Informed Securitization

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1. Introduction

The housing finance system began to unravel nearly a decade ago, but the ghosts of its demise continue to haunt us to this day. The housing finance system remains after six years on government life-support with no clear plans on when or how to resuscitate it despite a substantial recovery in the overall economy. The placement in conservatorship of Fannie Mae and Freddie Mac on September 6, 2008, in the aftermath of the Global Financial Crisis has created a de facto government-funded housing finance system in the United States. More than 7 years since the federal government placed these institutions in conservatorship, they continue to remain in that status with no established exit plans. As of 2015, Fannie Mae, Freddie Mac and Ginnie Mae are virtually the only issuers of mortgage backed securities. The public actions taken to support Fannie Mae and Freddie Mac were successful in their short-term aims of supporting the housing market and removing the two firms as an immediate source of systemic risk to the financial system. The conservatorship, however, does not achieve the goal of reforming securitization markets. In the current situation, the U.S. housing finance system is one in which the risks of mortgage backed securities are borne by the public sector.

The Achilles heel of the pre-crisis securitization market, inherent in its structure, was the potential for systemic instability due to credit or default risk.[1] As lending standards declined, surging housing prices veiled growing credit risk. Securitization markets shrouded rather than revealed information on the mounting system-wide leverage. The bursting of the housing bubble led to massive defaults, the collapse of securitization, systemic failure and, in response,

unprecedented public interventions to support the financial sector and the overall economy (Frame et al. 2015).

Episodes of systemic risk linked to real estate and housing finance markets are endemic across countries and history. This time securitization markets were at the center of the crisis. As a financial instrument, mortgage backed securities markets can provide information on developing market risks. However the structure of securitization markets precluded this in the GFC.

This paper presents principles for more stable securitization, focusing on the role of market information, and the potential for securitization to inform and complete rather than destabilize markets. The incomplete nature of real estate markets, due to high transaction costs and lack of short selling mechanisms, is well established. This paper focuses on possible solutions to information issues that otherwise make it difficult for market actors and regulators to properly assess and monitor risk.

Section 2 which follows examines long-standing information issues that characterize real estate and housing finance markets. Section 3 describes how nontransparent securitization and structural shifts worsened financial instability in the run-up to the crisis. Section 4 discusses a specific reform to monitor mortgage debt at the property level. Section 5 lays out what is needed to monitor mortgage debt on an economy wide basis. Section 6 concludes.

2. Real Estate Bubbles

Systems that do not account for interdependencies between asset prices and lending conditions are vulnerable to over borrowing and over lending. This is particularly the case for lending based on real estate assets. Like other assets, real estate is subject to waves of optimism

(Shiller 2006); unlike other assets, pessimists cannot easily exert downward pressure on real estate prices.

In efficient markets, asset prices follow a random walk. When prices get out of line with fundamentals, they are subject to downward pressure through short selling, thus incorporating all available information on market pricing. Investors sell the asset (that they do not own at the time of the sale) at the inflated market price and buy back the same asset at a deflated price to return to the seller at a future time, profiting from the difference. Real estate is heterogeneous, and, because of this, even if investors are confident that market prices are too high, they cannot sell a property they do not own and buy back that specific asset at a lower price.[2] Property owners can sell their own properties. But selling your own property is also subject to the heterogeneity problem. You are not likely to be able to buy it back; you will need to purchase another house, perhaps not as satisfactory as your own home, and incur large transaction costs in the process.

Again because real estate is heterogeneous, buyers are likely to have different views on the pricing of real estate. However, it is the pricing of optimists, whose reservation prices exceed fundamental value[3] that is likely to prevail in the absence of short selling, when prices are rising and credit is readily available. Real estate markets are incomplete and they are also highly correlated across space and heavily influenced by expectations. When demand slows and prices stall, price declines may follow, as the premium for expected appreciation disappears. Because prices are serially correlated (Case and Shiller 1989), their decline will not happen all at once, and declines will be predictable, which will have consequences for potential policy interventions, as discussed below. Moreover, price declines may be widespread if major financing channels become illiquid, which is likely, if national credit markets are implicated.

Housing bubbles are not likely to persist or become systemically important without an expansion of mortgage credit. Optimist buyers are typically allowed to use more leverage as markets heat up since recent losses to lenders have been negligible. This additional leverage allows optimistic buyers to bid on a larger share of housing transactions (Haughwout et al. 2012). Consequently, optimistic buyers instead of being wiped out by their investment decisions may be supported by increases in lending that is underpriced for the risk. Mortgage markets ratify optimist set prices because lenders use appraisals, which are based on market prices when deciding on how much to lend (Herring and Wachter 1999).

The implication of mortgage markets in real estate asset bubbles goes beyond the ratification of optimist set prices through appraisal based lending. Financial accelerators propagate increases in the price of real estate (Bernanke, Gertler, and Gilchrist 1999). Rising prices may lower the perceived risk of lending to real estate with the result that lenders increase the supply of credit to borrowers, ease lending terms and accelerate price increases in a positive feedback loop. In long periods of rising prices, lenders and investors may underestimate the risks of heavy concentrations of real estate lending due to the infrequency of price shocks and resulting disaster myopia. Competition reinforces this dynamic leading to erosion in underwriting standards. There may then be a sharp repricing of credit when risk becomes apparent, which in itself will cause prices to fall and raise the risk of future price declines.

Misaligned managerial incentives, that reward short-term loan production rather than long-term performance, may play a role in the propagation of asset bubbles. Managers may accelerate efforts to close risky loans in the presence of a bubble, because, not despite of, their awareness of growing risk, to “make hay while the sun shines.” Investors may find it difficult to detect increased credit risk due to the opacity of bank holdings or may themselves have short-

term horizons. Forbearance on the part of regulators may allow failing institutions to continue lending into a bubble and the resulting moral hazard may encourage managers to "gamble for resurrection."

The accelerated provision of cheap credit due to misaligned incentives magnifies asset bubbles. Nonetheless, asset bubbles and mispriced credit may arise even without misaligned incentives, given incomplete markets and competition for market share. Some lenders may be aware of market interdependencies of asset prices and lending conditions and of growing market risk; but others may not be aware of these interdependencies and will misprice credit accordingly. These, disaster myopic, lenders gain market share. Competitive markets may make it impossible for lenders and investors who are not disaster myopic to price transactions as if there were a finite probability of a major shock, or tail risk, when those who are disaster myopic price them as if that probability were essentially zero (Herring and Wachter 1999, 2003). As underpriced tail risk grows, short-term players or those who misjudge risk increase their market share. Systemic risk arises because, in order to lend more, myopic financial institutions increase their own leverage, as well, worsening liquidity shocks when prices decline.[4]

The macro literature has developed models (Jeanne and Korinek 2010) that explain the inefficiency of over borrowing and over lending. Easing borrowing terms initially makes loans more affordable, but this inhibits the ability of house prices to ration demand and upward price pressures continue. As underwriting standards continue to ease, this leads to increases in the likelihood of future defaults when demand growth stalls and prices decline. The ability to pledge collateral and raise collateralized funds is then debased which leads to a decline in the real economy. Models of default behavior can be used to predict increases in credit risk that result

from imbedded mortgage lending terms that are easing, given scenarios of future price paths, but they can only do so if lending terms are known.

3. Securitization in the Crisis

In this crisis, securitization markets propagated the real estate asset bubble and veiled increases in leverage and risk. Securitization markets thus had two fault lines: a structure that encouraged a race to the bottom in underwriting standards and information gaps that shrouded the resulting increases in leverage and credit risk. While high house price rises relative to rents (and to income and to other fundamentals that determine demand, including expectations on price rises) were identified in many markets, especially in the so-called "sand" states, changes in the pricing of and characteristics of credit expansion were not well measured. This was in part due to shifts in securitization markets (Wachter 2014).

Much of the increased funding for mortgages prior to 2007 came from private label securitization (PLS). While characteristics of mortgages backed by PLS were available in loan tapes, these were not readily available to investors or regulators, and the data fields often contained missing or inaccurate information. Investment prospectus summary documents lacked critical data; and the data that were provided were not standardized, making it difficult to aggregate credit flows and track lending terms over time. In particular, the complexity of mortgage instruments and mortgage backed securities made it difficult to identify the pricing of risk along with mortgage volume and characteristics. Moreover, it was not possible to track credit (along with characteristics) extended to specific regional markets over time, thus precluding linking credit supply characteristics to property market outcomes.

PLS were backed by nontraditional mortgages (NTMs). NTMs included complicated features such as the use of teaser rates or balloon payments as well as reduced documentation, as in the so-called liar loans. But information on the share of these loans by combinations of features, fees, lending rate and origination fees, in the aggregate and by region, was not available. While HMDA data, albeit with more than a year delay, provided information on the origination of subprime loans by region, other than this, characteristics of loans were not readily available. In particular, information on a key predictor of loan default, the combined loan to value ratio (CLTV) was not available (Moulton and Quercia 2013). Loans with high CLTV ratios, grew sharply in the years immediate to the crisis, funded by an increase in second-liens, i.e., piggy back loans (Wachter and Levitin 2015), but the extent to which this occurred was not known at the time, as discussed below. In the aggregate, we know now that NTMs and second-liens grew in market share from less than 10% in 2000 to almost 50% of mortgage origination in 2006, funded almost entirely through PLS, and then shut down in 2007 (Levitin and Wachter 2012).

Changes in the structure of securitization markets contributed to the expansion of leverage through NTMs and second-liens, as did regulatory shifts. From the early 1980s to 2000, almost all mortgage securitization had occurred through government regulated entities that precluded significant competition on rates or terms. With deregulation, there was a change in the structure of securitization markets, which contributed to the expansion of non-agency credit. Private label securitization firms and the GSEs competed for market share, moving away from a traditional de facto regulated securitization mechanism in which the GSEs held market power and dictated origination terms (Wachter 2014).

For chartered institutions, like GSEs or banks, which benefit from market power, the value of the option to survive and remain in business can limit the level of risk taking as a strategy to maximize value. Increases in competition that reduce the value of surviving can result in a change in strategy in which actors increase their level of risk taking as a way to extract value through underpriced options. The introduction of non-agency securitization, may have led to additional risk taking by Fannie Mae and Freddie Mac (Lai and Van Order 2014). Between 2003 and 2007, the share of nonstandard and risky loans guaranteed by Fannie Mae and Freddie Mac increased. At Fannie Mae, the percentage of newly purchased loans where the loan amount was 90 percent or more of the appraised property value increased significantly from 7 percent in 2003 to 16 percent by 2007, while at Freddie Mac the percentage increased from 5 percent in 2003 to 11 percent in 2007 (Frame et al. 2015).

Nonetheless the major expansion of mortgage funding in this period came through securitization markets and mostly from private label securitization (Levitin and Wachter 2012). The rapid increase in private label securitization occurred in large part through the expansion of CDOs, which are derivatives of PLS. Funded through CDOs, credit expanded rapidly in the commercial sector as well. Ling and Duca (2015) provide evidence of the resulting declines in the cost of credit and rise in rent to price ratios, or cap rates, in the commercial property sector. Levitin and Wachter (2012) record how the structure of securitized lending shifted in the commercial market, which had relied on equity owners of the riskiest tranche of CDOs, but increasingly shifted to securitization of all tranches.

After the fact we know that the pricing of credit risk decreased in this period both for PLS, CDOs and for agency and non-agency debt (Davidson, Levin, and Wachter 2014). As high CLTV mortgages' prevalence increased, the overall cost (combined opportunity cost of the down

payment and the mortgage interest rate) of prime credit decreased (Davidson, Levin and Wachter 2014). Pricing of NTMs, funded by PLS, decreased relative to that of prime loans funded by GSEs, lowering the cost of lending through both channels. These declines in the price of credit to the real estate market set up a flight from housing finance when risk became apparent.

Declines in credit risk premia that are correlated with rising prices ex ante predict the severity of price declines, in the downturn (Pavlov and Wachter 2009a, 2009b; Levitin, Pavlov, Wachter 2012). In the Asian Financial Crisis (AFC), countries that shored up their capital reserves and decreased their underpricing of credit, through raising lending rates relative to deposit rates, experienced lower price declines. In the aftermath of the AFC, they were able to continue to lend and their financial sector was not as vulnerable to the Asia wide tightening of credit conditions (Green et al. 2009). In the US, in the run-up to the crisis, bank capital requirements were lowered, enabling the expansion of lending to residential and commercial real estate (McCoy, Pavlov, and Wachter 2009).

The resulting excessive leverage and the subsequent inability to pledge collateral and raise collateralized funds led to a decline in the real economy. In response to the crisis, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (DFA) restricted the use of NTMs by establishing Qualified Mortgage (QM) loan standards that provide liability protection to issuers. As of now, non-QM loans remain a small share of the market, thus eliminating from the current market most non-standardized mortgage products. In addition, as noted above, almost all of the securitized mortgage debt is currently being issued by the GSEs, which now do provide information on mortgage pools, as discussed below. The standardization of mortgage product in the QM and GSE space provides information on loan characteristics of mortgage pools. Nonetheless, important information on market leverage is still not readily available.

4. Information on Property Level Leverage

The most important indicator of default risk is the overall level of leverage associated with an individual property. Overall leverage is measured by the combined loan to value ratio (CLTV), summing up all the liens against a given property.

Information on the evolution of this for originated loans and for the housing stock in the aggregate has important implications for the level of risk in the housing finance system. To track CLTVs requires data on origination and pay downs of both first and additional liens, as well as information on property values, linked in time to default.

This information is currently unavailable to market participants and regulators. In the U.S. context, borrowers are currently able to add a second-lien on their property without the agreement of the first-lien holder. First-lien holders cannot call due a mortgage or change its terms upon the addition of a second-lien, even if the second-lien increases the CLTV beyond the original LTV from the first-lien. This means that all mortgage products have embedded a leverage option that is priced ex-ante for the possibility that borrowers can increase their CLTV beyond the original LTV.

Levitin and Wachter (2015) show that this embedded option may contribute to increased mortgage costs and make it difficult to obtain information about the overall leverage associated with a specific first-lien loan in a security in particular and market-wide leverage in general. They show that when graphing LTV at origination and estimated CLTV over the recent cycle, the increased leverage in the system came entirely from the increase in the CLTV at origination that reached almost 90 percent at the top of the boom due to the extensive use of simultaneous second (piggyback) loans. Levitin and Wachter (2015) show that this increase in overall leverage could not be measured by market participants or regulators due to the lack of information about

second-liens at the individual loan and aggregate levels. There is no requirement for lenders to report second-liens in a way in which they would be automatically matched with the first-lien. Second-liens are recorded on property title, but there is no comprehensive dataset that matches all first-lien mortgages with eventual second-liens, although that information exists for segments of the market (Levitin and Wachter 2015).

The continued unavailability of CLTV data limits the ability of investors and regulators to accurately measure the level of risk in the system and therefore to properly price this risk. In addition to credit agency notations, investors in MBS during the boom largely limited their analysis to credit scores and LTV information in order to price risk (Rajan, Seru, and Vig 2010). LTV on first-liens is well documented as an important predictor of credit risk and loss given default, but the existence of a second-lien has important implications for the risk associated with that loan and the prevalence of second-liens in the market also contributes to overall risk.

Lee, Mayer and Tracy (2012) find that during the boom, over 40 percent of home purchases in a number of bubble markets (Phoenix, Las Vegas, Miami) were using simultaneous piggyback loans. In addition, they find that two-thirds of purchases with a piggyback had CLTV above 95 percent, meaning that a 5 percent decline in house value was enough for the borrower to be underwater. The issuer of the mortgage might have known about the presence of simultaneous seconds, sometimes originating both and keeping the second-lien on portfolio while securitizing the first-lien, but that information was unlikely to be reported to investors.

In addition to giving first-lien holders control over the amount of leverage on the collateral they are lending against, un-embedding the leverage option in the way proposed by Levitin and Wachter (2015) would facilitate the gathering of real time market-wide leverage information. As second-liens need to be reported to first-lien holders, a system would be in place

to facilitate the exchange of the information and it would become possible to capture all liens being issued on one property in a single national repository.

5. Structure and Data for an Informed Market

Distinguishing between credit booms that are sustainable and those that will lead to systemic risk remains a challenge (Dell'Ariccia, Igan, and Laeven 2012). The data requirements for this include information on volume of mortgage supply, mortgage terms and borrower characteristics and mortgage rates (Hunt, Stanton, and Wallace 2012). Importantly these data need to be linked to property market data. An issue is what entities are responsible for the development and collection of standardized data and to what end. The structure of securitization markets can incentivize the development and use of data to monitor risk if the structure internalizes the risks of individual lender decisions.

The proposal put forth by Dechario et al. (2010) is designed to accomplish this. Dechario et al. (2010) propose a cooperative structure, controlled by financial institution member/owners to carry out securitization, so that default risk is borne by all members, thus rewarding the enforcement of origination standards that promote market stability.[5]

Such a structure, however, does not preclude races to the bottom by non-members. To deal with this, Hancock and Passmore propose requiring catastrophe insurance. This neutralizes an advantage of new entrants who might enter and grow in markets in good times and exit markets quickly in bad times, outcompeting in good times those entities who are required to pay for catastrophe insurance. Thus, effectively Hancock and Passmore propose that, alongside a substantial private capital loss position, the government would require all mortgages, regardless of whether they are government-sponsored or not, to be insured against catastrophic outcomes. This government-provided catastrophic reinsurance would be implemented through an explicit

guarantee fee (g-fee) for securitizations paid by issuers to contain externalities otherwise imposed by underpricing lenders. To carry this out, regulators need to determine the appropriate level of the g-fee. In order to do this and to set capital requirements for entities holding and securitizing mortgages, regulators need to be informed on credit risk, requiring linked mortgage and property data.

Under the DFA, the CFPB has issued new Home Mortgage Data Act requirements and FHFA and the CFPB are in process of developing, the National Mortgage Database, the first fully representative national sample of the flow of U.S. mortgage supply. These will enable the ongoing collection of data on the characteristics of individual mortgages, including those eligible for purchase by Fannie Mae and Freddie Mac and those that are not, and including subprime and nontraditional mortgages. The NMDB data are merged with HMDA data to identify borrower characteristics and property value.

In addition, Nakamura (2010) describes a proposal to track financial institution credit risk exposure, through a macro-micro database using the Federal Reserve's Flow of Funds framework to link to the financial assets and liabilities of all U.S. parties (including households, nonprofits, firms, governments, and the rest-of-the-world). The macro side of the database would summarize aggregate data on nominal quantities of financial instruments and the identities of debtors and current asset holders, using individual firm entity identifiers through a Legal Entity Identifier. This could be connected to micro-database satellite accounts that could be linked to individual mortgages through unique loan identifiers. The database could be linked to the National Registry proposal suggested by Heller and Whitman, which with a reporting requirement on information on all first and additional liens and also with loan characteristics, and property values, could be used to produce a "national scorecard" combining bank and securitized

lending, as well as measures of credit exposure for financial entities which is necessary for regulatory oversight.

Combined with data from servicers on loan performance, these data could support studies of the changing risks of instruments. With information on interest and fees charged, the data could support pricing analysis that would bring financial, economic, and econometric theory to bear on the determination of potential systemic risk; enable regulators to observe counterparty risk and to undertake regular systemic stress testing informed by property sector risk. These databases could be used to increase transparency of institutional portfolios as well as to detect buildups of systemic risk outside the regulated financial system, given mandatory reporting requirements. Eventually, public versions of the datasets could be made available to engage the broader academic and industry research community in systemic risk analysis. However the ability to use such data to monitor securitization markets will be constrained by the underlying complexity of mortgage instruments, securities, and derivatives themselves, thus there needs to be attention to the underlying securitization standards as well.

Beyond the data, might there be the potential to structure markets so that market risk could be traded? When prices are out of line, macro-prudential policy to contain credit has recently been instituted in several countries, and in the U.S. and elsewhere, stress tests that consider house price vulnerability are in place. Beyond these new regulatory stances, are there market based mechanisms that could be brought to bear in the mispricing episodes? If the problem at base is a lack of financial derivatives or other market--based instruments to sell short overpriced real estate, is there a potential role for derivatives to signal mispricing and weigh against the market? The common fundamental of mispriced real estate and the absence of a short

sell instrument suggest that securitization or derivatives could be structured to trade credit risk (Shiller 2012).

Current efforts to do this include an innovative credit risk transfer mechanism, which can reveal current market pricing of risk, as well as several initiatives to gather data, to better inform markets. GSEs are now reporting the characteristics of their insured loans, and, in a new development, they are each offering credit linked notes (CLN) in a form of credit risk transfer. The CLNs are structured to hedge the GSEs against the loss arising from default and the price of the note is linked to the expected performance of insured mortgages, thus providing information on the market perception of the risk of the GSEs pool of loans and the appropriate level of the g-fee, as well.

At the heart of the housing boom and bust was a lack of transparency. In the build up to the crisis, market participants did not have enough information to identify the risk generated by the institutions that were most exposed to this risk. Had market participants been able to monitor the mortgages owned by these and other institutions, credit may not have flowed so amply and so cheaply--and capital markets might not have seized so abruptly when the information finally came to the surface. Nonetheless, there are two caveats to the widespread reliance on such risk transfer instruments. First it is global risk, not just GSE risk that will determine the fragility of the system, thus GSE insured mortgage transparency is not sufficient. Second, with a system wide shock, private capital is likely to flee, if there is time to do so. And given the serial correlation in housing finance and real estate markets, there is likely to be both ability to predict future declines and consequences for system stability of a run from risk. While potentially important for price discovery, CLNs do not substitute for the provision of equity capital.

6. Conclusion

With the demise of private label residential securitization and the conservatorships of Fannie Mae and Freddie Mac, there is both an opportunity and a necessity to rethink principles of securitization to promote systemic stability. Establishing a means to monitor and limit credit risk is critical to the restructuring of securitization markets and the return of private capital. This paper identifies features of the US mortgage market that accentuate the information barriers across financial intermediaries, investors and regulators, reinforcing the potential for underpricing risk and regulatory failures.

The structure of the pre-crisis securitization market systemic led to default risk that was not discovered nor properly priced. As lending standards declined and credit risk grew, surging housing prices limited current defaults, thus veiling the growing threat. Data on the overall level of leverage in the mortgage market and institutions' exposure to housing markets were not readily available. Securitization markets shrouded rather than revealed information on the mounting risk and the focus was on interest rate risk rather than credit risk.

The incomplete nature of real estate markets, due to high transaction costs and lack of short selling mechanisms, is well established. Securitization markets have the potential to inform and complete rather than destabilize markets. For this outcome, markets must be structured to provide incentives to market actors to monitor credit risk and a framework for regulatory responsibilities must be in place for the development, collection and use of data to monitor systemic risk. Expanded HMDA disclosure requirements set to go into effect in January of 2018 and the new National Mortgage Database will increase transparency. Nonetheless resolution of information issues requires attention to the structure and regulatory framework of the U.S. housing finance system.

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[1] Academics as well as policy makers focused on interest rate risk rather than credit risk as a source of systematic instability. See Wachter (forthcoming)

[2] See Herring and Wachter (1999) for the role of optimists in setting real estate prices. Although publicly traded companies do provide a means to short sell real estate, they do so imperfectly since their valuations do not only reflect real estate prices. Other attempts at creating indices to short sell real estate have not succeeded in part due to the heterogeneity of real estate.

[3] The fundamental value is the price that is equal to the discounted present value of the net income that can be generated.

[4] See Wachter (2015) for a discussion of the comparative financing of the bubbles in US and Europe. Financial institutions increased their leverage in Europe through on portfolio covered bonds.

[5] The cooperative would coordinate a mutual loss pool acting as a reserve to cover mortgage default losses. Members would contribute to the mutual loss pool based on equity capital and volume of mortgages securitized.