Barclays Capital Loan Transition Model

Introducing a New Residential Mortgage Credit Model

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At the close of business on Friday, December 3, 2010, Barclays Capital will be introducing a new residential mortgage credit model to Barclays Capital Live. Highlights of the new model include the following:

- It is a loan-level transition model that tracks the progression of mortgages through the entire chain of borrower actions and servicer reactions. It is implemented through Monte Carlo simulation at the loan level, which allows it to make full use of a borrower's entire payment history when projecting the level and timing of future prepayments and defaults.
- The model can be used to evaluate mortgage pools containing virtually any residential mortgage products whether prime, AltA, subprime, or second lien; fixed or adjustable rate; amortizing, interest only or negatively amortizing; 15y, 30y, or 40y amortization terms. It also distinguishes between second lien mortgages securitized into stand-alone deals and other second liens. This feature is particularly important when modelling transitions from 60+ to liquidation versus 60+ to foreclosure since the vast majority of second-lien securitizations require that loans be charged off once they become more than 180 days delinquent.
- We use the OTS method to classify borrowers as either current or delinquent and make a sharp distinction between those who have never been delinquent and those who are up-to-date on their payments but have been delinquent at some point in the past. This distinction is especially important for pools in which large numbers of borrowers have been cured back to a non-delinquent status through loan modification.
- Loan modifications are explicitly included as a form of curing separate from non-modification related cures, allowing us to make full use of this important information when projecting future delinquencies and cures. We also model the rate and/or principal reductions resulting from the modification and incorporate these mortgage contract changes into projections of post modification cash flows.
- LTVs are marked-to-market using zip code level home price indices provided by First American Core Logic. This improves the accuracy of LTV calculations over using state or MSA level home prices. The model uses y/y trends in zip code level home prices to track the strength or weakness of local housing markets. It also uses MSA-level unemployment information to measure improvements or deterioration in the local economy since loan origination.

- In modelling transitions for severely delinquent borrowers, the new model uses months delinquent, months in state and recent payment behaviour. This allows us to better distinguish consistently non-cash flowing, delinquent borrowers who are likely to transition through the foreclosure process to liquidation from those delinquent but cash flowing borrowers (e.g., borrowers in trial modifications) who are likely to cure or be modified back to a non-delinquent payment status.
- Foreclosure to REO transitions incorporate state-level differences in foreclosure laws and timelines to more accurately project the timing of transitions from foreclosure to REO. The model also incorporates the effect of the nationwide slowdown in foreclosures on the rate at which severely delinquent borrowers transition through the foreclosure process.
- Our loss severity model distinguishes between REO and non-REO liquidations and incorporates projected principal and interest advances into the calculation of loan-level losses. As a result, factors that slow down the foreclosure process or discourage non-REO liquidations automatically increase advances and projected severities.
- The prepayment model incorporates the dampening effect of tighter underwriting guidelines on the ability of borrowers with past delinquencies, high LTVs or nonconforming mortgage balances to refinance their mortgages, while at the same time allowing for the "prepayment curing" of borrowers who maintain clean payment profiles for several years.
- We include a range of scenarios on Barclays Capital Live for use with the new model. The national home price forecasts that define each scenario are distributed to state, MSA, county, and zip code levels based on each region's historical sensitivity to national home price appreciation, adjusted for recent trends in that region's home prices, anticipated changes in the share of existing home sales resulting from distressed transactions, and MSA level forecasts of income growth from Moody's Analytics.

Beyond Borrower Collateral Characteristics

The severe deterioration in mortgage performance over the past several years has made clear the need to go beyond credit models that use only borrower collateral characteristics and changes in the economic environment when projecting defaults and losses on individual pools of mortgages. This need is especially pronounced in the non-agency MBS sector, where the time and credit tranching of traded securities makes them particularly sensitive to the prepayment, default and recovery assumptions applied to the underlying mortgages.

Compared with the early stages of the housing crisis, the percentage of non-agency borrowers who are behind on their mortgages has increased markedly, with delinquencies on Jumbo ARMs approaching levels seen on Subprime mortgages just three years ago (Figure 1). A quick examination of defaulted loans also reveals that the number of missed payments between initial delinquency and ultimate liquidation has almost doubled, from an average of 9 months in 2007 to 16 months for recent liquidations. Finally, notice that, due to the systematic modification of delinquent loans, the share of borrowers classified as up-to-date on their mortgage payments but delinquent at some point in the past has increased significantly, from just 7% of all subprime borrowers in June 2007 to 23% today.

Figure 1: Changes in Borrower Delinquency Profiles over Time, OTS Delinquencies

	%Current, Never Delinquent	% Current, Previously Delinquent	% 30+, FLC & REO	Months Delinquent at Liquidation
		June 2010		
Jumbo Fixed	88.9	3.1	8.1	14
Jumbo ARM	84.4	3.5	12.1	15
AltA Fixed	69.1	8.0	22.9	17
AlA ARM	57.1	9.5	33.5	17
NegAm	44.7	9.5	45.8	17
Subprime	30.3	22.9	46.9	17
		June 2007		
Jumbo Fixed	99.2	0.5	0.3	8
Jumbo ARM	98.9	0.6	0.5	7
AltA Fixed	95.9	1.7	2.5	11
AltA ARM	93.0	1.9	5.1	8
NegAm	95.8	1.5	2.6	6
Subprime	76.9	6.9	16.3	12

Source: LoanPerformance, Barclays Capital

Other things equal, the likelihood of becoming delinquent is higher for someone who has missed payments in the past than for a borrower who has never missed a payment. Similarly, a property that has passed through the foreclosure process and is now real-estate owned (REO) is much more likely to be liquidated over the next several months—bringing to an end any interest advances on the associated mortgage—than one that is still passing through the foreclosure process. In short, knowing a borrower's current delinquency status and pay history is extremely important in estimating his likelihood of default and the loss that will be suffered if and when a default occurs. It is not surprising, therefore, that most non-agency investors now employ some form of transition model (also known as roll rate models) when evaluating non-agency MBS.

While transition models vary in complexity, all share a common structure in which loans are classified into one of several delinquency buckets, and then the probability of transitioning from one bucket to another or to prepayment/default is modelled. The simplest transition models classify mortgages into a small number of delinquency buckets and use recently observed transition rates to project future behaviour. Enhancements typically involve using separate transition matrices for each collateral type and vintage of interest, increasing the number of delinquency buckets, or replacing empirical transition rates with transition functions estimated using historical data. The most sophisticated and computationally intensive transition models tend to be implemented through Monte Carlo simulation because this allows them to factor a borrower's full payment history, not just his current delinquency status, into projections of future borrower (and servicer) behaviour.

The Barclays Capital Loan Transition Model (BLTM) is a simulated loan-level transition model that includes a number of enhancements relative to standard transition models. In the remainder of this article we will discuss in greater detail the model's basic structure and implementation, the primary factors affecting borrower delinquency and curing behaviour, servicer responses to borrower delinquencies, and loss severities on liquidated properties. We will also discuss the treatment of prepayments within the model as well as the home price assumptions used in the economic scenarios available on Barclays Capital Live.

Model Structure and Implementation

Model Structure

As stated in the introduction, the Barclays Capital Loan Transition Model is a Monte Carlo simulated, loan-level, transition model. The transition matrix in Figure 2 provides a useful visual representation of the model. At each point in time along a given simulation path, every loan with nonzero remaining balance is classified into one of the six delinquency categories in the left-most column of the matrix. The nonzero cells to the right of each starting delinquency category represent the possible ending delinquency states for a loan. The names displayed within each of these cells signify transition probability functions that take values between 0 and 1 and together determine the relative likelihood of each ending delinquency status. The transition functions displayed in Figure 2 represent a combination of borrower and servicer actions. Borrowers primarily choose whether or not to make payments (DQ functions), cure delinquencies (CC, C3, and C6 functions), or prepay their mortgages (PP functions). Servicers primarily choose whether to modify delinquent borrowers (M and MC functions) or pursue foreclosure (CFC and CREO functions). Involuntary payoffs (DD functions) can be the result of borrower actions (e.g., the sale of a property and full payoff of the mortgage), servicer actions (e.g., a foreclosure sale or REO liquidation) or the joint effort of both the borrower and servicer (e.g., a short sale). Since the columns to the right of a starting delinquency category constitute all possible one-period-ahead transitions, the probabilities in each row must sum to one. The named cells in each row signify those transition probabilities that we explicitly model. These functions were estimated using loan-level data from the LoanPerformance MBS/ABS securities database. The cells marked with an X represent no change in delinquency category and are calculated as the residual of the other transition probabilities, as indicated by the formulas listed below the matrix.

Figure 2: Structure of Barclays Capital Loan Transition Model

From \ To	ACUR	DCUR	30D	60+	FCL	REO	Prepay	Default
ACUR	X_{AC} , M_{AC}	0	DQ_{AC}	0	0	0	PP_{AC}	0
DCUR	0	X_{DC} , M_{DC}	DQ_{DC}	0	0	0	PP_{DC}	0
30D	0	MC_{30D} + CC_{30D}	X_{30D}	DQ_{30D}	0	0	PP_{30D}	0
60P	0	MC_{60P} + CC_{60P}	$C3_{60P}$	X_{60P}	DQ_{60P}*CFC_{60P}	0	0	DD_{60P} , SEV
FCL	0	MC_{FCL} + CC_{FCL}	0	$C6_{FCL}$	X_{FCL}	DQ_{FCL}*$CREO_{FCL}$	0	DD_{FCL} , SEV
REO	0	0	0	0	0	X_{REO}	0	DD_{REO} , SEV

Note: Delinquencies are calculated using OTS method (i.e., 30D implies two missed payments). ACUR signifies always current. DCUR signifies dirty current (i.e., current but previously delinquent). DQ functions represent probability of missing next payment. CC, C3, and C6 functions represent probability of borrower self curing to current, 30D OTS, and 60+ OTS, respectively. M functions represent probability that an OTS current borrower is modified. MC functions represent probability of a delinquent borrower being modified back to current. Prepayment is defined as any payoff out of a current or 30D OTS state (PP functions), while default is defined as any payoff out of OTS 60+, foreclosure or REO (DD functions). In the event of a default, losses are calculated using the severity function SEV. Xs represent the residual of other transition probabilities and are given by:

$X_{AC} = 1 - DQ_{AC} - PP_{AC}$
$X_{DC} = 1 - DQ_{DC} - PP_{DC}$
$X_{30D} = 1 - MC_{30D} - CC_{30D} - DQ_{30D} - PP_{30D}$
$X_{60P} = 1 - MC_{60P} - CC_{60P} - C3_{60P} - DQ_{60P}*CFC_{60P} - DD_{60P}$
$X_{FCL} = 1 - MC_{FCL} - CC_{FCL} - C6_{FCL} - DQ_{FCL}*CREO_{FCL} - DD_{FCL}$
$X_{REO} = 1 - DD_{REO}$

Source: Barclays Capital.

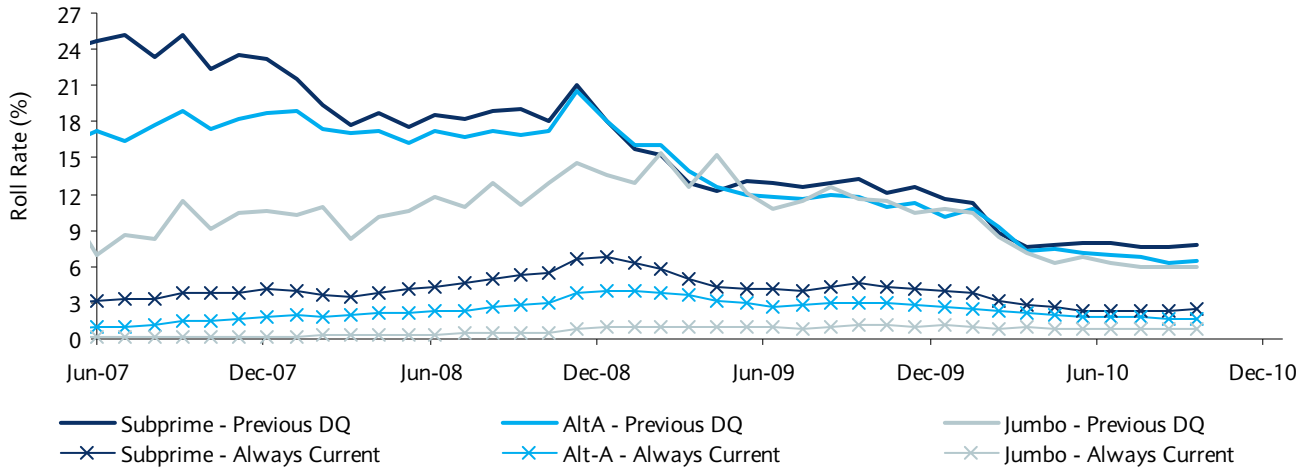
OTS versus MBA Delinquencies

The delinquency classifications used within the model are based on the OTS (Office of Thrift Supervision) method for determining delinquencies, as opposed to the MBA (Mortgage Bankers Association) method. This is true for all mortgage products covered by the model. The difference between the two methods is that, under the OTS method, a borrower is considered current until he becomes two months delinquent. Thus, a borrower who is "30 days" delinquent under the OTS method would be considered "60 days" delinquent under the MBA method and vice versa.[1] We have found the transition from OTS always current to OTS 30 days delinquent to be a much more reliable and powerful signal of changes in borrower credit quality than the transition from MBA always current to MBA 30 days delinquent. For this reason, we use OTS delinquencies to distinguish always current borrowers from other borrowers within our model.[2]

Always Current versus Dirty Current and Delinquent

One very important feature of the model is its distinction between borrowers who have never been delinquent (i.e., OTS 30-days delinquent or worse) and borrowers who are considered current on their payments but have been delinquent in the past. We refer to the former as clean current or always current (ACUR) and the latter as delinquent current or dirty current (DCUR). It is difficult to understate the disparity in performance between always current and dirty current borrowers. The difference is not just that dirty current borrowers are much more likely to become delinquent than borrowers who have never been delinquent (Figure 3), but also that their credit performance is much less correlated with the primary drivers of always current to delinquent transitions – factors such as original FICO score and Updated

Figure 3: OTS Current-to-Delinquent Roll Rates, 2006 Originations



Source: LoanPerformance, Barclays Capital

[1] The convention within the non-agency sector has traditionally been to report MBA delinquencies in the remittance reports of Jumbo securitizations and OTS delinquencies in the remittance reports of subprime securitizations. For AltA securitizations, the choice between OTS and MBA methods varies across deals.

[2] Servicing transfers, clerical errors, and life events that distract a borrower from his normal routine can all lead to a one-time MBA 30-day delinquency that contains little or no information about the borrower's ability to continue making payments. Since these issues tend to be cleared up before they result in a second missed payment, they are much less likely to result in an OTS 30-day delinquency. This noisiness in always current to 30-day MBA transitions was especially pronounced for prime mortgages during the pre-crisis period when delinquencies on prime collateral were extremely low and consequently erroneous transitions constituted a larger share of all current to delinquent transitions.

Combined LTV (UCLTV) (Figure 4). In addition, cross sector differences in current to delinquent transition rates are much less pronounced for dirty current borrowers than for always current borrowers. In fact, we have found that while it is best to have separate always current to delinquent transition functions for each non-agency sector (Jumbo, AltA, NegAm Subprime), it is not necessary for transitions out of dirty current or worse delinquency states. This finding has allowed us to sharply reduce the number of functions estimated for the new model. In particular, outside of the always current bucket, our model uses a single set of transition functions for all first lien mortgages.

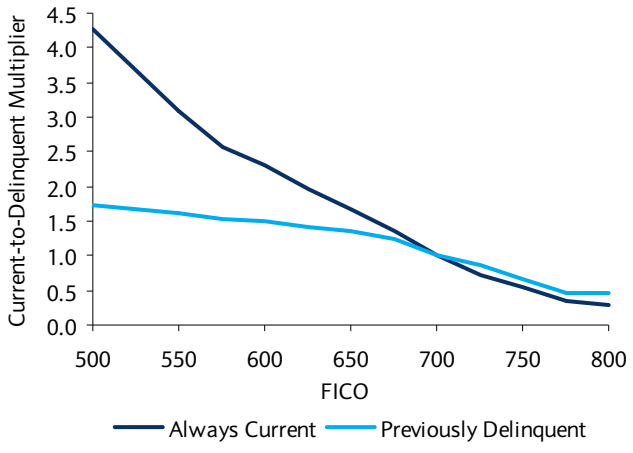
Implementation Using Monte Carlo Simulation

There is nothing in our description of the model's structure so far that requires that it be implemented through Monte Carlo simulation. If the only borrower payment information used by the transition probability functions were the starting delinquency categories on the left-hand side of Figure 2, then simulation would be unnecessary. However, information about a borrower's past and recent payment behaviour is enormously helpful in improving our estimates of future behaviour. For example, the probability that a recently delinquent borrower becomes delinquent again is much more dependent on how many continuous payments they have made since being modified than on their credit score at origination. Similarly, the speed with which non cash flowing borrowers transition from foreclosure to REO depends on how long they have been in foreclosure relative to the typical time to foreclose in the state where the mortgaged property is located. In order to use information like this to project future delinquency transitions, we must calculate and keep track of it as part of our projection. And we can only accomplish this by simulating each loan's behaviour forward from our last observed month until the point at which it is prepaid, liquidated or fully amortized. Appendix B contains an example of the simulation process for interested readers.

Figure 5 contains a list of the factors affecting the various components of the model. In the sections that follow we will discuss the most important factors.

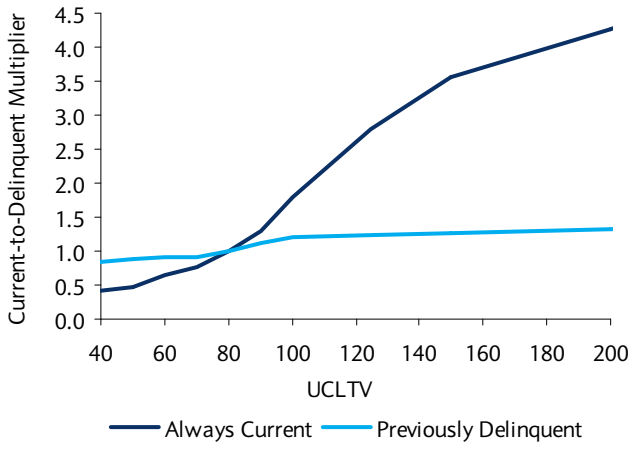
Figure 4: Estimated Sensitivity of Current-to-Delinquent Roll Rates to FICO and UCLTV by Pay History

a. FICO



Roll rates are shown as multiples of the case where FICO=700
Source: Barclays Capital

b. UCLTV



Roll rates are shown as multiples of the case where UCLTV=80
Source: Barclays Capital

Figure 5: Primary Factors Affecting Delinquency Transitions in the Barclays Loan Transition Model

	Borrower Delinquencies & Cures								
	Delinquencies			Cures	Servicer Reactions To Delinquency				
Model Variables	ACUR	DCUR	30/60+/FC	30/60+/FC	Foreclosure	Short Sale	Modification	Loss Severity	Prepay-ments
Static Factors									
Sector: Jumbo, AltA, Subprime , 2nd Lien	x	x					x	x	x
Product Choice: ARM vs. Fixed	x	x	x	x			x		x
Product Choice: 15y, 40y, IO, NegAm vs. 30y	x	x	x	x			x		x
Original FICO Score	x	x	x	x			x		x
Documentation	x	x	x	x			x		x
Occupancy	x	x	x	x	x	x	x	x	x
Loan Purpose	x	x						x	
Property Type	x	x	x	x				x	
Prepayment Penalties									x
Spread at Origination (SATO)	x								
Month of Year	x	x	x	x					x
Judicial vs. Non Judicial Foreclosure			x	x	x	x		x	
State Specific Foreclosure Timeline					x				
Borrower / Lender Paid Mortgage Insurance								x	
Time Varying Factors									
Delinquency Status							x		x
Updated Combined LTV (UCLTV)	x	x	x	x	x	x			x
Updated LTV (ULTV)							x	x	
Payment Reset Shocks	x	x	x	x					x
Cumulative Payment Change Since Origination	x	x	x	x					
Year-Over-Year HPA	x	x	x	x	x	x			
Change in Unemployment Rate Since Orig	x	x							
Loan Size	x	x	x	x			x	x	x
Refinance Incentive / Lockin									x
Path Dependent Factors									
Previous Delinquency Status		x	x	x	x	x		x	
Number of Missed Payments			x	x	x	x		x	
Months in State (i.e., months in dq bucket)		x	x	x	x	x			x
Recent Payment Behavior			x	x	x	x			
Modification History		x	x	x			x		x
Advanced Principal and Interest								x	

Source: Barclays Capital

Borrower Delinquencies and Cures

Always Current to Delinquent Roll Rates

The always current to delinquent transition can be thought of as giving the rate at which good borrowers go bad. Once borrowers become OTS 30 days delinquent for the first time, their likelihood of ultimate default increases markedly even if, in the near term, they manage to cure back to current. For this reason, the always current to delinquent roll rate is by far the most important borrower-driven delinquency transition in determining the overall level of defaults for a mortgage pool. It is also the one place in the model where we use separate

transition functions for different collateral types. Specifically, the model contains separate always current to delinquent transition functions for each non-agency sector and product type (i.e., Jumbo Fixed, Jumbo ARM, AltA Fixed, AltA ARM, NegAm, Subprime Fixed, and Subprime ARM). This increases our ability to capture the full range of credit performance across non-agency mortgages.

The most important drivers of always current to delinquent roll rates for prime, AltA, and subprime borrowers alike, are their credit score at origination, the amount of equity they have in the property, the level of income and asset verification they provided at the time of origination, any mortgage product choices they made that suggest a weaker or stronger credit profile than normal (e.g. 15y, 40y, IO, NegAm), and whether or not the mortgaged property is their primary residence.

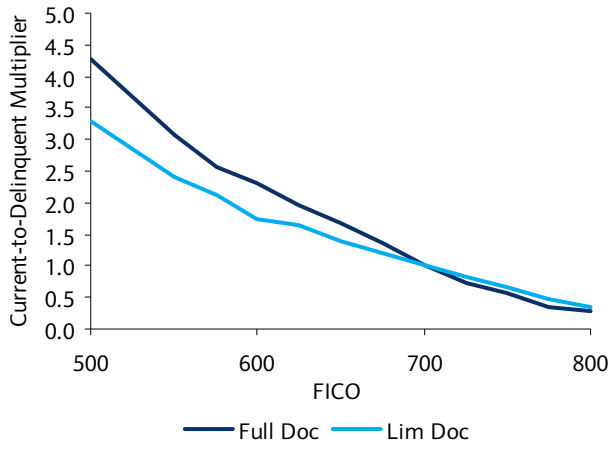
- **FICO Score at Origination**: While a borrower's credit quality is far from static (if it were, we would not need credit models), it tends to be sticky, especially for always current borrowers. As a result, knowing a borrower's FICO score at origination provides useful information for predicting future delinquencies (Figure 6a). Assuming all other characteristics are the same, always current borrowers with subprime FICO scores (FICO<=600) are 2.5-3.5 times more likely to become delinquent than high quality jumbo borrowers (FICO>=750).

- **Updated Combined LTV (UCLTV)**: One of the most important factors in any credit model is the borrower's equity position in the property, adjusted for changes in home prices and (possibly negative) amortization of the mortgage (Figure 6b). Borrowers with UCLTV>100 have an incentive to strategically default on their mortgage. High UCLTVs resulting from property price declines can also signal a weak local economy and therefore a reduced ability to continue paying one's mortgage. Both of these effects create a strong correlation between borrower equity and roll rates from always current to delinquent. Model estimates displayed in Figure 6b indicate that always current borrowers with a 20% equity deficit in their property (UCLTV=120) are 2.5-3.5 times more likely to become delinquent than borrowers with a 20% equity cushion (UCLTV=80).

- **Documentation**: Borrowers who willingly accept a higher mortgage rate (often significantly higher) in return for not verifying their income and assets reveal themselves to be riskier credits than their FICO scores might suggest. It is not surprising, therefore,

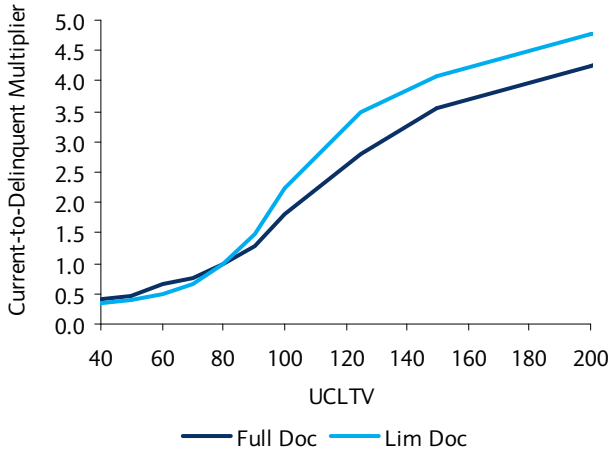
Figure 6: Estimated Sensitivity of Always Current-to-Delinquent Roll Rates to FICO and UCLTV by Documentation Type

a. FICO



Roll rates are shown as multiples of the case where FICO=700.
Source: Barclays Capital

b. UCLTV



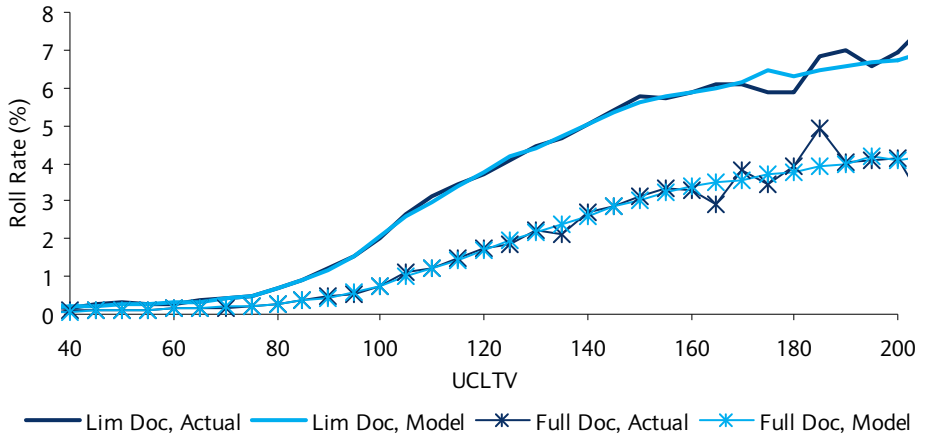
Roll rates are shown as multiples of the case where UCLTV=80.
Source: Barclays Capital

that limited documentation mortgages perform significantly worse than full-documentation mortgages with similar FICO and UCLTV (Figure 7). This difference is captured in our model, as is a slightly more subtle effect of limited documentation displayed in Figures 6a and 6b. Specifically, while FICO is an important predictor of credit quality for all borrowers, it is less informative for borrowers who failed to verify their income and assets at origination (Figure 6a). In contrast, UCLTV becomes an even more important predictor of future delinquency for these borrowers since, in many cases, they overstated their income in order to purchase a larger home or extract more equity from an existing home than might otherwise have been allowed.

- **Product Selection**: Another way in which borrowers reveal themselves to be better or worse credits than suggested by their other collateral characteristics is through the mortgage products they select. Borrowers who opt for mortgages with extended amortization schedules (e.g., 40-year mortgages) or low initial monthly payments (e.g., interest-only mortgages, negatively amortizing mortgages and adjustable rate mortgages with short fixed rate periods) tend to become delinquent at higher rates than borrowers with 30-year fixed rate amortizing mortgages. In many cases, the weaker performance occurs even before their initial payment resets higher (Figure 8). Once the reset occurs, credit performance can deteriorate rapidly (Figure 9). Conversely, borrowers who select mortgages with shorter amortization schedules (e.g., 15-year mortgages) tend to perform better despite the higher monthly payments required.

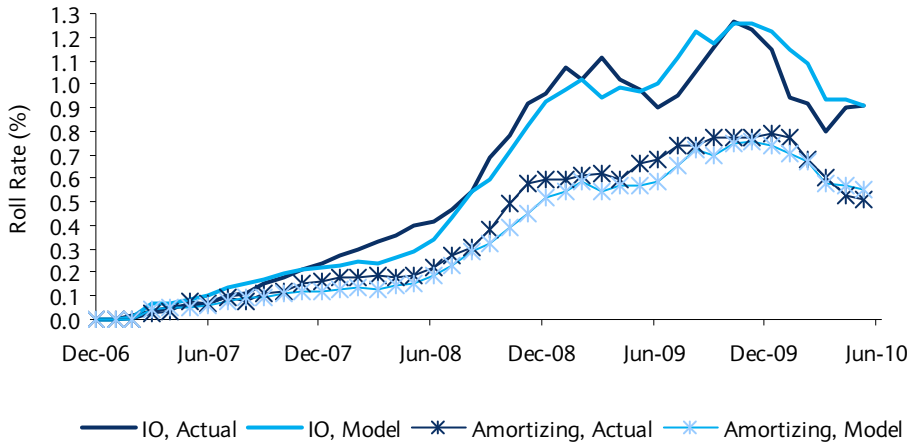
- **Occupancy**: Most home owners become anchored to their communities through the schools their children attend and the friends they make. As a result, defaulting on the mortgage backing one's primary residence can be a jarring experience, one that most people would choose to avoid. By contrast, an investment property primarily represents a stream of income or speculative opportunity, making the decision to default more one of dollars and cents than of a major life change. As a result, all else being equal, borrowers are less likely to default on a mortgage backed by their primary residence than on one backed by an investment property.

Figure 7: Always Current to Delinquent Roll Rates by UCLTV and Documentation Type, AltA Hybrid



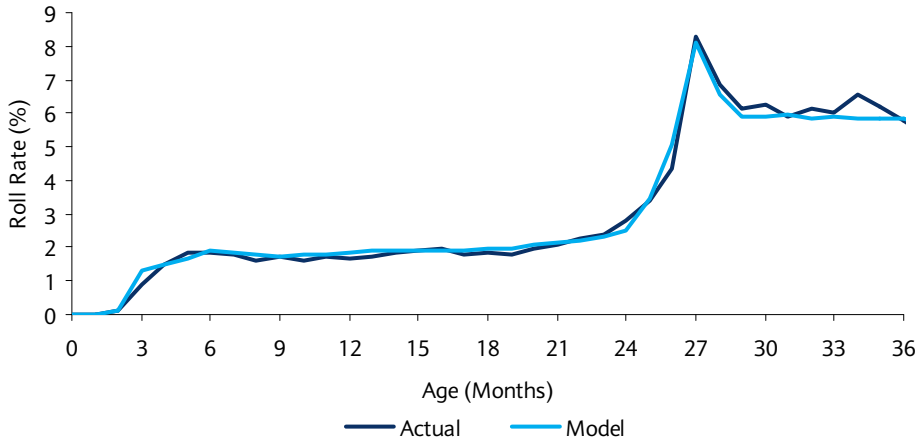
Source: LoanPerformance, Barclays Capital

Figure 8: Always Current to Delinquent Roll Rates by Amortization Type, Jumbo Fixed Rate, 2007 Originations



Source: LoanPerformance, Barclays Capital

Figure 9: Effect of Payment Shocks on Always Current to Delinquent Roll Rates, Subprime 2/28 ARM, 2005 Originations



Source: LoanPerformance, Barclays Capital

- **Spread at Origination (SATO)**: Just as borrowers reveal their credit quality via their product choices, originators reveal some of the information taken in on the mortgage application but not included in the published loan data via the rates they charge borrowers. Specifically, borrowers who receive mortgage rates significantly above or below that which a standard prime borrower with similar loan size would have received for the same mortgage product tend to perform worse or better, respectively, than other observable indicators of performance would indicate. For example, even though borrowers with interest only mortgages (IOs) tend to perform worse than borrowers with amortizing mortgages, a borrower with an IO who paid no premium over the prevailing prime mortgage rate is likely to be a better credit than an otherwise identical borrower with a 30-year amortizing mortgage who paid a 75bp premium over the prime mortgage rate.[3]

[3] Mortgages with initial interest-only periods or 40-year amortization schedules typically cost the borrower an additional 25bp in rate. Thus, a borrower with an IO who receives the standard prime rate has a 100bp better SATO than a borrower with a 30-year amortizing mortgage who paid a 75bp premium at origination.

- **Payment Shocks/Payment Changes**: Changes in monthly payments enter the model in two ways. The initial payment shock associated with a resetting ARM or recasting option ARM produces a short-lived spike in always current to delinquent roll rates, while the longer-term effect of the payment increase is captured in the model through a factor that measures the cumulative change in payment since origination. This treatment of payment changes allows us to more effectively capture both the large spike in delinquency rates that immediately follows a sudden increase in monthly payment as well as the long-run effect of the payment increase (Figure 9).

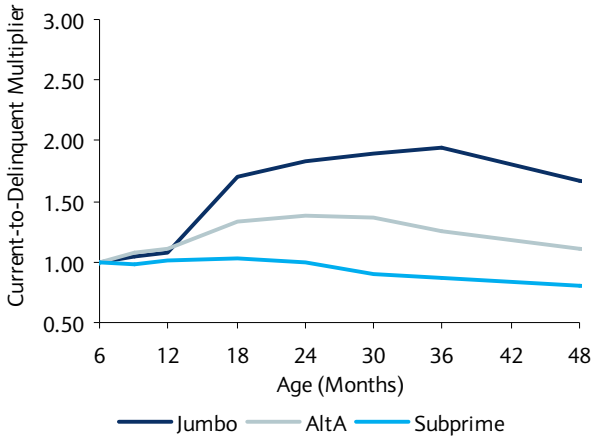
- **Y/Y Home Price Appreciation**: In addition to their effect on UCLTV, home prices enter the model directly as well. In particular, y/y trends in zip code level home prices are used as an indicator of the strength or weakness of local housing markets. Even after adjusting for changes in UCLTV, periods of rapid home price appreciation are associated with improved credit performance, while periods of home price decline tend to exacerbate already-high delinquency rates.

- **Unemployment Rates**: The model also uses the cumulative change since origination in the MSA-level unemployment rate to proxy for changes in a borrower's ability to continue making payments on his mortgage. This differs significantly from using the absolute level of the unemployment rate because it implies that underwriting standards are pro-cyclical and therefore that borrowers originated during a recession will tend to perform better during a recession than borrowers underwritten during a boom. Not surprisingly, the data appear to support this approach.

- **Consecutive Payments Made**: For an always current borrower, loan age is synonymous with the number of consecutive payments made since origination. The seasoning curve for an always current borrower can therefore be interpreted as measuring the extent to which maintaining a clean pay history improves a borrower's performance relative to his original credit score. The curves in Figure 10 display the probability of transitioning from always current to delinquent at each age (i.e., number of consecutive payments made) relative to the half year mark after origination. For subprime borrowers, the curves quickly start to decline, suggesting that for borrowers with low original FICO scores, making two or more years of consecutive payments is indicative of improving credit quality and hence higher current FICO scores. Prime borrowers, in contrast, often

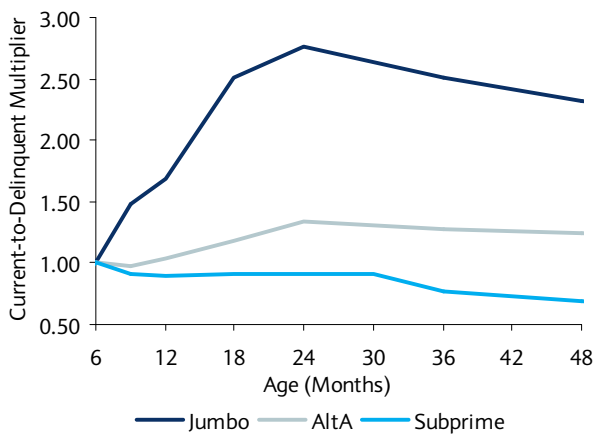
Figure 10: Positive Self Selection Among Always Current Borrowers by Non-Agency Sector

a. Fixed Rate



Roll rates are shown as multiples of the case where loan age = 6 months
Source: Barclays Capital

b. ARM



Roll rates are shown as multiples of the case where loan age = 6 months
Source: Barclays Capital

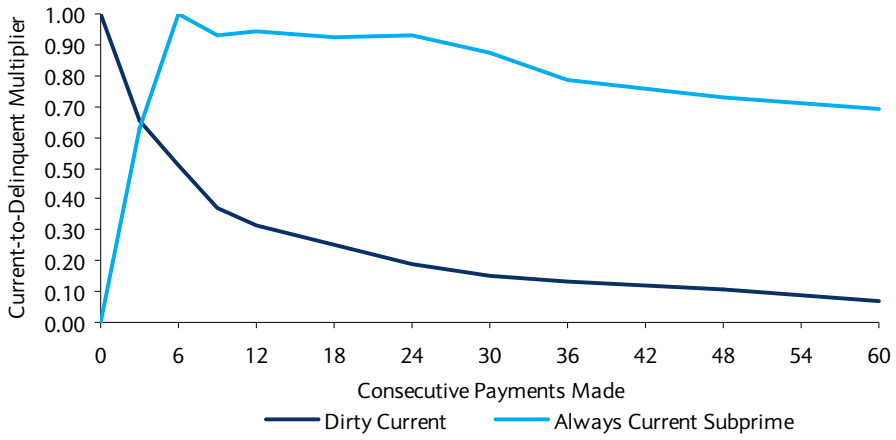
have FICO scores of 740 or higher at origination. Thus, while making even several years of payments is unlikely to materially increase their FICO scores, the passage of time increases the possibility of income shocks that could lower them.

Later Stage Delinquencies and Cures

Dirty Current to Delinquent Roll Rates

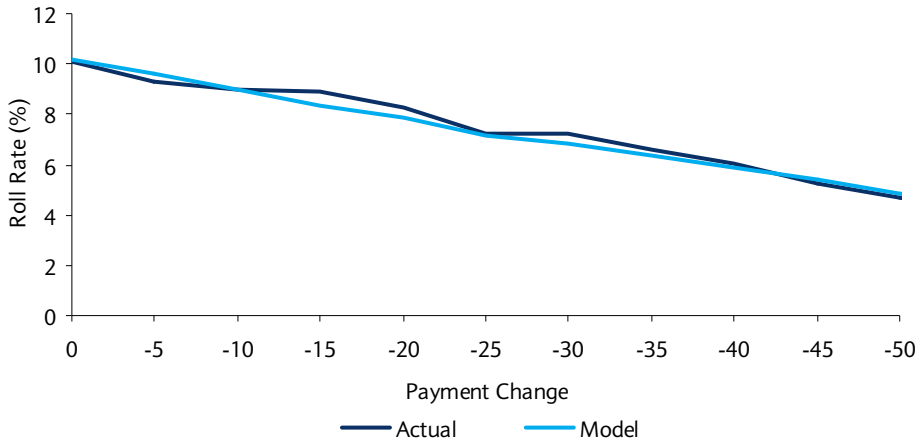
As Figure 3 illustrates, borrowers who are up to date on their payments but have checkered pay histories are much more likely to become delinquent than borrowers with similar collateral characteristics who have never been delinquent. The negative signal contained in the previous delinquency manifests itself not just in a higher base case delinquency rate but also in a significantly reduced sensitivity to the primary drivers of always current to delinquent roll rates. This point is illustrated in Figures 4a and 4b, which compare the effects of FICO and UCLTV on the current to delinquent roll rates of always current and dirty current borrowers. The positive signal of providing full documentation at origination is also reduced once a borrower has gone OTS 30-days delinquent for the first time. What matters most in the case of dirty current borrowers is precisely the factor that seemed to be least predictive for always current borrowers, namely the number of consecutive payments made since becoming current (Figure 11). Future delinquencies are also reduced by the magnitude of any payment reductions resulting from loan modifications (Figure 12).

Figure 11: Pay History and Positive Self Selection, Always Current versus Dirty Current



DCUR-to-DQ roll rates are shown as multiples of the case where consecutive payments made = 0
ACUR-to-DQ roll rates are shown as multiples of the case where consecutive payments made = 6 Source: Barclays Capital

Figure 12: Effect of Payment Reductions on Dirty Current to Delinquent Roll Rates, All Non-Agency



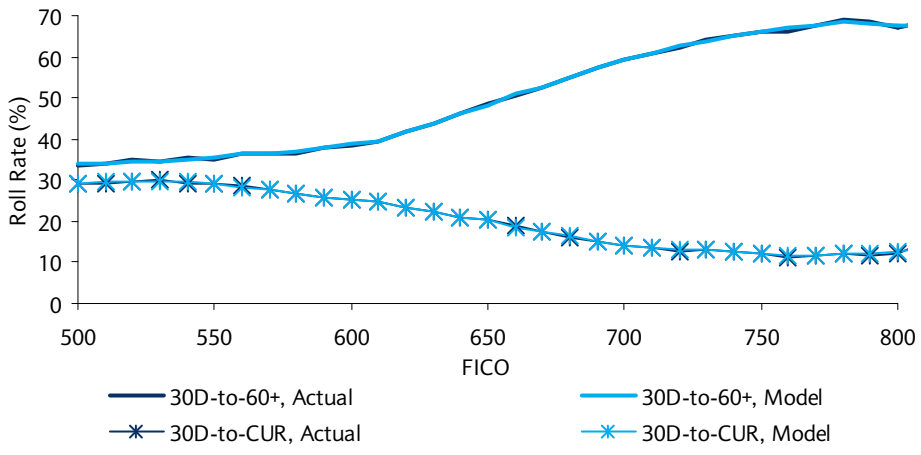
Source: LoanPerformance, Barclays Capital

Delinquencies and Cures from 30D, 60+ and Foreclosure

For delinquent borrowers, the usual correlation between credit performance and FICO score at origination becomes inverted and borrowers with large loan sizes struggle under the weight of their outsized monthly payments. UCLTV and recent payment behaviour are the most important drivers of future performance for delinquent borrowers.

- **FICO Reversal**: One of the more striking observations about the performance of delinquent borrowers is that borrowers with high FICO scores at origination are less likely to cure themselves back to a non-delinquent state than borrowers with lower FICO scores at origination (Figure 13). The reason for this is that borrowers with low FICO scores, such as subprime borrowers, have a history of cycling in and out of delinquency depending on their immediate income and employment situation and most likely received a mortgage sized to their more volatile incomes and smaller savings. In contrast, high FICO borrowers who become severely delinquent are likely to have suffered a more significant reduction in income and wealth and are therefore less likely to recover.

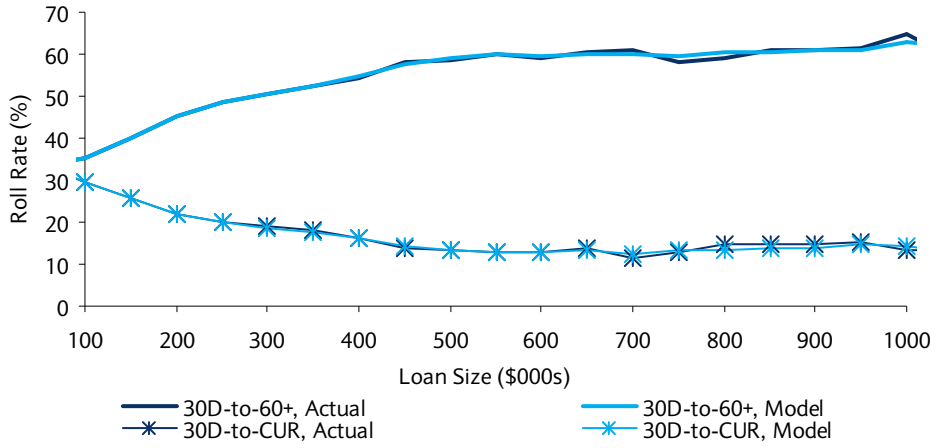
Figure 13: Transitions out of OTS 30-Days Delinquent by FICO Score, Excluding Modifications, All Non-Agency



Source: LoanPerformance, Barclays Capital

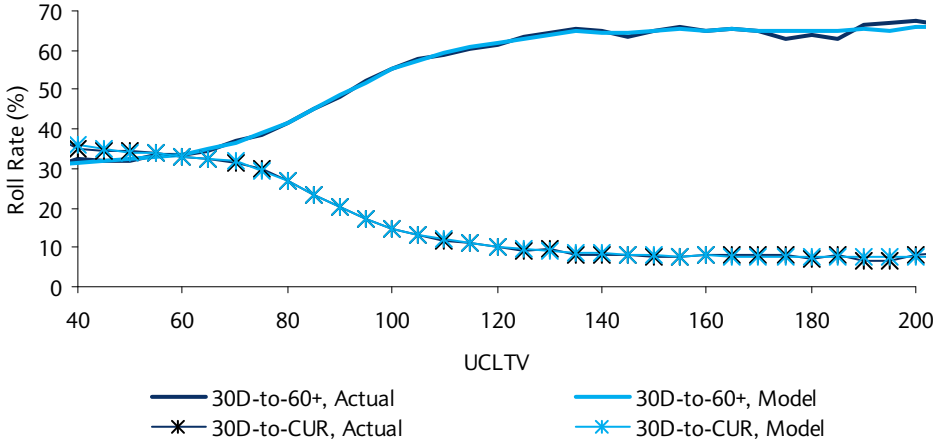
- **Loan Size**: Similar to the case of FICO scores, borrowers with large mortgages, and therefore high monthly mortgage payments, are less likely to cure than borrowers with smaller mortgages (Figure 14). Once again, the issue is that borrowers with large loan sizes are more likely to have suffered an income loss that makes their current mortgage burden unsustainable.
- **UCLTV**: The effect of borrower equity, while muted relative to its effect on initial delinquency remains intact once borrowers become delinquent (Figure 15). Specifically, borrowers with little or no equity in their properties (UCLTV>=100) are much less likely to cure their delinquency than borrowers with a substantial equity stake.

Figure 14: Transitions out of OTS 30-Days Delinquent by Loan Size, Excluding Modifications, All Non-Agency



Source: LoanPerformance, Barclays Capital

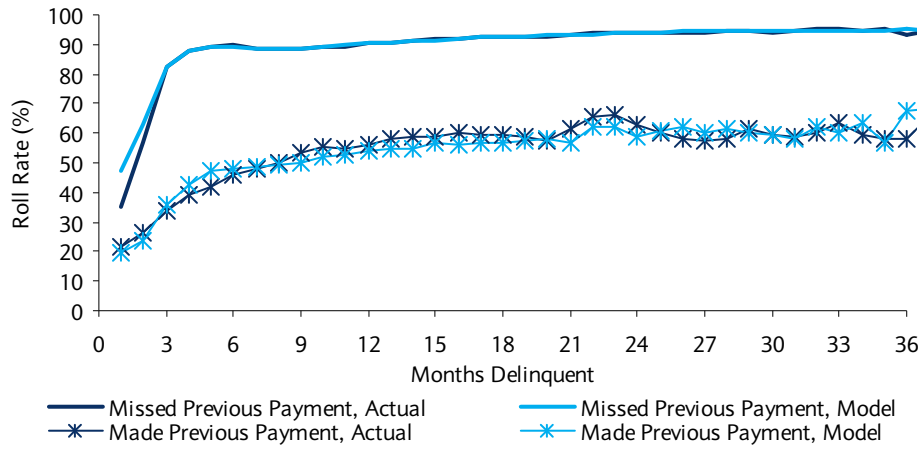
Figure 15: Transitions out of OTS 30-Days Delinquent by UCLTV, Excluding Modifications, All Non-Agency



Source: Loan Performance, Barclays Capital

Months Delinquent and Recent Pay History: One of the most important pieces of information for determining whether a borrower is likely to cure his delinquency or pass through the foreclosure process is the number of payments missed and recent payment behaviour (Figure 16). Borrowers who have made payments recently are much less likely to miss their next payment than borrowers who have not been cash flowing. This is true even in cases where the borrower is many months (or even years) behind on his payments.

Figure 16: Delinquency Performance of Mortgages in Foreclosure by Months Delinquent and Recent Pay History, All Non-Agency



Roll rate measures the likelihood of missing an additional payment while in foreclosure.
Source: LoanPerformance, Barclays Capital

Servicer Responses to Borrower Delinquencies

Once a borrower is delinquent, the three main options available to servicers are: 1) trying to "cure" the borrower back to a non-delinquent status, most likely via a loan modification; 2) facilitating a short sale in which the borrower sells the property and the servicer agrees to accept the net sale proceeds as payment on the outstanding mortgage, relieving the borrower of the responsibility of making up any shortfall;[4] or 3) initiating a foreclosure proceeding.

Modification

The implementation of the Home Affordable Modification Program (HAMP) since mid-2009 means that virtually all delinquent mortgages are screened for modification as an alternative to foreclosure. To qualify for a HAMP modification, borrowers must use the mortgaged property as their primary residence and be able to document a loss of income as the cause of the delinquency. The modification must also pass an NPV test as the most profitable alternative from the standpoint of the mortgage holder, although in practice this does not seem to be a particularly onerous hurdle. While HAMP does not limit the ability of servicers to modify non-HAMP-eligible mortgages, HAMP guidelines provide some indication of the types of mortgages that tend to get modified.

[4] The servicer could also accept deed to the property, absolving the borrower of any further obligation, and then sell the property without any borrower participation. This is referred to as a deed-in lieu of foreclosure.

Figure 17 Modification Rates by Occupancy, Documentation and Delinquency Status, ULTV>100

	Owner Occupied		Non Owner Occupied	
Starting Delinquency Status	Full Doc	Lim Doc	Full Doc	Lim Doc
Always Current, Never Modified	0.09	0.10	0.05	0.06
Dirty Current, Never Modified	1.70	1.54	0.67	0.65
OTS 30D	1.64	1.21	0.49	0.25
OTS 60+	2.58	1.79	0.75	0.71
Foreclosure	0.55	0.45	0.06	0.08

Source: LoanPerformance, Barclays Capital

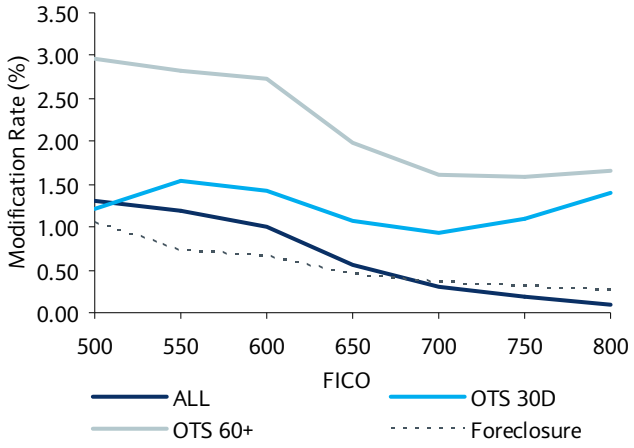
For example, modification rates are much higher for owner-occupied properties than for investment properties and are higher for full-documentation loans than for limited-documentation loans (Figure 17). This latter effect may reflect the fact that many limited-documentation borrowers significantly overstated their incomes at origination and so would require much larger payment reductions than full-documentation borrowers to make their homes affordable. Moreover, occupancy fraud is probably more pronounced in limited documentation mortgages. We control for occupancy and documentation type in our modification model. Modification rates also appear to be correlated with ULTV and FICO at origination, but a significant portion of this correlation is driven by the fact that the vast majority of modifications are for delinquent borrowers (as would be expected) and delinquency status is highly correlated with ULTV and original FICO (Figure 18). That said, modification rates are higher for low-FICO borrowers, even after adjusting for delinquency status, but much of this is probably because low-FICO borrowers tend to have much lower loan sizes than average, making the fixed costs of liquidation particularly onerous. Similarly, even after controlling for delinquency status, modification rates are lower for borrowers with ULTVs that are low enough to make a property sale a viable option. For those loans that are modified, payment reductions average 30-40%, with most of this coming from mortgage rate reductions (Figure 19). Balance forgiveness/forebearance seems to be much less prevalent, except in cases where the modified borrower's pre-modification mortgage rate is already very low, as is currently the case for most option ARMs .

Short Sale

In cases where a loan modification is deemed unfeasible because the payment reduction required to keep the borrower in the house would entail a greater loss than an REO liquidation, the next most preferred outcome from the standpoint of the mortgage holder would be a short sale. Short sales take less time than REO liquidations, have lower associated costs, and require that the borrower maintain the property in good condition until a sale is completed. However, they can be less attractive than foreclosure for those borrowers who have given up on keeping their homes. This is because a drawn-out foreclosure process can leave the borrower living rent-free for many months, or even years.

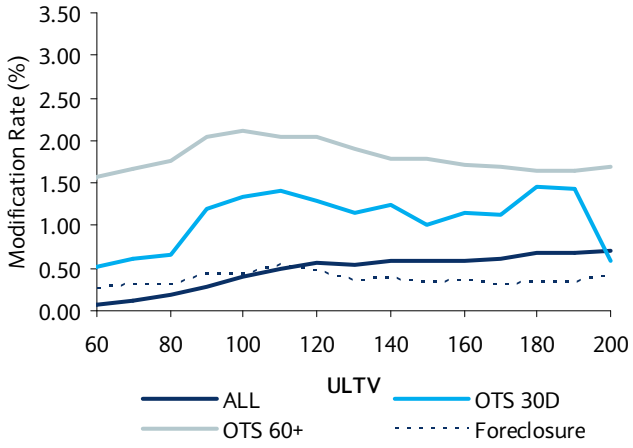
Figure 18: Modification Rates by FICO and ULTV, Jul 2009 - Aug 2010, All Non-Agency

a. FICO



Source: LoanPerformance, Barclays Capital

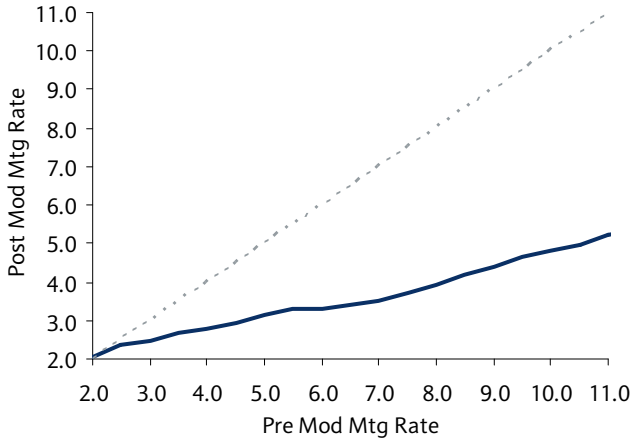
b. ULTV



Source: LoanPerformance, Barclays Capital

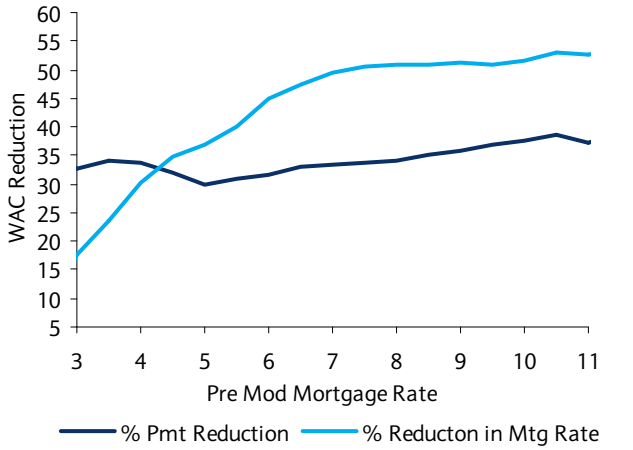
Figure 19: Effect of Modification on Mortgage Rates and Monthly Payments, Jul 2009 – Aug 2010, All Non-Agency

a. Post-Mod Mortgage Rate vs. Pre-Mod Mortgage Rate



Source: LoanPerformance, Barclays Capital

b. Percent Reduction in Payment and Mortgage Rate vs. Pre-Mod Mortgage Rate



Source: LoanPerformance, Barclays Capital

Foreclosure

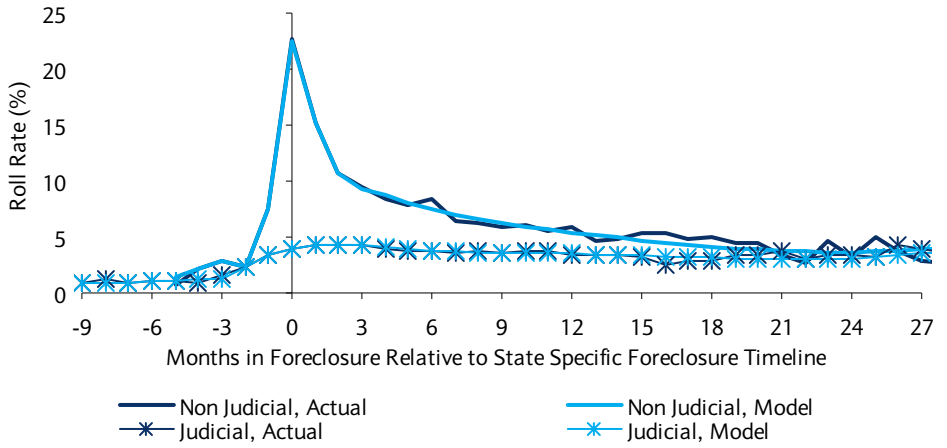
Even with recent increases in the use of loan modifications and short sales, the majority of borrowers who become seriously delinquent end up in foreclosure. While this removes much of the uncertainty about the ultimate outcome, the rate at which mortgages pass from initial delinquency through foreclosure to liquidation and the costs incurred by servicers along the way can vary widely. The primary source for much of the variation is due to differences in the time required to foreclose on properties located in states with judicial versus non-judicial foreclosure laws. In states where non-judicial foreclosures are the norm, servicers can complete a foreclosure quickly and with few legal hurdles. By comparison, in states where foreclosure proceedings are conducted in the courts and are more likely to face legal challenges from borrowers, the time to foreclose on a property is typically much longer and more open ended. We capture this by modelling the foreclosure to REO transition for non-cash-flowing borrowers as a function of the amount of time that the borrower has been in foreclosure relative to the typical time to foreclose in the state where

the foreclosed property is located. In addition, we estimated separate timing curves for judicial and non-judicial states to allow for the more open ended timelines in judicial states (Figure 20). The model also incorporates the effect of the nationwide slowdown in foreclosures on the rate at which severely delinquent borrowers transition through the foreclosure process (Figure 21).

Second Lien Charge-Off Policy

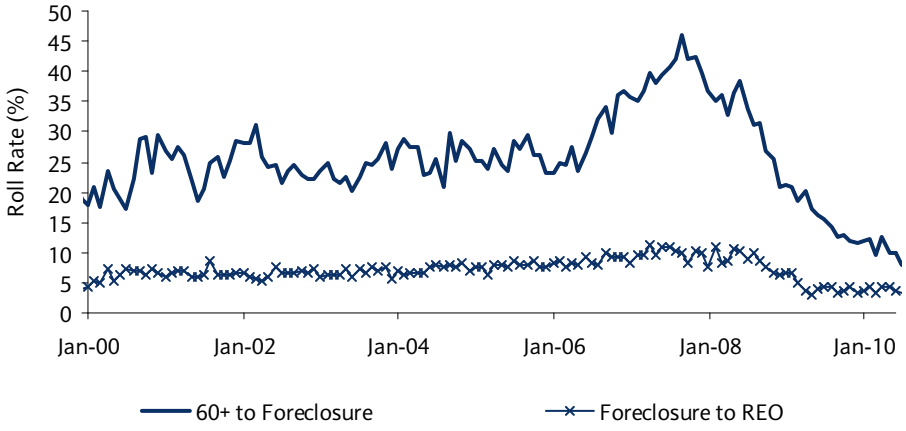
Most second-lien securitizations issued during the mortgage boom require servicers to charge off loans that become more than 180 days delinquent. As a result, very few second liens securitized into standalone deals transition from 60+ to foreclosure. To model this correctly, we estimated separate 60+ to liquidation (DD60P) and 60+ to foreclosure (CFC60P) transition functions for second lien mortgages included in standalone deals relative to other second liens. This allows us to capture the large spike in liquidations out of 60+ when the former pass the 180 day delinquent threshold while still managing to fit the more muted liquidation profile of second lien mortgages included in subprime securitizations (Figure 22).

Figure 20: Foreclosure to REO Transitions by Months in State Minus State-Specific Foreclosure Timeline, Judicial vs. Non-Judicial States, All Non-Agency



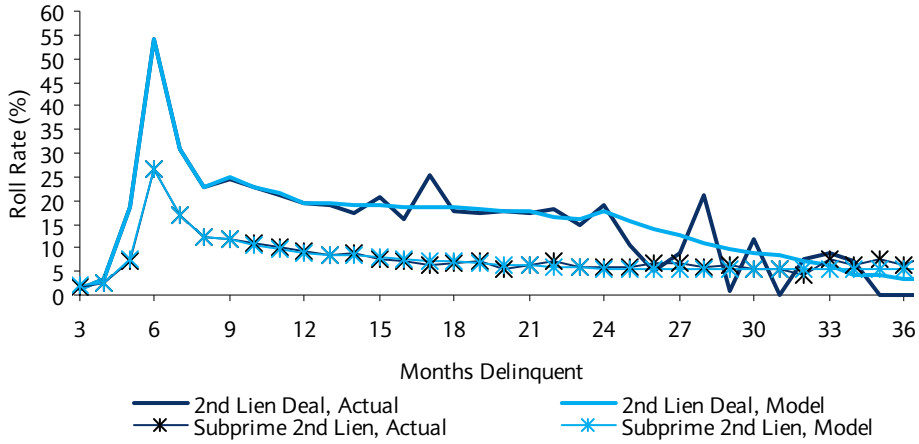
Source: LoanPerformance, Barclays Capital

Figure 21: Changes in OTS 60+ to Foreclosure and Foreclosure to REO Transition Rates, Excluding Modifications, Non-Cash Flowing Mortgages



Source: Loan Performance, Barclays Capital

Figure 22: OTS 60+ to Liquidation Transition Rates for Second Liens



Source: LoanPerformance, Barclays Capital

Loss Severity

The dollar loss suffered by non-agency MBS investors when a delinquent mortgage is liquidated is equal to the unpaid principal balance on the mortgage (B) plus any reimbursements due the servicer (PI + TIM + FCOST) minus the net proceeds received from the sale of the property (H) along with any payouts received from mortgage insurance policies taken out at origination (MI). The primary expenses for which servicers need to be reimbursed include all principal and interest advanced to the trust prior to liquidation of the property (PI), property taxes, hazard insurance premiums and maintenance costs paid by the servicer (TIM), and legal fees and other administrative expenses incurred by the servicer during the foreclosure process (FCOST). It follows that the associated loss severity (S) can be represented in equation form as follows:

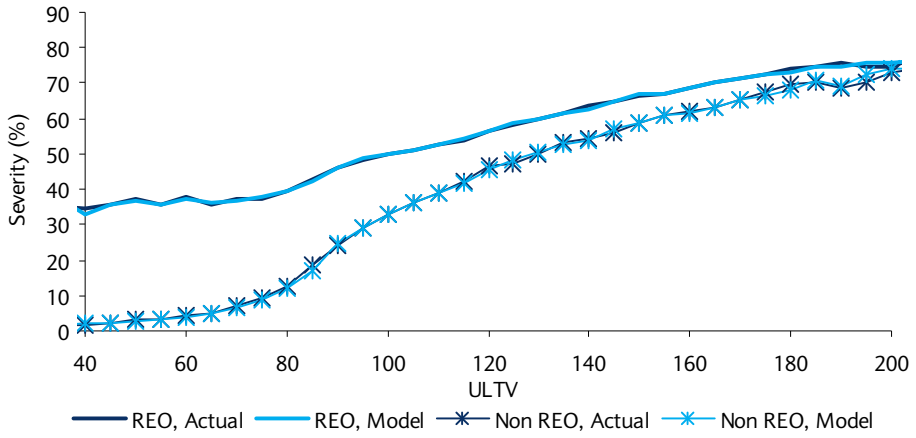
$$S = \frac{B + PI + TIM + FCOST - H - MI}{B}$$

The Barclays Capital Loan Transition Model takes each of these items into consideration along with several additional factors when calculating loss severities.

- **Updated LTV (ULTV)**: The most important determinant of loss severity for a first lien mortgage is the liquidated value of the property relative to the unpaid balance on the mortgage. This is given in the above equation by the H/B term which, in turn, is just 1 /ULTV. The ULTV used in the calculation of severity employs the same zip code level home price indices drawn on elsewhere in the model. For REO liquidations, a calculated ULTV below 100 suggests that the home price index used is overstating the liquidation value of the property (otherwise the borrower would have sold the house, paid off the mortgage and kept the profit). A calculated ULTV well above 100, in contrast, signifies a sharp fall in local home prices consistent with mass foreclosures. In these situations, home price indices are less likely to overstate the true value of REO liquidations.[5] Consequently, observed severities on REO liquidations tend to be much higher than implied by standard home price indices when ULTV<<100 and more in line with home

[5] To the contrary, REO liquidations may actually represent a significant portion of the transactions used to construct the index in these situations.

Figure 23: Sensitivity of Loss Severity to ULTV, REO vs. Non-REO Liquidations, All Non-Agency



ULTV is the updated LTV (not combined LTV) Source: LoanPerformance, Barclays Capital

price index implied severities when ULTV >>100. To address this issue, we estimated separate LTV functions for REO and non-REO liquidations. This allows us to capture both the flatter ULTV profile of REO liquidations and the convergence in severity between REO and non-REO liquidations for extremely high values of ULTV (Figure 23).

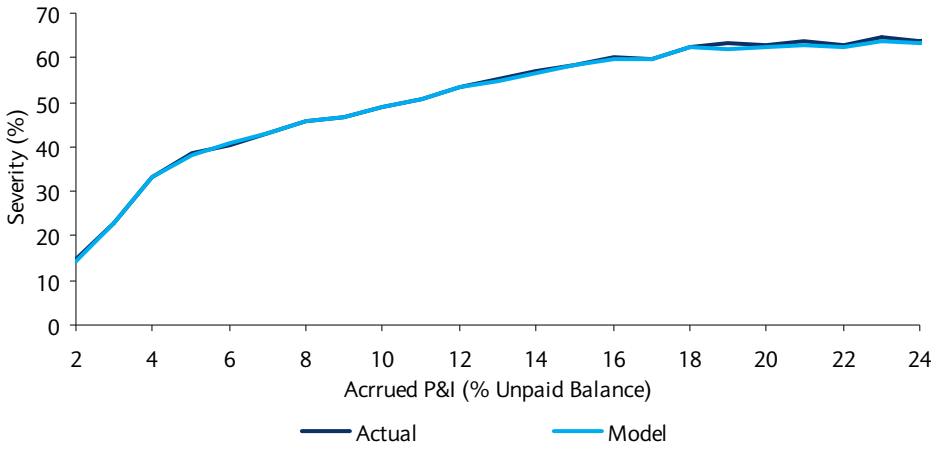
- **Servicer Advances**: The severity model incorporates projected principal and interest advances into the calculation of loan-level losses. As a result, factors that slow down the foreclosure process – such as the longer foreclosure timelines in judicial states – or discourage non-REO liquidations – such as a lack of borrower equity in the property – automatically increase total principal and interest advances and resulting severities. For loans where accrued principal and interest reaches extremely high levels, the effect on severities starts to diminish both in the data and in our model, reflecting a potential reduction in servicer advances (Figure 24). The model also takes into account other advances such as property taxes, hazard insurance, and maintenance fees (TIM/B in the above equation), which tend to be proportional to original property value rather than mortgage size.

- **Loan Size**: Because many of the legal fees and other administrative costs incurred by servicers during the foreclosure process are unrelated to the size of the underlying mortgage, they increase severities much more for small loans than for larger loans (FCOST/B). We capture this effect by including loan size as a factor in our severity model.

- **Mortgage Insurance**: With mortgage insurance companies struggling under the weight of existing policies, rescission rates have increased markedly. We estimate that higher rescission rates have increased severities by 7-14 percentage points on mortgages with MI and incorporate this into our severity projections.

- **Occupancy and Loan Purpose**: Non-owner occupied properties, and in particular investment properties, tend to produce higher severities than owner occupied properties. This occurs because the borrower's decision to not sell the property prior to liquidation is more revealing about the resale value of the property than when it is the primary residence of the delinquent borrower. Similarly, since the original LTVs of refinanced properties are the result of appraisals rather than arms-length transactions, they tend to overstate the initial value of a property, leading to higher severities in the event of default.

Figure 24: Sensitivity of Loss Severity to Accrued Principal and Interest, All Non-Agency



Source: LoanPerformance, Barclays Capital

Prepayments

The notable tightening of mortgage underwriting guidelines in terms of restrictions on borrower DTI, FICO and LTV, along with significantly more onerous documentation requirements and higher out-of-pocket costs, have significantly dampened prepayment rates on even the most refinanceable borrowers. This observation is made abundantly clear in Figure 25, which compares the recent refinancing response of high quality non-agency borrowers with that of similar borrowers during the refinancing episode of 2002-2003. During the earlier episode, fixed rate borrowers with clean pay histories, original FICO>=760, UCLTV<=70 and mortgage rates 100bp or more above prevailing mortgage rates prepaid at speeds greater than 80 CPR. In contrast, the current low mortgage rate environment has generated prepayment rates of only 30-40 CPR for borrowers with similarly pristine characteristics and large rate incentives. Just as striking is the fact that even minor deviations in FICO and UCLTV significantly reduce the already depressed prepayment rates observed for the highest quality borrowers – for example, fixed rate borrowers with clean pay histories, FICO at origination between 720 and 760, UCLTV between 70 and 80 and 150bp of rate incentive have prepaid at less than 20 CPR over the past year and a half.

Our prepayment model incorporates today's tighter underwriting guidelines into its projections of future prepayments. In addition to FICO at origination, UCLTV, documentation type and occupancy type, the prepayment model utilizes information on borrower pay history, modification history and GSE loan size limits in its projections.

- **FICO at Origination and UCLTV**: Consistent with the tighter underwriting guidelines that have replaced the go-go years of the housing boom, deviations in any direction from a high FICO, low UCLTV profile significantly reduce rate-term and cash-out refinancing in the prepayment model. UCLTV also significantly reduces projected turnover related prepayments for borrowers with little or no equity in their property.
- **Loan Size**: Borrowers with mortgage balances that exceed county-level GSE loan size limits are assumed to face much higher mortgage rates than borrowers with GSE eligible loan sizes. This effect is gradually reduced over time in model projections in anticipation of an eventual return of jumbo-conforming mortgage rate spreads to levels more consistent with a normally functioning mortgage market.

- **Pay History**: Borrowers with recent delinquencies are assumed to have little to no ability to refinance in the near term but can "cure" themselves by maintaining a clean payment profile for several years.
- **Occupancy and Documentation Type**: Mortgages on investment properties and mortgages where the borrower provided less than full documentation of income and assets are assumed to have much more muted refinancing profiles than full documentation mortgages on owner-occupied properties.

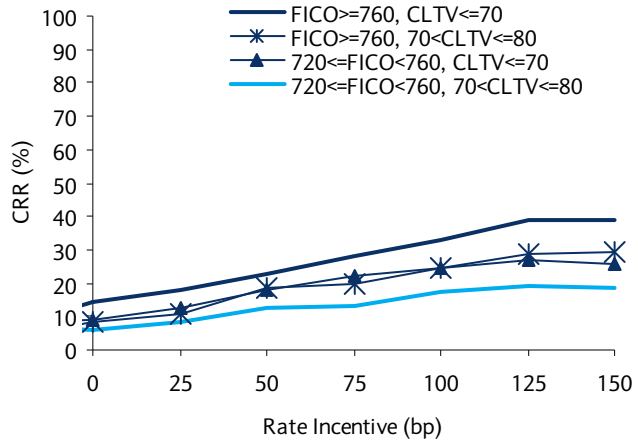
Home Prices

Zip Code versus State and MSA Level Home Price Indices

LTVs are marked-to-market in the model using zip code level home price indices provided by First American Core Logic. The model also uses y/y trends in zip code level home prices to track the strength or weakness of local housing markets. Using zip code level prices improves the accuracy of the calculations over using state or MSA level home prices. This is demonstrated in Figure 26, which compares average home price declines for 2006 originated non-agency mortgages calculated using state, MSA and zip code level home price indices. When measured at the zip code level, the home prices of jumbo fixed rate borrowers in California fell 10.7 percentage points less than for California subprime borrowers (-31.6% vs. -42.3%). This compares with a 7.1 percentage point smaller decline when measured using MSA level home prices (-33.6% vs. -40.1%) and no difference when measured using state level home prices (-35.9% for both). Even more telling than differences in average declines is the within-MSA variation displayed in the right-hand side of Figure 26, which shows that the home price declines of the top and bottom 10% of zip codes within an MSA typically differed by 13-15 percentage points. Given the importance allocated to home prices within most credit models, differences of this magnitude are too large to ignore.

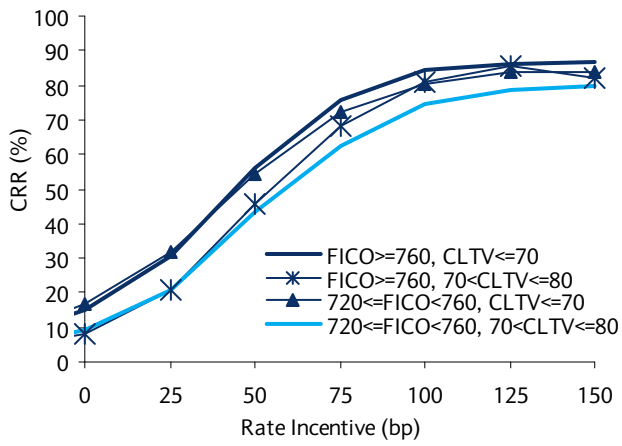
Figure 25: Sensitivity of Prepayments to Credit Characteristics, Always Current, Fixed Rate Mortgages with Current Loans Size $417K-$729K

2009-2010



Source: LoanPerformance, Barclays Capital

2002-2003



Source: LoanPerformance, Barclays Capital

Figure 26: Comparison of Zip Code vs. State and MSA Level Home Price Indices, 2006 Originations

	Cum HPA, Jan 2007 - Sep 2010			Zip Code Level Variation within MSAs		
					Diff from MSA Cum HPA	
Region	State	MSA	Zip	Std. Dev	10th Pctl	90th Pctl
US						
Jumbo Fixed	-27.4	-26.8	-25.1	9.9	-6.4	6.5
Jumbo Hybrid	-30.7	-28.9	-26.9	10.3	-6.7	6.6
AltA Fixed	-26.2	-26.5	-27.3	7.0	-8.5	6.1
AltA Hybrid	-31.4	-31.9	-32.6	7.2	-8.3	6.1
AltA NegAm	-34.1	-34.8	-35.8	6.9	-8.6	6.1
Subprime	-27.8	-28.9	-30.8	5.6	-9.3	5.9
CA						
Jumbo Fixed	-35.9	-33.6	-31.6	10.4	-6.6	6.8
Jumbo Hybrid	-35.9	-32.0	-29.9	11.0	-7.4	7.1
AltA Fixed	-35.9	-37.4	-38.0	7.6	-8.8	6.6
AltA Hybrid	-35.9	-36.5	-37.0	8.2	-8.4	6.6
AltA NegAm	-35.9	-36.8	-37.9	7.4	-9.2	6.5
Subprime	-35.9	-40.1	-42.3	5.1	-10.3	6.1

Source: LoanPerformance, Barclays Capital.

Figure 27: Home Price Assumptions Across Barclays Capital Live HPA Scenarios

	Annualized Home Price Appreciation								Cumulative Home Price Appreciation							
	US	AZ	CA	FL	MI	NV	NY	TX	US	AZ	CA	FL	MI	NV	NY	TX
History																
Jan 2000 - Jun 2006	11.3	13.5	15.8	15.8	3.1	13.7	12.3	5.2	99.0	124.7	156.6	156.3	21.6	128.3	109.8	38.2
Jun 2006 - Sep 2010	-7.6	-14.6	-10.8	-14.2	-11.7	-16.4	-2.9	-1.8	-28.6	-48.9	-38.6	-47.8	-41.2	-53.3	-11.7	-7.4
Strong Recovery																
Sep 2010 - Mar 2012	6.0	5.3	8.5	7.2	5.0	5.8	8.5	4.0	9.1	8.0	13.0	10.9	7.6	8.9	13.1	6.1
Mar 2012 - Mar 2022	2.8	3.4	3.3	3.4	4.2	2.6	3.5	3.2	32.3	39.3	38.8	40.3	50.7	29.5	41.0	37.5
Recovery																
Sep 2010 - Mar 2012	-0.3	-2.5	-2.0	-1.1	1.1	-2.5	2.0	2.5	-0.4	-3.7	-2.9	-1.7	1.7	-3.8	3.0	3.8
Mar 2012 - Mar 2022	2.8	3.4	3.3	3.4	4.2	2.6	3.5	3.2	32.3	39.3	38.8	40.3	50.7	29.5	41.0	37.5
Base Case																
Sep 2010 - Mar 2012	-3.4	-6.4	-7.2	-5.3	-0.9	-6.8	-1.4	1.7	-5.1	-9.4	-10.6	-7.9	-1.3	-10.0	-2.0	2.6
Mar 2012 - Mar 2022	2.8	3.4	3.3	3.4	4.2	2.6	3.5	3.2	32.3	39.3	38.8	40.3	50.7	29.5	41.0	37.5
Stress																
Sep 2010 - Mar 2012	-6.6	-10.4	-12.5	-9.6	-3.0	-11.0	-4.8	0.9	-9.7	-15.2	-18.1	-14.0	-4.4	-16.1	-7.1	1.3
Mar 2012 - Mar 2022	2.8	3.4	3.3	3.4	4.2	2.6	3.5	3.2	32.3	39.3	38.8	40.3	50.7	29.5	41.0	37.5
Severe Stress																
Sep 2010 - Mar 2012	-13.0	-18.5	-23.0	-18.3	-7.3	-19.7	-11.8	-0.9	-18.9	-26.4	-32.5	-26.1	-10.8	-28.1	-17.2	-1.4
Mar 2012 - Mar 2022	2.8	3.4	3.3	3.4	4.2	2.6	3.5	3.2	32.3	39.3	38.8	40.3	50.7	29.5	41.0	37.5

Source: LoanPerformance, Barclays Capital

Home Price Assumptions across Barclays Capital Live Scenarios

Figure 27 displays summary data on the HPA projections used within each of the scenarios included on Barclays Capital Live. The base case scenario in the calculator assumes home prices fall another 5% nationally over the next year and a half before stabilizing and beginning to grow at a 2.8% pace per year over the following ten years. Home prices in the boom-bust states of California, Arizona, Nevada and Florida are expected to fall by more than the national average in the base and stress scenarios but are also expected to achieve somewhat higher long-term growth rates in most cases. In contrast, home prices in Texas, which was less affected by both the housing market boom and bust, are expected to continue to display less sensitivity to national HPA cycles, and for the scenarios considered, are expected to outperform the national average in both the near and longer term. Figure 28 in Appendix A displays how differences in home price appreciation rates across the various scenarios affect BLTM projected cumulative defaults and losses across the non-agency sector.

Appendix A - Cumulative Loss Projections

Figure 28: BLTM Projected Cumulative Defaults and Losses[1]

				OTS Delinquency Dist			Projected Future Defaults & Losses by HPA Scenario, % of Current Balance															Timing of Projected Future Base Case Losses[2]					
				%	%	%	Severe Stress			Stress			Base Case			Recovery			Strong Recovery								
Sector	Issue Yr	Factor	UCLTV	Always Current	Dirty Current	DQ incl FC/REO	Default	Loss	Severity	Default	Loss	Severity	Default	Loss	Severity	Default	Loss	Severity	Default	Loss	Severity	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 10
Jumbo Fixed 30Y	2004	0.38	66	94.1	2.4	3.5	9.5	3.9	41	7.7	2.6	34	6.9	2.1	30	6.2	1.7	27	5.5	1.1	21	0.2	0.8	1.3	1.5	1.7	2.1
	2005	0.58	89	89.0	3.1	7.8	23.2	12.4	53	19.7	9.3	47	18.2	8.0	44	16.7	6.9	41	14.3	5.1	36	1.1	2.9	4.6	5.6	6.3	7.8
	2006	0.54	102	82.4	5.3	12.3	32.6	18.8	57	28.9	14.9	52	27.1	13.3	49	25.2	11.7	46	21.9	9.1	41	1.6	4.5	7.3	9.1	10.3	12.8
	2007	0.66	103	82.2	5.0	12.9	35.0	19.4	55	31.2	15.6	50	29.3	13.9	47	27.4	12.3	45	24.1	9.6	40	1.9	5.0	7.9	9.7	10.9	13.3
Jumbo Hybrid	2004	0.30	75	88.3	3.6	8.1	23.2	9.8	42	19.0	6.8	36	17.3	5.7	33	16.1	4.7	29	14.0	3.5	25	1.0	2.3	3.5	4.2	4.6	5.6
	2005	0.50	95	85.0	3.5	11.5	38.4	20.2	52	32.9	15.3	46	30.3	13.2	44	27.8	11.3	41	23.7	8.4	35	1.8	4.5	7.0	8.5	9.6	12.7
	2006	0.53	106	77.8	5.2	16.9	51.8	29.9	58	46.4	24.0	52	43.7	21.4	49	40.8	18.9	46	35.3	14.5	41	3.2	7.9	12.1	14.6	16.2	20.6
	2007	0.63	104	73.9	5.5	20.7	55.2	31.7	57	49.9	25.7	51	47.0	23.0	49	44.0	20.2	46	38.4	15.6	41	3.3	8.5	13.3	16.2	17.9	22.0
AltA Fixed	2004	0.36	75	81.6	7.9	10.6	30.6	14.8	48	26.9	11.0	41	25.3	9.5	37	23.8	8.1	34	21.5	6.2	29	1.2	3.3	5.4	6.7	7.6	9.2
	2005	0.55	97	75.5	7.5	17.0	46.7	27.7	59	42.5	22.7	53	40.6	20.5	50	38.6	18.4	48	35.1	14.9	42	3.1	7.6	11.8	14.4	16.1	19.8
	2006	0.56	112	59.0	11.2	29.8	62.7	41.7	67	59.0	36.3	61	57.5	33.8	59	55.7	31.4	56	52.2	27.0	52	6.5	14.7	21.5	25.6	28.1	32.9
	2007	0.70	109	58.6	11.3	30.1	63.9	40.9	64	60.1	35.2	59	58.0	32.5	56	56.2	29.9	53	52.3	25.3	48	5.6	13.3	20.1	24.2	26.6	31.4
AltA Hybrid	2004	0.22	90	74.7	9.4	16.0	46.3	22.6	49	40.8	17.1	42	38.4	14.9	39	35.9	12.8	36	32.3	9.7	30	2.5	5.5	8.0	9.6	10.7	14.3
	2005	0.43	113	65.1	9.8	25.1	62.6	37.3	59	57.9	31.0	54	55.6	28.2	51	53.1	25.4	48	48.5	20.6	42	4.6	10.7	15.7	18.8	20.9	27.1
	2006	0.49	128	49.3	12.4	38.3	76.5	52.0	68	73.3	45.8	62	71.4	42.7	60	69.4	39.8	57	65.5	34.2	52	9.4	20.1	28.2	32.8	35.5	41.5
	2007	0.62	122	47.1	11.8	41.1	79.4	53.7	68	76.2	47.2	62	74.4	44.2	59	72.2	40.9	57	67.8	34.9	51	9.4	20.7	29.6	34.5	37.3	43.0
AltA NegAm	2004	0.14	94	58.4	13.0	28.6	62.7	35.9	57	56.8	28.8	51	53.8	25.5	47	50.9	22.5	44	46.4	17.6	38	4.0	10.1	15.7	19.2	21.3	24.9
	2005	0.33	120	46.5	11.5	42.1	78.4	54.3	69	74.5	47.2	63	72.5	43.8	60	70.2	40.3	57	65.9	34.1	52	8.0	19.6	29.1	34.5	37.6	43.0
	2006	0.56	137	39.0	12.6	48.4	85.5	63.3	74	82.9	56.7	68	81.6	53.6	66	79.9	50.3	63	76.6	44.1	58	10.3	24.6	36.3	42.7	46.5	52.5
	2007	0.74	131	44.5	10.4	45.1	87.2	61.6	71	84.5	54.8	65	82.9	51.5	62	81.2	48.2	59	77.3	41.7	54	8.9	22.0	33.8	40.6	44.4	50.4
Subprime	2004	0.12	87	45.5	23.4	31.2	54.8	35.2	64	51.8	30.5	59	50.4	28.3	56	48.9	26.2	54	46.6	22.9	49	4.5	10.9	17.0	21.0	23.4	27.6
	2005	0.23	112	30.7	25.1	44.3	72.3	54.2	75	70.0	49.0	70	68.8	46.5	68	67.5	43.9	65	65.2	39.2	60	9.0	20.1	29.9	35.8	39.4	45.4
	2006	0.39	127	23.6	25.1	51.2	79.9	66.8	84	78.1	61.7	79	77.1	59.2	77	76.1	56.6	74	74.0	51.9	70	13.8	28.4	39.9	46.8	50.9	57.7
	2007	0.59	124	23.7	25.8	50.5	79.4	64.9	82	77.2	59.5	77	76.2	57.0	75	75.1	54.3	72	72.9	49.3	68	11.9	25.4	36.9	43.8	48.1	55.3
Second Lien	2004	0.06	94	76.6	14.0	9.5	44.1	44.1	100	40.3	40.3	100	38.7	38.7	100	37.0	37.0	100	33.8	33.8	100	11.9	20.7	26.3	30.1	32.8	38.2
	2005	0.13	113	69.9	15.8	14.3	60.9	60.9	100	57.7	57.7	100	56.0	56.0	100	54.3	54.3	100	50.7	50.7	100	18.7	31.4	39.3	44.3	47.8	55.2
	2006	0.25	122	73.0	11.9	15.2	65.4	65.4	100	61.9	61.9	100	60.3	60.3	100	58.4	58.4	100	54.7	54.7	100	21.5	34.6	42.7	47.8	51.4	59.3
	2007	0.32	125	74.4	12.8	12.8	66.6	66.6	100	63.2	63.2	100	61.5	61.5	100	59.6	59.6	100	55.7	55.7	100	20.3	34.5	42.9	48.3	52.0	60.2

Note: [1]Projections are as of October remittance reports for a sample of loans taken from each sector and issue year. [2] Cumulative projected base case loss realized as of end of period.
Source: LoanPerformance, Barclays Capital

Appendix B – Monte Carlo Simulation

To give an example of how the simulation works, consider a borrower who has just entered OTS 60+, is three months delinquent, has not made any payments in the past two months and has a UCLTV of 105. Given this information, the borrower is likely to miss another payment. Moreover, because the borrower is severely delinquent and has negative equity in the property, the only sales that are likely to occur are short sales, in which the servicer agrees to accept less than what is owed by the borrower. According to Figure 2 the possible outcomes for the next period are for the borrower to miss another payment and remain in OTS 60+ (DQ60P*(1-CFC60P)), miss another payment and be foreclosed on (DQ60P*CFC60P), sell the property (DD60P), be modified back to current (MC60P), self cure back to current (CC60P), self cure back to OTS 30-day (C360P) or make a single payment and remain in OTS 60+ (1 – DQ60P – MC60P – CC60P – C360P). If we assign numbers to these probabilities then it might look something like the following:

A. Miss another payment and remain OTS 60+ = DQ60P*(1-CFC60P) = 0.90*0.50 = 0.45

B. Miss another payment and be foreclosed on = DQ60P*CFC60P = 0.90*0.50 = 0.45

C. Sell the property = DD60P = 0.01, loss severity = SEV = 0.20

D. Be modified back to current = MC60P = 0.04

E. Self cure back to OTS current = CC60P = 0.02

F. Self cure back to OTS 30-day = C360P = 0.02 or

G. Make payment, remain OTS 60+ = 1 – 0.45 - 0.45 – 0.01 – 0.04 - 0.02 – 0.02 = 0.01.

While we have assigned probabilities for this example, in the actual simulation they would be calculated using the model's probability transition functions (which would make use of the fact that the borrower has just entered OTS 60+ and has not made any payments in several months). The next step in the simulation is to draw a random number between 0 and 1 and compare it to the above probabilities. If the number is less than or equal to 0.45 then the borrower misses a payment and enters foreclosure, if it is greater than 0.45 but less than or equal to 0.90 then the borrower misses a payment and remains in OTS 60+, if it is greater than 0.90 but less than or equal to 0.91 then the property is sold, producing a loss of 20% of the outstanding balance, and so on. Once the borrower's new delinquency status is determined and payment history updated, the process is repeated until the mortgage is either paid off or liquidated. One complete sequence of draws leading to payoff or liquidation represents a single path. We simulate 200 paths per loan and then average across paths and loans.

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