

The Subprime Mortgage Crisis: Underwriting Standards, Loan Modifications and Securitization*

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February 2010

Abstract

This is a survey of some literature on things that have been going on in housing mainly. Because it's interesting. I highlight some aspects of the bubble, then some causes of the crash. I add some notes on the mortgage finance industry, and a little bit about the role of securitization in the crisis, and in posing hurdles for resolving the crisis. Those familiar with this area will be familiar with what I write about. Those not might find better surveys elsewhere. So you've been warned.

Keywords: housing; securitization; subprime.

*Notes on institutional detail written for personal edification. Thanks to Patrick Bolton for helpful and kind comments.

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1. Introduction

This paper is a survey of some of the literature on the subprime mortgage crisis. I focus on two aspects of the debate around securitization. First, I consider securitization as a possible mechanism for a decline in underwriting standards. Second, I review some evidence about its role in inhibiting the restructuring of loans through modification. These aspects are related, since creating a more rigid debt structure can facilitate better risk management and permit the greater extension of credit. However, it can also result in inefficiencies, through externalities on non-contracting parties. This might justify intervention *ex post* (Bolton and Rosenthal, 2002 [7]). I then consider some of the recent government modification programs and their problems. A concluding section tentatively suggests topics for research.

We begin by outlining the shape of the non-prime mortgage market by way of background, tracing its rapid expansion from the mid-1990s, but in particular its rapid development since the turn of the century. The first part addresses some of the still unresolved literature on the causes of the crisis in the subprime market. I restrict attention to housing market specific explanation — leaving out broader macroeconomic issues — not because the latter are not important, but in order to focus attention on the institutional detail of the mortgage industry.

The first part, considers some contending (though not mutually exclusive) explanations for the crisis in subprime. I identify three main strands of the debate. First, the hypothesis that the products themselves were confusing — the allegation that consumers did not understand that rates were going to explode, and hence were duped into loans they could not afford. Next we turn to the discussion of securitization and underwriting standards. This turns on the debate around a well known paper by Keys et al (2008)[45] and some recent responses (e.g. Bubb and Kauffman, 2008 [10]). The question concerns the relative importance of securitization as a mechanism for causing a decline in underwriting standards. The innovation of securitization is also linked to powerful institutional and technological changes, such as the automation of underwriting. This can result in a decline in standards, though not on dimensions typically measured. It is not clear that spending fifteen minutes on a loan application rather than a day, represents a gain in quality-adjusted efficiency. Finally, we must recognise that underwriting standards are connected to expectations about house price changes. This is just to say that ‘the social contagion in bubble thinking’, such as discussed in various places by Shiller (2008)[70], may have been an important factor. Notice, the

fundamental implication of each of these explanations is the same — houses were sold to individuals who could not afford them.

The second part provides some background on the various players in the mortgage finance industry. As a general point, it is important to understand the nature of competition in mortgage finance. There appear to be two general and countervailing forces at work: the accounting and regulatory arbitrage incentives for disintermediation; second, the benefits from vertical integration in overcoming agency and transactional costs. The ultimate industry structure results from a firm-specific balance of these two competing forces. We present some very tentative information on this topic, mainly by way of providing context to the discussion around loan modifications which follows in part three. The industrial organization of finance, in particular in terms of understanding the financial crisis, appears to be an area where the research is as yet quite limited.

The third part is a consideration, in light of the preceding, of the various limitations on performing loan modifications. Following the outlines in the Congressional Oversight Panel (2009)[13] report, we consider four different types of constraints. The first two are directly related to securitization. First, is the idea advanced by authors such as Gelpern and Levitin (2009)[35], that the securitization pooling and servicing agreements introduce contracting rigidities and adverse incentives for renegotiation. Linked to this, but a little more general, is the idea that securitization has resulted in various incentive problems and inadequate fee structures for servicers. Other authors, such as Adelino et al (2009)[1] have argued that in fact the constraints are more prosaic — that concerns about redefault and self-cure (particularly in a setting of rapidly declining house prices) make it unprofitable for servicers to modify loans. Finally, it has been widely observed that loan servicers are capacity-constrained. This is an indirect result of securitization, in that the role of the servicers had altered from one of careful screening and monitoring, to essentially automated collection and disbursement. The debate here around securitization and modification ties back into the debate around securitization and underwriting in the first part.

Part four turns to an assessment of the various government programs aimed at moderating the speed and extent of foreclosures. I explain some of the criticisms that have been made about these programs, and outline some alternative suggestions. One prominent argument that has been advanced is that the federal government permit bankruptcy mortgage modifications for single-family principal residence mortgages in

Chapter 13. An amendment to this effect was defeated in the House last December, and the Senate has also shown no appetite for it. This illuminates our discussion of the political economy of financial regulation, another desperately under-researched area.

Finally, I conclude with some questions arising out of this survey and some suggestions for research.

1.1. Bubble

While in the past 50 years, national nominal housing price growth has never been negative, real price growth often has (for example, in the early 1980s).¹ It is somewhat surprising therefore, in a low inflation, low interest rate environment, that market participants and regulators do not appear to have anticipated any possibility of future nominal house price declines. Two features have been identified as underpinning the price dynamics of the US housing market — momentum and reversion (Wilcox, 2008)[79]. The literature explains momentum as a result of supply frictions and/or informational dynamics. First-time buyers may be unable to purchase based on this momentum effect, which may eventually trigger a reversal (Wilcox 2008, p. 8)[79]. Case and Shiller (2003)[11] argue that once buyers perceive that prices can no longer rise, this belief becomes self-fulfilling and prices may revert to ‘fundamentals’. While Himmelberg et al[41], writing in 2005, argued that fundamentals justified then higher prices²; recent experience suggests this was mistaken. In fact, the real economy many have been propped up by a strong real estate market, rather than the reverse.

Between 1997 and 2007 average annual nominal house price growth was 6.5%. Assessing whether or not this formed a ‘bubble’ requires some notion of fundamental determinants of housing prices. Demand side drivers could include incomes, access to credit, population and preferences; on the supply side we might consider construction costs and zoning restrictions (Wilcox, 2008, p. 17)[79]. However, the empirical basis for such a long-run relationship appears thin. Alternatively, we might assess house prices by comparison to interest rates and the rental market (this is a kind a relative value, “ketchup economics” approach). Prices might then be viewed as ‘overvalued’ if high relative to carrying costs, appropriately measured. Shiller (2008, p.34) considers ratios

¹See Shiller (2008, fig 2.2 p. 33)[70] for a national real house price index for the US constructed for the period 1890-2008.

²As did Ben Bernanke in Congressional testimony in 2005. See Henderson (2005)[40], ‘these increases, [Bernanke] said, ‘largely reflect strong economic fundamentals,’ such as strong growth in jobs, incomes and the number of new households.’

of home prices to building costs, rent and personal income and finds that home prices at 2004 were looking ‘*very* anomalous’ (emphasis in the original).

Shiller (2008, p.4)[70] argues rather that the boom was driven by ‘an epidemic of irrational public enthusiasm for housing investments’. Slightly more precisely, he describes this as (p.41) ‘the social contagion of boom thinking, mediated by the common observation of rapidly rising prices’. This feeds into a narrative of a ‘new era’. Shiller argues that this is a difference in opinion over time (a ‘changing zeitgeist’), as opposed to say across regions. As evidence for these raised expectations of housing price growth, he cites work of his (and Karl Case), on median expected price increases in various regions at 2005 which among a third of respondents were found to be ‘truly extravagant’.

1.2. Nonprime mortgages

By nonprime loans we mean those commonly referred to as ‘subprime’ and ‘Alt-A’. The use of these terms by industry participants is not consistent. Ashcraft and Schuerman (2008)[3] refer to the 2001 Interagency Expanded Guidance for Subprime Lending Programs to define these terms³. In Chomsisengphet and Pennington-Cross (2006)[12], subprime loans are those which carry a ‘premium above the prevailing prime market rate that a borrower must pay’. As noted also by Demyank (2009a, 2008)[19][21], the denotation of ‘subprime’, is not solely based on the poor credit characteristics of the borrower (typically a borrower having a FICO score below 620 would result in the loan being designated ‘subprime’). But a loan could also be classed as ‘subprime’ if it was originated by a high-cost lender, or if it had certain features — for example if it was a 2/28 hybrid. Furthermore, the process of securitization itself fed into this assignment; the riskiest of the securitized loans would be labelled as ‘subprime’. Frame

³According to these guidelines (Ashcraft and Schuerman, 2008)[3], ‘the subprime borrower [is] one who generally displays a range of credit risk characteristics, including one or more of the following:

- Two or more 30-day delinquencies in the last 12 months, or one or more 60-day delinquencies in the last 24 months;
- Judgment, foreclosure, repossession, or charge-off in the prior 24 months;
- Bankruptcy in the last 5 years;
- Relatively high default probability as evidenced by, for example, a credit bureau risk score (FICO) of 660 or below (depending on product/collateral), or other bureau or proprietary scores with an equivalent default probability likelihood; and/or,
- Debt service-to-income ratio of 50 percent or greater; or,
- otherwise limited ability to cover family living expenses after deducting total debt-service requirements from monthly income’

et al (2008)[29] note that First American LoanPerformance data provides information on loans sold into private label MBS securitization including information on securities marketed as Alt-A, subprime and jumbo. ‘Alt-A’ loans generally refer to those given to individuals possessing higher credit scores, but with incomplete or no documentation⁴. These also may be loans made where the recipient intends to buy a second home or to purchase for investment.⁵

Bhardwaj and Sengupta (2009)[5], for example, define ‘subprime’ and ‘Alt-A’ relative to the First American LoanPerformance database they employ — ‘subprime pools include loans to borrowers with incomplete or impaired credit histories while Alt-A pools include loans to borrowers who generally have high credit scores but who are unable or unwilling to document a stable income history or are buying second home or investment properties’ (fn 12, p.10). One can also examine the HMDA data, but as Kroszner (2008)[47] points out, HMDA data do not categorise loans as ‘subprime’ directly — rather the data identifies ‘higher priced’ loans.⁶

1.3. Growth in nonprime

In Frame et al (2009)[29], the first lien subprime loan total at March 2008, was estimated to be 6.7m loans, a total value of \$1.2tn. This is in the context of a \$10.1tn first lien mortgage loan market. According to Gramlich (2007)[39], subprime mortgage originations totalled \$625bn in 2005. The industry publication, *Inside B&C lending*, cited in Chomsisengphet and Pennington-Cross (2006, p. 37)[12], reports subprime origination as growing from \$65bn in 1995, to a total of \$332bn in 2003 but declining in share of all loans outstanding from 10.2% to 8.8% over the same period. During this time, in line with conventional mortgages, an increasing proportion of subprime mortgages were securitized (reaching 58.7% in 2003, up from 28.4% in 1995). One important feature of this period was the brief collapse in subprime loan securitization in 1998-99, which also coincided with a drop in originations, before the market underwent a period of

⁴These ‘stated income’ loans are also sometimes called ‘liar’s loans’. An amusing, but perhaps slightly apocryphal story is that WaMu made a second-mortgage loan to O.J. Simpson after a civil court judgment found against him on Simpson’s assurance in a letter to the lender that ‘the judgment is no good, because I didn’t do it’ (DeSilver, 2009)[24]. Florida state law providing for unlimited homestead exemption is likely to have been more of a factor. Credit Slips, 2 November 2009,

⁵When using First American LoanPerformance data, to get a sense of ‘Alt-A’, one usually considers the adjustable-rate prime category. For more details on the available data sources on loan performance, see COP (2009)

⁶As noted, industry use of the term is not consistent. As reported in the blog *Credit Slips*, mortgage servicing technicians might refer to a new batch of subprime or Alt-A loans as ‘crap of the crop’ or ‘scratch-and-dent’ loans. Credit Slips, 5 November 2009, accessed 10 November 2009.

consolidation and began to recover. Chomsisengphet and Pennington-Cross (2006, p. 40)[12], ascribe this to an under-pricing of these products in the mid-to late 1990s and reduced levels of liquidity in all markets following the East Asian crisis.

The reasons Gramlich (2007)[39] identifies for the rapid increase in subprime lending after 1993 (a time at which essentially no loans were ‘subprime’) include the 1980 Depository Institutions Deregulatory and Monetary Control Act of 1980, securitization and automatic underwriting ⁷ and the Community Reinvestment Act (CRA). To this Chomsisengphet and Pennington-Cross (2006)[12] add the 1982 Alternative Mortgage Parity Act, which allowed balloon payments and interest rate flexibility, and the 1986 Tax Reform Act, prohibiting the tax deductibility of interest on consumer loans.

Gramlich (2007)[39] breaks out shares of origination. While 20% of subprime loans were originated from federally supervised banks and thrifts, and 30% from affiliates of bank holding companies, fully one half of subprime loans originated from unregulated lenders, many of whom had ‘no skin in the game’ (Gramlich, 2007)[39]. These were ‘state-chartered but not federally supervised independent mortgage companies’.

According to Chomsisengphet and Pennington-Cross (2006, p.31)[12], key dimensions associated with the cost of credit are the down payment, and the borrower’s credit history. Prevailing practice before the explosion of subprime was ‘nonprice credit rationing’ — ‘minimum lending standards were based on a borrower’s income, prepayment history, down payment and the local underwriter’s knowledge of the borrower’ (p. 32). In contrast, the growth in the subprime market introduced differential tiers and product types, ‘[moving] the mortgage market closer to price rationing or risk-based pricing’. Their study, written in 2006, finds increasing use of ‘prepayment penalties and large downpayments’ which appears to indicate an increase in risk. These authors note that ‘subprime’ mortgages are characterised by higher costs for borrowers, while for lenders termination costs, in the form of prepayment and foreclosure, are also higher for this category. They examined Countrywide Home loans underwriting matrices and found these to have five categories under which a loan is grouped into one of six loan grades, namely: mortgage delinquency days, foreclosures, chapter 7 or 13 bankruptcy, and debt ratio. This is what these authors characterise as ‘[active] price discrimination’ and ‘risk-based pricing’ (p. 36).

⁷On automatic underwriting see Browning, L (2007)[8]. On this account, it was this technological development which permitted the variety in subprime mortgages to develop — ‘spawned an array of subprime mortgages’. It also reportedly made loans less costly to close (by \$916). We consider automatic underwriting in more detail the below, drawing in particular on the work of Poon (2008), although this topic is also considered by Bubb and Kauffman (2009)[10].

Thus Chomsisengphet and Pennington Cross (2006)[12] identify two periods in the evolution of the subprime market between the mid 1990s and 2004: the first period, until 1998-99 when growth was primarily in the riskiest grades of subprime, and the period from 2000-2004 where subprime volume was increasing, but mainly in the A-grade. Kregel (2008, p. 14)[46] though, citing data from Freddie Mac, finds that the period 2001-2007 was characterised by a rising share in ARM loans as well as loans with low- or no-documentation. In fact, many borrowers were struggling to meet repayments, even before the initial resets (Kregel, p. 14).

1.4. Crisis

Increasing mortgage rates and slowing house prices⁸ from mid 2005 led to a reversal in the growth of subprime and Alt-A originations. Before that, the Federal Reserve had begun its tightening cycle in 2004 which brought with it interest rate increases on new mortgage loans and loans with LIBOR-indexed floating rates. Notice though, that since between 2004 and 2006 housing prices were still appreciating, subprime borrowers could still refinance into lower monthly payments (Mayer et al, p. 20)[58]. Once prices stopped rising, defaults began, initially on a regional basis, in places such as Ohio, Michigan and Indiana where the macroeconomic environment was weaker (Mayer et al, 2008, p. 21[58]; for an excellent contemporaneous account of the situation in Ohio, see Katz, 2006[43]).

Subprime and Alt-A mortgages had experienced rapid growth in the first half of the decade (Mayer et al, 2008[58]). The character of this growth was different across the subprime and Alt-A categories — with subprime growth predominantly in the form of short-term hybrid loans (with a yearly share of originations between 68% and 81%) and Alt-A growth more evenly distributed across fixed- and floating-rate and short- and long-term hybrid loans (Mayer et al, 2008, p. 5[58]). Coupled with the reversal in originations was an explosion in delinquencies. By the second quarter of 2008, seriously delinquent loans — namely those either in foreclosure or on which the borrower is more than 90 days in arrears — were up to 4.5%, from an historical average of 1.7% between 1979 and 2006. Defaults and delinquencies were initially concentrated in the nonprime segment, although as the crisis, recession and unemployment have worsened, increasing numbers of prime loans have also become ‘seriously delinquent’. The factors identified by Bernanke (2008)[4] for an increase in foreclosures include weak

⁸Krugman (2005)[48]

underwriting (little documentation, low downpayments), increased inability to refinance, and tighter lending standards as secondary markets softened.

We consider three possible types of explanation for the foreclosure spike commonly called the ‘subprime crisis’, namely:

- consumers misunderstanding product features such as ‘teaser rates’ and prepayment penalties, leading to a spike in foreclosures when these ARMs reset;
- a declining standard of underwriting over this period — this has been considered to be related to securitization (originators who lack ‘skin in the game’ may devote less effort to screening borrowers), but underwriting standard declines may manifest in a variety of ways: through lower downpayment requirements; inflated appraisals on properties in refinancing transactions, through less rigorous documentation requirements (e.g. through allowing consumers to state their own income), or through altering credit score eligibility thresholds and;
- a general malaise of bubble psychology related to ‘animal spirits’ which lead to anticipations of continued appreciation in house prices. Notice, this is related to the second explanation above since underwriting standards may be allowed to fall because of this ‘national mood’, and increased access to credit for the purchase of assets may then result in self-confirming asset price increases. It is important to be clear on what we mean by declining underwriting standards.

2. Causes of the Crisis

2.1. Product Complexity, Mortgage Resets, Prepayment Penalties

Smith et al (2009)[73] present survey evidence that borrowers most often cite rate resets as the primary mortgage characteristic leading them to default. For example they quote one foreclosure counsellor they interviewed as stating simply ‘people [...] got hooked into loans they didn’t understand’. By contrast, in that same survey, the most commonly cited reason for default for individuals with fixed rate mortgages was loss of income or employment (p.8).

Bucks and Pence (2008)[9] compare consumer reports of loan terms in the Survey of Consumer Finances with how these terms are distributed in the administrative records of the Residential Finance Survey and the LoanPerformance data. They also consider direct reports in the survey of a lack of awareness of mortgage terms. They find among

ARM borrowers no knowledge of, or an underestimation of, the magnitude by which their interest rates could change. Lender reported potential ARM interest rate increases were double or triple those reported by consumers while a third were unaware of the extent of their mortgage interest rate caps. They argue that this is best accounted for by a model of rational inattention.⁹

Features which may have contributed to the foreclosure spike include: teaser rates, prepayment penalty clauses, and too little principal down (or even negatively amortizing loans). These were typical features of non-prime loans whose prevalence expanded over this period. However, Mayer et al (2008)[58] do not consider these features to be a primary factor in explaining the massive increase in delinquencies. Teaser rates were still quite high; and the spike in foreclosures does not neatly coincide with the reset event. Mayer et al cite Sherlund (2008) and Gerardi, Shapiro and Willen (2007) in support of this view, noting that defaults preceded the reset. Smith et al (2009) from the same interviews cited earlier, find that households might come before or after the rate reset for counselling on foreclosure mitigation.

Mayer et al also (2008)[58] also address a few other issues thought to be relevant to the subprime crisis. They describe as 'relatively uncommon' the situation that prepayment penalties would still be applicable at the time of reset (p. 12). They also note that by 2006 and 2007 an increasing proportion of subprime and Alt-A loans had payment schedules beyond 30 years and/or interest only or negatively amortizing payment profiles. The implied low equity position meant that default incentives under falling house prices were raised (p. 13). Households anticipating the recast of Option-ARM payments may choose simply to walk away. However, in the view of these authors, the particular characteristics of these mortgages were less important than factors such as the high loan-to-value ratio of the loan, and the corresponding very thin layer of equity for the borrower (p.24).

2.2. Declining Underwriting Standards

2.2.1. Dimensions of underwriting standards

The two prime delinquency risk measures that Mayer et al (2008, p.6)[58] identify are the 'combined loan-to-value ratio [combining both the primary and secondary lien]

⁹For example, Ben Bernanke, has been very busy, and also has revealed that he has recently refinanced his mortgage because 'we had an adjustable rate mortgage and it exploded, so we had to'. Time Magazine, 'Person of the Year 2009',

and the FICO credit score'. Furthermore, Mayer et al (2008), find that the mere presence of a secondary lien increases delinquency probability, even conditioning on combined LTV.¹⁰

Mayer et al (2008)[58], using data on subprime mortgages originated in the US between 2003 and 2007, determine that while median FICO scores were constant over the relevant time period, that underwriting standards had deteriorated in the following senses: there was more origination to no/low documentation borrowers and borrowers with low downpayments (higher loan-to-value ratios). Mayer et al (2008) also find that during this period there was an increasing share of subprime and Alt-A originated loans with second liens attached

They find that combined loan-to-value loans on subprime mortgages for housing purchases were rising between 2003 and 2007, and constant for refinancing. They note though, that this latter measure is biased downwards if housing appraisals were biased up over this period (as they surely were since, in a refinancing, the house price must be based on an appraisal and not an actual sale).

Mayer et al (2008) document an increase in the share of originations for these low documentation loans in the subprime area, but more particularly with respect to Alt-A and conclude from the fact that default rates are greater for this type of loan that this likely contributed to the increase in foreclosure rates.

Frame et al (2008)[29] also empirically document declining underwriting standards over this period in the following senses: increased subprime mortgage combined loan-to-value ratios (particularly for 2/28s); declining share of fully documented 2/28 subprime mortgages and falling average FICO scores for fixed rate subprime mortgages.

Furthermore, some of the decline in underwriting standards is likely to have been in areas which aren't easily measurable (else they would have been so measured by ratings agencies and investors) (Mayer et al, 2008, p. 15). A key debate has been around the (lack of) incentives for originators and lenders to properly screen borrowers due to the fragmented structure of mortgage bonding under securitization and the fact that originators and lenders no longer needed to necessarily hold these loans on their balance sheets for very long.

¹⁰This may relate to common agency problems such as is identified by (Segal, 1999[69]). Mayer (p.6) notes anecdotal evidence that loans 'in [which] the borrower takes out a second lien without notifying the original lender [...] may have become more prevalent over this period'.

2.2.2. The securitization screening incentive (originator moral hazard) debate

An important debate has centred on the issue of securitization and the role it played (if any) in causing a decline in underwriting standards. On the accounts of Dell’Ariccia, Igan and Laeven (2008)[18], Keys et al (2008)[45], and Mian and Sufi (2009)[59], securitization introduces an important friction in agency between the investors and the servicers of loans.

An important paper with this view is Keys, Mukherjee, Seru and Vig (2008)[45]. The authors use a regression discontinuity design, where they argue a FICO score just greater than 620 results in a higher probability of being ‘treated’ (in this case, this means the loan is securitized), than a FICO score of the borrower being just below 620 (where there is less chance of the loan being securitized). Since they find that loans made to borrowers with credit scores just above 620 (where they argue the loan is more likely to be securitized and hence passed on to the investor and off the balance sheet of the originator) perform worse than loans made to individuals with FICO scores just below 620, they argue that this is evidence that securitization reduces incentives for originators to undertake proper screening. A problem with this identification strategy, as noted in Bubb and Kaufman (2009)[10], is that while there appear to be a jump in mortgages at a score of 620, there does not appear to be a jump in the securitization rate. Hence, while there is a discontinuity in origination, there is no corresponding discontinuity in securitization.

Bubb and Kaufman (2009)[10] model credit score cut-offs as a response by lenders to the fixed cost of screening rather than being chosen exogenously by investors (hence they are inappropriate as an instrument).¹¹ In the symmetric information case, incentives to screen are retained through threats of later punishment (Bubb and Kaufman, p. 4 [10]). Where information is asymmetric, rational securitizers purchase fewer loans below the cut-off to force lenders to undertake screening (since they hold more loans).¹²

¹¹They argue that lenders were following guidance set out by Freddie Mac and Fannie Mae, who were ‘essentially providing a public good by analyzing their data on the relationship between FICO scores and mortgage performance to determine the optimal cutoff rule’ (p.14).

¹²Bubb and Kaufman do, however, find a discontinuity in the securitization rate for the ‘jumbo’ sample in which the vast majority of loans is done by private securitizers (p.23). They interpret this as a rational response by securitizers to induce lenders to hold more loans on their own books, so as to do more screening (although it is unclear how much screening lenders such as New Century Financial did at all). For conforming loans, the GSEs employed various punishment mechanisms not available to private securitizers (hence the jump in securitization probability around the cutoff for jumbo). However, the authors do not separately break out the default probability around the 620 cutoff for jumbo loans — in any event the crucial aspect is whether you think the 620 rule is an exogenous (securitizer) rule, or an endogenous

An important point Bubb and Kaufman need to deal with is the nature of the indivisible cost. They pinpoint this as the decision about whether or not to rely on automated underwriting systems (AUSs), or to perform manual underwriting (p. 15). Automatic underwriting began in the mid 1990s. A key feature of the causes of the crisis may well include things such as the ‘sociology of automatic underwriting’, with soft knowledge about the borrower being ceded to the technology of standards despite participants being aware of the pathology of the situation. This gives us a reinterpretation of the Keys et al (2008) results which found that loans with FICO scores just above 620 performed better than otherwise identical loans with FICO scores just below 620. On this reinterpretation it is automatic underwriting and the lender cut-off rule which results in less screening being performed on the loan applicant.¹³ Thus an important feature of securitization is that it lowers the cost of entry into the underwriting (mortgage origination) market; as Bubb and Kaufman state ‘instead of 15 minutes, manual underwriting may occupy days of loan officer’s time’. We consider this topic in more detail in the next section. A paper making similar points to Bubb and Kauffman[10] is Bhardwaj and Sengupta (2008)[5].

Demyanyk and Van Hemert (2008)[23] find that quality degradation of securitized subprime loans did not experience a structural break between 2001 and 2007; they had instead declined throughout that period, but this was masked by the housing bubble. As noted in Demyanyk (2008, p. 12) ‘default rates have risen for all categories of FICO scores [...]’. Her research indicates that credit score is a poor predictor of default likelihood — for each of 5 different FICO score baskets, in the period 2005-2007, mortgages originated later had higher rates of serious delinquency than those originated earlier.

Elul (2009)[28] examines prime loans over the period 2003-2007 and finds a significantly higher delinquency rate for securitized loans of various classes in comparison to non-securitized loans of the same type, for example, ‘for loans originated in 2006, the two-year default rate is at least 15 percent higher, on average’ for private securitized prime mortgages than loans held in portfolio. As in Bubb and Kaufman, Elul finds no differentially higher rate for subprime securitized loans. Elul ascribes this to either: closer inspection by investors of subprime loans, or, simply the fact that so few subprime loans were held in portfolio at all means that there should be little fear from

response to the agency problem between servicers/investors. Furthermore, the analysis does not address the bigger question of the inefficiencies resulting from securitization — or even the question of whether it lowered underwriting standards through other mechanisms.

¹³See Browning (2007)[8] ‘speed became something of an arms race, as software makers and subprime lenders boasted of how fast they could process and generate a loan’.

investors that lenders were engaging in ‘cream-skimming’. Elul also argues that the incentives for originators to maintain a good reputation worsened as the outlook for the housing market worsened. The level of subprime securitization was 90% in this period. And, as noted above, on important dimensions, underwriting standards on nonprime loans were falling. This suggests at least a strong correlation between securitization and underwriting, although the identification on the subprime subsample may require a different approach to that of Keys et al (2008)[10].

Thus, fundamentally some writers debate the role of securitization *per se* and argue instead that the reason for lack of proper screening was not so much that the risk could rapidly be offloaded to investors, but rather that it was expected that house prices would continue rising. Notice also, that consistent with this view of the world, most subprime originators are now bankrupt or have been sold to another financial institution.

2.2.3. Automatic underwriting and the ‘sociology of knowledge’

Poon (2008)[62] has detailed how the adoption by the GSEs in the 1990s of the consumer risk score FICO(R) became ‘hardwired’ into a ‘distributed and collective ‘market device’’, accompanied by the growth into mortgage finance of high-yield seeking investment capital. On Poon’s account, such ‘technical apparatuses’ are more important for explanation than stories about collective irrationality in lending¹⁴.

Freddie Mac adopted the FICO(R) consumer risk assessment tool in 1995 with the aim of standardising prime mortgage underwriting. This development, as well as the subsequent implementation of this methodology by ratings agencies had the effect of stifling ‘calculative diversity’ and provided the impetus for a shift from ‘credit control-by-screening [...] towards credit control-by-risk’. On Poon’s account, FICO scores are ‘manufactured economic information’, a market device that co-ordinates lender decision-making. The result, she argues, for consumer credit is a ‘risk segmented and saturated U.S. market’ (p. 13), and for mortgage finance, a ‘bipartite organization [...] into the conventional prime and high-risk subprime’.

It was Freddie Mac initially that shifted to statistical underwriting (Poon, p.20)[62], using systems that incorporated consumer credit data in the form of FICO(R) scores

¹⁴President Bush reportedly described the subprime crisis in the following terms, ‘There’s no question about it. Wall Street got drunk [...] and now it’s got a hangover. The question is, how long will it sober up and not try to do all these fancy financial instruments?’ Reuters, 23 July 2008, <http://uk.reuters.com/article/idUKN2330503720080723>

with the aim of preventing broker manipulation of loan eligibility (earlier attempts to develop a Residential Mortgage Credit Report were found to be open to manipulation). A 1995 Freddie letter stipulated that ‘a FICO(R) score of 660 was the eyeball threshold for their definition of loans eligible for the prime investments’ (Poon, 2008, p.21)[62]. Following this was the diffusion of underwriting software incorporating these standards. Through this means the ‘FICO(R) 660 rapidly became a free standing benchmark of prime investment grade status recognizable to (*sic*) among underwriters, securitizing bodies, investors, regulators [...]’

Importantly, this was accompanied by the incorporation of FICO(R) scores by the ratings agencies in the development of automatic statistical ratings for securitizations. Through this way private label securitizations became linked to the GSE segment — through the FICO(R) score as a means to measure consumer credit risk (Poon, p. 29). Poon goes on to argue that the ‘sliding scale [...] of risk as measured in the credit score allowed / spurred the proliferation of financial goods’ through a shift from screening to risk management. In other words, the credit score permitted the standardization of products. Hence, the growth of private label subprime alongside GSE-guaranteed and owned mortgages. This puts the GSEs in a paradoxical position — the institutions created to provide liquidity for affordable housing were providing liquidity in the ‘good risk’ segment of the mortgage market.

In summary, Poon (2008) argues that the adoption of GSEs of consumer credit scoring systems in its underwriting guidelines (shifting away from a rules-based underwriting system), and its incorporation in the systems of ratings agencies, led to the development of a risk-based pricing market of subprime finance by private label automated underwriters alongside the GSE-based prime finance market.¹⁵

MacKenzie (2009)[57] looks more broadly at the sociology of ABS, CDOs and ABS CDOs. MacKenzie (2009, pp2-3)[57] points out that trading requires a commonality of knowledge — in the sense that wide variance in valuation (or ‘wild discrepancy’) is likely to be unsettling.¹⁶

¹⁵Writers in the financial press have noted that these underwriting systems may also have been poorly adapted for no or low documentation loans (particularly ‘borrower-directed’ loans), and jumbo loans. See Dungey, D. (2007)[26] ‘FICOs and AUS: We Will Add Your Distinctiveness to Our Collective’, Calculated Risk, 19 March 2007 at <http://www.calculatedriskblog.com/2007/03/ficos-and-aus-we-will-add-your.html> Dungey, a former mortgage banker, has an analysis similar to that of Poon, when she wrote, ‘a large distortion may have entered the market during the boom because FICO (a kind of derivative or simplification of a complex credit analysis) drove a lot of pricing decisions [...] it made people willing to price [Alt-A] at tiny risk premiums over prime [...] maybe we should give this tech fetish another thought?’

¹⁶A crucial element of the current crisis was the dispute over the value of collateral. Sorkin (2009)[72] recounts that in November 2007 AIG reported its dispute with Goldman Sachs over the value of collateral

MacKenzie argues that there exist ‘evaluation cultures’ — by which he means ‘pockets of local consensus on how financial instruments should be valued’, comprised of ideas, but also ‘artefacts and technical systems.’ Following Callan, economic models can be performative since shaping market processes, or counterperformative, by which MacKenzie means that using the model makes its predicted outcome less likely (p. 5). The underlying logic is clear: the employment of these models, Mackenzie argues (for example, by the ratings agencies) may result in some change in the *ceteris paribus* conditions underlying the data generating process, hence causing parameter instability. In this way, the very use of a historical model by agents makes it less likely to be true.¹⁷

MacKenzie considers the disjunction between the ABS and CDO evaluation cultures. ABS as originally designed had AAA contingencies modelled based on simulations where the stresses considered was the conditions prevailing during the Great Depression (MacKenzie, 2009, p. 22). CDOs arose out of lumpier pools of corporate loans or bonds and were initially employed in the junk bond boom, but later spread more widely following the innovative example of the JPMorgan Bistro deal.¹⁸ Importantly, added to this mix was the credit default swap, which allowed the ‘synthetic’ transfer of risk — one could build ABS CDO without having to go out and assemble the underlying ABS pool.

The evaluation cultures of ABS and CDOs diverged in focus (prepayment risk versus the correlation of credit risk — modelled using a copula function), a natural divergence given their respective origins — ABS for residential mortgages, CDOs for lumpier corporate loans and bonds. As also detailed in Ashcraft and Schuerman (2008, p.5)[3], differences between ABS as opposed to corporate bond modelling include: more impor-

under various swaps contracts. This disagreement was a broader manifestation of the resensitization of informationally-insensitive debt, the mechanism of the liquidity breakdown, and marked the beginning of the run on wholesale finance (one could also characterize this as a loss in trust). As recounted in Gorton (2009)[38], money market funds ‘depositing’ at the broker-dealers required increasing haircuts on repo agreements resulting in ‘massive deleveraging’. Sorkin (2009, p. 159) provides a relevant anecdote: ‘a long-time insurance analyst for Credit Suisse asked pointedly what it meant that ‘your assessment of certain super-senior credit default swaps and related collateral ... differs significantly from your counterparties’’. Later, and still in the context of collateral valuation, Sorkin quotes Joseph Cassano, head of AIG’s Financial Products Group as saying ‘Just because Goldman says this is the right valuation you shouldn’t assume it’s correct [...] My brother works at Goldman, and he’s an idiot’.

¹⁷While this is an interesting and plausible idea, more work needs to be done to determine whether anything general can be said about when using a model is likely to make it less accurate. One important factor might be how widespread its use becomes.

¹⁸The most comprehensive account is Tett (2009). Interestingly, she recounts that J.P. Morgan, who had pioneered some of these structures, were themselves reluctant to do CDS deals with mortgage debt, since ‘mortgage risk was just too uncharted’ — data on defaults were too thin, and correlation structures as a result were not well understood (see pp 76-80)

tant role for systematic risks over firm-specific; greater reliance on quantitative models over judgement; and an explicit role for forecasting macroeconomic conditions etc.

CDOs of ABS increased greatly from 2001 (MacKenzie, 2009, p. 39), but tradable ABS indices for residential mortgages (the ABX indices) only started in 2006. In the interim, their evaluation was based on the distinct cultures around ABS and CDOs employed by banks' structuring specialists and the ratings agencies, respectively. Correlation was particularly difficult to get a handle on — there was no instrument like share price; defaults were rare (so historical data limited); and the traded ABX index (TABX), was introduced only in February 2007, so correlations could not be inferred from observed prices.

The correlations employed by the ratings agencies and structurers were based either on expert judgment or histories of ratings transitions and were, as it turns out, too modest. Large portions of the ABS CDO were comprised of super senior AAA debt — often held on the books of the issuer, but hedged using monoline or AIG CDS for very low premiums (as little as 12bp, MacKenzie, 2009, p. 48). This gave rise to the ability to book negative basis trade profits by buying AAA rated super-senior debt and 'fully hedging' it with monoline / AIG Financial Products insurance. Banks, therefore, had no need to model correlation — since they were 'hedged' — this was left then to 'ratings agencies, AIG and the monolines' (MacKenzie, 2009, p. 49).

From 2004 successive vintages of ABS CDO have performed progressively worse, increasing from 30% of events of default for 2005 to 80% for the 2007 vintage. MacKenzie argues that the key role of the ratings process was not ratings shopping *per se* (although he does not contend that it was not important) because this cannot explain why default rates were two orders of magnitude higher than those models (p. 53). Instead, he argues that the ratings process was 'counterperformative' in two senses: First, the increased 'popularity of ABS CDOs caused a structural change in the market for underlying [MBS]': whereas earlier mezzanine tranche insurers had been ABS specialists, new CDO arrangers were 'indiscriminate buyers'. Previously, these buyers had placed a ceiling on acceptable credit risk (and calculated this riskiness themselves) but by 2004, all that mattered was how they would be *rated*. The net effect was a reduced constraint on subprime originators (MacKenzie, 2009, p. 59), causing an amplification of the mortgage origination agency problem. Second, 'the modelling of mortgages [...] changed mortgages again in a way that rendered the models much less accurate'. By this MacKenzie means that the increased reliance on 'hard' criteria such as FICO(R)

scores and LTVs, resulted in the decreasing accuracy of these variables as predictors (Rajan, Seru and Vig, 2008). We can think of this as a multitask agency problem, where we would like the firm to screen agents on soft and hard features but can only measure performance on one of these dimensions. Increasing house prices result in a diverging alignment between these two tasks.

The final steps by which the subprime crisis was magnified into a generalised financial crisis were the decisions by many banks to retain, or in some cases purchase, super-senior AAA tranches for their balance sheets; as well as to move into subprime origination through vertical integration in order to overcome the transactions costs associated with warehousing ABS for the construction of ABS CDOs (MacKenzie, p. 62).¹⁹ Indeed these moves were in many cases completed at precisely the time when subprime lenders were weak on account of the softening of the housing market. This demonstrates the extent to which some banks underestimated — and/or had very poorly incentivized management.

Then, once the cost of buying ABX protection rose (and the index fell), banks holding ABS (in the warehouse) or ABS CDO supersenior on the balance sheet had large losses which they had to mark-to-market (MacKenzie, p. 63), under pressure from auditors (who needed to retain credibility lost following the dot-com bubble).

2.3. Remember, this was a bubble

The decline in underwriting standards must be understood in light of the speculation in the housing market. In many cases, the willingness to lend and to borrow was based on expectations of further price increases. Demyank and Van Hemert (2008)[23] find that for each of five categories of credit score, mortgages originated later (2007 vs. 2006 vs. 2005) had higher rates of serious delinquency than mortgages originated earlier. Garriga (2009)[33], studying HMDA data, finds that loan denial rates were increasing dramatically even before 2007 — they were up 33% by 2004 relative to 2002, and by 75% by 2007 relative to 2002. Most of these denials were for refinancings, which accounted for most new loans by 2003. This is suggestive of speculative pressure from ‘below’.

Bhardwaj and Sengupta (2009)[6], examining loan-level data of securitized subprime originations, find that subprime mortgages required housing price appreciation to be viable. Mortgages on earlier vintages were prepayed, but this became impossible for later originations. The evidence they present is fourfold. First they show that 70%

¹⁹See the next part for a discussion of vertical relationships.

of the subprime originations they consider were refinances. Second, a majority were of the hybrid-ARM form. Next, ‘teaser’ rates were not teasers per se; instead, they were at a similar level to fixed rate subprime mortgages (FRMs). Finally, prepayment penalties were typically applied with the term of application at least as long as the time to reset.

The authors also note two further important features of subprime mortgages — namely that resets always were step-ups and never step-downs and furthermore, that subprime mortgages were at much lower levels than other subprime loans (such as auto), since backed by appreciating collateral. Bhardwaj and Sengupta cite Gorton’s (2008)[38] view of these mortgages as a form of bridge-financing, and argue that this was sustained by prepayments. By 2007, 64% of total 2003-vintage hybrid ARMs had been prepaid (p.3), with a similar number for FRMs. Prepayments drop for later vintages, as the housing market tightened. Lenders, concerned by the high risk of these borrowers had imposed conditions that would require these borrowers to refinance, but protected themselves with prepayment penalties until reset. On this account, refinances were more likely for cash-constrained consumers, hit by the shock of a lost job or medical necessity (p.7).²⁰ These loans were ideal for liquidity constrained borrowers with a lack of other sources of credit.

There is a feedback mechanism between declining underwriting standards and expectations of house price increase. Improved credit scores fed into more borrowing for investment into housing, an increased value of collateral and hence higher credit worthiness. And institutional features like ‘stated income’ allowed consumers to fool themselves, and the system.

Underwriting ‘standards’ should be thought of not just in terms of measurable factors such as Loan to Values, Credit Scores, and the presence or not of a second lien, but also as dependent on the anticipated future path of house prices. To make loans which one did not think the borrower could repay (excepting some optimistic expectation of house price appreciation) is to loosen underwriting standards in the common sense of the phrase. A rhetorical confusion can arise depending on whether we are thinking of underwriting standards de jure or in fact. The credit worthiness of refinancing mortgage buyers may have improved as a result of rising house prices (at least before 2005) and so underwriting standards were not ‘looser’ in this sense, but lenders may have ‘known’ that this was driven by perhaps unsustainable price appreciation.

²⁰Cash-out refinancings are used in this setting for consumption-smoothing. A different, though not entirely distinct motive to refinance would be to take advantage of lower interest rates (‘rate-refinancing’). Bhardwaj and Sengupta observe that proportionately more subprime than prime mortgages involve cash-out.

On the other hand, writers may deny that participants ‘knew’ that prices were unsustainable as just described, and it may be that as articulated by Shiller, that the crucial element was the ‘social contagion of boom thinking’. In sum though, once the contagion had dissipated, and prices were overtaken by ‘fundamentals’, defaults started to rise. The Bhardwaj and Sengupta (2009)[6] study concludes that it was not the resets themselves that caused the jump in default, but rather the lack of ability to refinance as the housing market weakened. In other words, nonprime mortgages were never really ‘long-term mortgages’ in anything but name. They were short-term loans made to liquidity constrained, poor credit borrowers and speculators, who were unable to refinance when prices fell (Tung, 2009)[76]. Other evidence is provided by Frame et al (2008, p.15)[29], who study LoanPerformance data to find that for subprime mortgages originated between 2001-2004, most were terminated (on account of prepayment or default) within 36 months.

We are left then with a question about the causes of the decline in underwriting standards, as well as the contemporaneous ramp-up in housing prices. Other candidate explanations may include: deregulation, the low interest rate environment, demand for loans for MBS driven by excess liquidity linked to a global savings glut, and affordable housing goals. Wherever one comes down on these issues, and their relative importance is fundamentally an empirical question, the ultimate unfolding of the crisis clearly points to the important role of leverage, both of the lenders, and of the borrowers (who had placed ever-lower capital down against their loans). Mian and Sufi (2009), studying a dataset of some 70,000 homeowner credit files in the period 1997- 2008, find a doubling of debt-to-income ratios of US households between 2002 and 2007 to a 25-year record level. On their estimates, 1/3rd of 2006-2008 new defaults are explained by home equity borrowing on the back of rising house prices. In particular, default rates were most up in areas where house prices had experienced steepest appreciation, and where credit scores were lowest.

3. The Mortgage Finance Industry Structure

As set out in Reiss (2009a), innovations in technology, legal changes, and financial innovation have dramatically changed the way mortgages are originated, financed and administered. Reiss describes this as a ‘fracturing’ — and describes the end product in the following way, ‘it is common for a given mortgage to be originated by a mortgage

broker contacted by telephone; serviced by a mortgage banker; insured by a mortgage insurance company; legally owned by a trust; and beneficially owned by an institutional investor’.

Ashcraft and Schuerman (2008) draw on the example of a 2006 vintage New Century Financial securitized pool of mortgages to sketch seven informational frictions arising in the subprime mortgage securitization process: mortgagor/originator frictions (predatory lending); originator/arranger (predatory borrowing and lending — arising out of the informational advantage of the originator over the arranger); arranger/third party (potentially adverse selection since the arranger knows better the underlying quality of the originated loans); servicer/mortgager (moral hazard — during delinquency the mortgagor has little incentive to maintain the value of the home, this creates incentives to foreclose quickly); servicer/third parties (moral hazard — incentives for the servicer to inflate expenses in delinquency where it gets paid off the top); asset manager/investor (standard principal/agent type); and investor/credit rating agency (model error). They further recognise that these frictions are likely to be magnified in a crisis. Since we are primarily interested (in part III below) in loan modifications, the 4th and 5th frictions are what are primarily at issue here.

I sketch the roles of the various players in a little more detail below, drawing heavily on the industry knowledge of Dungey (2007). The next section of this part then considers the nature of the vertical relationships between these players. These vertical relationships, and the embedded informational and agency constraints, are central to understanding how the subprime crisis originated and magnified, as well as why now resolution and intervention are so difficult.

3.1. Players

3.1.1. Mortgage originators

Kregel (2008) identifies mortgage originators as either: Financial holding companies, specialised mortgage banks, or independent financial companies. As noted in Ashcraft and Schuerman, it is the role of the originator to finance the initial home purchase, and perform the original underwriting. For this the originator receives borrower fees, and the margin on the onward sale of the subprime loans (p. 5). Important subprime lenders included: Ameriquest Mortgage; New Century; CitiFinancial; Household Finance; Option One Mortgage; First Franklin Financial Corp; Washington Mutual; Countrywide Financial; Wells Fargo Home Mortgage; and GMAC-RFC.

3.1.2. Servicers

Servicers service loans either for themselves, or for investors. The accounting for both of these activities is the same, although the incentives obviously differ. In addition to the basic fee ²¹, the GSEs incentivize servicers with a bonus payment on performance and for loss mitigation; while private labels generally have servicers hold the equity tranche of the deal. Servicer fees are senior to investor income, but servicers also bear the first expenses in case of delinquency. Once delinquency is dealt with, either through refinancing or foreclosure and sale, again the servicer is paid first, with the investor receiving the remainder. As noted, scheduled interest income in general must be passed on to the investor by the servicer, even if the borrower is actually in default (but only up to 90 days delinquent). Only actual principal needs to be passed through to the investor.

Servicers administer the loan under pooling and servicing agreements which, for example might limit the number of modifications the servicer can perform (Adelino et al, 2009, p. 3). Ashcraft and Schuerman ([3] 2008 — drawing on Dungey, 2007[26]), argue that the core tensions between servicers and investors relate to '(a) reasonable and reimbursable expenses and (b) the decision to modify and foreclose' (p.8). As noted, under delinquency, the servicer advances interest and principal to investors, and is also responsible for property taxes and insurance. Under foreclosure, the servicer is required to cover all expenses until liquidation — but then is compensated 'off the top'. This creates an incentive for servicers to inflate costs between foreclosure and liquidation (as well as fees under delinquency).

The relationship between the servicer and mortgagor is one characterized moral hazard (Ashcraft and Schuerman, 2008 [3]). The mortgagor 'has unobservable costly effort that affects the distribution over cash flows shared with [...] the servicer'. When the mortgagor has limited downside liability when in a delinquent state he might not make an effort to maintain the property where he intends (or is likely to) default anyway (p.7). To mitigate this, under delinquency the servicer is required to advance the payments of property taxes and insurance. This confluence of factors can encourage immediate foreclosure by the servicer (to the extent that the incentives of the servicer are aligned with the investor).

²¹Smith et al (2009) describe the mortgage fee arrangements as '.25% to .50% of each loan's balance per year'.

3.1.3. Mortgage insurers

Private mortgage insurers²² insure the lender, not borrower against default — they thus provide a service similar to that of the FHA (the latter has restrictions on maximum loan amounts). They bear the ‘first loss’ from default (after the borrower, who is the equity holder), typically providing 30% coverage on a 30-year loan with a 95% LTV (Dungey, 2007[26]). It should be noted that private mortgage insurance can be cancelled when there is sufficient equity in the home. Insurer costs are increasing in foreclosure delay. Insurance premiums are funded in one of three ways — on a flow (lender or borrower paid) or bulk (lender paid) basis. Typically in securitizations, the insurance is ‘bondholder paid’ as a form of credit enhancement, on a ‘pool’ basis.

3.1.4. Issuers

The arranger / issuer monitors the originator as well as creating the trust and underwrites and structures securities the trust will issue to investors (it co-ordinates this activity with the rating agency to insure timely sequencing). Investors pay issuers fees for this service, and issuers make some margin over the cost of acquiring the underlying assets. Notice that there is a significant informational gap between the issuer and the borrower / originator who may collude to engage in predatory borrowing / lending (Ashcraft and Schuerman, p. 5[3]). The issuer then sells the loans to a special purpose vehicle — a bankruptcy remote trust (remote from the arranger). It should be noted that these trusts were often implicitly guaranteed by the issuer — once conditions started to deteriorate they were generally brought back onto the balance sheet.

3.2. Vertical relationships, integration and disintermediation

One of the crucial factors that needs to be understood in terms of this crisis, is the disintermediation (through securitization), and reintermediation (through vertical integration) of mortgage finance. In order to better understand the crisis — its origins, as well as the current difficulties around loan modification and the possibility that there are currently an excessive number of foreclosures, one needs to distinguish the vertical integration incentives from the forces pushing towards disintermediation. Williamson (1975, 1985) argued that integration facilitates adaptation.²³

²²Private mortgage insurers are represented by MICA, <http://www.privatemi.com/>

²³Forbes and Laderman (2009)[32] have, for example, found evidence in the setting of the airline industry that a vertically integrated airline/regional carrier can have better performance through being able to

Other discussions of the performance implications of vertical integration decisions are found in Grossman and Hart (1986) and Hart and Moore (1990). A situation of ex-post hold-up may arise, since ultimately, the investor needs the servicer healthy, and so may adjust covenants (requirements in the debt that must be maintained, e.g. maximum debt levels, or the interest rates can reset higher) to help the servicer. The servicer also thus ex ante may invest too little in developing appropriate loan modification ability.

To estimate the performance benefits of vertical integration, we might look at default rates among loans serviced by servicers for their own portfolios, as opposed to those serviced for private label securitizations. Levitin (2009)[53] has found that redefault rates are significantly worse for the latter.

Since we observe variety across firms as to whether they are vertically integrated or not, there must exist some cost to integration (such as, for example managerial capabilities). See for example Bajari and Tadelis (2001) . Empirical measurement is difficult since the firm boundary decision is endogenous (Masten, 1993). As noted in Aschraft and Schuerman[3] (Tables 2-4, 2008, p. 4), Countrywide for example was both the third biggest originator of subprime debt as well as the biggest subprime MBS issuer, and subprime mortgage servicer).

Against the vertical integration incentive is the fragmentation-linked securitization imperative. Securitization has been noted to facilitate 'regulatory arbitrage', and there may be further tax-based, accounting, and bankruptcy-remoteness advantages.

The winter/spring 2007 issue of an industry publication, the American Securitization Journal, had an article considering the decision by investment banks whether to integrate backwards into origination and/or servicing (Currie, 2007 [17]). One reason stated for why an investment bank might want to integrate was the elimination of double marginalization ('taking out as many of the middlemen as possible [...] or] capturing the spread from the creation value of the loan to the full offer price of the loan'). For example it was the strategy employed by Lehman Brothers. By 2006 when investment banks bought as many as 11 originators and servicers, industry participants were noting that access to product for ABS underwriting was becoming important and there were increasing numbers of bidders on loan sales such that having a 'captive' pool of loans seemed attractive. At the same time, slowing house prices meant that the value of mortgage originators was beginning to appear attractively cheap.

overcome transactions costs arising from non-contractible services.

Other benefits cited included accruing all the fees from origination of the loans to selling into the securitization. Furthermore, the better credit of the acquirer relative to the originator would lower the cost of capital for new loan issuance for the merged entity. The final benefit is cited (now perhaps somewhat ironically) as improved risk management, including for instance, having ‘much more information about the quality of the loans [...]’ which goes to the asymmetric information between originator and issuers.

Companies that bought subprime mortgage originators (and servicers) in 2006 included Barclays Capital, Bear Stearns, Deutsche Bank, Merrill Lynch, and Morgan Stanley. Lehman’s presence was particularly big, of the \$133bn in MBS it sold in 2005, \$86bn it originated itself (Currie, 2007 [17]). Origination was not the only thing Investment Banks targeted though, Currie (2007) goes on to cite economies from ‘bringing securities in-house’, and for example the potential to use the ‘servicing business as a distressed debt platform to buy non-performing loans’.

A further reason for buying a servicing business is related to the agency relationship between the investors/issuers and the servicers. For example Currie (2007[17]) quotes the co-head of mortgage trading at Bear Stearns as saying ‘I believe having a captive servicer is integral to being in the mortgage-backed security issuance business. In the aftermath of Hurricane Katrina we tried to ascertain the status of certain properties. On loans where we weren’t the servicer we had a very difficult time getting this information’ and, furthermore, ‘better servicing means better loan recoveries [...]’

Of course, not all banks aimed to expand vertically. The last wave began in 2006 as subprime originators were falling in value, although Bear and Lehman’s were already invested following the previous slump in subprime at the turn of the century. Reasons for not integrating into origination or servicing included not wanting to lose flexibility in purchase (UBS), lack of fit into other business lines (Goldman), and reputational risk from links to predatory lending charges (HSBC, Citigroup).

4. Modifications, Foreclosure, and Securitization

Modification data can be difficult to analyze, but a 2008 Credit Suisse Foreclosure Update estimates that by 2012, 8.1m homes will have been foreclosed (Credit Suisse, 2008 [16]). Initial attempts to modify the loans of many of the houses in foreclosure have been unsuccessful (OCC, 2008). Levitin (2009a) describes the various private sector,

administration, and industry association modification initiatives, HOPE Now Alliance, FHASecure, Hope4Homeowners, and the Making Home Affordable Program, as having very limited success. Recent press coverage has confirmed these failings.²⁴

4.1. Reasons for intervention

First we consider why it might be appropriate to intervene in the contracts so as to mitigate the extent of a foreclosure crisis. White (2009)[77] states that since some of the foreclosure cost are external, lenders foreclose ‘too often’. This, in her view, is the market failure justifying administration intervention. Levitin (2009c, p. 1) lists concerns such as pecuniary externalities on neighbourhoods and local tax bases; increased blight and potentially crime, and the erosion of ‘social bonds’, detailed in the Congressional Oversight Report (2009a, executive summary) as ‘community ties are cut, affecting friendships, religious congregations, schooling, transportation and medical care’.

The essential point is that there may be externalities on non-contracting parties. In terms of pecuniary externalities, and by way of historical analogy, we might consider the striking by the Congress under Roosevelt of the gold indexation clause. As Kroszner(2004)[47] details, the debt relief this implied resulted even in the increase in the price of corporate bonds containing gold clauses. This he argues shows that the benefits in some cases of avoiding the costs of bankruptcy more than offset the loss to creditors of trying to recover part or all of the losses from devaluation.²⁵

4.2. Limitations on intervention

There are various (not mutually exclusive) views of limitations on loan modifications. As summarised in Levitin(2009a) and COP(2009), these are (i) that the securitization structures, embodied in the pooling and servicing agreements (PSAs), introduce contracting rigidities and adverse incentives for renegotiation (See Gelpern and Levitin, 2009 [?]), (ii) that securitization has resulted in various incentive problems and inadequate fee structures for servicers (COP, 2009; Smith et al, 2009); (iii) that concerns about redefault and self-cure (particularly in a setting of rapidly declining house prices) make it unprofitable for investors to modify loans (Adelino et al, 2009 [1]); and (iv) that loan

²⁴Norris (2009)

²⁵See Kroszner (2004)[47] at p.16 ‘the anticipated benefits of enforcement of the gold clause [...] must be more than offset by the expected reduction of payments to bondholders due to bankruptcy and distorted investment incentives [...] a ‘debt relief Laffer Curve’ exists [...]’

servicers are insufficiently experienced and lack capacity to perform these modifications (COP, 2009).

4.2.1. Pooling and Service Agreement Contract rigidities and Renegotiation

In a speech made in 2008, Bernanke (2008)[4] has pointed to ‘anecdotal evidence’ suggesting inefficiencies arising from the diffuse nature of investors holding RMBS which has left renegotiation almost impossible:

this apparent market failure owes in part to the widespread practice of securitizing mortgages, which typically results in their being put into the hands of third-party servicers rather than those of a single owner or lender. The rules [...] do not always provide them with clear guidance or the appropriate incentives to undertake economically sensible modifications [...] some modifications may benefit some tranches of the securities more than others, raising the risk of investor lawsuits. More generally, the sheer volume of delinquent loans has overwhelmed the capacity of many servicers, including portfolio lenders, to undertake effective modifications.

Eggert (2007) also endorses this view when he states rather dramatically that in the ‘tranche warfare of securitization, unnecessary foreclosures are the collateral damage’. Smith et al (2009) cite foreclosure counsellors’ experience with many servicers who say ‘[that because of their] investor guidelines, they’re not allowed to do [anything except a repayment]’.

Gelpern and Levitin (2009) present the most detailed exposition²⁶ of the ways in which the securitization structures may be limiting foreclosure modification. As summarised in Levitin (2009a, p.2), these include ‘outright contractual prohibitions and limitations, litigation risk, and adverse incentives for the servicers who make the modification decisions’. The next section sets out in more detail the organizing framework they provide.

A typology of securitization contractual rigidities Gelpern and Levitin (2009)[?] consider the separate question of the immutability of the PSAs from that of the mortgage contracts themselves (rigidities there may include: prepayment penalties, restrictions

²⁶But see also, Cordell et al (2008).

on modifying single-family principal residence mortgages in bankruptcy, and the existence of multiple liens).

Instead, they focus on the rigidities imposed by the pooling and servicing agreements governing the RMBS securitization relationship between the servicer and the SPV, and hence investors. These PSAs, they argue, lead to 'excessive' foreclosures and numerous and varied spillover effects. Rigidities, on their account, range from the formal (prohibitions on amendment) to the functional (characterised by collective action problems).

The two formal rigidities from securitization they identify are explicit limitations on loan modifications²⁷ and statutory and contractual voting thresholds.²⁸ To this they add a structural rigidity (through bankruptcy remoteness and passive management)²⁹ and functional rigidities arising out of tranching, resecuritization and insurance which aggravate collective action rigidities.³⁰ In fact, and as they stress, making this debt non-renegotiable was the purpose of the design *ex ante*. But while this may have been bilaterally optimal, it now may be socially inefficient. The authors argue that voluntary loan modifications initiatives are unlikely to greatly reduce foreclosures in light of these PSA-induced rigidities. We consider government interventions in these debt markets in more detail below, but it should be noted here that none of the initiatives thus far have attempted to require contracting parties to infringe on the terms of their PSAs.

As described by the authors, the fact that multiple investors must delegate authority to the servicer to manage the mortgage pool on their behalf results in agency investor risks, in that the servicer 'will renegotiate the underlying loans, reducing payments into the pool' (p.13). However, the exact nature of the agency problem the authors consider is not clear, and this is an area which requires further research. Gelpern and Levitin (2009)[35] note that the problems identified above are amplified under resecuritiza-

²⁷Modification might be prohibited; may be restricted to various forms, may require third party consent (p.15), or may be limited in number. Hunt (2009)[42] finds that most deals embed some limitation and in 10% of 2006 subprime RMBS modifications are banned.

²⁸The effect of the 1939 Trust Indenture Act (TIA) is to require investor unanimity to modify the economic terms of the RMBS (p.17), although it should be noted that this is an area where case law to provide guidance is absent. At the very least, the effect of the Act is to create uncertainty, which is a factor where servicers are risk-averse. In addition to the TIA, there are often explicit supermajority requirements in the terms of the PSAs.

²⁹In contrast, Gelpern and Levitin (2009)[35] note that in the case of corporate default, the institution of bankruptcy is in place to overcome creditor collective action problems.

³⁰Aside from the number of diverse investors, the fact that RMBS are tranching can result in further coordination problems (p.29). Subordinated trancheholders may veto modification, for example, if they are out of the money. This is the common problem of hold up. Alternatively, senior trancheholders may have no incentive to modify, since assured of repayment regardless. It is only the 'pivotal' or 'fulcrum' tranche which should be decisive.

tion. Furthermore, agreement from net interest margin insurers also may be required to modify underlying mortgages as well as the PSAs.

An important point, not explicitly dealt with by the authors, but hinted at by Bernanke (above) is the fact that different tranches of the securities are often tied to different sources of cash. For instance, some might be comprised of principal repayments, and another against the interest income. This will result in large divergences in interests when it comes to restructuring the loan, a topic we consider in more detail below. This might make it particularly difficult for private label servicers to write down principal or extend term (contractually, the nature of the modification may also differentially impact servicer remuneration).

Contractual immutability and externalities. Gelpern and Levitin identify benefits of immutability as possibly including: enhanced disclosure, ex ante investment, discouragement of holdup and minimization of agency costs. For the borrower, this type of rigidity can lower costs of borrowing³¹. But, as noted, there can be externalities attached to this bilateral arrangement.

The arguments around flexibility have a similar nature to those advanced for the introduction of a Sovereign Debt Restructuring Mechanism at the start of the decade. The outcome of that process for political economy reasons, as explained in Gelpern and Gulati (2007)[36], was the introduction of Collective Action Clauses into New York law-governed sovereign debt contracts. Gelpern and Levitin (2009)[35] make the point that formal rigidity in sovereign debt contracts has not restricted states from term modifications. But the position of RMBS, with these additional and even stronger structural and functional features render, in their view, these securities ‘more effectively immutable than sovereign bonds’ (p.35).

In their view, the servicing regime — in which consumer debt is transformed into business debt — is an archetype of ‘bankruptcy contracting’. The SIV is remote from the statutory bankruptcy regime, and absolute priority is enforced through the tranching process. However, while bilaterally efficient, there are important externalities from these contracts onto communities, other creditors, financial markets, and the macroe-

³¹We should be clear on who the borrower is we mean here — it is unlikely that homeowners were aware of whether or not their loan would be securitized — the question of pass-through and the industrial organization of the origination business is one that deserves further research. It may be that the competitive variable was quantity of loans — with competition in essentially an unregulated market resulting in a decline in underwriting standards. If this resulted in loans being made which were unsuitable for borrowers, in some sense, then this might be consumer surplus reducing.

economy (p. 43). These may involve: higher foreclosure rates which have spillover effects in the region; as well as on holders of other RMBS (and there is then, furthermore, a feedback mechanism here). This then spills over into financial markets more generally through increasing uncertainty, counterparty risk, and illiquidity. In the current crisis, Gorton (2009) has characterised a crucial aspect as a run on the wholesale financing market in the form of lenders requiring ever-increasing haircuts on MBS held as collateral in repo transactions. The effect on the macroeconomy as a whole which again feeds into higher foreclosure rates (pp45-46).

The final part of Gelpern and Levitin (2009)[35] considers various possible responses to contractual rigidities. These include: statutory bankruptcy; government carrots (e.g. financing subsidies for renegotiation) and sticks (state foreclosure moratoria). The third method is an invocation of eminent domain (e.g. through nationalization). Furthermore, Congress might pass legislation rendering certain PSA clauses as unenforceable. The authors then examine the use of these mechanisms in the context of various New Deal programs. For example, the effect of the Gold Clause decisions is that legitimate government macroeconomic policymaking legally trumps private contracts (indeed allows governments to rewrite these). See also, Kroszner (2004)[?]. Finally, they consider failed efforts to address the farm mortgage crisis — in this instance coordination failures among secured creditors resulted in insurmountable ‘functional rigidities’ — that is, collective action problems. However, these problems were recognised and rectified in the 1986 enactment by Congress creating Chapter 12 of the Bankruptcy Code, which sought to help address the then crisis in farm foreclosures.

4.2.2. Securitization and Servicer Incentives

The lack of incentives of servicers to modify has also been touched on in general terms by Lewis Ranieri, one of the early creators of the private label MBS market in the following terms:³²

‘the cardinal principle [...] is you’re always financially better off restructuring a loan around a credible borrower than going into a foreclosure [...] the problem now with the size of securitization [...] so many loans are not in the hands of a portfolio lender but in a security where structurally nobody

³²Remarks at the 2008 Milken conference on financial innovation, Video at Economist’s View <http://economistsview.typepad.com/economistsview/2008/05/financial-innov.html>. See also the discussion by Mike Konczal at <http://rortybomb.wordpress.com/2009/07/31/the-financial-innovation-that-wasnt/>;

is acting as the fiduciary. And part of our dilemma here is ‘who is going to make the decision on how to restructure around the credible borrower and is anybody paying that person to make that decision’³³

In much the same way, Levitin’s (2009b) survey article describes the agency problem between servicers and investors as fundamental. He provides the example of the FDIC seizure of IndyMac and its decision to modify securitized portfolio loans to increase asset value (Levitin, 2009b, p. 625) to suggest that where that agency problem is absent, investors will find it profitable to modify.

The crux of the issue is compensation. Fee structures have been described as insufficiently incentivizing. The fee is generally ‘.25% or .50% of each loan’s balance per year’ (Smith et al, 2009). The labour intensive, lengthy and arduous process of modification may result in costs exceeding those fees.³⁴ The mechanics of payment is important here as well. Cash flow for the servicer may be tight — since they need to advance delinquent payments to investors even if not yet received, but once the delinquency has been ‘resolved’, they are paid ‘off the top’. This may incentivize them to foreclose quickly (Geanakopolos and Koniak, 2009[34]). Under foreclosure, compensation is on a cost-plus basis, and the fees the servicers can charge typically include ‘collateral inspection fees, and process serving fees, etc’ (Levitin, 2008c).

Geanakopolos and Koniak (2009)[34] have summarised the argument:

‘Once a homeowner is in default, the servicer must advance that homeowner’s monthly payments to the bondholders, getting repaid itself only when the house is sold or the loan is modified. So cash-strapped servicers want to foreclose prematurely or do a quick-and-dirty modification (without due diligence and thus without considering principal reduction) to get their money back fast.’

Or, as Levitin (2008c) has even more succinctly observed in testimony to the House Judiciary Committee:

³³However, Ranieri goes on to argue in this interview that government intervention is not required since ‘we know what to do [...] if we’re allowed to do it’, since technology ‘has made it immensely easier’ and the relevant know-how exists. This appears to have been overly optimistic.

³⁴Industry commentator David Merkel has observed that it may be useful to contrast CMBS servicing with these RMBS arrangements. In this setting delinquent loans are shifted from servicer to special servicer who receives a premium for successful workouts. The cost is offset against reduced interest payments for the junior certificateholder, who is frequently an originator. This is again suggestive of the agency cost, but it should be stressed that more work is needed here. For Merkel’s comments, see his Aleph Blog, <http://alephblog.com/2009/12/31/nine-notes-and-comments/>

‘The 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.’

4.2.3. Concerns about Redefault and Self-Cure

Empirically it is clear that there is insufficient incentive for renegotiation that would prevent foreclosure (p.3).³⁵ Adelino, Gerardi and Willen (2009)[1] present evidence that the lack of incentive for servicers to renegotiate mortgages is not due to securitization. Their view is that foreclosure is often privately optimal for investors so the agency frictions are not decisive. Instead they argue that servicers and investors are more concerned with post-renegotiation redefault or self-cure, namely that either borrowers will default again anyway or will become solvent without costly renegotiation.

Adelino et al (2009)[1] then compare renegotiation rates of ‘private-label loans’ to ‘portfolio loans’ and find no statistically significant, nor economically meaningful difference (they argue that their findings are robust to unobserved heterogeneity). They report reasons why portfolio loans may also be difficult to renegotiate — including accounting rules, staff shortages, and agency problems between loan portfolio managers and investors. They also note the following ‘institutional evidence’ in further support of their claims: low modifications in earlier housing crashes predating securitization; equal treatment provision statements in PSAs, directing servicers to behave as the mortgage owner; and the absence of lawsuits directed at servicers by investors in mortgage-backed securities.

There is a little bit of conceptual difficulty here — on the one hand they are arguing that there weren’t very serious modification difficulties induced by securitization, at least relative to the other factors they model; on the other hand they are saying that what frictions there were at least matched by the accounting-standards-induced renegotiation frictions on portfolio loans. They relegate to a footnote the possible explanation that the requirement for equal treatment of private label and portfolio loans in PSAs leads servicers to avoid portfolio loan modifications. Instead they concentrate their analysis on arguing simply that expected recovery under foreclosure is higher than under renegotiation.

The two factors they concentrate on are self-cure, namely that ‘more than 30 per-

³⁵In Adelino et al (2009)[1] less than 3% of ‘seriously delinquent’ loans are renegotiated in the form of ‘concessionary modification’ in the first year following this serious delinquency.

cent of seriously delinquent borrowers ‘cure’ without receiving a modification’ (p. 7) and redefault — namely the fact that many modifications suffer from recidivism which given declining house prices results in even less recovery. These two factors are the basis for their theoretical model. One limitation of their empirical study is that they cannot actually observe modifications and must impute them from information on loan terms. A further problem is that the dataset they employ (LPS) under represents subprime mortgages (p.12).

A similar paper (authored by some of the same individuals) is Foote et al (2009)[31]. They also dispute the contention that foreclosures are not in investor interests (while agreeing they may be socially inefficient). For them, the allegedly inappropriate compensation structures (in a situation of crisis) governing the servicer investor relationship are not decisive. They also emphasise instead redefault and self-cure. As in Levitin (2009) and COP (2009), Foote et al (2009)[31] find that origination DTI ratios are not a strong default-predictor,³⁶ in comparison to FICO scores, falling house prices and unemployment. It is important to make a point about interpretation here. We cannot equate origination DTIs with underwriting standards.³⁷ For the reasons outlined in part I, it appears clear that the mortgage industry originated too many ‘unaffordable mortgages’. It is not apparent what it means to say that falling house prices predict defaults, without any understanding of why house prices are falling. Similarly, to the extent that unemployment is a result of the collapse of the housing bubble, it is also endogenous. The fact that an individual has a large amount of negative equity is evidence of poor underwriting, which is to say, the underwriting of an unaffordable mortgage.

In any event, Foote et al (2009)[31] argue that the most important reason for the lack of successful modifications is not skewed servicer incentives, what they label the ‘renegotiation failure’ theory, but the twin factors of redefault and self-cure. In dismissing the renegotiation failure theory, they cite Cordell et al’s (2008) interviews with investors, and Hunt’s work showing that outright modification bans are rare (2009)[42]. They also contend that fears of investor lawsuits of servicers are overblown, since there have not been many lawsuits. This last argument is unconvincing, since there haven’t been many modifications reducing the total amount owed either. Finally, they cite the point made by Eric Maskin in a response to the op-ed by Geanakoplos and Koniak[34], namely that were there these large gains to be had from renegotiation, mortgage hold-

³⁶This paper also uses LPS data. As noted this under represents subprime mortgages. Furthermore, it does not include any information on secondary loans on properties securing a loan (Foote et al p.11). Thus DTI levels are too low.

³⁷I do not think the authors do this, but I have seen some writers make this leap.

ers, servicers, and borrowers would find a way to do these renegotiations. They state, that the transactions costs would have to be \$180bn. To some that might not be an implausibly large number. It is certainly true though that redefaults and self-cures are important considerations.

A model of the decision to foreclose. It is useful to consider the model of Adelino, Gerardi and Willen[1] of the foreclosure decision, an approach which they cite as similar to Ambrose and Capone (1996). The version in Foote et al (2009)[31] is slightly more detailed, but in the same spirit.

There are three periods $t = 0, 1, 2$. In period 0, the lender modifies or not. A payment m is owed at 1, and the balance M at 2. House collateral is P_1 at 1 and P_2 at 2. At 1, under no modification, the homeowner defaults with probability α_0 , and the lender forecloses receiving $P_1 - \lambda$. With probability $1 - \alpha_0$, the lender receives $m + M$. The PDV under no modification is $\alpha_0 * \min[P_1 - \lambda, M] + (1 - \alpha_0)[m + (1/R)M]$. Under modification, the lender receives m^* at 1, and M^* at 2, unless the borrower defaults with probability α_1 at 2. So the PDV under modification is $m^* + (1/R)\alpha_1 * \min[(P_2 - \lambda), M^*] + (1 - \alpha_1)(1/R)M^*$. Comparing these two terms one sees the following tradeoffs. Modifications can recover capital for lenders from aiding borrowers who otherwise would default, but it also loses capital by reducing payments for those who would have paid back ('self-cures'). The final group are those who were going to be foreclosed anyway ('redefaults') — for this group, while a modified payment is recovered at 1, m^* , the lender may lose by modifying if housing prices weaken further.

On this account, the crucial point that, for example, White (2009)[78] cited earlier, misses is this 'Type II error', namely the value which modified mortgages would have had in the absence of modification — in other words, the possibility of self-cure (which, in their data is about 30% of seriously delinquent mortgages). In addition, if borrowers are going to redefault (in their data, 30-45% of cases, in a 6 month timeframe), then lenders receive lower house prices which may be insufficient to compensate for the receipt of the $t=1$ payment.

Foote et al's (2009)[31] analysis of the LPS data indicates that portfolio loans are not that more frequently modified than private label securitized loans.³⁸ Finally, Foote et al argue that modifications in the past were not as frequent as is usually assumed (p.32). They base this claim on a review of foreclosure statistics from the Great Depression. It

³⁸They note though, that their analysis does not permit controlling for all the characteristics of these loans (p. 31)

is also my understanding that there were a large number of state-enacted foreclosure moratoria during the Depression.³⁹ Thus, evidence that ‘we see far fewer foreclosures than we did in the 1930s’ is perhaps suggestive that renegotiation in the past was not as common as imagined. On the other hand, the Great Depression was a far wider and deeper crisis so we should anticipate worse foreclosure figures.

Levitin’s critique. Levitin notes that the implication of the Adelino et al paper are two: firstly, that the number of ‘preventable’ mortgage foreclosures are fewer than is typically assumed; and secondly, that widening ‘safe harbour’ provisions for servicers — that is granting servicers flexibility to modify loans without fear of litigation — is unlikely to make much difference.⁴⁰ Levitin argues though, that while capturing some important reasons why modifications might be impaired (namely redefault and self-cure), these concerns are still not large enough to explain the low rates of modifications we observe.

Levitin also argues that securitization servicers and portfolio lenders view self-cures and redefaults differently. Servicers are paid first following sale, so for them redefault is not a concern, while it obviously is for portfolio lenders (although, if servicers are liquidity constrained it still might be). He also argues that self-cure is also not as great a concern since the amount of servicer compensation is not very elastic to interest reductions (which are the majority of modifications).

Levitin thus concludes that there may be a common factor driving the low rates of securitization servicer and portfolio lender modifications — which he speculates might be capacity related (see below). If this is true, we obviously cannot conclude then that contractual rigidities through securitization do not hinder modification initiatives.

Levitin points out further that in his analysis redefaults vary significantly across securitized loans and portfolio loans,⁴¹ with redefault rates for securitised modifications being significantly worse. This must arise either from differences in the loans, or differences in the modifications. Levitin notes that the overwhelming majority of securitized loan modifications do not involve a reduction in principal, and furthermore, servicers

³⁹See for example Levitin (2009, p. 628, fn, 220) ‘in 1933, twenty one states enacted legislation that functioned as foreclosure moratoria’.

⁴⁰Levitin (2009) ‘Is Redefault Risk Preventing Mortgage Loan Mods?’ at <http://www.creditslips.org/creditslips/2009/07/is-redefault-risk-preventing-mortgage-loan-mods-.html> ; accessed 17 November 2009.

⁴¹Levitin (2009) ‘Does Securitization affect Loan Modifications’, at <http://www.creditslips.org/creditslips/2009/07/a-few-days-ago-i-wrote-a-long-and-detailed-critique-of-a-boston-federal-reserve-staff-study-that-argued-among-other-things.html> ; accessed 17 November 2009.

extend the term of a loan in far fewer cases for private loan securitizations than for portfolio loans. Furthermore, term extensions are far more frequent in modifications performed where Freddie Mac, Fannie Mae or Ginnie Mae is the servicer. In more detail, he observes (2009, pp7-8) that ‘we know that almost no loan modifications address negative equity by reducing principal balances. Of the 185,156 loan modifications in the first quarter of 2009, only 3,389 or 1.8% involved principal balance reductions, and all but four of these were for loans held in portfolio, rather than securitized’. Furthermore, ‘we also know many loan modifications do not address affordability by reducing monthly payments. 45.8% of the loan modifications done in the first quarter of 2009 resulted in monthly payments remaining unchanged or even increasing (in 18.5% of cases).’ I do not think this important empirical debate has been resolved.

4.2.4. Capacity limitations

In addition to the structure of the PSAs, the Congressional Oversight Panel (2009) identifies various servicer capacity problems (pp39-40). These include a lack of preparedness for the crisis and notably poor staffing. The Panel observes that whereas previously work done by the servicers was routine, ‘loan mitigation is slower, more complex, and much less automated.’

The irony of the situation has not been lost on many commentators: loan modification is in many cases far more arduous than taking out the loan was in the first place. A 2008 New York Times piece⁴² reports that in many cases WaMu loans ‘merely required borrowers to provide an address and Social Security number, and to state their income and assets’ whereas in Smith et al’s (2009), survey of foreclosure intervention counselors who mediated between borrowers and servicers over the period October 2008 and January 2009, there is the clear indication that the modification procedure is difficult, lengthy, and often unsuccessful. Servicers are significantly constrained in their personnel capacity to help negotiate workouts, although some improvements have been noticed since the MHA programme was launched although fundamental problems persist.

On the other hand an industry publication characterises the ‘biggest problem’ as the lengthy nature of the modification process, ‘as borrowers often will not even return phone calls from the servicer seeking to reduce their payments’ (Temple, 2009 [75]). Temple also notes the problems of unaffordable payments and redefault. In his view,

⁴²Goodman and Morgenson (2008)

modifications raise moral hazard, and hence the costs of borrowing, through lowered cash flow for investors (who thus require higher ex ante returns).

5. Government Intervention in the Foreclosure Crisis

First we consider some of the key features of the foreclosure process. Firstly, foreclosure law is state-based, which gives rise to regional variation. In all cases, though, the borrower is the legal owner of the property, what the mortgage holder owns, is a right to force the sale (required to be in a public auction) in order to satisfy the debt.⁴³ Thus, properties only become real estate owned (REO), if the servicer (typically), buys the property at auction. Foreclosures may also differ along the following dimensions: they may be judicial or non-judicial (the latter is cheaper); the extent of the right of redemption (whereby the borrower can repurchase their former home) can vary; and bankruptcy treatment can be different across states. It would be interesting to consider the impact of these regional differences on foreclosure and modification outcomes, as well as to research the public auction design.

5.1. Interventions

For this account, we draw, in particular, on Robinson (2009)[67]. Traditionally, most modifications do not reduce the total balance due (or even the payment), and instead delay payment while adding fees or past fees (Smith et al, 2009). Various initiatives have been launched at the industry, state and federal levels to try and stem the flow of foreclosures. The Hope Now Alliance was initiated by various stakeholders to try and induce struggling homeowners to contact their servicer (Smith et al, 2009). The alliance helped fund the Hope Hotline Telephone Service in this respect.

Initially, in December 2007, Treasury Secretary Paulson introduced the Streamlined Foreclosure and Loss Avoidance Framework, ‘Teaser Freezer’, plan which sought to incentivize mortgage servicers servicing ARM securitized loans to freeze resets for a period of five years. Robinson (2009) reports that lack of investor approval for modifica-

⁴³An interesting feature of the current crisis is that due to the speed of the origination to securitization process, in some cases, purported mortgage holders are not able furnish evidence of their ownership, ‘on Oct. 9 in federal bankruptcy court in the Southern District of New York [r]uling that a lender, PHH Mortgage, hadn’t proved its claim to a delinquent borrower’s home in White Plains, Judge Robert D. Drain wiped out a \$461,263 mortgage debt on the property [...] some of the nuts and bolts of the mortgage game — notes, for example — were never adequately tracked [...] nobody truly knows who owns what.’ Morgenson, G (2009), ‘If Lenders Say ‘The Dog Ate Your Mortgage’, New York Times, 24 October 2009.

tions represented an impediment.

The FDIC introduced a Loan Modification Program, 'Mod in a Box', for certain securitized or serviced IndyMac loans, following the bankruptcy of that institution. Modification was to be performed for eligible loans where that modification would yield a positive net present value according to three steps namely: interest rate reduction (to reduce debt-to-income to 38%); extended amortization period; and finally, partial payment forbearance which tacks on a zero interest balloon payment to the end of the loan. Robinson (2009)[67] reports the importance of redefault probability as a constraint, in particular for negative equity borrowers, in a declining house price environment. As a technical point, the presence of mortgage insurance had the mechanical effect of biasing the NPV calculation towards foreclosure — this is something the 'Second Look' Program has been designed to overcome. Under this program, the servicer would forward the loan failing the NPV test to the mortgage insurer, who would then determine whether or not an advance claim could be provided which might permit loan modification.⁴⁴

FHASecure was designed to assist the refinance of non-FHA ARM loans into FHA fixed-rate mortgages. This aided orders of magnitude less people than expected. Congress established Hope for Homeowners (H4H) which allows homeowners to refinance their distressed mortgages with an FHA-insured mortgage. According to Levitin (2009c, p. 2) this programme has not been very successful thus far. Under revised Treasury guidelines, servicers receive \$2,500 up front for loans modified under this procedure (Robinson, 2009)[67].

The Streamlined Modification Program was a GSE-owned or securitized variation of the FDIC's 'Mod-in-a-box' programme which included the following aspects: a term extension to reduce the DTI to 38 per cent; incremental interest rate reductions; and again, a deferred principal balloon payment to be added due at maturity or upon sale. The GSEs would pay \$800 to the servicers for each modified mortgage.

The Home Affordable Modification Program, which is mandatory for TARP banks and voluntary otherwise, is a similar programme to the Streamlined Modification Programme and Mod-in-a-Box. The pooling and servicing agreements are still binding, however.

The protocol of the program allows servicers to choose the means by which to lower the monthly mortgage payment — i.e. it permits them to pick the combination of prin-

⁴⁴'MICA's 'Second Look' Program To Expand Loan Modifications', MICA Press Release, 27 July 2009 at <http://www.privatemi.com/news/pressreleases/detail.cfv?id=152>

capital/ interest/ insurance/ taxes reduction so as to reduce the ratio of payment to current income to 31%; the losses from which investors and government are to share (Treasury covers half the cost of reducing DTI from 38% to 31%). Servicers receive \$1000 up front per modified loan, and an annual \$1000 per loan for those modified that remain current. Recognising, that with declining prices, lenders would like to foreclose as early as possible if redefault is likely; the Home Price Decline Protection (HPDP) initiative compensates owners and servicers for modifications done where prices are declining (Robinson, 2009)[67] based on a general house price index. Modified loans are to be those with positive NPV, according to the following sequential procedure: capitalization of arrearages; incremental reduction of interest rates to reach 31% DTI; term extension to up to 40 years; and principal forbearance.

Thus HAMP is meant to address the following considerations (Robinson, 2009): the cost of modification (with Treasury matching funds); servicer constraints and capacities (with incentives for modification, and incentives for keeping the loan current); investor concerns about the chance of redefault (with a HPDP payment), and uncertainty (with a standardized protocol).

5.2. Criticisms

Consider the incentives of a borrower with negative equity. If the cost of the modified loan is lower than the cost of renting, then that borrower would want to modify; even if they fully anticipated defaulting at some point in the future. In this case, the servicer would likely not want to modify *ex ante*. Indeed, this view has been expressed by Edward Pinto, former Fannie Mae Chief Credit Officer⁴⁵, 'This fear has been heightened by the concern of some servicers that borrowers will use the trial period to game the foreclosure process and delay their own foreclosures by another 5 or 6 months.' This may particularly be a concern in an environment where the norms against walking away have been loosened. The importance of norms has been argued by Brent White (2009)[?]. Indeed, there do not appear to be strong moral reasons for arguing that borrowers who own more than their homes are worth should continue to make payments on them. He argues that at work is a desire to 'avoid the shame and guilt of foreclosure' and 'exaggerated anxiety over foreclosure's perceived consequences'. Shiller has

⁴⁵Edward Pinto: The Government's Loan Modification Numbers Are A Total Sham', *Clusterstock*, 25 October 2009, <http://www.businessinsider.com/edward-pinto-the-governments-loan-modification-numbers-are-a-total-sham-2009-10>

speculated that the emotional binds will loosen over the next year⁴⁶ and Lowenstein (2010)[56] has argued that they should. One can dispute the magnitude of the moral constraint, but it would be foolish to suggest that it is not present.

Geanakoplos and Koniak (2009)[34] criticised HAMP at its inception noting ‘it concentrates on reducing interest payments, not reducing principal for those who owe more than their homes are worth. The plan wastes taxpayer money and won’t fix the problem.’ They note further that for subprime and non-prime mortgages, that they estimate will comprise half of foreclosures:

there is room to make generous principal reductions, without hurting bondholders and without spending a dime of taxpayer money, because the bond markets expect so little out of foreclosures. Typically, a homeowner fights off eviction for 18 months [...] the subprime bond market trades now as if it expects only 25 percent back on a loan when there is a foreclosure [...] It is those ‘underwater’ on their mortgages — with homes worth less than their loans — who are defaulting, but who, given equity in their homes, will find a way to pay [...] This couple could rent a comparable home for \$10,000 a year, less than half of their current mortgage payments [...] walking away from their home will further weaken their credit rating and disrupt their lives, but pouring good money after bad on a home they do not really own is costlier still.

As noted in a New York Times editorial of 11 November 2009⁴⁷, this plan was designed to reduce foreclosures by financing interest rate reductions. Hence, it appears to have been founded on a belief that the proximate cause of increasing foreclosures was default due to exploding interest rates. However, as observed in Levitin (2009), the causes of defaults and foreclosures have changed over time. Initial defaults may have been driven by speculator walk-aways when housing prices first flattened and hybrid ARMs reset, but more recent defaults include pay-option ARM holders (taken out

⁴⁶Robert Shiller is quoted at the Wall Street Journal blog *Real Time Economics* as saying ‘[s]trategic default on mortgages will grow substantially over the next year, among prime borrowers, and become identified as a serious problem. The sense that ‘everyone is doing it’ is already growing, and will continue to grow, to the detriment of mortgage holders. It will grow because of a building backlash against the financial sector, growing populist rhetoric and a declining sense of community with the business world. Some people will take another look at their mortgage contract, and note that nowhere did they swear on the bible that they would repay.’ 5 January 2010, <http://blogs.wsj.com/economics/2010/01/05/2010-predictions-from-shiller-blinder-rajana-and-more/>

⁴⁷‘More foreclosures to Come’, New York Times, 12 November 2009, <http://www.nytimes.com/2009/11/12/opinion/12thu2.html>

by prime borrowers with imperfect documentation and hence 'Alt-A' rated) and other negative equity prime borrowers.

Note also that the HAMP programme still operates within the constraints of the pooling and servicing agreements.

5.3. Other possible interventions

The Smith et al (2009) survey of foreclosure counsellors has the following recommended modifications, 'market level interest rates [...] a fixed term [...] or with principal reductions to reflect the true value of the property'.

Levitin (2009) identifies as the 'only one option' remaining that the federal government permit bankruptcy mortgage modifications for single-family principal residence mortgages in Chapter 13, eliminating the negative equity position through 'cramdown'.^{48, 49} Following the 1978 bankruptcy reform principal residence mortgages were exempted from modification in Chapter 13, on the basis that ex ante interest rates for borrowers would be lower through incentivising ex ante lender competition. In fact, Levitin (2009b) argues that his empirical examination reveals that 'mortgage prices are largely insensitive to bankruptcy modification risk'. The crucial ingredient here is that foreclosure loss be at least as large as bankruptcy modification loss. In which case, ex ante credit costs should not be higher. In support of this, Levitin (2008a) notes that there is no spread between 'conforming mortgages on vacation homes and multifamily properties are currently priced the same as single-family principal residences'. Nor, for example, do Fannie and Freddie 'track the difference in bankruptcy modification risk'.⁵⁰

⁴⁸Levitin notes however, that Chapter 13 requires the debtor to possess a regular income — but this will obviously not be the case for those who are unemployed. White (2009)[78] also considers cramdown. On her account, the pooling and servicing agreements embedded in the securitization process resulted in socially inefficient rigidities. The policy dilemma identified by White (2009) is that administration loan modification programs have been relatively ineffective on account of requiring lender agreement, but that cramdown modifications in Chapter 13 would lead to 'too many' loan modifications.

⁴⁹There are two points here in favour of eliminating the special treatment accorded primary residence debt in bankruptcy. If it is true that this dramatically lowers the cost of access to mortgage finance, then it may be an important reason for 'excessive investment' in housing. Instead, if there is a limited effect, then it is possible to eliminate the adverse externalities from foreclosure without the effect of restricting access to credit in the future.

⁵⁰However, and as he points out in a brief footnote (70) rationing may be in quantity of credit rather than prices. We cannot conclude without knowledge of this quantity effect. Levitin, in a separate paper, presents historical evidence based on the period 1979-1993 where there was institutional variation across federal districts about whether they permitted strip-down (Levitin, 2009b, p. 598). The result here was that for some classes of credit LTVs were lower where strip down was permitted. He argues that his analysis suggests no effect on credit availability or the number of bankruptcy filings, but Levitin (2009b) does not present this evidence. However, his analysis showing that the losses from bankruptcy may in fact be lower than the losses from foreclosure are certainly suggestive.

Furthermore, argues Levitin (2009), this is not too administratively burdensome for the courts to handle. He writes that, ‘in an age of a trillion dollars in government bailouts, bankruptcy modification is a rare bargain. Bankruptcy courts are well staffed relative to historic filing levels, and court fees cover the administrative costs of the process.’

There are significant political obstacles to efforts to allow cramdown in bankruptcy. An article in *Slate* from February 2009 described the Obama administration as ‘laying the political groundwork to empower bankruptcy judges to order ‘cramdowns’ of unpaid mortgage debts — forcing investors to accept those elusive but all-important reductions of principal owed’ but goes on to note the ‘serious opposition from the securities and banking industries’ (Katz, 2009a). Temple (2009), writing in the *American Securitization Journal*, states the position succinctly, ‘such proposals would raise serious questions about the rule of law and the property rights of investors who funded the mortgages while having very little positive impact on the number of homes being foreclosed. As with modifications, I believe the single most important flaw related to cram-down is that it requires judicial intervention on a borrower-by-borrower basis.’ We should also note that many of the difficulties in performing modifications in general, and performing certain types of modifications in particular, are technical in nature. One reason, for example, why banks may oppose modifications including principal reductions is accounting treatment. Reductions in principal result in an immediate write-down on the balance sheet, whereas interest rate reductions result in a fall in future discounted income.

5.4. Further observations on the Political Economy of Intervention

Undoubtedly, one of the most important obstacles to any intervention in these debt markets is the politics. Skeel’s (2001)[71] history of American bankruptcy law might provide a model of the type of narrative approach one could apply to this issue. His is a discussion framed in the interest group theory of public choice, where the relevant interest groups at various stages include creditor groups and their advocates, and bankruptcy lawyers and judges (p. 15). In addition to interest groups, he notes the importance of which committees are active in congressional deliberations; the ‘undeniable influence’ of ideology; and the important role of particular individuals (most notable is his account of the role of William Douglas and his SEC). It is Skeel’s contention that there are three primary forces shaping American bankruptcy law and its develop-

ment (p. 16). These are: the compromise between creditor interests and the forces of prodebtor movements and other ‘populist’ forces. Attempting to shape these forces towards accretion of their own prominence have been bankruptcy professionals seeking to expand the law’s scope. Roughly speaking, Republicans have aligned with creditor interests and Democrats with prodebtor movements, while bankruptcy professionals have aligned with themselves.

I have spent some space outlining Skeel’s history, since it aids in considering the type of approach that one might take to the present case. A very interesting paper by Mian, Sufi and Trebbi (2009)[60], considers the relative magnitudes of the effects of constituent interests, special interests, and politician ideology in the context of voting behaviour on two acts — the American Housing Rescue and Foreclosure Prevention Act of 2008 and the Emergency Economic Stabilization Act of 2008. Their findings are: mortgage defaults, particularly of own-party constituents, increased the likelihood of voting for the housing bailout (particularly in competitive districts); financial firm campaign donations increased the likelihood of voting in favour of the bank bailout and; finally, they show that Republican politicians are driven more by ideology than constituent or special interests and argue that ‘this [...] suggests that politicians, through ideology, can commit against intervention even during severe crises.’

There are a few problems with this conclusion, leaving aside the question of whether or not the intervention was inappropriate. The first is empirical: following table 9B of their paper, Republicans are more likely to switch their vote on the financial bailout if a larger share of their constituents is working in the financial industry while it has no impact for Democrats (they note, but do not remark further on this in one sentence on page 26). This weakens the ideology commitment effect for Republicans. The second aspect is theoretical. It is not at all clear the extent to which politicians can pick their ideology. When is that done?⁵¹ There is also a point about selection bias here. The republicans had lost their majority in the house in the midterm elections, those that remained were likely to be in the more conservative districts, and hence less in play for constituents and special interest groups. Or, they may have been anticipating loss in the upcoming election and so simply voted their conscience. Or they may have been trying to rally their base. More work is needed here to address these alternative hypotheses.

This work provides some empirical basis for the important tension that exists (as

⁵¹Elster (1977, p. 482)[27].

suggested by Skeel[71]), between debtor and creditor interests (and hence debtor and creditor regions). It may be interesting to return to the case of mortgage cramdown. In March of 2009, House legislation was passed that 'would let federal judges lengthen mortgage terms, cut interest rates and reduce loan balances for homeowners in bankruptcy court, even if the lender objects, on the borrower's primary residence'⁵², but this did not come to a vote in the Senate. On 11 December 2009, the House voted 241-188 against an amendment to H.R. 4173, the Wall Street Reform and Consumer Protection Act of 2009, brought by John Conyers, and supported by House Financial Services Committee Chairman Barney Frank, containing the same language.⁵³ The measure was opposed by banks and what Bloomberg archaically describes as 'broker-dealers'. The American Bankers Association chairman, in his discussion of this success, stated⁵⁴

An amendment to add mortgage bankruptcy cramdown to the bill was defeated on the floor by a strong majority. Given that this amendment had passed the House earlier this year, our win is a strong reflection of the hard work of the state associations and grassroots bankers last week. Since the cramdown concept has now been defeated in both the House and Senate this year, hopefully it will not be brought up again.

This would appear to be the last word on the matter. It may be interesting to examine, in a similar manner to Mian et al, the determinants of voting on this amendment.⁵⁵ One way of getting at the tension between servicers and investors would be to examine whether there was a difference in opinion over the bankruptcy cramdown prohibition. Levitin (2009b, p. 625) asserts that opposition has been led by the servicers, who exert greater influence than investors who might benefit from cramdown. On the other hand, Foote et al (2009, pp22-23), cite a survey of investors by Cordell et al (2008) which found that 'investors [...] were not enthusiastic about an idea to reimburse servicers for expenses of loss mitigation'. This suggests that they may not see value in principal reduction, and hence may similarly oppose bankruptcy reform of the sort envisaged.

Finally, it is important to note also that should the number of individuals choosing to walk away from their mortgage dramatically increase, this could produce some

⁵²Bloomberg, 8 December 2009,

⁵³Bloomberg, 11 December 2009

⁵⁴Huffington Post, 16 December 2009,

⁵⁵Levitin (2009, p. 649-650) observes that in fact a similarly shaped bankruptcy reform passed the House in 2008 and 'was reported out of the Senate Judiciary Committee, but never came to a floor vote because of the inability to get cloture and avoid filibuster'. The legislation was Helping Families Save their Homes in Bankruptcy Act, S 2136, 110th Cong (2008).

pressure for loan modifications (Lowenstein, 2010[56]). Certainly, in an environment where regulators are intervening heavily in mortgage markets to support home prices, and there exists a moral constraint on walking away, it is not clear why we should expect a large number of modifications.

6. Conclusions

I conclude by presenting some questions arising out of my survey potentially deserving of further study. I divide this broadly into theory and empirics, but there is strong overlap.

6.1. Some theoretical and institutional questions

Barriers to Loans Modifications Further work is needed if we are to understand the reasons for foreclosures and why loan modification programs have been so dramatically unsuccessful thus far. These are also important questions to consider in the context of regulating the industry in the future. The classification is rough.

- Horizontal — across borrowers. How important are the social norms against walking away from your mortgage? Are these changing? When others default in your neighbourhood, does this make it more likely that you will default? What is the size of this effect? Aside from social norms, how important are things such as access to local schools? Can one quantify the price of this access by looking at foreclosure rates across districts?
- Horizontal — across servicers. How important is the following co-ordination failure: If Servicer 1 does not foreclose on an individual a in a particular neighbourhood, but servicers $2 \dots N$ in that same neighbourhood do foreclose on their debtors; this increases the probability that the price of a 's home will fall further, increasing the likelihood of default.
- Horizontal — across investors. Which investor tranches want the loan modified and which would rather see foreclosure?
- Vertical — between borrowers and servicers. What is the precise nature of the agency relationship between borrower and servicer? Roughly, the servicer would like the borrower to undertake some unobservable effort to pay if able. We can

think of this in the moral hazard framework. But there is also an adverse selection element, since the servicer has many borrowers, and would only like to modify the ‘good risks’.

- Vertical — between servicers and investors. Where is the precise point of tension between the interests of the servicer and the investors?
- Vertical — between servicers/investors and government. How important are government interventions to prop up the housing market (for example through Fed purchases of MBS) in disincentivizing servicers and investors from finding a way to modify mortgages?

Industrial Organization As a general point, it is important to understand the trade-off between integration and disintermediation. As noted, since the firm boundary is an endogenous decision, empirical evidence is difficult in settings such as this.

One area in which, to my knowledge, there is very little research the auction design of housing sales in foreclosure. This may be interesting in itself, but also with a view to understanding servicer incentives (for acquiring REO, or for performing modifications).

Some commentators (for example, Simon Johnson) have called for breaking up the too big to fail banks. It does not seem possible to do this using existing antitrust law, since while banks are very large in absolute size (measured by their stock of assets on the balance sheet, or their flow of revenue on the income statement) they would fail the market share test for dominance. Hence, special legislation would be required to shrink the banks (in particular, the ones that government does not control) How does one define relevant markets in the mortgage industry? What are the appropriate lines of separation to be drawn?

6.2. Some empirical questions

Barriers to Loan Modifications It should be noted that an important reason for our lack of understanding of the failures of loan modifications is a shortage of data. The Congressional Oversight Panel’s March 2009 report states that ‘the existing data are plagued by inconsistencies in data collection methodologies and reporting, and are often simply unverifiable. Worse still, the data being collected are often not what is needed for answering key questions, namely what are causing mortgage defaults and

why loan modifications have not been working' (p.14). For details on the available data to address questions around loan performance see COP(2009). With that caveat in mind I tentatively suggest some areas where future work is needed.

Is there a difference in redefault rates of modified securitized and portfolio loans? How do redefault rates vary across servicer, loan characteristics and modification characteristics? Levitin has claimed that redefaults vary significantly across securitized loans and portfolio loans with the former performing worse, but Adelino et al do not find this. Why?

As noted, foreclosure rules differ across states in terms of whether they are judicial or non-judicial; the extent of the right of redemption; and bankruptcy treatment. There is thus some (potentially) exogenous variation which we exploit in terms of considering the impact of these regional differences on foreclosure and modification outcomes.

How do modification rates vary by foreclosure rules, rules around the right of redemption, and bankruptcy treatment?

6.3. Political Economy

The foreclosure crisis can be used to address some classical questions in public choice and political economy, such as the relative importance of interest groups, politician preferences and voter preferences.

Can we predict the outcome of the votes on bankruptcy cramdown along the lines of Mian et al (2009), or McCarty (2009)? A useful exercise may be to replicate the analysis Mian et al did in the setting of the three house votes on cramdown. It would also be interesting to get a sense of why the legislation did not make it out of the Senate Finance Committee.

What is the evidence of the role of congressional intervention in promoting the mortgage expansion? What was the extent of congressional and executive interference in administrative decisions? A model here might be the work of Romer and Weingast (1992).

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A Other Issues

I now present in brief a number of important issues in the subprime crisis which are not the subject of this paper, but which are important in their own right — in turn: Predatory lending; the role of the GSEs; the Ratings game; and the role of the Community Reinvestment Act.

Predatory lending Reiss (2009a, p.3), describes the unregulated subprime market as ‘[presenting] an opportunity for those seeking to separate financially unsophisticated borrowers from the equity that they have built up in their homes’, which is how he defines predatory lending. Under this characterization, we can observe that it takes place at the level of the mortgage broker (in particular in refinancing settings where borrowers possess equity in their homes), with secondary markets responsible to the extent that they provided funding for the mortgage broker. Secondary lenders are protected from legal liability under the ‘holder in due course’ legal doctrine. The effect of this is that if originators sold the loan on quickly and were very thinly capitalized, there would then be little legal remedy available for the homeowner — the originator was insolvent, and the investor not liable.

Certainly, it appears clear that predatory lending was rife. Ameriquest settled in January 2006 with 49 states for USD325m over complaints that its ‘reps had aggressively pushed customers to refinance over and over again and misled many of them about the cost of their monthly payments’ (Katz, 2006).

The GSEs It is clear that the two GSEs were deeply implicated in the credit crisis (Reiss, 2009b). They were exposed to subprime and Alt-A, and experienced prime mortgage losses, eventually having to be taken into conservatorship on 7 September 2008. Their role is to promote secondary market liquidity by issuing and guaranteeing RMBS, and purchasing RMBS for their own portfolios using the proceeds from debt (‘Agency’) issuance. Since government implicitly backs this debt, their cost of capital is comparatively low. The risks they bear are mortgage borrower defaults and, where the RMBS is

held by Frannie, that the borrower prepays early. The charters of these companies restrict the loans they may purchase, and with their government-sponsored advantages they are dominant in the conforming loan markets. Private labels securitize subprime, jumbo and Alt-A mortgages. Freddie and Fannie's purchase of subprime and Alt-A loans from originators did, however, leave them exposed to the crisis in subprime. And as this crisis has spread to the rest of the housing market, so their financial positions have worsened. The bailout of Fannie and Freddie has already proved very costly to the taxpayer, and various commentators (for example, Reiss, 2009c) have suggested that in the future these companies be split up and privatized. The cost of the implicit government guarantee of Agency debt is only now coming onto the balance sheet.

A word on the ratings agencies There are three major credit ratings agencies: Standard & Poor's, Moody's, and Fitch which are National Recognized Statistical Rating Organizations, a designation which features in a number of state and federal regulations. In the real estate market, securities issuers pay ratings agencies to evaluate pools of mortgages comprising their securities (Reiss, 2009d). In a number of cases, RMBS Securitizations will be rated by two out of three of the main ratings agencies (Reiss, 2009d, p. 9). Their evaluation assesses features of the securitization along the following dimensions: (i) default frequency; (ii) conditional on default, loss severity; (iii) characteristics of the RMBS pool and; (iv) security features such as structure and credit enhancers (Reiss, 2009d, p. 9).

It should be noted that ratings agencies could, and in some cases did, refuse to rate RMBS based on mortgages originated in a particular state on the grounds that the RMBS holder may be liable under state Consumer Protection or Predatory Lending Law. This was the background to amendments to consumer protection regulation in New Jersey and Georgia in 2004 (Reiss, 2009d, p. 11). These developments surely chilled predatory lending reform efforts in other states. The Credit Ratings agency models were in many cases used as the basis for the determination of the degree of overcollateralization required, or the appropriate amount of equity cushion. Note, though, that with respect to subprime mortgages, there had been a big pickup in share and value since 2001 and hence any modelling would be on the basis of a very limited amount of data. It could be argued, furthermore, that the ratings agencies were crucial in legitimizing securities such as subprime CDOs (Reiss, 2009d, p.12).

The role of the Community Reinvestment Act Kroszner (2008) reports that two Federal Reserve studies of long-term evidence on CRA loans indicates no significant lower profitability of loans made through this program. Moreover, Fed staff analysis of loans originated in 2005 and 2006 found that CRA loans comprise a small total of subprime loans² and had in any event not performed differentially to other subprime loans (subprime loans had performed badly regardless of neighbourhood). Nor had institutions covered by the CRA legislation purchased applicable loans to a significant extent from non-CRA lenders. Furthermore, there was no discontinuity in loan performance around the CRA threshold.