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Prepayment Behavior of Australian Mortgages⁹

The globalization of the mortgage-securities market is a major theme for US ABS investors. Australian MBS offers US investors a means of diversification from the US economy and its lending institutions, while providing relative-value advantages. Because Australian mortgages typically have many moving parts, we examine how loan features influence prepayment rates. Then, we attempt to develop a framework for modeling.

Australian mortgage prepayments are very stable, around 20% to 30% CPR. Important influences on prepayments in Australia include the following:

Competition — Given the competitive nature of the Australian mortgage market, actions of individual lenders to attract more customers can cause refinancings to increase.

Culture — The “Great Australian Dream” of home ownership contributes to higher curtailments (partial repayments) and full payoffs on Australian mortgages.

Taxes — Owner-occupied loans are not tax-deductible, which is a positive contributor to prepayments, since borrowers in this category pay off their mortgages as soon as possible. Property investors, however, can deduct the interest component of their loan as an expense, so investment loans tend to display slower prepayment rates.

Interest rates — **Prepayments of variable-rate loans are, at most, weakly dependent on rates. Types of loans:**

Variable-rate loans — Given the home ownership culture and tax regulations in Australia, one could argue that curtailments and full payoffs increase as interest rates go down. Assuming the average borrower keeps making roughly the same

⁹ Originally published in *The Mortgage Market in Australia*, Peter DiMartino and Robert Young, September 12, 2000.

loan payments as before (rather than choosing to reduce the payment), higher curtailments could result in the case of declining rates. However, in practice, it is difficult to observe much correlation between rates and prepayments, partly because the prepayment effects resulting from competitive actions by lenders tend to obscure any changes in prepayments resulting from rates.

Fixed-rate loans — Because of prepayment penalties, decreasing interest rates do not spark the prepayment surges seen in the United States. Rising interest rates do tend to reduce prepayments because of a lock-in effect. Collateral for deals often contain some fixed-rate loans mixed in with variable-rate loans. The proportion of borrowers taking out fixed-rate loans in the primary mortgage market typically might vary from less than 10% to just over 20%.

Legal (full recourse) — Unlike in the United States, all of the borrower's assets, not only the property itself, are potentially available to the mortgage lender in the case of default. For borrowers, this is a strong disincentive to default on their mortgages and partly explains low default rates on Australian mortgages.

Geographic — Higher mobility in metropolitan areas leads to higher housing turnover.

LTV — Similar to the United States, higher LTVs imply slower prepayment rates.

Loan purpose — See "Taxes."

Redraw-type features — This may tend to increase curtailments relative to the United States as Australian borrowers have more flexibility to prepay and withdraw previous prepayments when needed. However, given that redraw is essentially a negative prepayment, this feature also gives borrowers the opportunity to reduce prepayments.

Portability — This can act to reduce housing-turnover-related prepayments if the conditions for using this facility are met. However, because the requirements described earlier for using this feature are not easy to meet, it is likely a small factor in reducing turnover-related prepayments.

Deal structure — Some of the features associated with Australian mortgages can cause a loan to be removed from the collateral backing a deal. For example, for at least some deals, "top-ups," which cause the principal balance to exceed the scheduled balance, result in loans being removed from the pool of mortgage collateral backing the deal. Although this is not a prepayment from the point of view of the lender, it is a prepayment for the investor. "Splitting" can also show up as a partial prepayment to the investor (see *Bond Market Roundup: Strategy*, January 19, 2001).

Australian Prepayment Decomposition

We categorize unscheduled principal repayments into five types, the sum of which is the total prepayment rate. Note that in addition to the usual components found in the US case, we subtract a redraw component from the Australian version of the basic prepayment formula:

$$\text{Total Prepayment} = \text{Turnover} + \text{Refinancings} + \text{Partial Repayments} + \text{Defaults} - \text{Redraws}$$

Some of the features associated with Australian mortgages can cause a loan to be removed from the collateral backing a deal.

We develop a modeling framework.

Turnover — More precisely, these are home-purchase-related prepayments. This component is closely linked to the housing turnover rate, which in turn is related to the strength of the housing market in Australia. We can roughly estimate the housing turnover rate from figures which show that out of a total of 4.37 million homeowners (not including first-time homeowners), 0.67 million bought their homes in the previous three years.¹⁰ This implies a turnover rate of about 5.4%.¹¹ This compares with the turnover rate of roughly 6% to 7% recorded recently by the strong US housing market.¹² The housing turnover rate is different from the turnover prepayment rate, because the turnover rate for homeowners with mortgages can be different from the rate for homeowners who own their homes outright. In fact, recent figures from the Australian Bureau of Statistics indicate that this difference can be substantial, with the borrower turnover rate possibly reaching up to almost three times that of the outright owner turnover rate (these figures are from an October 1999 study of population mobility in Victoria). In addition, portable mortgages reduce the turnover prepayment rate from the housing turnover rate, although this is likely a small factor, as indicated in the previous section. Figure 32 gives some indication of how high the turnover prepayment rate might be, as well as roughly what the turnover seasoning ramp looks like. It suggests that the turnover rate for homeowners with mortgages is significantly higher than our estimated overall turnover rate of about 5.4%.

In the United States, the housing turnover rate is assumed to depend weakly on interest rates. This is likely the case for the Australian housing turnover rate, but the effect is probably even weaker than in the US case. Although, as in the United States, higher rates mean lower levels of affordability, because of the large number of variable-rate loans, fixed-rate loans with prepayment penalties, and portability, there will be less of a lock-in type effect that affects American borrowers with a discount mortgage rate.

Refinancings are more dependent on lender actions than interest rates, which are the main driver of this type of prepayment in the United States.

Refinancings — As indicated, this is more dependent on lender actions usually taken for competitive reasons than interest rates, which are the main driver of this type of prepayment in the United States. For fixed-rate loans, refinancings should decrease as rates rise, since there is some financial disincentive to getting out of a relatively low fixed-rate loan.

For variable-rate loans, in theory, there should not be much of a link between interest rates and prepayments. Although any connection would be at most weak, one possibility is a link between prepayment speeds and rate volatility. In other words, prepayments might see a slight uptick if rates go up or down substantially. As in the United States, borrowers like to lock in a fixed rate after interest rates fall. But when rates go up, some borrowers like to lock in a fixed rate (at least on part of their loan) to protect against even higher rates. In any case, even if this kind of

¹⁰ See *The Mortgage Market in Australia*, September 2000, Figure 6.

¹¹ $5.4\% = 1 - (1 - 0.67/(4.79-0.42))^{1/3}$

¹² In Australia, it is not uncommon to buy a house by bidding at an auction. Also, in general, the term *gazumping* refers to when an offer on a home is accepted, but another party makes a higher offer, which secures the sale of the home.

behavior were to exist, the fact that the **switching** feature allows a variable-rate borrower to switch over to a fixed-rate loan (often at no cost) would tend to make any relationship weak.¹³

Partial repayments are much higher than in the United States.

Partial repayments (also called curtailments) — These are much higher than in the United States. This category includes full payoffs where no new loan is taken out.¹⁴

For variable-rate loans, we might assume that Australian borrowers, on average, attempt to keep their periodic payments fixed. So when interest rates decline, for example, curtailments would increase because the required payments would decrease, but the borrowers choose to continue making the same payments as before (so more principal is paid down). This might reflect a particular individual's behavior, but, in practice, it is difficult to determine whether such a relationship holds in aggregate.

Redraws are essentially negative partial prepayments.

Redraws — These are essentially negative partial prepayments.¹⁵ One question concerns how the availability of the redraw feature affects the volatility of prepayment speeds. In theory, redraws could make speeds more volatile. For example, if rates were to skyrocket, variable-rate borrowers might not only stop making partial repayments, but also redraw on principal already prepaid, resulting in even more extension in mortgage average lives than would be the case if the redraw feature were not available. However, putting aside these extreme scenarios, in practice, it appears that redraws tend to stabilize prepayment speeds, since things average out over a large group of borrowers. Some borrowers make use of the redraw facility, but normally the partial repayments made by others more than cancels out these negative prepayments (in which case, there is no issue concerning a lack of principal available to pay bondholders.)¹⁶

Defaults — These are very low and so a decent approximation (for prepayment analysis) is to assume this to be zero.

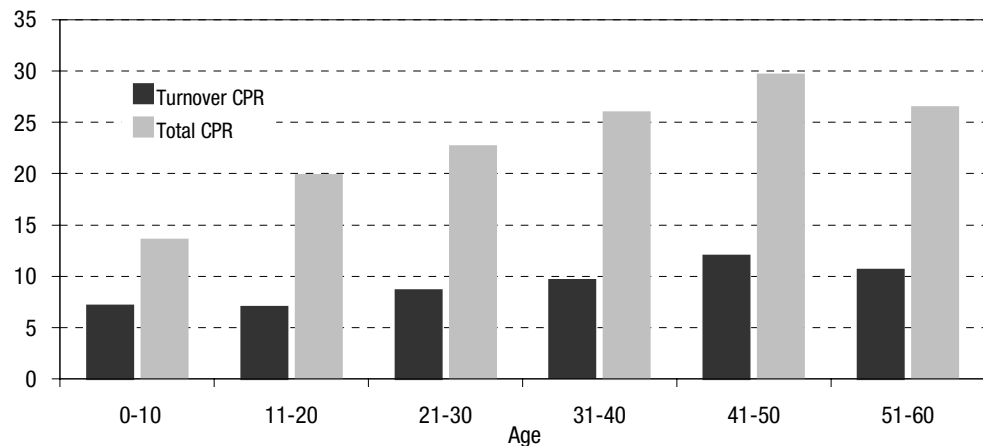
Figure 32 shows prepayment speeds for a sample of Australian MBS deals reported on by S&P. The data is grouped by age. In addition, estimates for the turnover component of speeds are shown.

¹³ Assuming it does not trigger removal of the loan from the deal collateral.

¹⁴ These full payoffs are still considered partial repayments because they do not involve a move or refinancing. Alternatively, these full payoffs can be thought of as very large partial repayments, where the borrower pays off all but a tiny portion of the loan.

¹⁵ Redraw being a positive quantity is the sign convention used (so it is subtracted from the sum of prepayments in computing a total prepayment rate).

¹⁶ The other prepayment components would provide additional principal to draw on if needed.

Figure 32. Sample Australian Mortgage Prepayments — Three-Month CPRs for Second-Quarter 2000

Source: S&P.

Prepayment Analysis

Based on a study of limited loan level data from a major Australian lender and available industry data, we can make some rough observations:

- 1 Prepayments are generally stable at around 20% to 30% CPR, which is representative of Australian prepayment speeds in general.
- 2 Loans season very fast with newer loans prepaying as high as over 20% CPR in some cases. Part of the reason for the fast initial speeds could be deal-structure-related prepayments, as discussed. The steepness of the seasoning ramp varies (Figure 32 gives some indication of seasoning). In general, initial prepayment speeds and the rate of seasoning will depend to some degree on particular collateral and deal characteristics.
- 3 Variable-rate loans have been prepaying much faster than fixed-rate loans. Since the limited data analyzed is from a period of rising interest rates, it is not clear to what degree the slower fixed-rate speeds reflect the financial disincentive of higher rates or self-selection by borrowers.
- 4 The loan rate does not appear to have a large effect on prepayment speeds. On variable-rate loans, speeds can at times actually be higher on low-rate loans. Partial repayments do not appear to explain this.
- 5 **The breakdown of prepayments appears to be roughly 5%–9% CPR for partial repayments,¹⁷ over 20% CPR for full payoffs, and approximately 4% CPR for redraws.**
- 6 **The breakdown of prepayments for fixed-rate loans is fairly subdued, at roughly 0%–3% CPR for partial repayments, approximately 10% CPR for full payoffs, and around 0% CPR for redraws (as should be the case since redraw is generally not a feature of fixed-rate loans).**

¹⁷ Here, partial repayments do *not* include any full payoffs, since lender data normally do not give the reason for a full payoff.

- 7 The breakdown of prepayments for variable-rate loans appears to be roughly 7%–11% CPR for partial repayments, approximately 20%–30% CPR for full payoffs, and about 4%–5% CPR for redraws.**

Of course, the breakdowns given in observations 5, 6, and 7 only apply to the particular collateral that was studied and would in general vary depending on particular collateral and deal characteristics.

An Australian Prepayment Model

One approach to modeling Australian prepayments is to use a modified PSA curve.

One approach to modeling Australian prepayments is to use a modified PSA curve. For example, a straight-line seasoning ramp (not starting at zero in most cases) could be assumed for the first few years, followed by a constant prepayment rate assumption. This was done for the limited set of data we examined and probably is good enough for some purposes, given the relative stability of Australian mortgage prepayments.

But what more can we say about interest-rate sensitivity? Our feeling is that interest rates may have a limited impact, but it is difficult to isolate the effect of changing interest rates from historical data, because of other industry changes that have occurred simultaneously in the Australian mortgage market. Also, as described earlier, there is limited financial incentive to refinance most loans. **Furthermore, the dynamic nature of the Australian market is likely to continue, meaning that being able to predict the effect of future interest-rate changes may be less important than, say, recognizing that a new round of intense mortgage-lender competition for borrowers is about to occur, which might raise prepayments substantially.** (But actually, after all of the competition during the past several years, a round of consolidation might be