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JANUARY 1999

Mortgage Research

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The Evolution of the Mortgage Origination Process

An Assessment of the GSEs' Streamline
Refinance and Automated Underwriting
Programs

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Acknowledgements

The authors wish to thank Eileen Contrucci and Eileen Farmarco for their meticulous preparation of the manuscript, and Peg Pisani for editorial assistance.

Changes in borrower behaviour and in the mortgage origination process can often lead to prepayment surprises. This paper examines changes in the refinancing process due to the GSEs' Streamline Refinancing Programs (SRPs) and Automated Underwriting (AU) systems.

The basic refinancing process has three steps: application, approval, and settlement (escrow). Each of these steps may have significant monetary and documentation hurdles associated with it, and borrowers typically still find the refinancing process time-consuming and expensive.

SRPs eliminate some of the steps in the standard refinancing process for qualified borrowers, and were first offered in the 1980s. Recently, the GSEs began to offer enhanced SRPs through selected lenders. The new programs further simplify the refinancing process.

AU systems were introduced in 1995, and the number of loans processed by these systems has increased dramatically over the past year. These systems expedite the refinancing process by using computer programs to make underwriting decisions.

The tangible cost savings realized by borrowers in both of these programs include part of the costs of an appraisal and a credit check. In addition, the processing efficiencies introduced by these programs reduce costs for the lender. Some of these intangible cost savings may be passed through to borrowers.

SRPs and AU systems have already lowered refinancing costs and will likely continue to do so in a gradual fashion over the next few years. However, although these lowered costs have created some refinancing efficiencies at "the elbow," we believe that the overall impact of these programs has been overstated. From a refinancing perspective, the most important change in mortgage markets over the past ten years has been the ability of borrowers to avoid paying refinancing costs up front by taking out no-point loans. Furthermore, it appears that the media effect continues to drive surges in refinancing activity.

Introduction

The refinancing wave of early 1998 led to prepayment speeds that were generally higher than expected. This event served as a salient reminder that things change and that past experience is not necessarily a reliable indicator of the future. Many factors, such as demographics, borrower sentiment, and the effect of the media, influence mortgage prepayment speeds, and many of these factors will change over time, often in ways that are difficult to estimate until there is a period of low rates. In this paper, we focus on how **changes in the mortgage origination process** may be affecting prepayment speeds. These changes stem from the development of:

- **Streamline Refinancing Programs (SRPs)**, which simplify loan underwriting requirements. More recently, the GSEs began to offer **enhanced SRPs**, which further simplify the refinancing process.
- **Automated underwriting (AU)** systems, which use computer programs to make underwriting decisions.

Although both these developments create efficiencies in the refinancing process and, therefore, could lead to faster prepayment speeds, much of the discussion about these topics is speculative, or seems based on incomplete information. In this paper we provide a comprehensive assessment of both these programs. First, we review the basic steps of the refinancing process in **Anatomy of a Refinancing**. Second, we describe the key features of streamline refinancing programs and discuss what advantages they offer over a standard refinancing in **Streamline Refinancing Programs**. Third, we offer an overview of the GSEs' Automated Underwriting systems, and detail how they affect the refinancing process in **Automated Underwriting Systems**. In the final section, **Implications for Prepayments**, we analyze the contribution of these programs toward changing borrower refinancing behavior. Appendix A summarizes **Enhanced SRPs**, while Appendix B looks at the **Ginnie Mae SRP and its Effect on Prepayment Rates**.

Anatomy of a Refinancing

We begin by giving an overview of the various steps involved in refinancing a mortgage. Despite improvements in the mortgage origination process, refinancing a mortgage loan can still be complicated, time consuming, and expensive. The time and effort spent in the refinancing process begin even before a refinance application is filed. At this preliminary stage, borrowers evaluate if “now is the best time to refinance”¹ by shopping around for the best rates, estimating the savings on their monthly payments if they were to refinance at current rates, deciding if they should wait for lower rates, and finally, considering if they want to restructure their debt either by borrowing on their equity or by altering the term on their mortgage.

The application process.

The first formal step in a refinancing consists of filing an **application**. This step often involves assembling a comprehensive package of documents, which the lender uses to determine whether the borrower qualifies for mortgage credit. Borrowers who are self-employed or paid by commission, have a history of credit problems, or who own property are required to provide additional supporting documentation.

The heart of a refinancing consists of **loan approval** and **settlement (escrow)**. The loan approval process is carried out or coordinated by the lender based on documents submitted by the borrower with the mortgage application, while the activities under the settlement process are orchestrated by a Title or Escrow company, or by a real estate attorney, depending on the state. The mechanics of each of these processes are as follows.

Loan Approval

Constituents of the loan approval process

The standard approval process involves:

- A **credit check**, which involves reviewing the applicant’s mortgage payment history and obtaining their credit report.
- **Qualification**, or determination of the **ability to pay**. This involves (i) verifying income and financial assets by means of W2s, pay stubs, tax returns, and bank statements; (ii) determining liabilities, typically through the credit report; and (iii) calculating **qualifying ratios**, namely computing the ratios of monthly mortgage debt payment to monthly income and total monthly debt payments to monthly income.
- A determination of **property value**, typically by means of an **appraisal**.

When this process is complete, and the lender has approved the loan application, the result is a **mortgage commitment**, which is valid for a specified number of days (typically 60).

¹ A catch-phrase often used in advertisements by mortgage brokers and lenders.

Settlement (Escrow)

*Constituents of the
escrow process*

The settlement process allows the lender to ensure that the borrower has legal title to the property, and complete other formalities related to funding the mortgage loan. The various steps in the settlement process include ordering a **title search**, obtaining **title insurance**, **deed preparation** and **notarization**, obtaining a **survey**, procuring **loan documentation**, and completing the **closing** with the borrower, which entails paying off the existing loan and disbursing funds. Finally, lenders require the establishment of an escrow or impound account. Lenders use this account to ensure that borrowers pay off their real estate tax bills, hazard, and flood insurance premiums, and mortgage insurance premiums (if applicable) on a timely basis.

*Each stage of the
refinancing process has
a time and cost
dimension associated
with it.*

The above discussion shows that we can bracket the refinancing process into three stages: **application**, **approval**, and **escrow**. Each of these stages has a **time** and/or **cost** dimension associated with it. Enhancements to the refinancing process, such as those achieved by SRPs or AUs, reduce or even eliminate the time spent or the cost incurred in some or all of these stages. To begin with, however, it is most useful to consider the time and cost associated to the different stages of a standard mortgage refinancing. Figure 1 presents estimates of the typical fees charged, and typical amount of time spent in each stage of a representative refinancing. This information has been obtained by talking to lenders, and from the web pages of major originators and other mortgage market participants.

Figure 1. Time and Cost Estimates for a Standard Mortgage Refinancing

Step in Refinancing Process	Typical Time Taken	Typical Fees Charged	Typical Fee Amount	Comments
Application	NA	Application	\$225	Often waived or may consist of the fees for the appraisal and credit report.
Loan Approval	Few days to two weeks	Appraisal	\$300	Paid to property appraiser.
		Credit Report	\$50	For report summarizing borrower's credit history.
		Document Preparation	\$175	Covers the costs to prepare final legal papers.
		Flood Certification	\$25	Charged for certificate that informs lender of the flood zone classification of the property.
		Origination	One point	Charged by loan originator. If the mortgage broker charges an origination fee, the lender will typically also charge an underwriting fee.
		Survey	\$125	Paid to surveying firm to verify that property lot has not been encroached upon by any structures since last survey.
		Tax Service	\$75	Paid to entity that informs lender if borrower is delinquent on property taxes.
Settlement (Escrow)	Two to four weeks	Underwriting	\$175	Paid to lender to underwrite and fund the loan, and to print documents. May be folded into origination fee.
		Attorney/Escrow Agent	\$500	Paid to settlement agent for managing final paperwork and escrow funds.
		Notary	\$75	Charged to notarize certain loan documents.
		Title Search/Insurance	\$400	For title insurance policy.

NA Not applicable.

Source: Salomon Smith Barney.

Research studies suggest that a refinancing is usually completed in six weeks or less.

The Time Dimension of a Refinancing

As Figure 1 suggests, the refinancing process can take one to two months, although most refinancings are completed in six weeks or less. A recent study² by Transamerica Intellitech³ based on more than 1,000 Californians who refinanced their homes in the first quarter of 1998 provides some useful statistics on the time spent by borrowers on different parts of the refinancing process:

- **Approval process.** 60% of all borrowers received their approval in one week, 18% received it in one to two weeks, and 18% took three or more weeks.
- **Closing period.** After the loan was approved, 25% of the borrowers closed within a week, 26% in one to two weeks, 12% in two to three weeks, and 38% of all borrowers closed in four weeks or longer.

² *Real Estate Studies: California Consumer Refinance 1998 Edition*, Transamerica Intellitech Market Insights.

³ Transamerica Intellitech (www.ta-intellitech.com) creates software for title companies, lenders, agents, appraisers, and other real estate professionals. The company is a subsidiary of Transamerica Corporation.

The cost of a refinancing can be unexpectedly large for borrowers.

The Cost Dimension of a Refinancing

The total of the costs listed in Figure 1 may surprise some people, given the common perception about “painless” refinancings (in fact, people are often unpleasantly surprised by the magnitude of closing costs). Furthermore, in practice these fees do not cover all the “cash to close” needed by borrowers. In addition to these fees, every borrower is expected by the lender to prepay up to two months of their insurance and tax premiums to ensure that the lender has enough money to make payments when these are due. However, the following should be noted:

- Lenders sometimes waive some fees, particularly loan application fees.
- Borrowers often do not pay many of the costs (excluding prepaid escrow expenses) out of pocket. Instead, they either roll them into the new loan balance or, in the case of a no-point/no-cost mortgage, pay them over time through a higher note rate.

The ability to take out no-point loans has been the most important change in the refinancing process.

In fact, it might be argued that the real change in the mortgage markets over the past ten years has not been a drastic reduction in closing costs but, through no-point/no-cost loans, the ability of borrowers to avoid paying these costs up front. Of course, the borrower pays these costs over time through higher monthly payments, but this is less onerous for most people than having to pay several thousand dollars at the outset.

Streamline Refinancing Programs

SRPs simplify portions of the loan approval process for qualified borrowers.

SRPs were one of the earliest attempts to simplify (or “streamline”) part of the standard refinancing process for select mortgagors by eliminating certain underwriting requirements, such as a full credit check or a new appraisal. These programs are directed toward borrowers whose loans are serviced by the original lender, who have a history of timely mortgage payments, and who wish simply to lower the monthly principal and interest payments on their current mortgage — that is, borrowers who do not wish to do a “cash-out” refinancing.

Enhanced SRPs offer further simplifications to the loan approval process.

SRPs were first made available to lenders by the GSEs in the 1980s, and were heavily used in the 1993 refinance wave by lenders in order to limit runoff from their servicing portfolios.⁴ In an interesting recent trend, the GSEs have also made **Enhanced SRPs** available to selected originators. Based on information from half a dozen of these originators, we have compiled the common features offered by the various enhanced SRPs in Appendix A.⁵ In Figure 2 we summarize the main differences between the requirements for a regular refinancing, a streamline refinancing, and an enhanced streamline refinancing.

Figure 2. GSE Refinance Programs^{a, b} — Typical Eligibility Requirements

	Standard or Cash-Out Refinance	Streamline Refinance Program	Enhanced Streamline Refinance Program
New Application	Required	Required	Required
New Appraisal	Required	Required only if lender determines property value has fallen	Required only if lender determines property value has fallen
Credit Check	New credit check required.	Review mortgage payment history. “In-file” credit report.	Review mortgage payment history.
Ability to Pay	Income/asset verification; qualifying ratios calculated.	Can verify income via paystub. Requalification not required in most cases.	Not required as long as borrower has a clean payment history and new P&I falls within guidelines
New Loan Amount	Based on new appraisal. Maximum LTV is 95% for no cash-out, 80% for cash-out.	Unpaid principal balance plus 5%.	Unpaid principal balance plus 2.5%.
Monthly Payment Increase	Based on new loan balance and requalification.	Up to 15%	Up to 20% allowed if loan term declines.

P&I Principal and Interest

^a For the SRP, it is assumed that the originator services the current mortgage. If this is not the case, the SRP can still be used, but there would be only minor differences versus a standard refinancing. ^b Will exhibit minor variations from lender to lender, and between agencies.

Sources: Fannie Mae, Freddie Mac, and Salomon Smith Barney.

⁴ See *Inside Mortgage Finance*, October 29, 1993.

⁵ Based on the information we have received from various lenders, there seems to be little variation in the enhanced SRPs offered by different originators. A more detailed analysis of this issue is currently not possible since it is not known which lenders have enhanced SRPs.

Enhanced SRPs have existed on a lender-by-lender negotiated basis since 1994.

As Figure 2 indicates, the most important differences between the standard refinancing programs and SRPs lie in the relaxed credit and documentation requirements for SRPs. The enhanced SRP loosens the requirements for documentation and credit checks even further. However, the agencies insist that variations on the standard SRP have existed on a lender-by-lender negotiated basis since 1994. Thus, **the current enhanced SRPs do not seem to constitute a dramatic break with existing SRP programs.** Nevertheless, it is still informative to estimate how many borrowers qualify for an enhanced SRP and what refinancing cost savings these borrowers can realize relative to standard refinancing programs. These estimates should help to address the central question at hand: to what extent do enhanced SRPs affect refinancing rates?

There are significant restrictions associated with the use of the enhanced SRP.

How Many Borrowers Are Eligible for Enhanced SRPs?

The agencies estimate that in late 1997/early 1998 enhanced SRPs were available to servicers that handle 20%-30% of all agency loans. So, in principle at least, these programs could have been available to about 20%-30% of all refiners by the beginning of 1998. However, this program has two important restrictions (see Figure 2):

- 1 The lender must be the servicer of the existing loan; and
- 2 Cash-out refinancings⁶ are not permitted.

Third-party originations are not eligible for enhanced SRPs.

The fraction of loans for which the lender is the current servicer of the loan varies significantly and depends on whether the lender focuses on retail or wholesale lending. The most important thing to keep in mind is that as a result of this restriction, **third-party originations** (loans originated by mortgage brokers and loan correspondents) **are not eligible for the enhanced SRP.** This significantly diminishes the number of borrowers eligible for the enhanced SRP – retail lending accounted for only 38% of all mortgage originations in the first quarter of 1998.⁷ In addition, by some estimates, mortgage brokers account for as much as 60% of originations in the important California mortgage market.⁸

Enhanced SRPs do not permit cash-out refinances.

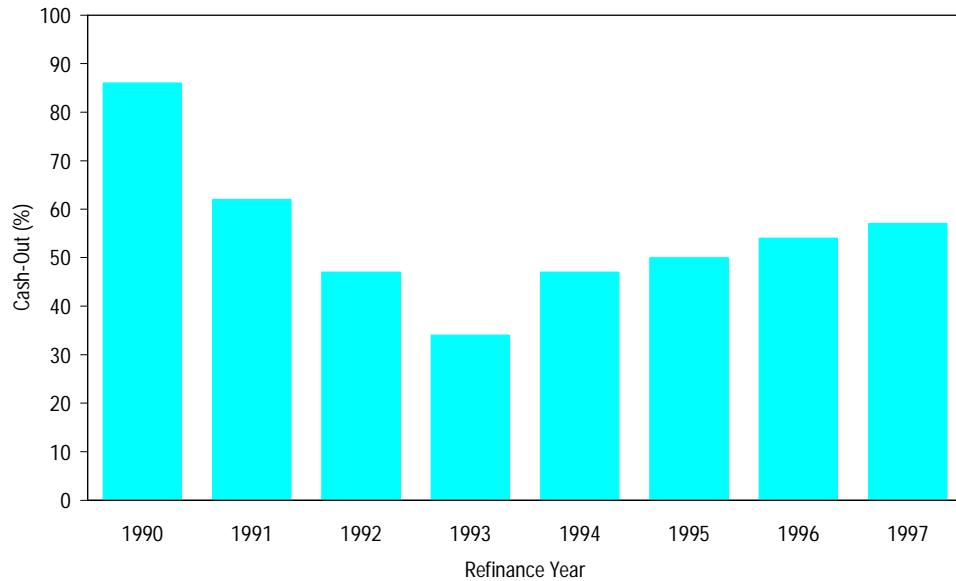
The restriction against cash-out refinances is also significant. Figure 3 depicts the percentage of refinance loans that represent cash-out transactions. The estimates come from a sample of properties on which Freddie Mac had funded at least two successive loans. The numbers clearly show the strong consumer preference for cash-out refinances — even in periods of high interest-rate-driven refinancing activity such as 1993, about one-third of all refinances were cash-outs.

⁶ Defined here to be a refinancing that results in a loan with an unpaid balance at least 5% greater than the original loan.

⁷ *Inside Mortgage Finance*, May 15, 1998.

⁸ *Inside Mortgage Finance*, June 26, 1998.

Figure 3. Percentage of Refinances Resulting in Cash-Out Transactions, 1990-97



Source: Freddie Mac Annual Refinance Review.

For borrowers that qualify, enhanced SRPs offer significant advantages.

Thus, the restrictions associated with enhanced SRPs suggest that these programs are not yet widely used. However, during periods of high refinance volume, lenders will use this program or the standard SRP to provide attractive financing for borrowers and, thus, limit the loss to their servicing portfolios. During such times, because the enhanced SRP does offer simplifications over the standard SRP, it will make refinancing easier for a small class of borrowers.

How Much Can Borrowers Save by Using an Enhanced SRP?

A borrower would save at most \$500 by using an enhanced SRP.

Do the savings from the enhanced SRP program provide a compelling and *previously unavailable* economic incentive for refinancers? The chief cost savings for enhanced SRPs arise from the following:

- 1 Waiving the appraisal (typical cost about \$250-\$350), and
- 2 Waiving the credit report (typical cost about \$25-\$50).

Other sources of savings may come from the lender charging less because of the reduced paperwork and lower hedging costs associated with enhanced SRPs.

However, as Figure 2 makes clear, there do not appear to be substantial differences between a regular SRP and an enhanced SRP. In both cases an appraisal is only necessary if the lender feels that property values have fallen – an unlikely event given the robust housing economy of the past few years. Hence, **the typical borrower could save perhaps a maximum of about \$500 in closing costs by using the enhanced SRP** over other programs.

SRPs benefit lenders by protecting their portfolios from runoff and adverse selection.

How SRPs Benefit Lenders

A crucial reason for the popularity for SRPs is that they offer significant benefits to lenders who service their loans by protecting their servicing portfolios from **runoff** and **adverse selection**. To guard against runoff (loss of servicing share), lenders will offer borrowers SRPs during periods of high refinance volume.

For a given pool of loans, the borrowers that refinance out of the pool typically are more credit-worthy than the borrowers who remain.⁹ As the pool seasons, the servicer consequently tends to end up with a selection of borrowers with relatively high delinquency and default rates on their mortgages. This process is referred to as **adverse selection**. To guard against adverse selection, lenders try to retain borrowers who wish to refinance by offering them attractive rates, and a painless refinancing process through an SRP. SRPs can also therefore be thought of as **servicer-retention** programs.

⁹ To qualify for financing, a borrower will generally have had to experience some measure of income and equity growth and possess a solid credit history.

Automated Underwriting Systems

The GSEs introduced AU systems in 1995.

Underwriting refers to the process of estimating a borrower’s ability and willingness to repay a loan. An **automated underwriting (AU)** system is a computer program that evaluates the likelihood that a borrower will repay their loan based on data summarizing how borrowers with similar loan, property, and credit characteristics had repaid their loans in the past. Our focus here is on the GSEs’ AU systems first introduced in 1995 and refined steadily since then. Freddie Mac’s AU system is called **Loan Prospector (LP)** and Fannie Mae’s AU system is known as **Desktop Underwriter (DU)**.¹⁰

Like SRPs, AU systems create efficiencies in the loan approval process.

As do SRPs, AU systems save time and money in a refinancing for some mortgage borrowers. The efficiencies are obtained by automating parts of the loan approval process that formerly involved a human underwriter. As we discussed in **Anatomy of a Refinancing**, in approving a loan, an underwriter decides whether to extend mortgage credit to an applicant based on the property value (“Collateral”), a credit check (“Credit”), and a determination of the borrower’s ability to make the monthly mortgage payments (“Capacity”). Figure 4 provides a detailed breakdown of the “three Cs” of underwriting.

Figure 4. The Underwriting Decision: Key Factors

Collateral	Credit Reputation	Capacity
<ul style="list-style-type: none"> • House value • Down payment 	<ul style="list-style-type: none"> • History of repayments • Current account balances • Recent inquiries • New accounts • Age of accounts 	<ul style="list-style-type: none"> • Income • Debt • Cash reserves

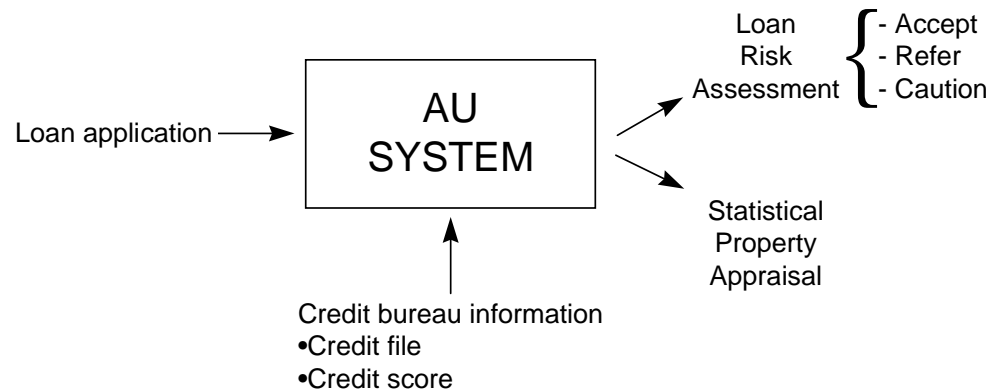
Source: Adapted from Exhibit 3 of *Automated Underwriting: Making Mortgage Lending Simpler and Fairer for America’s Families*, Freddie Mac, September 1996.

The GSEs’ AU systems assign each loan to a risk category, provide underwriting feedback, and produce a statistical appraisal.

The current generation of automated underwriting technologies employ the factors presented in Figure 4 in two ways. One system implements automated underwriting by creating rule-based expert systems that mimic the decision-making process of a skilled human underwriter. A second approach develops statistically-based, predictive models that correlate the underwriting data to credit performance. These models assign a loan to a risk category based on an estimate of the borrower’s likelihood of default. Both GSEs currently use the second approach. Figure 5 depicts the flow of information through a GSE AU system.

¹⁰ LP was formally launched in February 1995 and DU in April 1995.

Figure 5. The Automated Underwriting Process



Sources: Freddie Mac and Salomon Smith Barney.

The loan risk categories and the appraisal produced by the AU system form the basis for the lender’s underwriting decision:¹¹

- An **Accept** (LP) or **Approve** (DU) designation denotes the lowest level of risk and indicates that the relevant GSE is willing to purchase the loan with minimal documentation.
- A **Refer** (LP and DU) designation indicates that the loan application needs to be referred to a human underwriter for further review. Based on additional information, the loan may still be acceptable to the agencies.
- A **Caution** (LP) or **Refer with Caution** (DU) designation indicates that the application represents substantial risk and extenuating circumstances would have to be present for the loan to be acceptable for sale to the agencies.
- For certain loans, the **statistical property appraisal** generated by the AU systems can be used in conjunction with an exterior property inspection in lieu of a full appraisal. This **streamlined appraisal** process can save from 50%-75% of the costs associated with a standard appraisal.

DU and LP place the most weight on credit scores, collateral value, and the amount of the down payment in determining the risk category of a loan.

Because the GSEs’ AU systems are proprietary, the exact mechanism by which a loan is assigned a risk grade is not known. However, a review of publicly released AU documentation indicates that in deciding to which risk category a loan belongs, the current generation of AU systems relies most heavily on the borrower’s credit information, followed by the property value and amount of down payment. The borrower’s capacity is not given as much weight in the underwriting decision as previously.¹²

How Many Lenders Use AU Systems?

Automated underwriting has grown enormously in the past few years, with 1998 in particular marking an inflection point. Figure 6 illustrates this by charting the growth in the number of loans processed by Freddie Mac’s Loan Prospector since

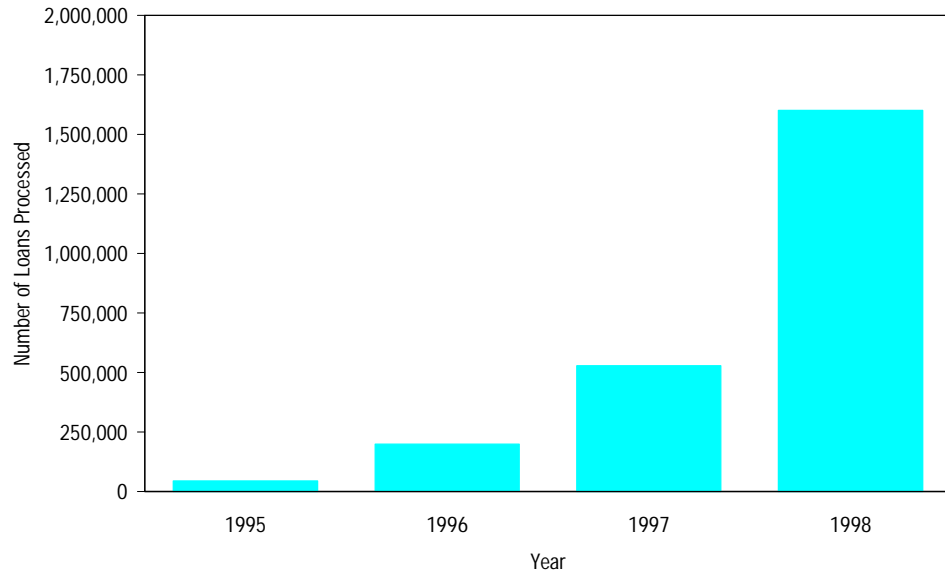
¹¹ These categories have been revised. As of November 8, Loan Prospector’s **Refer** risk classification was eliminated, leaving only two classifications, **Accept** and **Caution**.

¹² *Automated Underwriting: Making Mortgage Lending Simpler and Fairer for America’s Families*, Freddie Mac, September 1996.

its release in 1995. The GSEs have *each* informally estimated that about two million point. growth loans will be originated using their systems in 1998; four million loans would represent about 50%-60% of total originations for 1998.

AU systems are expected to process four millions loans in 1998, quadruple the number in 1997.

Figure 6. The Growth of Automated Underwriting: Loans Processed by Loan Prospector, 1995-Oct 98



Source: Inside Mortgage Technology, Freddie Mac.

Caution should be exercised in interpreting AU usage statistics.

Some caveats apply to the data shown in Figure 6:

- The loan counts may be inflated because of use of the AU system by the lender for portfolio evaluations, evaluations of nonconforming loans, and evaluations of loans that do not close;
- A revealing statistic about AU usage is the percentage of applications approved by the typical AU system. Applications that are passed on to a human underwriter for further evaluation will not experience the same time and cost benefits as applications that are immediately accepted for purchase by the GSEs. Previously, the agencies' AU systems were only immediately approving 50%-60% of all mortgage applications. However, this number is expected to increase to as much as 80%-90% in new releases of DU and LP.¹³

The following statistics (as of year-end 1997) illustrate the market share of the agencies' AU systems:¹⁴

- 54% of all lenders who close loans in their name use AU systems;
- Of these lenders, 40% use DU and 44% use LP;
- Among lenders originating more than \$1 billion, 41% use LP and 32% use DU.

¹³ *The Fannie Mae Technology Review*, Fannie Mae, Winter 1997; and *Freddie Mac Announces Major Enhancements to Loan Prospector*, LP/Outlook Press Release, Freddie Mac, October 13, 1998. The increase in acceptance rates arises from a better understanding by the agencies of the types of loans they are willing to purchase.

¹⁴ *Inside Mortgage Technology*, March 9, 1998.

In the next few years, AU systems should process most of the loans bought by the agencies.

Regardless of the number of loans recently processed by AU systems, it seems clear that over the next few years **most of the loans purchased by the GSEs will be processed through their AU systems.**

The Impact Of Automated Underwriting on Loan Approval Times

AU systems significantly reduce the time spent on the loan approval process. In the sphere of underwriting decisions, these systems accept a streamlined data set of loan and borrower attributes, and can inform a lender in minutes whether the relevant GSE will accept the loan for purchase. Loans that qualify for a streamlined appraisal will experience even greater reductions in approval times. A case study done for Wells Fargo Bank by management consultant Grant Thornton LLP found the following:¹⁵

AU systems shorten the loan approval process dramatically.

- The appraisal process accounts for up to 40% of the cycle time associated with loan origination; and
- The installation of an automated property valuation model can reduce the time spent on the appraisal process by as much as 60%-80%.

It seems clear that as the use of AU systems continues to grow, a significant majority of conventional loans will be approved in a week or less.

The Impact of Automated Underwriting on Refinancing Costs

Refinancers in the lowest AU risk category will save part of the costs of an appraisal and credit report.

Industry sources estimate that the efficiencies introduced by automated underwriting lead to cost reductions ranging from about \$300 to \$1,000 per loan. These costs savings accumulate from the following sources:

- **Processing efficiencies.** AU systems streamline some of the paperwork inherent to the mortgage process, expediting underwriting decisions.
- **Reduction in personnel costs.** Decisions on most loan applications can be quickly made by the AU system, leaving human underwriters to focus on **Refer** and **Caution** applications.
- **Cost reductions in the loan approval process.** As detailed previously, AU systems save part of the costs of an appraisal and credit report.
- **Reductions in hedging costs.** Quick loan approvals reduce fallout risk and allow lenders to manage their pipelines more effectively.

For now, lenders will probably hold on to the other cost reductions created by AU systems.

At present, lenders probably do not pass all these cost savings through to borrowers. For example, lenders will probably keep the savings resulting from processing efficiencies and personnel reductions to defray the costs of their investments in technology. Thus, a savings of \$300-\$500 (the typical costs associated with the appraisal and credit report, see Figure 1) from the loan approval process is probably the most a borrower can realize. Of course, as discussed, only

¹⁵ *Reengineering the Loan Origination Process – An Automated Underwriting Case Study*, Dave Ross and Bruce Macurda, presentation at “Leveraging Technology to Enhance Mortgage Origination” conference, May 18-19, 1998.

borrowers with excellent credit who are immediately approved by AU systems will realize these savings.¹⁶

Automated Underwriting in the Government Mortgage Sector

Automated underwriting is still in an embryonic stage in the government sector.

Several AU systems underwrite government loans. They range from proprietary systems developed by individual lenders to pmiAURA, a system developed by PMI Mortgage Insurance Company, San Francisco. Only a small minority of all government loans are underwritten using the GSEs' AU systems; recent estimates have Loan Prospector underwriting about 20% of all VA loans and about 10% of all FHA loans.¹⁷ This lack of penetration stems from the agencies' having to customize their AU systems for FHA/VA loans and extensively test these systems with lenders. This situation will likely change rapidly in the future, mirroring the explosive growth of automated underwriting in the conventional sector.

FHA borrowers stand to gain less than conventional borrowers from AU systems.

The benefits offered by AU systems in the government mortgage sector are familiar ones. Closings for government loans are quicker because of reduced paperwork and faster underwriting decisions. However, **government borrowers will not see immediate reductions in their refinancing costs** – most FHA/VA borrowers refinance through a SRP (see Appendix B), for which an appraisal and credit report are typically not required.

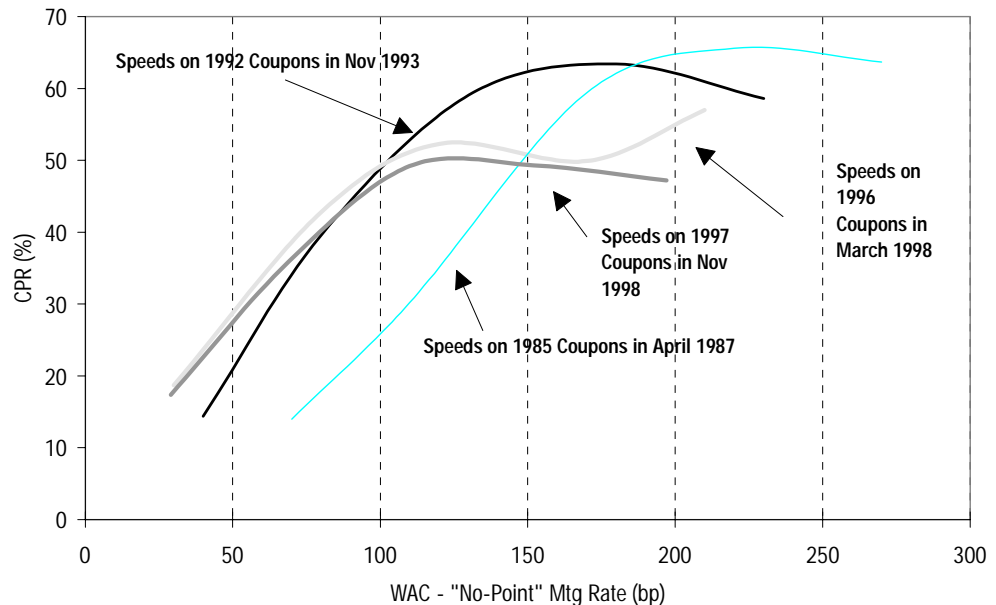
¹⁶ For a comprehensive discussion, see *The Effect of Automated Underwriting on the Profitability of Mortgage Securitization*, Wayne Passmore and Roger Sparks, *Finance and Economics Discussion Series*, Federal Reserve Board, May 1997.

¹⁷ *Inside Mortgage Finance*, October 23, 1998. Fannie Mae's Desktop Underwriter is being used in pilot projects with FHA lenders.

Implications for Prepayments

If one defines efficiency as an increase in refinancing levels for a given amount of refinancing incentive, then the refinancing response for cuspy coupons has undoubtedly become more efficient over the years. Figure 7 shows peak prepayment rates as a function of refinancing incentive in the refinancing waves of 1987, 1993, and 1998.

Figure 7. Peak Speeds on Conventional Coupons in Three Refinance Waves



Source: Salomon Smith Barney.

The heart of the matter: are the cost reductions created by SRPs and AU systems sufficiently compelling?

Figure 7 clearly shows that the major changes in refinancing levels took place between the 1980s and 1993, with only marginal changes since 1993, even though the enhanced SRPs and AU systems have only become available in the past few years. As discussed, it seems that *true* costs over the years have declined little, and while we believe that refinancing efficiency has increased slightly at the “elbow,” we feel that the most significant change has been the ability of borrowers to take out no-point loans. In particular, this change has allowed borrowers to circumvent the “rates have to decrease by 200bp for refinancing to be worthwhile” convention, leading to much higher speeds for cusp coupons.

Changes in Refinancing Efficiency Going Forward

SRPs and AU systems save the same types of refinancing costs.

Clearly, SRPs and AU systems **create significant time and cost efficiencies in the refinancing process**. However, the costs saved by the two programs are **not additive** — in each case the savings arise from simplifications in the appraisal and credit check process.

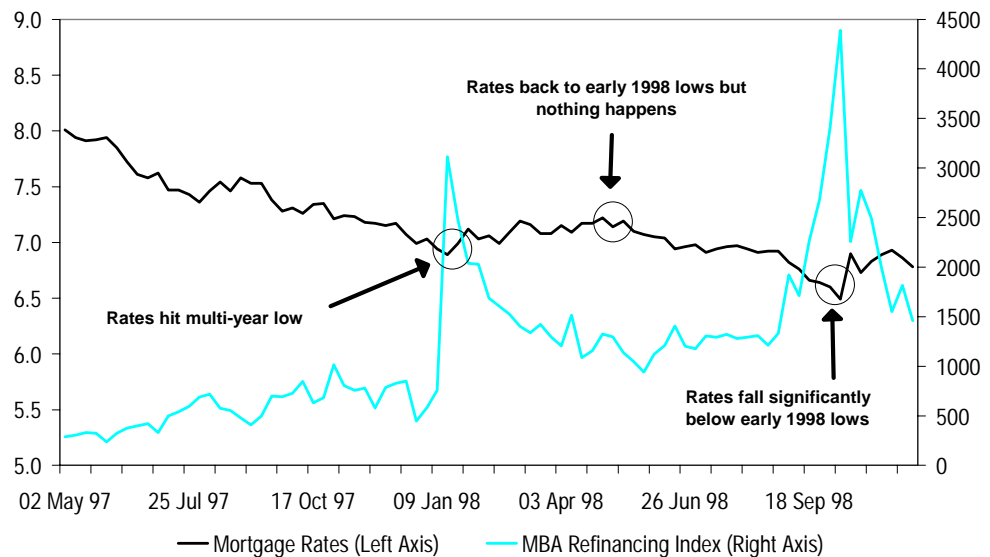
AU systems will continue to increase in popularity because they are clearly benefiting lenders by offering streamlined processing, quick approval of loans, and

corresponding reductions in hedging costs. We expect the increasing use of automated underwriting to reduce costs further over the next two years, albeit gradually. Although anecdotal evidence suggests that lenders have been selective about passing these cost savings through to borrowers, we have built further reductions in costs into our model: **the Salomon Smith Barney Prepayment Model assumes that refinancing costs will decrease by approximately 0.50 points (about \$500) over the next year or so.**

The Impact of SRPs and AU Systems on 1998 Speeds

Some observers have cited these programs for the sudden and surprising surge in refinancing activity in January 1998. However, the data in Figure 8, which shows mortgage rates and the MBA Refinance Index from May 1997 to November 1998, suggest that this is a misperception.

Figure 8. 30-Year Mortgage Rates and the MBA Refinance Index, May 97-Nov 98



Sources: Freddie Mac, Mortgage Bankers Association, and Salomon Smith Barney.

Mortgage rates started to decline in the spring of 1997, but refinancing activity remained muted until early 1998, when rates dropped below 7% and hit five-year lows. In June 1998, mortgage rates again dropped below 7%, but refinancing applications increased little until rates dropped well below early 1998 lows in September 1998. In other words, the major surges in refinancing activity this year occurred precisely after rates reached some psychologically important threshold from the borrower perspective, **indicating the key role played by the media effect.** Increases in refinancing efficiency because of AU systems and SRPs do little to explain these sudden jumps in the MBA Refinancing Index or why prepayment speeds (particularly on 8s and above) remained so muted between April and October, despite the fact that mortgage rates have been below 7% since the first week of June.

Another factor to keep in mind is that, as discussed earlier, SRPs have been around since the 1980s, the enhanced SRP since 1994, and AU systems since 1995.

Therefore, the savings produced by these programs have been available to an ever increasing subset of borrowers for some time, and their impact has been gradual rather than sudden. Moreover, the impact of these programs (at least initially) is likely to be felt *after* an application has been filed, in terms of streamlined underwriting, etc. It is not clear how their existence would cause a sudden jump in borrower response.

Note that Figure 7 also shows that for coupons well in the money, peak speeds have not increased since the 1980s, remaining in the 60%-70% CPR range.¹⁸ This trend is somewhat surprising, because, presumably, advances in technology should have increased processing capabilities. Peak speeds could well increase going forward, and in fact the Salomon Smith Barney model, estimates peak speeds of close to 80% CPR for “normal” coupons (that is, those originated at close-to-market rates, which are assumed to contain insignificant fractions of “affordable housing” borrowers) if they become sufficiently in the money.

In conclusion, the core drivers of refinancing activity still appear to be borrower sentiment and media coverage of historic lows in mortgage rates. Technology seems to have its greatest impact after a refinance application is filed — that is, after a borrower has already decided to refinance. Furthermore, while the refinancing cost savings produced by SRPs and AU systems are real, they do not appear to be of sufficient magnitude, or sufficiently different from those available prior to 1998, to induce a mortgagor to refinance.¹⁹

¹⁸ Speeds for high premiums were actually lower in 1998. This seems to reflect the increasing diversity of agency collateral in recent years, resulting from their affordable housing initiatives and high LTV programs.

¹⁹ A detailed assessment of the possible causes for the 1998 refinance wave can be found on MB775.

Appendix A. Enhanced SRPs: Requirements and Restrictions

Figure 9. Requirements and Restrictions for the Enhanced SRPs

Eligibility Requirements	Loan Products	The loan must be a conforming FRM, ARM, or hybrid. (Balloons are allowed in some programs.)
	Borrowers	The borrowers on the new mortgage must be the same as on the original mortgage. No mortgagor may be deleted from the title. Some programs allow for the addition of a mortgagor.
	Qualifying Ratios	No qualifying ratios are required.
	Temporary Buydowns	No temporary buydowns allowed.
	P&I Increases	Increases in the borrower's monthly P&I are only allowed in the following cases: <ul style="list-style-type: none"> • Up to a 5% increase in P&I allowed if the borrower refinances from a 30-year ARM to a 30-year FRM. • Up to 20% increase in P&I allowed if the term decreases.
	Property Types	<ul style="list-style-type: none"> • One- to four-unit primary residence • One-unit second home • One- to two-unit investment property • Condominiums • PUDs • Cooperatives
Loan Size/LTV Restrictions	Maximum Loan Amount	The size of the new loan may not exceed any of the following: <ul style="list-style-type: none"> • Conventional conforming loan limits • The amount of the original loan • 105% of the unpaid balance of the existing loan (principal and interest only) if closing costs are financed. Incidental cash back to the borrower cannot exceed 1% of the new loan balance.
	Maximum LTV	The new LTV may not exceed the LTV of the original loan. (The new LTV is based on the original appraised value. If the property is a restricted type, ^a or located in a restricted market, ^b a new appraisal may be required.)
	Maximum CLTV	There is no maximum CLTV.
Documentation Requirements	Application	A new residential mortgage application (FNMA 1003/FHLMC 65) is required.
	Income/Employment	Verification of the borrower's income and employment is not required.
	Assets	Verification of the borrower's assets is not required.
	Credit Reports	A credit report is not required.
	Credit Score Policy	No credit score requirements.
	Mortgage History	A new mortgage payment history for the existing first mortgage is required. The mortgage payment history must show: <ul style="list-style-type: none"> • that the existing loan is current, and • no more than one 30-day late payment in the previous 12 months (or elapsed term of the mortgage if the mortgage is less than 12 months old).
	Appraisal	An appraisal is only required for: <ul style="list-style-type: none"> • restricted property types^a • restricted markets • a borrower who requests cancellation of MI when the loan has amortized down to less than 80% LTV based upon the original property value.

^a Restricted properties are: three- to four-unit properties, Condominiums, and Cooperatives. ^b Restricted markets are areas that have experienced housing price declines in prior years as determined by criteria established by the lender.

Source: Salomon Smith Barney

Appendix B. The Ginnie Mae SRP and Its Effect on Prepayment Rates

The FHA SRP demonstrates how the existence of an SRP does not necessarily raise prepayment rates.

An appraisal and credit report are typically not required for the FHA SRP.

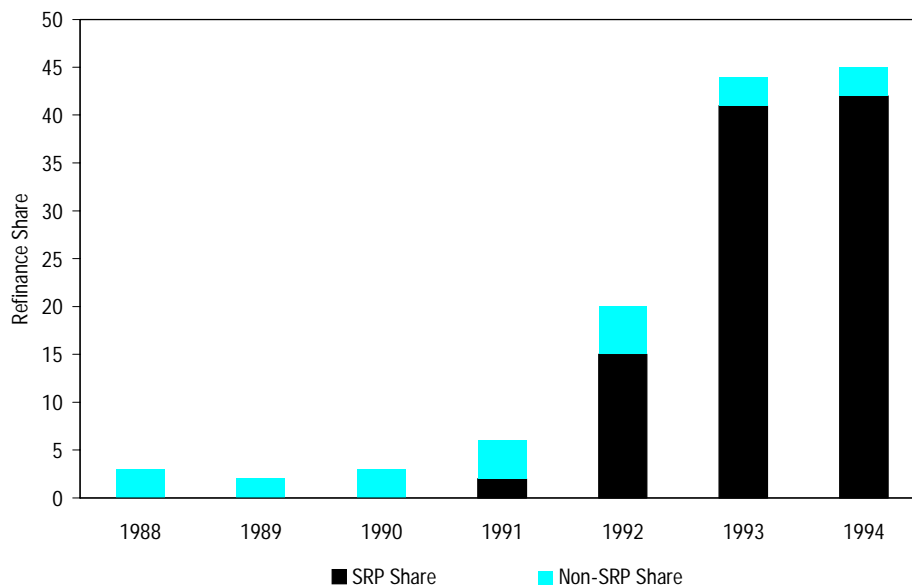
The Ginnie Mae SRP provides a useful case study of how the mere availability of an SRP by itself does not ensure that borrowers will use the program or that the existence of such a program will raise prepayment rates. The Ginnie Mae SRP actually consists of two distinct streamline programs. The FHA and VA each offer an SRP, and their key features are detailed in *Ginnie Mae Prepayment Behavior*.²⁰ The two programs are quite similar and we shall focus on the FHA SRP, because FHA loans constitute a significant majority of the loans in Ginnie Mae MBSs.

The characteristics of the FHA SRP are very similar to those of the conventional SRPs outlined in Figure 2. A borrower refinancing using the FHA SRP essentially has two options:²¹

- ▶ **If there is no appraisal**, closing costs cannot be financed, and the balance on the new loan is limited to the unpaid principal balance, less any mortgage insurance premium (MIP) refund, plus the new up-front MIP.
- ▶ Streamline refinancings with an **appraisal** allow the inclusion of closing costs (including points) into the new loan balance, subject to LTV limits.

Although the FHA SRP has existed since the 1980s, it did not enjoy widespread use until about 1991. Figure 10 tracks the growth of the FHA SRP by showing the growth in FHA refinance share over the 1988-94 period and the percentage of these refinance mortgages that were originated under the SRP.

Figure 10. FHA Refinance Share and Growth of SRP Share, 1988-94



²⁰ *Ginnie Mae Prepayment Behavior*, Lakhbir Hayre and Sharad Chaudhary, Salomon Brothers Inc, September 1997.

²¹ FHA data show that about 25% of all its streamline refinances use an appraisal.

Source: FHA.

FHA SRP growth was strongly correlated with regulatory changes and a substantial increase in refinance share for FHA lenders.

Three key factors explain the explosive growth of the SRP over the 1993-94 period:

- 1 **A sustained period of decreasing interest rates over 1992-93, with mortgage rates falling by about 150bp-200bp.** An increase in refinance share for lenders accompanied this drop in mortgage rates, leaving them concerned about protecting their portfolio against adverse selection. Given this backdrop, a heightened consumer awareness of refinancing options, coupled with lender solicitation of refinances under the SRP, led to strong growth in SRP usage.
- 2 In May 1992, the annual premium of 50bp was waived for all streamline refiners whose original mortgages had closed before July 1991.
- 3 In October 1992, a regulation limiting the percentage of closing costs that could be financed was rescinded.

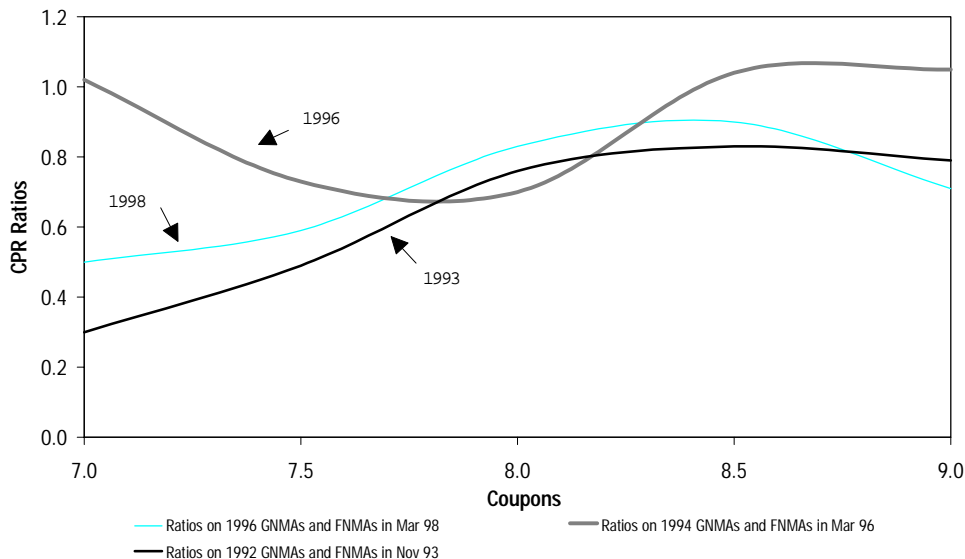
Most FHA refinances now occur through the SRP.

Thus, the FHA SRP achieved its maximum popularity in a period of declining interest rates and structural changes in regulations governing FHA refinances. Over the past few years, usage of the FHA SRP has remained at high levels with the majority of all FHA refinances occurring under this program.

It is difficult to see a relationship between use of the SRP and Ginnie Mae prepayments.

Is this increased usage of the SRP correlated to prepayment levels? Figure 11 provides perspective on this question by graphing ratios of peak Ginnie Mae to Fannie Mae speeds in the latest three refinance waves. We have chosen to compare peak speeds on new coupons in the figure to minimize the impact of equity buildup on refinancing rates for these coupons. This impact is particularly difficult to measure for Ginnie Maes because no pool-level geographic data is available.

Figure 11. Ratios of Peak Ginnie Mae to Fannie Mae Speeds in Three Refinance Waves



Source: Salomon Smith Barney.

Comparisons between the 1993 and 1998 refinance waves are particularly relevant in the current context. While the GSEs and Ginnie Mae had SRP programs in place

prior to 1993, the introduction of enhanced SRPs by the GSEs since then has no parallel in the government mortgage market. If the existence of such programs were strongly correlated to prepayment levels, one would expect to see conventional mortgages prepaying faster than Ginnie Maes compared to the past.

The data contradict this expectation. They show that if anything, Ginnie Mae speeds seem faster now (for new coupons) relative to conventionals than they were in 1993. Furthermore, Ginnie Mae speeds were fastest relative to conventionals in 1996 despite the absence of any major regulatory changes for FHA and VA in the intervening years from 1993 to 1996.

This agrees with the thesis we have developed in the body of this paper: prepayment data strongly suggest that the most important factors in determining prepayment levels are the health of the mortgage lending industry, the regulatory environment that governs this lending, and borrower sentiment.

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