of the major sectors of housing finance based on dollars, market share, number of housing units provided, and other useful statistics.

**Informal Markets for Housing Finance**

The fact that only 14 percent of housing is financed through normal channels raises the question, "How is the remainder of housing financed?" The answer is that most of the financing comes from equity sources or from credit sources other than those in the housing finance system, and some likely is provided by seller financing for preowned houses. A common practice among would-be home buyers in the low-income brackets is the "pay and build as you can" plan. Many individuals, after acquiring a site, will save enough money to purchase one construction component, such as steel and concrete for the foundation and columns, and build that much. Later, after accumulating additional savings, they purchase and install the concrete block walls. Next comes the roof. Once the roof is on, the owners are likely to move in, save paying rent on their previous location, and apply this free cash flow to completing their house. Two aspects of this approach to acquiring housing are ideally suited to this housing environment. First, with inflation in double and even triple digits in the past decade, the intermittent acquisition of materials, as minimum denominations of capital were saved, allowed low-income savers to avoid loss of purchasing power. Second, by performing much of the labor themselves, they contributed "sweat equity" (the monetary value of their own labor), which may have been a necessity to many. Also, sweat equity is not taxed as income unless the house is sold.

Obtaining data on the informal sector is not easy. Official government statistics often fail...
Table 1. Major Housing Finance Institutions, 1992

<table>
<thead>
<tr>
<th>Feature</th>
<th>Commercial Banks</th>
<th>FOVI</th>
<th>Pension Funds</th>
<th>Public Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lending (U.S.$ millions)a</td>
<td>6,560</td>
<td>317</td>
<td>1,914</td>
<td>518</td>
</tr>
<tr>
<td>Lending share (%)</td>
<td>70.5</td>
<td>3.5</td>
<td>20.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Total number of credits</td>
<td>129,362</td>
<td>24,638</td>
<td>126,611</td>
<td>112,444</td>
</tr>
<tr>
<td>Main type of housing financed</td>
<td>High-cost</td>
<td>Finished houses</td>
<td>Severalb</td>
<td>Serviced lots/core houses</td>
</tr>
<tr>
<td></td>
<td>finished houses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical cost of housing unit</td>
<td>18,000</td>
<td>10,000–20,000</td>
<td>11,000–20,000</td>
<td>2,000–10,000</td>
</tr>
<tr>
<td>(U.S.$)</td>
<td>and up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominant employment status</td>
<td>Salaried</td>
<td>Salaried</td>
<td>Salaried/</td>
<td>Nonsalaried</td>
</tr>
<tr>
<td>of home buyer</td>
<td></td>
<td>contributor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly income of</td>
<td>Above 5</td>
<td>3–6</td>
<td>2–8</td>
<td>Below 5</td>
</tr>
<tr>
<td>primary beneficiary group</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(multiples of minimum wage)</td>
<td></td>
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</tr>
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a Exchange rate 3,2000 pesos per dollar.
b Includes credit for raw and used dwellings, construction on own land, home improvements, and syndicated financing.

To recognize the existence of some parts of this market, so data are not reported. Further, we suspect that there are severe limitations on the development of the informal credit market because the foreclosure process—which is not simple in the case of the formal market—can be especially difficult in the case of housing finance. Housing is not fungible or liquid, and enforcing foreclosure rights can be extremely difficult where the formal market for credit has been avoided. See Ward (1990) for a more complete discussion of the informal housing and housing finance markets in Mexico.

Summary of Housing Finance

In summary, the housing finance system in Mexico is segmented in a way that provides a degree of access to housing for a broad spectrum of socioeconomic groups. Commercial banks finance high-cost, finished housing in the range of U.S.$18,000 and up. FOVI funds moderate-cost finished housing (U.S.$10,000 to U.S.$20,000) for salaried home buyers in the low- to middle-income range, three to six times the minimum wage. FOVI, a part of the Central Bank, lends at CPP to home buyers acquiring new houses from home builders who have been the successful bidders for the funds. The pension funds, primarily INFONAVIT and FOVISSSTE, service a clientele similar to FOVI's, the low-to-middle-income group buying housing in the range of U.S.$11,000 to U.S.$20,000. The primary distinction is that the pension funds lend at favorable rates to their contributing union members and offer a wider range of options regarding the type and age of the housing purchased. The income range for the union pension funds is wider than others, two to eight times minimum wage. Finally, Mexico attempts to house the poorest of its citizens through the public housing agencies, which focus on nonsalaried individuals earning less than five times the minimum wage and acquiring serviced lots or core housing priced at U.S.$2,000 to U.S.$10,000. SEDESOL oversees all housing programs in Mexico.

Mexico has seen to it that the short supply of housing finance is allocated across the socioeconomic strata. The safety valve for the housing shortage has apparently been self-help housing for the low income and poor. Mexico's plan is to double the amount of financing available for housing and to significantly reduce the interest rate being paid for mortgage money. Mexico hopes that the creation of a secondary mortgage market will bring a larger supply of funds for housing finance and drive down mortgage interest rates.

COMPETITIVE MARKETS, INTEGRATED MARKETS, AND MEXICAN CAPITAL MARKETS

The Mexican banking system in general, and housing finance in particular, is not highly competitive. As statistics presented earlier in the article show, the system is highly concentrated. Because of the comparative lack of competition, banks do not experience intense pressure to operate as efficiently as possible, although they are plainly making strides in implementing information systems and cost control. Estimates suggest that
operating costs in the banking system are on the order of 200 basis points higher than those in developed economies, and our estimates of the real costs of mortgage loans are consistent with inefficiency and lack of price competition. In fact, one manifestation of lack of competition is the absence of pressure to reduce costs. The wide variety of loan types available in the market suggests competition in offering financial instruments with varying features, but that competition does not appear to extend to the pricing arena. In fact, such variety may serve (among other purposes) to confuse the borrowing public, making the comparison of loan terms extremely complex.

In interviews with various industry officials in Mexico, we were repeatedly told of the difficulties of obtaining reliable credit histories on loan applicants. Banks were said to be unable to obtain information on a borrower's credit history at other institutions. In fact, some claimed that even an applicant's record with the same bank at which he or she was applying for a mortgage might be inaccessible in a credit review. Furthermore, more than 50 percent of Mexico's workers are thought to receive their income from "informal" sources, for which there is no formal accounting, so incomes are difficult to verify.

Given the lack of sound information on the creditworthiness of borrowers, it is natural for mortgage rates to be relatively high. Consider the Akerlof (1970) "market for lemons" argument. In a market in which borrowers are unable to distinguish themselves in terms of credit quality, lenders will tend to price mortgages to reflect the average quality of all borrowers. It may even be difficult to measure reliably the average quality of borrowers, so that risk-averse lenders might increase the cost of credit above the value appropriate for the expected value of average quality. With such high rates, borrowers of especially high quality might withdraw from the formal housing finance market, leaving a mix of borrowers of relatively low quality. Given the empirical fact of low-quality borrowers, lenders will adjust rates even further, resulting in further withdrawal of the relatively high-quality borrowers from among the remaining set, and so on. In the end, the market will consist mostly of low-quality credit risks ("lemons" in terms of credit quality) who are appropriately charged high mortgage rates. In other words, high real rates can be a natural product of a lack of information in the credit system. The market will be smaller than would otherwise be the case.

One would expect that in such a setting a given bank could obtain a competitive advantage by developing information systems superior to those of the other banks. Acting against this development is the high cost for a single institution of developing its own credit information-gathering system, which would also require cooperation by competing institutions. The solution in the United States is specialized credit information services that aggregate information and provide it system-wide. Such specialized institutions can spread the fixed costs of setting up their credit reporting systems across a number of institutions. For a single bank, the startup costs of developing a competitive edge in that area in Mexico might simply be prohibitive. The ability to be profitable in the absence of such systems (by charging high real rates) may reduce the incentives to develop the market further.

Mexican banks were nationalized in 1982 during the debt crisis. From that point until they began to be reprivatized in 1991, the banks lacked the infrastructure to manage adequately the mortgage lending process and the process of maintaining credit information. Spokespersons for various agencies suggested to us that the system is still about two years away from implementing the systems needed. Also, since economic conditions and policies in Mexico have changed dramatically in recent years under the Salinas government, historical data are relatively useless for inferring the quality of credits that had been previously granted. The relevant data period may be as little as two to four years.

When real rates of return are very high in one nation compared with others, all else being equal, capital is attracted to the nation with high rates. Hence, capital is naturally attracted to Mexico by the high real rates of mortgages. However, the information problems described above, government restrictions against the operations of foreign banking institutions, and concerns about legal and institutional circumstances in Mexico create risks and impediments that restrict capital market integration. Even under the proposals of the North American Free Trade Agreement (NAFTA), competition from foreign banks would be highly restricted.

Another factor affecting foreign entry into the market has to do with currency valuation. The Mexican peso (the new peso) is not a free-floating currency. Rather, government policy controls the value of the peso (in U.S. dollars per peso) and keeps it within a band whose lower bound declines in a gradual "crawl." The exchange rate from December 1988 through December 1992 is shown in figure 4. The lower curve in the figure reflects the value of the peso based on the application of purchasing power parity (PPP) to the peso, beginning with the end-of-1988 value of $0.438. The PPP value is computed by taking the initial value, multiplying by the U.S. CPI (from a base of 1.00 on December 31, 1988), and dividing by the Mexican CPI (from a value of 1.00 on December 31, 1988). We note a deviation of the official exchange rate from its PPP-estimated value so that by the end of July 1999 the official rate was $0.32 whereas the PPP rate was $0.249. On that basis, the peso was "overvalued" by 28.5 percent in July 1993.

Thus, on a PPP basis, foreign lenders who wish to invest in Mexican credits have to confront the very real risk of a significant devaluation in the peso, although government officials offer assurances that such a devaluation will not occur in the near future. On the other hand, Mexico has greatly improved its macroeconomy, and capital flight has been dramatically reversed. Further,
massive capital inflows in the form of foreign investment in Mexico and in Mexican securities have occurred in recent years.¹⁹ Such flows can cause a real increase in the value of the currency (i.e., the "real" value of the peso or new peso is logically above that implied by a simple PPP analysis; see Corbo and Hernández 1993). The band in the values at which policy makers will buy pesos instead of selling pesos had a spread of around 9 percent in early 1994, and this was approximately the percentage by which members of the investment banking community had suggested the peso was overvalued.²⁰

While short-term coverage of the peso value is possible through the cobertura (hedging) market, such coverage is not without cost, and the overhanging peso valuation problem represents an impediment to the flow of capital into peso-denominated mortgages.²¹

In sum, the Mexican housing finance market is not highly competitive, and foreign competition is not apt to be the solution in the near term. While the Mexican banking system has recently been deregulated to a high degree, impediments remain that limit the system's ability or incentives to provide mortgages at lower real rates of interest.

SECURITIZATION OF MORTGAGE LOANS

There is a great deal of interest in developing a market for mortgage-backed securities (MBS) in Mexico. Both inside and outside Mexico, market participants are interested in participating in securitization, which could channel more funds into the system. As background for a discussion of the prospects for securitization in Mexico, in this section we describe the general requisites for the development of MBS, and in the following section we discuss those requisites in relation to circumstances in Mexico.

Securitization of mortgages refers to the creation of MBS. In essence, a pool or portfolio of loans is developed and used to support the issuance of one or more types of securities. The sale of the securities generates cash flow back to the originator of the pool, which can then use the funds to create additional loans. Thus, the process renews the availability of funds originally loaned out.

Creating portfolios of loans can greatly reduce the risk of investing in a single mortgage loan. That risk includes not only the risk of default and/or the risk that an appraised value is erroneous (and insufficient to cover default), but also the risk of prepayment. Further, the pools are arranged and serviced by specialized institutions that are capable of doing so at low cost. Thus, for example, an individual who could not invest in a single mortgage because of the high costs and risks of doing so can invest an equal amount of money in a diversified portfolio of mortgages that manages the individual loans efficiently. The investor does not need specialized expertise in loan origination, servicing, or, in the event of default, disposing of the resulting property. Typical MBS in the United States consist of mortgages that receive guarantees from institutions such as Fannie Mae or the Government National Mortgage Association (GNMA) that effectively eliminate the effects of default. Finally, the timing of cash flows can be smoothed out by participating in a piece of a large portfolio rather than owning a single mortgage.

Further, a pool of mortgages can be broken into distinct packages that have identifiable characteristics. For example, an investor who wants to avoid prepayment early in the life of the investment can participate in a tranche consisting of those mortgages that are prepaid last, if at all. In essence, portfolios can be tailored to fit the needs of a variety of investors, a feature that attracts additional capital.²²

Sharpe (1992) describes critical elements for securitization, and Brueggeman and Fisher (1993) discuss prerequisites for such a market. Diamond and Lea (1993) also discuss conditions that enable MBS to function, and Roberts (1993) and Finnerty (1993) discuss benefits provided by MBS. Among other fac-
itors, there should be a need for such a market. The discussion above shows how MBS can reduce risk and increase the flow of funds into the mortgage finance sector, and there is a need to reduce risk and to attract funds in Mexico. A second point is that MBS should be encouraged when there is a need to facilitate a geographic flow of funds. In the case of Mexico, the lack of integration with international capital markets and the resulting high real interest rates suggest the need for a geographic flow of funds from foreign capital markets.

It is essential to issue mortgages that are of uniformly high credit quality and performance. There has to be the perception of such quality (in addition to its existence). The securities in such pools need to be standardized in terms of many of the features of the loans, including quality of the documentation as well as the obvious terms of the loans themselves. It must be possible to carve the portfolios into tranches that can be tailored and marketed to specialized elements of the investor community.

Many authors emphasize the need for guarantees such as those provided by Fannie Mae and GNMA in the U.S. market. In some countries, private mortgage insurance has been successful in supporting MBS activity (see, for example, the discussion of the Australian case in Richardson 1993). These guarantees allow the creation of MBS of very high quality. While it is not necessary that such guarantees be provided by government or pseudogovernment agencies, it is essential that they be offered by a very credit worthy source. In the United States, the market for MBS backed by private insurance is still quite small relative to that part of the market backed by guarantees from GNMA, Fannie Mae, and Freddie Mac.

A point that is sometimes missed (perhaps because in highly developed markets data are assumed to be present) is that data are needed on default and prepayment. In other words, it must be possible to estimate the properties of the various tranches of a pool, and estimation requires excellent data. This is especially true for prepayment characteristics.

Diamond and Lea (1993) point out that there must be no subsidized alternatives to MBS that make MBS uncompetitive as a source of funds. They also point out that, since MBS are advantageous in large part because they reallocate risk, they will not be common in markets in which risk bearing is subsidized. Finally, they emphasize the importance of complete contracting technology, which would include the enforcement of contracts.

It is critical that no taxes be imposed on the mere swap of funds entailed in an MBS. Accounting or tax implications will hinder the development of the market.

Additional elements include the need for high-quality services for hazard and title insurance. These services are essential to ensuring the quality of the loan portfolio. Similarly, highly standardized and reliable appraisal and credit measurement systems must be in place.

It is of course essential that a quality servicer be part of an MBS deal. The servicer must operate efficiently, at low cost, so that a minimum of the income from the mortgages is lost in the system. In the United States, mortgage loan servicers are normally paid between 0.25 and 0.5 percent of the loan balance.

In sum, there are many requisites for a smoothly functioning MBS market. In the next section we discuss those requisites in the context of the Mexican housing market and housing finance system. We will see that a number of critical elements are missing or are in a state of flux and/or uncertainty.

PROSPECTS FOR SECURITIZATION IN MEXICO

The prospects for securitization in Mexico exist, but there are formidable impediments to overcome. The Mexican mortgage market contains more risk and uncertainty than those of other countries with MBS, and the infrastructure is severely lacking. The general areas of deficiency are product standardization, legal and tax issues, and information on credit and mortgage behavior characteristics. Furthermore, the characteristics of Mexican mortgages reduce the need for some of the more sophisticated risk-allocating mechanisms.

Product standardization is a serious problem in Mexico. Mexico's mortgage lending industry has evolved in a very different environment from that in the United States. The U.S. mortgage industry is characterized by standardization of all aspects of mortgages, including underwriting, loan terms, documents, appraisals, building design, and minimum construction standards. Standardization has been imposed on the U.S. market by the Federal Housing Administration or the Department of Veterans Affairs for government-insured or guaranteed mortgages and by Fannie Mae or Freddie Mac for conventional loans. High loan-to-value ratio mortgages (above 80 percent) always carry some form of default insurance. Mexico, by contrast, has very little standardization. No government agency or institution dictates the standards in Mexico. Each of the 18 banks sets its own standards for underwriting, mortgage terms, contracts, and other documents. Not only do loans differ between banks, but loans with very different terms are available even within one bank.

Possible solutions derive from the fact that each of the two largest banks, Banamex and Bancomer, funds more than 50 percent of the market. Currently they each offer many types of mortgages, but if either were to develop standards tailored to attract both borrowers and MBS investors, they would probably set the pattern for mortgage standards in Mexico. It is conceivable that mortgage standards set by one of the two big lenders, if embraced by the secondary market, could emerge as the
standard for the industry. If securitization brings more capital and lower interest rates, market forces would encourage all lenders to comply with the standards. In 1992, Banamex and Bancomer each originated more than U.S.$150 million in residential mortgage loans per month. Either bank could independently supply enough mortgages to warrant securitization. With help and input from the investment community regarding desirable standards for Mexico, the standardization problems could be overcome rather quickly.

Obtaining information on credit and mortgage behavior is a difficult problem, but it too can be solved. Payment history on credit cards is available now. This service can be expanded to other forms of credit. If outside entrepreneurs fail to develop an acceptable credit information service, then the banks would need to create an association for sharing credit information. With strong leadership, such a system could be in place within a short time.

History on default and prepayment does not exist because the mortgage industry in Mexico was reborn so recently. Only time will provide more historical data. There is a need to collect information and make it available, and mortgage lenders should put in place the systems to collect and maintain such information. Currently, the lack of information and the accompanying risk and uncertainty are being compensated for by the high return on investment available in Mexico.

Tax issues regarding investment in Mexican mortgages are a problem, with or without securitization. First, there is the problem of taxes due on interest accrued but not yet paid. This is especially problematic because of the DIM. Contemporary Mexican mortgages normally accrue a portion of the interest owed. Taxation of earnings not yet received is excessively burdensome and counter-productive in a country lacking investment in mortgages. Banamex has addressed this issue with a mortgage scheme it calls “Espacios.” Espacios are mortgages in which the debiting rate is below market early in the life of the mortgage contract and above market later in the life of the contract.

The second tax problem in Mexico is the 15 percent withholding tax on interest paid to foreign investors. The market merely passes this tax on to the borrowers in the form of higher interest rates on mortgages. NAFTA would minimize this problem by reducing the taxes U.S. investors pay to less than 5 percent, at which point the expense becomes tax deductible under the U.S. tax code (Cleary, Gottlieb, Steen & Hamilton 1993). These are serious problems for the prospects of securitization, although in Mexico such problems can be legislated away quickly if the government desires to do so.

The variable rate of Mexican mortgages effectively deals with some of the risks mortgage investors would otherwise face. For example, prepayment is less an issue with variable rates because principal payments will be reinvested at current rates, which are more or less mimicked by floating-rate mortgages. Prepayment introduces a risk primarily because the spreads in mortgages, which seem high at present, might decline in future mortgages (i.e., there is a basis risk in the present economic environment).

In addition, variable rates address the asset-liability gap created by fixed-rate mortgages and variable-rate sources. However, on a cash flow basis, a problem remains in that the dual-rate Mexican mortgages produce cash flow at a rate different from the income rate of the mortgages. In fact, this point introduces a complication in the establishment of MBS with planned or targeted amortization classes that would require the use of alternative classes to absorb the payment volatilities.

The fact that a sizable fraction of the housing finance offered in Mexico is subsidized also reduces the demand for and competitiveness of MBS. Of course, as shown in table 1, the bulk of mortgages (in terms of mortgage values rather than number of mortgages) are provided by the banking system rather than through agencies.

There is the issue of guarantees by a very credit worthy source; participants in the U.S. market have become accustomed to credit enhancement. The Mexican government and the Central Bank have said that they would not provide credit enhancement for the mortgage industry, but recently the Central Bank has begun offering guarantees out to 20 years on FOVI loans, perhaps suggesting a general softening of the position of the government or the Central Bank. The private banks are currently prohibited by law from offering credit guarantees. Other countries, including the United States, are issuing MBS with third-party credit enhancement and/or overcollateralization and senior/subordinated issues in addition to (or in lieu of) government guarantees. Thus, there are avenues to credit enhancement in the absence of a government agency empowered to assume the risk.

Exchange rate risk is one of the bigger issues in the minds of Wall Street investment bankers. Our preliminary analysis of interest rates in Mexico indicates that they may carry a risk premium for the possible devaluation of the peso in relation to the dollar. If, in fact, the exchange rate risk premium is being paid by Mexican borrowers, solutions abound. The most obvious solution would be to pass the premium through, which would allow foreign investors to either self-insure or use the funds to purchase protection in the futures markets. If the premium is not being paid, or is only partially paid by borrowers, investors could gain some protection by taking positions in the more senior tranches of MBS, thereby limiting exposure to the short run.

In sum, there are significant impediments to the evolution of MBS in Mexico. However, government willingness to change the laws that inhibit development of a secondary market and the apparent willingness of borrowers to pay

HOUSING FINANCE INTERNATIONAL 13
high interest rates, which compensates for the high risk and uncertainty in that market, should result in the development of a secondary mortgage market for Mexico in the near future.

CONCLUSIONS

Mexico is characterized by an extreme shortage of housing, especially for low-income persons, and that shortage is growing. Real mortgage interest rates are high, seemingly creating an opportunity to attract foreign capital. One method for attracting such capital is to create portfolios of mortgage loans that could reduce the risks of investing in the Mexican housing finance system. Presently, serious impediments make the implementation of MBS problematic.

Legal impediments include the difficulty in transferring a security interest and the excessive time required for foreclosure. Tax code problems include the taxation of accrued interest and the 15 percent withholding tax on interest paid. However, if the government decides that a secondary market is needed, any legal and tax problems can be swept away by federal legislation.

Infrastructure problems are more difficult to overcome. Today in Mexico, credit reporting on individuals is costly and inadequate, record-keeping by the smaller banks is poor, and data on default and prepayment have too short a history and apparently have not been collected properly by some banks. Logic suggests that one of two sources will need to take the lead in providing the information infrastructure. Either the independent credit agencies will have to convince the banks to contribute credit information, or the banks will have to create an association to collect and share credit data. Either alternative could be accomplished in one or two years with some leadership from the two big banks, the bankers' association, or the Central Bank.

Standardization is particularly important to the securitization process. Uniformity and standardization are needed in underwriting, appraisal, documentation, construction, and especially in mortgage terms. The big banks are large enough to set standards for lenders wishing to deliver mortgages to the securitization industry. Jointly, Banamex and Bancomer originated more than U.S.$4 billion (Comision Nacional Bancaria 1993) in mortgage loans in 1992. Since the two banks together can generate more than U.S.$300 million per month in mortgages, they should have sufficient volume and market presence to establish standards acceptable for securitization.

The mechanics of designing MBS without excessive risk and uncertainty will be a challenge, especially given that market participants are accustomed to viewing at least some tranches of MBS as practically risk free. There are some virtues in Mexican mortgages that should help solve most of the problems. Nominal peso payments on some common categories of DIMs only go up. Also, the nominal interest rates are high and are adjusted to maintain the real peso purchasing power of the loan balance. Therefore, it should be possible to design MBS that have sufficiently predictable cash flows and compensate most foreign investors for exchange risk. In sum, it seems feasible to design MBS of acceptable quality and marketable at reasonable rates of return using mortgage contracts similar to those now offered in Mexico.

The Mexican government has macroeconomic concerns that may prevent it from encouraging development of additional capital sources in the short run. Because of the real appreciation of the peso and the dramatic increase in recent years of capital inflows into Mexico, policy makers are concerned about overheating the economy. Control of inflation is the primary economic goal. So the government may be reluctant to encourage an activity that, on balance, further increases the pressure on the monetary system.

Another open question is, "Are there sufficient incentives for all the required participants?" The government has incentives to provide more affordable housing opportunities, which can help to reduce some of the social and economic problems of the Mexican people and thereby contribute to the political stability of the country. Investors in MBS need only an attractive return for the level of perceived risk involved. It appears feasible to create such an incentive for MBS investors. The big question mark is the banks. Will they see securitization to be in their best interests? The gains they are earning now on mortgages appear to be sizable. Since the domestic banking system has a near monopoly on mortgage lending, and two to four banks dominate, where is their incentive?

One answer to the banking question might be banks' ability to lever their economic rents through the attraction of more capital, if indeed the high risk rates we have observed reflect economic rents. To the extent that returns are positive on a risk-adjusted basis (and we cannot yet be sure), the securitization of loan portfolios and sale of those portfolios at normal risk-adjusted levels can create capital inflows that can be reinvested to take more of the available rents. Clapham (1993) calls this process "synthetic capital production." In fact, this very process can ultimately eliminate the rents themselves. However, a major institution or group of institutions that could develop superior contracting technology, servicing ability, and credit origination might greatly expand its market share without thereby eliminating the rents associated with its efforts.

We cannot be sure whether the real rates we have observed in Mexico are excessive on a risk-adjusted basis. To answer that question, we must first identify and price all the risks that are implicit in such mortgages. Obviously, there are risks in the Mexican environment of today that are not present to such a degree in the United States, so direct comparison of U.S. real rates with those in Mexico is not meaningful. Those risks include currency risk,
uncertain credit quality, uncertain housing values, uncertainty in the future index values that will be used to determine interest charges and payments, and some institutional risks. Are those risks systematic? Do they merit higher returns on an ex ante basis? Certainly, if Mexico is viewed as a closed economy, the risks are highly systematic. If Mexico is viewed as an open component of a global economy, they are less systematic. Thus, to the extent that the Mexican economic system continues to be liberalized and opened to foreign investment, we would expect to see the real cost of mortgages decrease, even without decreases in the risks themselves but rather with changes in the allocation of those risks. In fact, the reallocation of risk by itself, without increases in the amount of capital committed to the market, can reduce the required returns to investors. Securitization of mortgage loans can play a role in broadening sources of credit, and thus can help to reduce the apparently high costs of buying a home in Mexico.

NOTES

1 There are many variations in the types of mortgages offered in Mexico. Among other variables, the nature of the indexation itself varies, and these variations can affect the performance of the mortgages under various economic scenarios. See Barry, Castañeda, and Lipscomb (1993) for a discussion of some of these mortgage types and their risks.

2 The terms are variable for loans whose payments are indexed to inflation rates but fixed for loans that are indexed to interest rates. The great majority of the mortgages are indexed to dual indices. Mortgages indexed to an interest rate have different payment and debit amounts.

3 While some institutions in fact choose the maximum of the CETE and CPP rates, others also consider the cost of commercial paper, the TIPP (Tasa Interbancaria Porcentual Promedio, a rate that functions in Mexico much like the London Interbank Offered Rate [LIBOR] in the United Kingdom), bankers’ acceptances, and the BONDES (Bonos de Desarrollo, a type of development bond).

4 We encourage caution in the interpretation of the mortgage rate data, since it is based on a very limited sample from a single bank. The values reflect the floating-rate values at which monthly loan balance calculations are made.

5 To calculate the real mortgage rates, we take the annualized nominal rates and inflation rates provided by Softec, and we compute the real rate as

\[
\text{Real} = \frac{1 + \text{Nominal}}{1 + \text{Inflation}} - 1.
\]

6 Although the adjustment does not capture the real rate every month, it does adjust on an annualized basis.

7 We note that mortgage debit rates are determined by adding a fixed number of basis points (the spread) to the leader rate, as specified in each mortgage contract. If the market softens and the spread declines, mortgagors will have an incentive to prepay and refinance in order to contract for a lower spread.

8 Terrington (1993) notes that statistical analysis of mortgage market data is lacking also in the U.K. housing market, but that mortgage-backed securities have been developed in spite of that shortcoming.

9 The information presented under this heading was derived from notes provided by Softec, a consulting firm in Mexico City.

10 Historically, the government has chosen to limit the number of notary licenses it issues. The notaries serve the functions of collecting property transfer taxes on behalf of the government and registering the property and documenting its transfer.

11 Secretaría del Desarrollo Social (Secretariat for Social Development), a powerful government agency that administers housing policy.

12 Instituto del Fondo Nacional de la Vivienda para los Trabajadores (Institute of the National Housing Fund for Workers).

13 Fondo de la Vivienda del Sistema de Seguridad Social de los Trabajadores del Estado (Housing Fund of the Social Security System for State Service Workers).

14 Fondo de Habitaciones Populares (Fund for Low-Income Housing).

15 "Acquiring a site" may not have the connotation it appears to have: It does not always mean "buying a site." In the informal sector, individuals may merely "invade" a site, occupying it illegally and constructing a home on it. A person who occupies a site long enough is ultimately granted the right to stay.

16 In an article on the effects of NAFTA on the Mexican banking system, Gruben, Welch, and Gunther (1993) conclude that it will not be easy for foreign banks to compete in traditional lending areas even under NAFTA. During the phase-in period (from 1994 to 2000), foreign banks would be restricted to 8 to 15 percent of the assets of the banking system, and the authors conclude that even after 2000, foreign banks will be unable to compete effectively in primary lending areas.

In March 1994, however, the Mexican government announced that it would begin accepting applications from foreign banks and that the banks that were accepted for entry into the market would be granted the same rights and privileges as Mexican banks. Early expectations were that 25 foreign banks would apply. It remains to be seen how this apparent change in policy will affect Mexico's banking structure.
17 Corbo and Hernández (1993) describe the peso devaluation scheme in detail. Basically, the value of the peso is reduced by a constant amount each day. In stages, as inflation has been gradually brought under control, the upper bound on the value of the U.S. dollar in pesos has been raised by 1 peso per day, then 0.8 pesos per day, then 0.0004 new pesos per day, then 0.0002 new pesos per day, and finally back to 0.0004 pesos per day.

18 Central bank officials assert that the Mexican economy is so “dollarized” that the effects of a devaluation would be adjusted away within six months’ time. Hence, they argue, an abrupt devaluation would not be effective in adjusting the value of the peso.

When presidential candidate Donald Colosio was assassinated in March 1994, the peso fell sharply in value relative to the dollar. After two weeks, the peso settled out at a decline of about 9 percent.


20 Conversation with Latin American specialists at Goldman Sachs, New York, in the summer of 1993.

21 Leahy (1993) describes the operations of the cobertura market, the Mexican market for futures transactions in the peso.

22 Stone, Zissu, and Lederman (1993) offer a number of articles that describe alternative types of MBS, the process of designing asset classes that suit particular investors’ needs, and the effects of MBS on a variety of risks faced by investors in mortgages.

23 One exception is FOVI loans, but they are only 3.5 percent of the market, and FOVI loans are issued at below-market interest rates.

24 Something similar to this took place in the United States when Fannie Mae issued its guidelines for conforming mortgages. Almost every conventional mortgage lender began to originate only conforming loans.

25 These comments are based on interviews with the Latin American investment groups of Goldman Sachs and Merrill Lynch in New York on June 10, 1993.

REFERENCES


