

Benefits to Homeowners
From Mortgage Portfolios Retained by Fannie Mae and Freddie Mac

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I. Introduction.

A consistent Federal policy favoring housing finance has made home ownership more feasible for millions of Americans. On the borrowing side, most mortgage interest is tax deductible; it represents the single largest deduction for many families. On the lending side, the Federal Government has been instrumental in fostering and maintaining the mortgage market, which has become one of the largest and most liquid fixed-income markets in the world, exceeding \$5 trillion in outstanding debt. The U.S. mortgage market is the envy of every other country².

Federal policies influence both the primary and secondary mortgage markets. For example, Federal insurance is provided for depositors in mortgage originating entities while credit enhancement is supplied by Fannie Mae and Freddie Mac, the government-sponsored enterprises (GSE's), and by the federal housing agency GNMA.

It is impossible to overstate the importance of credit enhancement in the process of mortgage securitization, one of the most prominent and striking features of the secondary market. Since mortgages have promised payments for up to thirty years, the GSE credit guarantees are very long-term commitments and hence are made more credible by the government's association. Mortgage-backed securities (MBSs) would exist only to a

¹ The author is grateful for constructive comments from Marsha Courchane, Edward Golding, Paul Kupiec, David Nickerson, Stephen Ross and Robert Van Order, none of whom was willing to accept responsibility for the remaining errors.

² Cf. Myerberg, chapter 12 in Kendall and Fishman [1996].
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limited extent if every individual mortgage backing each security pool were subject to default risk. Such idiosyncrasy is the enemy of a liquid and active market.

Thirty years ago, in fact, most mortgages were held until termination in the portfolios of originating entities, mainly thrift institutions that were faced with two dilemmas. First, their assets and liabilities were unavoidably mismatched, which resulted in chronic distress during periods of volatile interest rates. Second, mortgage loans could be sold to other investors only by offering substantial discounts to compensate for asymmetric information about credit quality.

Securitization solves both problems. The underlying mortgage loan cash flows can be apportioned to investors with more congruent horizons while the securities themselves, being of homogeneous credit quality, are inherently more liquid. There is, in fact, a very large volume of daily trading in the MBS market today. Mortgage originators no longer face inescapable problems for they can now package and sell MBSs with the aid of the GSEs or sell them the mortgages outright as “whole loans.”

The rapid growth of the secondary MBS market has been accompanied by ingenious developments designed to appeal to a broader spectrum of investors than would ever be enticed by a basic mortgage pass-through security. Collateralized mortgage obligations (CMOs) and other derivative securities have succeeded in attracting such investors, both foreign and domestic. Such securities serve two fundamental purposes: (a) they alter the timing of mortgage cash flows, which allows investors to select diverse pieces more compatible with their unique preferences and (b) they allocate mortgage risks to those with greater tolerance.

A mortgage is a risky investment. The borrower will sometimes default when the residential collateral falls in value below the mortgage’s outstanding loan balance. So housing price fluctuations represent a cause of great concern to lenders (and its mitigation is the objective of careful screening and underwriting with respect to both the borrower and the property being financed.)

But even when this credit problem has been alleviated by the enhancements mentioned earlier, a mortgage is still a risky investment because it can be repaid, usually without penalty, any time prior to the originally stated maturity. Borrowers repay early for a variety of innocuous reasons including moving to more luxurious residences, being transferred to other regions, etc. But many also prepay when they can refinance their current property at a lower interest rate, just the moment when the lender does not want to be repaid because the funds are unlikely to be reinvested at the same yield.

Essentially, the mortgage lender has granted an option to the borrower, which extends over the entire lifetime of the loan. It is an option to purchase the remaining cash flows at a price below their net present value at current interest rates. Valuing and managing this embodied option risk, which exists at present in all mortgages, MBSs, and mortgage derivatives, turns out to be a serious and slippery task, the domain of specialists.

It is a tougher problem than is typical for most other types of options. For example, equity warrants, corporate bond redemption options, options on currencies and the like are easier to deal with because the option holder can be relied upon to behave predictably; i.e., to exercise the option at an appropriate moment. Mortgage prepayment options, however, are held by homeowners, who are not usually finance experts and are sometimes inattentive to prevailing interest rates. Virtually none is equipped to tackle the complicated mathematical calculations required to determine a truly optimal exercise point in time. There are, of course, suggestions in the press and solicitations from mortgage brokers about refinancing, but whether a homeowner succumbs to such temptations at a particular moment depends on intricate psychological deliberations.

Hence, the mortgage investor is obliged to become a behavioral scientist as well, to get into the heads of homeowners in an effort to understand their logic or lack thereof. Correct prepayment forecasting is literally worth an enormous fortune, which is why many large MBS investment firms spend millions on the effort. A still broader array of investment capital would be attracted to U.S. mortgages if prepayment risk were reduced.

This is exactly where the Federal government has been helpful once again. By granting charters to Fannie Mae and Freddie Mac and maintaining a special relation with them³, it has augmented the GSE's own sound practices of risk and capital management. This has enabled them to secure the highest possible corporate credit rating and thus to borrow at the lowest conceivable rates.

Their non-callable corporate debt instruments are devoid of prepayment risk while their callable bonds are only indirectly exposed. Most funds raised in these borrowings are used to purchase "retained portfolios" consisting of MBSs and whole loans. Essentially, this resolves the second basic risk of mortgage investing. Purchasers of Fannie Mae and Freddie Mac non-callable bonds are in fact channeling funds to homeowners but are doing so without exposing themselves to either credit or prepayment risk. Purchasers of callable bonds bear the risk that the bonds could be refunded early if interest rates fall, but at least they need not become behavioral scientists. They can rely on reasonably predictable refunding decisions by Freddie and Fannie.

Given a desire to foster home ownership, it appears that the Federal government has adopted an array of appropriate policies. It is also worthwhile noting that its sponsorship of Fannie Mae and Freddie Mac has never cost the taxpayer a penny in direct cash payment. So it seems reasonable to wonder why anything working so manifestly well as the mortgage market in the U.S. should be tinkered with even slightly.

The basic issue at the present moment involves the benefits to homeowners of the "retained portfolio" investments of Fannie Mae and Freddie Mac. Could those benefits be provided as readily without the existing charters or more efficiently by other organizations? To answer this question it will first be helpful to tabulate relevant data about the composition of the retained portfolios and their sizes relative to all mortgage debt. This is provided in Section II. Section III discusses in more detail mortgage portfolio valuation and management and assesses whether it could be done as effectively by the plethora of domestic and foreign lenders now providing funds indirectly to US homeowner/borrowers. In Section IV, the need to access foreign sources of mortgage

³ For details about these charters and an analysis of their impact, see Van Order [2000].
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capital is advanced and discussed. Section V evokes some evidence about mortgage borrowing rates suggesting they are lower because of the existence of the Fannie and Freddie retained portfolios. Section VI discusses some ancillary benefits of the retained portfolios such as their usefulness in dampening the impact of financial crises.

My overall conclusions are simple. Federal policy toward Fannie Mae and Freddie Mac is accomplishing its intended purpose: It makes housing more affordable to a broad range of Americans. Reducing or removing the special relation between the GSEs and the government would likely increase mortgage borrowing costs and reverse the long sequence of Federal policies that has produced the highest proportion of home owners of any national population in history.

II. The Retained Portfolios.

Total mortgage debt outstanding has risen sharply during the last decade. As shown in Figure 1, the total was about \$2.7 trillion in the first quarter of 1990. By the fourth quarter of 1999, it had almost doubled, to \$5.2 trillion. As a comparison, the total amount of cumulative borrowing by the Federal Treasury, (the national debt), was about \$5.7 trillion in August 2000. The national debt is now shrinking with budget surpluses while mortgage debt appears to be growing at a slightly accelerating pace; so American mortgages should soon become the single largest class of fixed income securities on the planet.

A large part of the growth in demand for mortgage debt has been supplied by Fannie Mae and Freddie Mac via two distinct channels. First, their traditional securitization activity increased in relative importance from 1990 through 1993 and now accounts for roughly 25% of all mortgage debt. Second, their retained portfolios of directly purchased whole loans and MBSs rose steadily during the past decade from about five percent to more than sixteen percent of total mortgage debt. Because some MBSs securitized by Freddie and Fannie are held in their retained portfolios, one cannot just add the two fractions in Figure 1 to determine the total proportion of mortgage debt accounted for by their activities. It must amount, however, to at least one third of the U.S. total.

The retained portfolios are becoming a more important element of mortgage investing. This is particularly true since the beginning of 1994 because securitization has declined slightly as a fraction of total mortgage debt while the retained portfolios have roughly tripled as a fraction.

Figure 2 depicts the Fannie and Freddie retained portfolios relative to their total mortgage activities. The current proportions, around forty percent, actually understate the role of the retained portfolios due to double counting mortgages securitized and then retained.

These data reveal that Fannie and Freddie are extremely important conduits of capital from lenders to homeowner/borrowers. Their retained portfolios at the end of 1999

amounted to about \$847 billion, \$523 billion for Fannie Mae and \$324 billion for Freddie Mac. Lenders have voluntarily selected this indirect method of mortgage investing for an obvious reason: they consider it more suitable to their risk preferences and lending guidelines. Hence, any abatement of this activity would likely have a gravely depressing impact on mortgage prices in the secondary market and bring about an increase in interest rates on new mortgage originations.

III. Prepayment Risk and Mortgage Investing.

All of the leading Wall Street investment banks and many investment management firms have developed proprietary prepayment forecasting models. Their sophistication has steadily increased over the past fifteen years to the point that the lack of such a model is a major barrier to entry into the field of mortgage trading and investing. A firm with an inferior prepayment model is at a significant competitive disadvantage.

Prepayment models are usually based on extensive econometric analysis of historical prepayment data. All prepayment modeling starts with such data but not every entity possesses data of the same quality. In fact, the GSEs have the best data because they know the composition of every pool they have securitized and they also have detailed information about their own retained portfolios.

Such details are very important because prepayments turn out to depend on a number of factors. Typical models include (a) refinancing incentives: current mortgage rates compared to the existing rates on the old mortgages; (b) Seasoning: the age of the mortgage; (c) Seasonality: the time of year; (d) Burnout: past prepayment experience of similar mortgages; (e) Geographic location of the underlying collateral property; (f) Type of loan: e.g., 30-year or 15-year level pay, adjustable rate, fixed/adjustable combination; (g) Assumability; (h) Loan amount; (i) General economic conditions; (j) Volatilities of interest rates and real estate prices⁴.

Even when models agree on the array of possible explanatory factors, they often differ in their empirical proxies for those factors. For example, one model might proxy the refinancing incentive by taking the yield difference between the current rate on new mortgage originations and the coupon of the old mortgage while another model might use

⁴ For a general discussion of prepayment models, see Fabozzi [1996, ch. 11]. Richard and Roll [1989] discuss a typical model used by an investment banking firm and Patruno [1994] discusses an updated and expanded model used by the same firm. Beckett and Morris [1991] is a good example of just how detail-oriented prepayment modeling can become.

the ratio of same two rates. For a factor as nebulous as burnout, there are literally as many different empirical proxies as there are sensible models⁵.

Prepayment data are readily available for MBSs but since these are pools of mortgages, loan-level detail is often incompletely known except by the originators and securitizers of the specific pool. Consequently, compared to investment banks and managers the GSEs have a advantage in modeling prepayments with data from their own pools. Whole loan data are even more problematic due to greater diversity of individual loans.

A good illustration of the prepayment data problem is given by MBS trading activity and settlement. Trading can be either “pool-specific” or “generic” meaning, respectively, that the transaction must be settled with a particular serial-numbered pool or settled by delivery of any pool with a given coupon and guarantor; e.g., by any GNMA 7%. Generic trading prices are lower than the average pool-specific prices because a low-valued pool from the generic class will inevitably be delivered by the seller.

Prepayment modeling is a major task in mortgage investing but the valuation problem is not finished when the model is complete. The prepayment model becomes one component, a very important component, in a numerical calculation, or “Monte Carlo,” simulation of cash flows. At this stage, investors depart from one another again in their assumptions about the stochastic processes of future interest rates, the simulated random fundamental driving factors in the next step of the valuation process. Various theories of the term structure of interest rates are used as guidelines for specifying the stochastic process of cash flow discount rates and mortgage refinancing rates. There must also be a specification of correlations among rates along the term structure, based either on theoretical reasoning or empirical estimation.

Then the computer is set to work. It generates a hypothetical path for future interest rates, computes the prepayments implied by the model conditional on the interest rate path, and determines the conditional cash flows from prepayments and scheduled payments. Some valuation methods then discount the cash flows at a yield spread added

⁵ For an example, see Hayre [1994].

to an underlying set of simulated riskless discount rates; the spread is chosen so that the discounted net present value of the cash flows matches the current market price of the mortgage. Repeating this calculation a number of times provides an average spread, often called the “option-adjusted spread” (or OAS) which is supposed to reveal the investment worthiness of the mortgage. If every step is done correctly, the OAS purportedly gauges the extra return an investor should expect to receive above and beyond the return required by the risk involved.

Needless to say, given the multifarious differences possible in such a procedure, even sophisticated investors can come to markedly diverse conclusions about mortgage values. Perhaps this explains, at least in part, the large volume of trading. It should be noted that such differences are magnified with unusual features such as very high or very low coupons, old ages, and especially for mortgage derivatives such as REMICs, IOs, and POs⁶

Investor experience with the resulting valuations has not always been happy. One reason seems to be that prepayment models based on historical data fail spectacularly when conditions depart from past experience. For an interesting analysis of the unexpectedly volatile 1992-94 period, see Breeden [1994]. More recent analyses (e.g., Brown, 1999) even find that OASs depend on the level of interest rates and are highly correlated with corporate credit spreads. Kupiec and Kah [1999] attribute the very existence of the OAS to misspecification in the prepayment model. At a minimum, all this research suggests that mortgage prices probably respond to alterations in general market liquidity and certainly to things no one yet fully understands.

In summary, successful mortgage investing requires a highly sophisticated, imaginative, experienced, and well equipped analytic team. It is probably destined to always be the province of a limited number of specialized financial intermediaries who have the necessary economies of scale. Capital to homeowner/borrowers will be supplied most efficiently through such entities.

⁶ REMICs are the successor to CMOs. IOs and POs refer, respectively, to the interest and principal payments stripped apart from a whole mortgage and sold separately. Fannie and Freddie Retained Portfolios, R. Roll, October 1, 2000

IV. International Sources of Mortgage Capital.

The current robust health of mortgage financing in the United States is threatened by one troubling phenomenon, a very low domestic savings rate. The Commerce department reported a national savings rate of negative 0.2% during July, the lowest level since record keeping began in 1959⁷. Combined with the continuing rapid growth of mortgage borrowing, this implies that there must be a reduction in non-mortgage lending or an increase in fund flows from abroad or both.

Foreign lenders are probably even more reluctant than domestic lenders to provide funds directly to mortgage borrowers. Mortgage prepayment and credit risks must appear formidable from a foreign viewpoint, so the GSEs should be all the more important in raising mortgage capital abroad. Over the past decade, foreign ownership of U.S. MBSs has increased significantly; See Figure 3. In the latest available year, 1998, non-US entities owned almost 13 percent of the MBS total. In contrast, they hold approximately one-third of Freddie Mac's outstanding debt issues,⁸ more than twice the fraction of their MBS holdings. It seems plausible to anticipate that the retained portfolios are destined to become an ever more important channel of foreign funds into U.S. mortgages, simply because many foreign entities will want to steer clear of the prepayment evaluation and management expenses required with MBSs.

Another advantage of the GSEs is their ability to design debt instruments with specific features attractive to foreign lenders. For example, the GSEs already issue floating rate LIBOR⁹ linked debt, a standard instrument in the international fixed-income market. Moreover, they can borrow at a rate somewhat below LIBOR, which reveals their outstanding credit quality, even better than the large London-based international banks. Over the past nine years (the data availability period to this writer) Federal Agency three-month debt has been sold at a yield spread 19.0 basis points below LIBOR on average. The time series of this spread is plotted in Figure 4.

⁷ See "U.S. Savings Rate Hits an All-Time Low," *The Wall Street Journal*, August 29, 2000, p. A2.

⁸ Private communication from Marsha Courchane of Freddie Mac's research staff.

In the future, as foreign capital becomes even more critical, the GSEs will probably sell more specialized debt securities, possibly denominated in Euros or Yen to be even more palatable and less risky. (Freddie is issuing a five billion euro reference note in the near future.)

It seems unlikely that many foreign lenders will find it efficient to sink funds into a large expert staff to predict prepayments or erect systems to hedge prepayment risks. Although hedging might be cheaper than assembling a mortgage team, it still requires sufficient creditworthiness, reputation, and collateral to assuage counterparty fears in the hedge market. These economies of scale and scope suggest that the GSE retained portfolios will become ever more essential in attracting foreign funds for the U.S. mortgage market.

⁹ London Interbank Offering Rate.
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V. The Retained Portfolios Reduce Homeowner Borrowing Costs.

There seems to be little argument that homeowner borrowing rates are in fact lower because of GSE activities, but it is not well understood whether this derives from their credit guarantees or from their portfolio investments or both.

Fannie Mae and Freddie Mac are able to borrow at interest rates lower than competitors who are not government sponsored¹⁰, but this would not inevitably guarantee lower mortgage rates for homeowners. The favorable GSE borrowing terms must be passed along. To what extent does this happen? Recent empirical work by Gloria González-Rivera [2000] shows that MBSs are purchased by Fannie and Freddie when MBS yields are high relative to Treasury yields. These purchases are followed by a reduction in secondary market MBS yields and, more important, by a smaller (by about one-half) but still significant reduction in **primary** market mortgage rates. This is direct evidence that homeowners actually do enjoy lower borrowing costs because Fannie and Freddie are able to raise relatively inexpensive capital.

Another interesting and pertinent piece of empirical evidence is provided by borrowing rates on mortgages that are never purchased by Fannie and Freddie. There is one such class in the U.S.: so-called “jumbo” mortgages whose loan amounts exceed the maximum acceptable as “conforming” to Freddie and Fannie standards. Currently, the original amount of a conforming mortgage cannot exceed \$252,700.

Jumbo mortgages differ from conforming mortgages in a several respects other than size. The underlying real estate collateral for jumbos is obviously more valuable and jumbos have lower loan-to-value ratios on average. Jumbo borrowers tend to have higher incomes and better credit standing. Taking all these things into consideration, it would seem that jumbo mortgages possess credit quality no worse than conforming mortgages and perhaps somewhat better.

¹⁰ Figure 4 plots the yield spread advantage of Federal Agency debt compared to AA-rated financials. Fannie and Freddie Retained Portfolios, R. Roll, October 1, 2000

For thirty-year loans, Figure 5 shows that jumbo mortgages yields have been persistently higher than conventional yields, despite possibly better credit quality. A comprehensive study by Cotterman and Pearce [1996] provides interesting details and attempts to explain intertemporal changes in the jumbo/conventional yield difference. Their basic conclusion is that conforming mortgage borrowers benefit from cheaper capital channeled through Fannie and Freddie,

We interpret the results as evidence that interest rates on fixed-rate conforming loans continue to be more attractive [to borrowers] than rates on similar jumbo loans. We regard 25-40 basis points as the core range of the conforming loan differential....the differential primarily reflects the advantages of agency status, (p. 102.)

One should be a bit cautious about attributing the entire jumbo/conventional yield differential to GSE activity because jumbo borrowers might be more sensitive to refinancing opportunities. For example, Abrahams [1997], using a sample of non-agency whole loans, finds that refinancing sensitivity increases with the loan balance. However, Cotterman and Pearce [1996] report to the contrary that mortgage yields decrease with loan size, holding constant the loan-to-value ratio and other pertinent attributes of the loan.

Cotterman and Pearce also document a phenomenon clearly attributable to GSE activities. There is an abnormal clustering of mortgages precisely at the conforming upper limit and very few loans just above the limit. Evidently, borrowers who would otherwise have obtained somewhat larger loans settle for a lower amount in order to be conforming. This strongly suggests that they receive a lower borrowing rate as a consequence.

Finally, it seems likely that the observed jumbo-conventional mortgage yield difference is actually an underestimate of the GSE's impact on borrowing rates in general. Although jumbos are not purchased by the GSEs, their yields are probably affected because other direct mortgage lenders provide less capital to the conventional market. At the margin, mortgage-risk tolerant lenders are willing to accept lower jumbo yields than the extra-marginal lenders who would be providing mortgage capital in the GSE's absence.

Perhaps the best evidence of all that homeowners benefit from Fannie and Freddie's retained portfolios is the political opposition of competitors. Competitors must offer the same rates to mortgage borrowers as the GSEs offer, (otherwise they would find few takers), so their gross profit margin is the current market mortgage yield less their borrowing cost, which is typically higher than that of a AAA credit.

If Fannie and Freddie were displaced in their retained portfolio activities by, say, newly-established but lower-rated entities, a set of perfectly competitive current rivals would have exactly the same gross margins unless mortgage yields increased.¹¹ Consequently, their complaints strongly imply that they themselves believe mortgage yields would actually increase in such an eventuality. This is outright admission on their part that Fannie and Freddie are, in fact, passing along their lower borrowing costs to homeowners.

Despite the above-mentioned direct and indirect evidence, some observers have argued that GSE retention of their own MBSs "should" confer no benefits on housing markets. For instance, Miles [2000] testifies that

In order to repurchase the securities [MBSs], the GSEs must issue new debt. Given that U.S. capital markets are highly integrated, mainstream economic theory holds that there should be no lasting change in yields required by the market on either the debt or the MBS. As a result there should be no benefit to pass through to housing markets. (p. CRS-5, emphasis added.)

Miles does mention in a footnote, however, that "The exception would be if GSE debt and MBS were not good substitutes for one another..." Exactly! This is a main point of the present paper. No sensible lender, domestic or foreign, would consider them "good" substitutes because of their dramatically different exposures to prepayment risk.

Miles states mistakenly that GSE debt and MBSs would be good substitutes if "...the products are...well integrated in the capital markets." But there is no "mainstream

¹¹ If the GSEs' rivals are not perfectly competitive, they are currently earning rents and would be further enriched by the removal of Fannie and Freddie, to the general detriment of homeowners.
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economic theory” that well-integrated financial assets are good substitutes when they have markedly divergent risk characteristics. To the contrary, economic theory has long emphasized that risk sharing is the most important contribution of “integrated” capital markets to general welfare; Cf. Arrow [1964]. This principle is perfectly illustrated by the specialized ability of the GSEs to manage and control prepayment risk, thereby allowing other lenders to hold GSE debt rather than more risky MBSs.

VI. Other Benefits of the Retained Portfolios.

Retained portfolios provide some ancillary benefits that could not be obtained easily by securitization. An example is the ability to purchase less-homogeneous mortgages such as those with odd coupons. This same benefit is could in theory be provided by thrifts and banks to the extent that they retain such mortgages in their own portfolios. Indeed, those institutions enjoy a franchise because, unlike the GSEs, their portfolios are financed in large part by deposits that enjoy a full faith and credit guarantee of the Federal government. But many such entities are insufficiently equipped to cope with the inherent credit and prepayment risks of large mortgage portfolios, so the GSEs probably retain an overall net competitive advantage.

The GSE retained portfolios include large positions in MBSs that already have GSE credit enhancements. For instance, Freddie Mac buys its own Participation Certificates (PCs). There are three important aspects of this activity.

First, because of their large size and outstanding credit ratings, the GSEs can provide liquidity to the MBS market during periods of crisis. A recent example occurred in third quarter of 1998 when credit spreads widened dramatically on most corporate issues. In a statistical study of this episode, Capital Economics [2000] finds that MBS yields increased only modestly relative to Treasuries, by about fifty basis points, while loans not eligible for Fannie or Freddie purchase widened by as much as 150 basis points. They conclude that Fannie and Freddie purchases of MBSs “...stabilized home loan rates during the credit crunch...” and that “...mortgage credit remained available *and* affordable...” to homeowners, [emphasis in original.]

It is worth noting that Fannie and Freddie have compelling incentives to supply liquidity in the MBS market. They profit by purchasing MBSs when prices are low, which assumes, of course, they are skilled in recognizing when MBS prices fall below from their long-run equilibrium levels. Obviously, they would be unable to conduct this mutually beneficial business without being able to retain the MBSs in portfolio.

Second, purchasing at least some of their own MBSs alleviates a potential “lemons” problem for other MBS investors. Since Fannie and Freddie have better information about the underlying mortgage collateral, other investors might suspect them of keeping the “best” mortgages in portfolio and selling less valuable ones in packaged MBSs. Such a suspicion has the potential to decrease MBS values and to render the MBS market less liquid. But if everything is inserted into big pools and then some of the pools are repurchased by the GSEs, everyone is on a level playing field. Incidentally, from a credit perspective it makes no difference whether Fannie and Freddie hold mortgages directly in portfolio or repurchase their own pools. In both cases, they provide the credit enhancement.

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Figure 1. Total U.S. Mortgage Debt Outstanding and Fractions Securitized or Retained by Freddie Mac and Fannie Mae

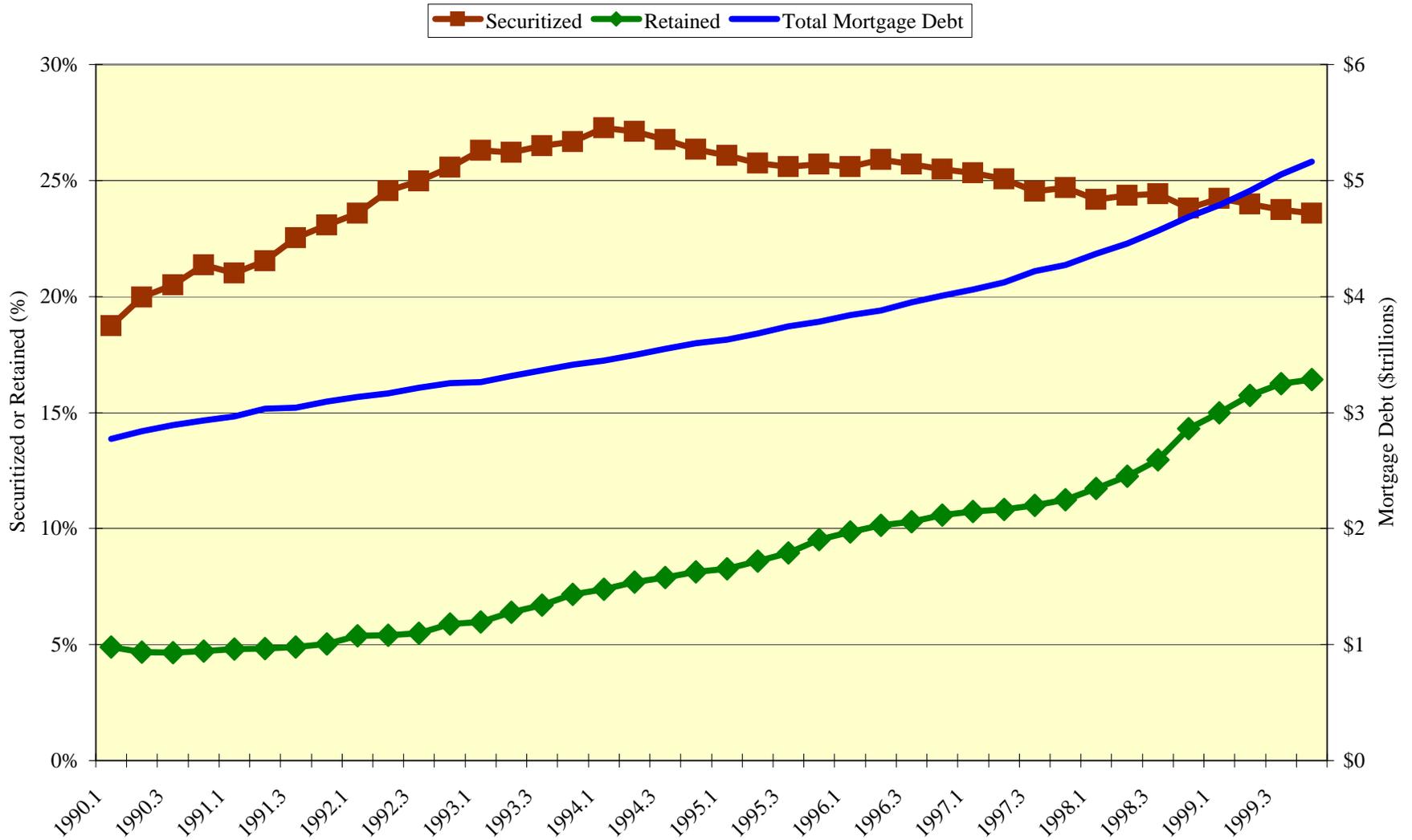


Figure 2. Freddie Mac and Fannie Mae Retained Portfolios as Fraction of Total Mortgage Activity

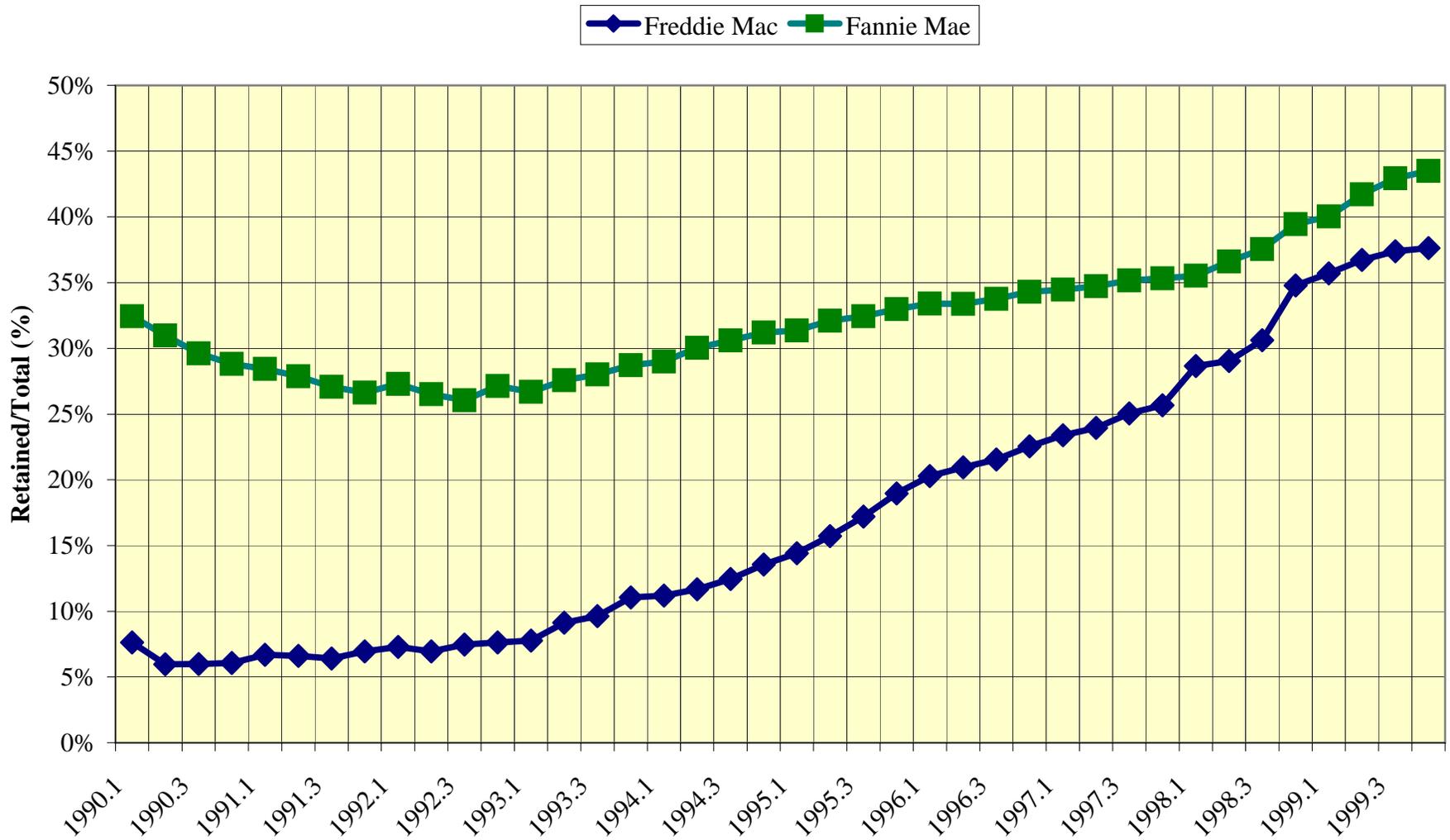
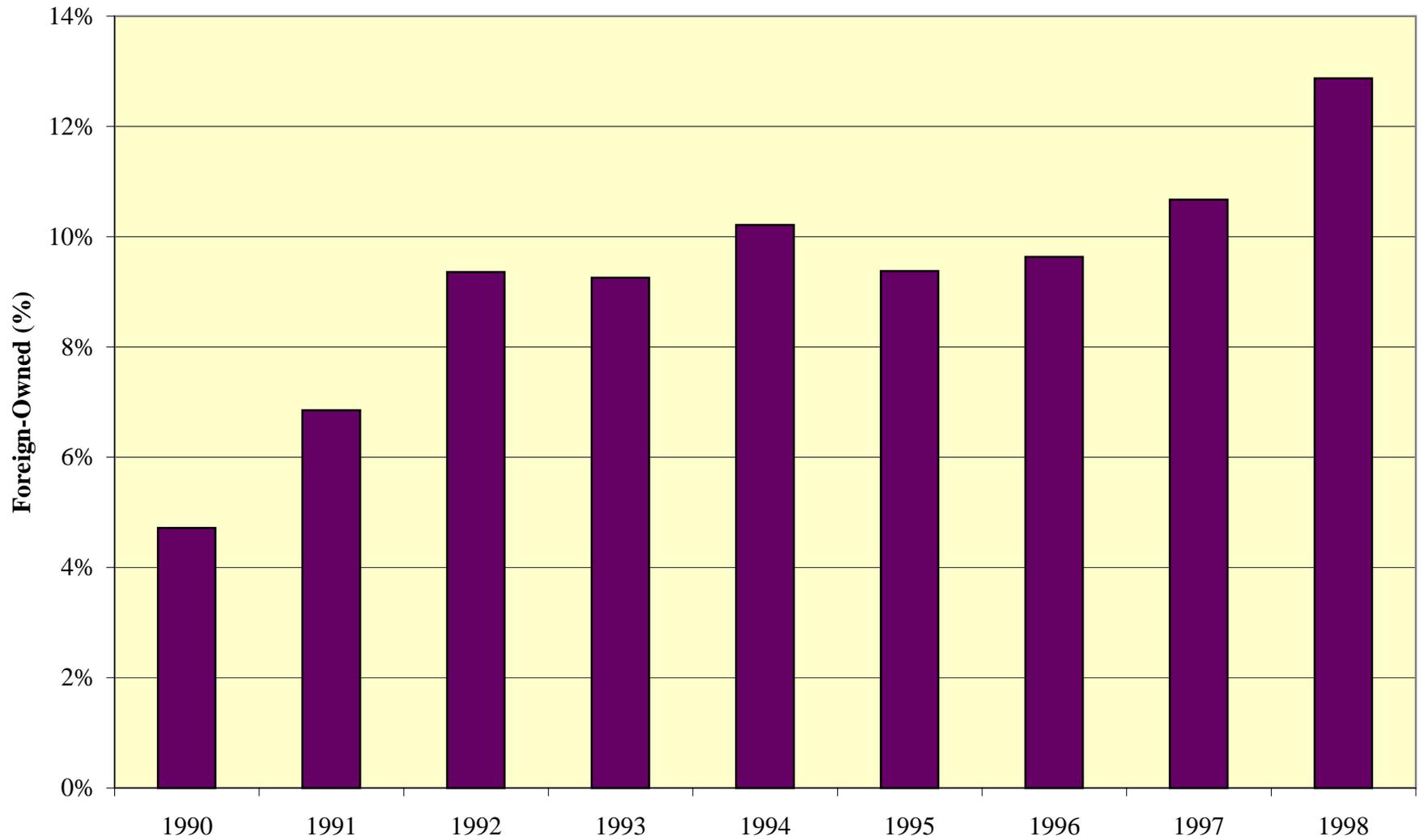


Figure 3. Mortgage-Backed Securities Owned by Foreign Entities



**Figure 4. Yield Spreads Over Federal Agency Debt
with Comparable Maturity**

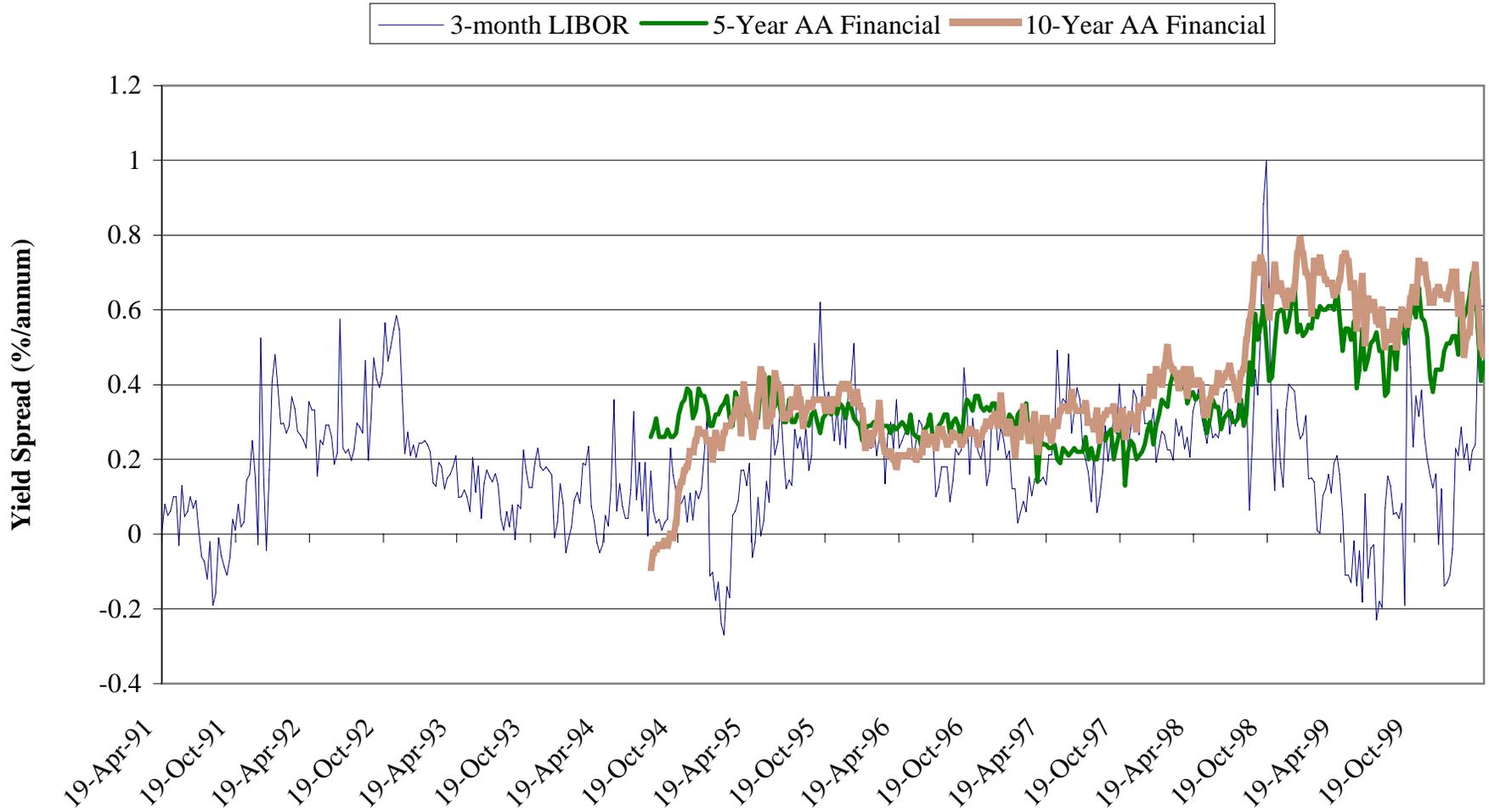


Figure 5. Jumbo Vs. Conforming Mortgage Yields

