

Residential Securitization in Japan: The Outlook for Growth and Performance

by Bruce Kramer

INTRODUCTION

Since the early 1990s, mortgage securitization has been gaining momentum in countries outside of the United States. In Europe, after getting a start in the U.K. and France, it has spread to Spain, the Netherlands, Italy, Belgium, Finland, and recently even to Germany, where the Pfandbrief structure had previously faced no competition as a mortgage funding mechanism.¹ The pace has accelerated since the launch of the Euro just over a year ago, as the European fixed-income markets have become increasingly attuned to asset allocation strategies.

Over the same period, the secondary mortgage market in the United States has grown by 55% (from US\$1.28 trillion to US\$2.31 trillion between January 1993 and April 2000). The U.S. growth has been fueled by several refinancing waves, a powerhouse U.S. economy, and a rising homeownership rate that was recently reported at 67.1% of the population, an all-time record. Indeed, the U.S. homeownership rate has probably benefited from the widespread use of securitization, since the practice generally results

in lower cost financing for homeowners. Through this period, the U.S. mortgage industry was undergoing substantial consolidation, resulting in greater concentration of market share among mortgage originators². A large percentage of these loan originators (including mortgage banks and commercial banks) employ securitization as a funding mechanism, as this practice has been well established in the U.S. market since the 1980s. Overall, more than 51% of all currently outstanding U.S. mortgage debt was securitized as of April 2000.

The triumvirate of large, industrialized economies is completed by Japan, which has only recently come to the securitization table. With ¥169 trillion (US\$1.53 billion) in outstanding residential mortgage debt and a 62% homeownership rate, the Japanese residential mortgage market is in fact the second largest in the world. Yet to date, there have been only four announced securitizations of Japanese residential mortgages.³ Simply from the standpoint of raw material, there is clearly huge potential for the creation of more Japanese mortgage deals in the future. Japan's Government Housing Loan Corporation (GHLC), the largest single originator of mortgages in Japan, is in a position to act as a "seed crystal" in the growth of the secondary mortgage market. If it embarks on a regular program of securitization

of its portfolio, the GHLC could both set the standard for the disposition of mortgage assets in Japan, and create sufficient secondary market liquidity to encourage participation by other issuers and investors alike. It is clear that market participants would view full-scale participation by the GHLC in a very positive light.

In this article, we discuss the prospects for the further growth of residential mortgage securitization in Japan and particularly for transactions in which prepayment risk is passed through to investors. Our emphasis is on educating market participants about the prepayment and credit performance of Japanese mortgages. We do not approach this question from the standpoint of issuers' motivations, which may include the desire to achieve one or more of the following goals:

- To fund mortgage lending.
- To transfer prepayment risk.
- To transfer credit risk.
- To dispose of a servicing portfolio.
- To restructure a balance sheet.
- To meet regulatory capital constraints.

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Rather, our emphasis in this discussion is on the demand side of the equation, i.e., the information that needs to be assembled, and the expertise that needs to develop before investors and broker/dealers will wholeheartedly embrace this sector of the international fixed-income market. We will, therefore, focus on the empirical record of the behavior of mortgage borrowers in Japan, and how it compares to mortgage markets in the U.S. and Europe. By comparing the record in this way, we seek to expand the knowledge base of market participants from areas that they may know (the U.S. and Europe) to one with which they may currently be unfamiliar (Japan). In so doing, we hope to enhance investor participation and market liquidity in Japan, the largest untapped mortgage market in the world.

Understanding the Risk/Reward Profile of Mortgage Assets

If a secondary mortgage market is to thrive, bonds need to be priced efficiently, so that investors are satisfied with both the buy price and the sell price. Specifically, investors need to believe that the extra spread they receive is sufficient compensation for the risk they assume when they buy the bonds. Therefore, they need to know how to assess that risk. Institutional investors, in particular, need to be comfortable with this process, since they can provide the two-way flow that creates a viable secondary market. Investors must, therefore, be conversant in analyzing complex cashflows, and familiar with the reasons for cashflow variability.

The performance of mortgage-backed securities (MBS) is highly dependent on the behavior of the borrowers whose loans collateralize the bonds. MBS share with other fixed-income instruments (such as corporate bonds) the risks common to the fixed-income sector: credit risk, liquidity risk, yield curve risk, and volatility risk. Prepayment risk, however, is unique to the MBS (and in

some cases to the asset-backed securities or ABS) sector. The decision to prepay or to default on a mortgage is not necessarily a rational economic choice. A corporate treasurer can be expected to optimally exercise the option on a callable bond, but the same cannot be expected of each individual in a pool of hundreds or thousands of mortgages. Indeed, it is the irrational, non-economic exercise of the homeowner's prepayment option that makes MBS cashflows unique in the fixed-income world. One result of this is prepayment sensitivity, which can cause excessive variability in MBS cashflows. In general, MBS investors benefit when interest rate changes cause less cashflow variability, i.e., when the mortgage collateral has less prepayment sensitivity.

The complexity of analyzing mortgage cashflows is one potential impediment to investor comfort with the MBS sector and, by extension, to the creation of a viable secondary mortgage market. The technical requirements necessary for originators and investors alike are another potential barrier. (Back-office accounting issues relating to monthly amortization and payments, as well as cashflow modeling, are two aspects of the infrastructure that may not be fully supported.) But investors receive compensation for all these risks by receiving additional spread over the risk-free rate.

The relevant question then becomes: What is the right amount of spread to demand for the level of risk assumed? The answer comes in the form of a detailed analysis of historical performance and, ideally, the creation of a prepayment model based on those observations that can be used to predict and value cashflows given a path of future mortgage rates.

In this respect, Wall Street's extensive record of experience with MBS/ABS in the U.S. can benefit investors in foreign, as well as domestic, markets since technical exper-

tise and market knowledge are transferable. Moreover, the cross-border comparison of borrower behavior, as evidenced in collateral performance, allows market participants to gauge performance variability between national markets. Such comparisons are particularly useful for investors who wish to understand this type of product in an MBS market that is unfamiliar to them, and they can, therefore, have a positive impact on developing market liquidity, investor interest and repeat participation.

FUNDAMENTALS OF THE JAPANESE MORTGAGE MARKET

Bear Stearns undertook a study of historical prepayments of a Japanese residential mortgage portfolio in early 1999, and released a prepayment model based on that data in May 1999. The release of the model coincided with the launch of the first securitization of Japanese residential mortgages—SHL 1999-1. The loans in the study were originated by a major bank with an extensive branch network throughout Japan. There were more than 3 million monthly loan history observations, covering prepayments between 1995 and late 1998. In the sections that follow, we discuss some of the characteristics and the performance of this portfolio. While a detailed discussion of the prepayment model is beyond the scope of this article, we will cover several of the important findings of the study, which have formed the basis for our future expectations about performance in the Japanese residential mortgage sector.

Regulatory Background/Types of Loans

In an effort to stimulate the economy, the Japanese government instituted major changes in the regulations concerning residential lending in July 1994. The new rules substantially liberalized mortgage lending in Japan, allowing banks to set mortgage rates at levels they saw fit, and to offer a va-

riety of new products. In conjunction with the release of these new regulations, prepayment penalties were waived for borrowers who refinanced into a new product type. Whereas the pre-1994 lending environment had been dominated by fixed-rate and annually adjusting loans, the new schema featured semi-annual adjustable-rate loans (indexed to short-term prime), as well as three-, five- and 10-year convertible fixed-rate loans. These convertible loans generally amortize to a final maturity of 20 to 35 years, and offer the borrower several conversion options, as follows:

- At the end of the initial fixed-rate period, borrowers may recast the loan for an additional three-, five- or 10-year period, at the prevailing mortgage rate for that product. Depending on the practice of the lender, the borrower may or may not have the option to switch product terms at the reset (e.g., to switch from a 10-year to a five-year convertible). Similarly, some borrowers may have the option to recast their loan before the completion of the initial fixed-rate period.
- At the end of the initial fixed-rate term, the borrower may convert the loan into an adjustable mortgage, whose rate adjusts every six months at a spread to short-term prime, and whose payment adjusts every five years. Such loans allow for the possibility of negative amortization. Lenders may also permit the borrower to convert more than once; for example, moving from fixed-rate convertible to adjustable, and then back into fixed-rate convertible. In those cases, the conversion from adjustable to fixed-rate convertible can be made on any monthly payment date.

In general, there are no costs associated with the conversions detailed above, provided they are accomplished according to the stipulations of the lender (primarily,

these requirements concern the timing of the conversion).

The government's deregulation effort was a response to the ongoing recession, the trend of declining residential real estate prices and the sluggish housing sector. These macroeconomic market forces, as well as cultural factors in Japan (see Loan Seasoning, page 27), have contributed to a level of housing turnover prepayments that is lower than that seen in the U.S., and comparable to levels seen in some national markets in Europe.

In early 1999, the Japanese government took additional steps to stimulate the housing sector, enacting a series of measures to greatly increase the tax advantage of home ownership. In addition, the new law also allows some homeowners whose homes are now worth less than the purchase price to deduct their loss if they sell. As discussed below, this effort appears to have resulted in slightly higher than anticipated speeds on SHL 1999-1 in the year since deal inception.

Prepayment Penalties

Full prepayments on loans in the study portfolio are accepted at any time, with prior notice. Partial prepayments (curtailments) are accepted on any monthly payment date, also with prior notice. Prepayment penalties are imposed as indicated below, and are not dependent on loan size.

- Full prepayment: up to ¥30,000 (US\$275) to lender; up to ¥10,000 (US\$90) to guarantor.
- Partial prepayment: up to ¥20,000 (US\$180) to lender; up to ¥3,000 (US\$27) to guarantor.

In the case of full prepayment, the loan guarantee fee (35 basis points) on the old loan is

refunded to the borrower, but he must at the same time reestablish mortgage registration for the new loan, a process normally requiring a larger payment. In addition, borrowers who refinance need to initiate other steps in the loan origination process, including documentation and appraisal; the borrower bears the cost of these procedures. Consequently, prepayment penalties alone are a minor portion of the cost of refinancing, and seem unlikely to materially alter borrower behavior. On an absolute basis, these penalties are small in comparison to penalties that are assessed in other non-U.S. mortgage markets, such as those in Europe (see Table 1).

Table 1. Indicative Mortgage Prepayment Penalties

U.S.	Prepayment penalties are extremely rare
Europe	A full range of penalties, up to a full-yield maintenance requirement
Japan	Penalties exist, but the amounts are nominal.

Curtailments

Curtailments, or voluntary partial prepayments, were a significant component of the prepayment equation in the study portfolio. Between 1995 and 1998, curtailments contributed an average of 1.41, 1.61 and 1.85 CPR (constant prepayment rate) per month for the 10-year, five-year and three-year loan products, respectively.⁴ In terms of the loan seasoning process, it is also important to note that this curtailment rate begins from the outset, rather than ramping up as do overall prepayment speeds. In other words, some borrowers begin to pay down additional principal on their loans shortly after they sign their loan papers. This borrower behavior reflects a debt-averse psychology,

and suggests a strong willingness to repay (see Defaults below). Since curtailments are an amount above the scheduled payment, this component can be seen to provide a steady underpinning for monthly prepayments. Curtailments represent a relatively large percentage of the baseline turnover rate in Japan, and lessen the potential for month-to-month variation in speeds.

Defaults

There were few default prepayments recorded in the study portfolio. Between 1995 and 1998, default prepayments for fixed-rate convertible loans averaged 0.063 CPR per month. The average was higher for the three-year convertible product (0.124 monthly average CPR from defaults), while the five-year and 10-year products averaged between 0.03 and 0.05 monthly CPR from defaults. In addition to the apparently strong desire of Japanese borrowers to minimize debt (see the Curtailments section, page 26), delinquent payments are minimized by the loan payment method, which involves a direct transfer of funds from the borrower to the lender on the payment date. In the case of insufficient funds, there is immediate contact between bank lending officers and the borrower to resolve the problem.

Loan Seasoning (Housing Turnover)

Loan seasoning is the process whereby voluntary prepayments (for reasons other than rate reduction) increase with the passage of time. The motivation for prepaying a loan with an out-of-the-money option⁵ can include a change in job or family status, or the desire to trade up to a larger house. This type of transaction is frequently called a "housing turnover" prepayment. Since few homeowners would choose to move again soon after purchasing a home, prepayments for such reasons start at a low level. Japanese mortgages season slower than loans in the U.S., and closer to the levels seen in

Europe (see Table 2). The slower seasoning of Japanese mortgages reflects the cultural preference of homeowners to make relatively few home purchases in a lifetime. In many cases, Japanese borrowers rent and save until they can afford a home, and are less likely than U.S. borrowers to repeatedly trade up from one home to another. This re-

sults in a lower observed prepayment rate for loans that do not have an economic incentive to refinance.

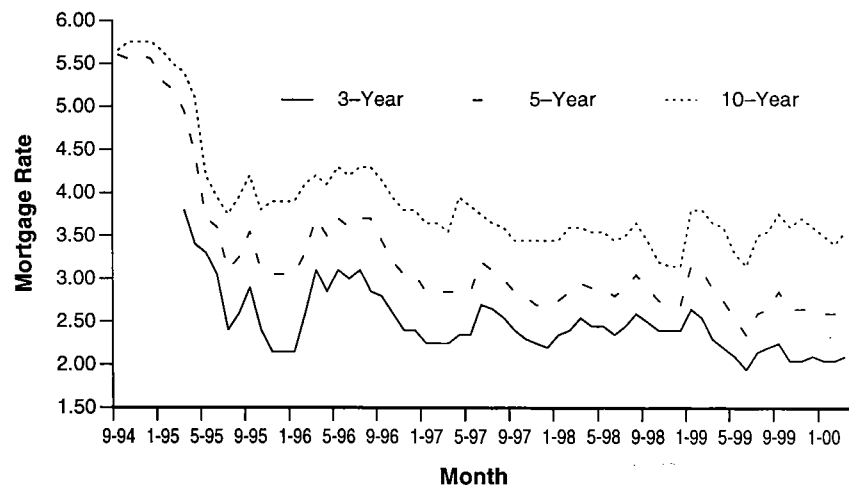
Prepayment Sensitivity

The loans in the study portfolio displayed markedly limited sensitivity to refinancing incentives between 1995 and 1998. On a time-series basis, few cohorts during this period ever paid faster than 10 CPR. In any mortgage market, we would expect borrowers to refinance more frequently when the difference between their mortgage rate and market rates becomes large. Given the low level of mortgage rates in Japan after the 1995 deregulation (see Figure 1), a difference of 50 basis points can be regarded as large in this market. A difference of that magnitude would roughly correspond to a difference of 100 basis points (1.00%) for a typical mortgage in the U.S., since the average rate for an outstanding mortgage is roughly twice as high in the U.S. as it was for the Japanese study portfolio. (To adjust for differences in the absolute level of mortgage

Table 2. Indicative Rates of Loan Seasoning

Sector	Length of Seasoning Ramp in Months (Collateral Type)	Fully Seasoned Speed (CPR)
U.S.	30 mo. (Fannie Mae 30-yr)	9 CPR
Europe	60 mo. (Dutch mortgages)	7 CPR
Japan	50 mo.	6 CPR

Figure 1. Historical Japanese Mortgage Rates: Fixed-Rate Convertible Loans



rates, prepayment models typically are designed to measure the economic incentive as a ratio rather than a difference.) As discussed below, the prepayment response we have seen in the SHL 1999-1 collateral since deal inception has been consistent with what we saw in the study portfolio: the response to an equivalent economic incentive is much lower in Japan than it is in either the U.S. or Europe.

ONE YEAR LATER: HAS SHL 1999-1 PERFORMANCE MET EXPECTATIONS?

In the year since deal inception, the prepayment performance of SHL 1999-1 has unfolded largely as anticipated. As seen in Figure 2, a time series of deal speeds shows that declines in the mortgage rate have nearly always resulted in a rise in prepayment speeds, and vice versa. In addition, speeds have stayed within a limited range (5.3 CPR to 13.2 CPR) over the past year.

Furthermore, when we create a refinancing function by plotting (in Figure 3) these same monthly prepayment rates against the change in the borrower's rate incentive since deal inception, we see that the resulting prepayment curve is highly linear, meaning that prepayments do not vary widely for a given rate incentive. This refinancing function reveals limited sensitivity when the rate incentive is relatively large, since the curve flattens out (rises at a slower rate) on the right side of the graph as the incentive continues to increase.

Based on the above prepayment data, we can make the following assertions:

- It is clear that the cause and effect relationships that govern prepayments are the same for Japan as for other markets. The difference in Japan is that the magnitude of the prepayment response is comparatively small. The maximum speed attained by SHL 1999-1 in the

Figure 2. SHL 1999-1 Historical Prepayments vs. Lagged 10-Year Mortgage Rate

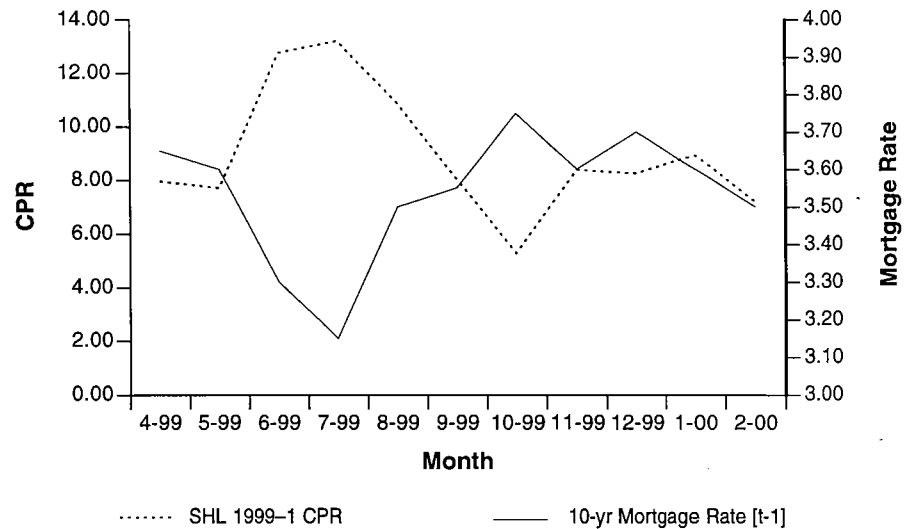
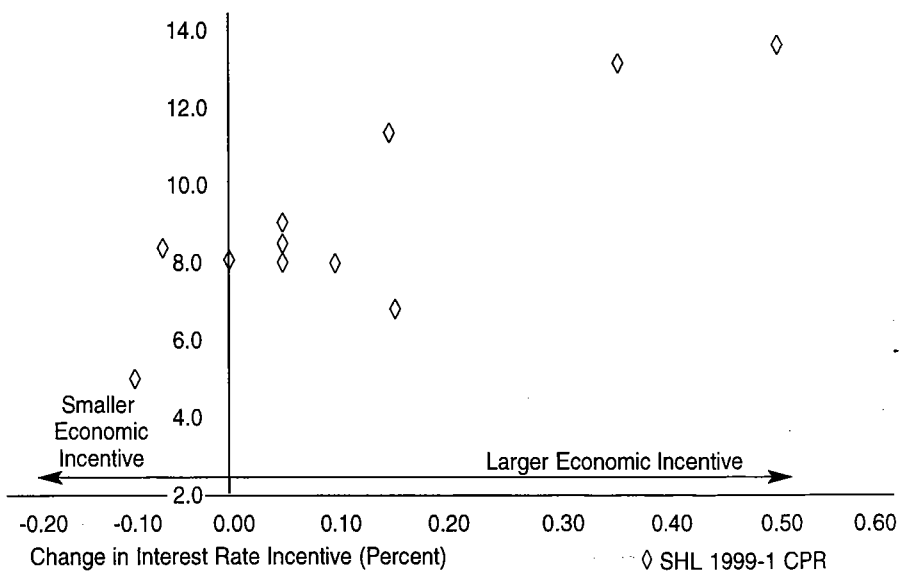


Figure 3. SHL 1999-1 Historical Prepayments vs. Change in Interest Rate Incentive



summer of 1999 was 13.2 CPR. This is quite moderate when compared to the response in U.S. and European mortgage markets at comparable levels of economic incentive. It was particularly low in light of the fact that mortgage rates in the U.S., Europe and Japan had all recently reached historic lows (the prepayment response for a given economic incentive typically is larger under those circumstances). Under similar conditions (comparable economic incentive to refinance, and with rates at historically low levels), recent speeds in those other markets have ranged in the area of 50 CPR (for moderately seasoned Fannie Mae MBS in the U.S.) and 20-25 CPR (for moderately seasoned MBS deals in the Netherlands).

- As soon as mortgage rates began to move higher in the summer of 1999, prepayments began to trend lower (see Figure 2). On the basis of the quick response to rising rates, it appears that there is no large unmet demand for refinancing in the Japanese market. If there had been a significant overhang of unmet refinancing demand, we would have expected speeds to stay higher even after rates had backed up, as a backlog of refinancing transactions moved through the mortgage pipeline.
- A lack of prepayment "surprises" so far in the SHL 1999-1 prepayment history supports our assessment of the relative lack of refinancing efficiency in the Japanese mortgage market. The moderate prepayment response we saw in 1999, particularly in the context of record low mortgage rates, suggests that Japanese borrowers do not currently utilize a wide variety of refinancing options. In markets where we know that borrowers do have access to many refinancing options (such as the U.S.), prepayments can go "out of sample," reaching new highs in an

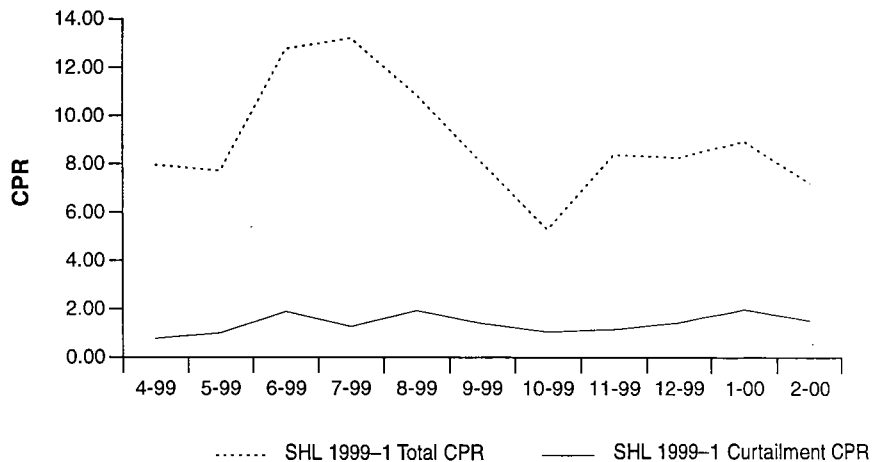
environment of record low mortgage rates. So far, there have been no such surprises in Japan.

- Curtailments remain a very significant component of the total prepayment equation in Japan. Over the four-year period of our initial study (1995 to 1998), curtailments of 10-year loans contributed an average of 1.41 CPR each month to collateral prepayments. This stands in contrast to the U.S. mortgage market, where curtailments normally add less than 0.15 CPR to the total prepayment speed. As seen in Figure 4 below, curtailments have contributed between 0.77 CPR and 1.98 CPR to SHL 1999-1 speeds since deal origination, with an average monthly contribution of 1.40 CPR. The high rate of curtailment in Japanese residential mortgages is important for two reasons. First, it indicates that borrowers have a strong desire to repay mortgage debt. Second, it provides a foundation for this deal's stable prepay-

ment profile, since it accounts for a relatively large percentage of the overall speed and is not linked to interest rates. Thus, we regard the role of curtailments in the prepayments of SHL 1999-1 as a positive both from the standpoint of expected credit performance and from the standpoint of stability in prepayment performance.

- To date, five loans in SHL 1999-1 have defaulted, for a cumulative loss of ¥63.6 million (US\$578,000). This amount represents a cumulative loss of 12.6 basis points through the March 2000 payment date. The A3/A-rated mezzanine (M) tranche of the deal, which constitutes 8.95% of the original balance, has not absorbed any of this loss, since excess spread has been more than sufficient to cover the defaults. In fact, the reserve fund of the deal has grown from 2.0% to 2.7% of the outstanding bonds since the deal was launched. This is another manifestation of the positive credit perfor-

Figure 4. SHL 1999-1 Curtailments and Total CPR



mance that we have observed in Japanese residential borrowers, and it bodes well for the possibility of lower credit enhancement levels and improved deal execution in the future. Indeed, the propensity of Japanese borrowers to reduce or eliminate debt (for example through curtailments) stands in dramatic contrast to the propensity of U.S. borrowers to accumulate debt. Even if credit enhancement levels in the U.S. and Japan were comparable, this important difference in borrower behavior would point to the intrinsic value of Japanese residential subordinates. Since Japanese enhancement levels are currently much larger than those in the U.S., the case for relative value in Japanese subordinates seems all the more compelling.

FUTURE EXPECTATIONS FOR THE JAPANESE MORTGAGE MARKET

What assumptions about future behavior can we make based on SHL 1999-1 prepayments to date, and on our experience in other markets?

- In the short term, we expect to see a trend toward slower speeds, provided rates remain in their current range. Monthly variations in speeds should largely be influenced by seasonal factors. (For example, the rate of housing turnover prepayments normally reaches its annual peak in March and April of each year, to coincide with the annual transition from one school grade to the next. Thus, we would expect prepayments due to housing turnover to increase in those months, independent of interest rates.) The housing markets in Japan may well be dependent on government initiatives to encourage demand in the housing sector. The current two-year stimulus program, which allows homeowners who have sold their home and suffered a loss to deduct that loss on

their income tax, is set to expire in early 2001. If that law is not extended, average speeds would be expected to trend as much as 1 CPR slower, a move that would put them closer to the levels observed in our initial study of the sector in 1999.

- In the medium term, and in the context of current economic and political events, the Japanese mortgage market does not appear to have a great potential for large increases in prepayment speeds. Signs of an economic revival in Japan remain mixed. For example, in early March the year-over-year difference in real household spending was reported at -3.2%. Similarly, in early April the National Land Agency reported that residential prices fell an additional 4.1% in 1999. The decline was even steeper in Tokyo, where residential land prices reportedly fell by 6.1% during the year. However, in the quarterly Mitsui Real Estate survey that was released at the end of April 2000, it was reported that residential land prices posted a 0.7% increase between January and April of the current year. Clearly, the quarterly survey may be picking up the first signs of a recovery that were not apparent in the most recent annual poll.
- In the long term, both the efficiency and the volatility of the prepayment response in Japan are likely to increase. Investors should not expect 1999's relatively benign Japanese prepayment profile to remain the benchmark in this market forever. We have yet to see a mortgage market in which lender competition and consumer education have not combined to increase refinancing efficiency (and hence the magnitude of the prepayment response when mortgage rates fall) over time. There is a long track record for this phenomenon in the U.S., as the prepayment waves of 1986/87, 1992/93 and 1998/99 saw a successive shrinking of

the refinancing incentive required to cause a strong prepayment response. Even in Europe, which has a much shorter history of secondary market activity, we have noted the impact of consolidations among mortgage lenders, and of heightened consumer awareness, on increasing prepayment speeds. Very recently, the menu of potential factors has grown to include the Internet, which offers the possibility of dramatically decreasing consumer costs in a refinancing transaction. At this juncture, we believe that the Internet could have an enhanced impact on markets other than the U.S. The reason is that Internet lenders outside of the U.S. have the potential to offer the competitive, low-cost alternatives that had developed naturally in the U.S. before the Internet became a household word. In contrast, that process is just beginning in countries outside the U.S., including Japan.

- Mitigating this and any other potential change in the Japanese housing market, however, is the important role of curtailments, which have been steady in all market and rate environments since 1995, and have been an important component of the stable prepayment profile observed in this deal to date. It is an open question as to which of the following three factors has the greatest impact on the high rate of curtailment observed in Japan:
 1. A strongly debt-averse borrower psychology.
 2. A salary structure that is well suited to making large payments at annual or semi-annual intervals (most salaried employees receive a semiannual bonus as part of their compensation).
 3. The fact that the cost of borrowing is higher than the nominal savings rate

currently available to Japanese consumers.

Point 3 is the only situation that is likely to change in the foreseeable future. If it does, homeowners might be tempted to put extra cash into savings accounts rather than continuing to curtail their mortgages. In the absence of such a change, we suspect that Point 1 is the primary factor causing curtailments (followed in importance by Point 2). If that is the case, a high curtailment rate should continue to be an important and defining attribute of Japanese prepayments.

- The low frequency of default is also linked to Japanese borrowers' debt aversion. While prepayment sensitivity should be expected to change as lender competition increases, the credit performance of this deal to date appears to be a product of cultural factors and, therefore, less apt to change over time. It is significant that Japanese borrowers have exhibited good credit performance through the severe and protracted recession of the 1990s, which has provided a stress case scenario. Under more favorable economic

circumstances, default frequency and severity would be expected to improve.

CONCLUSION

Our observations in this article were meant to inform readers about the performance characteristics of Japanese residential mortgages. They should be of particular use to market participants who wish to more fully understand transactions and structures that pass prepayment risk through to the investor. In the U.S. market, investors nearly always assume prepayment risk in mortgage-backed securities. In Europe and Japan, since issuers have in certain cases been willing to retain some or all of that risk, we have seen deals structured in this way. To the extent that large swings in the mortgage rate, economic conditions, or greater market efficiencies make the Japanese prepayment response more variable in the future, we can expect more transactions to pass prepayment risk through to investors.

NOTES

¹ For a discussion of the Pfandbrief structure, see Arndt, Franz-Josef, "The German

Pfandbrief and Its Issuers," *Housing Finance International*, March 1999, pp. 14-24.

² According to the 200 edition of the *Mortgage Market Statistical Annual*, the top five mortgage originators commanded a 16.3% market share (US\$166.9 billion issuance) in 1993. In 1999, the market share of the top five issuers had increased to 27.9%, or US\$355.5 billion in issuance.

³ The first was SHL 1999-1, priced in May 1999 by Bear Stearns International Ltd. and Sanwa Bank. Orient Corp. issued a private placement deal early in 2000. In April 2000, Fuji Bank priced a public deal in which prepayment risk was retained. Mitsubishi Trust is set to price a deal in May 2000.

⁴ The CPR is the constant prepayment rate, which is the rate at which the principal balance on a pool of mortgages is being paid, stated on an annualized basis.

⁵ The gross coupon on the mortgage is lower than the prevailing mortgage rate.