An Agent-Based Model of the Interaction between the Housing and RMBS Markets

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Abstract

Although many elements of the recent financial crisis are understood (e.g., the bursting of the housing bubble, a liquidity shortfall, a run on certain types of securities), the precise causes of the crisis is a matter of considerable debate. In this paper, I present an agent-based model that can be used to study the effect of the creation of asset-backed securities on the housing market. In this model, households move, purchase loans, refinance, and possibly default. Meanwhile, banks package these loans as mortgage back securities, which they sell to asset traders. These traders attempt to optimize the return on a portfolio of mortgage backed securities and a riskless asset (e.g., a 10 year treasury note). This model can reproduce some of the stylized facts of the crisis, such as the creation of a housing bubble and its eventual bursting, the use of mortgage backed securities causing an increase in the number of loans issued—including “predatory” adjustable rate mortgages—and the prevalence of cash out refinancing causing home owners to be highly leveraged. This model provides a basis for untangling the events leading to the financial crisis in 2008.
1. Introduction

The financial crisis that began in 2007 wrought havoc on the United States economy. In October of 2008, the Dow Jones Industrial Average fell by almost 20% in one week, and by March 2009 it had lost over 50% of its value from before the crisis. Unemployment, which rested at below 5% as late as March 2008 rose to over 10% by January of 2010 (BLS 2010). Although these events might have come as a surprise to most Americans, it is now known that the crisis had in fact begun in 2007 with the subprime mortgage crisis and the bursting of the housing bubble.

Although many elements of the crisis are understood—the bursting of the housing bubble, a liquidity shortfall, a run on certain types of securities, etc.—both the precise causes of the crisis and similarly what could have been done to prevent the crisis are matters of considerable debate. Moreover, as far as I know, no model used in the economic profession has been able to produce behavior similar to what was observed during the crisis. In fact, the FRB/US dynamic stochastic general equilibrium model used by the Federal Reserve predicted only a 0.25% decrease in GDP given a disruption in the housing sector similar to the one that set off the crisis (Economist 2009). In this paper, I present a design of an agent-based model that can reproduce some of the stylized facts of the financial crisis. Furthermore, this model can form a basis for the exploration of the origin of the crisis.

Without using simulation models, economists have provided a number of hypotheses on the crisis’s origin. One hypothesis blames the practice of banks securitizing mortgage loans and selling these securities to investors. This practice lowered banks’ incentives to price loan risk because banks no longer bore most of this risk. Furthermore, investors who bought the securities were too far removed from the loan origination to price the risk (see e.g., Ashcraft and Schuman 2008 who list this and other incentive problems with subprime origination, such as the principal agent problem between investors and asset managers). This hypothesis might be referred to as the “originate to distribute” hypothesis because it centers on the practice of originating loans to sell them as securities (i.e., distribute). A competing hypothesis argues that originate to distribute works in sectors other than subprime mortgages, and hence, it is the subprime mortgages that are the culprit, not the practice of securitization. Specifically, subprime loans were given to borrowers on terms that were too onerous for borrowers in the absence of house price appreciation and refinance. When house prices stopped appreciating, people started defaulting. When it was revealed to investors through futures indices that it was common knowledge that everyone thought subprime loans were poor investments, a run on securities that might be backed by subprime loans ensued (Gorton 2008). Finally, a third hypothesis blames the crisis on lack of regulation of the shadowing banking sector. Specifically, non-bank financial entities that trade in securities and commercial paper were not backed by government guarantees,
such as the FDIC, or a lender of last resort, such as the Fed discount window. Proponents of this hypothesis see the financial crisis as similar to banking panics that occurred before the institution of federal deposit insurance (Pozsar et al. 2010). A variation of this hypothesis blames financial institution’s engaging in regulatory arbitrage to get around capital requirements. They did this by selling loans to off balance sheet entities, even though these entities were in the end backstopped by the bank. The off balance sheet entities could take on much higher leverage than the bank would have been allowed based on regulations, even though these entities implicitly affected the financial viability of banks.

In this paper, I describe an agent-based model aimed at testing these hypotheses. Although the model certainly needs more work before it can provide compelling evidence to any side of debate, it already shows promise in uncovering the nature of the dynamics that caused the financial crisis. This model, which I describe more fully in section three, models both the residential mortgage market and contains a simple model of the mortgage backed securities market. I first show that the model can reproduce some empirical facts of the financial crisis, such as a housing bubble, defaults on subprime loans in the absence of house price appreciation, and increased loan origination when banks can create securities and sell these securities to investors. Before describing the model’s logic, I review related literature in section two. After laying out the model’s logic in section three, I present some results of model runs in the fourth section. In the fifth section, I describe the elements that need to be added to the model for it to be adequate for analysis of the financial crisis. Section six concludes.

2. Related Literature

By now, there has been an extensive literature describing the origins of the 2007-2008 financial crisis. Notably, Gorton (2008) provides a thorough description of how mortgages get packaged and then sliced up into asset backed securities (ABSes), how ABSes get further packaged and sliced into collateralized debt obligations (CDOs), and the types of entities involved in the chain from mortgage origination to investment in CDOs. He also provides a hypothesis, described in the previous section, of the cause of the financial crisis as being specific to the nature of subprime loans and the sudden revelation of negative investor sentiment about these products to all investors. Pozsar et al. (2010) provide a thorough description of the shadow banking system and its role in the crisis. Khadani et al. (2009) describe how low interest rates, rising home prices, and easy money led people to continually build up leverage through cash-out refinancing—which they term the “ratchet effect.” The ratchet effect led to systemic risk as many homeowners became highly leveraged. When interest rates increased, causing a drop in home prices, the only mechanism available to households to deleverage was default. Archer and Smith (2010) analyze defaults and give the two leading causes as a high (greater than one) loan to value
ratio and a high ratio of monthly mortgage payment to income. They also show that during times of house price appreciation, lenders typically relax standards on lending, increasing the size of housing bubbles and the negative effects of the bursting of these bubbles.

There is also a large literature base in economics on the effects, and to a lesser extent, the causes of financial crises. Bernanke et al. (1996) famously describe the credit channel effect through which disruptions in the financial sector can affect the real economy by restricting credit to firms that most need it. The model I present currently does not focus on the real economy so I do not build off of Bernanke et al.’s idea, but it is a rich avenue for future exploration. Geanakoplos (2009) describes the "leverage cycle," in which the most optimistic buyers of an asset drive prices up during boom times. These traders become heavily leveraged in order to buy the asset, and as long as the asset’s price is rising, these traders will gain more wealth and further drive the asset price up. Once the asset price goes too high and optimism wanes, the price starts falling and the optimistic traders lose wealth. The asset falls more and more into the hands of pessimistic traders further driving down its price. The cycle, which Geanakoplos terms the leverage cycle, exacerbates price cycles in assets. The leverage cycle mechanism in which asset booms become inherently unstable due to excess leverage is similar to the theme in Minsky (1986). Finally, there is also a large literature on financial crises. See especially Reinhart and Rogoff’s (2008) panoramic study of financial crises covering 66 countries and dating back to the 14th century for some countries.

In building an agent-based model to capture many of these insights, there were a number of sources from which I could draw. Delli Gatti et al. (2010) provide one of the best published macroeconomic models. The authors model the interactions between firms, banks, and individuals and are able to produce business cycles, typified by sustainable growth, followed by leveraged growth, followed by bankruptcies, and finally a consolidation of positions. There are many agent-based models of financial markets, such as Lux (1998), LeBaron (2001), and Alfarano and Lux (2007) to name a few. These models typically contain agents that price a risky security using some heuristic procedure, such as reinforcement or imitative learning. Additionally, there have been a few agent-based models of the financial crisis already published. For example, Markose et al. (2010) presented a paper using an agent-based model to shed light on the systemic risk caused by credit default swaps (CDSes).

3. Model Logic

In this section, I describe the algorithms that compose the financial crisis model I built for this study. Because I was most interested in investigating how the crisis was triggered, I left out elements of the real economy that would be necessary to understand the crisis’s
impact. Therefore, the only agents in the model are households, investors, a central bank, and financial institutions\textsuperscript{1}. The model also contains other objects, such as houses, loans, residential mortgage backed securities (RMBSes), and RMBS shares. I stepped the model using a one month timestep in which each timestep followed the basic process enumerated below:

1. Households activate sequentially in random order. A household receives income, and performs one of more of the following behavior: pays mortgage or rent, defaults, lists its house for sale, buys a new house, and refinances. The precise algorithm that the households follow is described later in this section. During household activation, households interact with financial institutions when applying for loans, paying loans, and defaulting.
2. Next, financial institutions package new loans into RMBSes.
3. Investors purchase shares in these RMBSes. Investors track the profitability of RMBS shares versus shares in a riskless asset, and place share bids based on this valuation.
4. Accounting is done for the turn. Financial institutions collect money from loans. They pay out to investors holding RMBS shares (described in more detail below) and determine how much cash they have for the next time step to lend.
5. The central bank updates its rate, and the financial institutions use this rate to update their fixed rate loan rate, ARM period one rate, and ARM period two rate for the next timestep.

Figure 1 describes the basic flow of one time step for a household. On the previous time step, the household might have decided it should look for a house (for example, its house sold last timestep or its lease is now up). If the household is trying to buy house, the household randomly samples some number of houses for sale (in the nominal parameterization I used, this number was ten) and sorts them from highest to lowest quality. The quality of each house is assigned from a Pareto distribution at the beginning of the simulation. Price is highly correlated with quality, and therefore in general, a household tries first to purchase the most expensive house in its random sample. A household applies for a mortgage to some number of financial institutions (two in the nominal case) for the first house on its list. If the household’s loan application is approved by one or both institutions, the household chooses the loan with the best terms—always preferring fixed rate over ARM loans. If no financial institution approved a loan for the household, the household proceeds down its list to the next house. If a house was not bought by the end of this list, the household signs a new rental lease.

\textsuperscript{1} Financial institutions are essentially banks, but because I rolled up a number of functions such as origination and loan warehousing into one entity, I was really modeling a financial holding company rather than a bank
If the household currently owns a home, the household decides if it can make its monthly payment. The household skips a payment if the loan to value ratio (value is determined as the house’s quality times the house price index) of its mortgage is above some threshold (1.2 nominally), or if the household’s income plus savings is less than the monthly payment, or the monthly payment is significantly higher than the household’s income (1.5 times income in the nominal case). Note that “income” actually represents income minus all non-mortgage related expenditures. In fact, the model variable is called “incomeForHouse.” The household default decision follows from Archer and Smith (2010) who give the two main causes of default as high loan to value ratio and high payment to income ratio. If a household skips a payment, it stops paying its mortgage forever, but does not get kicked out of its house for a number of months (24 months in the nominal case). The quality of the house is cut significantly by this default (cut in half nominally), and ownership reverts to the lending institution once the household is kicked out of its house.

If the household does not decide to default, it pays its mortgage. The household has the option to list its house for sale. The list price the household chooses equals the house’s quality times the current house price index times some markup (1.05 in the nominal case). Every few months that the house is listed and not sold, its price is reduced slowly. When the house is sold, the household tries to buy a house next period (sets trying to buy to true). If the household does not decide to list its house for sale, the household might try to
refinance. The household tries to refinance if either the household believes it can get a significantly lower interest rate or its house has appreciated in value significantly, such that the household wants to cash out this increase.

The loan approval process for refinancing is similar to the one for buying a house and graphically displayed in Figure 2. A financial institution begins by determining the value of the house, which will be the loan’s collateral. If the house is being sold, the sale price is considered to be the house’s value. If the loan application is for refinancing, the home value is appraised to be the house’s quality times the house price index. This house price index is computed similar to the Case-Shiller index (Case-Shiller 2010) and is based on the price difference between sequential purchases of the same house. A financial institution only approves fixed rate loans for households who make a 20% down payment and whose income (that is, income for house payments) is reasonably more than the mortgage’s monthly payment (10% more nominally). If a household does not meet these criteria, the financial institution considers an ARM loan, which requires no down payment. ARMs are structured as 2/28 mortgages with the first period rate being about 1% less than the fixed rate mortgage rate, and the second period rate being pegged to about 3% more than the current fixed rate mortgage rate, updated every six months. The current fixed rate mortgage rate is of course updated every month based on movements in the central bank’s rate. A financial institution approves a household for an ARM loan if the household can make payments on the initial fixed rate (and has a 10% income cushion). Note that there will be many households who meet the ARM criteria who will not be able to make payments during the adjustable period, triggering a refinance attempt. Of course, if home values have depreciated enough or interest rates increased enough, the household will not be able to refinance and will have to default.
After all households have completed processing, financial institutions take new loans and package them into RMBSes\(^2\). The structure of an RMBS is shown in Figure 3 based on the parameterization I used in my analyses (e.g., 80/20 split of senior to junior tranche, etc.). All loans in an RMBS loan pool are new loans on which no payments have been made and all are owned by the same financial institution. Each RMBS contains only two tranches, a senior tranche and a junior tranche. Each tranche is then divided into a number of shares. The shares represent claims on payment from the underlying mortgages. All shares in a particular tranche have the same priority of payment, but all shares in the senior tranche have priority over the junior tranche. Specifically, if up to 20% of the mortgages default, shares in the senior tranche are unaffected and still receive principal and interest payments. However, the value of junior tranche shares reduces as these shares absorb losses from defaults. Note that to make up for the increased risk, junior tranche shares are paid a higher interest rate than senior tranche shares. In this model, the financial institution keeps all junior tranche shares and sells senior tranche shares to investors. The financial institution also builds in a rate spread of 0.0075% of the value of the loans (that is, not all the interest payments on loans are given to owners of RMBS shares). This spread is used to make up for defaults and paid out to shares if interest payments are not paid on loans, but kept by the financial institution as profit if loans are paid on time.

\(^2\)The model abstracts away lots of detail of how mortgage backed securities end up in investor portfolios. Not only do I skip some steps, such as loan warehousing, RMBS warehousing, CDO creation (and possibly CDO\(^2\) and further creation), wholesale funding of security purchase, etc., I also made the RMBSes themselves very simple. I believe this abstraction makes the coding challenge tractable while keeping the essential features of mortgage backed securitization.
Next, financial institutions attempt to sell senior tranche shares to investors. Investors have the option of buying tranche shares or a riskless asset whose one period return is equal to about 8 basis points less than the Central bank’s rate (the equivalent of 100 basis points less annually). Investors keep track of the profitability of both types of assets each month. Specifically, the realized rate of return on RMBS shares for an investor is:

\[
\frac{\text{Interest Payments} + \text{Principal Payments} - \text{Reduction in Underlying RMBS Principal}}{\text{Last Month's RMBS Principal}}
\]

In other words, principal payments cancel out since they affect both sides of the minus sign in the numerator. Therefore, gross profits each month on RMBS shares equal interest payments minus principal lost to defaults. Gross profits are divided by the total amount of principal invested to determine a rate of return. Each investor has a memory length (from 4 to 15 months distributed uniformly in the nominal case) over which the investor computes an average realized rate of return for RMBS shares. Each investor also keeps track of the average riskless return rate in the same manner. An investor values $1 of a RMBS share’s principal at the following value:

\[
\left( \frac{1 + \text{Realized RMBS Return Rate}}{1 + \text{Riskless Return Rate}} \right)^{\text{Memory Length}}
\]
The first equation suggests that, in times of rising house prices and low interest rates, RMBS shares will be profitable since they return a higher interest rate than the riskless asset and do not suffer many defaults. However, in times of high default, the return on RMBS share investment drops precipitously. The second equation suggests that during housing downturns investors will value RMBS shares much less than during housing booms.

The financial market for RMBS shares is quite basic in this model. Investors bid on shares made available by financial institutions based on investors’ valuations of RMBS shares. Financial institutions sell shares at the bid prices, selling first to investors who bid the most. Investors who buy shares hold them until they mature, and unsold senior tranche shares are kept by the financial institution and not put up for sale on subsequent timesteps. Investors buy as many shares as they have money to buy and are available (with priority of purchase being determined by bid). The main influence the RMBS market has on the model is quickly freeing up assets of financial institutions to be used to make more loans. In future versions of the model, the RMBS market will drive financial institution lending standards. As demand increases for RMBS shares, financial institutions will be more willing to make loans and might need to approve loans to less qualified applicants to meet demand for RMBS shares.

After the RMBS market completes, financial institutions iterate through the mortgages they service and collect principal and interest payments. These payments are paid out to RMBS shareholders. Next, financial institutions calculate how much cash they can use for loans next time step. First, a financial institution determines its total number of assets, which equals its cash plus its unpacked loans (i.e., those not packaged in an RMBS) plus its owned RMBS shares plus the houses it owns through defaults. A financial institution is required to keep cash reserves equal to a certain percentage of its risky assets (loans, houses, and RMBS shares). Any cash owned above this requirement is available for loans next time step.

Finally, at the end of the time step, the central bank sets its interest rate to a new rate. The model can do this either via a random walk or update the rate based on an input file. For the model runs analyzed in the next section, I used an input file corresponding to the United States Fed Funds Rate from January 1980 through October 2010. Banks then set their rates based on this rate plus some markup (e.g., 2% plus some small noise value for fixed rate loans).

4. Preliminary Model Results

Although this model still needs a more mature RMBS market to really test hypotheses regarding the start of the financial crisis, it is still useful to understand what the current
model shows. I ran the model with 10000 households, 9000 houses (note that renters do not actually occupy a house), 10 financial companies, and 1000 investors. Initial house prices (i.e., when the house price index = 1.0) were Pareto distributed with a minimum value of $175,000 and a Pareto exponent of 2.0. Household income and wealth were also both Pareto distributed. The minimum income for housing was $1000 per month, and the Pareto exponent was 1.5 (note that households making less than this value were considered not part of the housing market). The wealth distribution was parameterized with a minimum value of $18,000 and Pareto exponent of 0.85. These distributions are meant to match stylized facts of housing price, income, and wealth distribution. When the model becomes more mature, I would like to match these more precisely to real data.

The first stylized fact about the crisis I wanted to replicate is the housing bubble. Specifically, I would like to see if the model produces a large spike in housing prices as the central bank rate nears zero; similarly, the house prices should drop sharply when the interest rate increases. Figure 4 graphs the interest rate (fed rate and average financial institution rate for fixed rate loans) in the top panel, and the house price index in the bottom panel. Recall that the central bank rate was based on the United States Fed Funds Rate time series from January 1980 to October 2010. Also, recall that the house price index is computed, similar to the Case-Shiller index, using the change in sale price in subsequent sales of the same house. As can be seen in Figure 4, house prices do in fact spike as the interest rate declines. Over a 4 year period (roughly timestep 274, corresponding to mid 2002, to 313, corresponding to early 2006), the house price index increases from around 1.0 to over 2.0. In actuality, a similarly large increase occurred in the Case-Shiller index, but the increase started in 1997 (notice that the model run produces an increase around that time as well, but then this mini bubble bursts before the larger bubble occurs). Once interest rates start increasing, the index decreases about 25 to 30%, similar to how the actual Case-Shiller index behaved.
Next, I was interested to see how investors valued RMBS shares. Figure 5 plots the riskless asset interest rate (blue line) versus the investor realized RMBS return rate (red line), both smoothed over several months and both reporting annualized return rates. The green line measures the difference between the two lines. Recall that the riskless asset return rate is pegged to 100 basis points below the central bank rate on an annualized basis and so
declines with the central bank rate for most of the simulation. The RMBS share return rate is correlated with both the central bank rate (because the central bank rate is ultimately correlated with mortgage rates) and the frequency of default of the underlying mortgages. For much of the simulation, the RMBS shares perform better than the riskless asset until the housing bubble pops near the end of the simulation, and RMBS shares provide a negative rate of return. Note that RMBSes packaged both prime and subprime loans in the same RMBS, better insulating senior tranche holders from subprime defaults than was the case during the actual crisis. A future version of the model will create RMBSes solely from subprime loans to understand how this practice affected the RMBS market.

![Investor Realized RMBS and Riskless Rates](image)

Figure 5 Rates of return for RMBS shares and a riskless asset. The blue line represents the riskless interest rate investors face (smoothed over a few months). The red line represents the realized rate of return that investors received on RMBS shares. The green line measures the difference in the two lines.

Thirdly, I wanted to investigate the effect of the RMBS market on financial institutions. Therefore, I ran the model both with and without the RMBS market. In the case of no RMBS market, financial institutions simply hold mortgages in their portfolio rather than creating asset backed securities out of them. I wanted to understand how the RMBS market affected financial institutions' ability to lend. I ran the model one hundred times for each case and compared the average number of houses sold per simulation for each case. I found, as expected, that the housing market is more liquid in the case with an RMBS market. Specifically, about 33% more houses were sold in the model runs which included an RMBS market. Similarly, financial institutions approved about 60% more loans—both for home purchases and refinancing—to homeowners in the RMBS simulations. Finally, the average household leverage, as measured by debt to income ratio, was almost 70% higher (0.144 versus 0.085) in the simulations with an RMBS market.
This result, while in some sense intuitive, is not altogether obvious. Consider that in the RMBS case, some of the default risk is placed on investors, mitigating the effects of default on financial institutions. Similarly, some of the gains in loans are captured by investors in the RMBS case, mitigating the lender profit in times with low defaults. In the non-RMBS case, financial institutions’ fortunes are more closely tied to homeowners’ fortunes. It might seem that this would produce larger house price bubbles since the financial institutions asset sheets grow faster in good times when they are not sharing profit with investors. However, this asset buildup is in illiquid mortgage loans, whereas in the RMBS case, financial institutions are able to turn mortgages into liquid assets quickly, supporting issuances of new loans. This mechanism is dominant in fueling housing bubbles. See, for example, in Figure 6 where the house price index in the non-RMBS case grows to only a little more than 1.4 rather than above 2 in the RMBS case.

![House Price Index](image)

Figure 6 House Price Index without RMBS market.

Hence, the model seems to suggest that the RMBS market causes the housing market and financial institutions lending in this market to be less stable. This result matches many hypotheses regarding the cause of the financial crisis. On the other hand, the mechanism
that caused these large bubbles is not—as some have suggested—a decrease in lending standards due to an adverse selection problem emanating from the relationship between investors and financial institutions. Instead, it is that securitization provides financial institutions ready access to liquid assets to fuel more lending. This increases the magnitude of booms and busts is a mechanism similar to Geanakoplos’s (2009) leverage cycle. However, two main shortcomings of the model—the unsophisticated RMBS market and the fact that financial institutions do not borrow money, somewhat altering the affect that changes in central bank rates have on the banking sector—make any conclusions from these results hard to draw.

5. Discussion

In this paper, I presented a model of the financial crisis linking the housing market and the RMBS market. This model, I believe, contains many of the essential features needed to study the causes of the financial crisis. Moreover, even in its initial state it matches some stylized facts of the crisis well. However, there are clearly a number of elements that need to be added to the model. In this section, I will discuss some of them.

First, as noted several times, the RMBS market is too simplistic. Investors simply spend all their money buying RMBS shares, which are priced only based on the valuations investors have for RMBSes and the principal value of the underlying mortgages. These securities are not traded in subsequent timesteps. However, there are ample models to draw on in agent-based finance for constructing a more realistic model. For example, LeBaron (2001) provides a nice structure for agents building a portfolio of a risky and riskless asset. Although it might be desirable to use a different specification for agent’s expectations than was used in that paper (e.g., such as the one in Hoffman et al. (2007) or Alfarano and Lux (2007)), the LeBaron setup could be used.

Secondly, another major concern is that financial institutions lend all money from cash. Therefore, if the central bank’s interest rate increases, there is really no reason for financial institutions to increase their rates since they do not borrow at the central bank rate. However, since financial institutions do raise their rates in the model, they simply make more money when the interest rates are higher and less when interest rates are lower. This has the effect of applying counter pressure to a financial crisis. When interest rates increase and households default, financial institutions make the money back through increased profit from those higher interest loans that homeowners do repay. This dynamic can be remedied by a more detailed representation of financial institution’s processes.

Thirdly, there is no change in lending standards throughout the model. Archer and Smith (2010) report that mortgage lending standards decreased during the buildup of the
housing bubble. Similarly, many have used this idea as part of their hypotheses for the causes of the financial crisis, especially the proponents of the “originate to distribute” hypothesis. To remedy this, lending standards should depend on the likelihood that a loan can be profitably sold as an RMBS, which in turn might depend on investors’ expectations of RMBS performance, which, as shown in Figure 5, increases during the bubble.

Fourthly, once these improvements are in place, it will be important to increase the similarity of the model’s input data with reality. That is, house values, income, wealth, and financial institution size should have roughly correct distributions versus actual data. Moreover, the relative number and size of these agents should be in the right proportions. There are doubtless other parameters that will need to be researched and based on real data, such as various factors that influence lending, refinance, and default decisions.

Finally, it is still an open question to me whether the real economy is important to include in this model. Clearly, if the purpose is to understand how havoc in the financial sector could double unemployment, the real economy would be essential. Of course, explaining the effects on the real economy is a long term goal of this research, but it is not a short term goal. The short term goal is to determine how it could be the case a 30% decline in house prices could cause over $1 trillion dollar losses to the financial sector. It is not obvious to me if the real economy is involved in that process.

6. Conclusion

The model in this paper provides promise in shedding light on the causes of the financial crisis that began in 2007. It links the housing market to the RMBS market and attempts to explain how a drop in house price could lead to huge losses in investor wealth. Currently, the model produces some stylized facts of the crisis, but clearly needs more work. As the model improves, it will be interesting to see which hypothesis regarding the origins of the crisis is most supported by the model’s behavior.

6. Works Cited


