

**The Proliferation of Mortgage-Backed Securities and the Imminent Recession of  
2008**

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4/29/30

IBUS 173-10

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## **Introduction**

The imminent recession of 2008 will be far more severe than economic downturns recently experienced. The recent “dot-com” bust and the succeeding terrorist attacks of 9/11 courted a recession relatively isolated in nature, exposing a mere contingent of anxious venture capitalists and greedy investment banks. An activist Fed, helmed by Greenspan, prescribed a series of aggressive interest rate cuts to unprecedented lows, in order to foster economic growth and preserve American consumer confidence for a short while longer. Historically low interest rates triggered a housing construction boom, resulting in a myriad of reckless financial innovations designed to afford the high credit risk, or subprime borrowers with a home furnished on credit, which was to be financed by the continual growth of the housing market. Moreover, mortgage lenders coaxed credit-worthy homeowners to amend their fixed rate mortgages to an adjustable rate mortgage (ARM), creating a new stash of cash or presenting an opportunity to upgrade houses. Additionally, appraised residential real estate values continued to climb, creating a perceived increase in net worth for homeowners, leading to more spending based on home equity and other forms of credit. As housing demand lapsed, a glut in housing inventories emerged, and prices began to fall. Incidentally, the subprime borrowers began to default on their loans and foreclosures ensued, resulting in further declines in relative housing markets. However, as of 2008, the subprime market comprises 20.6% (\$1.4 trillion) of outstanding mortgage loans, whereas subprime and prime (ARM)’s constitute 21.3% (\$1.34 trillion) of outstanding mortgages<sup>1</sup>. Now, a series of adjustable rate mortgages are beginning to reset. The magnitude of the looming recession had yet to be realized, as it involves not only the consumer, but the entire housing industry, and local, commercial and investment banks as well. Like a brewing “economic storm”, all of the aforementioned elements are just beginning to converge.

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<sup>1</sup> "Delinquencies and Foreclosures Increase in Latest MBA National Delinquency Survey."

At the end of the day, the performance of the economy is contingent upon the welfare of the American consumer, as private consumption represents roughly two-thirds of the Gross Domestic Product<sup>2</sup>. Accordingly, if consumers sustain a blow, so too will the economy. A consumer drowning in unanticipated mortgage payments, while shouldering massive credit debt with limited access to additional credit, will be forced to either dump the house on the market, or hunker down and weather the payments. Ultimately, the consumer will cut discretionary spending.

Upon examining the American real estate sector within the historical context of home financing and the evolution of home mortgage securitization, relating correlations between the trends in mortgage financing and the housing construction boom, cooperatively reveal a more systemic, macroeconomic problem-the proliferation of mortgage-backed securities, which enable a “debtor nation”.

### **The Evolution of the American Mortgage**

American homeowners may elect to pay a mortgage through a number of financial manifolds. A homeowner may pay a fixed or variable rate, offering negotiable terms, rates and periods, affording home equity borrowing and lending opportunities. Examples include, selecting rates of interest between term application and actual purchase of the home; choosing the time at which the rate resets, or “choos[ing] the term and amortization period [and even] prepay[ing] freely”<sup>3</sup>. Today, the characteristics of the typical American mortgage include a span of 15 or 30 years, under the more popular fixed rate, as adjustable rate mortgages (ARM)’s,

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<sup>3</sup> Green, Richard K., and Susan M. Wachter. P. 94

originating in the 1980s, comprise less than 25% of the market in the last decade<sup>4</sup>. However, the American mortgage has dramatically evolved throughout the course of the last century.

Approximately 60 years ago, a structured mortgage for the typical household comprised roughly 20% of disposable income and 15% of domestic assets, and rose to 46% and 15% in 1979, respectively; by 2001 mortgage debt represented 73% of household income and 15% of assets<sup>5</sup>. Throughout the last 60 years, mortgage debt as a percentage of GDP has increased six fold (See “Mortgage Percentage of GDP” on Appendix 1). Several federal agencies, such as Fannie Mae, Ginnie Mae and Freddie Mac, ushered the rise in total mortgage debt outstanding throughout the last century.

In the early 20<sup>th</sup> century, a mortgage instrument was designed for a short-term period of about 5 to 10 years<sup>6</sup>. Irrevocably, the Great Depression transformed the American mortgage. In response to the number of foreclosures resulting from staggering declines in property values, the federal government commissioned the Federal National Mortgage Association (FNMA), known later as “Fannie Mae”, replacing a dissolved Home Owner’s Loan Corporation (HOLC), to “[abet] a secondary market in FHA mortgages...issu[ing] bonds for purchasing mortgages at part, so that investors in affluent communities could invest with confidence in mortgages in communities with local capital”<sup>7</sup>. Originally, Fannie Mae intended to “only hold mortgages that it bought largely from banks”<sup>8</sup>.

After World War II, the ensuing “baby-boom” fostered an era of economic prosperity driven by rapidly increasing homeownership, facilitated by increasing incomes, along with a “new institution of the long-term (and therefore affordable) fixed rate, self-amortizing mortgages” financed by commercial banks, savings and loans, backed by the Federal Deposit

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<sup>4</sup> Green, Richard K., and Susan M. Wachter. P. 93

<sup>5</sup> Green, Richard K., and Susan M. Wachter. P. 93

<sup>6</sup> Green, Richard K., and Susan M. Wachter. P. 94

<sup>7</sup> Green, Richard K., and Susan M. Wachter. P. 97

<sup>8</sup> Frame, W. Scott, and Lawrence J. White. P. 161

Insurance Agency (FDIC), guaranteeing 5 to 6% mortgage payments<sup>9</sup>. However, in the late 1960s, yesterday's Fannie Mae buckled when the U.S. Treasury yield rose above 4%, resulting in massive outflows of savings and loans, creating a "shortage of funds of mortgage borrowers"<sup>10</sup>. Consequently, in 1968, Fannie Mae split into two divisions: the Government National Mortgage Association (GNMA), or Ginnie Mae and the new Fannie Mae. Ginnie Mae, a non-publicly traded entity, teamed with the Department of Housing and Development (HUD) to guarantee "mortgage backed securities that have as their underlying assets residential mortgages that are insured primarily by the Federal Housing Agency (FHA) or Department of Veterans Affairs", while the new Fannie was converted into a corporation, listing public shares on the New York Stock Exchange, and permitted to "buy and sell-non government backed mortgages to raise additional funds for mortgages"<sup>1112</sup>. Essentially, Ginnie Mae was created as an insurer, maintaining liquidity for government supported mortgages and guaranteeing payment of the principle and interest from approved issuers, such as mortgage bankers, savings and loans, and commercial banks<sup>13</sup>. On the other hand, the new quasi-private, Fannie Mae screens for approved mortgages that can be bundled in mortgage-backed securities (MBS) and traded on the open market, usually purchased by institutional investors<sup>14</sup>. Later in the 1970s, Congress created another publicly traded entity, Freddie Mac, to "securitize mortgages issued by savings and loans"<sup>15</sup>. Basically, both Freddie Mac and Fannie Mae provide "insurance to holders of mortgage backed securities against default risk on the underlying mortgages and are thus bearing the risk themselves"<sup>16</sup>. Explaining further, mortgage originators introduce "pools of mortgages and either swap these assets for securities or sell them outright to one of the two companies

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<sup>9</sup> Green, Richard K., and Susan M. Wachter. P. 97

<sup>10</sup> Green, Richard K., and Susan M. Wachter. P. 97

<sup>11</sup> Frame, W. Scott, and Lawrence J. White. P. 161

<sup>12</sup> Green, Richard K., and Susan M. Wachter. P. 98

<sup>13</sup> "Ginnie Mae"

<sup>14</sup> "Fannie Mae"

<sup>15</sup> Green, Richard K., and Susan M. Wachter. P. 98

<sup>16</sup> Frame, W. Scott, and Lawrence J. White. P. 160

[Fannie Mae or Freddie Mac]... exchang[ing] a mortgage pool for a mortgage backed security that is issued and guaranteed by one of the two companies that represents an interest pool...”, and in return, [Fannie Mae or Freddie Mac] guarantee security holders receipt of a “timely payment”<sup>17</sup>. The publicly traded Fannie Mae and Freddie Mac enjoy federally mandated benefits, which include: exemption from state and local taxes; an obligation to sell up \$2.25 billion dollars in securities to the Secretary of the Treasury (each); permission to issue “government securities” which are “eligible for use a collateral for public deposits, for purchase by the Federal Reserve in open market operations, and for the unlimited investment by federally insured depository institutions”<sup>18</sup>. In concert, Ginnie Mae, Fannie Mae and Freddie Mac promote liquidity in a safely insured secondary market, through mortgage securitization, in order to guarantee mortgage-lending efficiency. The inception of these federally commissioned housing agencies along with the advent of innovative financial instruments, like (MBS), cultivated a rich market landscape, encouraging increased home mortgaging. Examination of Fannie Mae and Freddie Mac and (MBS) development throughout the 20<sup>th</sup> century is now appropriate.

### **The Proliferation of Mortgage-Backed Securities**

(MBS)’s are “so called pass-through securities, which are new types of bonds whose investors retain ownership interest in the collateralized assets...[of] home mortgage loans”<sup>19</sup>. In 1980 the number of (MBS)’s outstanding for Fannie Mae and Freddie Mac was \$0 and \$1.1 billion, respectively; in 1985 the number of outstanding (MBS)’s grew to \$54.6 billion and \$99.9

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<sup>17</sup> Frame, W. Scott, and Lawrence J. White. P. 167

<sup>18</sup> Frame, W. Scott, and Lawrence J. White. P. 163

<sup>19</sup> Park, Yoon S. P. 3

billion; in 1990, total (MBS) was \$288.1 billion and \$316.4 billion, respectively<sup>20</sup>. Clearly, (MBS) flourished during the 1980s. (MBS) maintained steady growth throughout the nineties and by 2003, MBS positions grew to \$1.3 billion and \$7.7 billion respectively (See “Fannie Mae and Freddie Mac Assets and Mortgage Backed Securities in the Mortgage Market on Appendix 2)<sup>21</sup>. The proliferation of (MBS) began with Ginnie Mae pioneering the first “pass-through” mortgage backed securities, which “created a claim on an underlying pool of residential mortgages and meant that security holders had the right to receive the interest and principal repayments of the pool as a whole”<sup>22</sup>. Essentially, the MBS holders equally own, or share, the entire collateralized asset and entitled to the same interest payment. (MBS)’s greatly expanded the mortgage market as a number of institutional investors could now provide more financing for more home mortgages, as risk could be diversified when allocating mortgage payment cash flows among investors accordingly. Consequently, the number of mortgage holders increased nearly 17 fold from 1970 to 2000 (See “Holders of Single Family Residential Mortgages” on Appendix 3). Furthermore, at the end of 2006, (MBS) consisted \$7 trillion of the outstanding \$9 trillion in securitized debt<sup>23</sup>.

Then, in 1984, Fannie Mae devised a new mortgage financing instrument, known as the Collateralized Mortgage Obligation or (CMO). (CMO)’s are composed of “a series of sequential pay bonds or tranches created from a pool of fixed-rate mortgages or generic mortgage backed securities”<sup>24</sup>. In essence, the payments are collected in tranches of the collateralized pool of assets, or home mortgage payments, effectively serving as a hedging instrument. (CMO)’s were created in response to the “uncertain maturities of generic MBSs [made] them unattractive to potential investors...[as] the uncertain maturities because mortgagors may call, or prepay, their

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<sup>20</sup> Frame, W. Scott, and Lawrence J. White. P. 162

<sup>21</sup> Frame, W. Scott, and Lawrence J. White. P. 162

<sup>22</sup> Frame, W. Scott, and Lawrence J. White. P. 167

<sup>23</sup> Park, Yoon S. P. 4

<sup>24</sup> McConnell, John J., and Manoj Singh. P. 692



loans at any time without penalty”<sup>25</sup>. The (CMO) derives value from “so called pay-through securities where the investors of these securities do not have any ownership interest in the loan collaterals but their new securities [which] are serviced by the cash flows generated by the collateral assets”<sup>26</sup>. Effectively, (CMO)’s restructure cash flows from the mortgage pool, catering to “specific clienteles of investors with different maturity preferences”<sup>27</sup>. Accordingly, (CMO)’s can be “issued in different tranches categorized by the degree of risk exposure, with [the] safest tranche accorded with highest credit rating of triple-A, and the lowest tranche, known as the “toxic materials” being normally unrated due to its high credit risk but instead carrying high debt yields”<sup>28</sup>. Typically, mutual funds, insurance companies and hedge funds invest in (CMO)’s. Of the total outstanding \$9 trillion in securitized debt as of 2006, (CMO)’s represented roughly \$2.1 trillion dollars.

**Hence, it is now sufficient to deem the proliferation asset-backed securitization as the catalyst responsible for increasing the magnitude of outstanding American consumer debt.** The tremendous growth in (MBS) and (CMO) required creative financing techniques that would ostensibly increase consumption, creating more streams of total outstanding debt payments, which would therefore expand the market of asset-backed securities. In order to increase the number of securities, the flood gates of credit swung wide open, allowing average consumers to purchase an asset they couldn’t ordinarily afford, on borrowed money, that would earn interest payments; asset backed securities are serviced by these payments. The “democratization of credit”, or the aggressive issuance of credit, would ultimately lead to increased “consumption”. Relaxing access to credit would ultimately lead to even more lucrative debt securitizations, such as credit, automobile and student loans. Concordantly, irregular trends

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<sup>25</sup> McConnell, John J., and Manoj Singh. P. 693

<sup>26</sup> Park, Yoon S. P. 4

<sup>27</sup> McConnell, John J., and Manoj Singh. P. 693

<sup>28</sup> Park, Yoon S. P. 4

within the mortgage and real estate construction sectors should be examined along side the growth of (MBS) and (CMO).

### **Financial Trends and Mortgage-Backed Securities**

In the early 1980s, federal regulators amended a previous rule and permitted depository institutions to originate (ARM)'s, which at the time was a unique method of mortgage payment<sup>29</sup>. Such depository institutions anticipated increasing nominal rates of interest and were thus concerned with the risk involved with lending at the fixed rate<sup>30</sup>. Lenders were concerned about the possibility of increased interest rates, that would translate into higher mortgage costs or rates, resulting in a decline of fixed rate mortgage applications and new ownership during the 1980s. The (ARM) was designed for enduring such "tough times" of high interest rates. As economists during the 1980s were projecting "massive and variable inflation for years to come"<sup>31</sup>, many homeowners elected to amend a fixed rate mortgage for an (ARM) in order to weather the forecasted turbulence in interest rates, avoiding enormous fixed rate payments (a fixed mortgage rate is usually 300 basis points above the Federal funds rate). In fact, in 1986 -1987 and 1992-1993 marked the two largest re-financing cycles between 1980 and 2000 (See "Re-Financing Cycles" on Appendix 4). Consequently, in 1986, the (ARM)'s increased from 30% of outstanding loans to 60% of outstanding loans in 1988. Interestingly, in 1984, the newly devised (CMO) began operation as (ARM)'s became more prevalent. As mentioned earlier, (CMO)'s derive their value from the cash flows generated by the collateral pool. Furthermore, it has been established that the greater the prepayment risk of a specific

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<sup>29</sup> Frame, W. Scott, and Lawrence J. White. P. 165

<sup>30</sup> Green, Richard K., and Susan M. Wachter. P.99

<sup>31</sup> Green, Richard K., and Susan M. Wachter. P. 99

(CMO) tranche, the value of the tranche becomes more sensitive to changes in interest rates<sup>32</sup>. Thus, if analysts, during the early 1980s, forecasted massive and variable inflation and therefore a more risky financial environment, the creation of the (CMO) would serve as an ingenious hedging instrument to combat market risk, serving investors' varying degrees of risk aversion. As reiterated, (MBS) grew tremendously during the 1980s, and proved to be extremely lucrative. It wasn't before long until the rapid securitization of all possible assets increased during the 1990s of not just mortgages, but construction, housing, automobile and student loans as well.

### **Attending Trends in the Real Estate Market**

The 1986-1987 market cycles demonstrate appropriate and responsible re-financing of home mortgages in response to a tumultuous economic environment. (MBS) underwriters benefit from the volume of refinanced mortgages, as a new mortgage is created in lieu of the previous mortgages, effectively creating a new, longer stream of payments for (MBS)'s. Recognizing this, (MBS) underwriters have contributed to a recent development in re-financing, particularly with (ARM)'s, creating a disturbing trend in home mortgaging: "accessing the ATM of home equity". Homeowners will now re-finance when "in periods of relatively low interest rates, the household would refinance to receive a lower stream of mortgage payments and consequently receive an increase in lifetime wealth..." and to "access accumulated home equity"<sup>33</sup>. As demonstrated, all forms of (MBS) appear to be extremely lucrative, as the number outstanding securities surged throughout the 1980s. Thus, it would be sufficient to infer that if such securities are so lucrative, asset backed security underwriters would seek to increase the number of securities outstanding.

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<sup>32</sup> McConnell, John J., and Manoj Singh. P. 709

<sup>33</sup> Hurst, Erik, and Frank Stafford. P. 986

*Trends in Adjustable Rate Mortgages*

The only way to increase asset-backed securities, is to increase the amount of outstanding debt, or mortgages in this case. This was achieved by relaxing the financial qualifications required to obtain a mortgage, which will be discussed later in this paper. Additionally, construction of more housing would provide opportunities for even more mortgages, for the qualified and the marginally qualified; this will also be addressed later in this paper. Alternatively, another method to create additional (MBS)'s is to re-finance existing mortgages. If interest rates were increasing, or relatively "too high" for re-financing a fixed mortgage, a mortgage owner may be tempted by a teaser rate of "no money down" attached with a mortgage reset period beginning in two to three years through the use of an (ARM). Homebuyers who opt for the (ARM) are able to obtain "more house for less money because [the] (ARM) provides the opportunity to take advantage of lower introductory interest rates, homeowners have access to larger loan amounts under conventional eligibility ratios, and (ARM)'s offer potential savings over [fixed rate mortgages] if interest rates do not increase"<sup>34</sup>. Appropriately, (ARM) purchases have generally declined except for five time periods, which include: 1987, 1988, 1994, 1999 and 2000<sup>35</sup>. Correspondingly, the Fed funds rate on January 1, 2000 was 5.5%, which would translate to a prime rate of 8.5%- a steep mortgage payment if a homeowner committed to a fixed rate at that point in time. On the other hand, an adjustable rate would be more suitable, if anticipating interest rate cuts (eventually cut to 1.00% by January 1, 2004) especially if no money down was required for the first two years<sup>36</sup>. As a result many chose to pay an (ARM),

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<sup>34</sup> Finke, Michael, Sandra Huston, Emilian Siman, and Mel Corlija. P. 18

<sup>35</sup> Finke, Michael, Sandra Huston, Emilian Siman, and Mel Corlija. P. 18

<sup>36</sup> "Fed Funds Target."

and in 2003 (ARM)'s accounted for 19% of mortgage obligations<sup>37</sup>. As indicated, to date, (ARM)'s represent 21.34% of outstanding loans, or \$1.34 trillion. Originating in the last decade, the onslaught of predatory lending to people who do not necessarily realize what payments may be when the (ARM) resets will court an economic catastrophe in the near future. According to a recent report on cnmmoney.com, a record number of hybrid adjustable rate mortgages, amounting to roughly \$362 billion, are scheduled to reset in 2008. Therefore, these homeowners may be forced to default on their payment, as many may not prepared for the steep mortgage payment increase. If the homeowner defaults, the presiding bank will foreclose, depressing neighboring housing values. As (MBS)'s benefited from newly re-financed (ARM)'s, it was at the expense of a misguided, American consumer, which will contribute to the burst of the proverbial housing bubble, leading to a perception of decreased net worth, as the ability to re-finance and access home equity is no longer possible. Similarly, the high credit risk, or subprime borrower is a victim of the same circumstance.

### *Trends in Subprime Mortgages*

As stated earlier, mortgage underwriters were motivated to circumvent the regulatory approvals required to grant an applicant with a mortgage, in order to increase the number of outstanding mortgages, and therefore the increased number of (MBS)'s. Consequently, in the mid 1990s, mortgage lenders relaxed some of the financial qualifications required to obtain a mortgage, allowing high credit risk, or subprime, applicants a home loan at a higher rate of interest to compensate default risk<sup>38</sup>. Subsequently, the rate of homeownership soared from 64% in 1995, to an all time high of 69% in 2004<sup>39</sup>. A subprime borrower exhibited the following

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<sup>37</sup> Finke, Michael, Sandra Huston, Emilian Siman, and Mel Corlija. P. 18

<sup>38</sup> Utt, Ronald D.

<sup>39</sup> Utt, Ronald D.

characteristics “recent payment delinquencies; foreclosure or repossession charge-off within prior two years; bankruptcy within the last 5 years; and a limited ability to cover living expenses after debts (a debt/income ration of 50% or more). Lenders were now eager to get anyone and everyone into a house, and the recent construction boom of the last decade assisted this attempt (See “U.S. Residential Construction Jobs vs. Housing Starts and Completions” on Appendix 5). Lenders explained to the high credit risk borrower, who could barely afford a home, that the continuing growth in the housing market would finance the house, and, as housing values would increase, the owner could borrow against the accrued equity and pay off the outstanding debt. However, the housing values reached a critical mass, as housing inventories, or supply, outnumbered demand (See “Increase in Total Real Estate” on Appendix 6). Incidentally, the subprime borrowers, who could barely afford to make payments, began to default on their loan, and foreclosures ensued, depressing the value of neighboring houses. Although the subprime borrower was usually coaxed into an existing home, the increased construction of new homes attracted many existing homeowners to upgrade or move houses. This was made possible by a boom in housing construction, which deserves analysis.

### *Trends in Housing Construction*

On January 1, 2001, Greenspan’s fed began cutting interest rates in order to stimulate the economy. The aftermath of 9/11 courted a recession, and interest rates were aggressively cut to 2.00% by the year-end to accelerate a recovery<sup>40</sup>. Such historically low interest rates triggered a housing construction boom that reached an all time high in January 2006<sup>41</sup>. During 2001, construction spending rose increased 3%, while gross domestic product fell by 0.5%<sup>42</sup>. In the

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<sup>40</sup> "Fed Funds Target."

<sup>41</sup> "U.S. Residential Construction Jobs vs. Housing Starts and Completions."

<sup>42</sup> Zhou, Wei-Xing, and Didier Sornette. P. 2

same period, home equity gained about \$1.7 trillion, which Greenspan explained was the result of “low mortgage rates, immigration, and shortages of buildable land in some areas”<sup>43</sup>. This boom led to an oversupply of homes that was tremendously overvalued. U.S. housing prices increased by 6.9% in 2002, and 38.3% in the last 5 years. According to analysts, there are a few factors that explain the previously expanding real estate bubble; one, “housing demand increased faster than supply because something has changed to make housing more desirable than previously, as people could be wealthier and decide to spend some of that wealth on housing, mortgage rates could have fallen” or “a larger population could be of home-buying age”<sup>44</sup>. As indicated by analysts, something did make home ownership more attractive: easier access to mortgage lending. Although mortgage lenders reasoned that a housing market continuing to climb could essentially finance homes for those who could barely afford a mortgage, they did not realize that real estate prices were based on “irrational exuberance”. The excess supply of housing inventories, induced by historically low interest rates, only compounded further declines in the real estate market caused by (ARM) and subprime mortgage defaults, as the housing inventories immensely outnumbered demand. All of this was influenced by asset backed securities, like (MBS)’s and (CMO)’s. At the end of the day, it was all about greed.

## **Conclusion**

After examining the American real estate sector within the historical context of home financing and the evolution of the home mortgage securitization, relating correlations between the trends in mortgage financing the housing construction boom, a more systemic

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<sup>43</sup> Zhou, Wei-Xing, and Didier Sornette. P. 10

<sup>44</sup> Labonte, Marc. P. 1

macroeconomic problem was revealed-the proliferation of the asset backed securities, which enables a “debtor nation”.

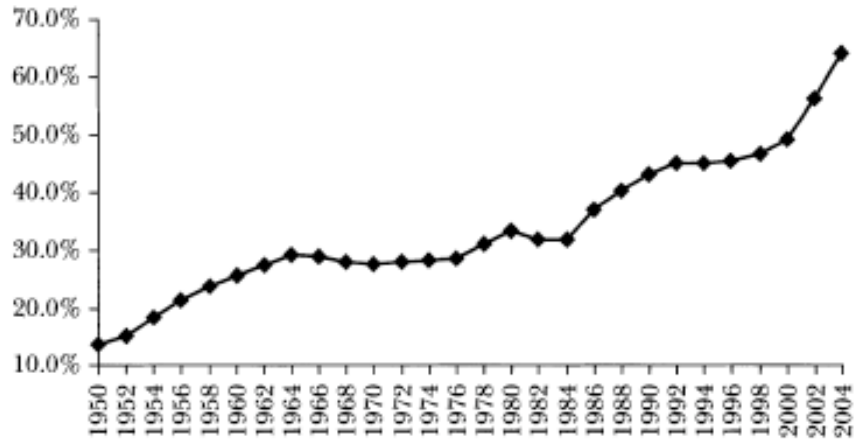


## Appendix-1

### *Mortgage Debt Percentage of GDP*

*Figure 1*

#### **Mortgage Debt as Percentage of GDP**



Source: GDP data are from (<http://www.bea.gov/bea/dn/gdplev.xls>). Mortgage debt data are from (<http://www.federalreserve.gov/releases/>).

Source: Green, Richard K., and Susan M. Wachter. "The American Mortgage in Historical and International Context." **The Journal of Economic Perspectives** 19(2008).

## Appendix 2

### *Fannie Mae and Freddie Mac Assets and Mortgage-Backed Securities in the Mortgage Market*

#### **Fannie Mae and Freddie Mac Assets and Mortgage-Backed Securities and the Mortgage Market**

*(in billions of dollars, includes single- and multi-family mortgages)*

Year	Fannie Mae			Freddie Mac			Total nonfarm, residential mortgages
	Total assets	Retained mortgage portfolio <sup>a</sup>	Mortgage-backed securities outstanding <sup>b</sup>	Total assets	Retained mortgage portfolio <sup>a</sup>	Mortgage-backed securities outstanding <sup>b</sup>	
1980	\$ 57.9	\$ 55.6	\$ 0.0	\$ 5.5	\$ 5.0	\$ 17.0	\$1,105
1985	99.1	94.1	54.6	16.6	13.5	99.9	1,730
1990	133.1	114.1	288.1	40.6	21.5	316.4	2,907
1995	316.6	252.9	513.2	137.2	107.7	459.0	3,745
2000	675.2	607.7	706.7	459.3	385.5	576.1	5,543
2001	799.9	706.8	859.0	641.1	503.8	653.1	6,110
2002	887.5	801.1	1,029.5	752.2	589.9	749.3	6,842
2003	1,009.6	901.9	1,300.2	803.4	660.4	768.9	7,715

<sup>a</sup> Includes repurchased mortgage-backed securities.

<sup>b</sup> Excludes mortgage-backed securities that are held in portfolio.

Sources: OFHEO, Federal Reserve, Freddie Mac.

Source: Frame, W. Scott, and Lawrence J. White. "Fussing and Fuming over Fannie and Freddie: How Much Smoke, How Much Fire?" **Journal of Economic Perspectives** 19(2005):

## Appendix 3

### *Holders of Single-Family Residential Mortgages*

#### **Holders of Single-Family Residential Mortgages (Credit Exposures), 1970–2000**

	1970	1975	1980	1985	1990	1995	2000
<b>Total (\$ Billion)</b>	<b>297.8</b>	<b>482.0</b>	<b>966.2</b>	<b>1523.5</b>	<b>2619.9</b>	<b>3478.2</b>	<b>5205.4</b>
Banks & thrifts	210.0	351.8	647.4	765.5	1030.5	1128.9	1559.9
Commercial banks	42.9	77.8	160.1	211.2	430.3	646.5	965.6
Thrifts	167.1	274.0	487.3	554.3	600.2	482.4	594.2
Fannie Mae & Freddie Mac	15.2	31.8	69.1	257.3	713.1	1285.5	2020.0
Fannie Mae	15.2	25.8	51.8	145.9	385.5	733.4	1160.5
Freddie Mac	0.0	5.9	17.3	111.4	327.6	552.1	859.5
Ginnie Mae	3.3	22.3	92.3	206.7	391.5	461.4	592.6
All others (residual)	69.4	76.2	157.5	294.0	484.8	602.4	1032.9
<b>% Distribution</b>							
Banks & thrifts	70.5%	73.0%	67.0%	50.2%	39.3%	32.5%	30.0%
Commercial banks	14.4%	16.1%	16.6%	13.9%	16.4%	18.6%	18.6%
Thrifts	56.1%	56.8%	50.4%	36.4%	22.9%	13.9%	11.4%
Fannie Mae & Freddie Mac	5.1%	6.6%	7.2%	16.9%	27.2%	37.0%	38.8%
Fannie Mae	5.1%	5.4%	5.4%	9.6%	14.7%	21.1%	22.3%
Freddie Mac	0.0%	1.2%	1.8%	7.3%	12.5%	15.9%	16.5%
Ginnie Mae	1.1%	4.6%	9.6%	13.6%	14.9%	13.3%	11.4%
All others	23.3%	15.8%	16.3%	19.3%	18.5%	17.3%	19.8%

*Note:* This table indicates who owns single-family residential mortgages (and excludes any holdings of mortgage-backed securities); in essence, it indicates who bears the credit risks on mortgages.

*Source:* Federal Reserve, Fannie Mae.

Source: Frame, W. Scott, and Lawrence J. White. "Fussing and Fuming over Fannie and Freddie: How Much Smoke, How Much Fire?" **Journal of Economic Perspectives** 19(2005).

## Appendix 4

### *Re-Financing Cycles*

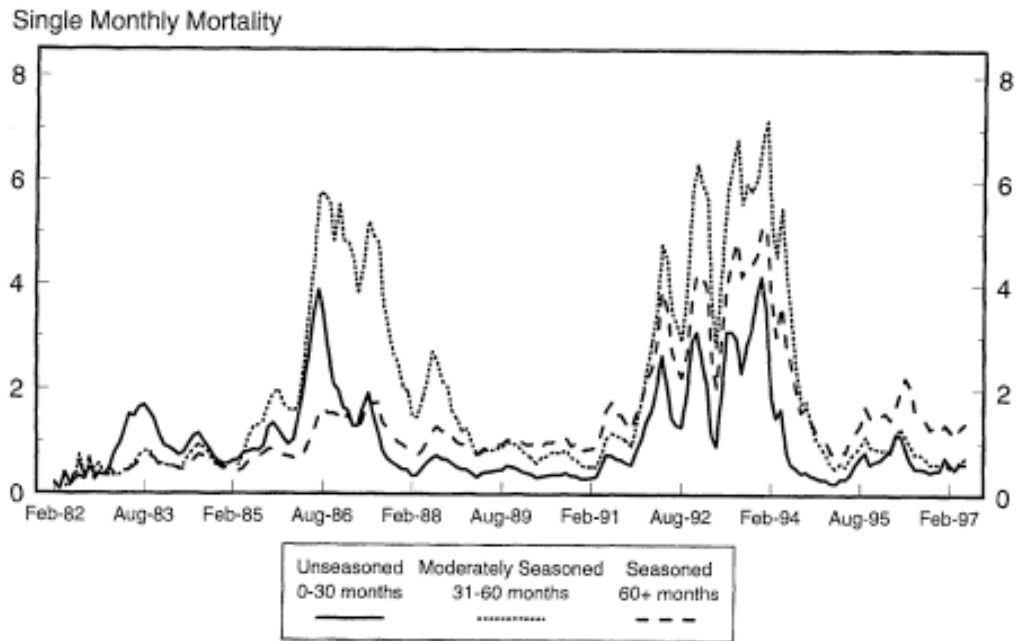
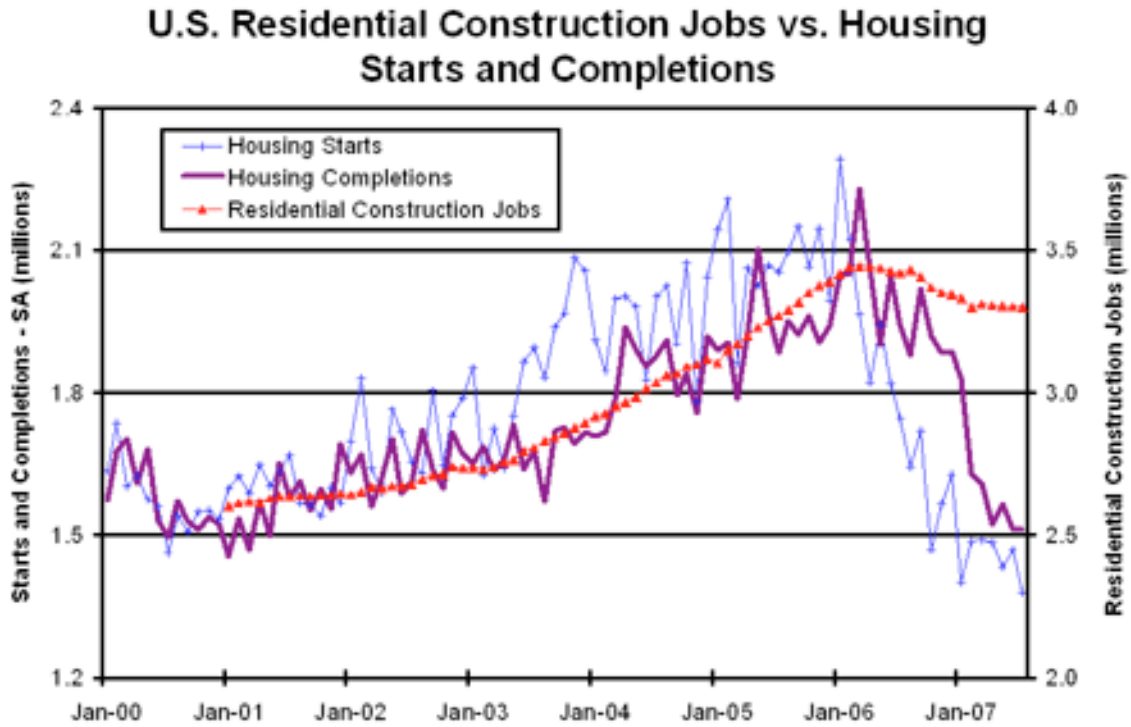


FIG. 1. Prepayment Speeds on FNMA Securities Backed by Thirty-Year Fixed Rate Mortgages

Source: Bennett, Paul, Richard Peach, and Stavros Peristiani. "Structural Change in the Mortgage Market and the Propensity to Refinance." *Journal of Money, Credit and Banking* 33(2001).

## Appendix 5

### *U.S. Residential Construction Jobs vs. Housing Starts and Completions*

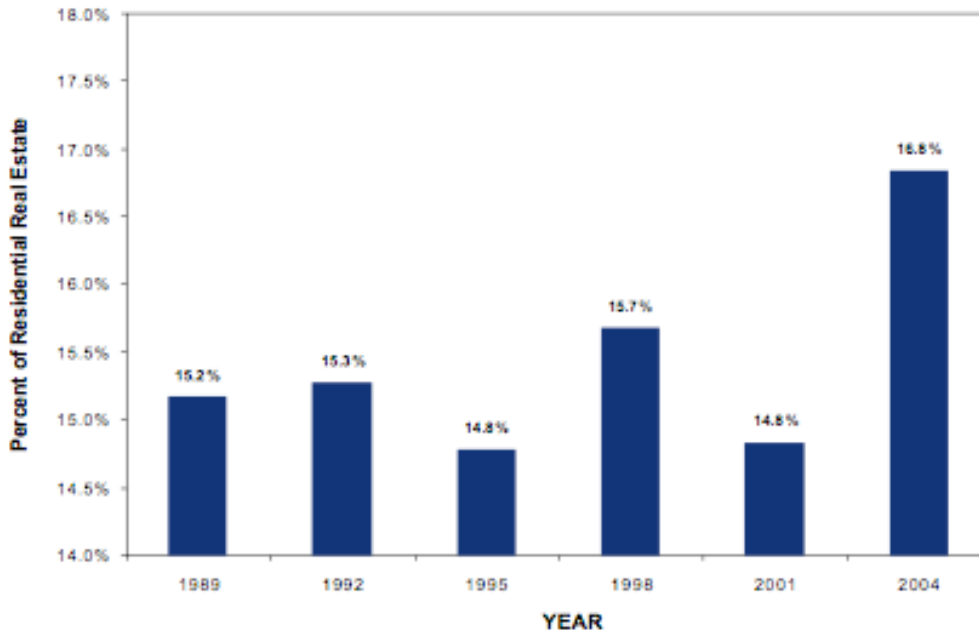


Source: "U.S. Residential Construction Jobs vs. Housing Starts and Completions." qualityinfo.org. 23 April 2008. Oregon Employment Department. 23 April 2008.

## Appendix 6

### *Increase in Total Residential Real Estate*

**Figure 7—Other Residential Real Estate as Share of Total Residential Real Estate**



*Notes: Calculations based on BOG (2006b).*

Source: “The End of the Great Housing Boom”. Center for American Progress, 2006.

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