

FOREIGN HOUSING FINANCE

America's unique mortgage finance system is facing renovation. The approaches of other developed nations may provide some guidance for reform.

BY RENEE HALTOM

On a June afternoon in 1795, a devastating fire broke out in a navy fleet warehouse on the outskirts of Copenhagen, Denmark. The fire burned for two full days, wiping out the city's oldest homes and leaving 6,000 residents homeless. It also gave birth to the mortgage bond system the Danes still use today, spurred by the imperative to rebuild.

The German system is even older. Frederick the Great introduced *Pfandbrief* bonds in 1769, after the Seven Years' War, to treat the resulting credit crunch facing Prussian nobility. European mortgage markets today are modeled on this system.

The U.S. housing finance system is similarly steeped in tradition. The policy stance has been explicitly pro-homeownership at least since the Great Depression, when the government began insuring mortgages to restart housing markets.

It is common for developed-country governments to intervene in the provision of housing services. Many have state-owned rental properties for example, and most have housing programs targeted to lower-income families.

Nearly every industrialized country also encourages the direct ownership of homes through tax breaks and other policies — but none does so to the extent of the United States. “Compared to other developed countries, only a couple come even close,” says economist John Kiff, who in April 2011 published a comparative analysis with colleagues at the International Monetary Fund (IMF). “You’ve got interest-payment deductibility, nonrecourse [mortgages] in some states, special protections in bankruptcy courts,” among other things, he says. Then there’s the support of mortgage finance by Fannie Mae and Freddie Mac, the creatures of statute known as government-sponsored enterprises (GSEs). “Everything you could possibly name for supporting homeownership for everybody regardless of whether they can afford it, it’s all in place in the U.S.”

Given that the United States pours relatively more public resources into promoting homeownership, one might

expect an obvious reflection in homeownership rates. This is not quite the case. At about 67 percent, the U.S. homeownership rate — defined as the ratio of occupied housing units that are owned by the resident — falls squarely in the middle of the pack among developed nations, although it should be noted that many factors affect homeownership, from rental policies to zoning regulations to intangibles such as culture.

By some measures, we actually perform worse. The United States experienced a greater percentage of mortgage defaults during the recent global housing market decline than any other developed nation, despite some occurrences of larger housing booms and busts elsewhere. About 8 percent of U.S. mortgages were in default at the end of 2010, down from almost 10 percent a year earlier. Countries differ in what legally count as mortgage defaults, or “arrears,” but according to local definitions, almost 6 percent of Irish mortgages were 90 or more days in arrears in late 2010. Spain and the United Kingdom trailed at about 3 percent and 2 percent of mortgages, respectively, and defaults in most other developed countries hovered below 1 percent.

Whatever benefits the government’s support of homeownership has bought for the United States, its costs are evident. The government has injected more than \$150 billion so far toward rescuing housing agencies Fannie Mae and Freddie Mac, whose support of the mortgage market resulted in record losses. U.S. housing policies heavily encourage consumers to build housing debt (as opposed to equity), which some data suggest may have helped to turn the unprecedented housing decline of the late 2000s into the major recession that followed (see sidebar on policies that encourage housing debt).

The need for reform is now a consensus, as illustrated by sweeping proposals offered by the U.S. Treasury and the Department for Housing and Urban Development (HUD) in February 2011. The focus of reform has been on creating a stronger role for private markets in mortgage lending, thereby reducing the GSEs’ footprint on mortgage markets.

While policymakers continue to debate the content and magnitude of reform, the housing policies of other industrial democracies provide insight into possible alternatives U.S. policymakers might consider.

Originate to Hold

If there's a single trend across developed countries in housing finance, it is revolutionary change over the last 30 years. As recently as the 1980s, mortgage finance was typically provided by specialized lenders and sometimes government-run institutions. Mortgage finance was cut off from the rest of the economy, write real estate economists Richard Green and Susan Wachter of the University of Southern California and the University of Pennsylvania, respectively, in a 2007 paper.

Contrast that with today: Mortgage markets are internationally linked through financial markets. Through deregulation, low global interest rates, and financial innovation, market-oriented commercial banks gradually replaced heavily regulated, state-owned, and government-rationed mortgage lenders after the 1980s. Stronger links between mortgage lending and capital markets enabled private lenders to meet the demand for mortgages, which was previously possible only with direct or indirect government subsidies. The result has been an explosion of mortgage growth in developed countries, an across-the-board surge in housing demand, and growth of house prices in the developed world, Green and Wachter write.

The links to capital markets take strikingly different forms in each country. The United States is among the best connected, relying primarily on securitization to fund mortgage lending. Here, lenders sell roughly 60 percent of all residential mortgages on the secondary market to raise funds for the next round of lending. A key perk of securitization is that the risks of lending — from interest rate fluctuations to borrower default — are passed on to savvy investors able, in theory, to assess and hedge accordingly.

This differs starkly from every other developed country. Only a handful have meaningful amounts of mortgage securitization; it made up about 30 percent of total mortgage debt in 2008 for the U.K., Canada, the Netherlands, and Ireland, among a few others. In fact, from Australia to Canada to most of Europe, lenders — typically commercial banks or specialized mortgage institutions — hold the majority of mortgages on their books and raise funds by other means. Most often that's through plain old bank deposits.

A big reason for the difference in the United States is the unique role played by the GSEs. Fannie Mae and Freddie Mac have existed as private entities since 1968 and 1970, respectively, to make mortgage credit cheaper and more available to homebuyers by buying up mortgages on the secondary market. They hang on to some of those mortgages as investments, and sell the rest to investors by packaging them into mortgage-backed securities (MBS), on which they pro-

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vide investors a payment guarantee for capital and interest.

The GSEs' impact on the U.S. mortgage market is enormous. At their precrisis peak in 2003, they were purchasing half of all new mortgages and owned or guaranteed more than 50 percent of all single-family residential mortgage debt. Their liabilities reached \$5.5 trillion in 2008, nearly equal to the total amount of U.S. government debt held by the public that year. In theory, their activities push mortgage rates lower, though empirical studies disagree on the extent to which that occurred.

By ensuring a rich demand for mortgages on the secondary market, the GSEs have made securitization a cheap funding source for U.S. mortgage lenders. It has been made even cheaper by the fact that markets have for decades assumed Fannie Mae and Freddie Mac to be implicitly backed by the U.S. government, and so have historically been willing to lend to them more cheaply. (This assumption was proven correct when GSEs' bondholders were protected from loss by the government in 2008 after the GSEs absorbed record mortgage default losses.) Some of the funding advantage provided by implicit government protection has been passed on to homebuyers, though Federal Reserve Board economist Wayne Passmore estimates that as much as half tended to be retained by GSE shareholders.

No other country has anything approaching the magnitude of what Fannie Mae and Freddie Mac do in the United States, according to Michael Lea, an expert on international housing markets at San Diego State University. “If we didn't have those entities issuing guarantees, then I think our markets would look more like other nations in terms of maybe only 20 percent of loans funded through securitization and the rest being held by banks.”

Growing Intrigue with Covered Bonds

To increase funding supply beyond deposits, many European mortgage lenders have turned to selling covered bonds. These are bonds backed by a pool of high-quality assets such as mortgages. They perform the same basic function as securitization — connecting mortgage markets with capital markets — but lenders in a covered bond system hold the mortgages on their books. European governments generally do not offer payment guarantees on mortgage covered bonds, though the European Central Bank, like the Federal Reserve and other central banks around the world, injected liquidity to support covered bond markets during the global financial crisis to the tune of €60 billion (about \$85 billion using current conversion rates). The Fed, in comparison,

injected \$1.25 trillion in liquidity to mortgage markets during the crisis.

Covered bonds date back to Germany's 200-year old *Pfandbrief* system. By the late 19th century, almost every European country had an active covered bond system. Their dominance waned for a time as deposits became more important and the influence of communism in Europe ushered out ties with capital market instruments. Germany revived the instrument in the mid-1990s.

Though deposits rule as a mortgage funding source in most developed countries besides the United States, covered bonds are a signature component of European mortgage markets. More than 300 institutions in over 30 countries issued €2.2 trillion (\$3.1 trillion) of covered bonds in 2010, mostly in Europe. There, covered bonds are 40 percent of the size of the sovereign bond market, and they fund 20 percent of residential mortgages in the European Union. In Spain they fund nearly half of mortgage debt, and in Denmark nearly all of it.

A key feature of covered bond systems is a law passed in each country providing strict guidelines for the mortgages eligible to be part of the "cover pool." Strict capital requirements apply, and the mortgages generally are very safe, with

loan-to-value (LTV) ratios rarely above 80 percent, and in some countries as low as 60 percent. Borrowers either put more money down, or obtain a high LTV second mortgage to help with the down payment.

A couple of countries, like Germany and Spain, allow state-owned banks to issue covered bonds. However, the European Union has strong guidelines on use of state guarantees to ensure a level playing field across Europe, Lea says. Aside from government liquidity provided during the financial crisis, "I would argue that there's really not any role of the government supporting the covered bond market."

Denmark's covered bond model stands apart from the rest of Europe. There, tightly regulated mortgage lenders issue bonds one-for-one with mortgages: That is, the mortgage bonds outstanding always exactly equal the mortgage debt that backs them in size, cash flow, and maturity characteristics. Leverage in this setup is precisely zero.

The Danish system has another unusual feature: When rates rise — or, equivalently, the price of the mortgage bonds fall — homeowners can reduce their principal by buying the corresponding bond back from the market at the lower market price. This reduces their odds of negative equity if house prices fall, which may have kept Denmark's mortgage

What If We Encouraged Home Equity Instead?

From the GSEs to the popular mortgage interest tax deduction, the major theme of U.S. policies toward homeownership is that they encourage or directly subsidize the accumulation of housing debt. These policies may encourage homebuyers to get bigger homes than they otherwise would, as well as reduce the incentive for households to repay mortgage debt quickly. They also make it cheaper for households to borrow against their homes to consume.

By definition, any form of subsidy leaves the recipient better off. But a policy of encouraging debt leaves the nation as a whole more vulnerable to house price swings, as the recent boom and bust has taught us. Greater debt increases the likelihood of negative equity if house prices fall, which is one of the biggest predictors of foreclosure. Moreover, negative equity may hinder labor market adjustment since underwater homes are harder to sell (whether because of the financial loss they cause borrowers or because the process for "short selling" an underwater home has proven arduous). During the recent bust, U.S. counties and developed nations that experienced greater increases in household leverage during the boom experienced larger house price declines and more severe effects from the recession, San Francisco Fed economists Reuven Glick and Kevin Lansing pointed out in a 2010 analysis.

Alternatively, there are ways to subsidize equity by rewarding savings. Germany and France are known for contractual savings programs called *Bauspar* and *Epargne Logement*, respectively. Savers receive a bonus based on the amount saved in each year, but the funds can be withdrawn

only after a minimum number of years, often five. In the meantime, funds are held by specialized institutions (e.g. *Bausparkassen*) and invested in low-rate housing loans or government debt. When the preset time period is reached, the saver is awarded a low-rate loan that often must be used for housing.

The majority of the adult population in Germany held contracts with *Bausparkassen* at the program's 1980s peak. France's program launched in the 1970s. Such programs have the potential to increase savings, and borrowers with the most discipline to save (and, potentially, to maintain a mortgage) self-select into them.

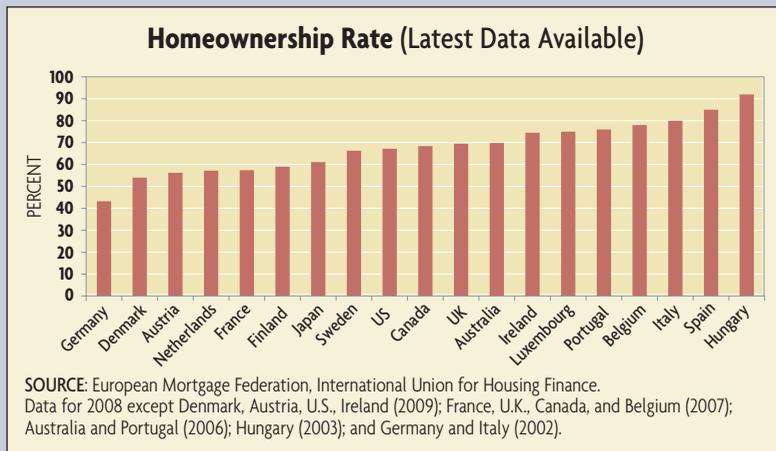
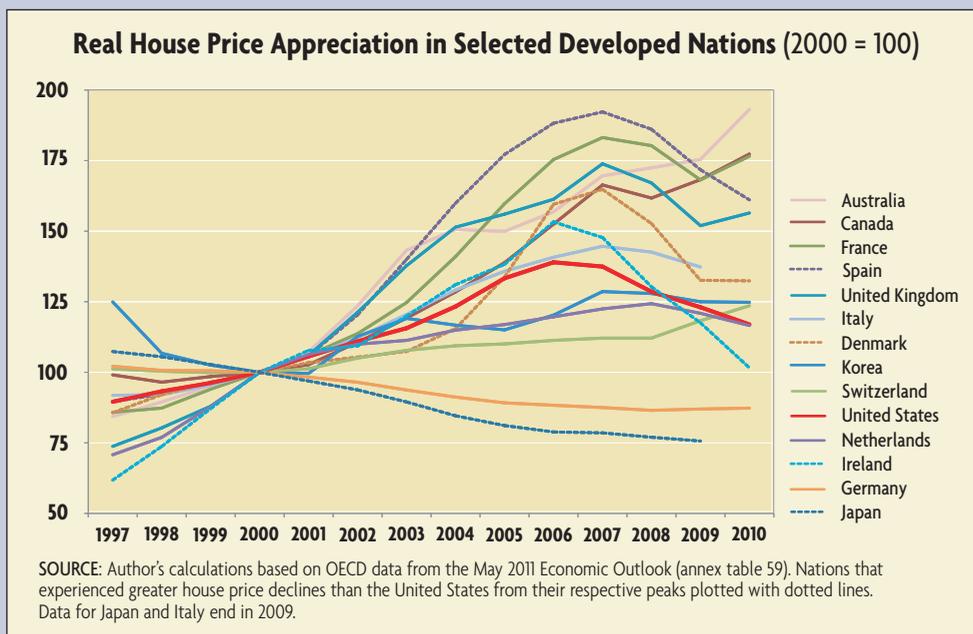
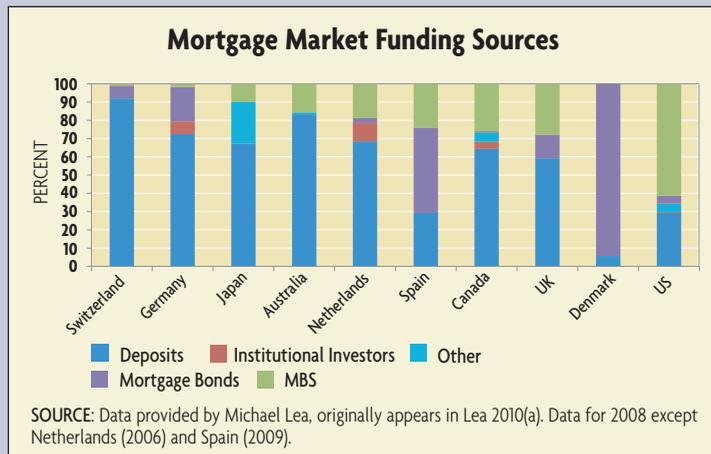
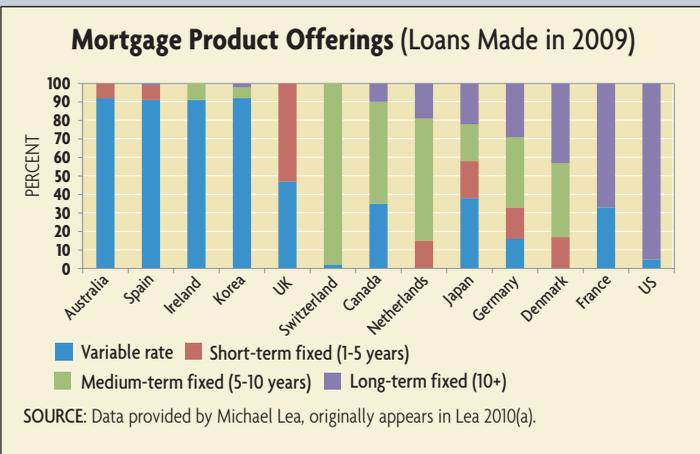
To the extent that U.S. policies making housing debt attractive have increased homeownership, propped up house prices, or suppressed mortgage rates — though economists are uncertain about the magnitudes of those effects — a reversal may be in store if the policies are unwound.

And pivoting our strategy toward equity-building would constitute a cultural shift. America's attitude toward homeownership and debt caused a bit of culture shock when Canada-born IMF economist John Kiff relocated to the United States. "People were telling me, 'John, when you buy a house in the U.S. you buy as much as you possibly can.' Here everything is basically focused on the idea that leverage is good and you go right to the hilt. Whereas in Canada it's the other way around: Your goal in life is to retire at something like 60 years old with absolutely no debt."

— RENEE HALTOM

How Housing Differs

Developed nations differ in mortgage funding, product, and performance



default rates relatively low. Only a few times in the bond system's 200-year history have payments to Danish mortgage bond investors ever been delayed, and that hasn't happened since the 1930s, according to BRFKredit, one of the Danish lenders.

As an alternative to securitization, many commentators suggest covered bonds could be a promising model for the United States. Lawmakers on both sides of the aisle have sponsored legislation that would lay the initial covered bond infrastructure, and Treasury and HUD officials have voiced support for potentially developing a U.S. market in covered bonds.

The appeal to many of these parties is that the lender hangs on to the mortgage, aligning incentives and making strict lending standards an intrinsic feature of the system. Investors usually enforce safe lending in a securitized system, but that discipline appears to have been weakened during the boom, reasons for which may have been the widespread expectation that the federal government would not allow GSEs to fail and that house prices would keep rising.

But covered bonds would come at a cost if adopted in the United States, writes IMF economist Jay Surti in a December 2010 analysis. Because they require greater lender capital and stricter lending standards, covered bonds could make mortgages more expensive, all else equal. And, he writes, the ability of a covered bond system to compete with GSE subsidies hinges largely on the extent to which the GSEs' influence on mortgage markets is reduced.

The Other GSEs

Canada and Japan also have major government-sponsored housing finance agencies, but their impact on mortgage markets is somewhat different. (The Netherlands and South Korea also have similar agencies, but they affect a very small proportion of the mortgage market.)

The Canada Mortgage and Housing Corporation (CMHC) was created after World War II to implement the nation's housing programs. It combines elements of the United States' major housing agencies: The CMHC both insures mortgages and guarantees securities backed by government-insured mortgages in functions that are analogous to the Federal Housing Administration and Ginnie Mae, respectively. The CMHC is fully owned by the government and its backing is explicit.

Since 1967, Canadian banks have been prohibited from extending highly leveraged mortgages (currently defined as LTV above 80 percent) unless the mortgage is insured to protect lenders against borrower default. Roughly two-thirds of Canadian mortgages are insured, and half the market was insured by the CMHC as of late 2009, Kiff estimates. The CMHC also guarantees 90 percent of private insurer losses. (In turn, those insurers must contribute to a guarantee fund and set aside loan loss reserves.)

Until 2007, the Japan Housing Finance (JHF) agency was a housing bank that originated fixed-rate mortgages funded by subsidies and by borrowing from the government. The

agency ran into financial trouble after a stretch of low-interest rates brought on a refinancing wave in 1995. The government removed the agency, then known as the Government Housing Loan Corporation, from the direct mortgage lending business. To support the fixed-rate mortgage (FRM) market, the government renamed the agency and gave it implicit backing to securitize privately originated FRMs, much like the GSEs do in the United States. But despite its similar structure to the American GSEs, the JHF was always intended to provide only what private markets couldn't, according to an analysis by the European Mortgage Federation.

Therefore, the effect of the Japanese mortgage agency on the mortgage market depends on the popularity of the FRM. Due to a deflationary, low-interest rate environment since the early 1990s, Japanese borrowers have become more accustomed to adjustable-rate mortgages (ARMs). That and the loss of official subsidies have meant that the JHF's influence has never quite reached that of its predecessor.

There are several key differences between these agencies and the American GSEs. The securitized mortgage market is not as important in Canada and Japan. Deposits are a cheap funding source in both countries, Kiff says. The Japanese are known for being aggressive savers, and in Canada so many mortgages are government-insured that lenders can hold them with minimal capital requirements. In both countries, "there's not much incentive for them to turn around and securitize those things."

Second, their guarantee and insurance activities aren't targeted to meet social objectives. In the early 1990s, Fannie and Freddie were given a formal mandate to support affordable housing for low-income households. In 2008, 56 percent of the mortgages they purchased were required to be granted to low-income families, up from 30 percent in 1993, according to the IMF study by Kiff and his colleagues. By contrast, the insurance and guarantee activities of the CMHC and JHF aren't subject to explicit affordable housing mandates, and they aren't targeted to relatively small mortgages.

This may relate to the third key difference: The Canadian and Japanese agencies don't purchase mortgages for their own portfolios. The GSEs may have taken on additional risk that way, perhaps to meet their affordable housing mandate, to increase their market share, or because their funding advantage made holding mortgages profitable for them — reflecting what the Treasury, HUD, European Mortgage Federation, and a variety of academics describe as an inherent conflict presented by their public-private structure.

An Outlier in Many Ways

The United States finds itself on the far end of the spectrum in many aspects of housing. At the funding level, the United States has the most government support of owner-occupied housing finance and is the heaviest user of securitization. Many countries subsidize homeownership through tax incentives like the popular mortgage interest tax deduction.

According to Lea's research, only the United States allows nearly full deductibility without taxing imputed rent — the rent homeowners effectively pay themselves when they live in their residences. Imputed rent is received in the form of housing services rather than cash, but economists argue that it is income nonetheless. Not taxing it gives owner-occupied homeownership an edge over other forms of investment such as owning a rental property or forgoing residential ownership altogether in favor of financial investment.

Lending standards deteriorated most in this country, an analysis by Luci Ellis at the Bank of International

Settlements suggests. During the boom, fewer U.S. borrowers were required to document income and assets, and lenders offered ARMs with "teaser" rates that adjusted sharply upward. The volume of second mortgages exploded, and highly leveraged mortgages became more common, as did loans for which the borrower had to repay only interest each month. Opinions abound on the extent to which various housing policies may have encouraged deteriorating lending standards but, according to Ellis, each of the above underwriting characteristics existed to greater degrees in the United States than in any other developed country.

The Fate of the 30-Year FRM

When it comes to mortgage markets, one of the many features that set the United States apart from other developed countries is its reliance on the prepayable 30-year fixed-rate mortgage (FRM). This type of financing has constituted more than 90 percent of new U.S. mortgages in recent years. The heavy use of securitization enables American lenders to offer longer-term FRMs without being locked into an illiquid asset saddled with interest rate risk.

Therefore, it is hard to debate how to wind down the support of troubled GSEs Fannie Mae and Freddie Mac, which provide strong support to securitization markets, without also considering whether lenders could still offer the 30-year FRM as affordably as they have in the past.

There are benefits and costs to the long-term FRM. It is consumer-friendly, providing payment certainty by shielding borrowers from interest rate risk. American FRMs are unique in the world in that they usually come with the options to prepay and refinance; many U.S. states ban prepayment penalties and the GSEs historically have refused to enforce them on the mortgages they purchase. The FRM may also promote stability. Research by the International Monetary Fund and others has found that in countries where adjustable-rate mortgages (ARMs) dominate, the economy as a whole is more sensitive to short-term interest rate swings.

But FRMs don't erase interest rate risk; they pass it on to investors. The longer the term of the loan, the more risk the investor faces. Investors are better equipped than households to manage that risk. However, the average life of a mortgage is only about five years so having fixed-rate periods as long as 30 years needlessly increases the cost of the loan for the average borrower, argue economists Michael Lea and Anthony Sanders of San Diego State University and George Mason University, respectively, in a recent analysis of the long-term FRM.

The long-term FRM is a construct of policy. Before the Depression, the United States relied on shorter-term fixed-rate loans that the borrower had to repay or refinance at the end of the period. To restart housing markets during the Depression, the federal government modified nonperforming loans and sold them back to banks as 20-year FRMs, a

more realistic payoff horizon in the falling-price environment. Federal insurance of mortgages, especially the long-term FRM, became a permanent fixture of the housing market. Until the 1980s, the government would insure only FRMs.

Interest rate risk wasn't an issue for lenders until the yield curve — the difference between long-term and short-term interest rates — sloped negative in the mid-1960s, and lenders became strained. One reason the GSEs were created was to establish a secondary mortgage market that would promote liquidity of mortgage holdings and therefore help lenders manage interest rate risk. These were mutually reinforcing trends: The more FRMs that lenders originated, the more liquid mortgage-backed securities markets became, which increased their attractiveness to investors and in turn increased the number of FRMs that could be originated. The ARM share of new U.S. mortgages tends to reach as high as 40 percent when markets expect interest rates to drop — hitting almost 70 percent at one point in the mid-1990s, according to a New York Fed staff analysis — but the long-term FRM is almost always the dominant product in the United States.

Without the GSEs to promote securitization and shoulder some of the risk, long-term FRMs will become more expensive relative to shorter-term fixed-rate or variable-rate alternatives, the U.S. Treasury and the Department of Housing and Urban Development said in their February 2011 proposal for winding down support of the GSEs. Policymakers are considering reform precisely because mortgage support through the GSEs has turned out to be costly. The costs of the government support they require will have to be weighed against the benefits of the long-term FRM.

Some fear the 30-year FRM would go away entirely, but Lea and Sanders argue FRMs would still be offered because of private-label securitization and any new funding systems that crop up. Still, "the ARM market share would increase substantially without Fannie and Freddie subsidies," Lea says.

Thus, if the support of the GSEs is reduced, the long-term FRM is likely to become a fading presence to some degree.

— RENEE HALTOM

Overall, the United States experienced the greatest proportion of subprime lending before the crisis at about 20 percent of new mortgages at the peak; the United Kingdom was second at about 8 percent.

Even our very definition of a high-risk loan tends to be more lax. “Subprime” in other countries might refer simply to a low-documentation loan, somewhat akin to Alt-A loans in the United States, which are riskier than prime but not as risky as subprime. American subprime mortgages were more prone to the layering of multiple high-risk factors. In some countries, Kiff says, “what’s called a subprime or high-risk mortgage would be laughable from an American’s point of view.” Perhaps not surprisingly, the United States’ poor mortgage performance relative to the rest of the world is concentrated in riskier loans.

Additionally, mortgage default is a costlier option for borrowers abroad due to recourse, which allows the lender to go after the borrower’s other assets in the event of default. Recourse is prominent in every developed country except the United States. About a dozen states are non-recourse, but even in recourse states the laws often are so onerous for lenders that they are rarely applied, according to a 2009 paper by Richmond Fed economist Marianna Kudlyak and Andra Ghent at the City University of New York. Many people point to recourse and strict underwriting standards as having kept defaults low in other countries.

The types of mortgages offered here are another extreme. Funding sources have a lot to do with that. When mortgage markets are tightly connected to capital markets, a longer fixed-rate period is possible since lenders can offload the associated risks. Case in point: The United States is the heaviest user of securitization, and more than 90 percent of the mortgages issued here in 2009 were the 30-year fixed-rate variety (though this share varies with market

interest rates). No other developed country except Denmark offers the prepayable long-term FRM in large numbers, and the share there was less than half that year.

If lenders don’t shift risks away, they are more likely to protect themselves by sticking with shorter-term or adjustable-rate contracts. But “all developed countries have highly developed bond markets,” Lea adds, so each actually offers an array of mortgage products with different mixes of maturities, which he documents in a 2010 study of international mortgage products. It is a question of finding the cheapest funding source, he says, “along with the lender’s desire to diversify funding sources and extend liability maturities.”

Thus, one way that reform could most directly affect U.S. homebuyers is through the types of mortgage contracts that are offered (see sidebar on page 17) — but that depends largely on the shape reform takes. The most drastic option, suggested by Treasury and HUD, would eventually wind down Fannie Mae and Freddie Mac completely, which would potentially leave room for a new system to emerge — whether created by the government or by markets.

Unwinding some of the U.S. policy tradition in favor of homeownership could be painful in the short term. A sudden shift away from government subsidies through the GSEs could further drag out the housing recovery, which is why many officials and academics suggest a gradual transition to whatever new regime policymakers ultimately allow.

In the long term, a permanent shift away from government support could move homeownership out of reach for some households on the lower end of the income distribution. Nonetheless, most policymakers agree that reform is needed to make U.S. housing markets more stable in the long run, regardless of whether they draw upon the tools used by their foreign counterparts. **RF**

READINGS

Ellis, Luci. “The Housing Meltdown: Why Did It Happen in the United States?” Bank for International Settlements Working Paper No. 259, September 2008.

Green, Richard, and Susan Wachter. “The Housing Finance Revolution,” paper presented at the Annual Federal Reserve Bank of Kansas City Economic Symposium in Jackson Hole, Wyo., Aug. 30–Sept. 1, 2007.

“Housing Finance and Financial Stability — Back to Basics?” IMF *Global Financial Stability Report*, April 2011.

“Hypostat 2009: A Review of Europe’s Mortgage and Housing Markets.” European Mortgage Federation, November 2010.

Kiff, John. “Canadian Residential Mortgage Markets: Boring But Effective?” IMF Working Paper No. WP/09/130, June 2009.

Lea, Michael. “International Comparison of Mortgage Product Offerings.” Research Institute for Housing America Special Report, September 2010.

Lea, Michael, and Anthony Sanders. “Do We Need the 30-Year Fixed-Rate Mortgage?” George Mason University Mercatus Center Working Paper No. 11-15, March 2011.

“Reforming America’s Housing Finance Market: A Report to Congress.” U.S. Department of the Treasury and U.S. Department of Housing and Urban Development, February 2011.

Surti, Jay. “Can Covered Bonds Resuscitate Residential Mortgage Finance in the United States?” IMF Working Paper No. WP/10/277, December 2010.