The Structure and Evolution of American Secondary Mortgage Markets, with Some Implications for Developing Markets

by Robert Van Order

INTRODUCTION AND SUMMARY

Between the end of World War II and the 1970s, American mortgage markets were easy to understand. They were dominated by depository institutions (mainly savings and loan associations or, more broadly, thrift institutions or simply "thrifts"), which by both regulation and tax incentive were induced to hold most (about 80%) of their assets in mortgages. The mortgages were financed with low cost, short-term, government-insured deposits. The thrifts provided all the major aspects of mortgage lending, and they held the majority of mortgages. They originated loans, serviced them (i.e., collected the payments and managed defaults) and were the ultimate investors, both accepting the risk of borrower default and raising money to finance the mortgages.

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The use of short-term deposits to fund mortgages posed two problems for thrifts. First, deposits had liquidity risk. That is, while most of the time thrifts enjoyed a stable source of core deposits, there were times when deposits flowed out of thrifts (or did not grow fast enough to keep up with the mortgage market), and they did not have an elastic source of funds with which to replace them. Second, deposits' short maturities, combined with holdings of long-term fixed-rate mortgages, led to a duration mismatch that became quite risky. In the late 1970s and early 1980s, when interest rates increased rapidly, many institutions had large losses and became insolvent on a mark-to-market basis. These losses, as well as some regulatory changes, led to thrifts' focus primarily, but not entirely, on adjustable-rate mortgages (ARMs) from the mid-1980s until the present. It is clear, in retrospect, that interest rate risk was the beginning of the collapse of the thrift industry in the 1980s.

Now most mortgages are sold into secondary markets where they, their derivatives or debt backed by them, compete with a wide range of securities in the capital markets. This is done primarily through three major secondary market institutions: the Government National Mortgage Association or Ginnie Mae, which is a government-owned agency that provides a secondary market for government-insured mortgages; and the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac), which are privately owned government-sponsored enterprises (GSEs) that provide secondary markets for non-government insured (or "conventional") loans. These institutions are primarily in the business of purchasing mortgages and packaging them into securities (or funding them with debt) that can be traded easily, and for which they manage the risk of default[1]. Tables 1 and 2 present basic data on the market shares of Fannie, Freddie and Ginnie. The focus of most of what follows is on the conventional market and the role of Fannie and Freddie.

A major change in mortgage markets, one which has been brought on largely by the secondary markets, has been increased division of labor, leading to the "unbundling" of the four major aspects of mortgage lending: origination, servicing, funding and accepting credit risks. This is most evident on the in-

vestment side. Investors in mortgages need not be involved in originating, servicing, or credit risk. Pools of mortgages (mortgage-backed securities) and mortgage-backed debt now trade in national and international markets, almost as efficiently as U.S. Treasury securities.

An effect of the advent of secondary markets has been to allow thrifts and banks to avoid interest rate risk, while allowing borrowers to continue to have long-term, fixed-rate mortgages. Banks can originate fixed-rate loans and sell them, and make money from servicing them; they can hold ARMs financed with short-term deposits; they can use derivative securities (e.g., options and forward contracts on Treasury securities or interest rate "swaps") to hedge the risks of long-term mortgages; they can hold derivative mortgage securities (discussed below) which have varying degrees of interest rate risk; or they can hold debt backed by mortgages with varying degrees of duration and call protection.

Liquidity problems have also been addressed. Initially this was done through the Federal Home Loan Bank System, which was created in the 1930s and which lends money to thrifts and banks in the form of loans that are over-collateralized by pools of mortgages, which are kept on the balance sheet of the thrift or bank borrower. More recently, there have been solutions in the form of repurchase agreements and brokered deposits, which allow banks and thrifts to bid for deposits almost as if they were issuing debt; and, of course, there are sales of loans into the secondary market, which have become the main source of liquidity.

Mortgage rates are now determined by capital markets in general and are largely independent of the ups and downs of the thrift industry, though they are subject to the ups and downs of capital markets. Because the system is based largely on bond-like instruments with access to the entire capital market, it is, taken as a whole, now quite liquid. The primary accomplishment of the secondary market in the U.S. has been to provide an elastic supply of long-run funding from the capital markets.

While these changes have generally increased the efficiency of the mortgage market, they have also generated some special management problems. The main management concerns for Fannie Mae and Freddie Mac are interest rate and credit risk, but there are also management and operations risks. The unbundling that has come with secondary markets has increased the dependence of the various participants in the market upon one another, and it has enhanced these risks. For instance, Fannie and Freddie have to worry about the quality of loans sold to them by originators who might know more about the loans than they do and can select against them.

Recent developments in information technology have increased competition in the mortgage industry, both among the institutions in it and between the primary and secondary market institutions, and they have changed the way that risks are managed. In some ways the market is coming full circle to "rebundling." The availability of nearly the same technology and information in all parts of the market is decreasing adverse selection risk, reducing the division of labor and reducing the extent of unbundling. This is making the distinction between primary and secondary markets increasingly irrelevant.

An accurate description of the structure of the mortgage market now can be summarized as one of *dueling charters* (see Lea (1986) and Van Order (2000a)). That is, there are two major charters in the industry: one charter is for depositories (traditionally thrifts but also including banks, which have become important participants in the mortgage markets as regulatory changes have diminished the distinction between banks and thrifts, so that it is now more accurate to think of both as simply "depositories" with few important differences) who use the deposit market as their primary way of attracting funds, and the other charter is for the government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac,[2] who use the capital or bond markets. Both charters have similarities, particularly in the form of implicit and explicit guarantees, and differences, for instance in regulation. And both are clearly viable, as the market share of the two remains close to fifty-fifty. The distinction between primary and secondary markets is no longer very important. Now there are simply two different ways (e.g., via a savings and loan or via Freddie Mac) of getting money from the capital markets to the mortgage market.

The rise of the secondary market in the last 20 years has involved implicit and explicit government support, but government support has dominated mortgage markets since the 1930s. Fannie Mae and Freddie Mac, whose share of the mortgage market has indeed increased over time (see Tables 1 and 2), do not represent an increase in government support as much as a change in the nature of support from the depository charter to the GSE charter. Competitive balance between the two charters depends to a large extent on which charter is more exploitable, which depends in part on the balance between the information advantages of the depositories and the fund-raising advantages of the secondary market.

There are lessons from all this that can be exported, but not directly. Many developing markets do not have the infrastructure, e.g., the current bond market, to support a secondary market like the U.S. market; management problems, particularly the adverse selection problems, are likely to be much more problematic in developing markets; government-sponsored enterprises may be quite difficult to regulate and can expose the government to bailout costs or systemic risk

Table 1. Mortgage Debt Outstanding (billions of dollars)

Year	Residential	GSE & Agency Share	Conventional Residential	GSE Share
1971	$397	6.9%	$276	6.8%
1972	$450	7.3%	$319	6.9%
1973	$502	7.8%	$367	7.5%
1974	$541	9.5%	$401	8.7%
1975	$583	11.0%	$436	8.8%
1976	$653	11.4%	$499	8.0%
1977	$757	12.3%	$596	7.4%
1978	$879	13.2%	$703	8.3%
1979	$1,006	14.9%	$807	8.7%
1980	$1,110	16.0%	$885	9.0%
1981	$1,186	16.7%	$947	9.2%
1982	$1,235	20.8%	$986	13.6%
1983	$1,371	24.2%	$1,091	15.5%
1984	$1,535	25.2%	$1,240	16.5%
1985	$1,737	27.6%	$1,409	19.0%
1986	$1,976	32.4%	$1,605	23.4%
1987	$2,229	34.8%	$1,798	25.4%
1988	$2,483	34.5%	$2,024	25.5%
1989	$2,731	36.3%	$2,244	27.7%
1990	$2,932	39.1%	$2,414	30.8%
1991	$3,096	41.8%	$2,559	34.0%
1992	$3,253	44.4%	$2,720	37.6%
1993	$3,412	46.0%	$2,899	39.9%
1994	$3,593	47.0%	$3,034	40.8%
1995	$3,781	47.4%	$3,197	41.3%
1996	$4,004	48.1%	$3,381	42.0%
1997	$4,271	47.7%	$3,611	41.5%
1998	$4,687	47.6%	$4,010	42.3%
1999	$5,161	48.4%	$4,432	43.3%
2000	$5,622	48.2%	$4,918	42.6%

Note: Residential mortgage debt is the sum of single-family mortgage and multifamily mortgages (apartment buildings). GSEs are Freddie Mac and Fannie Mae. Agency is Ginnie Mae. Conventional mortgages exclude FHA and VA mortgages.

Source: Federal Reserve Board

Table 2. Volume of Residential Mortgage Originations (billions of dollars)

Year	Residential	GSE & Agency Purchase Share	Conventional	GSE Purchase Share
1971	$70	10.7%	$50	9.7%
1972	$91	8.6%	$72	7.1%
1973	$93	11.4%	$77	9.8%
1974	$80	17.3%	$64	14.4%
1975	$89	15.2%	$71	8.5%
1976	$125	14.8%	$106	4.5%
1977	$178	14.8%	$150	5.9%
1978	$201	17.0%	$168	11.2%
1979	$202	20.5%	$159	10.4%
1980	$146	22.1%	$115	10.2%
1981	$102	24.3%	$84	12.6%
1982	$109	60.4%	$85	58.2%
1983	$223	44.8%	$172	28.8%
1984	$231	34.0%	$198	25.6%
1985	$322	41.6%	$274	32.0%
1986	$549	51.7%	$453	40.3%
1987	$552	44.8%	$438	34.9%
1988	$484	34.7%	$419	26.9%
1989	$484	45.6%	$424	38.5%
1990	$491	51.7%	$407	46.6%
1991	$588	50.9%	$525	45.1%
1992	$919	57.0%	$844	52.4%
1993	$1,052	62.9%	$925	56.5%
1994	$801	24.5%	$657	28.2%
1995	$679	43.5%	$603	36.9%
1996	$833	47.7%	$721	41.0%
1997	$907	39.9%	$802	35.4%
1998	$1,496	52.3%	$1,334	47.5%
1999	$1,366	52.6%	$1,192	47.5%
2000	$1,078	59.1%	$942	56.6%

Note: Residential mortgages are the sum of single-family mortgage and multifamily mortgages (apartment buildings). GSEs are Freddie Mac and Fannie Mae. Agency is Ginnie Mae. Conventional mortgages exclude FHA and VA mortgages.

Sources: Department of Housing and Urban Development, Freddie Mac, and OFHEO. Originations from 1998 on are Freddie Mac estimates.

should the GSEs collapse; and the creation of specialized secondary market institutions like Fannie and Freddie may or may not add much to the ability of the mortgage market to attract funds.

For instance, many countries have an existing depository system, banks, that can support a mortgage market. Bank-oriented systems are capable of providing the essential service of secondary markets, which is to connect capital markets in general (rather than just deposit markets) with mortgage markets, either as direct issuers of bonds (on balance sheet) or via off-balance-sheet securitization managed by banks, and there is the already-existing option of tapping deposit markets, which can also draw funds from capital markets. The problem in many countries is that there is not a market in long-term debt or deposits. A contribution of a secondary market can be the development of a market for long-term lending.

What can be exported from U.S. experience is the idea that, with the right legal and regulatory structure, it is possible to have well functioning mortgage markets that are integrated with capital markets and which have minimal subsidy. You can make money at this!

The next section presents a brief history. After that, I turn to the economics of the secondary market where I focus on their special management issues. In the Managing Risks section the ways that the different risks can be managed is discussed, and the Capital, Risk and Public Policy section discusses some public policy issues. The last section provides some comments on applications of the U.S. model to developing markets.

SOME HISTORY[3]

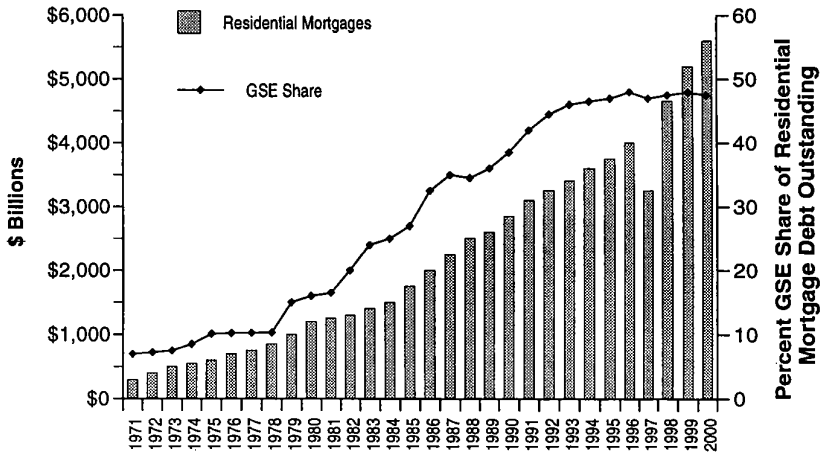
The primary (i.e., origination) mortgage market in the United States has been dominated, historically, by depository institutions and mortgage banks, which unlike European mortgage banks act as dealers and servicers in mortgages rather than investors. After origination, mortgages are either held in portfolio (e.g., by a traditional savings and loan) or sold into the secondary market. While there has always been a secondary market in the United States, until recently it was largely informal and *ad hoc*.

Fannie, Freddie, and Ginnie

The rise in the secondary markets in the 1970s and especially in the 1980s came about largely because of standardization of pools of mortgages brought on by Fannie Mae, Freddie Mac, and Ginnie Mae. Annual sales of mortgages to these three institutions have risen from $69 billion in 1980 to over $500 billion in 2000; they now own or are responsible for about half of the outstanding stock of single-family mortgages (see Figure 1).

Fannie Mae, the oldest of the agencies, was established in the 1930s as a secondary market for newly-created Federal Housing Administration (FHA) loans, which were insured by the government but which during the crisis of the Great Depression had trouble gaining acceptance by private investors. For much of its history, it operated like a national savings and loan, gathering funds by issuing its own debt (short-term debt rather than deposits) and buying mortgages that were held in portfolio, but because it held government insured mortgages it accepted almost no credit risk. This was a particularly useful function during credit crunches when deposit rate ceilings limited the ability of savings and loans to raise money. Fannie Mae was probably a useful counter-cyclical tool before deposit rates were deregulated in the early 1980s because it was, in effect, the only "deregulated" savings and loan.

Figure 1. Residential Mortgage Debt Outstanding and GSE Share



Source: Federal Reserve Board

In 1968 because of budget pressures[4] from the Vietnam war Fannie Mae was moved off budget and set up as a private, government-sponsored enterprise (GSE), which in the 1970s switched its focus toward conventional (not government insured) loans, which do have credit risk. It receives no government funding, and its operations are separate from the "on budget" parts of the government. Ginnie Mae was created as a successor to the old Fannie Mae; its purpose was to handle Fannie Mae's policy-related tasks and to provide a secondary market for government insured loans. It is on the federal budget as a part of the U.S. Department of Housing and Urban Development.

Ginnie Mae was responsible for promoting the major innovation in secondary markets, the mortgage-backed security (MBS). An MBS is a "passthrough" security. The issuer, typically a mortgage bank, passes the payments from a pool of mortgages (both principal and interest, net of its fee) through to the ultimate investors, who typically receive *pro rata* shares of the payments. The issuer also guarantees the payment of interest and principal even if the borrower defaults (the issuer is covered by the government insurance for almost all of foreclosure costs), and Ginnie Mae guarantees timely payment even if the issuer does not make the payments. Hence, its guarantee is on top of the federal insurance and the issuer's guarantee. This has proven to be quite valuable in marketing government-insured loans, and because it simply enhances other guarantees its costs are small, and it has actually made money from the relatively small (0.06% per year per dollar of loan balance) fee it charges. As with most passthrough securities, Ginnie Maes are subject to interest rate risk.

Freddie Mac was created in 1970 to be a secondary market for the thrifts. At the time it dealt only with thrifts, and Fannie Mae dealt with mortgage banks. Now both institutions deal with the same originators. Like Fannie Mae, it is a private, government-sponsored enterprise, and it too is off budget. It initiated the first MBS program for conventional loans in 1971. Fannie Mae began its conventional MBS program in 1981. Both institution's MBSs are similar to Ginnie Mae's; e.g., both protect investors against credit risk but not interest rate risk. Neither Fannie nor Freddie does more than a small amount of federally insured mortgages, which almost always go into Ginnie Mae pools.

Because Ginnie Mae is on budget, its securities have a "full faith and credit" federal guarantee. Because Freddie Mac and Fannie Mae are private corporations neither has an explicit guarantee, but they both have an "implicit" or "conjectured" guarantee, because investors believe that if these institutions went under the government would protect debtholders (though it has no *legal* obligation to do so). This allows the GSEs to borrow (or sell mortgage-backed securities) at interest rates lower than they would otherwise. Both are regulated by the Department of Housing and Urban Development for their public purpose missions and by the Office of Federal Housing Enterprise Oversight (OFHEO) for safety and soundness[5]. Fannie Mae and Freddie Mac are now, except for details, quite similar and compete in the conventional mortgage market, as buyers of mortgages, and in the securities markets as sellers of mortgage-backed securities and issuers of debt. The primary benefit of the implicit guarantee is that while Fannie and Freddie would still be strong companies (probably in the low AA range according to recent "stand alone" ratings by Standard & Poors) without their federal charter, they borrow at better than AAA rates with it. This saves them between 0.20% and 0.50% (currently probably around the mid-point of this range) in borrowing costs. As a result borrowing rates for loans eligible for purchase by Fannie and Freddie are lower than other rates. Both Fannie and Freddie consistently make returns on equity in excess of 20%.

The main difference between Fannie Mae and Freddie Mac and Ginnie Mae is in ownership structure. Fannie and Freddie are both owned by private shareholders (both are in the Fortune 500). Their shareholders presumably have the same motivation as other private shareholders. Hence, it is generally presumed that Fannie and Freddie's motivation is shareholder wealth maximization subject to their charters and regulations; whereas Ginnie Mae is government owned and is presumed to be more oriented toward public policy issues. The idea of the GSE charter is to combine the advantages of market-oriented private companies (e.g., cost minimization, responding to the market) with charter restrictions and regulation to pursue public interest goals. Some public policy aspects and conflicts inherent in the GSE structure are discussed in the Capital, Risk and Public Policy section.

Funding Mortgages

For most of the last 30 years the secondary market has relied primarily on the standard passthrough security described above. But there have been important changes. Since the early 1980s secondary markets have developed beyond the "plain vanilla" passthrough security and have attracted funds by partitioning MBSs into "derivative" securities. This is because a *pro rata* share in a pool of 30-year fixed-rate mortgages is not what all investors want. While MBSs have virtually no credit risk, they have two types of interest rate risk: the usual risk of any long-term security that its value will fall when rates rise, and a second risk that is similar to that of callable bonds, because borrowers have the option to refinance (i.e., call the mortgage) and they tend to do this when rates fall. This call risk is very difficult for many investors to evaluate because borrowers' prepayment

behavior is difficult to predict, and because some investors work much harder than others at assessing prepayment risk (e.g., by gathering data and estimating sophisticated statistical models) there is the risk that less informed investors are selected against and end up with the loans with the worst prepayment characteristics.

Beginning in 1983 with the first collateralized mortgage obligation (CMO), issuers and Wall Street dealers have created derivative securities, which take pools of mortgages and pass the payments through in non *pro rata ways*. The first CMO established groups or "*tranches*" that received principal payments in sequence, the first *tranche* receiving interest plus its share of principal payments, the second *tranche* receiving the next share, etc. In this way a complicated pool of 30-year callable securities was broken into a sequence of short-, medium-, and long-term bonds, which could be sold to different types of investors. This carving up of the mortgages does not eliminate interest rate risk, but it does allow the risk to be allocated more efficiently.

Complications in tax law limited the use of the first CMOs. Tax reform in 1986 created the "Real Estate Mortgage Investment Conduit" (REMIC), which solved most of the remaining tax problems. REMICs are much the same as CMOs (the names are often used interchangeably), but they and CMOs have become much more exotic, carving up the cashflows from a pool of mortgages in very complicated ways. They can now be tailored to quite specific investor needs, but because of their complicated nature (some REMICs have had over 50 *tranches*) REMIC *tranches* are often difficult to evaluate without considerable computer simulation. No two tranches are exactly alike, so they are often less liquid than straightforward passthroughs. Some particular *tranches* are quite risky in that sizable losses occur if interest rates move either up or down. A central problem is that the REMIC must be self-contained, so that it can pay off all claims under any circumstance (e.g., extremely rapid prepayments). This means that if one *tranche* assures investors a more stable level of prepayments (e.g., a *tranche* that looks like a five-year bond under most conditions) another, residual, *tranche* has to absorb the extra prepayment risk. Residual *tranches* are sometimes referred to as *hazardous waste*.

Both Fannie and Freddie also fund mortgages with debt. The share of debt financing has increased sharply for both GSEs, especially Freddie Mac, and is now around 45% (see Table 3). An accurate way of thinking about Fannie and Freddies' operations is that they buy mortgages that are financed with a portfolio of securities made up of passthroughs, comprising about 55% of the funding and various types of debt (and derivatives) comprising 45%. Variations in this mixture affect their exposure to interest rate risk, and both companies almost always take on credit risk regardless of the means of funding.

THE ECONOMICS OF SECONDARY MARKETS

Most mortgages are now sold into the secondary mortgage market. This is especially true for fixed-rate mortgages (FRMs), which are typically 60% to 90% of the market. Virtually all government-insured loans become mortgage-backed securities via Ginnie Mae. Over 40% of conventional mortgages are now sold to either Fannie Mae or Freddie Mac (see Figure 2). There is also a growing "private label" secondary market, which operates primarily in the market for conventional loans that exceed the Fannie/Freddie loan size limit (currently $275,000 for single-family houses[6]) that is around 10% to 20% of the market. Fannie and Freddie both buy multifamily loans, but these are small parts (around 3 or 4%) of their business.

The reasons for starting up the secondary market in the U.S. are not entirely the same as the reasons for its continuation. The evolution of the secondary market has been a product of a variety of factors, many of

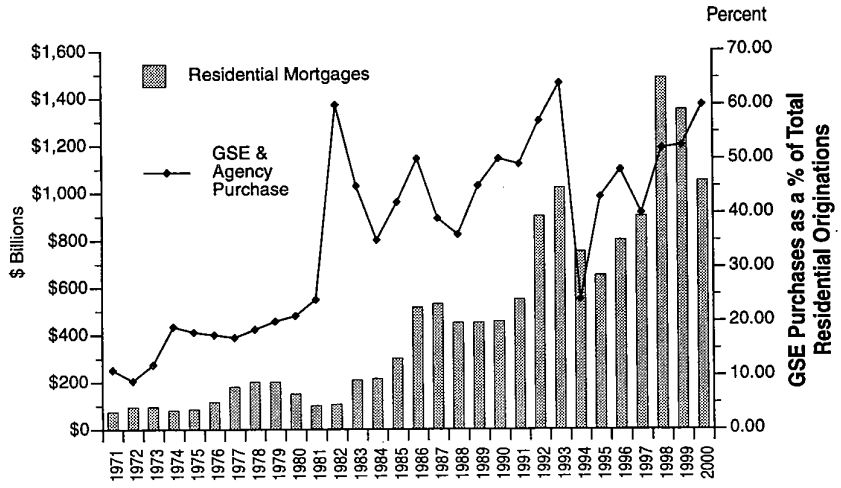
Table 3. GSE Residential Mortgage Portfolios (billions in dollars)

Year	*Total*	*MBS*	*Debt*	*Debt-to-Total*
1971	$19	$0	$19	100.0%
1972	$22	$0	$22	100.0%
1973	$27	$1	$27	98.3%
1974	$35	$1	$34	97.9%
1975	$38	$2	$37	95.8%
1976	$40	$3	$37	93.1%
1977	$44	$7	$38	84.9%
1978	$58	$12	$46	79.5%
1979	$70	$15	$55	78.4%
1980	$79	$17	$62	78.7%
1981	$87	$21	$67	76.3%
1982	$134	$57	$76	57.1%
1983	$169	$83	$86	50.8%
1984	$205	$107	$98	47.9%
1985	$268	$155	$112	41.9%
1986	$376	$269	$111	29.5%
1987	$457	$352	$109	23.9%
1988	$517	$405	$120	23.2%
1989	$622	$501	$132	21.3%
1990	$743	$616	$138	18.6%
1991	$870	$731	$156	17.9%
1992	$1,024	$852	$192	18.7%
1993	$1,155	$943	$247	21.4%
1994	$1,237	$1,021	$298	24.1%
1995	$1,321	$1,098	$361	27.4%
1996	$1,420	$1,205	$425	29.9%
1997	$1,499	$1,289	$481	32.1%
1998	$1,696	$1,481	$670	39.5%
1999	$1,918	$1,710	$847	44.1%
2000	$2,095	$1,880	$996	47.5%

Note: Total reflects both single-family and multifamily mortgage debt, but excludes GSE holdings of Ginnie Mae securities, mortgages insured by FHA and VA, and other non-GSE securities. GSEs are Freddie Mac and Fannie Mae. Debt represents the corporate debt issued by the GSEs to fund their retained portfolios.

Sources: Federal Reserve Board, OFHEO

Figure 2. U.S. Residential Mortgage Originations and GSE Purchase Share



Source: HUD, Freddie Mac, OFHEO

which are of largely historical interest. For instance, deposit rate ceilings, which limited the ability of savings and loans to raise money for mortgage loans, were a major factor in the rising importance of Fannie Mae in the 1960s and 1970s, and the creation of Freddie Mac in the 1970s, but deposit rate ceilings are no longer an issue. Similarly, the inability of banks and savings and loans to operate nationally was also important, but national deposit markets and liberalized branching rules have limited the importance of this.

The main reason, now, for the important role of secondary markets, and particularly for their rapid increase in the 1980s, is that secondary markets have for the most part been an efficient, low cost and stable way of raising money and managing cash flows. This is primarily because of economies both in raising money "wholesale" in the capital markets, in processing the purchase and servicing of large numbers of mortgage loans, and in managing risks, through diversification, and because Fannie and Freddie have an implicit guarantee which gives them a benefit comparable to deposit insurance for depositories (and Ginnie Mae has an explicit guarantee).

Depositories also have a low cost source of funds in the form of insured deposits, but this has not been as elastic a source of funds as the one coming from capital markets in general, which can be tapped quickly by the secondary market. As a result depositories sometimes have trouble raising money quickly, especially relative to Fannie and Freddie. This is especially true for FRMs because secondary markets have excellent access to long-term funds, through long-term debt, MBSs and hedging, whereas depositories have traditionally (there have been some important changes in this recently) been confined to the deposit market, which is primarily short-term, making it more difficult to hold FRMs without exposure to interest rate risk. However, as is discussed below, the depositories remain a major source of funds, particularly for ARMs, but also for FRMs; and they are increasingly capable of using their charter to find ways of getting to capital markets, for instance through the Federal Home Loan Banks, which provide them with loans collateralized by mortgages and are currently starting secondary market-like facilities for depositories.

Unbundling

The traditional savings and loan performed all aspects of the mortgage bundle: it originated the mortgage, serviced it, took the risk of default (perhaps along with a private or government insurer) and raised money in the deposit market to fund it. The secondary market evolved largely by unbundling this package. The major contribution of the "agencies" (Ginnie Mae, Fannie Mae, and Freddie Mac) has been to facilitate the money-raising part of the bundle by taking on credit risk and packaging mortgages, so that they could be sold as relatively homogenous securities or financed with homogenous debt in the capital markets. This allowed separation of the funding part of the bundle from the other three parts and has helped to lower mortgage rates.

All four aspects of the mortgage bundle can now be unbundled. The U.S. secondary market is now composed primarily of:

1. Mortgage originators, who are large in number and sometimes small in scale, who (depositories or mortgage bankers) sell the loans themselves or who (mortgage brokers) act as agents for mortgage bankers or depositories, who sell the loans.

2. Mortgage servicers (depositories or mortgage banks) who sell the mortgages into the secondary market and either keep the servicing or sell the servicing rights to other mortgage servicers.

3. Secondary market institutions and mortgage insurers, who usually take on credit risk.

4. Investors who buy mortgage-backed securities. Indeed, the last function has become further unbundled with the advent of derivative securities (REMICS, CMOs, etc.).

A Typical "Deal"

Interest rates on 30-year fixed-rate mortgages in the U.S. are currently about 7%. If a borrower takes out such a mortgage and it ends up securitized by Fannie or Freddie, the money and paperwork will flow approximately as follows:

1. The borrower will pay an upfront fee (e.g., 1% of the mortgage balance) to the originator, who would be a mortgage broker, mortgage banker or a depository, to cover expenses involved in originating the loan and/or to buy down the mortgage rate (the borrower typically has the option of paying a higher rate but no upfront fees). The borrower will then make principal and interest payments (at a 7% annual rate) necessary to pay off the loan in 30 years.

2. The loan will be serviced by either a mortgage bank or a depository. The servicer will typically receive 0.25% of the mortgage balance per year for the service. The servicing rights to a pool of mortgages can be sold to another servicer. Large mortgage banks acquire their servicing portfolios primarily by buying them from other mortgage servicers. There are scale economies in servicing, and the industry is becoming more concentrated.

3. The loan will be put into a pool with other similar loans and sold as a mortgage-backed security on which Fannie or Freddie will accept the credit risk. For this service they will receive about 0.25% (currently it's less than this) of which about 0.05% to 0.10% will cover expected default loss. If the loan has a downpayment of less than 20%, there will be a private mortgage insurance policy, which will typically cover the first 25 or 30 cents per dollar of mortgage balance of foreclosure losses (losses typically exceed coverage, so the insurance is more like risk-sharing) and for which a fee, roughly 0.75%, will be charged.

4. The mortgage-backed security made up of these loans will be sold through dealers at whatever price the market will fetch, competing with U.S. Treasuries, corporate bonds etc. Investors can be institutions like life insurance companies or pension funds, or they can be depositories or individuals. The pool will have a coupon rate of 6.5% (the 7% paid by the borrower minus servicing and secondary market charges). The pool might be carved up (by an investment banker) into a CMO for which there will be different pay-offs by tranche.

If the mortgages are debt funded there will be a similar process. Most of the time Fannie and Freddie do their debt funding by repurchasing their own passthroughs and issuing debt to fund the repurchase[7].

Principal-Agent Problems

Unbundling takes advantage of scale economies and division of labor and promotes competition among the suppliers of the various bundles, but it does not occur without cost. The cost is that the players that focus on one part of the bundle depend on players in the other parts of the unbundling to perform services for them as expected (e.g., sell them good loans) when it is not always in their interest to do so. That is, there is a "principal-agent" problem: the principals (e.g., ultimate investors) depend on agents (e.g., the institutions originating and servicing the loans) to perform as promised, even though it may not be profitable for them to do so.

The key element of the principal-agent problem is information asymmetry; if originators did not have superior information about the loans they deliver to investors and insurers, there would be no limit to what the secondary market could buy because of its lower costs.

For the secondary market the major principal-agent issue has come from the reliance on originators and servicers to originate good loans and service them properly. The major risks are that sellers, with superior information about loans, will select against them, keeping good loans and selling the ones that are riskier than they appear to be, relaxing monitoring, underwriting poorly, etc., or making loans that are of low quality either deliberately (occasionally this involves actual fraud) or through sloppy underwriting (this is often referred to as *moral hazard*).

The problem is that mortgage originators make money based largely on their volume of business. They may have little direct financial stake (they do have an interest in their reputation) in the quality of the loans they originate once they are sold. This is particularly true for institutions that are in danger of bankruptcy, for which reputation is less valuable. Because delinquent mortgages are more costly to service, mortgage servicers do have a stake in mortgage performance; however, they benefit from scale economies, and therefore have incentives to service lots of loans, which can outweigh the stake they have in servicing costs. Hence, to control credit risk, Fannie Mae and Freddie Mac need to do things that align the incentives of originators and servicers with their own.

Operating a market on the scale of the current secondary market has historically required that Fannie and Freddie not spend a lot of resources monitoring the credit risk of individual loans. Hence, the burden of controlling credit costs has largely fallen on: the performance of mortgage insurers, who insure loans with downpayments of 20% or less; underwriting guidelines, which attempt to define the parameters of an acceptable mortgage; the ability to provide incentives to induce originators to make good loans and monitor agents in order to make sure that they perform as expected; and ultimately the ability to foreclose on borrowers who do not make their payments.

This is all in contrast with the traditional, bundled savings and loan (portfolio lender), which had all the elements of the bundle under its control and was less worried that the part of the firm that originates mortgages would take advantage of the part of the firm that evaluates credit risk[8].

The balance between the role of the secondary markets and the role of traditional portfolio lenders has largely depended on the balance between economies of scale and fundraising that the secondary market brings with the advantages of control over some important risks that the traditional portfolio lender brings (see Van Order (2000a) for a more formal discussion). That this balance has been favorable to the secondary market for single-family mortgages has been due primarily to advantageous circumstances in the market for single-family houses that make it easier to control principal-agent conflicts and may not be easily replicable for other type of loans or in other countries.

Equity and Foreclosure

The most important of the favorable circumstances is the ability to use a house as security (this comes from foreclosure laws and registration) and the relatively good information that exists about house values (because houses trade fairly frequently and are relatively—though still imperfectly—easy to appraise). These two factors mean that lenders have a good idea of homeowner equity at loan origination and can foreclose and thereby minimize losses, so that homeowner equity is a good deterrent to default. As a result, a major concern of institutions that accept credit risk is the probability of equity becoming negative. This risk is subject to some control from diversification (we may not know much at all about how many houses in a particular neighborhood will fall in price by enough to leave owners with no equity, but we have a better idea of how many will on a nationwide basis), and it can be analyzed statistically.

The ability to treat houses and mortgages almost like commodities and default risk almost like a financial option (i.e., a "put" option, which gives the borrower the right to exchange the house for the mortgage) is a major factor in the success of the secondary market. To the extent that this is all that matters (or is all that can be measured) information asymmetries become much less important. Expected default costs then depend primarily on the initial loan-to-value ratio, which is known to everyone, and on the probability of house value falling by enough to trigger default, which is not known equally well by everyone, but which can generally be estimated reasonably well by the secondary market, and on other factors that can be diversified away.

An important part of the framework is the right of mortgage originators to sell mortgages without notifying the borrower and with minimal tax and transfer costs. Indeed, most borrowers do not know (or care) if their mortgage has been sold. Similarly, servicing rights can be sold or transferred without the borrower's permission, notification only happening because the borrower needs to know where to send payments.

These advantages are not common to many other markets. For instance, lending for rental housing is quite different. It is much more difficult to evaluate apartment building property values (these properties are much more heterogeneous, they trade less frequently, and incentives for inaccurate appraisals are greater), and incentives to take care of the property are weaker when owners are not also occupants. Also many countries do not have a legal framework that facilitates low (transaction) cost mortgage sales.

While single-family housing has great informational advantages, it is clear from both experience and research that there is more to evaluating credit risk than simply downpayment and expected equity build-up. Risks have been shown to vary by neighborhood, borrower characteristics, especially credit history, and other factors. Hence, even given initial downpayment, there is still much potential for those with better information to pass risks through to the secondary market. For the secondary market to survive, it must control difficult to measure sources of risk so that default risk can be treated in a simple and quantitative manner. This probably means trying to avoid risks that are hard to quantify and/or involve serious information asymmetries, and are therefore difficult to price, and at the same time working hard to gather objective information about default risk. This is especially the case in the current low-inflation environment. Rapid house price appreciation cannot be relied upon to build up borrower equity and solve credit problems.

Managing all the risks faced by a secondary market institution is quite complicated.

MANAGING RISKS

The major risks taken by Freddie and Fannie can be summarized as follows:

1. Credit risk, which is the risk from loss due to default.

2. Interest rate risk, which is the risk of change in value of the firm's assets and/or liabilities when interest rates change.

3. Business risk, which is the risk that a firm takes when making or providing a new product or service.

4. Management and operations risk, which is the risk that management and/or systems will break down.

As an historical matter, the first two risks have been most important for institutions involved in mortgage lending. The beginning of the savings and loan debacle in the U.S. was due to interest rate risk caused by the use of short-term deposits to finance long-term mortgages and the run-up of interest rates in the late 1970s and early 1980s. Credit risk has been less an issue for single-family mortgages in the U.S., primarily because house prices have generally been increasing and homeowners have generally had too much equity in their houses to default. However, some parts of the country have had serious real estate recessions (e.g., the southwestern region—especially Texas—in the middle and late 1980s, New England in the late 1980s and California in the early 1990s), and inflation slowed and default risk increased in the early 1990s, though default losses have decreased in the last few years.

The risk categories are related. For instance, one way of avoiding interest rate risk is to engage in sophisticated portfolio management techniques, but that can lead to operations risk because portfolio models and computer systems can break down. Similarly, business risk and credit risk are related because business risk is likely to show up as credit risk from new and unfamiliar business lines.

Despite the complicated interactions among these risks, I shall discuss them and the way that Fannie and Freddie approach them one at a time.

Credit Risk

Because the secondary market relies on third parties to originate and service mortgages, the amount of risk exposure depends on managing what these third parties deliver. It is here that principal-agent conflicts are potentially most serious. As described above, the central conflict has been that mortgage originators and servicers make money primarily from origination and servicing fees and do not generally have a direct stake in credit risk.

The underlying choice issues for both buyers and sellers in the secondary market can be summarized as follows. The secondary market has to worry about the principal-agent conflicts, and knowledge of downpayment is not enough to control the conflicts. Fannie and Freddie have traditionally published guidelines that specify what is clearly all right, and the guidelines allow lenders to use their judgment to go outside the guidelines if there is some compensating factor such that credit risk is unchanged (i.e., that the loans still be "investment quality"). For instance, a high downpayment may be enough to compensate for a bad credit history or high mortgage payment relative to borrower income. However, guidelines do not clearly specify exactly what the tradeoffs are; lenders are meant to exercise their own judgment, subject to occasional review. If the lenders are conservative, the guidelines can be a series of hoops through which borrowers must pass rather than a set of tradeoffs. The potential punishment to lenders who go outside the bounds and deliver excessively risky loans is that the GSEs do quality control sampling of loans and can make sellers repurchase the loans, which is costly, and if they deliver too many low quality loans they may not be allowed to sell more mortgages to the GSEs.

Hence, the choice problem for the lender who wants to sell mortgages has been that it can sell standard loans, which it will almost certainly not have to repurchase and/or sell nonstandard mortgages for which there is some risk of repurchase. Not selling (or not originating) nonstandard loans is safer but at the cost of missing some profitable business. Good originators can choose to sell nonstandard mortgages at relatively low risk of repurchase. There is a further choice, of course, which is either to violate the rules deliberately or be overly aggressive about what is creditworthy and make money from origination and servicing fees until caught. Entry into and exit from the mortgage origination business are relatively easy, which makes this a tempting strategy in some circumstances (e.g., firms in financial trouble, "gambling for resurrection").

There is something inevitable about all this. The secondary market needs to be flexible, but it needs to protect itself, and as a result, it needs to have a way to punish lenders who exploit their guidelines. Lenders, especially non-portfolio lenders (who are not in the business of holding mortgages and will probably have to sell loans that are sent back to them at a loss), need to worry about repurchase risk. For the secondary market to survive and to take advantage of the economies it has, it has to confront the principal-agent problem, which means that it might have to be more conservative in the loans it accepts than local portfolio lenders (like savings and loans) and more concerned with quantifying risks. Competition between Fannie and Freddie for the purchase of new mortgages tends to keep both institutions at some sort of margin between the benefits from volume and the costs of adverse selection.

An important aspect of controlling risks has been attempts to align the various interests

by requiring servicers to keep some sort of interest in their loans. One good example is the creation of valuable servicing contracts, which can be transferred if performance is bad. For instance, in the Ginnie Mae market, servicers are required to charge 44 basis points for servicing, but it costs less than this to service the loans. This extra income does not show up as higher interest payments for borrowers; rather it is a forced investment, which servicers must make to be able to service the loans, and it has little affect on market rates charged to borrowers (the actual cost of servicing loans does affect rates). The loan originators would prefer to charge a lower servicing fee, so that when the loans are sold into the secondary they have a higher coupon rate and can be sold at a higher price (or the cost of buying servicing rights would be smaller), which would give the servicers the money up front rather than as an investment in the pool of mortgages, which could be lost or taken away later. (The value of the right to service a pool of mortgages is on the order of one percent of the value of the pool.) If the servicer does not fulfill its obligations to Ginnie Mae, Ginnie Mae has the right to take all of the servicer's Ginnie Mae servicing and sell it, and it has this right before other claims (e.g., loans from banks) on the servicer.

There are similar incentives in Fannie Mae and Freddie Mac servicing, and an active market in trading servicing contracts has developed. This has facilitated the development of scale economies in servicing mortgages. Because these contracts are, in effect, annuities whose income stops when the mortgages prepay, they are subject to interest rate risk, and mortgage servicers are becoming increasingly aware that they are forced to be portfolio managers and hedge against interest rate risk.[9] Fannie and Freddie also require minimum amounts of capital by servicers, as a further way of ensuring that they have a stake in performing well.

This all helps, but it does not always provide good assurance that good loans will be originated or sold in the first place. This has been exacerbated by the advent of mortgage brokers, who make money from origination and have no stake after that. Indeed, Freddie Mac data indicate that loans originated by third parties have had higher default rates.

Recent changes in information technology are bringing about important changes in how risks are managed and on competition in the industry. The major innovation has been the use of technology to evaluate credit risk. In particular, Fannie and Freddie have both developed statistical automated underwriting systems that allow rapid decisions about what they want to purchase and what they do not want; the decision to accept can be made in five minutes,[10] and loans can be closed in five days, all at lower costs than before.

Fannie and Freddie's statistical credit scoring models use downpayment, credit history and a variety of other variables to evaluate credit risk. These models use much (but not all) of the same sort of information available to the depositories (who are, indeed, now using similar models), and they promise to use the information better (in part because they are using larger data sets than individual banks have), so that there is great potential for reducing the principal-agent conflicts discussed above, and much less need to delegate authority to mortgage originators. The statistical models automatically calculate the tradeoffs among different risk factors. This provides originators with greater clarity about what is acceptable; and indeed, once a loan is accepted, there is no repurchase risk as long as the information provided is accurate. Automated underwriting lowers the value-added of the originator, whose underwriting role is increasingly confined to loans that are at the margin or for which data are incomplete, or otherwise not useful.

Automation is producing a trend toward the secondary market taking more control over the origination process, which might be called *rebundling*. In the future it promises to allow entry into other more risky parts of the market and to price individual loans based on their individual risk, so that there will be fewer rejections, but a wider range of mortgage rates.

Interest Rate Risk

Both Fannie Mae and Freddie Mac finance most of their purchases with passthrough securities. Securitization effectively avoids almost all interest rate risk.[11] This is a marked change from the way mortgages were financed in the past. As was discussed above, savings and loans were traditionally short funded, which exposed them to considerable interest rate risk. It is also the case that Fannie Mae, before it introduced its passthrough securities in the early 1980s, was also short funded, and suffered from interest rate increases as well, to the point where it was insolvent on a mark-to-market basis. Securitization passes interest rate risk on to investors, who must then manage it. Many mortgage-backed securities go into derivative securities. This allows interest rate risk to be allocated among different investors in accordance with the types of risk they wish to take on, which effectively pushes unbundling yet one stage further.

Both Fannie Mae and Freddie Mac also have sizable holdings of mortgages that are funded by debt, rather than mortgage-backed securities (see Figure 3). However, having learned the lessons from the early 1980s, neither company is short-funded; both rely largely on long-term, callable debt or its equivalent (e.g., short-term debt and derivatives like interest rate swaps and options on swaps) to finance long-term mortgages. The advantage of debt funding is that investors like debt better than passthrough securities because if the debt is not callable

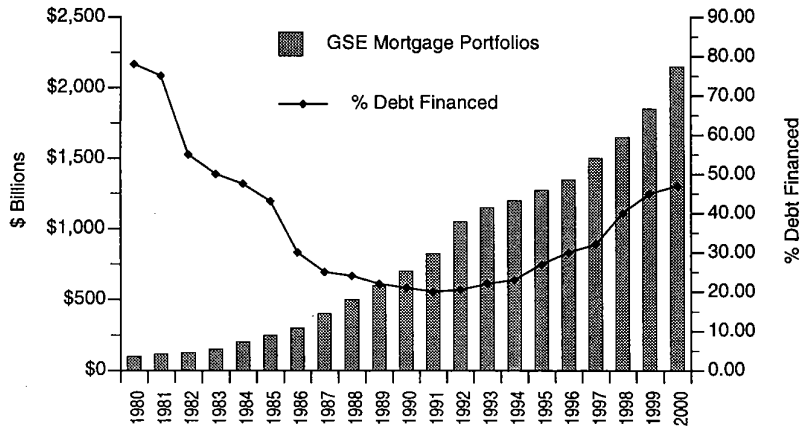
Fannie and Freddie take the call risk (and hedge it at lower cost than most investors have), and even if it is callable the circumstances under which it will be called are more transparent than the circumstances under which borrowers will prepay. Hence, Fannie and Freddie can raise money at lower cost by issuing debt even after adjusting for option costs. The disadvantage is that Fannie and Freddie run the risk that the models they use to estimate when borrowers will prepay will be inaccurate and/or their hedges won't work. For instance, it was the case in the 1990s that borrowers often prepaid faster than expected when interest rates fell, leaving Fannie and Freddie with the risk that they will have to reinvest at lower rates before they can call their debt.[12]

There is a further problem with prepayment risk, which is that there is much potential for adverse selection based on differences in prepayment behavior across borrowers. It has become clear that there is more to modeling prepayment behavior than simply the ruthless exercise of a call option. If depositories can tell which borrowers are likely to be less ruthless in exercising options (for instance, there is some evidence that low income and minority borrowers and borrowers with low loan balances and poor credit histories are less likely to present prepayment risk (see Van Order and Zorn [2000]), they can select against the secondary market.

This is a very broad issue, because selection problems arise at all levels of trading mortgages (e.g., some traders in mortgage-backed securities invest in information about prepayment characteristics of different mortgage pools, and they can select against other traders or investors). Asymmetric information among traders provides important incentives for Fannie and Freddie to continue the trend away from passthrough funding and toward debt funding. This is because they have superior information about prepayment risk relative to MBS investors' information, which they can exploit by funding mortgages with (the equivalent of) callable debt. Investors in debt, even if it is callable, have less chance of being selected against by other traders than do investors in passthrough securities. This, of course, exposes the secondary market to the above-mentioned risk from mistakes in its prepayment models, but that may be the best place to locate that risk.

Hence, there is a need for balance. There is more money to be made, on average, by financing mortgages with debt (well over half Fannie Mae's and Freddie Mac's profits come from the income from the 45% of their portfolios that are debt-financed), but there is also risk. This risk is not just from the imprecision of using debt to finance mortgages, but also because of management risks from controlling a large portfolio of debt and other hedging devices. Debt also provides flexibility. For instance, in 1994 when the CMO market fell apart and in 1998 when some hedge funds were dumping MBSs it was useful to have debt financing as an alternative (e.g., see Capital Economics [2000]).

Figure 3. Debt Finance of GSE Residential Mortgage Portfolios



Source: Fedral Reserve, OFHEO

Business Risk

Business risk comes primarily from the risk of the unknown that is associated with new business lines. To a large extent this is limited by Fannie Mae and Freddie Mac's charters, which limit them largely to residential mortgages. However, within this category there is still potential from unknown new risks. For instance, the extension of the statistical models used in automated underwriting to new and riskier areas may well be potentially profitable, but it runs the risk of losses from bad parameters.

A relatively new and rising market in the U.S. is the "subprime" market (see Lax et. al., [2000]), which has traditionally been the market in which borrowers with poor credit history borrow money by making big downpayments (exploiting the equity they have in

their houses) and paying higher interest rates (2 to 5 percentage point higher than in the "prime" market where Fannie and Freddie have traditionally operated). Both GSEs are moving, cautiously, into this new market. The caution is in part because of business risk. Recent research at Freddie Mac suggests that default risks of loans that have been made in the subprime market can be ordered by default models estimated with prime market data, but the magnitudes of the risks are larger than would be predicted from data taken from the prime market. Here business risk, not knowing enough about a new line of business, is combined with principal-agent conflicts because the potential for information asymmetry is large in this new market.

Management and Operations Risk

To a large extent, management and operations risks are the same for secondary market institutions as for most other businesses. An area worth emphasizing, given the size of Fannie Mae and Freddie Mac's mortgage portfolios, is that of computer systems. A large percentage of Fannie and Freddie employees are involved in one way or another in processing information, about mortgage purchases or mortgage prepayments, or monthly mortgage payments, or the sale of mortgage-backed securities or payoffs to security holders. The two institutions currently have around 20 million individual loans in their portfolios, each of which is supposed to be making monthly payments, which in turn must, in most cases be passed on to investors. They bought well over five million loans in 1998, a quite busy year, and they lost about four million due to prepayments. All of this must be kept track of, which puts a great deal of responsibility on systems.

CAPITAL, RISK AND PUBLIC POLICY

The safety and soundness of Fannie and Freddie (as well as depositories) has been a major public policy concern for some time. This is because of the potential disruption from a collapse of these institutions and ensuing spillover effects and/or because an implicit guarantee and the implicit benefits that go with it can lead to misallocation of resources and/or bailout costs. A major concern has been whether or not GSEs (like depositories in the past) take on too much risk.

At some level most risks can be managed, particularly in the sense of keeping the risks from bankrupting the company. One way to achieve the latter is for the company to finance a large share of its investments with equity rather than debt. This is particularly important from a public policy standpoint if the financial institution has either an explicit or implicit government guarantee. The amount of capital (mainly equity, though it could be subordinated debt) needed to keep a company solvent with high probability depends on how risky its business is.

But capital decisions also involve principal-agent conflicts among the government (and/or taxpayers), shareholders and debtholders. Both depositories and the secondary market institutions have an incentive to put up as little of their own money as possible, so that they can leverage their guarantee. Furthermore, having to make regular interest payments forces discipline on management, which also benefits shareholders, and in the U.S. interest expenses are tax-deductible but dividends are not, which provides a tax incentive to issue debt rather than equity.

Hence, there is a potential conflict between a guarantor's needs for safety and the shareholders' profit motive. The conflict is not inevitable. Because Fannie Mae and Freddie Mac have valuable charters, which no one else has, they have incentives not to take on too much risk and not to be undercapitalized, lest they lose the franchise that comes from their charters. A major factor in the risk-taking by the thrifts in the 1980s was the fact that free entry, competition from the rest of the capital markets and bad luck greatly diminished the value of the thrift franchise and left them with little to lose and much to gain from increased risk-taking.

Nonetheless, the potential for risk-taking is real, particularly if either company starts to lose money and loses franchise value; and while credit risk on single-family mortgages is generally quite small in the U.S. it is possible to take on interest rate risk quite rapidly. This means that the government has to worry about safety and soundness, particularly about whether the institution has enough capital relative to its risk. Much progress was made along these lines with respect to Fannie Mae and Freddie Mac in 1992 when legislation set up capital standards, but safety and soundness is still a controversial issue. The centerpiece of the new standards is the use of stress tests, as well as minimum capital ratios, which simulate the companies' performance through stressful environments that are taken to represent scenarios when risks have taken a particularly bad turn. The 1992 legislation requires that both companies have enough capital to survive 10 years of stress, in three different scenarios that involve both serious interest rate risk and credit risk, and prescribes actions to be taken if capital is insufficient. The minimum standards apply even if the stress test requires no, or little, capital.[13]

Stress tests represent a major improvement in capital regulation compared with the historic tendency to rely on accounting capital ratios such as those associated with the Basle Accord of 1987 (e.g., hold 4% capital against single-family mortgages and 8% against commercial loans, where capital is measured by book rather than market value; see Basle [1987]), which were only loosely related to risk. Such ratios can hide more than they reveal. Because they rely on book rather than market values, they can give the

appearance of capital adequacy when an institution is really in trouble, and, as was the case with the savings and loans in the 1980s, they can be "gamed" by firms who inevitably have better information than regulators and can hide risk (e.g., by moving it off balance sheet). Stress tests can differentiate among subtle differences in risk (all single-family mortgages are not of equal risk) and can take account of some kinds of diversification benefits (some types of assets might systematically do well when others are doing poorly). Indeed, capital regulation in the U.S. is moving beyond stress tests and looking at more sophisticated, probabilistic models that estimate, for instance, the amount of capital necessary to be, say, 99% sure that an institution won't fail over some period of time. It is apparently the case that the new version of the Basle Accord will have a wider range of capital ratios than the old version and use of fancy models to estimate failure probabilities.

Stress-test-based capital requirements also present important management problems for the companies. Because traditional capital standards specify required ratios of accounting capital to book value of assets, it is relatively easy to see how the ratios are moving, and they generally move slowly, giving management time to adjust to change. Stress test standards are more realistic, but stress test results can be quite volatile. Hence, management in its planning must estimate the probability of the stress test results becoming bad, and will probably want to build a cushion against unforeseen changes.

Finally, while it is clear that Fannie and Freddie cause mortgage rates to be lower than otherwise, there is a controversy over whether that is a good thing. On the one hand, it can be argued that lower rates represent a subsidy for housing that distorts capital flows. On other hand, it can be argued that homeownership is socially beneficial, and that Fannie and Freddie make contributions to promoting homeownership and stabilizing markets, improving resource allocation and lowering the real cost of making loans. As yet, we do not have much empirical work to evaluate these differing propositions (see Van Order (2000b) for a discussion).

APPLICATIONS TO DEVELOPING MARKETS

Can the benefits and /or lessons of the U.S. secondary market be exported to other countries? Some can, but it may well be the case that the principal-agent problems discussed above will be more difficult to manage in other countries. The lessons of the secondary market do not come from the details of how it operates in the U.S. (e.g., the use of sophisticated capital markets instruments like CMOs and automated underwriting systems). These details probably cannot or need not be exported. Depository-based systems can, with the right laws and regulations, do much the same thing as secondary markets. Indeed, about 80% of the increase in homeownership rates that took place in the U.S. from the 1940s until the present took place by the 1960s with a system that was largely depository-based, primitive (relative to today's standards) in operation and with virtually no secondary market.

The success of Fannie and Freddie has come, in part, from the fundamental simplicity imposed on them by charter. The simplicity is that Fannie and Freddie function primarily as conduits with the capital markets, so that they work with market forces rather than against them. They have focused primarily on a particular part of the bundle, guaranteeing credit risk, primarily of single family mortgages, without taking interest rate risk, and they have done this primarily by relying on others, mainly mortgage originators and servicers, private insurers, and investors to accept most of the risk. As discussed above, however, some of this is changing, and we are beginning to see rebundling, largely because of innovations in measuring (automated underwriting) and managing (hedging vehicles) risk that are not widely applicable elsewhere, especially in developing countries. Nonetheless, the basics of what Fannie and Freddie do—take credit risk but not (much) interest rate risk—have not changed a lot.

What U.S. experience has shown, both before and after the advent of secondary markets, is that with the right legal and regulatory framework (in particular the ability to foreclose and evict and a good system for recording title to property, which make it possible for houses to act as real collateral) and a reasonably stable macro-economy, you can make money in single-family mortgages. Moreover, linking mortgage markets with capital markets can be done with minimal (if any) subsidy. While government has provided a backup role for some time, it can be argued that this role has involved rather small subsidies (e.g., for Fannie and Freddie it is hard to argue that subsidies in the form of low borrowing costs (there are other relatively small sources of subsidy) are as much as half a percent, and a case can be made that they are considerably less), which are largely controllable.

Applications?

Many countries do not currently have effective ways of linking lending markets with capital markets. Secondary markets might be a particularly good way of tapping international capital markets, particularly for long-term loans. This does not, however, mean that creating a GSE like Fannie or Freddie is a good idea:

1. The selection issues discussed above are likely to be more formidable in developing markets, where asymmetric information may be a bigger problem, because mortgage originators will have

access to all sorts of local information. Another factor is the difficulty of accessing things like credit history, historical data and automation. Underwriting will be left to originators who will inevitably be able to select the best loans for themselves. The problem is worse if foreclosure costs are high, in which case the house is not good security.

2. Banks are often in a position to access bond markets as well as deposit markets. A Fannie or Freddie-like institution might have no funding advantage over banks. Anything they could do banks could do, funding with deposits or bonds, and without the selection problems a secondary market institution would have.

3. Much of the infrastructure for unbundling would have to start from scratch.

4. A whole new regulatory scheme would have to be set up, with possibilities for too much risk-taking. For instance, a major effort to control interest rate risk would be necessary. As was the case in the U.S., taking interest rate risk (long-term assets funded with short-term debt, possibly complicated with prepayment risk) can lead to trouble very quickly. Compounded by adverse selection problems, there is potential for insolvency, bailout costs and/or market collapse.

These, of course, are things regulators might also have to worry about with banks as well. A central question is whether new GSEs (banks are, after all, essentially GSEs too) add to risk and whether existing institutions, like banks, can do what GSEs can.

There is, of course, no reason in principle for not simply equipping the private sector with a legal framework that will let it evolve and securitize as it chooses, competing with banks, perhaps in the form of specialized mortgage lenders. Specialized portfolio lenders do not appear to be the direction in which mortgage markets around the world are moving. For instance, the distinction between thrifts and banks in the U.S. is fading rapidly, and the building societies in the United Kingdom have basically become full service banks. Fully private securitizers (e.g., investment banks and mortgage banks) have not been very successful in most countries, but there is no reason in principle for opposing them. A problem, though, is that financial institutions in general might have automatic implicit GSE status. Hence, new institutions will have the potential to require future bailouts and/or require new regulatory regimes even if that is not the original intention. In that case, explicitly chartered GSEs with accompanying regulation might be preferable.

This is not to say that there need not be a role for government, but it need not be in the form of creating a secondary market. Some form of government guarantee might be useful, particularly in attracting foreign investment. A major obstacle to getting a mortgage market off the ground can be the credibility of foreclosure laws, especially in countries where foreclosure laws have recently been adopted and there are questions about the ability to enforce the laws, as well as poor information about risk. It might be possible to provide guarantees designed to promote credibility, for instance, by putting the banks in a position to take the first loss on mortgages, according to estimates of a reasonable level for normal losses (assuming the foreclosure laws work). The government would take the risk beyond that, which it is better prepared to accept, by covering losses due to unenforceability of the foreclosure laws and other catastrophic losses. Because of their first loss positions, banks would have incentives to underwrite loans properly.

This need not require creating a Fannie or Freddie, but a GSE structure with private ownership and value-maximizing incentives is likely to be a more efficient way of providing guarantees and starting up a mortgage market than is a state-owned corporation. A substitute for Fannie and Freddie, which is also a GSE, is a liquidity facility like the Federal Home Loan Bank System in the U.S., which takes very little risk, because it lends against over-collateralized pools of mortgages so that banks take the first loss, but nonetheless also connects mortgage and capital markets. Clearly, a concern with any GSE-type setup, or any government intervention, is the details of the charter, responsibilities, incentives, etc., which will be filtered through a political process that may not get everything right.

It is a central fact of life that capital is scarce in developing markets. The most markets can do is allocate it efficiently.

NOTES

[1] Ginnie Mae does not actually purchase mortgages, but it does essentially the same thing by guaranteeing the timely payment on its passthrough securities.

[2] A third GSE is the FHLB System mentioned above. Because the FHLB System is owned by its members, depositories, it is best viewed as an extension of the depository charter. It is, however, changing and will be discussed in somewhat more detail below.

[3] For a discussion of Fannie Mae and Freddie Mac history, see Weicher (2000).

[4] At the time Fannie Mae's lending counted as spending, which was offset by repayments, which were counted as negative spending. However, because it was growing it contributed, in an accounting sense, to the (at the time) high level of government spending.

[5] While Fannie Mae and Freddie Mac are off-budget, there is a separate federal credit budget which does analyze their risks. See Budget of the United States, 1992.

[6] This loan limit is indexed to a house price index calculated by the Federal Housing Finance Board, which regulates the Federal Home Loan Banks.

[7] This may seem like an odd way to hold mortgages, but there is a point it. The point is that if Fannie or Freddie choose which loans to hold and which to sell, the market will assume it is being selected against (keeping the ones with the least prepayment risk) and will be reluctant to hold the securities. When the securities are repurchased Fannie and Freddie traders purchase them with the same information (about pools) as everyone else, mitigating the selection problem.

[8] That is not to say that there is no risk. Compensation schemes could induce conflicts of interest inside the firm. The point is that conflicts inside the firm are easier to resolve.

[9] In this sense all mortgage-backed securities are derivatives because an interest-only strip has been removed and sold separately to servicers.

[10] Automated underwriting systems do not generally reject loans; rather they refer them back to the lender for more work, perhaps with a signal that the loan looks bad and there is serious repurchase risk.

[11] I say almost all because there are some remaining risks that come from the inability to predict borrower prepayments. For instance, prepayments are not passed through immediately, which expose Fannie Mae or Freddie Mac to losses from "float."

[12] Callable debt is usually issued with the provision that it cannot be called before some future date. Fannie and Freddie try to issue portfolios of callable debt with different call dates in a way that matches the way mortgage borrowers prepay, so they run the risk that the call dates will not be soon enough to match prepayments.

[13] For recent reports see Congressional Budget Office (1996) and United States Treasury Department (1996). The safety and soundness regulator of Fannie and Freddie, the Office of Federal Housing Enterprise (OFHEO) puts out annual reports. (Its website is www.ofheo.gov.).

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