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Three Essays on U.S. Household Debt and the Sources of Systemic Financial Fragility

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**THREE ESSAYS ON U.S. HOUSEHOLD DEBT AND THE
SOURCES OF SYSTEMIC FINANCIAL FRAGILITY**

A Dissertation Presented

by

THOMAS HERNDON

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 2016

Economics

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THOMAS HERNDON

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DEDICATION

For all the teachers, beginning with my Mother and Father, who have given me their love, support, and expertise throughout the years. I hope that I will be able to give back to my future students a small fraction of what has been given to me.

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Finally, I would like to acknowledge the community organization Springfield Noone Leaves. This group worked to encourage loan modifications and prevent evictions on the frontlines of the foreclosure crisis. Their lived experience provided an invaluable lesson on the failures of housing finance system during financial crisis and weak recovery. Their work directly inspired the topic of this dissertation, and I hope my research will be meaningful for them.

ABSTRACT

THREE ESSAYS ON U.S. HOUSEHOLD DEBT AND THE SOURCES OF SYSTEMIC FINANCIAL FRAGILITY

SEPTEMBER 2016

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This dissertation consists of three essays which analyze the role of household debt in the financial crisis of 2007-2009, and weak recovery that followed. In these essays, I pursue the following research topics: 1) Estimation of the effects of mortgage fraud on losses to foreclosure, 2) Estimation of whether loan modifications increased or decreased debt, and 3) Analyzing the historical evolution of housing finance regulation to advance a proposal for reform. While formally independent, these essays share a common theoretical perspective located at the intersection of financial macroeconomics and political economy. These essays analyze how conflicts of interest and inside information in the structure of private mortgage securitization generated perverse incentives that increased financial fragility. These problems caused large losses to foreclosure for borrowers, investors, and the communities in which the foreclosures were located in.

The first essay describes how mortgage fraud by the financial services industry concentrated risk and leverage on the borrowers least able to bear it. The industry then deceived investors who bought securities based on these mortgages about the level of risk they were taking on. This essay finds that excess losses to foreclosure borne by investors due to fraud were substantial, prolonged through time, and concentrated in economically fragile communities that did not recover from the financial crisis. The second essay discusses how a conflict of interest between loan servicers and investors impeded efficient debt restructuring in loan modifications. This essay finds that instead of mitigating losses for investors by forgiving debt, servicers increased borrowers' debt by imposing punitive fees. However, while these fees were profitable for servicers, they resulted in larger eventual losses for investors due to redefaults. The final essay locates the failures identified by the first two essays within the larger historical evolution of housing financial regulation. This essay proposes the creation of a new public option for household finance which would provide regulatory tools to prevent consumer protection abuses.

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CHAPTER 1

LIAR’S LOANS, MORTGAGE FRAUD, AND THE GREAT RECESSION

1.1 Introduction

Losses in private label residential mortgage backed securities (RMBS) were at the epicenter of the financial crisis. These losses caused the failure of institutions heavily invested in them, as well as the failure of institutions like Bear Stearns or AIG that were invested in complex derivatives based on them such as collateralized debt obligations or credit default swaps. Existing economic research has shown that a substantial portion of the defaults in the loans used to collateralize these securities was associated with fraudulent or negligent origination practices,¹ that fraud was particularly severe in no/low documentation loans known colloquially within the industry as “Liar’s Loans”, and that the quality of these loans was systematically misrepresented to the investors that purchased these securities by all major intermediaries involved in the sales of mortgages (Ben-David, 2011; Black, 2013; Garmaise, 2015; Griffin and Maturana, 2016; Jiang, Nelson and Vytlačil, 2014; Keys et al., 2010; Mian and Sufi, 2015; Piskorski, Seru and Witkin, 2015). However, as of writing the no paper has yet estimated the effect of fraud on losses to foreclosure in the loans used as collateral for these securities.

This paper seeks to fill this gap by 1) Accounting for total losses to foreclosure due Liar’s Loans, and 2) Estimating what portion of total losses can be considered

¹The term fraud is used in this article in the economic sense and should not be seen as having any legal significance. See page 5 for a full definition.

excess from the perspective of the investor. Losses for Liar’s Loans are considered “excess” if they are greater than those that would have occurred if the loan quality information disclosed to investors had been accurate instead of fraudulent. The main findings in this paper suggest that losses in foreclosure due to fraud in this market were substantial, prolonged throughout the entire crisis and Great Recession from 2007-2012, and concentrated in economically fragile geographic areas. Losses in Liar’s Loans account for roughly 70% of total losses in the data and 30% Liar’s Loans losses of can be considered excess. Projected to the level of the entire market, this implies that no/low documentation loans can account for approximately \$345 billion of the \$500 billion in losses in this market, \$100 billion of which can be considered excess. Moreover, 44% of total losses occurred in ZIP codes with the highest levels of fraudulent income overstatement on mortgage applications. These areas were particularly poorly suited to bear these losses, and the prolonged losses to foreclosure in these neighborhoods helps to explain the terrible economic performance of these areas throughout the Great Recession.

The research design pursued in this paper identifies the causal effects of fraud on losses to foreclosure by comparing losses on loans in the no/low documentation treatment group, with losses on loans with similar observable risk measures in the full documentation control group. Systematically larger losses in the treatment group are consistent with the causal effects of fraud. The main problem with this research design discussed in the empirical literature is the presence of fraud in the full documentation control group, which would cause this comparison to understate true excess losses caused by fraud (Jiang, Nelson and Vytlačil, 2014; Griffin and Maturana, 2016). To address this issue, qualitative information on high fraud originators from lawsuits regarding the actual loans in the dataset² is used to refine the control group by

²These lawsuits are discussed in section 3.3.

removing loans originated by these institutions. Additionally, loans from ZIP codes with high levels of fraudulent income overstatement on mortgage applications are removed from the control group. Regression discontinuity models based on those in the literature are then used to confirm the presence of fraud in the full documentation control group, as well as show that the refined full documentation control group is meaningfully freer of fraud.

In addition to the contribution to the empirical research on fraud, the findings in this paper are broadly relevant for research on macroprudential financial regulation, and research on the role of household balance sheets in the financial crisis. The estimate of excess losses to foreclosure is significant for financial regulation because these losses have caused numerous lawsuits from investors who claim they were defrauded by the major financial institutions that misrepresented the quality of the mortgages in the offering documents for the securities they purchased. Market regulations and contractual obligations that require the accurate disclosure of asset quality are a necessary condition for the basic functioning of capital markets. However, this minimum condition was not met on a widespread basis because all reputable intermediaries involved in the sale of mortgages were engaged in systematic misrepresentation (Griffin and Maturana, 2016; Piskorski, Seru and Witkin, 2015). The basic issue underlying these lawsuits is succinctly summarized in a recent ruling by District Judge Denise Cote,

“This case is complex from almost any angle, but at its core there is a single, simple question. Did the defendants accurately describe the home mortgages in the Offering Documents for the securities they sold that were backed by those mortgages? Following trial, the answer to that question is clear. The offering documents did not correctly describe the mortgage loans. *The magnitude of falsity, conservatively measured, is enormous.*

Given the magnitude of falsity, it is perhaps not surprising that in defending this lawsuit defendants did not opt to prove that the statements in the Offering Documents were truthful.”³ [emphasis added]

From the perspective of the investor, the estimate of excess losses is significant because it measures how much more Liar’s Loans lost in foreclosure than if the offering documents had accurately described the quality of the mortgages, rather than misrepresented it. To eliminate the problems in this market, financial regulation will likely need to prioritize increased monitoring of financial institutions, enforcement of penalties for violations of disclosure rules including criminal prosecution for financial institution executives involved in misrepresentation, increase investor recourse for violations of stated representations, and limit extreme compensation packages for executives to reduce incentives for looting.

The findings are also relevant for historical narratives of the role of household balance sheets in the financial crisis because losses to foreclosure imply that household wealth had already been entirely wiped out. In addition to loss of wealth for the individual homeowner, losses to foreclosure have substantial negative externalities that cause needless loss of wealth for everyone in a neighborhood. Research has shown that the fire sale of homes caused by large numbers of foreclosures during the financial crisis reduced house prices lower than they otherwise would have fallen, and can account for roughly one-third of the fall in house prices. The reduction in house prices further impaired household balance sheets, thereby reducing aggregate demand. Estimates suggest the causal effects of foreclosures during the crisis were responsible for roughly one-fifth of the decline in residential investment and auto-sales

³From ruling in *Federal Housing Finance Agency v. Nomura Holding America*, May 11th, 2015. The FHFA sued 16 trustees for misrepresentations made in offering documents and prospectuses for securities sold to Fannie Mae and Freddie Mac. All but Nomura and Royal Bank Scotland settled out of court, and the court ruled against these institutions in trial on May 11th, 2015. Accessed on June 26th, 2015 from: <https://s3.amazonaws.com/s3.documentcloud.org/documents/2077713/ruling-on-mortgage-fraud-in-2008-crisis.pdf>

(Mian, Sufi and Trebbi, 2015). Moreover, many of the investors in these securities were institutional investors such as retirement and pension funds. Therefore losses in these securities also contributed to losses of household wealth and retirement savings.

The prolonged losses to foreclosure due to fraud that were concentrated in economically fragile areas also help to explain the lack of recovery in these places. The financial panic had largely subsided by 2009. However losses to foreclosure in private label RMBS were much more prolonged, and remained at a high level of close to \$100 billion per year from 2010-2012. Fully 44% of the losses to foreclosure from 2008-2012, or roughly \$220 billion, occurred in ZIP codes with the highest levels of fraudulent income overstatement on mortgage applications. These ZIP codes were particularly poorly suited to bear these losses because in the pre-crisis period they had low average credit scores, low income, high poverty rates, and high unemployment. Research has shown that these ZIP codes experienced terrible economic performance throughout the course of the crisis, including negative income growth, increased poverty, and increased unemployment (Mian and Sufi, 2015).

1.2 Literature Review

The literature review in this section provides the necessary background context for understanding how the main results contribute to the existing research on mortgage fraud. The existing empirical research has directly observed numerous forms of fraud, and estimated the effects of fraud on increasing the probability of default. The basic description of fraud that emerges from this body of research is that executives of institutions that originated loans to be securitized in the private label market had perverse incentives based on the volume of loans originated, rather than the quality. To increase origination volume, these institutions systematically abandoned underwriting standards or falsified documents outright. These practices were particularly severe in no/low documentation loans that did not require documentation of income,

assets, or employment, and were thus named “Liar’s Loans.” The deceptive practices were not disclosed to investors who purchased securities based on these loans, as required by market regulations and contractual obligations. Finally, mortgage fraud was clustered in economically fragile areas before the crisis and contributed to the prolonged deterioration during the Great Recession.

The empirical research has focused on directly observing fraud, and estimating the effects of fraud on delinquency at the loan level. However, we would also expect fraud to cause increased losses in foreclosure because most forms of fraud resulted in concealing increases in borrower leverage. The analysis in this paper fills this gap by 1) Accounting for the amount of losses to foreclosure in this market due to no/low documentation Liar’s Loans, and 2) Estimating what portion of these losses can be considered excess from the perspective of the investor. Losses are considered “excess” if they are greater than those which would have occurred if the loan quality information disclosed to investors had been accurate, rather than fraudulent.

Fraud is defined as deception or misrepresentation with the intended to result in financial or personal gain. The term fraud is used in this paper in the broader economic sense, rather than the narrow legal sense. Fraud is used to refer to the economics of deception and trickery, rather than trades based on mutually beneficial gains. The term as used here should not be seen as having any legal significance. That being said, much of what occurred in this market was in fact illegal. These fraudulent practices have led to numerous lawsuits and Department of Justice settlements, but few prison sentences. Although there is no direct evidence of intent in the dataset, existing research has shown that the relevant parties in this market had the information to be adequately aware of misrepresentation, as well as the incentives to profit from deception (Griffin and Maturana, 2016). Therefore fraud is the most accurate term to describe the practices in this market.

The private label, originate to distribute supply chain consisted of institutions which originated mortgages and sold these loans to trustees. The trustees then packaged the mortgages into securities, obtained ratings from ratings agencies, and sold the securities to investors. Losses in these securities were at the epicenter of the financial crisis of 2007-2008. A substantial body of research has documented a high incidence of mortgage fraud in the loans used as collateral for these securities. For example, as early as 2004 the FBI warned of an epidemic of mortgage fraud which could cause a financial crisis (Black, 2013). Also, the Financial Crisis Inquiry Commission concluded that a “systemic breakdown in accountability and ethics” was an essential cause of the crisis (FCIC, 2011).

Executives at institutions that originated loans to be securitized in this market had perverse incentives to increase short-term profits based on the volume of loans originated, rather than the quality of loans. Executives were able to receive large bonus compensation for short term gains, for example through stock options that were not required to be paid back if the firm went bankrupt.⁴ Fraud was particularly useful for increasing short-term revenues because toxic loans tended to have high initial fees attached to them. Similar to problems in the S&L crisis, this allowed originators to report high fee revenue before losses occurred (Black, 2013). Additionally, originating institutions could sell riskier loans to be securitized for a higher price than safer loans (Taub, 2014).

That being said, many of the originators still held a large portion of the toxic loans in their portfolio, and went bankrupt as a result. The pattern of extreme executive compensation, despite the failure of their firms, could reasonably be described as “looting.” Looting occurs when owners or executives have limited liability for a

⁴Perverse incentives due to extreme bonus compensation were not limited to this market. They were a consistent feature of the expansion of the financial system following deregulation (Crotty, 2009).

firm, and maximize short-term pay-outs at the expense of the long run health of their firm resulting in bankruptcy. Looting has been described as bankruptcy for profit. (Akerlof and Romer, 1993). This pattern of looting is significant for macroprudential regulation because “skin in the game” rules that require institutions to hold a portion of the mortgages they originated in their portfolio would not have prevented fraud. These institutions had substantial skin in the game which caused their failure. However, their executives did not. Fraud prevention would likely have required increased monitoring of institutions, limits to extreme compensation packages, and criminal prosecution of top executives (Black, 2013).

These perverse incentives led originators to increase loan volume through the systematic abandonment of underwriting standards, or the outright falsification of documents. The common effect of these fraudulent practices was for loan officers to conceal increases in leverage or risk in order to qualify borrowers for larger loans than they would have been able to otherwise obtain. A recent set of empirical papers has directly measured a high incidence of a wide variety of types of mortgage fraud. These forms of fraud include income overstatement, asset overstatement, unreported second liens, misreported owner occupancy status, and appraisal inflation (Ben-David, 2011; Garmaise, 2015; Griffin and Maturana, 2016; Jiang, Nelson and Vytlačil, 2014; Keys et al., 2010; Piskorski, Seru and Witkin, 2015). For example, using conservative measures Griffin and Maturana (2016) find that 48% of loans contain at least one of three relatively easy to quantify forms of fraud: appraisal inflation, unreported second liens, and misreported owner occupancy status. They find that loans with one of these forms of fraud were 51% more likely to become delinquent.

The focus on no/low documentation loans in this study is meaningful because these loans were so notoriously fraudulent that they were colloquially known within the industry as “Liar’s Loans.” To be sure, at the time, originating no/low documentation mortgages was not prohibited as long as the stated income or assets were

accurate. However, as the colloquial name indicates, these loans were not used to accurately state borrower financial characteristics. Indeed, loan officers often coached borrowers to falsely state their information, or falsified borrower documents without the borrower’s knowledge.⁵ As a result, these loans performed particularly poorly. For example, Jiang, Nelson and Vytlačil (2014) estimated the effects of income overstatement on delinquency rates in Liar’s Loans, and showed that the delinquency rate for these loans is 5-8 percentage points higher than the full documentation control group.⁶ Most forms of Liar’s Loans have now been prohibited.

This body of research has also shown that these forms of fraud were systematically concealed from investors who purchased securities based on these loans. For example, Piskorski, Seru and Witkin (2015) found that a “significant degree of misrepresentation exists *across all* reputable intermediaries involved in the sale of mortgages,” [emphasis in original]. The sale of loans that were originated with fraudulent practices, or simply negligent underwriting, typically violated market regulations and contractual obligations. These rules require the accurate disclosure of loan quality; however, these practices obviously were not disclosed.⁷ All major trustees have had

⁵For example, Omar Khan, a loan officer at Ameriquest/Argent, stated, “Every closing was a bait and switch, because you could never get them to the table if you were honest.” He further elaborated, “There were instances where the borrower felt uncomfortable about signing the stated income letter, because they didn’t want to lie, and the stated income letter would be filled out later on by the processing staff” [*National Credit Union Administration Board v. Wells Fargo Bank, National Association*, 2014]. This anecdote is supported by an FBI study, which found that 80% of fraud cases involved “collusion or collaboration” with industry insiders based on investigations and fraud reports (FBI, 2007).

⁶However, the authors emphasize that this should be seen as a conservative lower bound, because the identifying assumption is that the full documentation control group is free of fraud.

⁷The typical offering documents included prospectus supplements which described the quality of collateral underlying the securities. These documents tended to include boilerplate language similar to, “Wells Fargo Bank’s underwriting standards are applied by or on behalf of the Wells Fargo Bank to evaluate the applicant’s credit standing and the ability to repay the loan, as well as the value and adequacy of the mortgaged properties collateral” [*General Retirement System of the City of Detroit v. Wells Fargo et al*, 2009]. If the trustee discovered a breach of these representations and warranties, such as falsification of borrower financial characteristics, violations of assurances that loans were originated following proper underwriting standards, or that the appraisal value for the collateral was inflated, the “trustee must notify the appropriate parties and take steps to enforce

numerous lawsuits initiated against them.⁸ Forensic auditing has found that in some cases as high as 99% of the loans in an issuance were in violation of underwriting practices stated in offering documents. One court described the problem thus: “to accept that the Trustee was unaware of...reports and investigations [regarding underwriter and servicer misconduct] would require the court to ‘find that responsible officers of Defendants had been living under a rock’” and that “[i]f the Trustee was indeed ‘living under a rock,’ it had no right to do so given it’s role and responsibilities” (Galdston, Kaplan and Gilmore, 2014). The estimate of excess losses is significant from the perspective of the investors. The estimate shows on average how much more the fraudulent loans used as collateral for these securities lost in foreclosure than if the information disclosed about them was accurate rather than misrepresented.

In contrast to the problems with originating institutions that could reasonably be described as looting, the problems in the market for securities based on these loans are more accurately described as a “market for lemons.” The term “lemon” refers to a car which is poor quality, or more generally to any product that is poor quality. A market for lemons is a market where good and bad quality products are sold, but where the buyers cannot know beforehand whether they are buying a good or bad product. In these markets bad products tend to push out good products because good and bad products must sell at the same price. Over the course of the housing

the responsible parties obligation to cure, substitute, or repurchase the defective mortgage loans” [*National Credit Union Administration Board v. Wells Fargo Bank, National Association*, 2014]. It should be noted that origination practices that could be argued were simply negligent or dubious, but did not involve outright falsification, were still fraudulent because they violated the representations made in offering documents.

⁸An older list of 58 lawsuits filed between 2008-2012 can be found in the appendix to ?. However, this list is not exhaustive, as the 2009 class action lawsuit used in this paper was not on the list (*General Retirement System of the City of Detroit v. Wells Fargo et al*, 2009). In addition, several similar lawsuits have been filed for violations of the False Claims Act or the Financial Institutions Reform, Recovery and Enforcement Act (FIRREA), for actions such as misrepresenting the quality of loans to entities which insured these loans. A list of 31 lawsuits can be found at: http://www.buckleysandler.com/uploads/1082/doc/Recent-FIRREA-Cases_Buckleysandler-LLP_v20.pdf. Accessed August 12th, 2015.

bubble, it is clear that bad practices in this market had pushed good practices out because these problems were common to all major institutions involved in the sale of these securities (Akerlof, 1970).

As of writing, the empirical papers on mortgage fraud have primarily focused on directly observing the incidence of fraud, and constructing loan level estimates of the effects of fraud on delinquency. However, we would also expect the concealed leverage and risk to cause these loans to lose more in foreclosure than non-fraudulent loans. Ben-David (2011) provides a simple illustration of how fraud concealed increases in borrower leverage using the example of appraisal inflation in the 2006 sale of a condo in Chicago. The condo was worth \$235,000, but the builder was willing to inflate the price to \$255,000 and return the extra cash to the buyer at the closing table. The buyer could then use the extra \$20,000 as a down payment for a mortgage with a loan-to-value ratio of just under 95%. However, the true loan-to-value ratio was 100% because none of the borrower's own money was actually used for the down payment.⁹ Due to this hidden increase in leverage, the loan would also be expected to lose more in foreclosure. This paper builds on the existing literature by estimating total excess losses for the entire market.

The estimates in this paper are also relevant for research that has shown that the geographic areas with high levels of fraud performed poorly during the Great Recession. These estimates of losses to foreclosure provide a quantitative description of one of the mechanisms that caused this poor performance. For example, Mian and Sufi (2015) construct a measure of fraudulent income overstatement on mortgage applications at the ZIP code level.¹⁰ They find that high income overstatement

⁹Alternatively, in some cases the buyer walked away with the money, used it to finance remodelings, or even to buy a new Mini-Cooper sports car in one instance. Also, loan originators often pocketed the extra money through high origination fees.

¹⁰They construct this measure as the difference in the annualized growth of income reported to the IRS, and reported on mortgage applications under the Home Mortgage Disclosure Act (HMDA). They find that the housing bubble period from 2002-2005 was unique in that the growth of income

ZIP codes performed significantly worse with higher default rates, negative income growth, increased poverty, and increased unemployment. Additionally, Griffin and Maturana (2014) find that areas with higher concentrations of originators who misreported mortgage information experienced a 75% larger relative increase in house prices from 2003 to 2006, and a 90% larger relative decrease from 2007-2012. The estimates of total and excess losses to foreclosure produced in this paper are significant for understanding the poor performance of these areas. Research has shown that foreclosures have large negative externalities which cause unnecessary destruction of wealth for everyone in a neighborhood. The large number of foreclosures that occurred during the financial crisis and Great Recession caused homes to be sold in a fire sale that depressed values for all houses in the neighborhood. The neighborhood wide reduction in house prices impaired all household balance sheets in an area, reducing aggregate demand. Research has shown that the causal effects of foreclosures during the financial crisis and Great Recession were responsible for roughly one-third of the decline in house prices, one-fifth of the decline in residential investment, and one-fifth of the decline in auto-sales (Mian, Sufi and Trebbi, 2015).

1.3 Research Design

The research design section is organized into three parts. The first part presents the data description, the second presents the identification strategy and regression model, and the third discusses data-driven refinements for the control group. Refinements are necessary for the full documentation control group because the empirical literature has shown that full documentation loans in the private label RMBS market also had a high incidence of fraud. This contamination would cause comparisons

on mortgage applications reported in HMDA data substantially outpaced that reported on IRS documents, while in past periods the ratio of growth in income was constant. They find that this was driven by fraudulent income overstatement in the private label RMBS market.

based on the unrefined control group to understate the true effects of fraud on excess losses. Refinements to reduce the incidence of fraud in the full documentation control group are made using qualitative data from lawsuit documents, measures of high fraud ZIP codes, and regression discontinuity models from the empirical literature.

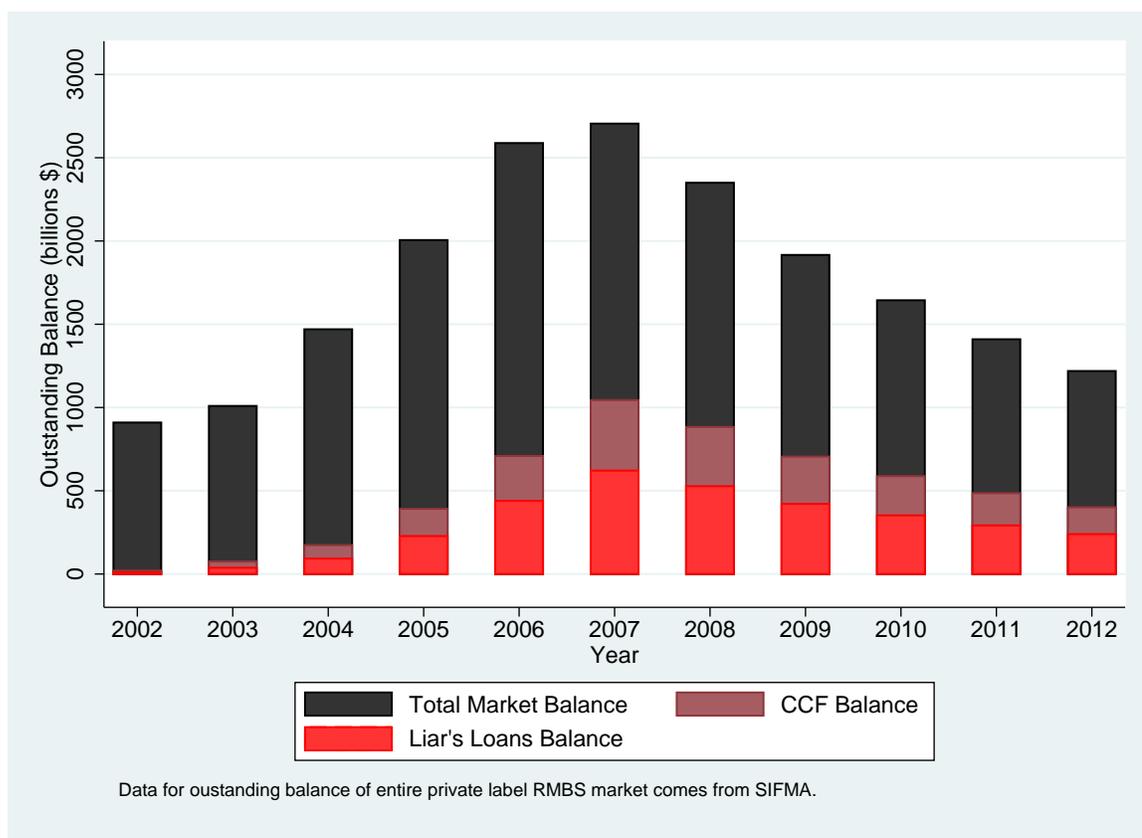
1.3.1 Data Description

The sample of loans used in this study comes from the Columbia Collateral File (CCF). The CCF is a large loan-level panel dataset that includes all loans used as collateral in private label RMBS for which Wells Fargo is a trustee. The data contains monthly observations for 139 variables that include measures such as loan characteristics and performance. The data begins in December 2006, which makes 2007 the first year for which complete data is available. In December 2007, the CCF contained roughly 4.2 million total loans; 2.4 million of these loans, or 58%, were Liar's Loans. By 2012 the number of loans in the dataset had fallen to roughly 1.8 million. This is largely due to the 1.5 million completed foreclosures that occurred.

Figure 1.1 shows the yearly outstanding balance of the the entire private label market, the CCF, and Liar's Loans in the CCF from 2002-2012. The private label market grew rapidly from 2002 to 2007, almost tripling in value. After peaking at an outstanding balance of \$2.7 trillion in 2007, the market experienced severe losses and decline rapidly. The CCF was not a substantial portion of the market until 2005. However, it grew rapidly to account for just under 40% of market share in 2007 at an outstanding balance of \$1.05 trillion.

Descriptions of fraud suggest that the intensity of fraud increased through time peaking roughly from 2005-2007. Liar's Loans have been reported to be particularly bad in this time period. The growth of the share of Liar's Loans in the CCF mirrors this pattern. In 2003 the share was 40% of loans in the CCF. The share grew rapidly

Figure 1.1. Outstanding Balance of Private Label RMBS Market



to peak at two-thirds in 2007. The share has remained high at about 60% from 2007-2012 (SIFMA, 2015).

The CCF data from 2007-2012 appears to be broadly representative of the entire market. In general, the data accounts for a substantial portion of the entire market and mirrors the growth of the market. Also, the summary statistics of observable risk measures are similar to those in Griffin and Maturana (2016) and Piskorski, Seru and Witkin (2015). The dataset also contains loans originated by roughly 2000 different institutions.¹¹ However, there is also some reason to believe that the loans in the CCF performed better than average for the market. Wells Fargo was not found to be one

¹¹There were approximately 7000-8000 entries for originator names in the CCF. However, redundancies in originator names occur across numerous dimensions such as capitalization, slight variation in name, spacing, etc. Therefore the actual size of the list is likely closer to 2000 originators.

of the ten originators with the highest incidence of fraud by Griffin and Maturana (2016). This is corroborated by anecdotal reporting that the subprime origination practices at Wells Fargo were not as bad as for other institutions in the market. This led Wells Fargo to emerge from the crisis in a much better position than many other financial institutions.¹² Additionally, Wells Fargo has been the subject of fewer lawsuits than many other institutions.¹³ Therefore, to the extent that fraudulent practices were less prevalent in the loans for which Wells Fargo was a trustee, the estimate of total and excess losses in this paper may understate losses to fraud in the entire market.

The main risk measures in this dataset are the FICO credit score and the loan-to-value (LTV) ratio. The LTV ratio is the ratio of the original loan balance to the appraisal value of the home and is a measure of the amount of leverage for a given mortgage. The LTV ratio measures the amount of equity in a home which serves as a cushion to absorb house price declines. The FICO credit score is an index of creditworthiness that measures the borrower's chance of default over the next two years. A higher credit score indicates a less risky borrower. The score is based on the amount of debt a borrower currently owes, the borrower's payment history, types of credit in use, the length of credit history, and new credit.

The sample of loans from this dataset is restricted to all mortgages that are 1st lien, owner occupied, originated between 2002-2008, with loan-to-value ratios between 70 and 100, FICO credit scores between 300 and 850, balances greater than \$30,000, and for which there are complete data. The pooled sample is built by merging the December data to provide a retrospective snap shot of the year. After these restrictions, the final 2007-2012 pooled sample includes slightly over 7 million

¹²For example, see <http://www.economist.com/news/finance-and-economics/21586295-big-winner-financial-crisis-riding-high>

¹³For example, Wells Fargo appears far fewer times than other institutions on the two lists of lawsuits in footnote 8.

loan-year observations. The sample also includes roughly 700,000 of the 1.5 million unique foreclosures. A large portion of foreclosures are typically dropped the month after the foreclosure sale is recorded, so dropped foreclosures are merged back into the December observations.

To my knowledge this study is the first to use this dataset in the context of measuring the effects of fraud on losses to foreclosure. However, the sample is compiled from trustee reports so it is most similar to the data used in Griffin and Maturana (2016) and Piskorski, Seru and Witkin (2015). The main advantage of this data relative to others used in the literature is that this data contains detailed information on losses to foreclosure. It is not clear if information on losses to foreclosure is available in the other data sources used in the empirical literature. However, no other paper has measured losses in foreclosure due to fraud.

The ideal dataset for comprehensively estimating the total effects of fraud would be a loan-level panel set which included measures that recorded whether a loan was fraudulent or not, what type of fraud, and how intense the fraud was (i.e., whether income was overstated 5% or 50%). The obvious main disadvantage of data from the CCF is that it does not directly measure fraud in this manner. Others have been able to directly measure certain easy to quantify types of fraud by matching loan-level records with data from other sources such as credit bureau records. However, these data come from large proprietary datasets which as of writing I do not have access to.

To address the limitation of not being able to directly observe all forms of fraud, I restrict the analysis to only estimating the effects of fraud on losses to foreclosure in no/low documentation loans. These loans were known colloquially within the industry as “Liar’s Loans” because they were notoriously fraudulent. These loans were overwhelmingly used to overstate borrower income or assets. Therefore the estimates produced in this paper do not represent exhaustive estimates of losses due to all forms

of fraud, but are limited to only measuring losses based on lack of documentation. Additionally, addressing this limitation also requires refinements to the full documentation control group to reduce the incidence of fraud. These refinements are detailed in the section 1.3.3.

1.3.2 Identification Strategy and Regression Model

Fraudulent loans are expected to cause increased losses to foreclosure because most forms of fraud result in concealing borrower leverage and risk. This analysis identifies the causal effects of fraud on excess losses to foreclosure by comparing losses for loans in the no/low documentation treatment group with losses for loans with similar risk measures in a refined full documentation control group. Excess losses in the treatment group which cannot be explained by observable risk measures are consistent with the causal effects of fraud.

The mean differences in losses to foreclosure between treatment and control groups can be decomposed into two portions.

$$E[L|D_i = 1] - E[L|D_i = 0] = \{P(FC|D_i = 1) - P(FC|D_i = 0)\}E[L|FC, D_i = 1] + \{E[L|FC, D_i = 1] - E[L|FC, D_i = 0]\}P(FC|D_i = 0),$$

where L =loss in foreclosure, FC = foreclosure, and D_i is an indicator variable coded 1 for the treatment group. The first of these terms is the increase in losses due to the extra foreclosures caused by fraud. The second term is the increase in losses for Liar's Loans conditional on foreclosure (Angrist and Pischke, 2008).¹⁴

I use a simple linear regression models to estimate these effects in two steps. The regression model is:

$$y_{izt} = \alpha_z + \gamma_t + \beta_0 + \beta_1 * D_i + A * X_i + \epsilon_i ,$$

¹⁴In addition to conditioning on foreclosure and treatment status, these means also need to be conditioned on appropriate controls. These subscripts have been omitted to facilitate ease of presentation.

where y_i is one of four outcome variables, D_i is the binary treatment variable, X_i is a vector of controls, α_z is a set of ZIP code level fixed effects, and γ_t are loan-year observation fixed effects. Standard errors are clustered at the ZIP code level for all models. This model is run for the pooled sample of loans; however, the results are robust to running the model for each year separately.

The first set of regressions measures estimates the increase in the foreclosure rate using an indicator variable coded 1 for loans that were foreclosed on during a year. The second set of regressions measures the increase in losses in dollars using data from the variable loss on liquidated property. This variable likely includes all home forfeiture actions more broadly, such as short sales or deeds in lieu. These actions are all substantially similar to foreclosure because they require loss of the home. I also estimate extra delinquencies using an indicator variable coded 1 for loans that were delinquent at least once during the year. Finally, I estimate losses as a share of the original balance. This helps normalize losses to foreclosure to help ensure that the dollar value estimates are accurate. Foreclosure and delinquency rates are estimated in the full pooled sample, while losses are estimated conditional on foreclosure.

The set of controls includes risk measures, loan type, loan purpose, origination years, and original balance. The principal risk measures employed are the loan-to-value (LTV) ratio and FICO score. A set of indicators for low, medium, and high LTVs are used for the regressions. Low LTVs are those with LTVs of 80 and under, which is the traditional cut off for the classic mortgage. High LTVs are those with LTVs of 95 or higher because this is a common cut-off for inclusion into RMBS pools. LTVs between 80 to 95 are considered medium leverage mortgages.

Indicators are also included for FICO credit scores. The OCC Mortgage Metrics report defines subprime loans as those with FICO scores less than 620, alt-A loans as those with FICO scores between 620 and 660, and prime loans as those with FICO

scores above 660. In addition an indicator is also included for FICOs greater than 760, which is the cut off for the “FICO High Achievers” list.¹⁵

Indicator variables for loan type and purpose are also included in the regressions as well. The dataset has two broad types of mortgages: fixed rate and adjustable. Fixed rate mortgages are typically considered the least risky, while adjustable rate are considered higher risk. Finally, indicator variables for origination year and observation year are also included.

Formally, identification depends on $E[\epsilon_i | D_i, X_i, \alpha_z, \gamma_t] = 0$. This condition should be largely satisfied because the highly detailed micro data allows for fine-grained controls for risk measures, geographic shocks, or different shocks by year. Comparing loans with similar risk measures, in the same ZIP codes, and within the same years should eliminate selection bias on observables. In addition, I conduct the Oster (2014) robustness test in section 5 to assess the stability of estimated coefficients due to selection on unobservables.

There are also two known problems with this identification strategy. These problems would both cause the estimates to understate the true causal effects of fraud on losses to foreclosure. The first problem is that estimating excess losses conditional on foreclosure introduces the conditional-on-positive selection bias. The estimate of excess losses conditional on foreclosure can be decomposed into a causal effect and a selection bias. Selection bias arises due to fraud changing the composition of those who are foreclosed on (Angrist and Pischke, 2008). In this case, the bias likely understates the true effects of fraud because fraud lowers the threshold for those that are foreclosed on in the treatment group. At the margin, the set of foreclosed loans in the Liar’s Loans group should therefore be larger and contain more borrowers who were

¹⁵This definition comes from myfico.com. Accessed 6-25-2015 from: <http://ficoforums.myfico.com/t5/Understanding-FICO-Scoring/Expanded-quot-FICO-High-Achievers-quot-scores-of-760-and-above/td-p/111525>.

less risky than the full documentation group. This selection bias would understate average losses. Thought of slightly differently, the set of borrower's who were selected into foreclosure in the full documentation group were more risky on average ex-ante because they ended up in foreclosure despite having better loans. The inclusion of appropriate controls for risk to some extent should mitigate some of this selection bias, but it is unlikely to completely eliminate it. That being said, the estimation of the effects of fraud on delinquency and foreclosure rates are unaffected by this bias and still have a causal interpretation. To the extent that risk controls do not mitigate this selection bias, the estimates of losses conditional on foreclosure in this paper would understate the true causal effects of fraud.

The second problem with this identification strategy is the presence of fraud in the full documentation loan control group. This problem has been well documented in the existing research and would cause the estimate of excess losses to understate the true effects of fraud (Jiang, Nelson and Vytlačil, 2014). For example, the widespread incidence of fraud in full documentation loans in this market was confirmed by Griffin and Maturana (2016). They found that roughly half of full documentation loans contained at least one of three easy to measure types of fraud: appraisal overstatement, misreported owner occupancy status, or unreported second liens. Therefore, refinements to the control group to remove full documentation loans with a high probability of fraud are necessary and will be described in the next section. Surprisingly, Griffin and Maturana (2016) also found a similar incidence of fraud between full documentation and Liar's Loans for these measures. However, Griffin and Maturana (2016) were not able to estimate differences in income or asset overstatement which is likely the main dimension of fraud on which no/low and full documentation loans differ. Therefore, the comparison of these loans should still provide an estimate of meaningful differences in fraud provided that refinements are made to the control group. To the extent that the refinements do not completely purge fraud from the control

group, we would also expect the estimates in this paper to underestimate the true causal effects of fraud. For these reasons, the estimates produced in this paper are best interpreted as a conservative lower bound for the true causal effects.

1.3.3 Refinements to the Control Group

I make two refinements to the control group to remove loans with a higher probability of containing fraud. First, I use qualitative information from lawsuit documents concerning the actual loans in the dataset to remove loans originated by institutions notorious for employing fraudulent practices. Second, I remove loans from ZIP codes with high levels of fraudulent income overstatement on mortgage applications. I then use regression discontinuity models based on those in the empirical literature to confirm the presence of fraud in the control group, and show that the refined control group is meaningfully freer of fraud than the unrefined control group.

The sample of loans used in this article is from the Columbia Collateral File (CCF) which includes all publicly available collateral files for RMBS for which Wells Fargo serves as a trustee. Wells Fargo has been sued at least twice for misrepresenting the qualities of these loans in offering documents. In 2011, Wells Fargo settled a class action law suit for approximately \$125 million with several retirement funds that sustained large losses on RMBS purchased from Wells Fargo [*General Retirement System of the City of Detroit v. Wells Fargo et al*, 2009]. As of time of writing, Wells Fargo is also being sued by the National Credit Union Administration (NCUA) for severe losses on \$2.4 billion in RMBS purchased by five credit unions, which caused the liquidation of the five institutions [*National Credit Union Administration Board v. Wells Fargo Bank, National Association*, 2014].

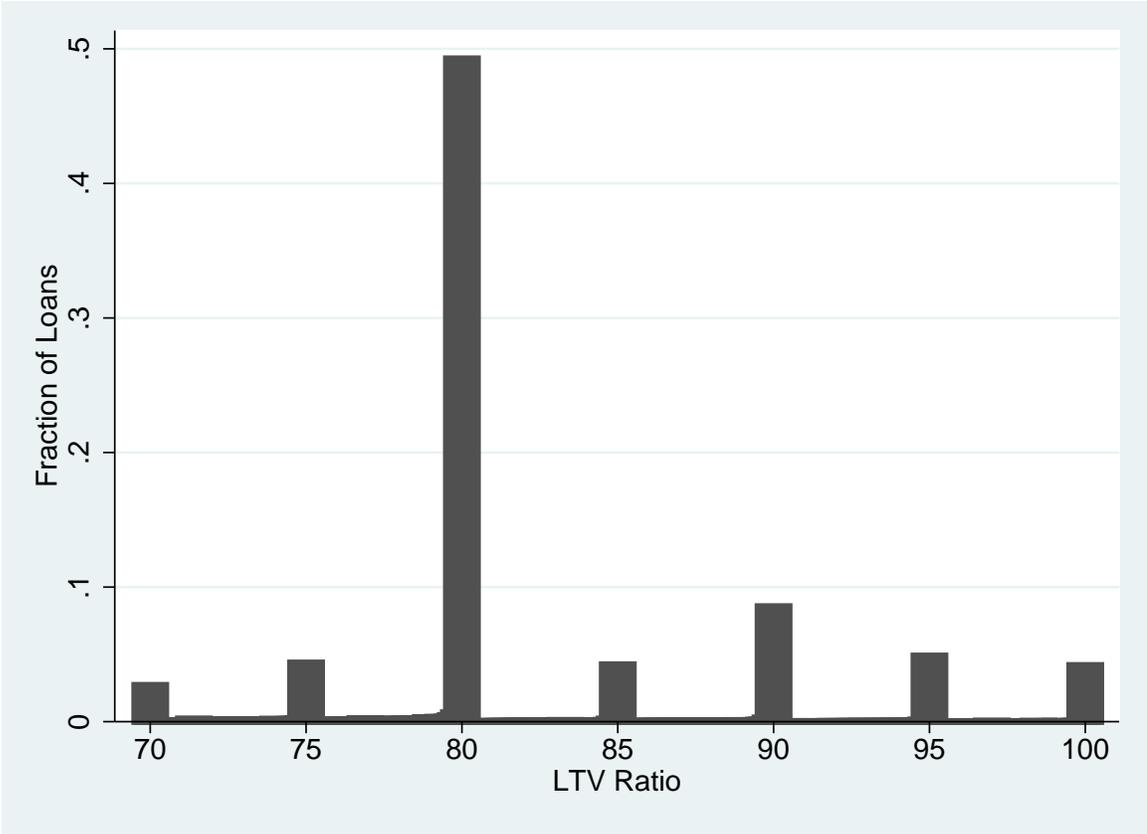
These lawsuits provide important qualitative information concerning the high incidence of fraudulent practices at particular loan originators, with a total of twenty-five institutions discussed in depth in both lawsuits. High fraud originators are one of 25

institutions whose fraudulent practices were described in depth in either lawsuit document, while low fraud originators are institutions who are not mentioned in either lawsuit document.¹⁶ Even though the high fraud originators are only 25 institutions out of a possible list of approximately 2000 institutions, these originators were also some of the larger institutions and originated approximately half of the loans in the sample with data recorded for originator name, depending on year. While the study makes use of lawsuit documents which target Wells Fargo, this study should not be interpreted as singling out Wells Fargo for uniquely poor practices. Deceptive practices were common to all institutions in this market, and all trustees have had numerous lawsuits initiated against them. Moreover, as discussed above there is reason to believe that the practices at Wells Fargo may have been less fraudulent than average for this market.

Two regression discontinuity models based on loans clustering at LTV intervals of 5 are used to confirm fears of the presence of fraud in the unrefined full documentation control group, and that the refinements provide a control group more free of fraud. Griffin and Maturana (2016) find that a large portion of loans in this market were discontinuously clustered at LTV intervals of 5 units (75, 80, 85, etc.) which can be seen in Figure 1.2 below. They find that appraisal overstatement was consistently higher for clustered loans, and that these loans consistently defaulted at a much higher rate. They conclude that this pattern is more consistent with appraiser's targeting home valuations given by loan officers than with a random pattern of mistakes.

¹⁶The originators named in the NCUA lawsuit are: Ameriquest/Argent, Bank of America, Countrywide, Decision One, DLJ, First Franklin, Fremont, GreenPoint, Impac, Morgan Stanley Mortgage Capital, National City, New Century, Option One, Paul Financial, RBS/Greenwich Capital, WMC Mortgage Corp; and the originators named as defendants or named in testimony in the retirement fund lawsuit are: American Home Mortgage (named in testimony), Bank of America, Bear Stearns, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, Merrill Lynch, RBS/Greenwich Capital, UBS, and Wells Fargo.

Figure 1.2. Histogram of LTV Heaping at Intervals of 5



The first model measures excess losses at the LTV intervals. The regression discontinuity model measures the increase in negative outcomes for loans clustered at the LTV intervals of 5, which have been shown to have a higher incidence of fraud. The regression discontinuity model includes an indicator for clustered loans, and controls for a fourth degree polynomial of LTV. The model is:

$$Y_i = \alpha_z + \gamma_t + \beta_0 + \beta_1 Z_0 + \beta_2 ltv + \beta_3 ltv^2 + \beta_4 ltv^3 + \beta_5 ltv^4 + \Gamma X_i + \epsilon_i,$$

where Z_0 is an indicator variable for loans with clustered ltv values, and the rest of the controls are the same as those used in the main regressions. The excess losses measured by the estimated coefficient for Z_0 are distinct from the excess losses presented as the main result. The coefficient for Z_0 measures excess losses for loans at the LTV interval compared to loans within the same documentation type not at the LTV interval, rather than compared to a fraud-free control group. Therefore, this is a useful tool to measure the incidence of fraud within a single documentation type, but not across types. Results for this test can be seen in Table 1 and Figure 1.3 below.

The second model based on this discontinuity is to use the McCrary (2008) heaping test for manipulation of the running variable. This test measures the threat to identification in regression discontinuity designs of agents strategically manipulating treatment status. The test first divides the data into a rough histogram based on the running variable, and then smooths the histogram on either side of the breakpoint being tested. Manipulation of treatment status would produce heaping at the breakpoint, which is measured as the log difference in the height of the smoothed polynomials fitted on either side of the breakpoint. This test is relevant to the current analysis because it is likely that a substantial portion of the heaping seen at LTV intervals of 5 comes from loan officers telling appraisers to target a specific valuation price that would produce the desired LTV ratio. The heaping test only allows a single breakpoint to be tested, so the data are recentered around the LTV intervals. The

default bin size of 1 and bandwidth are used. Results for this test are presented in Table 1.1 and Figure 1.4 below.

Table 1.1. Results for Excess Losses and Heaping from Regression Discontinuity Models Based on LTV Clusters

	Excess Negative Outcomes		Excess Heaping	N
	Loss/Orig Balance	Loss (\$)	Log Difference	
Full Doc				
Unrefined	0.00739*** (4.44)	2734.3*** (6.92)	3.24 (.003)	296657
High Fraud	0.0127** (3.35)	3971.9*** (3.91)	3.65 (.008)	66327
Semi-Refined	-0.00241 (-0.61)	1939.3 (1.88)	3.18 (.007)	57769
Refined	-0.00557 (-0.60)	1634.8 (0.75)	3.40 (.014)	15379
No Doc				
Unrefined	0.0139*** (9.29)	5400.7*** (11.08)	3.43 (.003)	374910
High Fraud	0.0152*** (5.16)	6289.2*** (5.58)	3.64 (.007)	90430
Semi-Refined	0.0101*** (3.21)	4958.9*** (5.74)	3.41 (.005)	108424
Refined	0.0208*** (3.59)	5764.6** (2.59)	3.39 (.011)	22140

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table presents results from regression discontinuity models based on loan clustering at LTV intervals of 5, by documentation type and level of refinement. Columns 1 and 2 present results for excess losses, with t -statistics in parentheses. Column 3 presents results from the McCrary heaping test (log-difference) with standard errors in parentheses. Column 4 presents the total number of loans (N) by level of refinement. The unrefined group uses all loans within a documentation type. The high fraud group uses all loans from high fraud originators within a documentation type. The semi-refined group removes all loans from high fraud originators. The fully refined group also removes all loans from high fraudulent income overstatement zip codes.

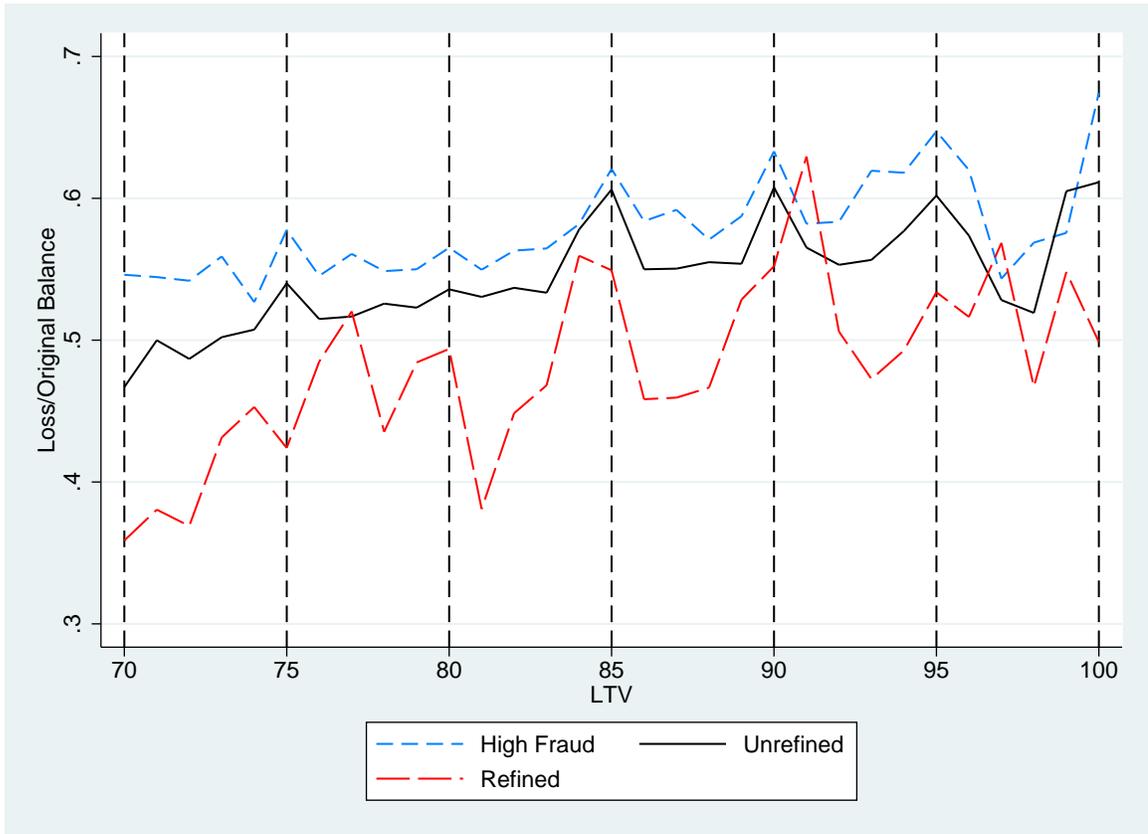
Table 1.1 presents results from the two tests. Columns 1 and 2 show results for excess losses, while column 3 presents results from the McCrary test. T-statistics are reported in parentheses for excess losses while standard errors are reported in parentheses for the heaping test. The table compares regression discontinuity results for the unrefined full documentation control group, full documentation loans from high fraud originators, the semi-refined full documentation control group which removes full documentation loans from high fraud originators, and the fully refined full documentation control group which removes loans from high fraud originators as well

as those originated in ZIP codes above the median level of fraudulent income overstatement. These groups are also compared for no/low documentation loans. The basic findings in this table are 1) the unrefined sample of full documentation loans shows measures consistent with fraud, while 2) both semi- and fully-refined full documentation control groups exhibit fewer measures associated with fraud than the full documentation control group. Additionally, measures consistent with fraud are found for both semi- and fully-refined no/low documentation groups, so it is unlikely that the null finding for semi- and fully-refined full documentation loans is spurious.

The test for excess losses showed that unrefined full documentation and high fraud full documentation loans clustered at LTV intervals of five exhibited excess losses, relative to loans in these groups not clustered at LTV intervals. Excess losses for these groups ranged from roughly \$3,000-\$4,000 dollars. Unrefined and high fraud no documentation loans also showed excess losses which were larger than those estimated for full documentation loans in these categories by roughly \$2500. In contrast to unrefined and high fraud full documentation loans, semi-refined and fully refined full documentation groups did not exhibit statistically significant excess losses. However, semi-refined and fully-refined no documentation groups did exhibit excess losses similar to unrefined and high fraud groups. This suggests that the null finding for semi- and fully-refined full documentation groups is not spurious.

The results for the excess losses for loans clustered at LTV intervals can also be seen in Figure 1.3. Figure 1.3 displays excess losses for the unrefined control group, high fraud full documentation loans, and the fully refined control group. The graph shows that excess losses for the unrefined control group and high fraud full documentation loans consistently reach local maximums at the LTV intervals of five, shown with reference lines. For these two groups, the local spikes all consistently coincide with the LTV intervals. However, this pattern does not occur for the refined control group. The spikes in excess losses for the refined control group almost all

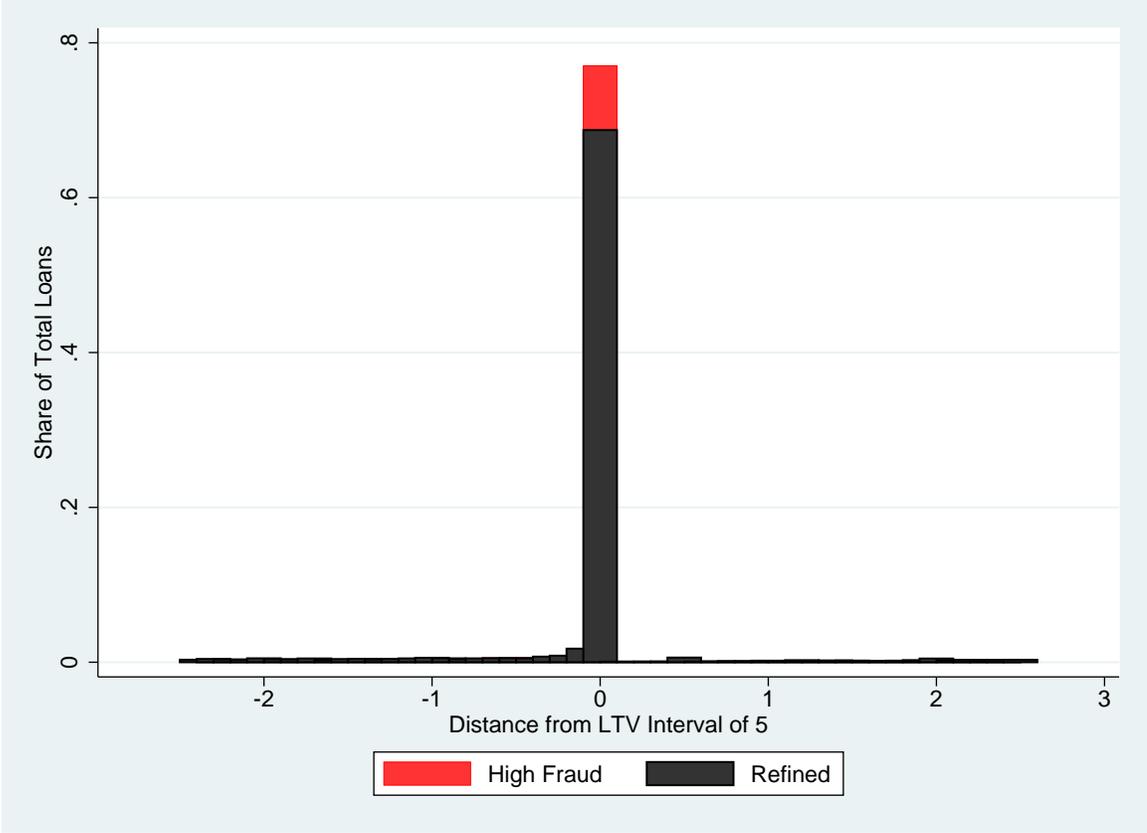
Figure 1.3. Excess Losses at LTV Intervals of Five for Full Doc Loans



occur away from the LTV intervals of 5, with approximately equal amounts occurring above as below the LTV intervals. This suggests that the pattern of losses for the refined control group is more random, while the pattern for the other two groups is not.

The McCrary tests in Table 1.1 showed significant heaping for all groups. However, high fraud loans showed consistently more heaping than any other group. When considered with the positive excess losses, this suggests that the full documentation loans from high fraud originators are appropriate for removing from the control group. The semi- and fully-refined groups also still exhibited excess heaping. While this heaping was not associated with statistically significant excess losses, this raises some concern that fraud has not been completely purged from the control group. To the extent that some fraud remains in the fully-refined control group, the estimates in

Figure 1.4. Net Heaping for High Fraud and Refined Full Doc Loans



this paper would understate the true effects of fraud. Figure 1.4 shows heaping for high fraud and fully refined groups. The data is centered around the LTV intervals to facilitate visual comparison. As can be seen, both groups exhibit a substantial amount of heaping. That being said, the refined group exhibits less heaping than the high fraud group.

The final table in this section shows the distribution of covariates between the Liar’s Loans treatment and fully-refined full documentation control groups to assess any possible observable selection bias. Table 1.2 is divided into three panels. Panel A shows mean loan information including the original loan balance, LTV and FICO score. Panel B presents the distribution of risk measures, loan type, and loan purpose between groups. Finally Panel C presents loan performance information. The basic finding in this table is that the control group consistently has worse observable

risk measures than the treatment group. To the extent that this selection is not entirely mitigated by the risk controls, we would expect the estimates in this paper to underestimate the true effects of fraud.

In panel A, we see that the control group has a slightly lower original balance than the treatment group. This is consistent with the slightly riskier average measures for the control group. The control group mean FICO score was roughly 30 points lower than that for the treatment group, while the LTV was 3 percentage points higher. Panel A also shows the number of loans in the treatment and control group. The refinements removed a substantial portion of loans from the control group. Removing loans from high fraud originators caused the largest drop in loans because only roughly half of the data contained originator names.¹⁷ Removing loans from ZIP codes above the median fraudulent income overstatement also removed a large portion of loans. Only roughly one-third of the loans in the CCF were originated in ZIP codes below the median level of income overstatement. However, there are still over 200,000 loans left so lack of statistical power should not be a problem.

Panel B shows the distribution of LTV ratios, FICO scores, loan purpose, and loan type between these groups. The control group had a significantly larger proportion of subprime FICO scores than the treatment group, which had roughly 67% of loans with credit scores prime or higher. The treatment group also had 80% of loans with LTV ratios 80 or under. This is a high proportion of loans that should have had a large equity cushion to absorb house price declines of up to 20%. The treatment group also had less risky loan types and purposes. Cash-out refinances were notoriously abused during the housing bubble, and the treatment group includes fewer cash-out refinances. The treatment group does include more adjustable rate mortgages, which

¹⁷While only half of the data contains originator names, all observations contain data for the current servicer of the loan. As will be more fully discussed in the robustness section, the estimates in this paper are robust to including high fraud servicers in the high fraud originator measure to preserve some of the data.

Table 1.2. Sample Description

Panel A: Loan Information (mean)		
	Treatment	Control
Original Balance (\$)	324,749	274,638
Loan-to-Value	80.9	83.5
FICO Score	684.7	652.4
N	3,695,068	204,529
Panel B: Distribution of Risk Measures, Loan Type, and Purpose (%)		
	Treatment	Control
<i>FICO Score</i>		
Sub Prime	12.5	36.4
Alt-A	20.4	20.7
Prime	55.2	31.5
High Achiever	11.9	11.4
<i>Loan-to-Value</i>		
LTV \leq 80	80.3	61.5
80 < LTV \leq 95	13.5	24.1
95 \leq LTV	6.3	14.5
<i>Loan Type</i>		
Fixed Rate	32.7	49.2
Adjustable Rate	67.3	50.8
<i>Loan Purpose</i>		
Purchase	53.0	40.5
Refinace	13.9	16.1
Cash-out Refinance	33.1	43.4
Panel C: Loan Performance		
	Treatment	Control
Delinquency Rate (%)	46.8	38.0
Foreclosure Rate (%)	10.2	7.5
Mean Loss in Foreclosure (\$)	176,315	97,675
Loss/Original Balance (%)	57.8	50.3
LTV if Foreclosed (mean)	81.6	84.8

were riskier than fixed rate mortgages. However, on net, the treatment group has substantially better observable risk measures. Due to the better risk measures in the treatment group, if selection bias persists despite the inclusion of controls, we would expect this bias to understate the true effects of fraud.

The final panel shows loan performance statistics. The poor performance of these loans is without precedent in recent history. For example, the delinquency rate between 1995-2005 averaged roughly 2%, and peaked at 11% during the crisis. Despite having better observable risk measures, the treatment group had a delinquency rate almost 9 percentage points higher than the already high delinquency rate of the control group. This difference alone is almost the entire peak rate for all mortgages during the crisis. Additionally, the foreclosure rate was roughly 25% higher for the treatment group. These loans also lost a large amount in foreclosure at close to 60% of the original balance or \$176,000. Combined with the roughly 80% mean LTV of foreclosed Liar's Loans, the average loss of close to 60% of the original balance implies that the value of the home must have declined by roughly 80% of the appraised home value. In contrast, the control group lost slightly less of the original balance despite having a higher mean LTV.

1.4 Main Results

Section 1.4 presents the main results for total and excess losses to foreclosure caused by fraudulent Liar's Loans. The main findings in this section are that total and excess losses in foreclosure due to fraud were substantial, prolonged, and concentrated in neighborhoods particularly poorly suited to bear the losses. Losses to foreclosure for the entire private label RMBS market totaled roughly \$500 billion from 2007-2012. Roughly 70%, or \$345 billion, of these losses are accounted for by losses in no/low documentation Liar's Loans. Of this \$345 billion, roughly \$100 billion can be considered a conservative lower bound estimate for excess losses. This implies that

excess losses in Liar’s Loans alone account for 20% of total market losses. Forty-four percent of total market losses occurred in ZIP codes above the 75th percentile of fraudulent income overstatement. These neighborhoods were already economically fragile before the financial crisis and experienced terrible economic performance throughout the Great Recession. The prolonged foreclosure crisis was a significant factor in explaining this poor performance.

The results in this section are presented in two tables and one figure. Table 1.3 presents estimates of excess foreclosures, delinquencies, and losses conditional on foreclosure. Table 1.4 uses these estimates to calculate total and excess losses at the level of the entire market. Finally, Figure 1.5 shows the distribution of these losses through time.

Table 1.3. Main Results: Excess Negative Outcomes for Liar’s Loans in Pooled Sample

	No Controls	Some Controls	Preferred	Unrefined
Loss (\$)	26083.4*** (22.61)	21290.1*** (20.05)	22912.3*** (29.02)	11112.8*** (42.98)
Loss/Orig Balance	0.106*** (20.43)	0.0906*** (18.47)	0.0911*** (28.27)	0.0359*** (42.84)
<i>N</i>	390289	390289	390289	671567
Foreclosure Rate (%)	0.0269*** (22.53)	0.0290*** (27.86)	0.0209*** (27.68)	0.0175*** (55.51)
Delinquency Rate (%)	0.0903*** (26.28)	0.128*** (48.33)	0.0980*** (48.54)	0.0812*** (103.13)
<i>N</i>	3899597	3899597	3899597	7018803

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1.3 shows the main results for excess foreclosures, delinquencies, and losses conditional on foreclosure for Liar’s Loans in the pooled sample. The table presents results from regressions of the outcomes on the no/low documentation indicator,

with 1) no controls, 2) risk controls only, 3) all controls, and 4) the unrefined full documentation control group with all controls. Specifications one to three move from least saturated to most saturated models, with the most saturated model being the preferred estimate. The unrefined specification is included to allow us to assess the size of the effects of the refinements. Specification one regresses each outcome on the treatment indicator, and only controls for the size of the original balance. Specification 2 also includes sets of controls for the LTV ratio, FICO score, loan purpose, and loan type. Finally, specification three also includes ZIP code level fixed effects, indicators for origination year, and loan-year observation fixed effects.

All specifications in this table show statistically and economically significant results for all outcomes. The results are also reasonably consistent across specifications. The preferred estimate in this table shows that the conditional foreclosure rate was roughly 2.1 percentage points higher than that for the control group. This result implies that fraud caused a 30% relative increase in foreclosures compared to the control group foreclosure rate of 7.5%, or equivalently that roughly one-fifth of Liar's Loans foreclosures were excess. Excess losses conditional on foreclosure in dollar values for the preferred specification were just under \$23,000. To the extent that the risk controls do not completely eliminate COP selection bias, this represents an underestimate of the true causal effects. However, the size of this estimate is plausible and consistent with descriptions of the size of the average fraud in the literature. In the example of appraisal inflation presented by Ben-David (2011), the price of the home was inflated \$20,000. Excess losses as a share of the original balance for the preferred specification were 9 percentage points of the original balance. The average loss as a share of the original balance for the refined control group was 50%. This implies that Liar's Loans lost 20% more conditional on foreclosure than the control group average.

Excess foreclosures estimated for the unrefined control group are also consistent with those estimated for the refined group. The increase in the foreclosure rate for this specification was 1.75 percentage points, which is similar to that estimated for the refined model. Excess losses conditional on foreclosure were just under half as large as those estimated for the refined specification. The difference in losses suggests that the refinements did meaningfully reduce the incidence of fraud in the unrefined control group. This also helps to assess how sensitive the final results are to the refinements employed. As discussed in greater depth in the next section on robustness test, estimates from other alternative refinements fall in between estimates using fully-refined and unrefined control groups.

Excess delinquencies were also large and consistently averaged just under 10 percentage points across specifications. This increase is quite substantial at roughly 25% greater than the average delinquency rate of 38% for the refined control group. Additionally, the estimates of excess delinquencies are within the range of estimates in the existing research. The increase is slightly higher than the 5 - 8 percentage point increase reported by Jiang, Nelson and Vytlačil (2014) which was based on their unrefined full documentation control group. However, the increase in excess delinquencies was less than the 50% - 60% increase in the delinquency rates estimated by Piskorski, Seru and Witkin (2015) and Griffin and Maturana (2016). These results were produced by directly observing fraud and are therefore the most credible in the literature. This suggests that the refinements made to the full documentation control group may not have completely eliminated the presence of fraud. That being said, the increase in excess losses to foreclosure estimated with the refined group was larger than this increase. This suggests that unrefined and refined estimates provide a reasonable bracket for the true effects, assuming that COP selection bias is mitigated by the inclusion of risk controls.

Table 1.4. Total and Excess Losses to Foreclosure for the Entire Private Label RMBS Market from 2007-2012

Panel A: Total Losses and Foreclosures		
	Full CCF	Entire Market
<i>Foreclosed Balance (billions \$)</i>		
All Loans	\$321.54	\$892.95
Liar's Loans	\$220.05	\$611.10
<i>Losses to Original Balance in Foreclosure (billions \$)</i>		
All Loans	\$179.51	\$498.51
Liar's Loans	\$125.06	\$347.30
<i>Total Foreclosures</i>		
All Loans	1,473,244	4,091,345
Liar's Loans	890,960	2,474,284
Panel B: Excess Losses and Foreclosures in Liar's Loans		
	Full CCF	Entire Market
<i>Losses due to Extra Foreclosures (billions \$)</i>		
Total Liar's Loans Excess Foreclosures	182,560	506,986
Average Loss in Foreclosure	\$140,384	-
<i>Excess Losses in Foreclosure (billions \$)</i>		
Unrefined	\$7.87	\$21.86
Refined	\$16.23	\$45.08
Total Excess Losses (billions \$)		
Unrefined	\$33.50	\$93.02
Refined	\$41.86	\$116.24

Table 1.4 shows total and excess losses from 2007-2012 projected to the level of the entire market using the average CCF market share. Panel A shows total losses and foreclosures. The total foreclosed balance in the CCF was \$321.5 billion, which implies a total market foreclosed balance of almost \$900 billion. Over half of this foreclosed balance was not recovered through foreclosure auctions. Losses for Liar's Loans accounted for 70% of total losses, and 40% of the foreclosed balance. Raw numbers of foreclosures were also substantial at 1.5 million in the CCF, and 4 million for the entire market. In comparison, estimates of the total number of foreclosures for the financial crisis and Great Recession suggest that roughly 5 million foreclosures occurred, and an additional 5 million home forfeiture actions similar to foreclosures occurred.¹⁸ Therefore, the CCF dataset accounts for roughly 15% of total home forfeiture actions that occurred, and the private label market accounts for roughly 40%.

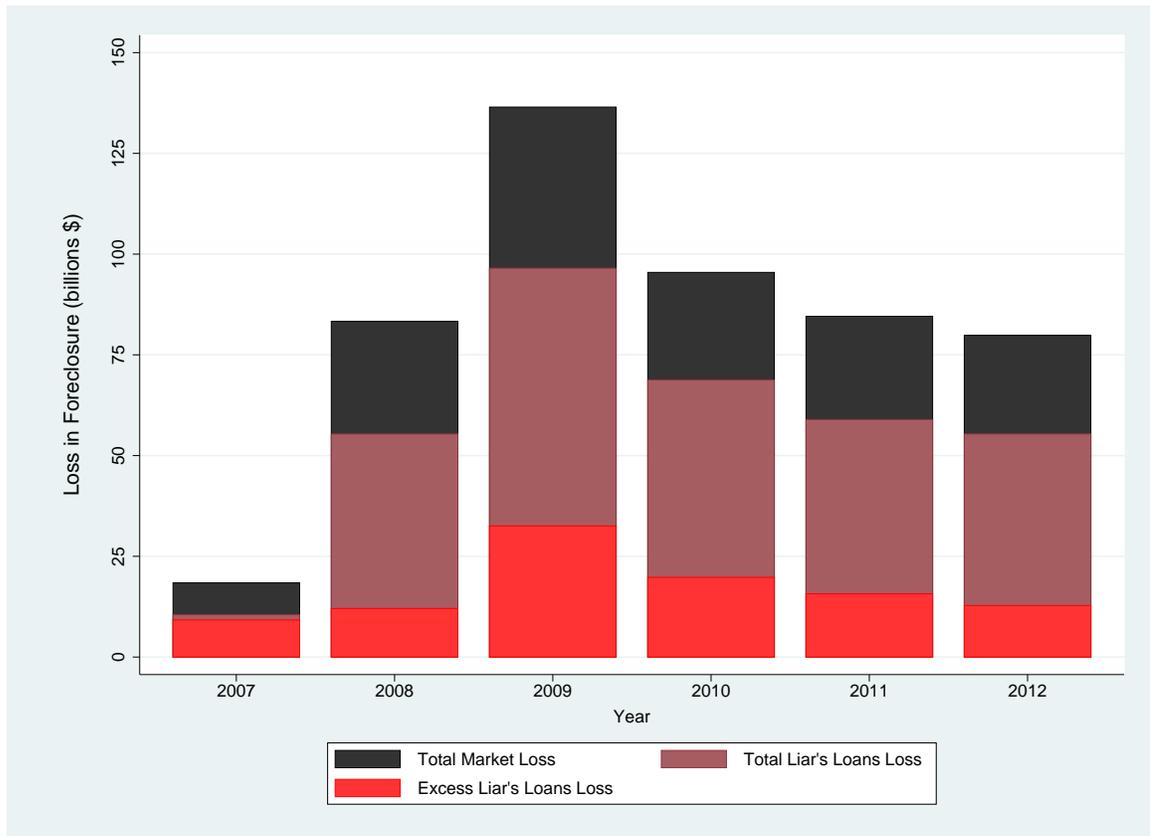
Panel B presents the total amount of excess losses and foreclosures implied by the regression results, which are substantial. Excess losses due to extra foreclosures and excess losses conditional on foreclosure are presented separately, as well as the total effect. To project the findings from the sample to the level of the full CCF, the average loss conditional on foreclosure for Liar's Loans in the full CCF is used, roughly \$140,000. This is less than the sample average Liar's Loan loss of 180,000 largely because LTV ratios of less than 70 were omitted from the sample.¹⁹

Excess losses due to extra foreclosures is simply the number of excess foreclosures times the average loss in foreclosure. This is not presented separately for refined and unrefined groups because the regression estimates implied similar amounts of excess foreclosures for these groups. Roughly 20% of Liar's Loans foreclosures were excess,

¹⁸<http://www.creditslips.org/creditslips/2013/10/foreclosure-crisis-update.html>

¹⁹Excess losses for the market using the sample average loss of \$180,000 total roughly \$112-\$135 billion for the unrefined and refined control groups respectively.

Figure 1.5. Total and Excess Losses Caused by Liar’s Loans from 2007-2012



which implies that over 500,000 Liar’s Loans foreclosures at the level of the market were excess. The effect due to extra foreclosures totaled \$71 billion for the market, which is where the bulk of excess losses occurred. The effect due to loss conditional on foreclosure is the loss conditional in foreclosure times the number of non-excess Liar’s Loans foreclosures. At the level of the market, the loss conditional on foreclosure effect ranged between \$21-\$45 billion. These results imply total losses ranging from \$93-\$112 billion for this market. Total excess losses account for 40% of total Liar’s Loans losses, and 20% of total market losses. While these losses are quite substantial, it is worth re-emphasizing that they are best seen as a conservative lower bound.

Figure 1.5 shows the level of total market losses, total Liar’s Loans losses, and excess Liar’s Loans losses for each year from 2007-2012. This figure is significant because it shows that the bulk of losses to foreclosure were substantially more prolonged

than the financial crisis. The market panic had largely subsided by 2009. However there were over \$125 billion in losses to foreclosure in 2009, and between \$75-100 billion in losses in each year from 2010-2012. These losses were disproportionately concentrated in geographic areas that were economically fragile before the crisis, and help to explain the lack of recovery in these areas.

Fully 44% of these losses, or close to \$220 billion, occurred in ZIP codes above the 75th percentile of fraudulent income overstatement on mortgage applications.²⁰ Similar to the findings for the entire market, 70% of total losses can be accounted for by Liar’s Loans. These prolonged losses are significant for the lack of recovery in these areas because existing research has shown that foreclosures have substantial negative externalities. Foreclosure sales cause house prices, and thus wealth, to decline for every home in the neighborhood, which depresses local aggregate demand. Mian, Sufi and Trebbi (2015) find that the causal effects of foreclosures can account for one-third of the total fall in house prices, one-fifth of the decline in residential investment, and one-fifth of the decline in auto sales. These effects contributed to the terrible performance of high income overstatement ZIP codes. Mian and Sufi (2015) found that these ZIP codes experienced negative income growth from 2005-2012, as well as increases in poverty and unemployment.

1.5 Robustness Analysis

Section 1.5 discusses the robustness of the main results presented in section 1.4. This section discusses the robustness of the results to different model specifications and the sensitivity of estimates to different levels of control group refinement, and formally tests for coefficient stability to bias from unobservable confounders using

²⁰The measure of income overstatement used in this paper is slightly different than that in Mian and Sufi (2015). The measure used in this paper matches census tracts to ZIP codes through the free program developed by the Missouri Data Center as in Adelino, Schoar and Severino (2015), rather than the proprietary bridging used in Mian and Sufi (2015).

the analysis developed in Oster (2014). Overall, the main results hold up well across different specifications or levels of refinement, and are stable to bias due to unobservables.

The main results presented in section 1.4 are reasonably robust to model specifications with different geographic levels of fixed effects and different sample restrictions, and across loan types or purposes. The estimates are robust to including either state or county level fixed effects, which both produce slightly larger estimates than ZIP code level fixed effects. To an extent, ZIP code level fixed effects represent a conservative assumption, because it is known that fraud was clustered by ZIP code. Therefore the fixed effects may pick up some of the effect that is rightly attributed to the treatment indicator. These estimates are also consistent in the unrestricted full sample. Finally, the estimates are robust across loan types and purposes, with coefficients similar to those estimated in the full sample. In general, fixed rate loans, refinance, and cash-out refinance loans showed excess losses slightly larger than those previously estimated, while ARM mortgages and primary purchase loans showed excess losses that were slightly less.

The estimates are also reasonably robust to different levels of refinement. Unrefined and refined full documentation control groups produce estimates that range from \$93 - \$112 billion. This range brackets estimates produced by different levels of refinement. For example, the semi-refined group produces an estimate close to \$100 billion. Other alternative refinement restrictions also fall in this range. For example, I was concerned that refining the control group by removing loans from high fraud originators inadvertently removed too much data because only half of the observations had data for originator name, while all observations had servicer name data. To make sure that this was not the case, I coded the servicers for high fraud servicers and reintroduced the data that was dropped. The results for the semi-refined and fully refined group for this model were slightly larger than \$100 billion. Therefore, it is

reasonable to conclude that the range of estimates given by the unrefined and refined control groups credibly bracket the sensitivity of the estimates to different levels of refinements.

While the visual comparison of the estimates produced by differing levels of controls in Table 1.3 suggest that the estimates are reasonably stable, it is still useful to formally test for coefficient stability using the method developed in Oster (2014). This analysis formally tests for the stability of coefficients to bias due to unobservable confounders by comparing co-movements in coefficients and R^2 in models which include and exclude controls. The bias adjusted coefficients are defined as:

$$\beta = \beta_{long} - (\beta_{short} - \beta_{long}) \frac{(R_{max}^2 - R_{long}^2)}{R_{long}^2 - R_{short}^2},$$

where β is the bias adjusted beta, β_{long} and R_{long}^2 are the coefficient and R^2 from the regression which includes controls, β_{short} and R_{short}^2 are the coefficient and R^2 from the regression without controls, and R_{max}^2 is the maximum R^2 . The short regressions correspond to the no control model specification in Table 3, while the long regressions correspond to the preferred specification. The test is performed under the assumption of equal selection, which assumes unobservables are equally as important as observables. Additionally, the test uses the recommended R_{max}^2 of $1.3 * R_{long}^2$. As described in Oster (2014), this assumption for R_{max}^2 is conservative because only 90% of true results estimated using constructed data survive this threshold.

Table 1.5. Results from Oster Bias Adjustment for Fully Refined Estimates

	Loss (\$)	Loss/Original Balance	Foreclosure (%)	Delinquency (%)
Adjusted Coefficient	19124	.08615	.01908	.1003

This test shows that the estimates are stable and that any bias due to unobservables is likely slight. All bias adjusted coefficients are quite close to non-adjusted coefficients. The estimate of excess losses conditional on foreclosure is still close to \$20,000. The adjusted foreclosure rate is still roughly 2 percentage points. Losses as

a share of the original balance are within a half percentage point of the non-adjusted estimate. Finally, the delinquency rate is slightly higher than the non-adjusted estimate. Therefore this test suggests that any bias due to unobservables is slight even if we assume that unobservables are equally as important as observables.

The estimates produced in this paper are stable across specifications and robust to different modeling assumptions. However, it needs to be emphasized that these estimates are best interpreted as conservative lower bounds for the true causal effect of fraud on excess losses to foreclosure for three main reasons. First, the refinements may not have completely removed fraud from the control group because the estimates of excess delinquencies are still much lower than those estimated in research that directly observes fraud. Second, the COP selection bias is likely not entirely mitigated by the inclusion of controls for risk. This understatement is also concerning because the effects from loss conditional in foreclosure were substantially less than those due to extra foreclosures. Finally, the sample appears broadly representative of the market in terms of risk measures, and also contains a broad portion of the market. However, there is reason to believe that the practices at Wells Fargo may have been less fraudulent than average for the market. For these reasons, the estimates may understate the true effects of fraud. While these estimates show that a substantial portion of the losses in this market are due to fraud, they are best interpreted as a conservative lower bound.

1.6 Conclusion

The findings in this paper and the broader research on fraud have shown deep seated problems with deception in the structure of financial intermediation. Accurate disclosure of the quality of collateral backing securities is a minimum condition for the basic functioning of asset markets. However, this condition was not met on a widespread basis, with disastrous consequences. These problems with deception led

to historic losses of wealth for savers who invested their retirement funds in these bogus securities, for borrowers who were given mortgages that were counter to their best interests, and for the communities which experienced the prolonged foreclosure crisis. Losses in no/low documentation Liar's Loans account for 70% of total losses to foreclosure in the data. A conservative lower bound estimate for excess losses suggests that \$100 billion, or roughly 30% of total Liar's Loans losses, can be considered excess. Moreover, 44% of total losses occurred in ZIP codes with the highest levels of fraudulent income overstatement on mortgage applications. These areas were particularly poorly suited to bear these losses, and the prolonged losses to foreclosure in these neighborhoods helps to explain the terrible economic performance of these areas throughout the Great Recession.

Borrowers and savers lacked sufficient protections against fraud in part because, at the time, the dominant view was that these protections were unnecessary. It was argued that in a free market a financial institution's interest in maintaining their reputation would be sufficient to prevent dishonest activities on a large scale. Moreover, complex financial innovations were seen as efficiency enhancing because they allowed prices to more fully reflect new information about fundamentals. A sad irony of the financial crisis is that at precisely the time that these arguments were being made, all of the major financial institutions involved in the sale of mortgages were falsifying and misrepresenting the information needed to accurately price these innovations. Instead of reputation providing incentives for honest dealing, the reputation of the major financial institutions was used to support the deception by making investors less suspicious of the securities they purchased (Akerlof and Shiller, 2015).

In light of the widespread problems revealed by the financial crisis, the dominant pre-crisis view of the impossibility of dishonest practices should be seen as naive, and now discredited. To address these problems will require the creation of new protections for borrowers and savers, as well as more aggressive enforcement of existing

protections. Moreover, financial regulation needs to prioritize increased monitoring of financial institutions, limit extreme executive compensation, and criminally prosecute financial institution senior executives engaged in deception and fraud.

CHAPTER 2

PUNISHMENT OR FORGIVENESS? LOAN MODIFICATIONS IN PRIVATE LABEL RESIDENTIAL MORTGAGE BACKED SECURITIES FROM 2008-2014

2.1 Introduction

A major factor contributing to the Great Recession and weak recovery in the U.S., from 2008-2014, was instability in the household mortgage market. Following historic declines in house prices, the default rate on household mortgages increased from the historical average of 2% to a high of 11% in 2010.¹ These defaults resulted in waves of foreclosures that were highly costly to borrowers who lost their homes, investors in securities or derivatives based on these loans, and the communities in which the foreclosures occurred. When facing a large number of defaults, a standard tool for preventing foreclosures is modifying delinquent mortgages to forgive debt. Forgiving debt mitigates losses through preventing foreclosures, and provides economic stimulus through deleveraging borrowers. However, mortgages can also be modified to increase debt, instead of forgiving it, through capitalizing missed interest payments and fees. Increasing debt reduces the effectiveness of modifications at loss mitigation and providing stimulus.

This paper examines the extent to which voluntary modification of privately securitized mortgages either increased or forgave debt during the Great Recession and weak recovery from 2008-2014. I focus on loans used as collateral for mortgage-backed

¹Data on the delinquency rate for U.S. household mortgages is available from the St. Louis Federal Reserve FRED database. Accessed June 15th, 2016 from: <http://research.stlouisfed.org/>

private label securities (PLS), because this is where the largest portion of defaults occurred. The market for residential mortgage backed securities (RMBS) in the U.S. is divided into two portions: agency and non-agency. Agency RMBS are securities issued by government sponsored entities, such as Fannie Mae and Freddie Mac. Non-agency RMBS, also known as private label RMBS, are those securities issued by the private institutions. The PLS market is where the bulk of subprime mortgages were securitized, and hence where the largest portion of defaults occurred. I account for the increase or decrease in debt due to modifications using a loan-level panel dataset which covers roughly 30%-40% of the PLS market, depending on year.

There are three primary findings in this paper. First, the total net increase to borrower debt balances due to modifications for the entire PLS market from 2008-2014 was \$20 billion. Second, the net amount of debt added per modification grew from 2010-2014, roughly doubling from 5.6% to 11.3% of the original balance. Finally, I find that the growth in the amount of debt added per modification is not consistent with capitalization of increased numbers of missed interest payments, because the number of missed interest payments per modification remained constant from 2010-2014. Therefore, the growth in the amount of debt added is consistent with increased capitalization of fees such as delinquency fees. Additionally, my data show that modifications which reduced debt were rare, with only 5% of modifications resulting in net reductions of debt. Also, foreclosures were much more common than modifications, with 88% more foreclosures occurring. These foreclosures were highly costly, with losses ranging from 45%-65% of the original loan balance, and totaling almost \$600 billion from 2008-2014. In contrast, the gross amount of forgiveness only totaled \$18.8 billion. The large difference between losses to foreclosure and debt forgiven suggests that there was ample room to increase forgiveness to mitigate losses to foreclosure.

To be sure, 75% of modifications in my sample did reduce borrower monthly payments, and so provided some relief even if increasing debt balances. However, through increasing negative equity, the increase in debt by modifications blunted the ability of modifications to mitigate losses or provide economic stimulus. Modifications that increased debt impeded loss mitigation because they had significantly higher redefault rates than those that reduced debt (Haughwout, Okah and Tracy, 2009). Moreover, increasing negative equity, rather than eliminating it through debt forgiveness, guaranteed that redefaults would result in costly foreclosure because the borrower could not sell the home without paying the lender the difference between the amount owed and the sale price.

Increasing negative equity also reduced the stimulative effects of debt restructuring. First, increasing negative equity did not reduce the need for substantial cuts in borrower spending to deleverage and rebuild lost savings. Negative equity also reduced the effectiveness of monetary policy because it prevented the borrower from gaining access to external finance, such as refinancing at lower interest rates (Mian and Sufi, 2014). Negative equity also reduced aggregate demand by reducing the incentive to invest in the household, because all gains would go to the lender. Haughwout, Sutherland and Tracy (2013) find that from 2007-2012, households with negative equity decreased residential investment by 75%. Finally, the increased redefault rate led to more foreclosures with substantial negative externalities for the communities in which they occurred. Foreclosures reduce house prices for all homes in the community, thus further depressing aggregate demand. Mian, Sufi and Trebbi (2015) find that the causal effects of foreclosures can account for roughly one-third of the decline in house prices, one-fifth of the decline in residential investment, and one-fifth of the decline in auto sales from 2007-2009.

The findings in this paper are also consistent with reports of a principal-agent problem between investors in privately securitized mortgages, and the servicers of

these loans who are responsible for processing payments and managing defaults (Levitin and Twomey, 2011; Thompson, 2011; COP, 2009). This principal-agent problem is caused by the perverse incentives built-in to the servicers' cost-plus compensation structure once a loan enters default. Servicers' compensation structure does not align their interests with the investors' interest in maintaining the net present value of the loan. Instead, servicers' compensation is based on three main parts. First, servicers receive a fee assessed on the unpaid principal balance of the loan. Second, servicers receive float income based on the time in which the servicers receive payments from borrowers, but have not yet remitted them. Finally, once a loan enters into default, servicers are able to receive income from a diverse array of fees, including but not limited to late fees, title search fees, property maintenance fees, appraisal fees, and other fees related to the foreclosure. These fees are paid by lenders in addition to borrowers, because the fees can be recovered through the proceeds of foreclosure sales prior to lenders receiving any revenue. The ability to assess these fees effectively creates a cost-plus compensation structure with little oversight.

The misalignment of servicer and investor interests caused two forms of perverse incentives directly relevant to the interpretation of the findings in this paper. First, this compensation structure can make foreclosure more profitable to servicers than modifying, even when modifying is in the best interest of investors, because they can charge expensive fees with little oversight. Second, when servicers do modify, they favor modifications that increase borrower indebtedness through capitalizing missed interest payments and fees, because these will increase their income based on a fixed-rate of the unpaid principal balance. These type of modifications are not in investors' interests because they have a high redefault rate. However, servicers are able to receive additional income from these redefaults through charging additional fees (Levitin and Twomey, 2011; Thompson, 2011; COP, 2009). The findings in this paper of the increase in debt added per modification being driven by fees, as well as the

larger frequency of foreclosure than modifications, even when foreclosures produced large losses, are consistent with these perverse incentives.

This work extends the previous findings of White (2008) and a 2010 study by the Congressional Oversight Panel (COP, 2010) to cover the entire course of the recovery from the Great Recession, from 2010-2014. These earlier papers found that 68% of voluntary modifications of privately securitized mortgages (White, 2008), and 95% of modifications done through the Home Affordable Modification Program (HAMP) (COP, 2010) during 2008 and 2010, respectively, increased borrower debt balances by roughly 5%. My findings extend this analysis by showing that the increase in debt added per modification doubled from 2010-2014, and calculating the total amount of debt added by modifications throughout the Great Recession and weak recovery. My findings show that the problems identified in these previous papers worsened during the subsequent years. Indeed, the total net addition to debt balances was larger in 2014 than in any other year in the sample, with the exception of the peak crisis year of 2010.

The remainder of this paper is organized into two sections. The first section reviews the relevant literature and background information needed to understand the results. The second section presents the data description and main findings.

2.2 Literature Review and Background Information

This section presents a review of the relevant literature and discusses the background information necessary to understand the main results. This section begins by discussing the role of loan modifications in mitigating losses to foreclosure. I then describe in further depth the market failure of the principal-agent problem between servicers and investors outlined in the introduction, and how it caused an inefficient level of loss mitigation in privately securitized loans.

Loan modifications which reduce debt are seen as a standard tool for loss mitigation. In general, household debt forgiveness produces mutually beneficial gains to both borrower and lender through avoiding high costs associated with foreclosure. Houses sold in foreclosure typically sell at steep discounts, averaging roughly 27% of the home price, for two main reasons. First, housing is a classic example of an illiquid asset, but financial institutions typically have an incentive to sell a home as rapidly as possible once it enters foreclosure. Therefore, forced sales require larger discounts than if the market were fully liquid. Second, the house may also have become physically damaged during the foreclosure process (Campbell, Giglio and Pathak, 2011). Moreover, foreclosures also have negative externalities that lower prices for all homes in the neighborhood. Mian, Sufi and Trebbi (2015) estimate that the causal effects of foreclosures can account for roughly one-third of the total decline in home values from 2007-2009. They also estimate that the destruction of wealth from these foreclosures also lowered aggregate demand, accounting for one-fifth in the reduction of residential investment and auto sales during this period.

Estimates during the Great Recession showed that the mutually beneficial gains to avoiding foreclosure could have been substantial. For example, the Congressional Budget Office (CBO) analyzed different options for principal reduction for delinquent borrowers who have mortgages owned or guaranteed by Fannie Mae and Freddie Mac. They found that debt forgiveness sufficient to reduce loan-to-value (LTV) ratios to 100 or 90 percent through principal reduction could have saved Fannie Mae and Freddie Mac \$2.8 billion for reducing the LTV to 100, or \$2.1 billion for reducing the LTV to 90. Therefore, even if Fannie Mae and Freddie Mac had undertaken loan modifications for delinquent borrowers that were generous enough to give the borrowers 10% equity in their home (i.e. to reduce the LTV to 90), they would still have saved slightly over \$2 billion. Giving the borrower positive equity in their home would also have prevented a foreclosure if the modification redefaulted, because the borrower could

sell their home without having to pay the lender the difference between the sale price and the amount owed on the home (Moore and Remy, 2013).

Due to mutually beneficial gains to avoiding foreclosure, lenders tend to look for alternatives including modifying the original terms of the loan to forgive some portion of the debt. However, several problems in the structure of private label securitization prevented modifications in loans used as collateral for these securities, even in cases where modification was efficient for both borrower and investor. First, mortgages held in securitization pools are governed by a contract known as a pooling and servicing agreement (PSA). These contracts define the roles and responsibilities of all parties to the securitization, such as the transfers of the loans into the trust, management of the trust, issuance of securities to investors, servicing of the loans, and permissible actions that can be taken once a loan is in default. However, research has shown that roughly 40% of securitized mortgages are governed by PSAs with some clause that restricts servicer modification ability (Gelpern and Levitin, 2009).

Second and more relevant to the interpretation of the results in this paper, there is also a principal-agent problem between servicers and investors that impedes restructuring even when it was in the investor's interest. Servicer's compensation is not aligned with the investors interest in maximizing the net present value of the loan. Instead, servicer's choice of modification or foreclosure, and type of modification, is based on the incentives in their own compensation structure. Servicers receive three main types of income: a fixed-rate fee based on the unpaid principal balance of a loan; float income from the period in which the servicer receives monthly payments but has not remitted them to the trust; and ancillary fees. The main types of ancillary fees include delinquency fees and reimbursement for costs associated with foreclosure, such as property maintenance fees, title search fees, process serving fees, appraisal fees, other legal fees, or any of a number of other fees. There is no effective oversight of the reasonableness of these fees, and servicers are able to be reimbursed for these

fees out of the proceeds of the foreclosure sale prior to any revenue being given to investors. This misalignment of incentives creates two related problems which prevent efficient restructuring (Levitin and Twomey, 2011; Thompson, 2011; COP, 2009).

First, these fees can be quite lucrative and create an incentive to foreclose, even when it is in the investors best interest to modify, because modification is costly. Modification is costly for three reasons. First, modifications require substantial labor costs such as reunderwriting the loan. Second, if the modification reduces monthly payments through reducing the unpaid principal balance, the servicer loses its fixed rate fee. Third, servicers must advance missed payments while the loan is delinquent. They can recoup these advances in cases of foreclosure or if the loan becomes current, but not in many types of modifications. In contrast, the fees associated with managing delinquency and foreclosure can be quite lucrative. For example, analysis of one major servicer, Ocwen, showed that late fees and loan collection fees made up 18% of it's revenue in 2008 (Thompson, 2011). There can also be an incentive to keep a borrower delinquent so that the servicer can receive revenue from delinquency fees, until the cost of financing advances outweighs the revenue received from the fees. This has been described as keeping the borrower in a default fee "sweatbox" (Levitin and Twomey, 2011). Essentially, the servicer's choice between "modification and foreclosure is a choice between limited fixed-price income and a cost-plus contract arrangement with no oversight of either the costs or the plus components," (COP, 2009). Even worse for the investor, this cost-plus structure creates an incentive to foreclose in a more costly manner than less, because servicer's compensation is positively related to costs and has the senior claim on foreclosure sale revenue. Cost-plus compensation is typically banned from government contracts due to these perverse incentives (Levitin and Twomey, 2011; COP, 2009).

The second problem created by this compensation structure is that it provides incentives for servicers to choose types of modifications that promote their own inter-

ests, even if these modifications have a higher redefault rate and hence do not promote the investor's interests. For example, reducing monthly payments through principal reduction has been shown to be the most effective form of modification at preventing redefaults (Haughwout, Okah and Tracy, 2009; Goodman et al., 2012). However, servicers are disincentivized to perform principal reduction because it reduces the amount of revenue they receive from their fixed-rate servicer fee, which is assessed on the unpaid principal balance of the loan. In contrast, servicers prefer modifications that increase the unpaid principal balance of the loan through capitalizing missed interest payments and fees because this increases the revenue from their fixed-rate fee. But these modifications that increase borrower indebtedness have higher redefault rates, which result in costly foreclosure for investors. Providing unsustainable modifications designed to redefault can also be a source of profit for servicers, because they can receive the lucrative foreclosure fees described above (Thompson, 2011; COP, 2009).

An obvious question is what is preventing market competition from correcting the principal-agent problem by creating incentives for "good" servicers who can meet the needs of investors? Market competition is unlikely to self-correct the misalignment of incentives because of information and collective action problems. Investors faced two main collective action problems in changing this structure. First, many PSAs had collective action clauses requiring a super majority of investors to amend any contractual terms. However, there were typically large numbers of geographically dispersed investors party to most of the major securitizations. Second, the investors often had different interests regarding the type of loan modification they would desire because they received compensation based on different parts of the cash flow, such as principal or interest payments. Therefore, some modifications would be favorable to some subset of investors, while wiping out a different subset of investors. Even if investors could overcome the collective action problem, they also lacked the necessary data to

evaluate loss mitigation practices of servicers, such as loan-level data concerning the reunderwriting of modifications. Moreover, investors typically lacked detailed information on the amount of fees being assessed by servicers. These collective action and information problems effectively undermined investors ability to perform meaningful oversight of servicers (Levitin and Twomey, 2011).

The cumulative effect of market failures in the structure of securitization was to make the level of modification for loans in this market inefficiently low. The difference in the amount modifications between securitized loans and loans held in bank portfolios suggest that modifications for securitized loans are inefficiently low. Recent estimates have shown the mortgages held in private securitization pools were less likely to be modified than loans held in banks portfolios, by 26%-36% (Agarwal et al., 2011) or 13%-32% (Piskorski, Seru and Vig, 2010). Additionally, Maturana (2016) found that an additional modification for the marginal loan reduced losses by 40% relative to the average loss. This suggests that the marginal benefits to modification were substantially higher than the marginal costs, which implies that the level of modifications was inefficiently low. Substantial losses for borrowers and lenders alike could have been avoided through modifications rather than foreclosures.

The perverse incentives in servicers' compensation also helps to explain why the public intervention to promote more modifications through the Home Affordable Modification Program (HAMP) fell short of its stated goals. The HAMP program sought to induce more voluntary modifications through providing incentive payments to servicers for performing more modifications. However, when compared to the possible fee compensation from foreclosing, these incentives were too small to promote an efficient level of modifications (Levitin and Twomey, 2011). The initial HAMP program was created in 2008 and designed to provide roughly 3-4 million modifications. However, five years into the Great Recession, it had only provided 860,000 permanent modifications (Mian and Sufi, 2014). In addition to the principal-agent problem, another

reason for the failure of HAMP is that many servicers simply lacked the capacity to handle the necessary volume of modifications (Agarwal et al., 2012).

The incentives in the servicers' compensation structure also caused a large portion of the voluntary modifications in the PLS market which did occur to be unsustainable because they often increased borrower debt balances and monthly payments. A study of voluntary PLS modifications found less than half of the modifications reduced monthly payments. Moreover, 68% of modifications increased borrower debt balances by capitalizing unpaid interest and fees. The average amount capitalized was \$10,800 on a balance of \$225,000. In contrast, only 10% of these modifications included principal reduction (White, 2008).

Voluntary modifications through the HAMP program also resulted in increasing borrower debt balances. However this was largely due to program design. The HAMP program did prohibit the capitalization of delinquency fees, however the program also mandated capitalization of missed interest payments. The HAMP program then reduced borrowers monthly payments through a combination of interest rate reductions and term extensions. Overall, reports showed that 95% of HAMP modifications increased borrower negative equity by roughly 5%. Redefault rates were also quite high. For some of the early vintages of HAMP modifications, close to 50% redefaulted within the first year (COP, 2010, 2009). The previous studies of White (2008) and COP (2010) which documented modifications increasing borrower debt balances are the closest studies to the analysis in this paper.

The perverse servicer incentives are relevant to the interpretation of redistribution inherent in modifications in two ways. First, to the extent that the increase in debt balances represents the imposition of arbitrary fees by servicers due to cost-plus compensation, the increase in debt balances can be unambiguously interpreted as an increase in total borrower debt obligations. This is relevant because some have interpreted capitalization of missed interest payments alone as not increasing total

borrower obligations (COP, 2010). The findings in the next section will show that a substantial portion of the increase in debt is consistent with increases in punitive fees, but not increases in missed interest payments. Therefore, a large portion of the findings can be interpreted as an increase in total borrower obligations.

Second, the perverse servicer incentives are also relevant to the interpretation distribution of losses from the housing bubble which is inherent in the restructuring of mortgage debt. Debt contracts are inherently distributional in that they specify that borrower equity takes the first losses from house price declines. In this context, the distributional conflict at the root of the renegotiation of debt terms was which party would bear the losses from the collapse of house prices. Would debtors be made to bear the all losses from the house price decline, or would there be a more equitable split between borrowers and investors (Mian and Sufi, 2014; Farhi and Werning, 2013)?

The outcome of this renegotiation was that modifications would concentrate all losses from the house price decline on debtors. If borrower equity was insufficient to absorb these losses, the borrower would be left with negative equity. In addition to taking all losses from the house price declines, debtors would take additional punitive losses due to delinquency or other fees imposed upon them by servicers. However, the choice to essentially punish debtors for the house price collapse, rather than to forgive them, resulted for larger losses for investors as well. It appears that the only party that benefited from this destruction of wealth was servicers. In effect, it was in their interest to destroy wealth by making the foreclosure process costlier through the imposition of arbitrary fees.

2.3 The Increase in Borrower Debt Balances from PLS Modifications

Two early reports suggested that voluntary modifications tended to increase borrower debt balances by capitalizing missed interest payments and fees (White, 2008; COP, 2010). However, to my knowledge no study has provided a systematic description of whether voluntary modifications continued to increase borrower debt balances throughout the course of the recovery from the Great Recession, and if so, by how much. This study seeks to contribute to the literature on household balance sheets by providing a systematic description of the increase in borrower debt balances by loan modifications in the PLS market from 2008-2014.

There are three primary findings in this paper. First, for the entire PLS market from 2008-2014, loan modifications resulted in a total net increase to borrower debt balances of \$20 billion. Second, the amount of net debt added per modification grew from 2010-2014, roughly doubling from 5.6% to 11.3% of the original balance, or \$16,000-\$26,000. Finally, the growth in amount added per modification is consistent with growth in fees assessed by servicers, but not increased numbers of missed interest payments, because the number of missed interest payments per modification remained constant from 2010-2014. This resulted in the average amount of capitalization per delinquency increasing from \$1,761 to \$3,488 from 2010-2014. This finding suggests that the growth in net debt added per modification from 2010-2014 is consistent with the agency problems due to servicer's cost-plus compensation structure described in the previous section. This also implies that the increase in borrower debt balances can be unambiguously interpreted as an increase in total borrower debt obligations.

My data also showed that foreclosures were much more common than modifications, with 88% more foreclosures occurring. These foreclosures were highly costly, with losses ranging from 45%-65% of the original loan balance. In contrast, modifications which reduced debt were rare, with only 5% of modifications resulting in net

reductions of debt. Modifications which resulted in net forgiveness of debt were also tightly limited to a small subset of servicers, with one servicer, Ocwen, accounting for roughly 60% of these modifications. Finally, cumulative losses to foreclosures during the full sample period totaled almost \$600 billion, while the gross amount of forgiveness only totaled \$18.8 billion. The large difference between losses to foreclosure and debt forgiveness suggests that there was ample room to increase forgiveness to mitigate losses to foreclosure. The remainder of this section is organized into two parts. The first part presents a basic description of the dataset, and the second presents the main findings.

2.3.1 Data Description

This section presents the basic description of the dataset. This section includes description of the source of data, major variables for measuring modifications and foreclosures, major risk measures, and the restrictions used to construct the sample from the larger dataset. The section also discusses the relation of this dataset to the larger PLS market, and the performance of these loans through time.

The sample of loans used in this study comes from the Columbia Collateral File (CCF), which is the same dataset used in White (2008). The CCF is a large loan-level panel dataset that includes all loans used as collateral for private label RMBS for which Wells Fargo is a trustee.² The full dataset contains monthly observations for 139 variables such as loan characteristics and performance. The data begin in December 2006, which makes 2007 the first year for which complete data are available. The number of loans and outstanding balance peaked in December 2007, with 4.2 million loans. However, by 2014 the number of loans in the dataset had fallen to roughly 1.44 million. This is primarily due to the 1.9 million completed foreclosures which occurred.

²This dataset is publicly available from www.ctslink.com.

The CCF data provide several variables measuring modifications including modification date and type of forgiveness or increase of debt. The CCF added variables to measure types of debt forgiveness or capitalization in November of 2008, which makes 2009 the first year for which we have complete data on redistribution in modifications. Types of debt forgiveness measured include principal forgiveness, interest forgiveness, and expense forgiveness. Total capitalized amount is the only variable which records the amount of debt balance increase. Capitalization in modifications occurs when missed interest payments or fees are added back to the outstanding balance of the loan. Unfortunately, the dataset does not provide separate measures of capitalization due to missed interest payments or fees. The data also do not include whether the modification occurred through the HAMP program. However, servicers which sign up for the HAMP program are required to use the HAMP template for all modifications that meet HAMP requirements. Many of the servicers in this dataset participated in HAMP, so it is likely that many of the modifications in the CCF data are HAMP modifications (COP, 2010).

The variable used in this study to measure foreclosures is titled “loss on liquidated property.” This variable measures the dollar value of losses to the lender due to having to sell the home for a price below the amount of debt owed on the loan. This variable measures any losses due to the sale of the home, which includes broader home forfeiture actions such as short sales or deeds-in-lieu, in addition to foreclosures. Foreclosures, short sales, and deeds-in-lieu are the three most common types of home forfeiture actions. These actions occur when a borrower is delinquent, but the value of the home is less than the amount owed on the loan, so that the borrower cannot sell the home. A foreclosure occurs when the lender forces the sale of the home to repay the value of the debt. A short sales occurs when the borrower finds a purchaser for the home at an amount below what is owed on the loan, and then gets the lender to consent to the sale. A deed-in-lieu of foreclosure occurs when the delinquent borrower

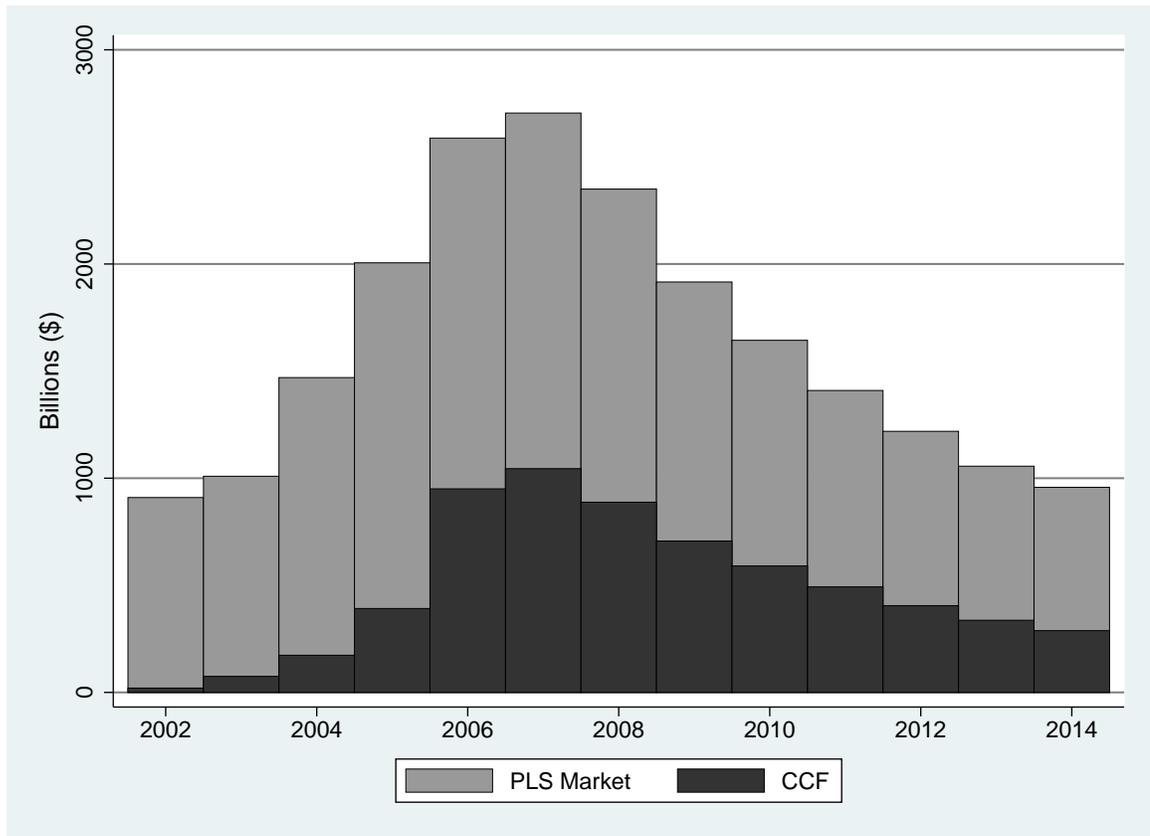
signs over the deed to the lender to prevent foreclosure from occurring. The lender will then need to sell the home. Borrowers tend to prefer short-sales or deeds-in-lieu because they are less damaging to a borrower's credit score than foreclosure. The results for losses to foreclosure reported in the next section are actually losses due to home forfeiture actions more broadly defined. It is satisfactory to combine these broader home forfeiture actions under the label of foreclosure for the purposes of comparing losses due to home forfeiture with debt forgiveness in modifications.

The main risk measures in the dataset are the FICO credit score and the loan-to-value (LTV) ratio. The FICO credit score is an index of creditworthiness that measures the borrower's chance of default over the next two years, with a higher credit score indicating a less risky borrower. The score does not provide an absolute measure of chance of default. Instead, the score provides a ranking of a borrower's creditworthiness relative to other borrowers. The score is based on the amount of debt a borrower currently owes, the borrower's payment history, types of credit in use, the length of credit history, and new credit. However, the exact formula used to calculate how each of these categories affects a credit score is proprietary, and thus not publicly available. Additionally, the weight given to each of these categories in calculating the credit score differs for each individual based on their particular credit history (Bhardwaj and Sengupta, 2015).

FICO scores range between 300-850, and are used to classify borrowers as sub-prime, alt-A, and prime. Subprime credit scores are those with FICO scores less than 620, alt-A are between 620 and 660, and prime are greater than 660. These categories are one factor that is used to determine what type of loan a borrower can receive, the amount of the loan, and the interest rate of the loan. Typically, prime borrowers qualify for the lowest interest rates and largest loans.

The LTV ratio is the ratio of the original loan balance to the appraisal value of the home. The LTV ratio measures the amount of equity in a home which serves

Figure 2.1. Outstanding Balance of the PLS Market 2002-2014



as a cushion to absorb house price declines. For example, a loan with an LTV of 80 can withstand a price decline of 20% of the value of the home before the borrower would have negative equity in the home. If the home was sold in foreclosure after this decline in value, the lender would typically take this loss. Traditionally, LTV ratios of 80% or below are considered lower risk mortgages.

The growth of the outstanding balance of loans in the CCF broadly mirrors that of the PLS market. Figure 2.1 shows the nominal yearly outstanding balance of the PLS market and the CCF from 2002-2014. The private label market grew rapidly from 2002 to 2007, tripling in value. After peaking at an outstanding balance of \$2.7 trillion in 2007, the market experienced severe losses and declined rapidly. As of 2014, the outstanding balance of the PLS market was \$957 billion, which was roughly equal to the 2002 outstanding balance. The CCF was not a substantial portion of

the market until 2005. However, it grew rapidly and accounted for just under 40% of market share in 2007, with an outstanding balance of \$1.05 trillion. The outstanding balance in the CCF then declined rapidly throughout the sample period, ending 2014 with roughly \$350 billion outstanding (SIFMA, 2015).

The CCF data appear to be broadly representative of the entire market. In general, the data account for a substantial portion of the entire market and mirrors the growth of the market. Also, the summary statistics of observable risk measures are similar to those reported in Griffin and Maturana (2016) and Piskorski, Seru and Witkin (2015), who use data based on this market. Because it appears representative of the entire market, the full CCF dataset from 2008-2014 is used to produce calculations for the entire market in Table 2.1, based on the yearly market share of the CCF.³ Additionally, a restricted sample of loans from the CCF is used to analyze average redistribution in modifications and losses to foreclosure. Following common practice in the literature which analyzes the PLS market, the sample of loans from this dataset is restricted to all mortgages that are 1st lien, owner occupied, originated between 2002-2008, with loan-to-value ratios between 70 and 100, FICO credit scores between 300 and 850, balances greater than \$30,000, and for which there is complete data.

These restrictions help to ensure that we are analyzing a consistent group of loans, and to prevent data errors. Loans are limited to those that are 1st lien loans because these are qualitatively different from junior liens. If a home is sold in foreclosure, junior liens are only paid back once the first lien is paid in full. Due to this difference in priority, comparing average modification and foreclosure experiences across these groups would be less informative than focusing on 1st liens exclusively. The sample

³I use 2008-2014 for the calculations in this table, rather than the full 2006-2014, because November 2008 is the first month in which redistribution information is recorded for modifications. Therefore, comparing total losses to foreclosure from 2006-2014 with total debt added in modifications from 2008-2014 would overstate the magnitude of losses to foreclosure relative to modifications.

is limited to owner-occupied loans because the public intervention to encourage more modifications was designed to prevent the forfeiture of a family's primary residence, rather than the loss of an investment property. The sample is restricted to loans originated between 2002-2008 because these homes were at the focal point of the foreclosure crisis. Loans are limited to LTV ratios between 70 - 100 to compare loans with similar amounts of pre-crisis equity. The sample is limited to FICO credit scores between 300 and 850, because this is the range of credit scores produced by FICO. Loans outside of this range represent some type of data error. Similarly, loans are restricted to those above \$30,000, because Griffin and Maturana (2016) showed that loans below this range contained a greater proportion of data errors.

The pooled sample is built by merging the data from the month of December to provide a retrospective snap shot of the year. After these restrictions, the full 2006-2014 pooled sample includes 10 million loan-year observations. The sample also includes roughly 900,000 of the 1.9 million unique foreclosures, and 515,000 of the 900,000 modifications. A large portion of foreclosures and modifications are typically dropped from the sample during the year in which they occur, so these dropped observations are merged back into the December observations.

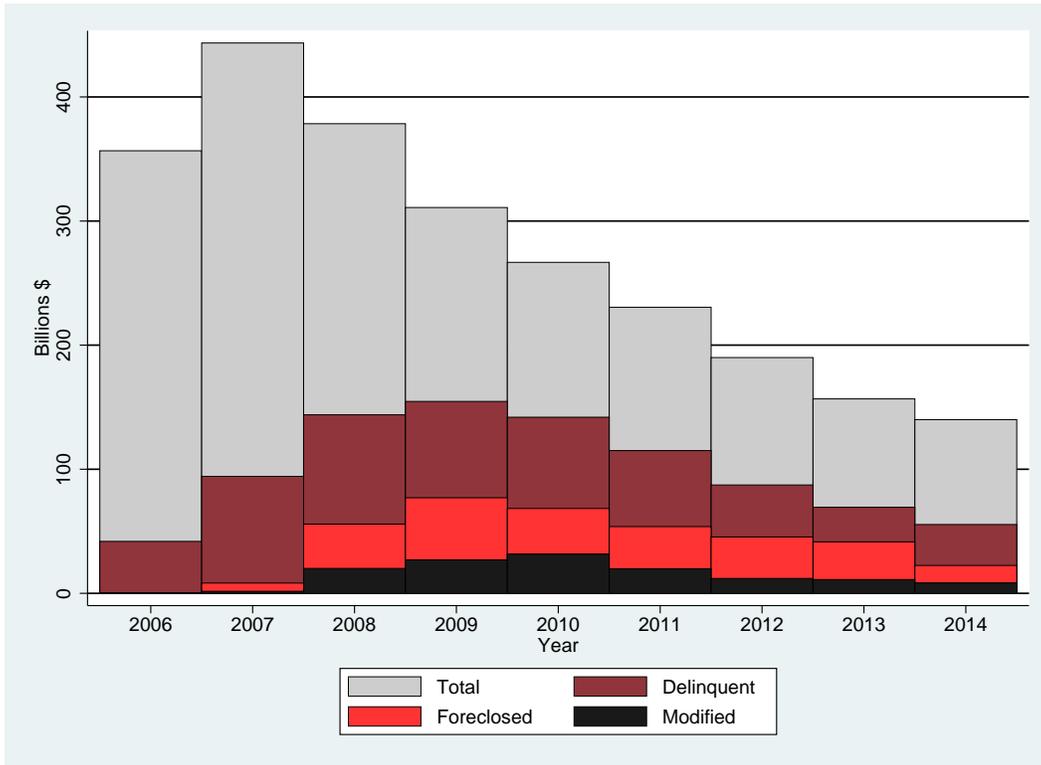
Table 2.1 presents the descriptive statistics for all loans, current loans, delinquent loans, foreclosed loans, and modified loans. The basic pattern is that loans across these groups tended to be quite similar. As expected, current loans have slightly better risk measures than delinquent loans. Somewhat unexpectedly, modified loans tended to have slightly worse risk measures than other groups. However, modified loan's risk measures were still relatively close to those of the other groups.

There were roughly 1.5 million unique loans in the full sample in 2006 and 2007. For the pooled sample, this yields 10,000,000 loan-year observations with an average original balance of \$275,000. Throughout the course of 2006-2014, roughly 40% of loans were delinquent at least once, for a total of 4.3 million delinquent loan-year

Table 2.1. Sample Description

Panel A: Loan Information (mean)					
	All	Current	Delinquent	Foreclosed	Modified
Original Balance (\$)	276,663	282,970	267,957	272,698	259,552
Loan-to-Value	82.12	81.72	82.66	82.86	82.98
FICO Score	661.9	677	640.9	645.4	627.6
N	10,057,406	5,854,415	4,103,753	884,741	513,954
Panel B: Distribution of Risk Measures, Loan Type, and Purpose (%)					
	All	Current	Delinquent	Foreclosed	Modified
<i>FICO Score</i>					
Sub Prime	27.4	20.6	36.9	34.3	45.9
Alt-A	21.6	19.5	24.5	25.0	25.1
Prime	51.0	60.0	38.6	41.0	29.0
<i>Loan-to-Value</i>					
LTV <= 80	71.0	73.9	67.2	67.1	62.7
80 < LTV <= 95	19.4	17.1	22.6	22.2	26.6
95 <= LTV	9.6	9.0	10.3	10.7	10.7
<i>Loan Type</i>					
Fixed Rate	35.7	38.2	32.1	31.1	49.7
Adjustable Rate	62.8	60.6	66.1	66.1	44.9
<i>Loan Purpose</i>					
Purchase	47.5	48.1	46.8	48.6	40.2
Refinace	13.2	14.3	11.7	11.0	11.0
Cash-out Refinance	37.5	35.9	39.6	37.6	46.2

Figure 2.2. Total Current Balances for Delinquent, Foreclosed, and Modified Loans



observations. Delinquent observations in this sample are counted as any loan that is delinquent at least once in the preceding year. During the full 2006-2014 period, the sample contains roughly 900,000 unique foreclosures, and 515,000 unique modifications. However, about 140,000 of these modifications eventually ended up in foreclosure.

Panel B shows the distribution of risk measures, types of loans, and purpose of loans across these groups. As could be expected, risk measures were better for current loans than delinquent loans. Current loans had a much higher proportion of prime credit scores, while modified loans had the largest proportion of subprime credit scores. Current loans also had lower LTVs than delinquent loans. Current loans and delinquent loans tended to be more similar in terms of loan types and purposes. The exception is modified loans, which had a largest proportions of fixed rate mortgages and cash-out refinances.

Figure 2.2 provides data on the performance of loans in the sample from 2006-2014.⁴ The figure shows the total balances of loans that are current, delinquent, foreclosed, and modified. The table shows the level of delinquencies as well as the distribution of delinquency actions between foreclosures and modifications. The basic pattern in this figure is that delinquencies were quite severe, and tended to result in more foreclosures than modifications.

The total balance of loans in the sample peaked in 2007 at nearly \$450 billion, before rapidly declining due to poor performance. From 2009-2011, the delinquent balance was roughly the same or slightly greater than the current balance. The delinquent balance in these years ranged between \$140-\$155 billion. The delinquent balance remained between 85%-65% of the current balance in the remaining years of the sample.

The figure also shows the distribution of delinquency actions between foreclosures and modifications. The height of the delinquent balance shows the total delinquent balance, while the area of foreclosed and modified balances shows what portion of delinquency actions they account for respectively. In all years, the foreclosed balance was larger than the modified balance. The modified balance peaked at \$31 billion in 2010, which was 86% of the foreclosed balance. The modified balance ranged between 50%-60% percent of the foreclosed balance in 2008, 2009, 2011, and 2014, but was only 36% of the foreclosed balance from 2012-2013. In addition, typically between 40%-60% of delinquent loans were neither modified nor foreclosed.

2.3.2 Main Results

This section presents the main results for the increase in borrower debt balances in loan modifications from 2008-2014. The presentation of the results begins by de-

⁴The full 2006-2014 period is shown here, rather than the 2008-2014 period which forms the basis for the bulk of the analysis in the next section, to allow the reader to see the pre-crisis period of 2006.

scribing the total increase in debt for the entire sample period, and total increases per year. The section then provides greater detail for these aggregate findings by using the restricted sample to analyze average increase in debt per modification. This portion also discusses results for whether capitalization in modifications is driven by fees or missed interest payments, and the servicers who are responsible for modifications which reduce debt.

Table 2.2. Total Losses to Foreclosure and Change in Debt Balance for Sample, CCF, and Market 2008-2014

Panel A: Total Number of Foreclosures and Modifications			
	Sample	CCF	PLS Market
Foreclosures	847,109	1,707,782	4,868,735
All Modifications	513,954	908,486	2,590,405
Redistribution Modifications	328,437	565,022	1,644,977
<i>Type of Redistribution</i>			
Capitalization	304,448	517,552	1,506,732
Forgiveness	67,673	123,099	357,712
<i>Type of Forgiveness</i>			
Principal	27,630	52,817	155,164
Interest	58,526	104,897	304,437
Expense	25,778	46,870	137,446
Panel B: Total Loss to Foreclosures and Change in Debt Balance from Modifications			
	Sample (Millions \$)	CCF (Billions \$)	PLS Market (Billions \$)
Loss to Foreclosures	121,458	209.9	599.8
<i>Redistribution Modifications</i>			
Capitalization	7,143	11.4	34.0
Forgiveness	-2,957	-4.7	-14.2
Net	4,186	6.7	19.8
<i>Type of Forgiveness</i>			
Principal	2,096	3.33	9.92
Interest	545.2	.89	2.66
Expense	316.3	.52	1.58

Table 2.2 presents the main results for total changes in debt balance due to modifications, and total losses to foreclosure from 2008-2014. The results are reported for the restricted sample, and the full CCF. The results from the full CCF are then projected to the level of the entire PLS market based on the CCF's yearly market share. Panel A presents the cumulative total number of modifications and foreclosures for

the sample and the market. The basic patterns in this panel are that the cumulative total number of modifications with capitalization far outpaced those with forgiveness, and that foreclosures substantially outpaced modifications. For the restricted sample, the total number of modifications with forgiveness was only slightly greater than 20% of the number of modifications with capitalization. There were also almost 75% more foreclosures than modifications in the restricted sample, and 88% more foreclosures than modifications in the full CCF.

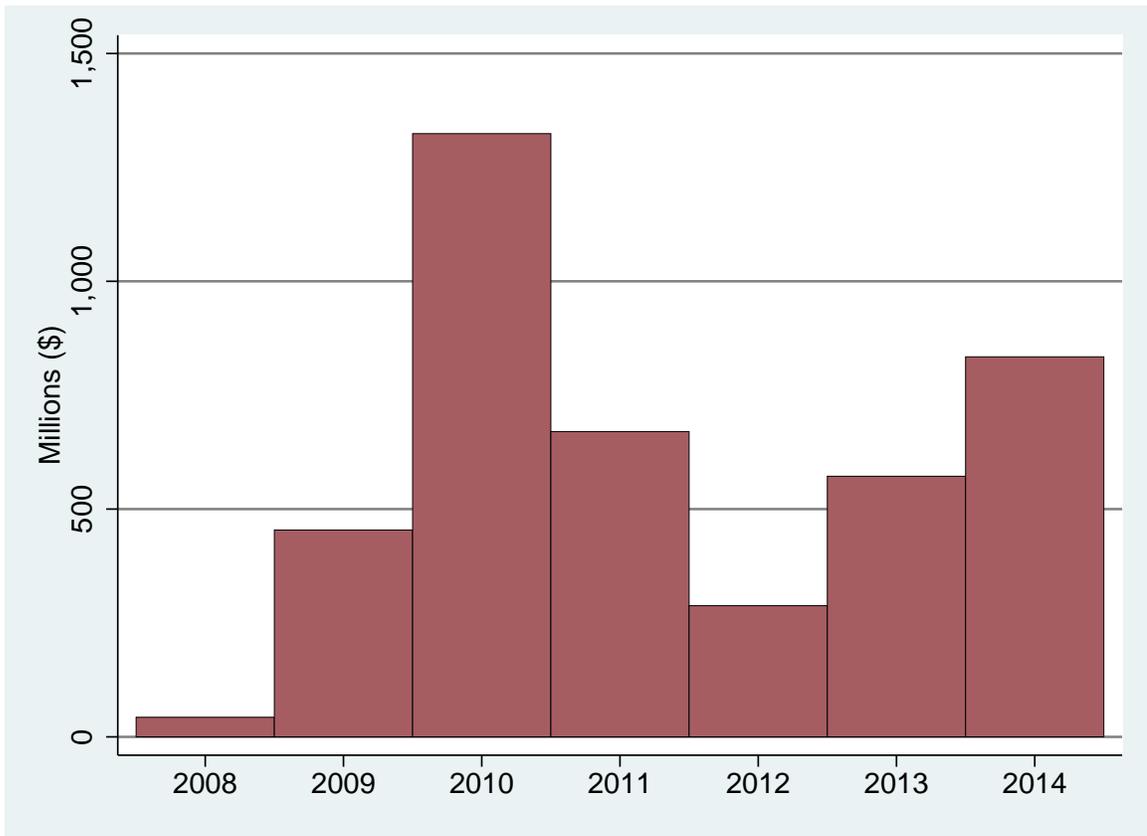
At the level of the entire PLS market, the results imply that there were slightly under 5 million foreclosures. Compared with Corelogic's estimate of 5.7 million total foreclosures since 2008 this figure is unexpectedly high, even when considering that the PLS market accounted for the lion's share of foreclosures during the Great Recession and weak recovery.⁵ However, the variable which measures foreclosures in the CCF includes home forfeiture actions more broadly, rather than just narrow foreclosures. This factor can likely account for the difference in estimates.

Panel B presents the main results for total change in debt balances and losses to foreclosure. This panel presents the primary finding of the paper - that modifications in the PLS market resulted in a cumulative net increase of borrower debt balances by roughly \$20 billion dollars from 2008-2014.⁶ The total amount capitalized in modifications in this market was \$34 billion, which was over twice as much as the total amount forgiven of \$14.2 billion. The panel also shows that losses to foreclosure were significantly larger than total forgiveness. Roughly \$120 billion was lost to foreclosure in the sample, and \$210 billion in the full CCF, from 2008-2014. At the level of the entire market, this implies that total losses to foreclosure for this period

⁵Corelogic is a leading data provider which constructs widely used foreclosure reports. The reports can be found here: http://www.corelogic.com/about-us/researchtrends/national-foreclosure-report.aspx?WT.mc_id=prnw_160510_IrWNB#.V1dDVJErKhc.

⁶As described in the data description section, November 2008 is the first month for which the CCF recorded different measures of redistribution in modifications. This makes 2009 the first year for which we have complete data for redistribution in modifications.

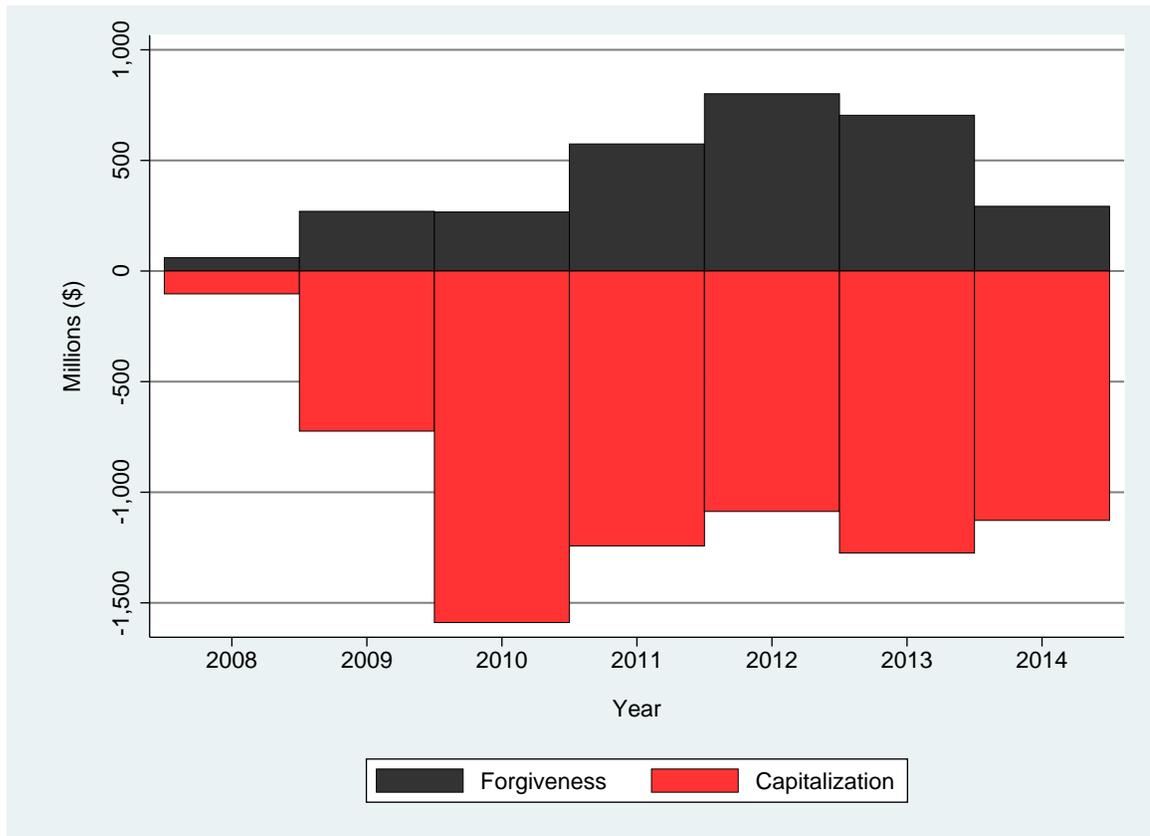
Figure 2.3. Net Change in Debt Balance from Modifications



were almost \$600 billion. This level of loss is equal to 22% of the December 2007 peak outstanding balance for the entire PLS market of \$2.7 trillion. The large amount of losses to foreclosure relative to total debt forgiven suggests that substantially more forgiveness could have occurred to prevent losses to foreclosure.

The remainder of the results in this section are all based on the restricted sample. Figure 2.3 presents greater detail for the results in Table 2.2 by showing the total net change in debt balances from modifications per year. The main finding in this figure is that there was a larger increase in debt balances in 2014 than in any other year, with the exception of the peak crisis year of 2010. This finding extends the existing literature, because it shows that the increase in debt identified in COP (2010) and White (2008) became larger through time. The peak year for total increase in debt balances was 2010, where roughly \$1.3 billion was added to borrower debt balances.

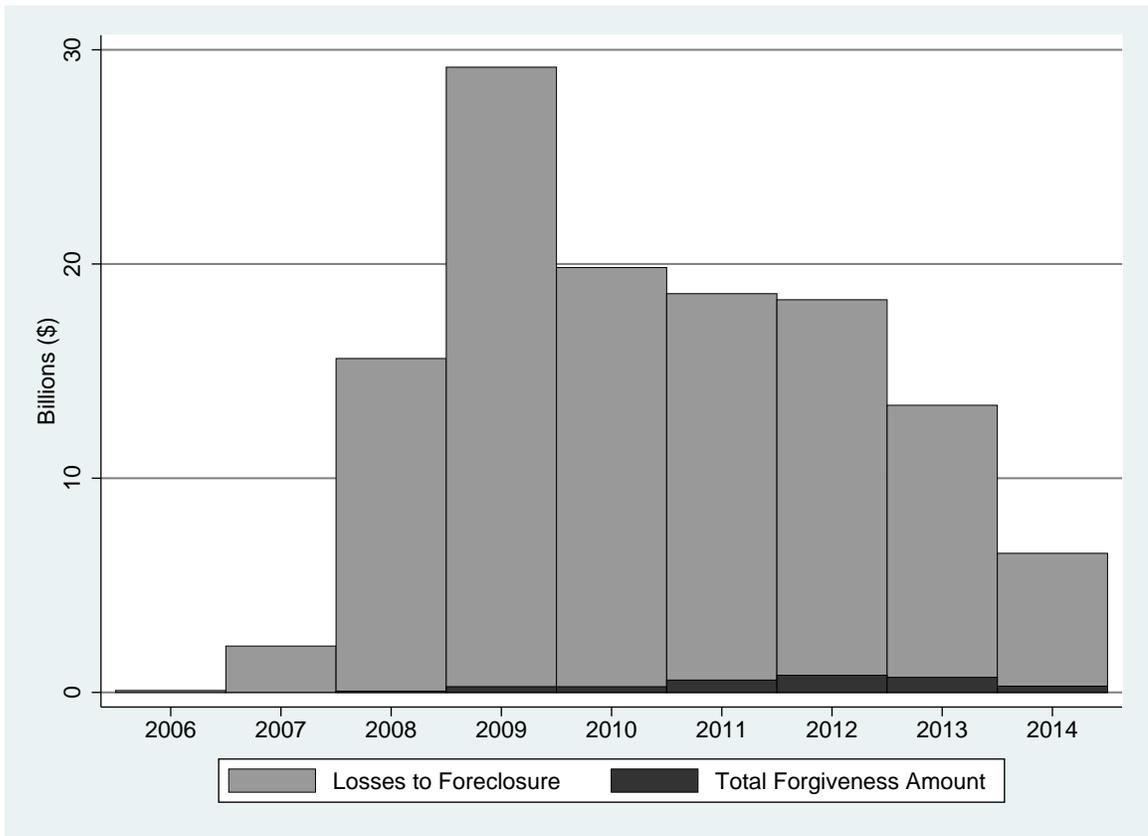
Figure 2.4. Total Forgiveness and Capitalization in Modifications



Over the course of the next two years, the total amount added to debt balances due to modifications decreased. The lowest total amount added to debt balances occurred in 2012, when debt balances were only increased by \$288 million. However, following 2012 the total amount added to debt balances grew each year. In the final year of the sample, modifications added \$834 million to borrower debt balances.

Figure 2.4 presents total forgiveness and capitalization per year. This figure helps to show whether changes in the total net increase in debt balances presented in Figure 2.3 were driven by forgiveness or capitalization. Variation in the total net change in borrower debt balances seems to be driven more by variation in forgiveness than capitalization. Total amounts capitalized peaked at over \$1.5 billion in 2010, and then remained fairly consistent at slightly over \$1 billion per year for the remainder of the sample period. In contrast, total forgiveness was quite low until 2011, when it

Figure 2.5. Total Losses to Foreclosure and Forgiveness in Modifications



reached roughly \$500 million. Total forgiveness peaked in 2012 at almost \$800 million, before returning to pre-2011 levels in 2014. The total amount of capitalization was relatively constant from 2011-2014, so variation in total net change in debt balances was driven largely by the increase and decrease in total forgiveness. A probable explanation for this pattern is that 2012 was the final year of the primary portion of the HAMP program. To be sure, HAMP was extended beyond 2012. However HAMP modifications accounted for a much smaller portion of total modifications in the PLS market after 2012.⁷ As the HAMP program wound down, the results suggest that forgiveness in modifications also decreased.

⁷For reference, see the quarterly OCC Mortgage Metrics reports from 2013-2014.

Figure 2.5 compares total losses to foreclosure with the total amount of forgiveness per year. The total amount of forgiveness here is gross forgiveness, not net, because modifications resulted in net increases in debt balances in every year. The basic pattern shown in this figure is that losses to foreclosure were several orders of magnitude larger than gross forgiveness, which suggests that there was ample room for increasing forgiveness. Indeed, losses to foreclosure per year in the sample are most usefully measured in the tens of billions of dollars, while total forgiveness is more usefully measured in the hundreds of millions. Losses to foreclosure peaked at close to \$30 billion in 2009, and remained close to \$20 billion for the next 3 years. In contrast, gross forgiveness was not larger than \$800 million in any year. At \$30 billion, losses to foreclosure in the peak year were roughly ten times larger than the combined total forgiveness for all years in the sample, which was just under \$3 billion. Considering the large losses to foreclosure, forgiveness could have been far more generous.

Table 2.3 helps to provide more detail for the cumulative totals shown in Table 2.2 by reporting the total number of modifications and foreclosures, and mean change in debt balance due to modifications, per year from 2008-2014. Panel A provides counts of modifications, types of modifications, and foreclosures per year. The total number of modifications are reported, as well as the number of modifications that resulted in some change in borrower debt balances. Panel A also reports whether the modification included capitalization or forgiveness, and type of forgiveness. The difference between all modifications and redistribution modifications are the modifications which did not result in net change debt balances. It is likely that these modifications only included repayment plans. November 2008 was the first month in which information for redistribution in modification was recorded in the CCF, which explains why redistribution modifications was so low in 2008. Many modifications included some combination of both capitalization and forgiveness.

Table 2.3. Total Number of Modifications, Foreclosures, and Mean Change in Debt Balance

Panel A: Total Number of Modifications and Foreclosures (\$)							
	2008	2009	2010	2011	2012	2013	2014
Foreclosures	140,008	180,000	128,905	121,257	115,679	106,803	54,457
All Mods	83,061	104,933	110,581	74,878	51,261	46,873	35,569
Redistribution Mods	9,446	57,893	82,891	59,104	44,653	41,966	32,484
<i>Type of Redistribution</i>							
Capitalization	8,443	54,543	80,320	53,130	38,753	38,169	31,090
Forgiveness	2,428	12,943	10,975	14,565	13,252	8,790	4,720
<i>Type of Forgiveness</i>							
Principal	902	3,366	2,852	6,197	7,113	5,219	1,981
Interest	2,036	11,405	9,691	13,129	11,511	6,772	3,982
Expense	1,132	3,335	2,578	6,448	6,703	3,856	1,726
Panel B: Mean Loss to Foreclose and Change in Debt Balance (\$)							
	2008	2009	2010	2011	2012	2013	2014
Loss to Foreclosure	111,388	162,243	154,099	153,911	158,793	127,582	122,528
<i>Redistribution Modifications</i>							
Capitalization	12,219	13,268	19,743	23,386	28,038	33,396	36,232
Forgiveness	24,758	20,832	23,849	39,296	60,264	79,934	61,921
Net	-4,558	-7,843	-15,973	-11,339	-6,449	-13,632	-25,680
<i>Type of Forgiveness</i>							
Principal	46,182	55,257	66,917	71,332	80,412	95,142	84,191
Interest	6,729	5,917	5,454	6,578	12,079	17,109	17,542
Expense	4,201	4,842	6,997	6,813	13,071	23,395	32,231
Panel C: Mean Loss to Foreclosure and Change in Debt Balance (%)							
	2008	2009	2010	2011	2012	2013	2014
Loss to Foreclosure	46.3	61.6	57.0	57.3	57.6	45.1	46.5
<i>Redistribution Modifications</i>							
Capitalization	5.6	5.7	7.1	9.2	13.0	14.7	14.6
Forgiveness	13.6	9.0	10.1	16.4	21.9	25.2	18.3
Net	-1.5	-3.3	-5.6	-4.6	-5.1	-8.1	-11.3
<i>Type of Forgiveness</i>							
Principal	26.3	25.1	31.4	35.1	35.5	37.1	32.0
Interest	3.5	2.8	2.5	4.1	7.0	8.2	7.1
Expense	2.5	2.6	4.0	5.1	8.4	11.7	14.1

There are three basic patterns in Panel A. First, most modifications increased debt through capitalization. In contrast, modifications which included any form of forgiveness were quite rare. The ratio of modifications which included capitalization to those which included forgiveness ranged from roughly a high of 8:1 to a low of 3:1. Even in the years in which forgiveness was most common relative to capitalization, three times as much capitalization occurred. The second basic pattern is that forgiveness tended to occur through forgiveness of interest, but not principal or expenses. In the peak crisis years of 2009-2010, interest forgiveness occurred almost twice as often as the combined total of expense and principal forgiveness. Finally, the third basic pattern is that foreclosures outpaced modifications in all years, which can also be seen in Figure 2.2. The biggest difference between foreclosures and modifications occurred in 2012-2013, when there were over twice as many foreclosures as modifications.

Panels B and C show the mean loss to foreclosure and change in debt balances in dollars and as a percentage. These panels also show three basic patterns. First, foreclosures were extremely costly. The average loss to foreclosure ranged between roughly \$110,000-\$160,000, which was between 45%-62% of the original balance of the loan. The large costs to foreclosure suggest that there was ample room for more forgiveness to reduce loss severity. Second, principal forgiveness was much more generous than any other form of forgiveness, for the few loans that received it. Principal forgiveness was over 30% of the current loan balance from 2010-2014, and peaked at almost \$100,000 in 2013. However, even at its peak, principal forgiveness per loan was still less than the lowest amount of losses to foreclosure per loan. This suggests that losses to foreclosure were high enough to create substantial room for much more widespread principal forgiveness.

The third basic pattern, which is also the second primary finding of this paper, is that the average net increase in debt balance per modification grew from 2008-2014. The average net increase in debt balances per modification was only 1.3% in 2008, but

grew substantially to 11.3% in 2014. Average capitalization and forgiveness per loan both grew throughout the sample period. However, forgiveness was far less common as only 5% of total modifications resulted in net forgiveness. Therefore, the net increase in loan balances grew through time. Average capitalization per loan roughly tripled throughout the sample period, from \$12,000 in 2008 to \$36,000 in 2014. This increase was from roughly 5.5% to 15% of the current loan balance. Average forgiveness per loan also increased substantially during the sample period, peaking in 2013 at close to \$80,000 or 25% of the loan balance. Average forgiveness tended to be far larger than average capitalization, however far fewer loans received forgiveness. Therefore the average net change in debt balance was substantially negative in all years. Reflecting the increase in capitalization, the net increase in loan balance was largest in the final two years of the sample at between 8%-11% of loan balance, or \$13,000-\$25,000.

The third pattern in this table also extends the earlier findings of COP (2010) and White (2008) by showing that the problems they identified grew worse through time. Consistent with COP (2010) and White (2008), only 5% of total modifications in my sample reduced borrower debt balances, and 2010 modifications increased debt balances by roughly 5%. However, by the final year of the sample, modifications increased borrower debt balances by an average of 11.3%, which is twice as large as found in COP (2010) and White (2008).

The final primary finding of this paper is that the increase in average net debt added per modification from 2010-2014 identified in Table 2.3 is consistent with agency problems associated with servicers cost-plus compensation structure, because the increase cannot be explained by a greater severity of delinquency in the later years. Table 2.4 below provides results supporting this interpretation by presenting mean amount of capitalization per delinquency, as well as average delinquencies for all modifications, modifications with high amounts of capitalization, and modifications with low amounts of capitalization. High and low amounts of capitalization are

defined as modifications in the highest and lowest quartiles of capitalization amounts as a share of the outstanding loan balance.⁸ The main finding in this table is that average capitalization per delinquency in modifications grew through time. This pattern is consistent with larger fees imposed by servicers, but not a greater number of missed interest payments.

Table 2.4. Mean Capitalization Per Delinquency

	2008	2009	2010	2011	2012	2013	2014
Capitalization/Delinquency (\$)	950.6	1,291	1,761	1,912	2,472	2,995	3,488
<i>Mean Delinquency Per Modification</i>							
Low Capitalization	4.1	4.3	6.4	6.6	6.3	6.6	6.3
All Modifications	5.0	5.6	8.1	8.3	8.1	8.6	8.6
High Capitalization	10.4	10.3	10.8	10.7	10.5	10.6	10.4

In Table 2.4, average delinquency per modified loan remained constant from 2010-2014, at close to 8 delinquencies during the previous year. Therefore, the average number of missed interest payments per loan modification was constant during these years. The average modification had 8 missed interest payments. This pattern is consistent if we divide modifications into high and low capitalization modifications. The average number of delinquencies per high and low capitalization modifications were also constant from 2010-2014, at 6 and 10 delinquencies respectively.

This finding implies that variation in the number of delinquencies can explain some of the cross-sectional variation in total amount capitalized per loan in a given year, but not time-series variation in the increase in capitalization per modification from 2008-2014. Therefore the mean amount capitalized per delinquency increased substantially through time. Mean capitalization per delinquency more than tripled during the sample period, growing from \$950.60 in 2008 to \$3,488 in 2014. The finding

⁸The lowest capitalization quartile is modifications which resulted in capitalization less than or equal to 3.2% of the outstanding balance of the loan. The highest quartile includes modifications that resulted in capitalization greater than or equal to 11.5% of the outstanding balance of the loan.

of increased capitalization per delinquency is consistent with reports that many of these modifications were designed to redefault to allow servicers to gain lucrative foreclosure fees (Thompson, 2011; COP, 2009). This interpretation is also consistent with the high redefault rate for the last three years of the sample, where over half of the modifications redefaulted within the first year. Increased fee revenue in later years is also consistent with the winding down of the HAMP program, because the HAMP program prohibited the capitalization of late fees.⁹

The finding that the increased capitalization in later years represents increased fees charged by servicers, but not increased missed interest payments, also implies that a large portion of the increase in debt balances can be unambiguously interpreted as increasing total debt obligations for the borrower. As discussed in the literature review, whether capitalizing missed interest payments should be interpreted as increasing total borrower debt obligations is ambiguous. However, this issue does not affect the interpretation of the findings in this paper, because the increases in capitalization amounts are driven by increases in servicer fees, not missed interest payments. Therefore, a large portion of the increase in debt balances found in this paper can be unambiguously interpreted as increasing total borrower debt obligations through punitive fees.

Overall, roughly 75% of these modifications did reduce borrower monthly payments and so provided some relief, even if increasing total borrower debt obligations. However, increasing debt balances still had negative effects because it reduced the stimulative power of debt restructuring. Even more significant considering the high redefault rate is that increasing the borrowers negative equity guaranteed that re-

⁹The HAMP program prohibited the capitalization of late fees, but not all fees. The HAMP program allowed servicers to capitalize advances made to third parties. However, many of the third parties were in fact affiliated with the servicer, and servicers often received a percentage of the advances made to these affiliates (Thompson, 2011). This practice was one practice which formed the basis for CFPB enforcement actions, such as the one concerning Ocwen described below.

defaults would result in costly foreclosure. Had sufficient principal been forgiven to eliminate negative equity, the borrower would have been able to sell the home and avoid foreclosure if they were still unable to remain current on their mortgage after modification. Avoiding these foreclosures would have avoided unnecessary destruction of wealth for borrowers, lenders, and the neighborhoods in which these foreclosures occurred.

A final finding is that the modifications which reduced borrower indebtedness were tightly limited to a small subset of servicers. Just three servicers account for over 80% of modifications which reduced borrower debt balances: Ocwen (61%), Litton (13%), and Bank of America (7.5%). Of these, Ocwen alone accounts for over half of modifications that resulted in net debt forgiveness. Ocwen also engaged in more modification activity than other servicers. Ocwen serviced just 12% of total loans and 14% of delinquent loans, but provided 25% of modifications. Ocwen is one of the largest mortgage servicing companies in the country. It was the fourth largest in 2010, before a series of acquisitions made it the largest single servicer in 2013. One of these acquisitions was Litton in 2011, and so Ocwen accounts for an even larger share of modifications that reduced debt.¹⁰

That Ocwen accounted for such a large portion of modifications which reduced debt is somewhat surprising because of Ocwen's documented history of consumer protection abuses in loan servicing. The largest single complaint against Ocwen was issued by the Consumer Financial Protection Bureau (CFPB) and attorney generals from 49 states, and settled for \$2 billion in December 2013. CFPB director, Richard Cordray, stated that, "Ocwen took advantage of borrowers at every stage of the process." The complaint documented that Ocwen "took advantage of home-

¹⁰Further details about the purchase of Litton can be found here: <http://www.bloomberg.com/news/articles/2011-06-06/goldman-sachs-agrees-to-sell-litton-unit-to-ocwen-for-264-million-in-cash> Accessed June 7th, 2016.

owners with servicing shortcuts and unauthorized fees,” “deceived consumers about foreclosure alternatives and improperly denied loan modifications,” and “engaged in illegal foreclosure practices.”¹¹ While it was surprising that Ocwen accounted for a large portion of the loan modifications that reduced debt, the findings in this dataset are also consistent with these consumer protection complaints. Ocwen also accounted for a large proportion of the modifications that increased debt the most, and these modifications were far more frequent than those that reduced debt. Ocwen accounted for 35% of modifications in the top 25th percentile of the largest increase in borrower debt balances. Wells Fargo was the only other servicer which accounted for over 10% of modifications with high increases in debt balances, at 12%.

2.4 Conclusion

The primary results in this paper show that voluntary household debt restructuring through loan modifications in the PLS market increased borrower debt balances rather than reduced them. From 2008-2014, loan modifications added \$20 billion to borrower debt balances. The net increase in debt per modifications also grew larger through time, roughly doubling from 2010-2014. This resulted in the net increase in debt in 2014 being larger than in any other year of the sample, with the exception of the peak crisis year of 2010, despite having fewer modifications than other years. The increase in net debt added per modification is also consistent with increased fees imposed by servicers, but not by increased numbers of missed interest payments, because missed interest payments per modification remained constant from 2010-2014.

¹¹A description of the complaint and settlement can be found here: <http://www.consumerfinance.gov/about-us/newsroom/cfpb-state-authorities-order-ocwen-to-provide-2-billion-in-relief-to-homeowners-for-servicing-w>
The full text of the settlement can be found here: http://files.consumerfinance.gov/f/201312_cfpb_consent-order_ocwen.pdf Accessed June 6th, 2016.

The results in this paper are also consistent with a principal-agent problem between servicers and investors, based on the perverse incentives in servicer's cost-plus compensation structure. Servicers were incentivized to foreclose rather than modify, or to provide unsustainable mortgages that increased borrowers debt. This market failure resulted in the unnecessary destruction of wealth for borrowers, investors, and the communities in which these foreclosures occurred. Better loss mitigation likely would have prevented a significant portion of the 5 million foreclosures, which resulted in \$600 billion lost, in the PLS market from 2008-2014.

CHAPTER 3

A NEW PUBLIC OPTION FOR HOUSEHOLD FINANCIAL SERVICES

The goal of this paper is to draw lessons from the history of housing finance regulation in the U.S. to advance a new proposal for reform. This paper proposes that the U.S. federal government should create a new public option in housing finance, which includes two components. First, the government should create a public bank which directly provides households with basic payment services, small dollar loans, and mortgages. Second, the government should manage an online financial services marketplace.

This paper proposes the creation of a new public option because it would provide the government with regulatory tools to prevent consumer protection abuses based on asymmetric information, such as unstable mortgages that concentrate risk on households, as well as increase access to financial services for those who currently lack it. The direct provision of services would help to regulate by enforcing a quality floor through competition from below, which would make risky terms in mortgages uncompetitive. This would also give government the power to directly provide mortgages with stable terms, rather than relying on prohibiting mortgages with the most risky terms. Managing an online financial services marketplace would also prevent consumer protection abuses such as deceptive practices, hidden fees, or risky terms by increasing transparency with consumer protection ratings, product standardization, and consumer reviews. This would directly regulate products sold in the online public market, but also indirectly regulate products sold in the broader private market through competition.

This new public option would build off of the strengths of the New Deal housing finance regulatory structure, while addressing a key weakness that rendered this structure vulnerable to erosion through time. This proposal builds off of the strengths of the New Deal regulatory structure which heavily relied on public options as a method of regulation to prevent unstable mortgages and increase access to financial services. The public option as a method of regulation is defined as the use of public institutions to regulate the market through active participation and direct competition with private intermediaries. The paper will describe how these public institutions were able to increase access to financial services by transforming existing intermediaries into the functional equivalent of a heavily regulated public utility whose mission was to provide affordable mortgage credit to households in the communities it was located in. This paper will also describe how these public institutions were able to address the problem of unstable mortgages by setting the terms of how mortgages distributed risk to protect borrowers. These institutions accomplished this by making mortgages with stable terms more competitive than mortgages without these terms by providing these mortgages access to Federal Housing Administration (FHA) insurance and secondary market liquidity. For example, the government insured credit risk in mortgages through the FHA. However, mortgages were only eligible for this insurance if they had terms that shielded borrowers from risk such as long repayment terms, fixed interest rates, and full amortization. Public institutions were thus able to indirectly set the terms of mortgage origination in the primary market to protect borrowers by limiting access to the services they provided in the insurance and secondary market (Levitin and Wachter, 2013).

This paper also argues that the lack of a public option in the primary market was a key weakness of the New Deal regulatory structure that rendered it vulnerable to erosion through time. I argue this was a weakness because the effectiveness of indirectly setting the terms of the primary market through limiting access to the insurance and

secondary markets depended on narrowly restricting the activities of primary market intermediaries through regulations from above. However, these restrictions were vulnerable to erosion. I will describe how these restrictions were vulnerable to erosion through time because they were too rigid to adapt to adverse market conditions, such as the high inflation and interest rates of the late 1960s and throughout the 1970s. I will also describe how the declining effectiveness of the ability to regulate using public options following deregulation in the 1980s allowed the reemergence of unstable mortgages which concentrated risk on households who lacked alternative sources of stable mortgage credit. The resulting defaults in these mortgages contributed to the largest financial crisis since the Great Depression. The proposal in this paper describes how direct public participation in the primary market would provide tools to prevent the reemergence of unstable mortgages and lack of access, resulting in a regulatory structure that would be more resistant to erosion through time.

The proposal for a public bank in this paper is also related to, but distinct from, proposals for postal banking from the United States Postal Service Office of the Inspector General (USPS OIG) (USPS, 2015, 2014). The USPS OIG has proposed that post offices provide basic financial services such as deposit, bill pay, check cashing, and small loans to households that lack access to traditional financial services. The lynchpin postal banking product would be a reloadable, pre-paid postal debit card. The public bank in this paper would also provide these basic services. However, there are several key differences. First, it would provide a much wider range of services such as mortgages, and possibly any other government guaranteed loan such as Small Business Administration (SBA) loans. Second, I argue that the public bank should directly compete with private institutions as a method to regulate them. Finally, another key difference is that I propose that this bank be constituted as an independent agency with independent finances from the USPS. The main role of this agency would be to improve the function of regulation, rather than to provide

revenue for the USPS. That being said, I think it would still be advisable to work with the USPS to take advantage of its large geographic post office branch network. This public bank could also generate revenue for the USPS, by renting space in postal branches and providing services for the USPS to sell. However, revenue generation would not be its primary function.

The remainder of this paper is organized into three sections. Section 1 describes the New Deal solution to lack of access and unstable mortgage structures through the creation of public options in housing finance. Section 2 describes weaknesses in the New Deal regulatory structure which rendered it vulnerable to erosion through time. The final section describes the details of the proposal for a new public option.

3.1 New Deal Solutions for Unstable Housing Finance

The purpose of this section is to describe how the New Deal reforms addressed the housing finance problems of unstable mortgage structures and lack of access through the creation of public options. To do so, this section begins by describing unstable mortgages and lack of access in the pre-New Deal era. The section then describes how the New Deal interventions during the Great Depression created a diverse array of public institutions that actively participated in the market. This section will describe how these institutions improved access to mortgage credit through transforming depository institutions, particularly thrifts, into the functional equivalent of a heavily regulated public utility that would provide affordable mortgage credit to households. The section then describes how the Homeowner Loan Corporation (HOLC) created stable mortgages that shielded borrowers from risk through the necessity of restructuring the existing unstable mortgages that had defaulted. These new stable mortgages also improved access by including terms, such as longer terms and higher loan-to-value (LTV) ratios, that made them affordable to a larger share of households. Finally, the section will also describe how the government was able to

indirectly regulate the terms of mortgage origination in the primary market through limiting access to FHA insurance and the secondary market.

3.1.1 Lack of Access and Unstable Mortgages in pre-New Deal Housing Finance

Lack of access to basic financial services for low to moderate income classes was a persistent feature of unregulated U.S. financial markets before the New Deal. Prior to the New Deal era, roughly one-third of counties lacked access to a provider of mortgage credit (FHLBB, 1983). Additionally, a large portion of families could not access mortgage credit due to the terms of the mortgages. Maximum LTV ratios were typically capped at 50 percent. Therefore, a family would require a 50 percent down payment to obtain a mortgage. Lack of access contributed to the homeownership rate being much lower than modern levels. The homeownership rate at the turn of the century was roughly 40 percent, compared to modern levels of between 60-70 percent in the latter portion of the twentieth century (Snowden, 2009).

Expansion of access to financial services was a central demand in widespread calls for reform from historical social movements such as the populists in the late 19th century, the progressives in the early 20th century, and the labor movement throughout this period. Widespread lack of access was also a main driving force behind early proposals for postal banking in the U.S. and Europe. These calls advocated for the post office to provide safe deposit services and credit to households who lacked access. For example, the Populist Party's 1892 platform stated that, "We demand that postal savings banks be established by the government for the safe deposit of the earnings of the people and to facilitate exchange," (Baradaran, 2015).

When households were able to access mortgage credit in the pre-New Deal era, the structure of mortgages was unstable because it concentrated risk on households. These loans typically had terms of 3-5 years, but were not fully-amortizing. They

were named “bullet mortgages” because they required a large “bullet” payment at the end the loan term. Borrowers typically depended on the extension of a new mortgage at the end of the loan to prevent foreclosure (Levitin and Wachter, 2013). This structure concentrated interest rate, liquidity, and market risk on households. These mortgages concentrated interest rate risk on households because if interest rates increased during the loan term, households would only be able to obtain a new mortgage at the higher interest rate. These mortgages concentrated liquidity risk on households because households had to bear the risk that a new mortgage would not be available at the end of the loan term. Finally, the households had to bear market risk also, because they would bear the first losses if the value of their home declined.

Bullet loans are also consistent with what Hyman Minsky described as financially fragile ponzi or speculative structures (Minsky, 2008). These structures are fragile because of the dependence on external finance for solvency. Minsky provided a three-part taxonomy of hedge, speculative, and ponzi financial positions. This taxonomy is based on the relation between the operating income and debt service payments of borrowers. A firm or household is in a hedge financial position when the anticipated operating income is sufficient to cover both interest payments and scheduled reductions in indebtedness. A firm or household is in a speculative position when anticipated operating income is sufficient to cover interest payments, but not sufficient to cover the amounts due on maturing loans. This is more fragile than a hedge position because the agent must rely on external financing, for example in the form of new loans, to repay part or all of the amount due on maturing loans. Finally, a firm or household is in a ponzi position when anticipated operating income is insufficient to even cover interest payments. This is the most fragile position because the firm must rely on external financing to even meet interest commitments (Kindleberger, 1978).

3.1.2 New Deal Crisis Intervention and the Creation of Public Options

The unstable mortgages described in the previous section experienced a large wave of defaults during the Great Depression. From 1931-1935, there were roughly 250,000 foreclosures per year (Green and Wachter, 2005). At the height of the Depression in 1933, roughly half of homes were in default, and 10 percent of homes in foreclosure (Levitin and Wachter, 2013). These defaults were particularly onerous for savings and loans (S&Ls) institutions, because their portfolio was highly concentrated in mortgages. From 1930-1934, the foreclosure rate on mortgages, measured as a share of the total dollar value of loans outstanding, was approximately 14 percent. This caused the failure of a large portion of S&Ls. From 1931-1933, the size of the S&L industry contracted by 25 percent. The industry contracted another 15 percent between 1933-1939 (FHLBB, 1983). The large number of foreclosures and failing financial institutions prompted widespread calls for government intervention.

Levitin and Wachter, who are legal historians of housing finance regulation, present a detailed case study of how the use of public options as regulatory tools in housing finance emerged in an ad hoc manner to respond to the crisis of the Great Depression. The description of the use of public options in this section will draw heavily from their account, and focus on how public options were used to address the problems of lack of access and unstable mortgages. They define the public option as a mode of regulation as the use of public institutions to regulate the market through competing with private institutions and directly providing goods and services. The remainder of this section will describe how public options in housing finance regulated the market in two ways. First, they provided services to private intermediaries, but used the provision of these services to regulate the private intermediaries. For example, the FHA provided a service to intermediaries by insuring credit risk on mortgages. However, the FHA used this insurance as a regulatory tool by limiting access to insurance to mortgages with stable terms. Second, public institutions, in particular the HOLC,

used the direct provision of services to household to also create durable trends which set the terms of the market. For example, the HOLC set the terms of how mortgages distributed risk to shield borrowers by creating the fixed interest rate, long repayment term, fully amortizing mortgage (Levitin and Wachter, 2013).

The creation of public institutions was initially intended to serve as temporary stop-gap measures until private financial markets could be revived. However, these institutions ended up operating far longer than was anticipated. The creation of these public institutions occurred in two waves. First, the government created the Federal Home Loan Bank (FHLB) system, the Federal Savings and Loans Insurance Corporation (FSLIC), and the Federal Deposit Insurance Corporation (FDIC). When these proved insufficient to revive the market on their own, the government then created the second group of institutions, which include the HOLC, FHA insurance, and the Federal National Mortgage Association (Fannie Mae). In the remainder of this section, I will describe in more detail how these institutions solved the problems of lack of access and unstable mortgages (Levitin and Wachter, 2013).

3.1.2.1 The FHLBs, FSLIC, and FDIC

The first set of institutions created was the FHLBs, FDIC, and FSLIC. These initial institutions helped to improve access to financial services through transforming depository institutions, particularly thrifts, into the functional equivalent of a heavily regulated public utility for providing mortgage credit. The New Deal reforms established the FHLBs, which were modeled after the Federal Reserve system and governed by the Federal Home Loan Bank Board (FHLBB). The FHLBB was given the power to charter federal savings and loans associations. These charters granted S&Ls access to services that stabilized their funding, such as liquidity provided by the FHLB system through discounting mortgages, and deposit insurance through the FSLIC. However, these charters also served a regulatory function by restructuring existing

S&Ls into a specialized intermediary for providing mortgage credit through imposing substantial restrictions on permissible activities and portfolio strategies. These included restrictions on lines of business, branching, types of assets that could be held and in what amounts, lending beyond a specified distance from the thrift institution, the amount of loan that could be lent to a single entity, and prohibited adjustable rate lending. Essentially, these restrictions created a narrow business model where thrifts would originate mortgages and hold them in their portfolio (Levitin and Wachter, 2013; D'Arista, 1994).

The New Deal reforms essentially envisioned the role of thrifts as similar to a heavily regulated public utility whose “public mission” was to provide access to affordable mortgage credit for the communities in which they were located. These public utilities were also designed to provide fair access to affordable credit for all communities, at all income levels. The branching restrictions, geographic restrictions on lending, and restrictions on interstate banking can be understood in this context. These restrictions were put in place due to fears that interstate branch banking would undermine fair access to credit by channeling deposits out of low-income rural communities and into financial centers such as New York (D'Arista, 1994).

The FDIC also provided commercial banks deposit insurance which helped stabilize their funding. However, deposit insurance was also used as a regulatory tool to promote the reduce risk at commercial banks. For example, acces to deposit insurance required commerical banks to submit to direct monitoring through bank examinations. This were necessary to prevent moral hazard due to deposit insurance. While depository insurance stabilized deposits, it also removed the market incentive for depositors to monitor the risk activities of insured institutions. Therefore, the FDIC needed to directly monitor risk (Levitin and Wachter, 2013; D'Arista, 1994).

3.1.2.2 The HOLC

The creation of stable mortgage structures occurred through the need to address the large number of foreclosures caused by the existing unstable mortgage structures. As described above, at the height of the Great Depression in 1933, roughly one-half of the mortgages in the country were in default, and 10 percent were in foreclosure. To address this crisis, the federal government directly entered into the mortgage market through the creation of the HOLC. The HOLC bought up defaulted mortgages and restructured them into more stable mortgages on a large scale. The new stable mortgage terms pioneered by the HOLC included fixed-interest rates, long payment terms, and full amortization. In its first year, the HOLC received applications from 40 percent of all mortgage holders, and refinanced half of them. After the HOLC's first year, the federal government was the country's largest single mortgagor, holding and servicing slightly over 10 percent of all residential mortgages in the country. The program was also quite successful at crisis mitigation, preventing default and foreclosure by significantly lowering monthly payments for borrowers. Additionally, lenders were happy to receive much needed liquidity and to remove non-performing loans from their balance sheets (Levitin and Wachter, 2013).

The significance of the HOLC for the public option is that it showcased the power of the government to use the direct provision of services to households in the primary market to shield borrowers from risk. In setting the new terms of the mortgages to improve stability, the government needed to redistribute the bundle of risks inherent to the structure of mortgages. The new mortgages were stable because they redistributed liquidity and interest risk away from households and towards financial intermediaries, who more robust tools to manage these risks. For example, the long-term, fully-amortizing structure removed liquidity risk from households because it did not require the extension of a new mortgage at the end of the loan term. Financial intermediaries would now have to bear greater liquidity risk than under the older mortgage structure

with a 3-5 year term. However, they would also have more tools to manage this risk than households, because they had access to liquidity from the FHLBs and Federal Reserve, as well as deposit insurance. Additionally, the fixed-rate shielded households from interest rate risk, leaving them with stable monthly payments they could budget around. However, depository institutions would now have to bear this risk. As will be described below, the tools they had to bear this risk were insufficient to deal with the high inflation and interest rates of the late 1960s and 1970s. It was only with the growth of securitization in the 1990s that they would have adequate tools to manage interest rate risk. Finally, the new mortgage structure did not shield households from market risk, because they still bore first losses from house price declines (Levitin and Wachter, 2013; D’Arista, 1994; Mian and Sufi, 2014).

The new mortgages were also more accessible due to the long-terms and higher allowable LTV ratios. The long-terms lowered monthly payments to a level that was affordable for a much larger share of households. Additionally, the higher allowable LTVs of up to 80 percent, compared to the 33-50 percent before, made the mortgages more accessible by lowering the required down payment. The HOLC also helped this mortgage set the trend by proving the feasibility of this radical innovation on a large scale, and then standardizing it. The HOLC standardized this mortgage by creating a basic template for origination, servicing, and foreclosure, which allowed for widespread adoption by private intermediaries. Standardization was also a necessary condition for sale in the secondary market, because investors were typically unwilling to assume the credit risk inherent in non-standard products (Levitin and Wachter, 2013).

3.1.2.3 FHA Insurance, Fannie Mae, and the Secondary Market

While the entrance of the HOLC into the mortgage market made the federal government the single largest mortgagor in the country, the federal government was not

interested in actually holding these mortgages. The government was not interested in managing the credit and interest rate risk in these mortgages, or having to conduct foreclosures on delinquent mortgages. Therefore, the government wanted to sell these loans back to the private market. However, at this time there was no functional secondary market for mortgages. Creating the secondary market required the government to assume credit risk through FHA insurance, and to create Fannie Mae to sell FHA insured loans in the secondary market. This was significant for regulation because the provision of mortgage insurance and secondary market funding to intermediaries was used as a tool to indirectly regulate the terms of mortgages in the primary market, as will be described below. Additionally, it was also a necessary condition for the widespread adoption of the new mortgage structure. (Levitin and Wachter, 2013).

The government needed to assume credit risk to create the secondary market because investors were still wary due to the Great Depression. FHA insurance accomplished this goal, but more significantly also served as a tool to regulate the primary market. FHA insurance was able to indirectly set the terms of the primary market by limiting access to mortgage insurance to loans that conformed to the new structure created by the HOLC. Initially, the FHA required mortgages to have fixed interest rates up to 5 percent, long terms up to 20 years, and LTVs up to 80 percent. However, in 1937 this was increased to 30 year terms with LTVs as high as 97 percent (Levitin and Wachter, 2013).

Limiting access to insurance to mortgages that met these stable terms served as a tool to regulate mortgage terms in the primary market by making stable mortgages more competitive. From the perspective of the intermediary, insured loans were more desirable because they could be sold in the secondary market and hence had greater liquidity. Insurance also indirectly regulated uninsured loans through competition by creating a quality floor. Uninsured loans needed to have comparable terms to insured

loans in order to be desirable to borrowers. Indirectly regulating the primary market by limiting access to FHA insurance and the secondary market became one of the main regulatory mechanisms of housing finance in the latter half of the twentieth century (Levitin and Wachter, 2013).

Once the federal government had assumed credit risk through mortgage insurance, the loans could then be sold back to private institutions through the secondary market. However, the government needed an institution to manage the sales of loans and securities on the secondary market. The government accomplished this by creating Fannie Mae to purchase FHA insured loans, and sell long-term bonds based on the underlying cash flows. Moreover, Fannie Mae was willing to purchase any government insured loan at par, and so increased market liquidity for insured loans even when it did not directly buy them. While the secondary mortgage market did not experience rapid growth until the 1980s, it was still important in this time period because it increased market liquidity. Moreover, the creation of the secondary market helped to further cement the trend of the mortgage structure pioneered by the HOLC as the dominant U.S. mortgage structure (Levitin and Wachter, 2013).

3.1.2.4 Successes and Limitations

While dating institutional systems is necessarily arbitrary to some degree, the regulatory structure put in place by the New Deal reforms only fully solidified after World War II with the Treasury-Fed Accord of 1951. Before this, public efforts were either concentrated on direct crisis intervention in the depression, or on financing the war.¹ The public institutions that regulated intermediaries through providing them services, such as liquidity and insurance, proved to be long-lasting. However, direct public participation in the primary market was always seen as temporary. As the

¹During the war, depository institutions were essentially turned into government bond holding companies. However, this also had the effect of filling the financial system with safe, liquid assets which reduced financial fragility (Minsky, 2008).

HOLC wound down operations in 1951, so too did the government's participation in the primary market. As the government retreated from direct provision of credit in the primary market, it left the private intermediaries with stable mortgage products to provide to households, as well as the robust secondary market infrastructure to support these mortgages.

The regulatory structure for housing finance during this period was remarkably successful at increasing homeownership and preventing financial crises. The institutions specialized to solely provide mortgage credit, thrift institutions, grew rapidly following World War II, with assets increasing 900 percent between 1945-1960. Thrifts provided roughly half of mortgage credit during this time period, and commercial banks also provided roughly one-third. Homeownership increased dramatically in the postwar period. The homeownership rate was roughly 40 percent at the turn of the century, and remained relatively constant until declining slightly during the Great Depression. However, following the New Deal reforms and the end of World War II, the homeownership rate increased from 44 percent in 1940 to over 65 percent in 1970. Considering the previous unstable structure of housing finance, it is an impressive accomplishment that this structure successfully provided stable household credit en masse for the first time in U.S. history (Gale, Gruber and Stephens-Davidowitz, 2007; Markham, 2002; FHLBB, 1983; Goldsmith, 1968).

However, the accomplishment of increasing homeownership during this period was also incomplete and highly unequal due to pervasive racial discrimination. Most notably, FHA housing policies such as redlining systematically prevented African-Americans from receiving mortgage credit. This discrimination excluded African-Americans from homeownership which was the primary channel for building wealth. Moreover, African-Americans who did own homes were concentrated in neighborhoods where home values were affected by the "self-fulfilling prophecies" of the FHA appraisers. These areas were cut off from sources of new investment, which caused

their house prices to lose value compared to white neighborhoods which FHA appraisers deemed desirable. This systematic exclusion of African-Americans from the primary wealth building channel for the middle class has featured prominently in recent calls for reparations, such as that from Ta Nahisi-Coates (Coates, 2014; Gordon, 2005; Oliver and Shapiro, 1995).

The exclusion of African-Americans from stable mortgage credit also foreshadows a problem that contributed to the financial crisis of 2007-2009. Lack of access to affordable financial services made African-Americans vulnerable to predatory lending because of lack of alternatives. The dominant form of housing finance for African-Americans during this period was buying on contract. The terms of this financial arrangement would be that the buyer would make monthly payments directly to the seller, with the promise that they would receive the deed only once the home was entirely paid off. However, this financial arrangement gave African-Americans all the risks of owning the home, with none of the benefits. African-Americans would be responsible for all repairs to the home, similar to an owner. However, they would not build equity in their home as they made payments, similar to a renter. Therefore, if they fell behind on payments they would be evicted, with the seller keeping all the equity in the home. This provided an incentive for sellers to design these contracts to be unaffordable. To this end, sellers typically inflated home prices two to three times the market rate, and included high interest rates to make monthly payments unaffordable (Coates, 2014; Satter, 2010). As will be described in the next section, lack of access making borrowers vulnerable to predatory lending was a problem which contributed to the 2007-2009 financial crisis.

3.2 Weaknesses in the New Deal Regulatory Structure

The purpose of this section is to analyze the history of the housing finance regulatory structure, from 1951-2007. It identifies weaknesses which the proposal in this

paper would provide tools to address. The primary historical argument developed in this section is that a key weakness of the New Deal regulatory strategy was that the ability of public options in the secondary and insurance markets to indirectly set the terms of the primary market depended on narrowing the permissible actions of primary market intermediaries through restrictions from above. However, these restrictions were vulnerable to erosion through time. Essentially, the ability of public institutions to use the provision of support to make stable mortgages more competitive than alternatives depended on what alternatives were available. This historical argument will be developed based on an analysis of two time periods, 1951-1979 and 1980-2007. The analysis of the first time period will describe the forces contributing to the erosion of restrictions, eventually leading to deregulation in the early 1980s. The analysis of the second time period will then describe how deregulation helped to allow unstable mortgage structures reemerge and contribute to the largest financial crisis since the Great Depression.

3.2.1 Regulatory Weaknesses Leading to Deregulation: 1951-1979

This section describes forces contributing to the erosion of the New Deal restrictions during the postwar period from 1951-1979, which resulted in deregulation in the early 1980s. This section argues that the basic problem of this period was that the New Deal restrictions were too rigid to adapt to the high inflation and interest rates of the late 1960s and 1970s. The previous section described how New Deal restrictions essentially created a narrow business model for depository institutions, particularly thrifts, based on originating and holding long-term, fixed rate mortgages. However, the viability of this business model depended on stable low inflation and interest rates, and restricting competition over sources of funding for depository institutions. This section describes how the changing economic environment in the late-1960s and

throughout the 1970s undermined both of these conditions, leading to the removal of restrictions through deregulation in the 1980s.

The New Deal restrictions essentially created a narrow business model for the provision of long-term, fixed rate mortgages, where depository institutions would originate these mortgages and hold them in their portfolio. Richard Kovacevich, former CEO of Wells Fargo, reflected on this period as one in which the business of banking was “boring” because, “the government told banks what products they could sell, what prices they could charge, and where they could do business.” The relative straightforwardness of the business model left to depository institutions has also been described by the “3-6-3 rule.” Banks borrowed money at the Regulation Q 3 percent interest rate for deposits, and loaned money at 6 percent. They were then free to play golf by 3 p.m because there was nothing left to do (Kovacevich, 2008; Markham, 2002).

Regulation Q interest rate caps were an important part of this stable business model. Regulation Q prohibited the payment of interest on demand deposits, and set a maximum rate on the amount of interest rate allowed for savings accounts. Regulation Q was created as part of the New Deal reforms to restrict banks from engaging in “ruinous” price competition. New Deal reforms saw aggressive bidding for customers through offering higher interest rates on deposits as contributing to the financial instability which caused the Great Depression. While inflation and interest rates were low, Regulation Q contributed to stability by preventing this form of competition. Additionally, the interest rate caps provided depository institutions a subsidy by allowing them to raise funds at below market rates (D’Arista, 1994).

Inflation remained low and stable until the mid-1960s. Inflation in 1964 averaged 1 percent per year. However, in the late 1960s inflation started increasing due to spending on the Vietnam war. Inflation continued to rise throughout the 1970s as well due to large increases in oil prices. By 1980, inflation had reached 14 percent per

year (Bryan, 2013). This inflation caused problems for the originate and hold business model because the value of the debt was set in nominal terms, and the interest rates were fixed. As the price level rose, this caused the real value of these assets and the income stream derived from them to depreciate.

The high inflation, in turn, led to increases in the nominal interest rates on government bonds. This posed an additional problem for depository institutions because interest rates on government bonds increased beyond the maximum rate of interest allowed to be paid on deposits under Regulation Q. This led to disintermediation, as deposits moved to the money market where they could earn a higher interest rate (Minsky, 2008; D'Arista, 1994; Wolfson, 1993).

Disintermediation in the 1970s was also facilitated by the development of close substitutes for deposits. The ability of depository institutions to raise funds at below market rates depended on these institutions having a monopoly on the provision of deposit accounts. As long as there were no other providers of deposit accounts, Regulation Q interest rate caps allowed them to raise funds for a lower cost. However, money market mutual funds (MMMFs) challenged this monopoly by providing deposit-like services (Minsky, 2008; D'Arista, 1994; Wolfson, 1993).

MMMFs were mutual funds that pooled funds from investors, and invested them in money market instruments. The liabilities of MMMFs were technically equity shares in the overall mutual fund, and not deposits. These liabilities were not covered by deposit insurance, and could experience loss. However, they shared many features with deposits that made them close substitutes. First, these liabilities were relatively safe because they were invested in stable money market instruments, such as government bonds. Second, they were easily withdrawn on demand. Some MMMFs even issued limited check-writing capabilities. As market interest rates rose above Regulation Q caps, MMMFs were able to offer a higher rate of return than depository institutions, for liabilities that were functionally similar to deposits. As a result, depository in-

stitutions experienced disintermediation as their deposits flowed to MMMFs. The competitive inequity between depository institutions and MMMFs created incentives for regulators to loosen restrictions to allow depository institutions to better compete on a level playing field. To this end, commercial banks and thrifts developed money market deposit accounts (MMDAs) and negotiable order of withdrawal accounts (NOWs). These were similar in nature to MMMF shares, because they were functionally demand deposits which were allowed to pay interest. These new innovations were initially prohibited, but eventually allowed under deregulation in the 1980 Depository Institution Deregulation and Monetary Control Act (DIDMCA) and 1982 Garn-St. Germain Act (Minsky, 2008; D’Arista, 1994; Wolfson, 1993).

To combat rising inflation in the 1970s, Federal Reserve Chairman Volcker significantly increased interest rates in what has since been named, the “Volcker Shock.” In 1981, the effective federal funds rate peaked at just over 19 percent.² The Volcker shock effectively ended the viability of the originate and hold model because depository institutions needed to pay a higher rate for their funding than they were able to receive on their long-term fixed-rate assets. The increase in interest rates was particularly onerous for the thrift industry, whose portfolios contained a higher proportion of mortgages than commercial banks. By 1982, the entire thrift industry was insolvent by roughly \$150 billion (Black, 2013; Levitin and Wachter, 2013).

3.2.2 The Consequences of Deregulation: 1980-2007

This section discusses how the removal of restrictions on intermediaries following deregulation weakened the ability of public institutions to indirectly regulate the primary market through participation in secondary and insurance markets. A complete description of the effects of deregulation is beyond the scope of this essay. Instead,

²Source: St. Louis Federal Reserve FRED Database. Accessed July 7th, 2016 from: <https://fred.stlouisfed.org/series/FEDFUNDS>

the discussion in this section will focus on the problems which the proposal in this paper will provide tools to address. This section will describe how deregulation contributed to: 1) The reemergence of unstable mortgage structures through innovations that redistribute risk towards households, 2) Lack of access to affordable financial services, and 3) Competition in laxity by regulators due to erosion of distinctions between intermediaries.

As described in the previous section, the Volcker shock effectively ended the viability of the originate and hold business model for providing long-term fixed rate mortgages. This exposed the limits of depository institution's ability to manage interest rate risk, leading to widespread insolvency in the thrift industry. The resolution of this crisis could have occurred through either allowing adjustable rate mortgages (ARMs), or through securitization through the government sponsored enterprises (GSEs), Fannie Mae and Freddie Mac. The eventual resolution of the crisis occurred through securitization, which renewed the viability of long-term fixed-rate mortgages by enabling the originate to distribute business model. Fannie and Freddie would also regulate the terms of the primary market by setting the terms of access to the secondary market. However, this only occurred after deregulation removed restrictions on depository institutions to allow them to experiment with adjustable-rate lending. The removal of these restrictions would have wide-ranging effects that limited the ability of Fannie and Freddie to set the terms of the primary market. These effects will be described in detail below.

Deregulation occurred with the DIDMCA of 1980 and Garn-St. Germain Act of 1982. In addition to allowing adjustable-rate lending, these acts also abolished an entire range of restrictions including those on interest rates, underwriting standards, lines of business, concentration of ownership, size of loans that can be given to a single borrower, and conflicts of interest. To be sure, Congress attempted to reimpose restrictions through the Home Ownership and Equity Protection Act (HOEPA) in

1994. This act prohibited certain predatory lending practices by regulating balloon payments, negative-amortizing mortgages, and many other practices. The act additionally directed the Federal Reserve to prohibit acts which were deceptive, not in the interest of the borrower, or designed to evade the act. However, under Chairman Greenspan the Federal Reserve refused to engage in HOEPA rulemakings despite pressure from consumer groups. Even worse, when states enacted their own HOEPA like regulation, federal banking regulators such as the OCC pre-empted these laws making them no longer binding. While the DIDMCA and Garn-St. Germain Act dismantled the federal regulatory structure, this preemption dismantled the remaining state regulatory structure, leaving an essentially unregulated market (Taub, 2014; Levitin and Wachter, 2013).

Deregulation allowed the rapid reemergence of mortgage structures that were unstable because they redistributed risk back towards households. As described in section 1, when the HOLC created the fixed-rate, fully amortizing mortgage, it redistributed interest rate risk and liquidity risk away from households and towards financial intermediaries. However, the general trend in mortgage innovations following deregulation was to redistribute these risks back towards households. For example, immediately following deregulation ARMs with initial teaser rates became available. These loans contained a lower interest rate, and hence lower monthly payments, for an initial teaser period. At the end of this period, the interest rate would reset at a higher rate, resulting in higher payments. In addition to redistributing interest rate risk back to households, this loan also redistributed liquidity and market risk towards households. Households bore liquidity risk because these mortgages often required refinancing at the expiration of the teaser period because the increased payments were unaffordable. Additionally, market risk was already concentrated on households under the terms of the traditional fixed-rate mortgage. Market risk also amplified liquidity risk because if the value of the home declined sufficiently to cause negative

equity for the borrower, the borrower would not be able to refinance the loan. The concentration of interest, liquidity, and market risk on households was functionally similar to the pre-New Deal bullet loans described in section 1 (Taub, 2014; Levitin and Wachter, 2013; Peek, 1990).

Deregulation also increased lack of access to financial services for low and middle income borrowers. Following deregulation in the 1980s, credit unions and thrift institutions ceased to play their traditional role of providing low-cost services to lower and middle income households, in favor of adopting business models more similar to commercial banks. Without the institutions that traditionally fulfilled this role, a large fraction of the U.S. population is currently excluded from access to basic, low-cost financial services (Baradaran, 2013).

In 2013, roughly 7.7 percent of U.S. households were unbanked, defined as lacking access to a bank account. This includes roughly 9.6 million households, containing 16.7 million adults and 8.7 million children. However, this figure understates the problem because a large portion of the population is underbanked. This is defined as having a bank account, but still having to rely on high-cost, predatory financial services like pay-day lenders. In 2013 there were an additional 20 percent of households that were underbanked. This includes roughly 24.8 million households, containing 50.9 million adults, and 16.6 million children. In total, roughly 30 percent of U.S. households are unbanked or underbanked, and thus are excluded from access to traditional financial services.³ Lack of access to traditional financial services makes these households particularly vulnerable to high cost, predatory lending practices. For example, the average payday loan contains a 400 percent interest rate, compared to interest rates of between 12-30 percent for credit cards.⁴ Additionally, the average

³Source: 2013 FDIC National Survey of Unbanked and Underbanked Households. Accessed 7-13-2016 from: <https://www.fdic.gov/householdsurvey/2013report.pdf>

⁴Source: Consumer Finance Protection Bureau. Accessed July 7th from: <http://www.consumerfinance.gov/askcfpb/1567/what-payday-loan.html>

household that lacks access to traditional services spends almost 10 percent of its income on fees for financial transactions. These fees totaled roughly \$89 billion in 2012 alone (Baradaran, 2015; USPS, 2014).

Lack of access also made these borrowers vulnerable to mortgages that redistributed risk towards them because they did not have an alternative source of stable, affordable mortgage credit. In the period preceding the financial crisis, unstable mortgages concentrated risk on these borrowers. However, these borrowers were also the least able to bear this risk because they were precisely those who had low income, low assets, and lacked access to alternative financing. When house prices declined enough to give these borrowers negative equity, these borrowers were not able to refinance mortgages once the initial teaser periods expired. This caused a large number of defaults which generated large macroeconomic externalities by contributing to the financial crisis of 2007-2009 (Mian and Sufi, 2014).

The concentration of risk through unstable mortgage structures was facilitated by the rapid growth of the market for private-label mortgage backed securities (PLS). Under the previous originate and hold model for mortgages, borrower's and lender's interest were aligned because concentrating risk on subprime borrowers would also increase credit risk for the originating institution. Additionally, during the 1990s the underwriting standards required to be eligible for securitization through the GSE's helped to reestablish the traditional fixed-rate mortgage as the dominant mortgage during the 1990s. However, the rapid growth of the PLS market from 2002-2006 allowed these risky mortgages to be securitized, hence removing the credit risk from the originating institutions. This created an incentive structure where the incentives of lender's were not aligned with those of borrowers. Instead, originating institutions were incentivized to originate a larger volume of mortgages to gain more fee revenue, without regard to the credit quality of mortgages being originated. The rise of the PLS market thus weakened the ability of the GSE's to regulate the primary market

through limiting access to the secondary market (Taub, 2014; Levitin and Wachter, 2013).

These private mortgage-backed securities could be sold to investors, who were only interested in safe securities that did not bear credit risk, because the quality of the underlying mortgages was grossly misrepresented. A recent body of economic research has now extensively documented that investors in private MBS were systematically defrauded and misled about the quality of the securities which they purchased. For example, Piskorski, Seru and Witkin (2015) show that fraud was endemic to this market because, a “significant degree of misrepresentation exists *across all* reputable intermediaries involved in the sale of mortgages, [emphasis in original].” A related study by Griffin and Maturana (2016) confirms these findings by showing that approximately half of the loans used as collateral for MBS exhibited at least one of three easy to measure indicators of fraud: appraisal value inflation, unreported second liens, and misreported owner occupancy status. These findings should also be interpreted as a conservative lower bound for the incidence of fraud because they do not measure all types of fraud. In a recent ruling from a lawsuit concerning whether the quality of mortgages used as collateral for MBS was accurately described or misrepresented, District Judge Denise Cote stated that, “The magnitude of falsity, conservatively measured, is enormous.”⁵

Deregulation also weakened the ability of regulators to prohibit these practices directly because the erosion of distinctions between intermediaries allowed them to switch their charters to be regulated by whoever would offer the least stringent restrictions. This produced an incentive for regulators to compete to offer the lowest

⁵From ruling in *Federal Housing Finance Agency v. Nomura Holding America*, May 11th, 2015. The FHFA sued 16 banks for misrepresentations made in offering documents and prospectuses for securities sold to Fannie Mae and Freddie Mac. All but Nomura and Royal Bank Scotland settled out of court, and the court ruled against these institutions in trial on May 11th, 2015. Accessed on July 7th, 2016 from: <https://s3.amazonaws.com/s3.documentcloud.org/documents/2077713/ruling-on-mortgage-fraud-in-2008-crisis.pdf>

standards - “competition in laxity.” The Office of Thrift Supervision (OTS) was likely the most spectacular example of competition in laxity from the period leading to the 2007-2009 financial crisis. OTS funding was based on a levy on the amount of assets under its supervision. The OTS therefore had an incentive to increase the amount of assets under its regulation so that it could increase its funding. To do so, it offered banks less stringent regulation, and provided regulatory cover for institutions responsible for the largest failures of the crisis. These institutions include AIG, Countrywide, Indymac, Lehman Brothers, and Washington Mutual. That AIG, an insurance company, and Lehman Brothers, one of the largest investment banks, could recharter as thrift institutions, which were originally designed to be narrowly specialized institutions for providing mortgage credit to households, illustrates how far deregulation had eroded distinctions between institutions (Taub, 2014; FCIC, 2011).

In a now infamous 2003 photo,⁶ the director of the OTS, James Gilleran, posed with three bank lobbyists to advertise the loose regulatory approach of the OTS. In front of Gilleran and the lobbyists sat a stack of papers wrapped in red tape, which signified federal regulations. Behind them was a banner which read, “Cutting Red Tape.” In this picture, Gilleran held a chainsaw to the stack of regulations to dramatically show the commitment of the OTS to protecting financial institutions from regulatory oversight. John Reich held garden shears in this picture, and continued this trend when he replaced Gilleran as director of OTS. The OTS was abolished for this negligence following the financial crisis from 2007-2009 (Taub, 2014; FCIC, 2011).

Due to the role of unstable mortgages in contributing to the financial crisis, the Consumer Financial Protection Bureau (CFPB) was created as part of the Dodd-Frank reforms. The CFPB has authority to regulate any person that engages in

⁶This picture was published in the FDIC Annual Report of 2003. Accessed 5-5-2016 from: <https://www.fdic.gov/about/strategic/report/2003annualreport/ar03full.pdf>

offering or providing a consumer financial product or service. The authority to regulate several different types of institutions helps to prevent the competition in laxity described above. The CFPB also has the authority to use rulemakings to prohibit unfair, deceptive, or abusive financial products. For regulating mortgages, the most significant CFPB reform is the ability-to-repay rule. This rule requires that lenders make a good faith effort to ensure that borrowers can repay the loan, such as documenting income, employment, other debt or expenses, and credit history. Failure to do so provides the borrower a legal defense against foreclosure. The CFPB has also establish a class of “qualified mortgages” which are considered to have met the requirements of the ability to repay rule. Qualified mortgages are prohibited from containing features such as negative amortization, balloon payments, excess upfront points and fees, and limit how much of your income can go towards debt (Levitin, 2012).⁷

However, the ability of the CFPB to protect consumers is also subject to important limitations. Most importantly, the CFPB’s powers are limited to ensuring consumer protection through restrictions from above. The CFPB can use rulemakings to curtail consumer protection abuses, but cannot mandate that intermediaries provide products which embody best practices. For example, the CFPB cannot mandate that a lender provide “plain vanilla” products to which more complex products can be compared to. Additionally, the CFPB cannot mandate that a lender provide services to those who currently lack access to financial services (Levitin, 2012). Another limitation to restrictions imposed from above is that there are detection and enforcement costs in identifying abuses and prohibiting them. For example, prior to rulemaking the CFPB must identify the abusive practice, and thoroughly document

⁷For more description of the ability-to-pay rule and qualified mortgages, see: <http://www.consumerfinance.gov/askcfpb/1787/what-ability-repay-rule-why-it-important-me.html> and <http://www.consumerfinance.gov/askcfpb/1789/what-qualified-mortgage.html>. Accessed July 7th, 2016.

it. To enforce the restriction, the CFPB must file a civil suit, and engage in extensive litigation. Therefore, there is potentially substantial lag time between when the abusive practice occurs, when it is discovered, and when the prohibition is enforced. The next section of this paper will describe how the creation of a public bank and online financial services marketplace can complement the CFPBs current abilities by addressing these shortcomings through competition from below.

3.3 A New Public Option

This section presents the proposal for the creation of a new public option for household finance in the primary market. This section first describes the features of the new public option, which include the creation of a public bank and online financial services marketplace, as well as the regulatory tools each of these features would provide. The section then discusses the similarities and differences between this proposal and the proposals for postal banking by the USPS OIG. It concludes by discussing likely banking industry criticisms of this proposal.

Overall, the new public option would have two related features. First, the public option would include the creation of a new public bank which directly provides basic financial services, including mortgages, to households. Second, it would include an online financial services marketplace. These two features would use competition and transparency to address the two regulatory weaknesses associated with deregulation identified in section 2. These problems include private financial innovations that redistribute risk to households, and regulatory arbitrage.

The first feature of the new public option would be the creation of a public bank to serve the needs of households. This bank would be organized as a government corporation, rather than a government agency, to increase administrative flexibility. The primary difference between a government corporation and a government agency is that the government corporation is not subject to the congressional appropriations

process, because it is required to generate enough revenue to cover costs by providing goods and services. Therefore it has much more flexibility in the design and execution of its budget (Kosar, 2011). The public bank would be a member of the Federal Reserve system, and have deposits insured by the FDIC. The bank would be regulated by the Federal Reserve, FDIC, OCC, and CFPB. The bank would also work in coordination with the FHFA to meet federal housing objectives.

The public bank would directly provide basic financial services to households. The services provided would include deposit services, small dollar loans, and mortgages. The basic deposit services would include checking and savings accounts, check cashing, direct deposit, and online banking. The checking account would also include a public debit card. This card would allow online bill payments, mobile payments, e-commerce payments, and any other activity traditionally associated with debit cards. The public debit card would also allow access to a nationwide network of surcharge-free ATMs, which would be located in post offices. Additionally, the public bank would offer payment products like electronic money orders and international remittances. These basic deposit and payment services are similar to those proposed by the USPS OIG (USPS, 2015, 2014). The USPS proposal would implement all of these services through a reloadable, prepaid debit card, provided by a partnering with a private financial institution. In contrast with the USPS proposal, the public bank would simply offer a traditional debit card linked to a deposit account, and not need to partner with a private institution to provide this service.

From the perspective of promoting financial inclusion, it would be best if these basic deposit services were provided free of charge. Revenue to cover operational costs for these services could be derived from lending income or the provision of other payment services such as money orders. Revenue for this could also be generated by charging sellers a fee for participating in the online public financial services marketplace, described below. However, if these revenue sources were not sufficient to

cover operational costs for deposit services, then a modest fee could be also assessed. Providing free checking accounts and charging a fee for these services are both common in private financial institutions. Currently, 39 percent of checking accounts in commercial banks are free, and 76 percent of checking accounts in credit unions are free.⁸

The government should also provide small dollar loans which would replace unaffordable non-traditional lending, such as payday lending. The loan terms would be similar to those proposed by the USPS. The USPS proposal would make small dollar loans available to any borrower that deposited two consecutive paychecks. Users could borrow up to 50 percent of their gross paycheck, and make required monthly payments of 5 percent of their gross paycheck. The USPS provides the hypothetical example of a borrower making \$18,000 per year, and paid in bi-weekly paychecks. This person would be able to borrow up to \$375. If the loan contained a 25 percent interest rate and \$25 origination fee, the loan could be paid off in 5.5 months with interest and fees totalling \$48. This presents substantial savings relative to the typical payday loan, where interest and fees would total \$520, implying an interest rate of nearly 400 percent (USPS, 2014).

Alternatively, the loan terms could follow the template used in the FDIC Small Loan Pilot Program. This program issued loans for \$2,500 or less, with repayment terms 90 days or greater, and a 36 percent interest rate. This program found that longer loan terms reduced default rates, so longer terms should be encouraged (FDIC, 2010). Additionally, I propose that once a borrower successfully repaid a small dollar loan, they be allowed access to a small dollar revolving line of credit. This would provide users a more flexible safety net for unexpected expenses than having to apply

⁸Data on free checking accounts come from: <http://www.bankrate.com/finance/checking/want-free-checking-check-out-credit-unions-1.aspx>. Accessed June 30th, 2016.

for each loan separately. This would also reduce underwriting costs by removing the need to underwrite every small loan to the same individual separately.

In addition, I propose that the public bank provide the full range of government guaranteed mortgages, such as those insured by the FHA or guaranteed by the GSE's. The public bank would focus on issuing affordable, "plain vanilla" mortgages with transparent terms and fees. Mortgages to low-income borrowers would be insured through the FHA, and follow the underwriting templates they have already developed. Mortgages to middle or high income borrowers would need to conform to current GSE underwriting guidelines. The bulk of mortgages issued through the public bank would be securitized in the secondary market. Once these services have been proven successful, it would also be straightforward to expand services to provide any other type of government guaranteed loan, such as small business loans guaranteed by the SBA. Expansion into other government guaranteed loans would be straightforward because the public bank could take advantage of already developed underwriting templates, and not be subject to credit risk due to the guarantees.

A related question is whether the bank should offer a full range of consumer loans, such as credit cards and auto-loans. For the purposes of this proposal, I would recommend that the public bank not offer these services. Instead, the public bank should make them available through private providers in the online marketplace described below. In principle, I think the government could likely provide these services successfully. However, from a practical perspective, it would make more sense for the public bank to initially focus on providing a more limited range of services. This would avoid the need to create new underwriting standards, and reduce the public bank's exposure to risk.

Directly providing services to households would provide several tools to accomplish the regulatory goal of improving consumer protection, and address weaknesses in the regulatory structure associated with deregulation. First, directly providing services

to households would indirectly regulate the entire market by enforcing a quality floor through competition, rather than through restrictions from above. High-cost financial services, such as payday or title lending, would simply not be competitive with the low-cost, small dollar loans provided by the public bank. This quality floor would also address the two regulatory weaknesses associated with deregulation described in section 2. First, the quality floor would prevent financial innovations in mortgages from redistributing risk away from intermediaries and towards households, i.e. the type of innovation that flourished after deregulation. Mortgage innovations that were riskier for households would not be competitive with public mortgages which were less risky. Second, the ability to regulate through competition from below would also prevent the regulatory arbitrage that occurred following deregulation. As intermediaries adopted similar business models following the removal of restrictions on their activities, they could change their charter to whatever regulatory institution would offer the least restrictions. The quality floor prevents this because it would apply to all institutions, regardless of the type of charter, or even if they lacked a charter.

This quality floor would also be similar to the proposal that the CFPB mandate that private lenders offer plain vanilla products. These plain vanilla products would serve as a reference point which more complex products could be compared to. This would ensure that the additional mortgage terms added value for consumers, rather than shifted risk towards them. The rejection of the plain vanilla proposal also highlights a key weakness of the CFPB. The CFPB is limited to prohibiting worse practices through restrictions, and mandate best practices (Levitin, 2012). In contrast, the public bank could directly offer products embodying best practices for reducing risk for households. In doing so, they would incentivize private institutions to also offer these products through competition, rather than mandating they do from above.

Second, directly providing services would improve consumer protection by directly providing access to financial services for those who currently lack them. As described in the previous section, between 30 percent of U.S. households either lacks access to a deposit account, or has a deposit account but is still forced to rely on non-traditional high-cost services such as payday lending. Providing those who lack access with services also provides a way to build credit history for the underserved, thus allowing them to eventually be included in the traditional market (Baradaran, 2015; USPS, 2015, 2014). Moreover, as described in section 2, those who lack access to traditional financial services are vulnerable to financial innovations that redistribute risk towards them, because they have no other alternatives. However, these innovations generated substantial macroeconomic externalities because they concentrated risk on those least able to bear it, thus contributing to the financial crisis. Directly providing the underserved with services would prevent this problem by giving those who currently lack services low-risk alternatives.

Finally, similar to the experience of the HOLC described in section 1, directly providing services to households would give the government the ability to regulate through setting trends with financial innovations. The government could experiment with creating new forms of financing for households, and standardize best practices to allow them to be adopted on a widespread basis by private institutions. This would provide an alternative to the regulatory weakness associated with private innovation following deregulation, which often redistributed risk away from intermediaries.

For example, one possible area for innovation would be to experiment with more equity-like financing structures for mortgages that shield borrowers from the market risk associated with house price declines, such as shared responsibility mortgages (SRMs). The financing structure of SRMs is different from traditional debt-based mortgage structures because the lender offers downside protection to the borrower in cases of house price declines. If the value of the home decreases to below the purchase

price of the home, their monthly payments would be proportionally reduced, while the amortization schedule remained the same. As the house price recovered, the monthly payment would be proportionately increased until it reached the original level. In return for this protection, the borrower would offer the lender a small percentage of any capital gains on the home due to house price appreciation.⁹ In contrast, the distributional terms inherent to debt-financing specify that the borrower take first losses from house price declines, until their equity is wiped out (Mian and Sufi, 2014).

The distributional terms inherent in debt-financing cause negative externalities from a macroeconomic standpoint because this financing structure can cause large declines in spending following house price declines, as was seen during the financial crisis of 2007-2009. Mian and Sufi have argued that widespread use of these mortgages would have significantly reduced the severity of the Great Recession (Mian and Sufi, 2014). Some form of financial structure such as SRMs that results in a more equitable distribution of losses between debtor and creditor could potentially offer a superior alternative to the current structure of mortgages. However, it will likely take some experimentation and standardization before this structure could be adopted on a widespread basis. Directly providing services would give the government the ability to accomplish this.

An obvious concern with the creation of a public bank is that it will expose taxpayers to loss. Providing basic payment services is a relatively low risk enterprise, because it does not involve lending. However, providing loans of any type does necessarily expose taxpayers to some risk. This risk can be minimized through securitization, ensuring risk-pricing of loans rather than politicized underwriting, high capital re-

⁹? provide rough calculations suggesting that 5 percent of any capital gains would be sufficient to cover the costs of the downside protection. However, in practice the particular percentage charged will likely vary depending on a number of factors.

quirements, and explicitly pricing the government's guarantee of the public bank's debt. I consider these factors in detail below.

First and most basic, most of the mortgages originated by the public bank will be securitized in secondary markets. Securitization provides two forms of protection against loss. First, securitization directly removes credit and interest rate risk from the public bank's balance sheet. Second, securitization provides a revenue stream from servicing mortgages that can be used to offset losses. Additionally, mortgages that were held in portfolio would be high quality because they would either be insured through the FHA/VA, or conform to GSE underwriting standards. These underwriting standards have benefitted from the experience of several decades of development, and will help to shield the public bank from loss.

Second, the public bank will have to ensure that underwriting is not politicized. One could imagine the possibility of substantial political pressure to lower underwriting standards in an attempt to make loans more widely available, leading to underpricing of risk. A bulwark against politicized underwriting is that this institution will be organized as a public corporation which is required to raise enough revenue to cover costs. The public bank would bear first losses due to inadequate underwriting, and so would be interested in resisting any pressures to loosen underwriting standards. Additionally, the public bank will be regulated by the FDIC, OCC, and Federal Reserve. These regulators have substantial experience in best risk management practices, and will provide external controls against inadequate underwriting.

The danger of politicized underwriting is likely most acute for small dollar loans, because risk-pricing may conflict with the goal of financial inclusion. To the extent that these loans are made to higher risk borrowers, such as those that do not have access to traditional financial services, they will require higher interest rates. This is one reason why interest rates are high at non-traditional lenders such as payday lenders. However, there is also good reason to believe that the government could provide small

dollar loans at lower cost than non-traditional lenders, while still adequately pricing risk. The government has a lower cost structure due to 1) economies of scale, 2) lower overhead costs, and 3) non-profit structure. Were the public bank to partner with the USPS to provide these services through the post office branch network as proposed below, the government would be able to benefit from large economies of scale and lower overhead costs. These economies of scale would allow the creation of standardized underwriting templates which would reduce underwriting costs. Utilizing already existing post offices, as well as a robust online platform, would also lower overhead costs. Finally, not needing to generate profits would also lower the cost of these loans. These cost-advantages should allow the public bank to meet the goal of financial inclusion by offering these services at lower cost than currently available, while still adequately pricing risk.

Alternatively, if these cost advantages are not adequate to provide these small dollar loans at a low enough cost to make them sufficiently available to the financially underserved, then the public could consider directly subsidizing them through Congressional appropriations. This could be economically justified based on preventing the negative macroeconomic externalities described above. Additionally, this could also be justified based on the positive externalities of these services. The provision of small dollar loans can be interpreted as a social insurance program that provides a safety net. To be sure, the primary beneficiary of the small dollar loan is the person who needs it because of some unexpected shock. However, we all benefit when our neighbors have a safety net. Those who are desperate for money often resort to unethical behavior to obtain the money, resulting in larger social costs. To the extent that the community benefits when its weakest members have a safety net, but this benefit is not priced, we would expect markets to under produce this service. Therefore, there is an economic argument for directly subsidizing this service.

A third mechanism to protect taxpayers from loss is to reduce allowable leverage through a high capital requirement for the public bank. To be sure, the final capital requirements would need to be determined based on the expertise of the Federal Reserve, OCC, and FDIC. However, the experience of the 2007-2009 financial crisis can provide a benchmark for capital requirements sufficient to withstand even catastrophic losses. For example, combined mortgage losses for Fannie Mae, Freddie Mac, and private mortgage insurers during the 2007-2009 financial crisis were roughly 4-5 percent of the loan balance (Zandi, 2013). Therefore, a capital requirement of 7-10 percent would provide a very conservative level of capitalization able to withstand even catastrophic losses similar to the crisis of 2007-2009. For small dollar unsecured loans, the FDIC Small Dollar Loan Pilot Program, which occurred from 2007-2009 during the financial crisis, can provide a benchmark estimate. The program provided small dollar loans under \$1,000, and near small dollar loans of between \$1,000-\$2,500. The charge off rate for small dollar loans peaked at 6.2 percent in the fourth quarter of 2009, while the charge off rate for near small dollar loans peaked at 9 percent (FDIC, 2010). Therefore, a higher capital requirement of between 10-12 percent would be a strong cushion against losses in small dollar loans even during periods of high economic stress.

The last mechanism protecting taxpayers against loss would be to explicitly price the implicit guarantee of the public's banks debt. As a public corporation, the public bank's debt would be backed by the full faith and credit of the U.S. government. However, if this guarantee was not explicitly priced, the government would not have any reserves against loss. This guarantee could be priced by having the public bank pay a small assessment for any non-deposit debt issued. This assessment could then be placed into an insurance fund managed by the FDIC. The FDIC would be an appropriate institution to manage this insurance fund because this guarantee is functionally similar to deposit insurance. Explicitly pricing this guarantee would also help

to ensure that this institution did not enjoy a competitive advantage compared with private banks, due to lower borrowing costs. Overall, for the loans held in portfolio the combination of prudent underwriting, high capital requirements, and explicitly priced government guarantee should provide redundant levels of taxpayer protection sufficient to withstand even catastrophic financial crisis.

A final question concerning the public bank is how large we would expect this bank to be. To be sure, there is likely too much uncertainty to credibly estimate the precise market share this institution would be expected to account for. This would depend on a number of factors such as the outcome of market competition, the state of the economy, and how the financial system evolves through time. However, it is plausible to anticipate that the public bank will likely be roughly as large as a medium-sized financial services provider. Due to the limited nature of the services offered through the bank, we would not expect it to be as big as the largest firms, which all offer a substantially larger range of services. Indeed, the top 5 banks - J.P. Morgan Chase, Bank of America, Wells Fargo, Citigroup, and U.S. Bancorp - control almost half the assets of the banking industry.¹⁰ That being said, were the public bank to partner with USPS to deliver services through the postal branch network, as described in more detail below, the public bank would be able to increase the total number of bank branches by one-third. Therefore, it would have a substantially larger geographic presence than any other financial services institution. This large geographic network would likely allow the public bank to grow in size comparable to a medium-sized institution, despite the limited range of services offered.

¹⁰See Schaefer, Steve, December 3, 2014, "Five Biggest U.S. Banks Control Nearly Half Industry's \$15 Trillion in Assets," *Forbes*. Accessed July 4th, 2016 from: <http://www.forbes.com/sites/steveschaefer/2014/12/03/five-biggest-banks-trillion-jpmorgan-citi-bankamerica/#427f3a711d43> .

3.3.1 A Public Online Financial Services Marketplace

The second service that the new public option would provide would be to manage an online financial services marketplace. This marketplace would allow private intermediaries to offer a wide range of financial services to households, provided that these services met high consumer protection standards. Services from the public bank would also be offered through this marketplace, and directly compete with private services. This marketplace would also include a consumer protection ratings system and consumer reviews. The consumer protection ratings system would be developed in coordination with the CFPB. Both individual products as well as service providers could be rated. If a service provider's rating fell below a threshold, they could lose access to the online market place. This online financial services marketplace would be similar to the health insurance market places created by the Affordable Care Act, which also includes a ratings system for health insurance plans.

Providing consumer protection ratings in an online marketplace would help to prevent consumer protection abuses through increasing transparency and standardizing comparison of terms. Standardized ratings systems have been successfully used in numerous contexts to eliminate consumer protection abuses based on informational asymmetries or outright fraud. For example, grain is often used in economics textbooks as the canonical example of a uniform product. However, in actuality grain quality is highly heterogeneous across numerous dimensions such as type of grain, weight per bushel, presence of other seeds, amount of foreign material such as glass or stones, the amount of animal filth, and many other measures. The development of a rating system by the U.S. Department of Agriculture allowed wheat to be easily traded because the buyer knows exactly what they are getting (Akerlof and Shiller, 2015). Standardization would also allow for easier securitization and widespread adoption of best practices.

This ratings system could also be modeled off of that developed by the Affordable Care Act for rating consumer protection in health insurance plans. Financial and health services share many similar informational asymmetries that provide fertile soil for deceptive practices. For example, when a patient walks into a doctor's office, they do not always know exactly what health problem they are suffering from, or the necessary treatments to cure them. They rely on the doctor's professional knowledge, and trust the doctor to not prescribe unnecessary treatments of little medical value that would enrich the doctor (Arrow, 1963). Similarly, when a borrower applies for a loan, the loan underwriter typically has better knowledge of what they can afford than the borrower does. The borrower relies on the loan underwriter's professional knowledge to provide them with an affordable loan that is in their financial best interest (Campbell et al., 2011).

Financial contracts and health insurance contracts are also similar in that their complexity provides many areas to hide fees or other contract terms. Developing a standardized template for rating consumer protection could prevent consumer protection abuses by increasing transparency of services, shine light on hidden contractual clauses, and create a standard pricing system to eliminate hidden fees. Hidden fees and transactions costs are especially onerous for first time homebuyers. Total transactions costs can often total over half the down payment for first time home buyers (Akerlof and Shiller, 2015).

The consumer protection ratings system would also help to address the two regulatory weaknesses associated with deregulation that were discussed in section 2. First, it would help to prevent financial innovations that redistributed risk away from financial intermediaries and towards households. New private innovations would need to be rated before they could be listed on the public marketplace. Innovations that redistributed risk towards households would receive low ratings. If these innovations redistributed too much risk, their ratings would sufficiently low that they could not

be listed. For example, if a private bank wanted to list a new mortgage structure, the public bank in coordination with the CFPB would evaluate the mortgage based on how the mortgage terms distributed interest rate, market, and liquidity risks between borrower and lender. Various fees such as delinquency fees and prepayment penalties could also be included in the rating. Additionally, if the new mortgage structure had some prior usage in the private market, average default rates could also be included. Each of these features would receive a score based on how they predicted default, or some other negative outcome. A weighted average of these scores would then be combined into a total score. If this score predicted a level of defaults above an acceptable threshold, for example one standard error above the mean default rate for a 30 year fixed-rate mortgage, then this new mortgage would not be listed.

Second, these ratings would apply to all institutions, regardless of type of charter or lack of charter. This would prevent the regulatory arbitrage which occurred following deregulation. Institutions would not be able to avoid this rating system by switching charters to a less stringent regulatory authority. Moreover, unregulated entities such as shadow banks would not be able to avoid this ratings system and still be listed in the public marketplace.

Consumer reviews of products and sellers would also help to supplement the regulatory effectiveness of the consumer protection ratings system. Consumer reviews would give consumers a voice in addressing consumer protection issues as they emerge, and serve as an early warning system. If enough negative reviews accumulated for a product or seller, then their consumer protection rating would be reviewed by the public bank and CFPB. If this review found that these negative reviews were warranted, then the product or sellers rating would be downgraded. If the downgrade was sufficiently large, this product or seller could be excluded from the online marketplace. Limiting access to the online marketplace to products and sellers that had high consumer protection ratings would directly regulate products and sellers partic-

icipating in the marketplace, but would also indirectly regulate products and seller in the broader private marketplace through competition. Lenders outside of the public marketplace would need to compare the services to those offered in the public marketplace to show borrowers that they contained similar protections and were a better deal.

Finally, managing an online marketplace would also improve private regulation of the marketplace. For example, one of the primary forms of fraud which contributed to the housing bubble was appraisal value inflation (Griffin and Maturana, 2016). Loan officers told appraisers what price the house needed to be appraised at in order to make the loan go through. This contributed to the inflation of the bubble through increasing house prices. Appraisers are formally supposed to be independent from loan officers. However, loan officers were able to gain leverage over appraisers by threatening to blacklist them if they did not provide the desired appraisal values. A 2007 survey of 1,200 appraisers conducted by the October Research Corporation found that 90 percent of appraisers reported that mortgage brokers and others pressured them to inflate appraisal values in order to approve more loans, and that 75 percent of appraisers reported the possibility of being blacklisted for not providing the inflated values requested (Murray, 2009).

3.3.2 Relation to Existing Postal Banking Proposals

The proposal for a new public option in this paper builds off of the proposals for postal banking from the USPS OIG (USPS, 2015, 2014). However, there are also important differences. The primary difference is that I propose that the public bank be constituted as an independent agency whose main mission is improving regulation, rather than as a subsidiary agency whose primary goal is revenue generation for the USPS. This is to prevent any conflict that may arise between revenue generation and the regulatory mission of the institution.

The tension between generating revenue for the USPS, and the public mission of providing low-cost financial services to those that lack them, is the primary drawback I see in the USPS proposal. The USPS proposals argue that they would be able to provide financial services at lower cost than private industry because of lower overhead costs and economies of scale. It is likely that these cost-advantages would allow the USPS, or the public bank, to sustainably provide these services at a lower price than is currently available in the private sector. However, to the extent that the provision of these services would need to also generate revenue to fund mail delivery, these services would require a higher price. In the end, it may not be feasible for the financial difficulties of the postal system to be paid for by the poor (Levitin, 2014).

While I propose the new public bank be constituted as an independent organization, it would still be useful for this institution to partner with the USPS to take advantage of the postal service's large geographic branch network. The primary benefit I see in the postal banking proposals is that the wide scope of the geographic branch network - a post office in every ZIP code - would make the USPS particularly well-suited for providing financial services to those who currently lack it. The post office currently has more than 35,000 post offices which could serve as local financial services providers. In comparison there are roughly 95,000 bank branches. Therefore, a partnership between the public bank and the USPS would single-handedly increase the total number of branch locations serving communities by over one-third. Additionally, 59 percent of post office branches are located in ZIP codes with either a single or no bank branches. Moreover, these post office branches are unified into a single national network which is significantly larger than any private network. For example, the largest single bank branch network belongs to Wells Fargo, and includes roughly 6,300 bank branches (Baradaran, 2015; USPS, 2014).¹¹

¹¹Commercial bank branch data from Hess, Alexander, "Bank with the Most Branches," USA Today, October 5th, 2014. Accessed April 13th, 2016 from:

In partnering with the USPS, this new public option could still generate some revenue for the USPS. Revenue could be generated through renting space from postal branches or through the sale of financial products provided by the public bank. For example, the postal service could gain revenue through helping borrowers apply for loans that would then be underwritten by the public bank. This arrangement would also be easier to implement for the post office than directly providing these services itself.

3.3.3 Would the Public Bank Create Unfair Competition?

The financial services industry will almost certainly oppose this proposal on the grounds that a public bank would create unfairly subsidized competition. To be sure, the goal of this proposal is to regulate the market through fair public-private competition, rather than unfairly subsidized competition. To this end, there are mechanisms in this proposal to ensure that competition between the public bank and traditional banks is on a level playing field. First, the public bank would be required to generate enough revenue to cover costs, and would not be explicitly externally subsidized. Second, I proposed above that the guarantee of the public banks debt be explicitly priced to insure taxpayers against loss. This would also help to ensure fair competition by reducing the ability of the public bank to borrow funds at lower cost than private banks due to government guarantee of its debt. Third, I also proposed that the public bank have high capital requirements to protect taxpayers against loss. However, these capital requirements are higher than those for private banks, which would put the public bank at a competitive disadvantage. Finally, the limited product range of the public bank also reduces the scope of competition. For example, commercial banks are typically not interested in offering borrowers small dollar loans

<http://www.usatoday.com/story/money/business/2014/10/05/24-7-wall-st-banks-with-most-branches/16648133/> .

because they are less profitable than larger loans. Therefore offering these products would not be in direct competition with commercial banks.

Additionally, the public bank would also provide private banks with a range of benefits. For example, the public banking system could serve as a mechanism for bringing new users into the private banking system. The public bank would increase access to those who currently lack it, and potentially help them build credit history. Due to the limited nature of the services the public bank would offer, these new users would then migrate into the traditional private financial services system when they needed a wider range of services. Another potential benefit is that if the public bank allowed members to deposit and withdraw funds at postal branches, it would be easy to extend this capability to private institutions as well. Private banks would then have access to a branch network that is 5-6 times larger than any single private bank network, and located in every ZIP code in the country. Additionally, private banks would be able to access the online financial services marketplace, potentially gaining new business. Allowing access to the postal branch network and online marketplace would also help to level the playing field between smaller community banks and larger commercial banks.

Finally, it is likely that the public bank will gain market share, at the expense of private banks, through fair competition. This competition would represent a limitation on the private banks' current domain. However, this limitation would fulfill the important public purpose of regulating market failures in the private sector, and providing goods and services that private institutions are not adequately providing. As described in the second section of this paper, serious consumer protection abuses by private financial services providers concentrated risk on those least able to bear it, and contributed to the worst financial crisis since the Great Depression. The terms which distribute risk in mortgages are therefore legitimate objects of public regulation due to the large macroeconomic externalities they can potentially generate. Moreover, these

consumer protection abuses rapidly reemerge absent a regulatory framework sufficient to suppress them. Public-private competition would provide regulatory tools to prevent these abuses which are likely more durable than those currently available.

Moreover, public-private competition will only be onerous for financial institutions to the extent that their business model relies on consumer protection abuses for profits. For example, this competition will likely be strongly felt by non-traditional lenders, like payday lenders. Competition will make these institutions need to change their business model to one that does not rely on charging the poor 400 percent interest rates, or risk being displaced by low-cost public alternatives. However, through directly providing services the public bank would also be creating a sustainable business model for small dollar loans which could be adopted. Therefore public banking would also provide these institutions a pathway for change, in addition to compelling them to change through competition.

An irony of this proposal is that in many ways, the image of the public bank would be to fulfill the role of the limited public utility which the New Deal envisioned for private intermediaries, as described in section 1. Rather than imposing restrictions on private intermediaries to fulfill this role, under this proposal the government will directly perform this function itself, and in doing so improve regulation of the private market as well. This is appropriate because this type of limited public utility could still provide important functions, however private intermediaries are not interested in playing this limited role. Private intermediaries were always interested in significantly broadening their business activities beyond that of a narrowly restricted public utility. For example, former CEO of Wells Fargo Dick Kovacevich described the passage of the Graham-Leach-Bliley Act in 1999, which represented the final repeal of the New Deal Glass-Steagall act, as, “a change I personally worked on for two decades. So, by the year 2000, after a quarter century of deregulation, financial services companies could sell any financial product, in any part of the U.S., at competitive, market-

driven prices,” (Kovacevich, 2008). While public-private competition under the new proposal may restrict the domain of private institutions in some areas, there would still be a much wider domain of action for these institutions than was allowed prior to deregulation.

3.4 Conclusion

The proposal in this paper to create a public bank and manage an online financial services marketplace would allow the government to use competition and transparency to prevent consumer protection abuses in financial services. These tools would complement the CFPB’s current capabilities, helping to ensure that consumers received financial products consistent with their best interest. However, in closing it is also important to acknowledge the limitations of the tools provided by this proposal. The main limitation of this proposal for housing finance is that in restricting the discussion to the creation of new primary market institutions, it does not focus on the current discussion of reforms of secondary market institutions.

Since the 2007-2009 financial crisis, the government has played a larger role in supporting mortgage origination due to the withdrawal of private capital. Since 2008, the GSE’s have guaranteed 60 percent of new mortgage originations, while the FHA/VA has guaranteed another 20 percent (Frame et al., 2015). This has led to a widespread debate concerning possible institutional structures for the secondary market, as well as the appropriate role for government in this market. As of 2013, there have been at least 26 prominent proposals from academics, think tanks, industry, and policy makers for reforming the secondary market, including 4 which were introduced as bills in the House of Representatives.¹² These proposals have spanned a wide range

¹²For example, in 2013 the Center for American Progress compiled a summary of 26 secondary market reform plans. Retrieved July 10th, 2016 from: <https://www.americanprogress.org/wp-content/uploads/2013/09/GriffithHousingTable-revised.pdf>

of institutional structures, including fully private, fully public, and hybrid public-private structures. A full review of these plans are beyond the scope of this paper. However, it is worth noting that regardless of the final structure agreed upon for the secondary market, the regulatory tools provided by this proposal would be useful for reducing credit risk in the mortgages to be securitized. The tools in this paper are tailored for reducing consumer protection abuses. However, this would also reduce credit risk to the extent consumer protection abuses increase the probability of default. Indeed, reducing credit risk in this paper would be more important for the more lightly regulated fully private proposals. These tools would help to reduce the gross misrepresentation of credit risk in private MBS which contributed to the 2007-2009 financial crisis, as described in section 2.

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