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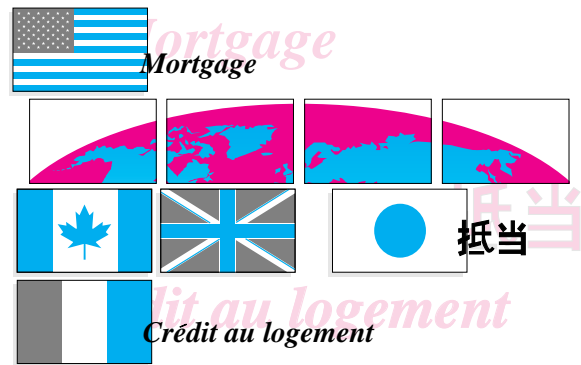
SECONDARY MORTGAGE MARKETS

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You Say Mortgage, I Say Cr dit au Logement

Loans Around the World



by Ellen P. Roche

PEOPLE THE WORLD OVER SEEK THE SECURITY AND CERTAINTY OF homeownership. Realizing that ambition, though, presents a struggle for families virtually everywhere, given that a typical house can cost four, eight or 10 times what a household makes in a year. Many families simply do not possess sufficient funds to purchase a house with equity, that is, to pay with cash.

Debt financing has evolved as a nearly universal alternative to paying for a house outright before taking possession. The debt used to purchase a home goes by many names: *mortgage* in English-speaking countries, *financiaci n de la vivienda* in Mexico, 抵当 in Japan and *cr dit au logement* in France. All, though, refer to loans that allow a borrower to make many payments over time when the house is pledged as collateral.

Every housing-finance system struggles to create instruments that will efficiently finance the purchase of owner-occupied housing. The

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EXHIBIT 1: Dominant Mortgage Instruments by Country

	France	Japan	Mexico	United Kingdom	United States
Type	Fixed-Rate Mortgage	Government-Subsidized Mortgage	Dual-Indexed Mortgage	Reviewable-Rate Mortgage	Fixed-Rate Mortgage
Interest-Rate Adjustment Process	None	Fixed for 10 years then resets for 15 years	Mortgage balance indexed to market interest rate	Adjusts at lender's discretion	None
Down Payment	30% to 40%	40% to 50%	20%	20%	3% to 20%
Holds Interest-Rate Risk	Investor	Government	Government	Borrower	Investor
Holds Credit Risk	Borrower	Borrower and government	Borrower and lender	Borrower and insurer	Borrower, insurer, secondary market, investor

Sources: Michael J. Lea and Steven A. Bernstein, *International Housing Finance Sourcebook*, 1995; Douglas Diamond, Jr. and Michael J. Lea, "Housing Finance in Developed Countries: An International Comparison of Efficiency," *Journal of Housing Research*, 1992; *Housing and the Government Housing Loan Corporation*, Government Housing Loan Corp., 1996.

—Information compiled by Ellen P. Roche and Sheldon L. Pine.

nature of housing, the allocation of risk and the economic and institutional forces that shape a country all contribute to the critical design differences found among mortgages worldwide. As a result, a number of unique mortgage solutions, highlighted in *Exhibit 1*, have evolved. They address a variety of situations ranging from uncertain interest rates in the United Kingdom to **hyper-inflation**¹ in Mexico, high housing costs in Japan, lengthy foreclosure times in France and historical foreclosure losses and more recent financial deregulation in the United States.

One measure of any country's success in fostering a viable

mortgage-finance system lies in the homeownership rates achieved within its boundaries. The difficulty in purchasing with cash is underscored in *Exhibit 2*, which shows the median price of housing in major cities across the world relative to the median annual income level there. The homeownership rates convey the intensity of the desire to own a home despite this barrier. As expected, lower homeownership rates generally occur where the house-price-to-income ratio is high. For instance, only 45 percent of the Algiers, Algeria population owns a home that typically costs nearly 12 years of paychecks. Not every city,

though, fits that pattern because other factors also influence national ownership rates.

Ties That Bind, Forces That Differentiate

From a structural standpoint, houses remain much the same from country to country because they can withstand repeated use and generally are built to last 30 years or more. These characteristics make residential dwellings ideal **collateral** for long-term lending of up to 30 years.

The spatially fixed quality of housing, though, inspires international variation in mortgage instruments. The political jurisdiction in which a house is permanently located influences the economic

¹See glossary on page 24 for definitions of words highlighted throughout the article.

environment and, thus, the housing values and interest rates bound up in a mortgage's design. Location-specific laws also determine the ease with which an investor can acquire the property serving as collateral to satisfy an unpaid mortgage debt.

Addressing any nation's demand for homeownership through long-term financing requires capital provided by an investor either directly or through an intermediary. Under either arrangement, the borrower promises to compensate the investor with a risk-adjusted rate of return, as well as to repay the sum advanced, at the risk of losing the house if unable to do so. In countries that have adopted a simple model, the investor and the lender are one and the same. In countries with more developed housing-finance systems, one or more intermediaries share in the risks and returns with investors. Specialization has given rise to contributing roles played by **securitizers** like Freddie Mac, **mortgage insurance** firms, **mortgage wholesalers**, **mortgage brokers** and **securities traders**.

Spreading the Risks

Uncertainty about interest rates and the future value of real estate influences lending practices from country to country; mortgages serve as mechanisms for allocating these risks between borrower and investor. Those who need capital pay the investor

EXHIBIT 2: Housing-Finance Indicators in Selected Cities Worldwide

	House-Price-to-Income Ratio	Homeownership Rate
Algiers, Algeria	11.7	45%
Bogota, Colombia	6.5	62
Helsinki, Finland	3.7	63
Melbourne, Australia	3.9	73
Monterrey, Mexico	3.7	83
Munich, Germany	9.6	17
Paris, France	4.2	43
Tokyo, Japan	11.6	40
Toronto, Canada	4.2	60
Washington, D.C., U.S.A.	3.9	61

Note: Median figures are used to calculate the house-price-to-income ratios.
 Source: Stephen Malpezzi and Stephen K. Mayo "Housing and Urban Development Indicators: A Good Idea Whose Time Has Returned," *Real Estate Economics*, 1997.

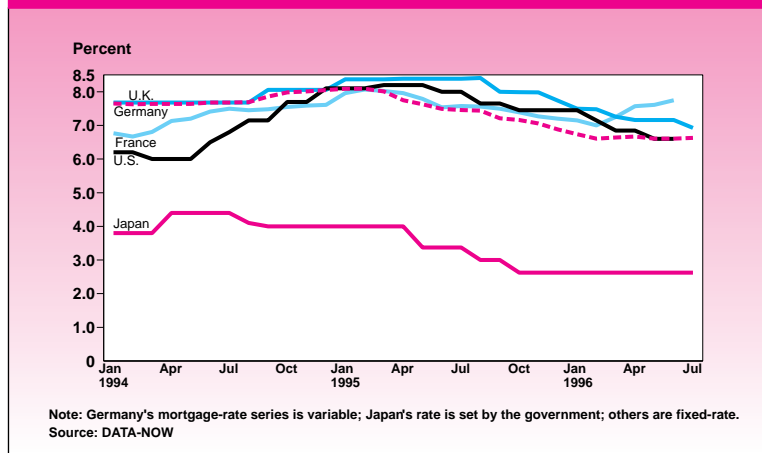
less when they shoulder some of the risk. Similarly, those who supply capital or otherwise contribute to the housing-finance system receive returns commensurate with the risk they absorb.

The danger of losing money on a mortgage takes two forms: **interest-rate risk** and **credit risk**. Borrowers can assume some or all of either risk. In a simple system, the investor (also possibly acting as lender) absorbs both. With more specialization, though, the idiosyncratic nature of credit risk often shifts this exposure to another player in closer proximity to the borrower and the property from an information and risk-assessment standpoint. In contrast, interest-rate risk is typically born by the underlying investor because this risk, determined by the capital market, is generally uncontrollable (outside of making offsetting investments to hedge interest-rate changes).

Interest-rate risk plays a large role in mortgage design, especially in the United States, because the longevity of a mortgage investment increases possibilities for borrower prepayment. The investment's long shelf life also provides more opportunity for interest rates to change by enough to cause a decline in the investment's value. The macroeconomic policies of national governments also figure prominently into interest-rate variability. Mortgage rates may change not once but many times over even a brief period in the life span of a mortgage, as the experiences of several countries demonstrate (*Exhibit 3*).

When a borrower pays a fixed rate of interest, as is often the case in the U.S., the investor assumes the risk that interest rates will change. Locking into a fixed income stream from a mortgage results in two potential costs: **funding risk** and

EXHIBIT 3: Mortgage Interest Rates by Country



prepayment risk. When interest rates rise, the funding risk of fixed-rate mortgages grows in that an investor's cost of funds may go up unless the **duration** of the mortgage and funding are well matched. Alternatively, the revenue thrown off by the mortgage may lose its appeal as higher-yield opportunities become available. On the other hand, falling interest rates increase prepayment risk. An investor loses a premium asset when a borrower elects to pay off a mortgage early in order to refinance into a lower rate.

With other mortgage designs, the interest-rate risk resides with borrowers. This is the case with the reviewable-rate mortgage in the United Kingdom, the rollover mortgage in Canada and the adjustable-rate mortgage in the United States. Borrowers choosing these loans benefit from a lower initial rate, but lose relative to fixed-rate-mortgage borrowers when climbing interest

rates drive the floating-rate payments higher. A significant interest-rate upswing increases the odds that a borrower will no longer be able to afford the payments, leading to the second type of investment exposure known as credit risk.

Counting on Housing Values

Credit risk results from the possibility that the borrower will default and the proceeds from a foreclosure sale of the collateral then will prove insufficient to repay any outstanding mortgage debt and related expenses. Typically, lenders and those providing credit enhancements such as mortgage insurance take on the credit risk. However, borrowers also bear credit risk in the sense that they lose equity as the result of foreclosure. When a mortgage's design adds to the size of a borrower's potential loss through a larger down payment, then, in effect, the credit risk to the borrower has increased.

Mortgage lending is considered less risky with respect to credit risk than other types of personal and commercial lending because housing is highly valued as collateral and usually retains its value over time. In addition, families need a place to live and often form an emotional attachment to their homes, further reinforcing the safety of this collateral.

Variability in house-price conditions can influence the magnitude of credit risk. Higher appreciation rates tend to reduce credit losses when the collateral becomes worth substantially more over time than it was when the mortgage was originated. Conversely, house-price reversals undermine the collateral's value, thereby increasing the likelihood of default and credit losses.

Credit risk is also a function of the ease with which a country's laws and procedures allow an investor to redeem a pledged property. Under a difficult or time-consuming foreclosure process, the value of housing as collateral deflates, credit risk expands and investors demand higher returns. Some mortgage designs keep credit risk in check by shifting it to the borrower in the form of larger equity contributions. In countries like France and Italy, where the legal hurdles can make an investor wait several years to foreclose on a property, down payments of 30 percent to 40 percent are common.

Another means of diverting some of the credit risk to borrowers is through mortgage insurance. Although this insurance covers an investor's default losses, the premiums are paid by the borrower and are typically viewed as a trade-off against making a larger down payment.

Scanning the Globe for Loan Variation

Lending practices in several parts of the world serve to demonstrate the range of similarities and differences in mortgage design spurred by the level and allocation of interest-rate and credit risks.

United Kingdom: Unscheduled Rate Changes

The **reviewable-rate mortgage** reigns as the dominant residential finance instrument in the United Kingdom. In this version of an adjustable-rate mortgage, the borrower shoulders most of the interest-rate risk. Whenever market rates change, the investor reviews the current mortgage rate and decides whether to impose a new one, unfettered by any constraints but competition.

The U.K.'s tradition of reviewing interest rates grew from an inability among the country's major lenders to access long-term funds. These lenders, called building societies, are roughly equivalent to U.S. thrifts. At the end of 1994, building societies held more than 60

British borrowers readily accepted reviewable-rate mortgages until turmoil in the economy ended a long run of stable interest rates.

percent of the mortgage loans outstanding in the U.K, according to the 1995 *International Housing Finance Sourcebook* by Michael J. Lea and Steven A. Bernstein. As deposit-taking institutions, building societies rely primarily on short-term monies to fund the mortgages they issue. These investors developed the reviewable-rate option to strike a better match between the cost of funding a mortgage over the long haul with the value of short-term assets in a rising rate environment.

British borrowers readily accepted reviewable-rate mortgages until turmoil in the U.K. economy ended a long run of stable interest rates. As part of the deregulation of the financial markets in the 1980s, the British government reduced several housing benefits paid to

consumers, including unemployment insurance on mortgages. The central government then tightened monetary policy, sending interest rates climbing and the economy into recession. Without the buffer of job-loss insurance to pick up the interest portion of monthly mortgage payments, many unemployed borrowers defaulted, and house prices subsequently declined.

With a growing demand for fixed-rate mortgages and newly legislated access to the capital markets for long-term funds, building societies now will issue fixed-rate mortgages, which transfer some of the interest-rate risk to investors. Reviewable-rate mortgages continue to dominate the housing-finance scene, however.

Mexico: Rate Indexing in the Extreme

Although the risks that confront Mexico's housing finance system are no different than elsewhere, the extreme economic conditions that gripped the country in the 1980s gave rise to yet another mortgage wrinkle. Mexico's banks, in cooperation with the national government, devised the **dual-indexed mortgage** in 1988 to confront the twin problems of hyper-inflation—running at 100 percent per year—and a recession brought on when oil prices dropped worldwide.

These two economic difficulties increased interest-rate

and credit risks at the same time. When investors put money into fixed-rate mortgages, they faced an immediate funding risk in the face of monthly rate hikes that exceeded annual rate increases in many other countries. Credit risk rose in lockstep with the job losses triggered by the recession.

A dual-indexed mortgage addresses these twin risks by tying the interest rate due on the remaining loan balance to a market-rate index while linking the amount of the monthly borrower remittance to movements in a minimum-wage-based index, according to José Manuel Agudo Roldán and Manuel Campos Spoor, who examined the loan program in detail in a 1992 *Housing Policy Debate* article. When the extra interest due exceeds the extra monthly payment amount the borrower must make, the shortfall is added to the unpaid balance. If a private investor originated the mortgage, this deferred interest is allowed to accumulate to a certain point, after which the borrower must begin paying down the total accrued. If a lending arm of the government issued the mortgage, and if the deferred interest precludes repayment of the original 20-year mortgage within 30 years, then the government will repay the remainder.

How the mortgage functions depends largely on the economic

The downfall of Mexico's dual-indexed loan was due to its implementation rather than its design.

conditions under which the two indexes interact. Some possible scenarios include:

- **Interest rates and wages hold firm.** If interest rates and the wage index remain constant over the life of the mortgage, then loan payments do not change, and loans pay off in about 20 years.
- **Rates and wages move together.** When inflation causes interest rates and the wage index to increase along parallel tracks, then the funding and credit risk will remain unchanged, residing with the investor. The borrower may face larger nominal payments, but the burden of the payments relative to the borrower's income stays the same.

- **Rates outstrip wages.** Shortfalls can occur when interest rates rise faster than the wage index, meaning loan amounts due will exceed the contract amount borrowers must pay each month.

The borrower bears the interest-rate risk under the privately originated version of the dual-indexed loan, while the government and the borrower share the risk in the government-backed plan. With either approach, the borrower and the investor share in the credit risk.

The Mexican dual-indexed loan is one mortgage experiment that faltered. Its downfall was due to the loan's implementation rather than its design. The Mexican government chose to use a wage index that couldn't keep pace with inflation. As a result, some banks began indexing the monthly payment to the inflation rate, essentially collapsing the dual-indexed mortgage into an adjustable-rate mortgage and shifting the interest-rate risk entirely to borrowers, many of whom defaulted following a 1995 inflationary surge. Despite its demise, the dual-indexed loan demonstrated how new mortgage design can minimize risk and facilitate borrowing and mortgage investment in different economic environments.

Japan: Government Agency Ensures Low Rates

An acute shortage of land creates unusually high housing costs in Japan, where the price of home-ownership consumes nearly 12 years' worth of a typical family's earnings. To ease this burden for middle-income families, the Japanese government functions as the country's major mortgage investor, originating long-term

risk, though, through down payments that are a high 40 percent to 50 percent.

France: Collateral Plays Hard to Get

In France, the most common mortgage product—a 15-year, fixed-rate loan—seems unremarkable on the surface. However, uncertainty about the value of the underlying property

product exists in the country. What's more, five years can elapse between the time a loan defaults and the time the investor succeeds in taking legal title to the property.

The high costs exacted by the foreclosure process carry implications beyond the high down payment requirement. For example, investors rely more on borrower credit reputation and

Crédit au logement



home loans at subsidized interest rates through the Government Housing Loan Corp. (GHLC).

The GHLC loan, which Lea and Bernstein report accounts for more than 40 percent of the country's mortgage activity, is technically an adjustable-rate instrument that changes once after 10 years by an increment that the government agency determines at the outset. The loan more closely resembles a fixed-rate instrument, though, when the government opts to set the same interest rate for the two loan periods. By accepting all of the interest-rate risk, the GHLC lowers the government-subsidized loan rate further still.

The GHLC mortgage leaves borrowers to help bear the credit

boosts the credit risk. As a result, borrowers must produce cash down payments of 30 percent to 40 percent of a home's value, based on research conducted by Douglas Diamond, Jr. and Michael J. Lea and reported in the 1992 *Journal of Housing Research*.

Investors hope to avoid the French foreclosure process by discouraging borrower defaults through hefty equity contributions. That's because investors there find it difficult to ascertain how much a property is worth before making a mortgage because there is no appraisal system. Nor, in the event of default, can investors look to mortgage insurance to absorb any of the loan losses as no such

capacity as a guarantee of repayment than they do on the collateral value of the property. Likewise, investors tend to limit the payment-to-income ratios they will accept. Consequently, the property collateralizes the debt only in a nominal sense; in reality, the mortgage more closely resembles an unsecured personal loan.

The United States: A 30-Year, Fixed-Rate Mortgage Tradition

The principles of risk apply equally to the United States, but specialization within the mortgage-investment community has resulted in residential-loan products that differ from the mortgage solutions fashioned in other countries.

Credit risk played a critical role in the rise of the 30-year, fixed-rate mortgage as the loan of choice in the American housing-finance system. The Great Depression proved the undoing of the once-prominent five-year balloon note. When these loans came due during that economic upheaval, borrowers typically could not obtain refinancing to extend their loan payments, and many lost their homes. The resulting house-price declines created such strong perceptions of credit risk that investors refused to take any chances associated with long-term lending. Rather than see borrowers forced to make still higher down payments to absorb this added risk cost, the U.S. government supported the development of mortgage insurance through the Federal Housing Administration (FHA) to disperse some of the credit risk. Private companies later moved into the mortgage-insurance business, as well.

Fifty years after the birth of the 30-year, fixed-rate mortgage, investors tackled the problem of interest-rate risk in the face of challenging economic conditions. High inflation in the early 1980s boosted the level and volatility of interest rates in a country accustomed to decades of stable rates. Depository lenders, as the traditional mortgage investors, found they could not manage this unfamiliar interest-rate risk and retreated from the 30-year,

Credit risk played a critical role in the rise of the 30-year, fixed-rate mortgage as the loan of choice in the American housing-finance system.

fixed-rate mortgage. In its place, these investors began offering adjustable-rate mortgages, which gave borrowers lower mortgage rates in exchange for higher interest-rate risk.

At the same time that some investors were experimenting with adjustable-rate lending, Freddie Mac helped forge a broader market for high-yield mortgage securities and debt issuances. The increasingly sophisticated investment vehicles attracted a new phalanx of investors—commercial banks, pensions funds and insurance companies—which were willing to accept the prepayment and funding risks of fixed-rate mortgages or that found ways to manage the risks through hedging instruments.

To insulate the new crop of investors from credit risk, Freddie Mac and Fannie Mae assumed

this risk position as the guarantors behind their securities. Concurrently, they worked to develop tools to minimize credit losses, including private mortgage insurance, automated underwriting and nationwide appraisal databases. The two secondary mortgage market firms now provide financing for about 40 percent of the conventional fixed-rate mortgages originated in this country.

Although the fixed-rate mortgage prevails in most economic environments, adjustable-rate mortgages grow in popularity and occasionally achieve dominance when interest rates are high and rising. Lured by savings of about 2 percentage points off the 30-year, fixed-rate mortgage when it stood at 9.15 percent in January 1995, borrowers flocked to adjustable-rate mortgages. As a result, ARMs commanded 59 percent of U.S. mortgage originations that month, compared to an average 33-percent share for the year when the 30-year, fixed rate averaged 7.93 percent. These two products, and hundreds of variations on the two themes, give U.S. borrowers a robust selection of mortgage choices.

The Perfect Mortgage(s)

Each country has produced, through a combination of economic and institutional influences, a mortgage response

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that meets the needs of many people. The resulting diversity of mortgage products illustrates the many different ways to finance the purchase of a house.

A housing-finance system can best meet the wide-ranging needs of borrowers and investors with an array of products that allows both parties to choose the level of risk most appropriate for them. Countries should consider how interest-rate and credit risks refract through their economic and institutional prisms when considering ways to increase the range of mortgage choices for borrowers and investors. **SMM**

Glossary

Collateral. In mortgage finance, the property that secures or guarantees the discharge of a mortgage obligation.

Credit Risk. The probability the borrower will default and the proceeds from a foreclosure sale of a house pledged to secure a mortgage then will prove

insufficient to repay any outstanding mortgage debt and related expenses.

Dual-Indexed Mortgage. An adjustable mortgage built around two variable indexes; the interest due on the remaining loan balance moves with shifts in market interest rates, and the borrower's monthly payment fluctuates with wage changes.

Duration. The length of time an asset or liability survives. The duration is shorter than the stated term if the investment is terminated early. The duration of a mortgage and its funding are well-matched if the expected durations are similar and both durations respond similarly to changes in interest rates.

Funding Risk. The probability that interest rates will rise, making it more expensive for investors to fund mortgages or more costly for investors to hold fixed rates of return when higher-yield opportunities become available.

Hyper-inflation. Extremely high rate of inflation, which generally is defined as greater than 10 percent per month.

Interest-Rate Risk. The probability that a change in interest rates will cause a decline in the value of the investment.

Mortgage Insurance. Credit enhancement paid by the borrower to reduce the credit risk to the investor. In the United States, mortgage insurance allows for the origination of mortgages with less than 20 percent down payments.

Prepayment Risk. The probability that falling interest rates will prompt borrowers to pay off their mortgages early, leaving investors unable to match the premium returns they had been earning on these assets.

Reviewable-Rate Mortgage. A mortgage issued at the prevailing interest rate but reset at a new rate, upon the investor's review, when market rates change.

Securitizer. An organization acting as an intermediary, typically buying individual mortgages from originators and then combining them into securities sold to end investors.

