STRATEGIC MORTGAGE DEFAULT IN FINANCIAL INSTITUTIONS: A PROPOSAL FOR AN ALTERNATIVE MANAGEMENT

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Executive Summary

Strategic mortgage default is a unique kind of behavior and requires a different kind of treatment from regular default. This paper defines strategic default as the willingness of the borrower to walk away from a mortgage obligation when the value of the property falls below the unpaid principal balance despite the ability to make monthly payments on the mortgage. Despite undergoing a similar mortgage crisis as the United States, an investigation from a selection of European countries shows that the main reasons for the absence of strategic default are the possibility of unlimited recourse and the legislation relating to mortgage defaults. Unfortunately, this is not the case in the United States and current management programs available are not properly addressing these issues. Evidence suggests that negative equity is the most significant driver of strategic default behavior, and designing a program that is beneficial for both the borrower and the lender is an important consideration in preventing and treating strategic default. This paper aims to introduce an alternative management solution named Share Appreciation for Responsible Homeowner Alternative (SARHA). It is a modification program designed to provide a balanced incentive for both the borrower and the lender.

Table of Contents

Chapter 1 - Introduction

"Are you having trouble deciding if it makes financial sense to strategically default?"[1]

The global economic recession of 2007-2009 caused ripple effects across the United States, Europe, and Asia in the form of systemic financial failures and global credit crunch. This had been greatly traced back to the mortgage subprime crisis, which rooted from a speculative bubble in the housing market. In 2006, the burst of the mortgage bubble in the United States coincided with the drastic decline of house prices. This resulted in a significant portion of borrowers being "underwater" or with "negative equity" – the value of the property is significantly less than the remaining mortgage balance. According to First American CoreLogic, more than 11.3 million or 24% of all residential properties with mortgages were in negative equity at the end of 2009[2].

The significant number of borrowers with negative equity had led to a rapid increase in mortgage default and foreclosures. In the third quarter of 2009, delinquency rate for mortgage loans on residential properties reached a record high of 9.64%. This did not include loans in the foreclosure process, which accounted for 4.47% of all loans outstanding during that quarter. It was reported at the end of 2009 that foreclosure filings reached a record of 2.8 million properties, an increase of nearly 21% from 2008 and 120% increase from 2007. A foreclosure filing includes default notices, scheduled foreclosure auctions, and bank repossessions. In all, 2.2% of all U.S. housing units, or one in every 45 properties, received at least one foreclosure filing during the year[3]. This "situation" is believed to be triggered by several factors, such as the growth of subprime lending, the originate-to-distribute model of securitization, and the lack of regulatory oversight.

[1] www.youwalkaway.com, April 5, 2012

[2] First American CoreLogic. "Negative Equity Report", February 23, 2010.

[3] See www.realtytrac.com, January 14, 2010.

In response to the increase of mortgage defaults, a number of modification programs were introduced to the market; however, none of them seemed to be successful. Haughwout et al., (2010) of the Federal Reserve of New York analyzed the effect of modifications made by financial institutions to securitized subprime mortgages that preceded the government initiative modification program. The paper concluded that 56% of the loans re-defaulted over 12 months following the modification. This posed a huge problem to the financial institutions as the cost of foreclosure according to Standard & Poor's was estimated to be 26% of the loan amount. Half of the cost was attributed to loss of revenue, with the average sales price of homes in foreclosure estimated to be 34% below the price of homes not in foreclosure.[4] Other costs include broker's commission, home maintenance, property taxes, and legal fees.

The new administration was extremely concerned as the number of delinquencies and foreclosures continued to rise. This urged for a more comprehensive approach of modification. As a result, the Obama administration with the coordination of the Treasury Department and participation of several financial institutions announced a national loan modification program on March 4, 2009, which aimed at helping 3 million to 4 million at-risk homeowners. Under the Homeowner Affordable Modification Program (HAMP), a loan servicer uses a uniform modification process to address a borrower's inability to pay and provide a sustainable monthly payment. However, despite this enormous public policy initiative, delinquencies, re-defaults, and foreclosures continued to increase. Early results indicate that within the first six months, more than half of all modified loans were 30 days or more delinquent and more than a third were 60 days or more delinquent (Office of the Controller of the Currency and Office of Thrift Supervision 2009). Primary concerns with HAMP loan modification included the high re-default rate on the modified loans and lack of focus on addressing strategic default – the willingness of the borrower to walk away from the mortgage when the property goes underwater.

[4] See www.realtytrac.com, "Q3 Foreclosure Sales Report: Restricted Supply Lowering Foreclosure Sales," January 26, 2012.

Strategic mortgage default or strategic default as referred to for the rest of this paper is the willingness of a borrower to walk away regardless of the ability to pay the monthly mortgage when the borrower experiences negative equity. Strategic default, also known as voluntary foreclosure, accounted for 20% of all mortgage delinquencies[5] in the United States during the peak of the crisis. For many homeowners having a loan with a higher balance than the free-market value of the property, strategic default allowed them to hand the keys back to the lender and walk away even if they have the capacity to fulfill their mortgage payments. Therefore, the decision to strategically default is one that is difficult but oftentimes the first step to financial freedom. Like bankruptcy, it became an instrument that provides a fresh start.

Interestingly, strategic default is not a new occurrence in the area of home mortgages. But, putting it in the context of the recent mortgage crisis, where the surge in strategic defaults has contributed to the adverse shift in the global economic landscape, suggests that the benefit from strategic default is now higher than ever. According to Guiso et al., (2009), 26% of the mortgage defaults are strategic and one of the main drivers is negative equity. At the end of 2011, 22.8% of all residential properties with a mortgage were in negative equity.[6] With house prices continuously dropping[7], strategic default rates will be expected to increase.

Objective and Structure of the Paper

This paper aims to introduce our alternative management solution for strategic default. It is a modification program designed to provide a balanced incentive for both the borrower and the lender. The paper is structured as follows: It starts with the definition of strategic default in the context of the borrower in Chapter 2 and describes the factors as to why a borrower opts to strategically default. In Chapter 3, it provides a discussion of private and government institutions' current management of strategic default and

[5] Experian "Strategic defaults off from peak but still high," June 23, 2011

[6] CoreLogic. "Negative Equity Back to Q3 2009 Housing Market Trough Level," March 2012.

[7] CoreLogic. "December Home Price Index Gives First Look at Full-Year 2011 Price Changes," February 2012.

examines the international perspective of dealing with default in a selection of European countries. In Chapter 4, it discusses an empirical model measuring the significance of different factors in the identification and prediction of strategic defaults. Finally, Chapter 5 outlines the different policy implications and alternative management solutions in addressing strategic default.

Chapter 2 - Factors Leading to Strategic Default

There are several reasons why borrowers opt to default strategically regardless of their ability to continue paying their financial obligation. Some consider their houses as investment instruments such that when the borrower experiences significant loss as the property becomes underwater, they exercise their option to cut their losses. Other borrowers rationally choose to default because of the lack of incentive to keep their houses. Falling property values within their neighborhood due to foreclosures make it less attractive for the homeowners to stay. This creates a spillover effect on the prices within the area and stimulates more foreclosures. On the other hand, some borrowers still believe it is morally wrong to "walk away" from their contracts and choose to remain in their homes and continue making payment. However, this notion is slowly fading away as the value of properties continues to deteriorate and fall into negative equity level.

This chapter will discuss the factors that affect the borrower's decision to strategically default and argue that the lack of incentive to keep their home is mainly due to the loss of property value.

Section 2.1 Mortgage as "Investment": Decrease of Market Value

A mortgage is a loan to finance the purchase of a real estate with specified payment periods and interest rates. The borrower (owner of the mortgage) gives the lender (provider of the mortgage) a lien on the property as collateral for the loan. In a residential mortgage, a homebuyer pledges his/her house to the bank. The bank has a claim on the house should the homebuyer defaults. In the case of a foreclosure, the bank may evict the home's tenants and sell the house using the income from the sale to clear the mortgage debt. But, what happens if the current value of the house is less than the outstanding mortgage debt?

The option to walk away occurs when the owner of the mortgage decides that continuing the monthly payments is practically the same as throwing away money. In that case, the market value of the property has greatly decreased (negative equity), and therefore, the value of the mortgage exceeds the value of the property. Homeowners have a call option on the home equity with a strike price equal to the mortgage balance. That option is worth very little once prices fall below the strike.

Some borrowers default when the mortgage payments begin to escalate beyond a certain threshold. For instance, some borrowers have adjustable rate mortgages (ARM) where the mortgage payment adjusts (goes up) periodically. In such instances, if mortgage payments begin to consume too much of the borrower's monthly income, a strategic default can be triggered. Along the same lines, strategic default can be triggered when monthly mortgage payments begin to significantly exceed comparable rental rates. The logic behind this trigger is that a borrower can rent a similar property for a price that will not consume an ever-increasing amount of monthly income.

Similar to an investment instrument, a mortgage has two embedded options. A borrower can prepay or pre-terminate the contract, which is a call option on the interest rate. On the other hand, the borrower can stop making payment and default, which is a put option on the price of the property. The call option can also be exercised by refinancing when the interest rate falls below the original note rate. The put option provides the borrower the option to default if the current price of the property declines below the current unpaid principal balance. The amount that a property is "underwater" generally determines the strike price at which the put option is exercised.

Foster and Van Order (1984) are the first to apply option theory formally to the field of mortgage default. Using data on Federal Housing Administration 203(b) default rates from 1960 through 1978, the authors estimated loan-to-value ratios over time and used this information to create variables representing the percentage of loans with negative equity for each year in the study period. Ultimately, Foster and Van Order

attributed the imperfect exercise of the option to the importance of transaction costs. A more recent study by the Federal Reserve (Bhutta et al., 2010) suggested that borrowers tend to opt for strategic default when the negative equity of the home is greater than 50%. When combined with other shock events, borrowers tend to accelerate the decision to exercise the strategic default option. This phenomenon is known as the "double trigger" theory of default.[8]

Section 2.2 Federal and State Laws: Recourse versus Non-recourse

Federal and state laws allow lenders to take a variety of actions in the effort to collect on the delinquent mortgages when borrowers default. The degree of action that a lender may take is one of the factors that strategic defaulters consider when making the determination to default. Generally speaking, state laws allow lenders to pursue defaulters to varying degrees based on the following categories[9]:

A. Recourse: In the event that the lender is not remedied (paid in full) with the repossession and/or sale of the property, the lender can further pursue the borrower to collect the balance that is owed;

B. One Action: The lender must either choose debt collection from the individual or sale of the property. If the lender chooses to repossess the property, the law prohibits the lender from pursuing the borrower in the event that the sale of the property does not cover the entire debt that is owed; or

C. Non-recourse: The lender can take no further action against the borrower after repossession of the property takes place. (See Exhibit 1 for the list of states per category[10].)

[8] Lowrey, Annie. "When Underwater Homeowners Walk Away." The Washington Independent; June 2010.

[9] Ghent, Andra C., Kudlyak, Marianna, "Recourse and Residential Mortgage Default: Theory and Evidence from United States." Federal Reserve Bank of Richmond Working Paper No. 09-10; 2009.

[10] Ghent and Kudyak, page 32.

Recourse versus non-recourse is also central to the issue of establishing the value of the property at the point where the strategic default decision is made. In a non-recourse state, the borrower is only liable for the value of the property at the time of repossession. Thus, a strategic defaulter theoretically could wait until the property is at a maximum point in terms of being underwater, opts to default, and causes the lender to accept (repossess) at a point where the lender faces the prospect of recouping the least amount from the subsequent sale of the property. This point is synonymous with the point where the property value has declined the most.

Evidence suggests that strategic default occurs more frequently in non-recourse states. Also, the strategic default option is exercised at a rate of two to one in non-recourse states versus recourse states when the value of the property exceeds $500,000[11].

Section 2.3 Neighborhood Effect: Price Depreciation and Foreclosure

Even before the housing mortgage bust, the so-called neighborhood effect was generally in force. It pertained to the "neighborhood quality" which dictated the value of the property. Hence, properties in "good" neighborhoods had higher market values and those in "bad" neighborhoods were less. At that time, determinants of good and bad neighborhoods were linked to qualities, such as cleanliness and sanitation, security and safety, accessibility and convenience, and demographics of its residents. According to Campbell, Giglio, and Pathak, foreclosed properties sell for approximately 27% less than non-distressed properties in a given neighborhood[12]. The impact can also be long lasting, which could potentially affect home sales in a given neighborhood for an extended period. Others (Burnside et al., 2011) hypothesized that housing price increases and decreases were more correlated to the number of new entrants into the housing market as opposed to other dynamics.[13]

[11] Ibid, page 24.

[12] Campbell, John Y., Giglio, Stephano, Pathak, Parag, "Forced Sales and House Prices". December 2009.

[13] Burnside, Craig; Eichenbaum, Martin, Rubelo, Sergio. "Understanding Booms and Busts in the Housing Market". NBER Working Paper 20-12; January 2011.

The occurrence of strategic defaults has tweaked this paradigm to the point of having foreclosures as an added variable in determining good and bad neighborhoods. Increased foreclosures in areas, which were once deemed as good neighborhoods, should be viewed and treated as some sort of an epidemic. If this is not controlled, this will drive the contagion further. Not getting a grip on this will likely urge borrowers, who are still struggling with the morality of walking away, to actually push through with it. Seeing these foreclosed properties in their own neighborhoods everyday only makes it more real to them and more acceptable perhaps.

Section 2.4 Social and Moral Stigma: Why Some Remain in Their Homes

Given our definition of strategic default, it is important to inspect the psyche of the borrowers who choose to remain in their homes instead of exercising the option of walking away. Interestingly, some homeowners are facing the dilemma of choosing what is morally right by continuing their mortgage payments versus freeing themselves from financial indebtedness by strategically defaulting. One paper notes that 82% of the people think it is morally wrong to engage in a strategic default. Everything else being equal, people who think that it is immoral to default strategically are 9.9% less likely to declare strategic default.[14]

It further turned out that underlying emotional considerations might be drivers of the strategic default behavior. "People have shown to be more likely to inflict a loss on others when they have suffered a loss themselves, especially if they consider their loss to be unfair; people who are angrier about the current economic situation are more likely to express their willingness to default, as are people who trust banks less. Similarly, people

[14] Guiso, Luigi, Sapieza, Paola, and Zingales, Luigi. "Determinants of Attitudes Toward Strategic Defaults on Mortgages." NBER Working Paper No. 15145. July 2009.

who want to regulate executive compensations and the financial sectors are more likely to declare their willingness to walk away."[15]

Section 2.5 Opportunity to Refinance a Mortgage Loan

Another factor of strategic default is related to the opportunity to refinance a mortgage loan. In such cases, the borrower is confronted with the fact that refinancing the property to either take advantage of lower interest rates or for the purpose of locking in a fixed rate is not possible because the home is worth less than the amount owed. In many instances, this default trigger will invariably push the borrower to default when and if the monthly mortgage payments escalate due to the reset of interest rates.

Strategic default can become an attractive "exit strategy" when the owner of a mortgage experiences an income shock due to the loss of a job, a disruptive life event, divorce, sickness, death, etc. Although this may be considered as strategic behavior, this is not the focus of this paper. In a strategic default, as defined earlier, the borrowers have the ability to make the monthly mortgage and have no income constraints; rather, they are unwilling to continue their obligation because they are not properly incentivized or probably due to a sign of frustration for not being able to get better options of refinancing or modification in spite of being current and responsible borrowers.

This is the reason why the modification treatment needs to address the issue of moral hazard to avoid defaulting strategically just to be able to qualify for the existing modification programs. This was the issue presented by Mayer et al., (2011) in the legal settlement with Countrywide, when homeowners respond strategically to the news regarding the mortgage modification program. The design of the treatment must provide not only proper incentive but also consider the selection criteria and policy to avoid strategic behavior.

[15] Ibid, page 5.

Chapter 3 - Current Management of Strategic Default

As a reaction to the events of increasing delinquencies and foreclosures, a number of modification programs were introduced to the market. One specific type was the voluntary interest rate freeze modification for securitized subprime ARMs, which was introduced in December 2007. But, while the number of mortgage modifications steadily increased during 2008, the number of delinquencies and foreclosures still continued to rise (Haughwout et al., 2010).

The following chapter of the paper will discuss the current default management options made available by financial institutions and existing government-sponsored programs. Also, a top-level analysis will elaborate on the effectiveness of these programs in addressing the issue of strategic default. Additionally, it also examines briefly selected European countries to find possible solutions to remedy the problem of strategic default in the United States.

Section 3.1 Financial Institutions: Current Default Management Options

Financial institutions have a variety of loan workout options, primarily designed for borrowers who are in the early stages of delinquency or as an alternative to foreclosure. Utilization of these may not have been fully optimized as Hatcher (2006) of the Federal Reserve of Chicago's Consumer and Community Affairs revealed that some lenders do not inform borrowers that alternative programs are available. Here are the following workout options available:

For temporary setbacks

- *Reinstatement* – Accepting the total amount of back interest and principal owned by specific date. This option is often combined with forbearance.
- *Forbearance* – Reducing payments for a short period of time, after which another option is agreed upon to bring the loan to current status. A forbearance option is

often combined with reinstatement when it is known that the borrower will have enough money to bring the account current at a specific time in the future. The money might come from bonus, investment, insurance settlement, or tax refund.

- *Repayment Plan* – With the repayment plan, the bank agrees to add, for example, half the amount of the first missed payment onto each of the next subsequent two payments. These plans provide some relief for borrowers with short-term financial problems.

For long-term or permanent setbacks

- *Mortgage Modification* – If the borrower can make the payments on the loan, but does not have enough money to bring the account current or cannot afford the total amount of the current payment, a change to one or more of the original loan terms, such as interest rate and tenor may make the payment more affordable.
- *Short Refinance* – Forgive some of the debt and refinance the rest into a new loan, usually resulting in a lower financial loss to the lender than foreclosing.
- *Claim Advance* – If the mortgage is insured, the borrower may qualify for an interest-free loan from the insurer to bring the account to current. Full repayment may delay for several years.

For when keeping the home is not an option

- *Sale option* – If the borrower can no longer afford to repay the mortgage, the lender agrees to give the borrower a specific time period to find a buyer and pay off the total amount he/she owes.
- *Pre-foreclosure Sale or Short Payoff* – If the proceeds from the sale of the property do not cover the loan in full, the lender may accept less than the full amount owed. Though the lender takes a loss on the sale, the additional cost of foreclosing the property is avoided.
- *Assumption* – Allows a qualified buyer to assume the mortgage even if the original loan documents state that it is non-assumable.

- *Deed in lieu*[16] – Agree to allow the borrower to voluntarily surrender the property and forgive the debt. This option may not be available if other liens, such as judgments of other creditors, second mortgage, and Internal Revenue Service or state tax lien exist. (Hatcher, 2006.)

Prior to the financial crisis, there were two primary loss mitigation programs for the U.S. mortgages designed to bring the borrowers back to current status. First, a tailored repayment plan designed for short-term delinquencies. If a borrower missed a payment, additional payments were made for the next few months to bring the borrower back to current status. As a result, the borrower's monthly payments increased which is counterintuitive and unproductive. The second type was using mortgage modifications, which was designed for longer-term delinquencies. All accrued interests and expenses were capitalized into the balance without forbearance. Modification design, where the principal balance was simply recapitalized, only delayed the inevitable and was found to be less effective as re-default rates on these types of modification were observed to be very high.[17]

Many modification programs have been overly complicated and required multiple qualification criteria for borrowers. A number of these programs were designed to address short-term reduction of income for borrowers and did not seem to provide long-term solutions. More effective solutions, such as principal reduction or principal deferrals, provide better performance in terms of re-default rate. However, they oftentimes require higher cost on the part of the financial institutions making it less attractive and less feasible to implement. This was reflected in the most recent results where the percentage of modification made by servicers using principal reduction was only 7.8%, while 88.5% used some type of capitalization of missed fees and payments (OCC Mortgage Metrics Report, Q3, 2011).

[16] Both a short sale and deed in lieu damage the borrower's credit rating less than a foreclosure as they reflect efforts by the borrower to come to terms with the lender. But the short sale is less damaging than deed in lieu because it indicates recognition by the lender that the event was caused by the factors outside the borrower's control (Hatcher, 2006).

[17] BlackRock Solutions. "Borrower Behavior in Distressed Mortgage Markets: Comparative Studies from the US, UK and ROI, Focus on the Efficiency of Loan Modification". October 13, 2011.

The impact of the mortgage crisis forced financial institutions to re-evaluate their strategies and expand different workout programs to provide alternative solutions to the rising defaults and growing foreclosure inventory. Financial institutions started to realize the importance of customization of the workout programs and modification options based on the unique situation of the borrowers. Banks started to reach out to customers more proactively when initial sign of default became imminent through the use of predictive analytics and using historical performance to improve and refine existing programs.

Presented in Exhibit 2 are the different workout programs and foreclosure alternatives offered by four of the top largest mortgage lenders. The workout and modification schemes available do not vary much from one lender to another. The overall intent of helping the borrowers in distress is to provide different workout options solving the issue of affordability of their mortgage and to present alternative solutions to foreclosure.

For example, Bank of America's Home Loan Assistance Solutions and National Homeownership Retention Program introduced earned principal forgiveness. This targets underwater homeowners who have defaulted on their mortgage payments and whose total payments made are already more than the current worth of their properties. The primary feature of this program is principal reduction. The intent is to bring the loan down to an amount corresponding to the property's current value. This should help the homeowner move forward and build positive equity. To ensure the stability of this arrangement from the bank's side, the actual principal forgiveness will be amortized in either three or five years.[18]

CitiMortgage appears to have more comprehensive bank-specific options and programs to match the borrower's specific situation. These include repayment plan, deferment, partial claim, and modification, through the CitiMortgage Homeowner Assistance Program. In addition, CitiMortgage has mobilized a nationwide initiative

[18] See http://mediaroom.bankofamerica.com/phoenix.zhtml?c=234503&p=irol-newsArticle&ID=1405541&highlight=

aimed at reaching out to its borrowers. CitiMortgage dubbed the campaign as "Road to Recovery." The agenda is to tour across the United States and host 25 homeowner-assistance events across the nation. "CitiMortgage had been able to establish contact with many of the more than 2,300 homeowners who attended the events, prior to which CitiMortgage was unable to reach them through conventional means. Almost 90% of the attendees were at least 60 days behind on their mortgage payments and almost a third was already in the foreclosure process."[19]

JP Morgan Chase, through JP Morgan Chase Homeowner Center, has made bank-specific enhancements to the government program via JP Morgan Chase Home Affordability Program or "CHAMP." The general intent of the program is to provide the borrower who has a renewed willingness and ability to repay with an opportunity to change the original terms of his/her loan, based on demonstrated need to achieve an affordable and sustainable payment. JP Morgan Chase has also mobilized an initiative similar to CitiMortgage's "Road to Recovery." JP Morgan Chase tours U.S. cities and hosts multiday "Homeowner Assistance Events" exclusively for struggling JP Morgan Chase homeowners. During these events, up to 40 JP Morgan Chase counselors will work with homeowners as long as 12 hours a day for four or five days in a central location like a civic center or community college.[20]

Similarly, Wells Fargo, through Wells Fargo Help for Homeowner and Wells Fargo Equity Assist Programs, offers refinance, repayment plan, and modification workout options for troubled customers, but uniquely emphasizing modification and refinancing to their home equity customers. It also has specialized programs like "Helping America's service members," which expanded benefits beyond the Service member Civil Relief Act. It also provides different outreach programs designed to help

[19] See http://blog.citimortgage.com/2012/04/citimortgage-launching-road-to-recovery-events-for-2012.html

[20] See https://www.chase.com/chf/mortgage/hrm_resources

communities understand and act on the effort to stabilize their current housing situation while advancing homeownership through the "Leading the Way Home" program[21].

A more recent development involving the nation's biggest mortgage lenders (including Bank of America, Citigroup, JP Morgan Chase, and Wells Fargo) was the National Foreclosure Settlement or the "robo-signing" litigation. This involved a $25 billion settlement with the state and federal authorities resulting from the investigation regarding certain origination, servicing, and foreclosure practices. Under the agreement, the servicers are required to enhance and expand their existing workout programs. This includes modification solutions using broader principal reduction, treatment for current borrowers facing negative equity situation, and providing cash payments of $2,000 for borrowers who lost their homes to foreclosure from September 2008 to the end of 2011. However, only portfolios owned by the servicers are eligible under this settlement; therefore, loans owned by government housing finance agencies such as Fannie Mae and Freddie Mac are not qualified for the expanded programs.[22]

With the increasing concern of strategic default and the weakness in the housing market, lenders are turning to analytics to understand the nature of strategic default and ways to identify them in their portfolios. For example CoreLogic, a leading provider of mortgage information, analytics, and business services, announced a new loan modification decisioning platform called WillCap Analytics, which employs newly developed behavioral technology that optimizes the outcome of the borrowers and mortgage holders. This tool claims to reduce defaults, including strategic defaults, and provides the optimal principal reduction treatment to a loan (CoreLogic, 2010). Similarly, Fair Isaac FICO, maker of the FICO Score and a leading provider of analytics and decision management technology, has been consulting with top mortgage lenders to provide custom analytics solutions for their mortgage portfolios, and designing preventive actions to reduce the overall cost of strategic default (FICO, 2011). Both

[21] See https://www.wellsfargo.com/homeassist/index

[22] See http://nationalmortgagesettlement.com/

provide solutions that focus on the identification of strategic default based on historical portfolios and credit bureau information. Alternatively, more recent solutions are starting to evolve putting more focus on behavioral and incentive treatment to borrowers to solve strategic default. Loan Value Group (LVG), a pioneer developer with an incentive program designed to treat strategic default, uses the "Responsible Homeowner Reward" (RH Reward) program. This proactive and reactive strategy uses a cash reward to incentivize the customer to remain current with any modification on the existing loan. The homeowner is granted a reward account, which grows with every on-time payment, up to a cap. The reward is paid in cash when a predefined payout condition is met – typically full payoff of the mortgage. The homeowner forfeits the whole reward if they breach a predefined delinquency condition, say 60+ days delinquent (Loan Value Group, 2012).

With regard to the worsening impact of strategic defaults in the housing recovery, policy makers have started a more harsh approach to penalize strategic defaulters. In June 2010, Fannie Mae announced policy changes that encouraged borrowers to work with their servicers and pursue alternatives to foreclosure. Strategic defaulters will be ineligible for a new Fannie Mae-backed mortgage loan for the next seven years from the date of foreclosure (Fannie Mae, 2010). This was in conjunction of the passage of H.R. 5072 FHA Reform Act of 2010 that is said "to improve the financial safety and soundness of the FHA mortgage insurance program"; for the first time, this act mentioned prohibition of insurance for borrowers with a case of strategic default (Waters, 2010).

Section 3.2 Government-Sponsored Programs

Despite all these, defaults and foreclosures steadily increased. It became apparent to the Obama administration that immediate action was needed in order to prevent the collapse of the housing market, which would potentially push the global economy into depression. In response to the crisis, President Obama announced the Home Affordability and Stability Plan on February 18, 2009 to help 7 million to 9 million families restructure

or refinance their mortgage to prevent foreclosure. As part of the plan, the US Department of Treasury announced on March 4, 2009, a national loan modification program aimed at helping 3 to 4 million at risk homeowners. Under the compilation of programs called Making Home Affordable (MHA) program, the U.S. Department of Treasury partnered with different financial institutions to address a borrower's inability to pay and provided the borrower sustainable monthly payment options through a standardized modification process and guidelines. More than 5.9 million[23] modification arrangements were started between April 2009 and March 2012. There were also more than 1.8 million homeowners who have started the trial modification under the HAMP and there were more than 1.3 million FHA loss mitigation and early delinquency interventions. Private sector modification, through the HOPE Now lenders, has reached more than 2.8 million through February 2012. As of March 2012, more than 990,000 homeowners have received permanent modifications (U.S. Department of Housing and Urban Development; U.S. Department of Treasury, 2012).

Since the inception of the program, MHA has expanded to different areas, such as second lien holders, homeowners who are struggling because of their unemployment status, or those with "underwater" properties, to extend assistance and avoid foreclosure. The government also introduced an alternative to foreclosure through Home Affordable Foreclosure Alternative, which is designed to provide a better alternative to the conventional short sale or deed in lieu of sale[24], promising less negative effect on the borrower's credit score rating. (See Exhibits 3a and 3b for the list of MHA programs).

The modification process is labor intensive and costly on the part of the lender (Eggert, 2007) and Quercia and Ding, 2009. It was estimated by Eggert (2007) that cost of modification per account could reach up to $500 to $600. To incentivize lenders to perform the modification process, the MHA program provides some "short-term and one-

[23] This figure includes private modifications.

[24] In short sale, the mortgage company lets you sell your house for an amount the fall "short" of the amount the borrower still owes. In a deed in lieu of sale, the mortgage company lets the borrower give back the title, transferring the ownership back to them. http://www.makinghomeaffordable.gov/programs/exit-gracefully/Pages/hafa.aspx

time" cash incentives. For example, part of the program guidelines of the HAMP include monthly payment reduction cost sharing, which the Treasury will shoulder and match further reductions on the monthly payments dollar per dollar, down to a 31% front-end, debt-to-income ratio for the borrower. The servicers receive $1,000 for each eligible modification based on the prescribed guidelines and receive "pay for success" fees up to $1,000 awarded in increments every month for the next three years as long as the borrower stays current on the loan. A one-time incentive bonus payment of $1,500 to the lender or investor and $500 to servicers will be provided for a modification made while the borrower is still current on the mortgage payment (U.S. Department of Treasury, 2009). Through the cash incentives, lenders and servicers are encouraged to perform modifications; however, the MHA program is only temporary and will be ending on December 2013.

Section 3.3 How Effective are These Programs

In the long run, lenders are faced with the cost of managing re-default risk, which is relatively high for modified loans regardless of the type of modification. In fact, based on the latest report, the overall re-default rate (became 60 days or more delinquent after being modified) for portfolio loans and serviced by others modified in 2008 is 45% in the first 6 months and 58% in just 12 months alone. Based on the same report, more recent modifications have generally performed better than earlier modifications, reflecting the ongoing emphasis of lower monthly payments and payment sustainability. For example, loans modified in 2010 reported 17% and 26% re-default rate after 6 months and 12 months respectively. Although this was a significant improvement from the previous modification period, this level still remains high. Other results also show that re-default rates are highest for government-guaranteed mortgages and loans serviced by private investors compared to modification on mortgages held on the servicer's own portfolio across modification vintages. Additionally, re-default rates are lowest for those with payment reductions - a decrease by more than 20% across vintages and months after modification. Modifications on mortgages held in the servicer's own portfolio or serviced

for the government sponsor enterprises (GSEs) – Fannie Mae and Freddie Mac performed much better than the modifications on mortgages serviced for others. The variance in the re-default performance reflects the differences in the modification programs and the flexibility to modify the terms for greater sustainability (OCC Mortgage Metrics Report, Q3, 2011).

As re-defaults increase from modifications, so are the servicing costs. Default drives servicing costs higher since the servicer has to engage in time-intensive loss mitigation (Eggert, 2007). Another type of risk that Adelino et al., (2009) pointed out is the "self-cure" risk. Based on their empirical analysis, 30% of seriously delinquent borrowers cure themselves without receiving any type of modification, creating a false positive on the modification treatment and creating inefficiency on the usage of capital funding. It is due to wrong targeting of modification population or a mismatch on the modification programs offered. This is the same problem highlighted by the Countrywide settlement case (Mayer, et al., 2011) when borrowers who appear to be the least likely to default were attracted to the announcement of the modification program and reacted strategically. Ultimately, the short-term incentives may not be enough to compensate for the overall cost of the modification, making it uneconomical for the servicers.

How effectively do the private and government modification programs address the issue of strategic default? Apparently, not too well. Although the MHA program has made significant programmatic changes to broader segments of distressed borrowers, including underwater properties, the program does not directly address the issue of strategic default. For example, according to the Home Affordable Modification Program Guidelines (U.S. Department of Treasury, 2009), the program excludes non-owner-occupied (rental properties or second homes) and investor-owned properties. The program also prioritizes distressed customers who are potentially vulnerable to any payment shock or exhibit financial hardship. This is evident in the underwriting analysis process, requiring all potential eligible borrowers to submit to financial hardship screening. If the servicer determines that a non-defaulted borrower facing financial

hardship is in "imminent default," the servicer will apply another layer of verification using the Net Present Value (NPV) test[25]. This additional layer of qualification criteria in the modification process discouraged those borrowers who are in current standing and who have the capacity to make monthly payments. This segment of the population who are investors with deep pockets owning rental properties or second homes, exhibiting the financial capacity to perform their obligations and who are unaffected by any payment shocks are unlikely to qualify; hence, not given the same incentive under the current programs. In contrast, the recent National Mortgage Settlement is a great opportunity to address the issue of strategic default. With this settlement, servicers are required to provide up to $17 billion in principal reduction to homeowners needing modification and up to $3 billion in refinancing relief to homeowners who are current but underwater.[26] However, the entire settlement is only limited to selected servicers within a limited time frame and capital allocation. Unless fair treatment to all types of borrowers is established (especially those underwater), the risk of strategic default remains high. Designing a mortgage modification program which gives a fair treatment to all borrowers and encourages servicers to offer modification options will be a great contribution to the recovery of the fragile mortgage market.

Section 3.4 Securitization, Modification, and "Having No Skin in the Game"

Securitization has added more complications to the modification process; securitized loans tend to receive biased treatment from the servicer favoring loans held in its own portfolio. Adelino, Gerardi and Willen (2009), Piskorski, Seru, and Vig (2010) all expressed similar thoughts that because of the misalignment of financial structure and incentives, in terms of shouldering the cost of foreclosure, the servicer may not act in the best interest of the investor in providing the optimal modification treatment to the

[25] A standard NPV test will be required on each loan that is Imminent Default or is at least 60 days delinquent under the MBA delinquency calculation. This compare the net present value (NPV) of cash flows expected from a modification to the net present value of cash flows expected in the absence of modification. If the NPV of the modification scenario is greater, the NPV result is deemed positive. The NPV Test applies to the standard waterfall only and does not require consideration of principal forgiveness (US Department of Treasury, 2009).

[26] http://www.nationalmortgagesettlement.com/help

serviced loan. Since modification may remove the cash flow stream to the servicer, it creates structural conflicts leading to foreclosure even if it is not in the best interest of the investor. This notion was supported by the Piskorski et al., (2010) empirical study, which suggests that foreclosure bias is greater in securitized loans than loans held by banks with an average rate of 8.5% in absolute terms (34% in relative terms). This implies that servicers may choose to foreclose rather than modify when it comes to securitized loans as compared to loans that are held in their portfolios.

The Pooling and Servicing Agreement (PSA) is another barrier for a loan modification (Quercia and Ding, (2009), Adelino et al., (2009), and Eggert (2007)). This legal document outlines the responsibilities of the servicer and restricts the extent of loan modifications allowed. Bound by the PSAs, servicers find that it is not easy to work with investors of securitized mortgages to achieve loan modifications, and usually, it is not clear what is legally permissible. The differences in the type and scope of modifications that are explicitly permitted among different trustees raise operational compliance costs and litigation risks. These negative aspects of securitization seem to affect servicers' incentives and reduce their propensity to modify loans—even when such action would be in the collective interests of investors and borrowers.

Although the MHA program does not exclude securitized loans from the eligibility of the program, still, there is a lack of incentive for the servicer to perform modification because of the complexity of the process and different prohibitions entailed in the securitized loans. One solution is to obtain an automatic modification approval for qualified loans. This is done by designing an incentive program for the lenders, servicers, and investors and incorporates it in the servicing agreement. Another solution is to change the nature of the mortgage contract to provide for automatic modification.

Section 3.5 European Practices in Managing Mortgage Default

Most of the European member states recorded an increase in non-performing loans (NPL) during the peak of the crisis. The rise of the NPL indicator was mainly the result of an increase in unemployment rate and the deterioration of the macroeconomic environment, which greatly affected the borrower's ability to repay their mortgages. Both Europe and United States experienced an increase in mortgage default rates during the period of 2007-2009[27]. Despite this, there are no known records of strategic default in Europe.

The main difference between most of the United States and Europe is the possibility of unlimited recourse, allowing lenders to pursue deficiency judgments. This was confirmed by Duygan-Bump and Grant (2008) in their research using the European household debt data. According to their findings, the decision to default is at least partly strategic, since the decision to repay depends heavily on the type of institutions, cost of default and the extent of how effectively defaults are punishable based on the type of loans, whether collateralized or unsecured. According to the European Mortgage Federation (EMF) study on efficiency of mortgage collateral, borrowers remain liable for deficiencies in Belgium, Germany, Greece, the Netherlands, Spain, France, Ireland, Portugal and the U.K. The duration of debtor liability was without limit in Belgium, Germany, France and the Netherlands; 20 years in Greece; 15 years in Spain; and 12 years by law, six years in practice following voluntary industry agreement in the U.K.[28] The differences in debtor liability seem to provide an explanation for the deviation of mortgage default rates within Europe. For example in 2009, Belgium and France showed lower default rates of 1.69% and 0.44% respectively while Spain and Greece showed default rates of 2.88% and 6.4% respectively.

[27] See Exhibit 4 and 5 Default Rate in Europe during 2007-2009.

[28] EMF Study on the Efficiency of the Mortgage Collateral in the Europe an Union 2007

Foreclosure Procedures

Prior to starting a foreclosure procedure, a minimum waiting period gives time to the borrower to settle any outstanding payments or come up with alternative payment measures. The borrower can either choose the following options: reconciliation, mediation and modification. Reconciliation provides resolutions for distressed borrowers to overcome payment difficulties and designs an individual resolution plan to prevent falling to foreclosure. This is almost similar to a repayment plan in the United States, which provides temporary relief to the distressed borrowers. This type of reconciliation procedure was implemented in countries like Belgium, the Netherlands and U.K. Mediation is another type of practice that provides a neutral, non-confrontational setting in which creditors and borrowers can negotiate. It aims to help both parties to understand and analyze the issues as well as to identify cost effective solutions. The U.K., France, Ireland and Cyprus are example of countries with specialized mediation mechanisms during the period of increasing default environment. Lastly, modification of loans is meant to help in bridging temporary economic difficulties. For this, an assessment of the borrower's long-term ability to repay the loan has to be made.

According to the European Central Bank report in 2009, foreclosure process varies from country to country within Europe. In the Netherlands, a lender may foreclose the mortgaged property if non-payment of the mortgage loan occurs. Under the Civil Code and Code of Civil Procedure, mortgage lenders have full recourse against borrowers who have defaulted on mortgage payments. This legal protection acts as a strong disincentive to default and limits the potential losses for the lenders. Likewise, Spanish mortgage holders are very cautious in avoiding default because legal fees, taxes and charges on foreclosure proceedings are very high. Penalty charges are usually over 20%. According to the Spanish Civil Code, borrowers are not only liable with their current assets but also their future assets. Seizure of payroll, pension and salary of a person is a legal remedy to ensure recovery of debts. Moreover, the borrower can be blacklisted in the database for years and will be denied access to future mortgages or

loans.[29] During the foreclosure process, the debtor and creditor agree on a settlement plan of either reducing the debt to a maximum of 50% or extending the payment period for up to 5 years. Unlike other European countries, Spain does not allow for a debt discharge. The debtor will be liable until he pays off his debt regardless of the time period. On the other hand, bankruptcy in the U.K. lasts no longer than 12 months[30]. At the end of this period, the person is automatically discharged and ceases to be liable for his debts without a need for a judge's decision. By far, the United Kingdom comes closest to the United States' idea of giving debtors a fresh start.

The period required for the completion of a foreclosure proceeding ranges from a minimum of two months (Finland) to a maximum of 56 to 132 months (Italy and Cyprus respectively). On average, the usual time needed for the entire procedure is close to two years. The corresponding cost of foreclosure also varies across countries. The average cost of foreclosure reported in 2007 was about 9% of the outstanding balance. In the U.K. the cost can vary from 2.5% to 7%. This however, remains relatively lower when compared to the United States' experience during the crisis.

In conclusion, the most notable difference between the United States and Europe is the legislation relating to mortgage defaults. In the United States, insolvency laws are more favorable to the borrowers wherein bankruptcy procedures are less severe and burdensome and give more emphasis on providing a fresh start for borrowers. Relatively, one can be out of bankruptcy in four months as compared to a number of European countries where waiting period can be very long. In some United States, borrowers are protected through the no recourse policy. Unlike the insolvency law of European countries where it is more inclined to satisfy creditor's claims and allowing them to recover any shortfall not covered by the collateral. Creditors can go after the borrower's personal assets and in some European countries, their future income.

[29] Spanish Civil Code Articles 1911, 1175 and 1849

[30] Enterprise Act of 2002

Chapter 4: Data Analysis

Section 4.1 Data Description and Definition

To further understand strategic default behavior, it is important to analyze different risk factors triggering such behavior and use these as tools in designing early warning mechanisms, loss mitigation programs and further improve credit policies. The data used in this analysis is obtained from the risk portfolio of a large mortgage lender in the United States with detailed loan level information including combined loan-to-value at origination (CLTV) ratios, monthly refreshed credit bureau information from Equifax, borrowers' payment history and delinquency performance. United States macroeconomic information such as home price index from CoreLogic's Loan Performance, foreclosure rates from CoreLogic's Real Estate Analytics Suite and the unemployment rates from Moody's Analytics' economy.com were also used.

In an effort to identify strategic defaulters, we classified them as borrowers who suddenly stopped making a mortgage payment, while showing evidence of their ability and capacity of paying. In particular, we defined strategic default loans as those (a) that are never delinquent in their mortgage trade in the past, then suddenly became 60 days past due and went straight to 180 days past due ("straight rollers"); (b) that have no delinquent non-mortgage trade lines (one month prior to becoming 60 days past due on their mortgage) and remain current for the next five months; (c) with negative equity where a significant drop in property value resulted in a mortgage higher than what the current property is worth (CLTV > 100) and at the same time, has a 60 days delinquency status.

To create the base dataset for this analysis, we identified the loans that fell under our definition of strategic default between the periods of July 2008 to December 2010, following their performance until April 2011. For condition (a), we flagged all straight rollers within the observation period using the delinquency information from the mortgage servicing system. Then, we merged the monthly credit bureau information and

identified the attributes specified in condition (b). For condition (c), we calculated the current CLTV ratio by comparing the mortgage balance versus the current property value obtained from CoreLogic's Loan Performance repeat sale index at the time of default. Based on these criteria, we have a total base file of 182,524 defaulted loans, of which after applying conditions (a) and (b), 9,789 strategic default loans were identified. Applying condition (c) on the total base file, we identified 84,383 defaulted loans in negative equity, of which 6,507 were strategic. See Table 1 summary statistics for details.

To investigate the different types of borrower's characteristics and the factors that determine strategic default behavior, we regressed strategic default indicators on different risk factors as represented by macroeconomic variables, credit quality variables, borrower's profile, types of product offering and policy programs to the total base file. Our basic empirical model is a logistic model of strategic default that can be written as:

Logit of SD = f (Macroeconomic variables, Credit Quality Variables, Borrower's Profile, Product Type, Policy Programs)

where Logit of SD represents the log odds of strategic default, expressed as a binary response variable.

The descriptions of various risk factors used in this logistic regression analysis are as follows:

Macroeconomic Variables

- Foreclosure Rate (at the FIPS Level) – county level monthly foreclosure rate using five-digit Federal Information Processing Standard (FIPS) codes. It is expected that strategic default will increase with the foreclosure rate in the immediate neighborhood.
- Unemployment (year-over-year percent change) – state level year-over-year unemployment rate at the time of default (60 days past due).

- Home Price Index (year-over-year percent change) – year-over-year change in home price index based CoreLogic's Loan Performance data at the time of default (60 days past due).

Credit Quality Variables

- Current Combined Loan-to-Value (CLTV) – a credit risk variable that measures borrower's equity or the degree of property being underwater with respect to the initial investment on the property or origination value. Current CLTV is calculated as the sum of the original principal balance(s), if more than one lien exists, provided that both are with the mortgage lender that provided the data, divided by the current value of the property, adjusted "mark-to-market" using zip code level repeat sales index to the original value of the property from CoreLogic Loan Performance.
- Negative Equity – a dummy variable indicating the property is underwater. Negative Equity is equal to one if CLTV>100%, zero otherwise. It is hypothesized that negative equity is highly associated to strategic default behavior.
- Refresh FICO – Equifax's monthly updated credit score. The FICO score is a strong indicator of borrower's credit quality based on payment history performance.

Borrower's Profile

- Non-Owner Occupied – a variable indicating whether the property is non-owner occupied. It takes a value of one if non-owner occupied and zero for owner occupied. Occupancy type is a measure of emotional attachment to the home. Non-owner occupied properties such as investment property, second home and the likes are expected to have higher strategic default rates than owner occupied.
- Borrower's Investment < 20% - Borrower's investment is computed based on the initial down payment and total amortization made, up to the time of default, as a percentage of original property amount assessed during the application of the mortgage. If it is less than 20%, the dummy variable is set to one, and zero

otherwise. This measures the degree of economic attachment and "skin in the game" on the property.

- Months on Books (Log MOB) – The number of months the borrower has been in the portfolio since the time of origination. We used the log transformation of MOB in the actual logistic model.

Product Offering

- Adjustable Rate Mortgage (ARM) – a dummy variable for ARM products (includes all types of ARM e.g. 5/1 ARM, 10/1 ARM, etc.) which takes the value of one, zero otherwise. It is hypothesized that different product types have specific effects in strategic default behavior, specifically between fixed rate mortgage and ARM products.

Policy Programs

- Non-Recourse States – a dummy variable representing states having a non-recourse mortgage policy with value one, zero otherwise, where borrowers are not personally liable for more than the home's value at the time the loan is repaid. The lender may recoup some of its loss through foreclosure; however, if the foreclosure sale did not generate enough to satisfy the loan, the lender may not sue the borrower for the shortfall and must accept the loss. Non-recourse states include AK, AZ, CA, CT, FL, ID, MD, NC, ND, TX, UT and WA.
- Never Modified – a dummy variable for loans that were never given any type of modification or restructuring since origination. Never Modified is equal to one if no modification occurred; otherwise, the value is zero.
- Within the HAMP Period – a dummy indicator for loans originated prior to January 2009 and where delinquency happened after the original Home Owner Affordable Modification (HAMP) program was announced on February 18, 2009. If the loan was originated prior to January 2009 and defaulted after February 2009, the value is one, zero otherwise. This will try to validate the hypothesis that strategic behavior is correlated to the announcement of this program and provide empirical evidence on the weakness of the existing modification program's qualification criteria.

Section 4.2 Testing and Validation of Strategic Default

Considering the definition of strategic default established above, we analyzed the data into two parts. First, using the straight roller definition without negative equity and second, with negative equity condition applied. The rationale behind this analysis was to validate the impact of negative equity to strategic default behavior and to identify other factors besides negative equity that could have exhibited high likelihood of triggering strategic default. We observed that the overall percentage of strategic default classified in the sample was 5.4%, which increased to nearly 8% with the negative equity condition applied.

Percentages of strategic default in different key portfolio segments are presented in Tables 2a and 2b. As documented in previous literatures, (Guiso, Sapeinza and Zingales (2009), Bhutta, Dokko and Shan (2010), Jagtiani and Lang (2011)) strategic default increases as the property becomes deeper underwater. This is consistent with our findings as observed in the measure of the current CLTV. With 10% negative equity (CLTV 100% - 110%), strategic default was found to be at 4.9%. This number increased to almost 12% when CLTV reached 150+%. Bhutta, Dokko and Shan (2011) described this as "consumer ruthlessness"[31].

Most of those who strategically defaulted have originally higher FICO scores (710 vs. 671) and continue to have higher refresh FICO even during the time of default on their mortgage. This provides strong evidence of good credit history performance and above average financial management traits. This is also a manifestation of being up to date with other credit trades, as payment behavior reported to the credit bureau may lag before it reflects its default history on his or her mortgage. Based on our sample data, it was consistently observed that the higher the refresh FICO, the higher the incidence of strategic default. For example, within the 620-659 score band, it showed a 12% strategic default rate. This percentage increased to almost three times (33%) when refresh FICO

[31] Bhutta, Dokko and Shan (2011) empirical analysis reveals that median borrowers in their sample only walk away until the housing equity drops negative 67 percent, which can be explained by moral aversion to default.

score was at 780+. Unsurprisingly, average refresh FICO of borrowers dropped to 682 due to the effect of voluntary default in their mortgages, which was reflected in their credit report. This credit profile is unique compared to regular default with generally lower FICO score, suggesting the credit sophistication of this type of borrowers. The profile also fits the classification of prime customers who have better credit quality than non-prime loans. Non-prime segments showed significantly lower strategic default rate of 5.6% compared to prime loans of 18.7%.

Based on the findings, there was less emotional or economic attachment for non-owner occupied properties with almost three times higher incidence of strategically defaulting compared to owner occupied properties. The highest strategic default rate observed within occupancy type was 23% in second homes. Borrower's investment (payments made into the property) and length of stay also indicated some correlation between strategic defaults. Borrowers who have less "skin in the game" tend to have less incentive or attachment to stay in their properties. Borrowers with investment of less than 20% have higher default rate compared to those with more than 40%, (7.8% vs. 2.5%). Similarly, people who just bought their properties and stayed for less than 5 years tend to strategically default at a higher rate (7.9%) than those who have remained beyond 5 years. It was also observed that borrowers staying in townhomes or condos (13.6%) have higher risk of strategically defaulting than single-family homes (7.2%) or multi-family homes (9.5%).

In terms of product offering, ARMs have higher strategic default rate compared to traditional fixed rate products, 14% vs. 4.7% respectively. In particular, borrowers with interest only type of mortgage have higher strategic default rate (17%). Note that a prepayment penalty clause in the contract does not significantly differentiate strategic default much (7.3% vs. 9.4%). This may be due to a very short prepayment penalty period (usually around 3-year period) and the actual penalty amount is insignificant.

As expected, strategic default in non-recourse states was significantly higher (8%) compared to recourse states (2%). Moreover, distressed states that suffered the highest

home price depression, foreclosures and unemployment exhibited the highest strategic default rates – Nevada (16.9%), California (14.5%), Arizona (13.6%), and Florida (8.5%). County level unemployment and foreclosure rates seemed to have a correlation between strategic default events. For unemployment rate below 5%, the strategic default rate was at 5.7%; however, it increased to 7% when unemployment was between 5%-10%. As unemployment rate soared to over 10%, strategic default rate rose to as high as 8.7%. Similarly, as foreclosure rate reached 10% and higher, strategic default increased to as high as 10.6% compared to 7.2% when foreclosures were less than 5%. This partly explained the hypothesis regarding the phenomenon of neighborhood effect and the role of contagion within local neighborhood districts.

Finally, we also explored some relationships between loan modification and government sponsored HAMP program. It was observed in our sample that higher cases of strategic default (9.9%) came from those who never had any type of loan modification in the past. It is also interesting to further examine on whether the cause of strategically defaulting in the selected sample was triggered by existing modification programs which, the primary criterion is being delinquent as investigated by Mayer, Morrison, Piskorski and Gupta (2011), in the legal settlement case with Countrywide. The concern of providing the right modification and mitigation program, limiting the issue of "moral hazard" (strategically defaulting to qualify for the program) is significantly important in designing an optimal treatment on preventing strategic default.

Section 4.3 Identification and Prediction of Strategic Default

To identify the different factors that influence the predictability of strategic default, we used the empirical model defined in section 4.1 and introduced various sets of predictors and observed their significance level, estimates and goodness of fit. Table 3 shows the summary results of the logistic regression of strategic default on varying sets of independent variables.

In Model 1, we first introduced all the macroeconomic variables: foreclosure rate, unemployment rate, and home price index (HPI)[32]. All variables are significant at 99% confidence level. In this model, the foreclosure rate is statistically significant with a positive coefficient. This implies that borrowers whose properties are located in a county experiencing high level of foreclosures are more likely to declare their willingness to walk away. Everything else equal, a 1% increase in foreclosure rate increases the chance of strategic default by 50%. Unemployment and HPI both have negative coefficients. This suggests that high unemployment numbers or a positive increase in HPI reduces the likelihood of the loan to be identified as strategic. For instance, if unemployment rate increases by 1% (year-over-year), the likelihood of a strategic behavior decreases by 50%, everything else being constant. The result in unemployment seems counterintuitive, but this confirms that borrowers who are considering to strategic default are not sensitive to the economic shock of unemployment and it does not affect their ability to pay their monthly obligations. This evidence is also consistent with this paper's definition of strategic default loans where borrowers are still able to make payments on their other credit lines (credit cards, auto loan, etc.). Similarly, a positive change in HPI signifies an appreciation to the property value that will provide borrowers the incentive to stay in their homes and minimize the option to default strategically. Put simply, a 1% increase in HPI (year-over-year), reduces the probability of strategic default by 49%.

In Model 2, we added all the credit quality variables from the previous model: Refresh FICO, Current CLTV and Negative Equity. Negative equity exhibits positive coefficient, which means that borrowers with properties in negative equity are more likely to strategic default by 54%, all things being constant. In this model, borrowers with high current CLTV are more likely to observe strategic default behavior. For example, when current CLTV goes up from 100% to 130%, the probability of strategic default increases by almost 12% and reach as high as 20% when CLTV becomes 150%. This means that the more the property is underwater, the higher the chance of strategically defaulting, holding all other factors constant. This illustrates how important the equity of

[32] Both unemployment rate and HPI are measured as year-over-year percent change.

the property is for the borrowers as an incentive to keep their homes and not walk away. Surprisingly, an increasing refresh FICO also contributes to strategic default behavior. For instance, an increase in refresh FICO from 640 to 780 increases the chance of predicting strategic default accurately from 10% to 40%, everything else the same. This illustrates the credit sophistication on the part of the borrower, which indicates that the higher the credit quality, the more likely the borrower is able to strategically default. This truly separates those who are not capable of making monthly payments from those who are not willing to and decided to strategically default because of lack of incentive. Percent concordant and c-statistics both indicate strong predictability of the model to identify strategic default with 83.3 and 0.837 respectively. By adding the credit quality variables, R-square (Re-scaled R- square) increases to 0.2279, almost 10 times improvement from Model 1.

Model 3 adds borrower's profile to Model 2, including Non-Owner Occupied, Borrower's Investment < 20% and Months on Books (MOB) variables. In this model, both Non-Owner Occupied and Borrower's Investment < 20% add to the likelihood of strategic default behavior. This provides additional support to the earlier claim that strategic default is significantly higher for borrowers with investment below 20% and non-owner occupied properties, indicating minimum incentive or less "skin in the game". All things being constant, homes that are non-owner occupied are more likely to strategically default by almost 64%, while the probability of strategic default is 55% higher in borrowers whose initial investments are below 20%. MOB, which indicates a negative coefficient, suggests that the option to strategically default usually deteriorates by 48%, as the borrower remains longer in their homes.

Model 4, which comprises of ARM products (all adjustable products including subprime) having a positive coefficient, suggests that borrowers with adjustable rate type product associated with the mortgage loan, is more likely to observe strategic default behavior than fixed rate products by 56%, given all other variables are constant.

Lastly, Model 5 introduced policy programs such as Non-Recourse, Never Modified and Within the HAMP period. As expected, borrowers from non-recourse states contribute positively to strategic default behavior as there is no policy holding them liable from performing their obligations; hence the incentive to default strategically is more tolerated. Borrowers coming from non-recourse states are more likely to strategic default with probability of 54%. Both Never Modified indicator and Within the HAMP period dummy variable have significantly positive coefficients. This suggests a 64% probability that borrowers coming from this time period can be positively identified as strategic defaulters (all others things held constant). However, it is also worth noting that it is within the same period that the economy is doing poorly and defaults are increasing. In addition, there is an overall improvement from previous Model 2 as seen in the increase in R-square and percent concordant ending with 0.2394 and 83.6 respectively. This model started to show signs of stabilization with marginal increase in c-statistics ending with 0.84 compared from 0.839 in the previous model (Model 4).

Using Model 5 as the final model and assuming a predicted probability cutoff of 0.50, the maximum accuracy rate of the model to correctly classify specific events (strategic default and non-strategic default) is 94.4%. Table 4 shows the Bias-Adjusted Classification for each specific probability level cutoff. The percentage of false positive within the same probability level ($p > 0.50$) is 53.7% while false negative with 5.4%. Chart 1 shows the graphical representation of the relationship between the sensitivity and the false positive rate, depicting the area coverage under the curve for Model 5 with c-statistics of 0.84. This provides strong statistical evidence that the model can be used efficiently in predicting strategic default borrowers with high accuracy.

Chapter 5: Our Recommendation: Management, Treatment, and Implementation

Section 5.1 How to Manage Strategic Default

Strategic default is a unique kind of default behavior that emerges due to the borrower's lack of incentive to remain in their property in spite of having the capacity to perform his or her financial obligation. We argue that because of its uniqueness, it should be managed differently than traditional defaults. An alternative risk management solution and treatment should be formulated to uniquely address this phenomenon. In a typical mortgage, from the servicer or lender's situation, setting up a dedicated staff to manage strategic default alone will be too costly and impractical. Keeping this in mind, we want to establish guiding principles on how we can address strategic default that are economically efficient and operationally feasible both in the short and long term. In addition, we would like to propose an alternative to the current traditional risk mitigation techniques such as applying some kind of mortgage insurance premium or by simply setting aside loan loss reserve, which are currently being used today by major mortgage servicers and financial institutions. We believe that this traditional risk management technique can be further improved in terms of effectively utilizing valuable capital allocation through efficiently targeting high-risk population of strategic default.

Based on our empirical results, negative equity is one of the most significant factors that determine whether to exercise the strategic default option. The loss of property value triggers the loss of interest in keeping the property, thereby, exercising the option to default and walk away. Consistent with our findings, strategic defaulters are highly sophisticated and credit savvy borrowers. Deciding the right economical equilibrium to determine and limit potential losses on the borrower's investment is critical in keeping their interests to stay in their properties. Providing the right incentive in the form of replenishing the equity level back to their investment is one of the main

considerations in designing a right treatment for strategic default[33]. However, it is also equally important to consider the position of the lender, bearing in mind the benefits of performing such "treatment", whether in terms of minimizing future loss or potential cost of foreclosure that will have significant impact in their bottom line profitability[34]. Another consideration is the identification of the sample for treatment. Who will receive the treatment? How will the sample be selected? What are the criteria in selecting the sample? To answer these questions, the most economical and practical way to have the targeted approach and determine those with the highest probability of defaulting strategically is to use an empirical model similar to what was presented in Chapter 4. All the necessary data should be readily available in the existing servicing and origination system of any mortgage servicer. This model can be further enhanced and used to establish a credit-scoring model to target the highest potential strategic default risk. Moreover, the treatment should also be applicable to everyone regardless of delinquency status to avoid the issue of "moral hazard" or intentionally defaulting to qualify for the treatment. This is one of the criticisms of the previous modification programs focusing only on seriously delinquent borrowers, making it somewhat unfair to the current customers who are able to continue making monthly payments and not providing equal incentive that can encourage risky behavior and strategic default.

Section 5.2 SARHA: Our Treatment for Strategic Default

Shared Appreciation for Responsible Homeowner Alternative (SARHA) is based on the concept of Shared Appreciation Mortgage (SAM) but specially designed as a workout program to manage strategic default[35]. The SARHA program will specifically

[33] Edmans, Alex (2010) proposed an incentive based program called "Responsible Homeowner Reward", which provide cash reward to customer once the loan is repaid, as incentive to remain in their property, through increasing homeowner's equity. One weakness we see on this proposal is the unbalance incentive given to the part of the lender or investor and more bias on side of the borrower.

[34] Hatcher, Desiree (2006) of the Federal Reserve Bank of Chicago estimated the cost for the lender can reach as much as $50,000 per foreclosure. In 2003, this number can translate approximately into $25 billion in foreclosure-related cost for the lender. This will be significantly higher when apply after the latest foreclosure inventory after the recent mortgage crisis in 2007.

[35] Caplin, Cunningham, Engler and Pollock (2008) discussed positive application of Shared Appreciation Mortgage (SAM) as obvious workout instrument in the current default crisis, preventing housing crashes and affordability crisis. Also see *The Wall Street Journal*

target high potential strategic defaulters who have proven the capacity to perform their financial obligations but unwilling to continue their mortgage payments due to the absence of the right incentive, mainly because of the falling equity value of the property. Other types of loan modifications and restructuring programs, such as using a principal write down (Das, 2011) or a cash reward based incentive (Edmans, 2010) to alleviate the issue of negative equity, are more biased toward the borrowers, making it less attractive for the lenders (besides the savings from foreclosure cost), since they need to take the initial loss which affects their overall profitability.

SARHA on the other hand, provides similar incentive not only to the borrower, by providing the equity back to the property and effectively reducing its monthly payments, but at the same time, rewarding the lender as well by sharing part of the future appreciation gain on the property. In addition, this has also no restrictions with regard to existing delinquency status of the borrower, as long as the customer can provide a proof of his/her capacity to make payment, which fits the basic profile of a typical strategic defaulter. This satisfies all the principal guidelines on effectively managing strategic default.

Section 5.3 How to Implement SARHA

The implementation of SARHA begins with determining the target population to be offered the product. The identification can be done as suggested earlier, through the use of an empirical model and selecting the highest probability of strategic default within the portfolio. Upon identification, we can prequalify them and proactively present a loan restructuring option. The treatment between the two segments could be tailored based on the riskiness of the profile. The main feature of this product is to incentivize the borrower with negative equity through offering "partial write-down", effectively reducing its monthly mortgage payment. Restructuring of the loan will be done simultaneously,

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article: "We Can Keep People in Their Homes" by Caplin, Cooley, Cunningham and Engler (2008).
http://online.wsj.com/article/SB122523972217878309.html

incorporating the shared appreciation agreement. This will include determining the percent share equity for the lender who will be entitled to the future appreciation of the property. The lender will have a future receivable that can be applied towards the initial write down and costs initiated during the process. Additional details such as the percentage of allowable write down, appreciation sharing, prepayment penalties, pricing adjustment and convertibility option can be added features of the product and can be customized accordingly based on the risk profile of the potential customer. This process will be treated no different from a regular new product offering, requiring minimal or no cost in terms of additional staffing required for the roll out of the program. In this model, both parties benefit, preventing default of the borrower and a chance for the lender to recoup some of the loss (or even profit depending on the future appreciation) when the mortgage market recovers.

For example, consider a homeowner with an existing balance of $260,000, with 6% original note rate, 25 more years on the mortgage and currently underwater with current property value of $200,000, a 30% negative equity and positively identified as high risk of strategic default[36]. The simplest approach using this program is to restructure the loan, putting the equity back (for example $160,000 or 80% LTV level) to the borrower, effectively forgiving $100,000 ($260,000 - $160,000) from the current loan balance, reducing monthly payment by approximately 40% (assuming the same interest rate of 6% and remaining term is 25 years), in exchange for a 50% share[37] in the future appreciation and promise to remain current in the new mortgage contract on the new

[36] The example presented is for illustration purpose only to express the general idea of the proposed program and not as the optimal solution in any potential application of the program. Detail optimization analysis is required to determine the optimal parameters to be used to come out of the best results in terms of risk and reward tradeoff.

[37] Similarly Sen. Robert Menendez of New Jersey (Senate Banking, Housing, and Urban Affairs) recently proposed bill S.2093 entitled "Preserving American Homeownership Act of 2012", to establish a pilot program to encourage the use of shared appreciation mortgage modification. Within the bill he introduced key guidelines for the shared appreciation mortgage: (1) reduce the loan-to-value of the covered mortgage up to 95% within 3 years, by reducing the amount of principal under the covered mortgage by 1/3 each year for 3 years. (2) reduce the interest rate for covered mortgage if the result of the reduced monthly payment is not affordable for homeowner; (3) reduce the amount of any periodic payments to be made by the home owner, so that the amount payable by the homeowner is equal to the amount that would be payable by the homeowner, (4) required the homeowner to pay the investor after refinancing or selling the real property securing the covered mortgage percentage of the amount of any increase (not to exceed 50% of such increase) and (5) result in the positive net present value for the investor after taking the principal reduction or interest reduction. For details information about the bill, please see http://www.opencongress.org/bill/112-s2093/text.

restructured loan amount of $160,000. Payout for the lender will depend on what will happen to the housing market[38]. Here are the possible scenarios:

Scenario 1: If the price of the house appreciates in the value of $400,000, the borrower will pay back $160,000 plus interest (for example for 25 year fixed, at 6%, approximately $310,000) plus $100,000 in shared appreciation ($400,000 - $200,000 x 50%), for a total revenue of approximately $410,000.

Scenario 2: If the price remains the same (zero appreciation), the borrower will just pay back $310,000 ($160,000 25 years fixed at interest of 6%).

Scenario 3: If the price further depreciates below $200,000, say $150,000. The borrower will just pay the original loan of $160,000 plus interest ($310,000).

(See Appendix A, Exhibit A1 and A2 for a detailed NPV analysis and calculation)

Other considerations can be incorporated in the policy implementation of SARHA such as designing the right equilibrium between the restructured balance (debt portion) and the SAM balance (equity share portion). As suggested by Caplin, Cunningham, Engler and Pollock (2008), we recommend a shorter holding period than the conventional term loan[39]. From the previous example, the forgiveness or write down of the $100,000 can be incorporated as part of SAM loan which can be written down within a 3-year period, with equal increment reduction (assuming up-to-date payment) every year-end (Menendez, (2012)). This should be incorporated in the written payment covenant agreement by the borrower, to provide an incentive to stay current and get the full reduction or total write-off benefit.

[38] All scenarios assume no re-default risk or pre-payment risk that will impact the overall payout of the program. Estimation of these parameters is complex and is not the focus of this paper. However, most established financial institutions have already existing models to estimate it and can be leveraged accordingly.

[39] Caplin et al. (2008) also detail another variation of SAM with the new treatment of Housing Appreciation (SAMANTHA), using the shared-equity rate mechanism. This can be another option in determining the appreciation rate, but is not necessary required in this discussion.

Lastly, we emphasize that there is a great flexibility in designing this program by incorporating more add-on features (like combining it with interest reduction), depending on the risk profiles and characteristics of the borrowers. Overall, the clear benefit of using this in managing strategic default is the risk-sharing feature that equally benefits both the borrower and lender. The borrowers are incentivized by resetting their mortgage balance to a more comfortable level, effectively gaining back the equity and reducing their monthly mortgages just by keeping their homes and remaining current. On the other hand, financial institutions have more incentive to perform deeper principal forgiveness since there is a possibility to recover it back in the future and at the same time avoid the cost of foreclosing the property.

Section 5.4 Securitization of Strategic Default SARHA

As the housing market continues to remain fragile and weak, properties with negative equity will remain in the high level. According to CoreLogic negative equity data report, 11.1 million or 22.8 percent of all residential properties were still in negative equity at the end of Q4 2011[40]. This poses a great risk in terms of the increasing strategic default rates and this is expected to continue not unless an effective alternative program such SARHA is implemented to counter this problem. For lenders, securitization might solve the problem in terms of funding the loans generated through SARHA program and minimize the exposure through transferring the credit risk to the capital market and can even provide another attractive proposition and incentive. Creation of a new pool with tranches based on Strategic Default (SD) SARHA backed securities and selling it to investors, outside the coverage of Government Sponsor Enterprises (GSE), can establish a new private-investor based secondary market. These tranches will have different levels of risk exposure and varying degrees of subordination due to the waterfall structure of its cash flows. It will attract more investors as it allows them to further diversify their portfolios and minimize their credit risks.

[40] CoreLogic."Negative Equity Report", March 2012.

With the continued interest of shared appreciation mortgage market, a different kind of investor would be interested in SD SARHA backed securities that can be used as a diversification tool and hedging instrument related to the real estate market. The uniqueness of this securitized product is the combination of both debt and equity component. Valuation and pricing will be crucial, given that the greater risk lies on the levered equity part of the instrument than the debt portion, so the transactional cost will be much higher on the equity product. However the risk will be properly compensated through higher return.

As of the end of the first quarter of 2012, the residential mortgage debt outstanding is at $11 trillion[41]. Applying the same period's delinquency rate of 7.4%[42] will yield an estimate of $814 billion worth of delinquent mortgages. With the empirical model discussed in the previous chapter, strategic default rate is calculated at 7.71%. Using this, we estimated that the potential market for this product is approximately $63 billion[43]. In the long run, as the market develops related products of shared appreciation mortgage, we expect a high potential for this new instrument in providing attractive return and development of new liquidity in the mortgage securitization market.

[41] http://www.federalreserve.gov/econresdata/releases/mortoutstand/current.htm

[42] http://www.mbaa.org/NewsandMedia/PressCenter/80807.htm

[43] Estimated as $11 trillion * 7.4% *7.71%

Appendix

Appendix A: Cost Benefit Analysis of SARHA: NPV Calculation

The profitability of modification using the SARHA program depends on two main factors: the probability of future home appreciation and the net improvement of the lifetime probability of default on the new modified loan. To determine the net benefit of SARHA modification program, we compare the NPV of doing SARHA modification and the NPV of not doing SARHA modification. If the NPV is positive or the total discounted value of expected cash flows for the modified loan is higher than the total discounted value of expected cash flows for no loan modification ($NPV_{Mod} > NPV_{NoMod}$) then the modification through SARHA creates value to the investors or lenders. Figure 1 shows the NPV calculation of modifying a loan using SARHA and the different sources of future cash flows.

One of our main assumptions is that by reducing the monthly payments through the SARHA modification program, it provides an incentive to the borrower by reducing the borrower's monthly debt burden as a result of the principal forgiveness. We assumed further that the overall loan performance of the new modified loan would significantly improve by reducing the lifetime probability of default. On the lender's side, the overall impact of the modification is the reduction of the expected cash flows (principal and interest). However, this is replaced by a new stream of future cash flows expected to come from the share of future appreciation on the property, which we discounted in a 10-year time period. This provides an incentive for the lender to perform this type of modification since there is a possibility to recover the initial loss, which resulted from the principal reduction or forgiveness.

At the loan level, each will have an individual lifetime probability of default (*p)* and probability of no default (*1-p)* for both NPV scenarios (Mod and NoMod). For the default scenario, we followed Standard & Poor's assumption that total cost of foreclosure is 26% of the loan balance, and deducted the foreclosure cost from the present value

calculation of cash flow in the default scenario. For the purpose of NPV calculation, we define default as the terminal stage that ends in foreclosure and property disposition, with no chance of curing. The present value of home appreciation is calculated and weighted by scenario's probability assumptions as stated in Figure 2.

Estimating lifetime probabilities and expected probabilities of home price appreciation is a complicated task and not the main objective of this paper. In practice, more sophisticated modeling tools can be utilized to estimate these parameters. For illustration purposes, we used the following assumptions in Figure 2 and Figure 3. To derive the probabilities of default for NPV_{Mod} scenario, we assumed the net improvement of the probability of default in the new modified loan to be at least 5% reduction from the probability of default in the NPV_{NoMod} scenario.

Exhibit A1 – Strategic Default Loan Profile with SARHA Modification Assumptions

Example Strategic Default Loan Profile	
Original Loan	280,000
Original Note Rate	6.0%
Original Monthly Payment	1,679
Remaining Term (years)	25
Current Balance	260,000
Current Property Value	200,000
Current Loan-to-Value	130%
New Balance	160,000
Potential Loss (Forgiven)	100,000
New Note Rate	6.0%
New Monthly Payment	1,031
New Term (years)	25
Discount Rate	6.0%

Exhibit A2 – Sample NPV Calculation for SARHA Modification Program

Net Present Value of Doing SARHA Modification	
Probability of Default	57%
PV of Expecetd Cash Flow with Default	72,058
Foreclosure Cost	67,600
PV of Expected Cash Flow with Default - Forclosure Cost	4,458
Probability of No Default	43%
PV of Expected Cash Flow of No Default	72,058
PV of Future Appreciation (50% Sharing - Discounted in 10 yrs)	45,090
Net Present Value with SARHA (NPV_{Mod})	**78,617**
Net Present Value of Not Doing SARHA Modification	
Probability of Default	60%
PV of Expected Cash Flow with Default	117,343
Foreclosure Cost	67,600
PV of Exepected Cash Flow with Default - Forclosure Cost	49,743
Probability of No Default	40%
PV of Cash Flow of No Default	117,343
Net Present Value with No SARHA (NPV_{NoMod})	**76,783**
Net Benefit of SARHA Modification	**1,833**

Note: For the probability of default we used is60% for NPV_{NoMod} and assumed 5% reduction on NPV_{Mod} scenario. For foreclosure cost we used 26% of the original current balance of 260,000 for both NPV_{Mod} and NPV_{NoMod} scenarios. Based on the NPV calculation, SARHA program has exhibited positive NPV and generates $1,833 per loan NPV value.

Figure 1. Cash Flows Analysis and NPV Calculation

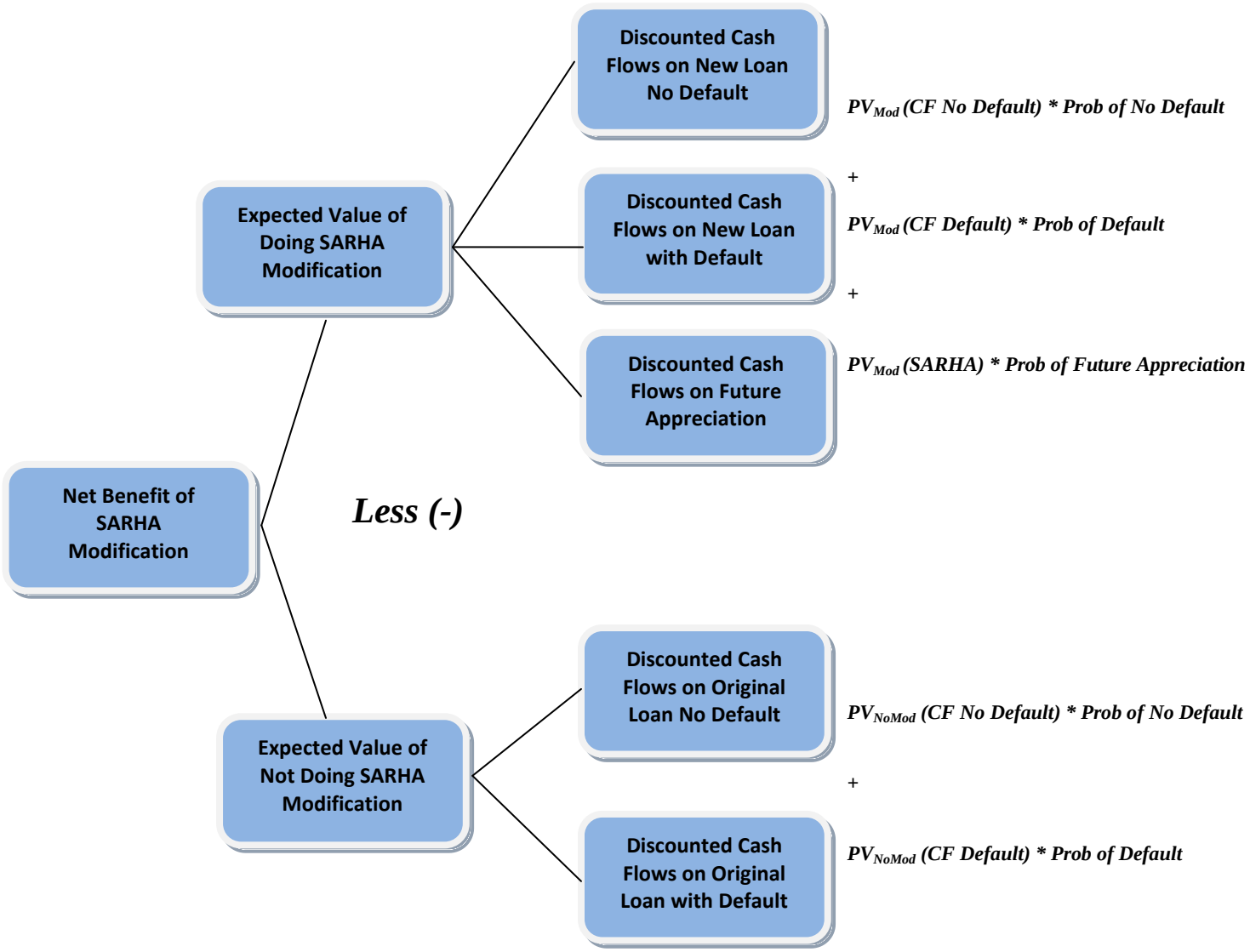


Figure 2. Future Home Appreciation Assumption

Appreciation Scenario in 10 Yrs Assumption	Probability
No Appreciation (< 5 %)	5%
[5 - 50 %)	15%
[50 - 100 %)	25%
[100 - 150 %)	35%
[150 - 200 %)	15%
200 % Above	5%

Note: Probability of each appreciation assumptions were derived based on historical performance of Home Price Index changes (HPI) at MSA level from CoreLogic.

Figure 3. Lifetime Default Assumption

Product	Vintage	Lifetime Default Ratio
Jumbo Prime FIX	2003	6.8
	2004	13.3
	2005	24.2
	2006	33.3
	2007	33.4
Jumbo Prime ARM	2003	10.5
	2004	18.6
	2005	29.2
	2006	39.9
	2007	44.3
Alt-A FIX	2003	20.3
	2004	36.4
	2005	47.0
	2006	60.7
	2007	59.1
Alt-A ARM	2003	32.0
	2004	45.6
	2005	56.1
	2006	68.0
	2007	68.3
Option ARM	2003	57.4
	2004	69.3
	2005	81.0
	2006	84.8
	2007	83.8

Source: CoreLogic, Citi Inventment Research and Analysis, May 2012

Exhibit 1: List of Recourse, Action and Non-Recourse States

Recourse States

Alabama	Illinois	Massachusetts	New Jersey	Tennessee
Arkansas	Idaho	Michigan	New Mexico	Texas
Colorado	Indiana	Mississippi	New York	Utah
Delaware	Kansas	Missouri	Oklahoma	Vermont
Washington, D.C	Kentucky	Ohio	Pennsylvania	Virginia
Florida	Louisiana	Nebraska	Puerto Rico	West Virginia
Georgia	Maine	Nevada	Rhode Island	Wisconsin
Hawaii	Maryland	New Hampshire	South Carolina	Wyoming

One-Action States

California, Idaho, Montana, Nevada, New York, and Utah

Non-Recourse States

Alaska	Iowa	Montana
Arizona	North Carolina	Oregon
California	North Dakota	Washington
Connecticut	Minnesota	

Exhibit 2: Workout Programs Offered by the Top 4 Largest Mortgage Lenders

	BofA	Citi	Chase	Wells Fargo
Name of the Programs	Bank of America Home Loan Assistance Solutions; National Homeownership retention program for Countrywide	CitiMortgage Homeowner Assistance	Chase Homeownership Center	Wells Fargo Help for Homeowner; Wells Fargo Equity Assist Program
Available Work Out Options	Refinance, Foreberance, Modification, Short Sale, Deed-in-Lieu	Repayment Plan, Deferment, Modification,Partial Claims, Short Sale, Deed-in-Lieu, Citi Home Affordable Foreclosure Alternative (HAFA)	Modification, Repayment Plan, Partial Claims - For FHA Loans, Pre-Foreclosure Short Sale, Home Affordable Foreclosure Laternative (HAFA), Deed-in-Lieu	Refinance, Repayment Plan, Modification, Short Sale, Deed-in-Lieu
Government Sponsored Programs Available	Home Affordable Modification Program (HAMP), Home Affordable Refinance (HAR), Home Affordable Unemployment Program, FHA Home Affodable, Home Affordable Modification Military Modification, Home Affordable Second Lien Modification, Home Affordable Foreclosure Alternative, Hardest Hit Fund Principal Reduction Program, Hardest Hit Fund Second Lien Relief Program, Hardest Hit Transition Assistance Program, Hardest Hit Fund Reinstatement Program	Home Affordable Modification Program SM (HAMPSM),Principal Reduction Alternative SM (PRA), Second Lien Modification Program (2MP), FHA Home Affordable Modification Program (FHA-HAMP), USDA's Special Loan Servicing, USDA's Special Loan Servicing, Veteran's Affairs Home Affordable Modification (VA-HAMP), Home Affordable Foreclosure Alternatives Program (HAFA), Second Lien Modification Program for Federal Housing Administration Loans (FHA-2LP),Home Affordable Refinance Program (HARP), FHA Refinance for Borrowers with Negative Equity (FHA Short Refinance), Home Affordable Unemployment Program (UP), Housing Finance Agency Innovation Fund for the Hardest Hit Housing Markets (HHF)	Home Affordable Modification Program SM (HAMPSM),Principal Reduction Alternative SM (PRA), Second Lien Modification Program (2MP), FHA Home Affordable Modification Program (FHA-HAMP), USDA's Special Loan Servicing, USDA's Special Loan Servicing, Veteran's Affairs Home Affordable Modification (VA-HAMP), Home Affordable Foreclosure Alternatives Program (HAFA), Second Lien Modification Program for Federal Housing Administration Loans (FHA-2LP),Home Affordable Refinance Program (HARP), FHA Refinance for Borrowers with Negative Equity (FHA Short Refinance), Home Affordable Unemployment Program (UP), Housing Finance Agency Innovation Fund for the Hardest Hit Housing Markets (HHF)	Home Affordable Modification Program SM (HAMPSM),Principal Reduction Alternative SM (PRA), Second Lien Modification Program (2MP), FHA Home Affordable Modification Program (FHA-HAMP), USDA's Special Loan Servicing, USDA's Special Loan Servicing, Veteran's Affairs Home Affordable Modification (VA-HAMP), Home Affordable Foreclosure Alternatives Program (HAFA), Second Lien Modification Program for Federal Housing Administration Loans (FHA-2LP),Home Affordable Refinance Program (HARP), FHA Refinance for Borrowers with Negative Equity (FHA Short Refinance), Home Affordable Unemployment Program (UP), Housing Finance Agency Innovation Fund for the Hardest Hit Housing Markets (HHF)
Others Related Programs	Bank of America-Hosted Outreach Events; Homeowner Couseling Services	CitiMortgage's Road to Recovery	Chase Homeownership Assistance Events	Leading the Way Home ; Helping America's Servicemen

Exhibit 3a: List of Current Making Home Affordable Program

Program Name	Description	Purpose	Eligibility	Program Availability
Home Affordable Modification Program (HAMP)	If you're *not* unemployed, but you're still struggling to make your mortgage payments, you may be eligible for the **Home Affordable Modification Program (HAMP)**. HAMP can lower your monthly mortgage payment to 31 percent of your verified monthly gross (pre-tax) income, which usually provides savings of hundreds of dollars per month.	Lower Monthly Payment	• You occupy the house as your primary residence. •You obtained your mortgage on or before January 1, 2009. • You have a mortgage payment that is more than 31 percent of your monthly gross (pre-tax) income • You owe up to $729,750 on your home. • You have a financial hardship and are either delinquent or in danger of falling behind. • You have sufficient, documented income to support the modified payment. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud or forgery, money laundering or tax evasion, in connection with a mortgage or real estate transaction.	Program ends December 31, 2013. Not available to all servicers.
Principal Reduction Alternative (PRA)	if your home is currently worth significantly less than you owe on it, MHA's **Principal Reduction Alternative** (PRA) was designed to help you by encouraging mortgage servicers and investors to reduce the amount you owe on your home.	Lower Monthly Payment/ Underwater	• Your mortgage is not owned or guaranteed by Fannie Mae or Freddie Mac. •You owe more than your home is worth.•You occupy the house as your primary residence. • You obtained your mortgage on or before January 1, 2009. • Your mortgage payment is more than 31 percent of your gross (pre-tax) monthly income. •You owe up to $729,750 on your 1st mortgage.• You have a financial hardship and are either delinquent or in danger of falling behind. • You have sufficient, documented income to support the modified payment. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud or forgery, money laundering or tax evasion, in connection with a mortgage or real estate transaction.	More than 100 servicers participate in HAMP and can evaluate homeowners for principal reduction. Participating servicers are required to develop written standards for PRA application. The largest servicers include Bank of America, CitiMortgage, JP Morgan Chase, and Wells Fargo.

Exhibit 3b: List of Current Making Home Affordable Program

Program Name	Description	Purpose	Eligibility	Program Availability
Second Lien Modification Program (2MP)	If your first mortgage was permanently modified under HAMPSM and you have a second mortgage on the same property, you may be eligible for a modification or principal reduction on your second mortgage as well, through MHA's Second Lien Modification Program (2MP). 2MP works in tandem with HAMP to provide comprehensive solutions for homeowners with second mortgages to increase long-term affordability and sustainability. If the servicer of your second mortgage is participating, they can evaluate you for a second lien modification.	Lower Monthly Payment/Second Lien	• Your first mortgage was modified under HAMP. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud or forgery, money laundering or tax evasion, in connection with a mortgage or real estate transaction. •You have not missed three consecutive monthly payments on your HAMP modification.	**Servicers participating in 2MP are:** 1. Bank of America, NA 2. BayviewLoan Servicing, LLC 3. CitiMortgage, Inc. 4. Community Credit Union of Florida 5. GMAC Mortgage, LLC 6. Green Tree Servicing LLC 7. iServeResidential Lending, LLC 8. iServeServicing, Inc. 9. J.P.MorganChase Bank, NA 10. NationstarMortgage LLC 11. OneWestBank 12. PennyMacLoan Services, LLC 13. PNC Bank, National Association 14. PNC Mortgage 15. Residential Credit Solutions 16. ServisOne Inc., dbaBSI Financial Services, Inc. 17. Wells Fargo Bank, NA **Program ends December 31, 2013**
Home Affordable Refinance Program (HARP)	If you're not behind on your mortgage payments but have been unable to get traditional refinancing because the value of your home has declined, you may be eligible to refinance through MHA's Home Affordable Refinance Program (HARP). HARP is designed to help you get a new, more affordable, more stable mortgage. HARP refinance loans require a loan application and underwriting process, and refinance fees will apply.	Lower Interest Rate/Underwater	You may be eligible for HARP if you meet all of the following criteria: • The mortgage must be owned or guaranteed by Freddie Mac or Fannie Mae. • The mortgage must have been sold to Fannie Mae or Freddie Mac on or before May 31, 2009. • The mortgage cannot have been refinanced under HARP previously unless it is a Fannie Mae loan that was refinanced under HARP from March-May, 2009. • The current loan-to-value (LTV) ratio must be greater than 80%. • The borrower must be current on the mortgage at the time of the refinance, with a good payment history in the past 12 months.	Program ends December 31, 2013. Not available to all servicers.
FHA Refinance for Borrowers with Negative Equity (FHA Short Refinance)	If you're not behind on your mortgage payments but owe more than your home is worth, FHA Short Refinance may be an option that your mortgage servicer will consider. FHA Short Refinance is designed to help homeowners refinance into more affordable, more stable FHA-insured mortgage. If your current lender agrees to participate in this refinance, they will be required to reduce the amount you owe on your first mortgage to no more than 97.75 percent of your home's current value.	Lower Interest Rate/Underwater	You may be eligible for FHA Short Refinance if you meet the following criteria: • Your mortgage is not owned or guaranteed by Fannie Mae, Freddie Mac, FHA, VA or USDA. • You owe more than your home is worth. • You are current on your mortgage payments. • You occupy the house as your primary residence. • You are eligible for the new loan under standard FHA underwriting requirements. • Your total debt does not exceed 55 percent of your monthly gross income. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud, forgery, money laundering or tax evasion in connection with a mortgage or real estate transaction.	Participation of mortgage servicers is voluntary.
Treasury/FHA Second Lien Program (FHA2LP)	If you have a second mortgage and your first mortgage servicer agrees to participate in FHA Short Refinance, you may be eligible to have your second mortgage on the same home reduced or eliminated through the FHA Second Lien Program (FHA2LP). If your second mortgage servicer agrees to participate, the total amount of your mortgage debt after the refinance cannot exceed 115 percent of your home's current value.	Lower Interest Rate/Underwater/ Second Lien	You may be eligible for FHA2LP if you meet the following criteria: • You are eligible for FHA Short Refinance. • You obtained your mortgage on or before January 1, 2009. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud, forgery, money laundering or tax evasion in connection with a mortgage or real estate transaction.	•If the servicer of your first mortgage agrees to an FHA Short Refinance and you have a second mortgage on the same home, the first mortgage servicer will work with the second mortgage servicer to reduce or eliminate the second mortgage. • More than a dozen mortgage servicers have agreed to review homeowners for FHA2LP when the first mortgage servicer has agreed to a refinance under FHA Short Refinance.
Housing Finance Agency Innovation Fund for the Hardest Hit Housing Markets (HHF)	Early in 2010, Treasury announced that the **Hardest Hit Fund**® would provide more than $7.6 billion in aid for homeowners in states hit hardest by the economic crisis. Since then, state housing finance agencies have used the fund to develop programs that stabilize local housing markets and help families avoid foreclosure. Hardest Hit Fund programs complement the Making Home Affordable Program but are not limited to homeowners eligible for Making Home Affordable.	Unemployed/Underwater	If you live in one of these states or DC: Alabama, Arizona, California, Florida, Georgia, Illinois, Indiana, Kentucky, Michigan, Mississippi, Nevada, New Jersey, North Carolina, Ohio,Oregon, Rhode Island,South Carolina Tennessee,Washington D.C.	Local Finance agency within the given states.
Home Affordable Foreclosure Alternatives (HAFA) Program	If you can't afford your mortgage payment and it's time for you to transition to more affordable housing, the Home Affordable Foreclosure Alternatives (HAFA) program is designed for you. HAFA provides two options for transitioning out of your mortgage: a short sale or a Deed-in-Lieu (DIL) of foreclosure.	Foreclosure Alternative	You may be eligible for HAFA if you meet all of the following criteria: • You live in the home or have lived there within the last 12 months.• You have a documented financial hardship. • You have not purchased a new house within the last 12 months. • Your first mortgage is less than $729,750. • You obtained your mortgage on or before January 1, 2009. • You must not have been convicted within the last 10 years of felony larceny, theft, fraud, forgery, money laundering or tax evasion in connection with a mortgage or real estate transaction.	HAFASM is available for mortgages that are owned or guaranteed by Fannie Mae and Freddie Mac or serviced by over 100 HAMPSMparticipating mortgage servicers.

Exhibit 4: Default Rates in Europe during 2007-2009

Member States (in protocol order)	Default rate[1] 31.12.2007 (%)	Default rate[1] 31.12.2008 (%)	Default rate[1] 31.12.2009 (%)	Increase?
Belgium	1.72	1.65	1.69	Yes[11] in 2008/2009 No[11] in 2007/2008
Bulgaria	1.32	0.53	7.83[6]	Yes
Czech Republic	1.5	1.6	2.5	Yes
Denmark	0.12	0.26	0.55	Yes
Estonia	0.4	1.5	4.0	Yes
Ireland	1.21[2]	1.44[3]	3.6	Yes
Greece	3.6	5.3	6.4[8]	Yes
Spain	0.72	2.38	2.88	Yes
France	0.44	0.40	0.44	Yes[13] in 2008/2009 No in 2007/2008
Italy	1.0*	1.4*	–	Yes
Cyprus	3.24	3.90	6.90	Yes
Latvia	0.71	4.73	15.95[9]	Yes
Lithuania	–	0.87[3]	2.77[7]	Yes
Hungary	2.9	3.47	7.65	Yes[14]
Malta	–	0.53–0.84	2.6[10]	Yes
Norway	0.50	0.7	–	Yes in 2007/2008 N/A in 2008/2009
Poland	1.2	1.0	3.2	Yes
Portugal	1.3*	1.3[4] (1.5*)	1.60[11] (1.7* July 2009)	Yes
Romania	–	0.03[5]	1.67[11]	Yes
Slovakia	2.17	2.27	–	Yes in 2007/2008 N/A in 2008/2009
Finland	0.12	0.17	1.2[7]	Yes[12]
United Kingdom	1.88	2.42	2.45	Yes

Source: European Commission. *"National Measures and Practices to Avoid Foreclosures Procedures for Residential Mortgage Loans"*. March 3, 2011.

* Data provided by industry as of January 2010.
1) Default rates relate to the volume of outstanding residential mortgage loans in default to the total volume of outstanding mortgage loans in Cyprus, Denmark (mortgages issued by specialized mortgage credit institutions) and Estonia.
2) 31.12.2006
3) 30.6.2008/1.7.2008
4) February 2008
5) April 2008
6) 30.6.2010
7) 30.3.2009/1.7.2009
8) 31.3.2009
9) 30.9.2009
10) March 2009
11) Data calculated using statistics provided in the annual report in the National Bank of Belgium fro 2009 – *cf. Statistiques, Centrale des credits aux particuliers*, February 2010.
12) Data calculated using statistics on number of judgments on payment demands.
13) Data refers to the volume of default installment over 12 months to the volume of outstanding household loans at the end of those 12 months.
14) Data includes both consumer and mortgage loans.

Exhibit 5: Number of Foreclosure Procedures[1)] in Europe during 2007-2009

Member States (in protocol order)	Number of foreclosures in 2007	Number of foreclosures in 2008	Number of foreclosures in 2009	% change 2007–2008	% change 2008–2009	Increase?
Bulgaria	449 (45[2)])	886 (98[2)])	1 570[3)] (67[2)3)])	97.33	77.20	Yes
Denmark	1 015	1 942	2 860	91.33	47.27	Yes
Germany	91 788	88 379	86 617	-3.71	-1.99	No
Estonia	–	843 (766[2)])	1 329 (869[2)])	N/A	N/A	N/A
Ireland	–	–	714[4)]	N/A	N/A	N/A
Spain	25 943 (17 402[2)])	58 686 (20 549[2)])	93 319 (37 677[2)])	126.21	59.01	Yes[8)]
France	–	–	9 422	N/A	N/A	Not aware of any noticeable increase in foreclosure procedures[6)]
Cyprus	596 (27[2)])	636 (14[2)])	358 (24[2)])	6.71	-43.71	Yes in 2007/2008 No in 2008/2009
Latvia	–	558[2)]	1 702[2)]	N/A	205.02	Yes in 2008/2009
Hungary	225 663 (2 557[2)])	245 597 (2 588[2)])	71 683 (663[2)])	8.83	-70.81	Yes in 2007/2008 No in 2008/2009
Malta	–	–	–	N/A	N/A	Not aware of any noticeable increase in foreclosure procedures[6)]
Netherlands	1 811	1 961	2 256	8.28	15.04	Yes
Austria	7 908	8 186	7 920	3.52	N/A	Yes in 2007/2008 No in 2008/2009
Poland	1 841	1 618	–	-12.11		No in 2007/2008
Slovakia	1 070	1 865	–	74.30		Yes[7)] in 2007/2008
Finland	506	825	1 036	63.04	25.58	Yes [5)]
Sweden	1 904	3 157	3 499	65.81	10.83	Yes
United Kingdom	27 869[2)]	46 984[2)] (0.30 % of all mortgages)	54 014[2)] (0.35 % of all mortgages)	68.59	14.96	Yes

Source: European Commission. *"National Measures and Practices to Avoid Foreclosures Procedures for Residential Mortgage Loans"*. March 3, 2011.

*Data provided by Member States as of September 2010.
1) Data refers to opening of foreclosures, which does not necessarily correspond to the number of concluded foreclosures in a given year, unless otherwise indicated.
2) Data refers to forced sales. In Spain this figures refers to the concluded foreclosure procedures, i.e. procedures resolved by the judge, whether in favor of the lender or not. In Estonia, the figures refer to terminated procedures. In Latvia, the figures refer to the process completed in court with a decision on the transfer of the property after a forced action. In Hungary, the figure refers to the number of properties sold.
3) 30.6.2009.
4) Number of court applications to commence proceedings to enforce debt/security in Q3 and Q4 2009.
5) Data also includes loans other than residential mortgages and loans to legal persons.
6) Qualitative information provided in 2009.
7) Data reflects all foreclosures, of which residential mortgage loans account for approximately 90%.
8) Data applies to all mortgages, not only for housing.

Table 1: Summary Statistics – Strategic Default Sample Characteristics

	Total Default (60+ DPD)	Strategic Default (Straight Roller)	Default + Negative Equity	Strategic Default (Straight Roller + Negative Equity)
	Total # Units	**Total # Units**	**Total # Units**	**Total # Units**
	182,524	**9,789**	**84,383**	**6,507**
Average Origination FICO	660	707	671	710
Average Current FICO	575	674	589	682
Average Origination CLTV	83.61	82.29	87.67	84.84
Average Current CLTV	106.08	117.50	124.35	129.93
Average Origination Note	7.30	6.78	7.12	6.70
Average Months On Books	43.44	38.50	36.48	36.43
Wtd Average Foreclosure Rate (FIP Level)	2.80	3.26	3.40	3.59
Wtd Average Unemployment Rate (FIP Level)	8.94	9.72	9.71	10.38
Strategic Default %	n/a	5.36	n/a	7.71

Table 2a: Percentage of Strategic Default by Key Portfolio Segments

	Total Default (60+ DPD)	Strategic Default (Straight Roller)	Strategic Default %	Default + Negative Equity	Strategic Default (Straight Roller + Negative Equity)	Strategic Default %
	Total # Units	Total # Units	# Units	Total # Units	Total # Units	# Units
	182,524	9,789	5.4%	84,383	6,507	7.7%
Current FICO Score						
0.MISSING	4,085	204	5.0%	1467	67	4.6%
1.<620	136,795	2768	2.0%	57648	1537	2.7%
2.620-659	17,112	1672	9.8%	8934	1085	12.1%
3.660-679	6,121	878	14.3%	3596	583	16.2%
4.680-699	5,005	899	18.0%	3208	634	19.8%
5.700-719	3,744	796	21.3%	2557	594	23.2%
6.720-739	2,909	700	24.1%	2054	545	26.5%
7.740-759	2,391	596	24.9%	1704	468	27.5%
8.760-779	2,040	570	27.9%	1510	439	29.1%
9.780+	2,322	706	30.4%	1705	555	32.6%
Refreshed CLTV						
0.MISSING	117	0	0.0%	0	0	0.0%
1.<80	47,265	1257	2.7%	0	0	0.0%
2.[80-100)	50,752	2025	4.0%	0	0	0.0%
3.[100-110)	29,003	1417	4.9%	28,996	1417	4.9%
4.[110-120)	19,939	1337	6.7%	19,939	1337	6.7%
5.[120-130)	11,424	1014	8.9%	11,424	1014	8.9%
6.[130-140)	7,064	758	10.7%	7,064	758	10.7%
7.[140-150)	5,468	625	11.4%	5,468	625	11.4%
8.150+	11,492	1356	11.8%	11,492	1356	11.8%
Occupancy Type						
OWNER	177,000	9044	5.1%	82,065	6044	7.4%
SECOND	1,644	284	17.3%	928	214	23.1%
INVESTMENT	3,698	432	11.7%	1,327	230	17.3%
OTHER	182	29	15.9%	63	19	30.2%
Risk Segment						
PRIME	23,869	3534	14.8%	13,661	2553	18.7%
ALT-A	26,861	2164	8.1%	14,882	1567	10.5%
NON-PRIME	61,194	2568	4.2%	31,031	1756	5.7%
SUBPRIME	70,600	1523	2.2%	24,809	631	2.5%
Debt Burden						
<40	65,561	4029	6.1%	31,752	2789	8.8%
[40-45)	25,610	1710	6.7%	15,265	1307	8.6%
[45-50)	23,252	1154	5.0%	13,394	833	6.2%
[50-55)	14,201	559	3.9%	7,769	384	4.9%
[55-60)	5,810	288	5.0%	3,379	214	6.3%
60+	4,670	235	5.0%	2,232	137	6.1%
MISSING	43,420	1814	4.2%	10,592	843	8.0%

Table 2b: Percentage of Strategic Default by Key Portfolio Segments

	Total Default (60+ DPD)	Strategic Default (Straight Roller)	Strategic Default %	Default + Negative Equity	Strategic Default (Straight Roller + Negative Equity)	Strategic Default %
	Total # Units	Total # Units	# Units	Total # Units	Total # Units	# Units
	182,524	9,789	5.4%	84,383	6,507	7.7%
Borrower's Investment						
<20%	170,021	9440	5.6%	83,034	6451	7.8%
20%-40%	7,048	193	2.7%	786	31	3.9%
40%+	4,728	128	2.7%	477	12	2.5%
MISSING	727	28	3.9%	86	13	15.1%
Months on Books						
<60 MOB (<5 yrs)	127,263	7902	6.2%	74,887	5932	7.9%
60-120 MOB (5-10 yrs)	41,718	1466	3.5%	9,112	560	6.1%
120-180 MOB (10-15 yrs)	10,555	313	3.0%	366	15	4.1%
180+ MOB (15+ yrs)	2,988	108	3.6%	18	0	0.0%
Property Type						
SINGLE FAMILY	165,774	8323	5.0%	75,946	5460	7.2%
CONDO/TOWNHOME	11,039	1107	10.0%	6,316	857	13.6%
MULTI - FAMILY	4,273	302	7.1%	1,531	145	9.5%
OTHER	1,438	57	4.0%	590	45	7.6%
Product						
ARM	44,732	4984	11.1%	27,341	3818	14.0%
FIXED	137,792	4805	3.5%	57,042	2689	4.7%
Interest Only Product						
NO	158,384	6072	3.8%	66,993	3512	5.2%
YES	24,140	3717	15.4%	17,390	2995	17.2%
Lien Position						
1ST	161,850	9469	5.9%	75,685	6373	8.4%
2ND	20,674	320	1.5%	8,698	134	1.5%
Loan Type						
CONVENTIONAL LOAN	128,588	8699	6.8%	58,993	5946	10.1%
GOVERNMENT LOAN	33,262	770	2.3%	16,692	427	2.6%
SECOND MORTGAGE	20,674	320	1.5%	8,698	134	1.5%
Recourse State						
NO	170,047	9564	5.6%	80,535	6427	8.0%
YES	12,477	225	1.8%	3,848	80	2.1%
Ever Modified						
NO	114,062	7330	6.4%	48,387	4798	9.9%
YES	68,462	2459	3.6%	35,996	1709	4.7%
Offered HAMP						
NO	153,126	8205	5.4%	68,729	5311	7.7%
YES	29,398	1584	5.4%	15,654	1196	7.6%
With Prepay Penalty Clause						
NO	153,537	7884	5.1%	69,133	5080	7.3%
YES	28,987	1905	6.6%	15,250	1427	9.4%
States						
NV	3,710	572	15.4%	3,142	530	16.9%
CA	22,614	2830	12.5%	16,558	2399	14.5%
AZ	5,306	629	11.9%	4,050	549	13.6%
FL	15,754	1064	6.8%	10,048	851	8.5%
IL	8,181	423	5.2%	4,379	276	6.3%
MI	8,220	393	4.8%	7,295	361	4.9%
OTHERS	118,739	3878	3.3%	38,911	1541	4.0%
Vintage						
<=2005	85,529	3545	4.1%	24,692	1801	7.3%
2006	44,940	3108	6.9%	29,548	2495	8.4%
2007	40,760	2536	6.2%	24,222	1905	7.9%
2008	10,137	552	5.4%	5,631	298	5.3%
2009	1,129	46	4.1%	281	6	2.1%
2010	29	2	6.9%	9	2	22.2%
Unemployment Rate						
<5%	7,890	238	3.0%	1,641	94	5.7%
5%-10%	111,826	5269	4.7%	44,323	3085	7.0%
10%+	62,808	4282	6.8%	38,419	3328	8.7%
Foreclosure Rate						
<5%	162,223	8094	5.0%	70,298	5093	7.2%
5%-10%	14,724	1215	8.3%	10,245	1007	9.8%
10%+	5,577	480	8.6%	3,840	407	10.6%

Note: Performance based on July 2008-Dec 2010 (Observed until April 2011)

Table 3: Logistic Regression Model for Indentifying Strategic Default

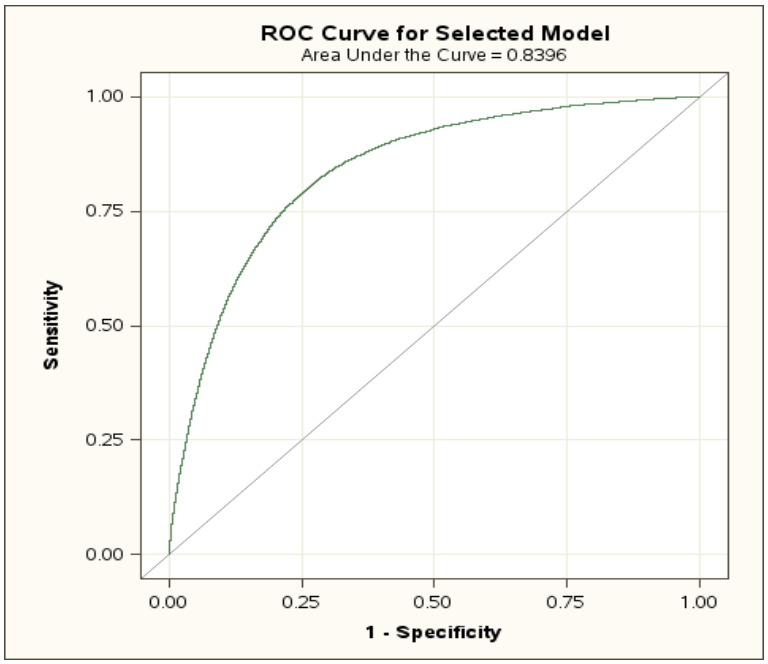
	Logit of Strategic default = $\alpha + \beta_1 X_{i,1} + \ldots + \beta_n X_{i,n}$				
Estimate	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Standard Error	**Macro Level Variables**	**+ Credit Variables**	**+ Borrowers Profile**	**+ Product Offering**	**+ Policy Programs**
Intercept	*-3.1588* 0.0214	*-11.2713* 0.0919	*-11.0182* 0.1586	*-10.75* 0.162	*-11.1774* 0.1821
Foreclosure Rate (FIPS Level)	*0.0625* 0.00356	*0.0232* 0.00433	*0.0214* 0.00441	*0.0232* 0.00442	*0.00956** 0.00457
Unemployment (Year-over-Year % Change)	*-0.00498* 0.00045	*-0.00648* 0.000504	*-0.00674* 0.000508	*-0.00709* 0.000512	*-0.00167* 0.000619
Home Price Idex (Year-over-Year % Change)	*-3.5405* 0.1401	*-1.4148* 0.1552	*-1.2606* 0.1582	*-1.187* 0.1587	*-1.5357* 0.1664
Negative Equity		*0.1688* 0.0354	*0.1569* 0.0357	*0.1432* 0.0357	*0.1195* 0.0361
Refresh FICO		*0.013* 0.000136	*0.0129* 0.000136	*0.0124* 0.000146	*0.0121* 0.000147
Current CLTV		*0.00454* 0.000486	*0.00445* 0.000494	*0.00423* 0.000499	*0.0043* 0.000497
Non-Owner Occupied			*0.5677* 0.0491	*0.5216* 0.0493	*0.4213* 0.0497
Borrower's Investment < 20%			*0.1861** 0.0732	*0.1596** 0.0733	*0.1513** 0.0737
Months on Books (Log MOB)			*-0.0873* 0.0239	*-0.0879* 0.0241	*-0.1389* 0.0251
Adjustable Rate Mortage (ARM)				*0.223* 0.0265	*0.196* 0.0266
Never Modified					*0.4262* 0.0268
Non Recourse State					*0.1549** 0.0758
Within HAMP Period					*0.5723* 0.0425
# Observation	162,393	158,623	158,622	158,622	158,622
Likelihood Ratio	1,260	13,225	13,379	13,450	13,919
-2 Log L	68,755	55,345	55,190	55,119	54,650
Max-rescaled R-Square	0.0221	0.2279	0.2305	0.2316	0.2394
Percent Concordant	59.4	83.3	83.4	83.5	83.6
Percent Discordant	37.1	16	15.8	15.8	15.7
c - Statistics	0.611	0.837	0.838	0.839	0.840

Significant at 1%
** Significant at 5%;*

Table 4: Bias-Adjusted Classification Table

Classification Table							
	Correct		Incorrect		Percentages		
Prob Level	Strategic	Non-Strategic	Strategic	Non-Strategic	Correct	False Positve	False Negative
0.000	8,901	0	150,000	0	5.6	94.4	.
0.050	7,013	112,000	37,649	1,888	75.1	84.3	1.7
0.100	5,328	131,000	19,059	3,573	85.7	78.2	2.7
0.150	4,071	138,000	11,729	4,830	89.6	74.2	3.4
0.200	3,096	142,000	7,704	5,805	91.5	71.3	3.9
0.250	2,307	145,000	5,158	6,594	92.6	69.1	4.4
0.300	1,696	146,000	3,384	7,205	93.3	66.6	4.7
0.350	1,219	148,000	2,140	7,682	93.8	63.7	4.9
0.400	820	148,000	1,249	8,081	94.1	60.4	5.2
0.450	527	149,000	676	8,374	94.3	56.2	5.3
0.500	292	149,000	338	8,609	94.4	53.7	5.4
0.550	138	150,000	137	8,763	94.4	49.8	5.5
0.600	57	150,000	50	8,844	94.4	46.7	5.6
0.650	17	150,000	13	8,884	94.4	43.3	5.6
0.700	2	150,000	0	8,899	94.4	0	5.6
0.750	0	150,000	0	8,901	94.4	0	5.6
0.800	0	150,000	0	8,901	94.4	0	5.6
0.850	0	150,000	0	8,901	94.4	0	5.6
0.900	0	150,000	0	8,901	94.4	0	5.6
0.950	0	150,000	0	8,901	94.4	0	5.6
1.000	0	150,000	0	8,901	94.4	0	5.6

Chart 1: Receiver Operating Characteristics - Sensitivity vs. (1-Specificity) Curve



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