

PART

One

Causes of the Financial Crisis of 2007–2009

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There is almost universal agreement that the fundamental cause of the financial crisis was the combination of a credit boom and a housing bubble. It is much less clear, however, why this combination led to such a severe crisis.

The common view is that the crisis was due to the originate-to-distribute model of securitization, which led to lower-quality loans being miraculously transformed into highly rated securities by the rating agencies. To some extent, this characterization is unfortunately true. That is:

- There was a tremendous growth in subprime loans. Many of these loans were highly risky and only possible due to the clever creation of products like 2/28 and 3/27 adjustable rate mortgages (ARMs).
- Moreover, this growth in subprime lending was only possible due to the ability of securitization to pass on the credit risk of loans faced by the lender to the end user investor in asset-backed securities (ABSs).
- The end user was willing to invest only because the rating agencies had rubber-stamped a large portion of these securities as AAA by creating a chain of complex structured products.

Chapter 1, “Mortgage Origination and Securitization in the Financial Crisis,” looks at these issues in detail and lays out principles and proposals for future regulation. Of course, while this chapter focuses on the mortgage market and—in particular—on subprime loans, the discussion holds more generally. There was a plethora of cheap loans made throughout the economy, and many of the same issues of deteriorating loan quality are at play in these other markets. Credit card debt, car loans, “covenant-lite” corporate bonds, and leveraged loans for leveraged buyout (LBO) transactions were all trading at historically low spreads over risk-free bonds. Like the past fate of the subprime market, many of these loans are now facing increasing default rates. For example, default rates on credit card debts may rise to 10 percent in 2009, which is double the 5 percent average of the past 10 years. Car loan delinquencies are on the rise, and financial economists (e.g., NYU Stern School’s Edward Altman) forecast corporate bond delinquencies to double from around 4 percent in 2008 to 8.5 to 9 percent in 2009. The same argument made in Chapter 1 that an increase in securitization reduced screening and monitoring efforts for the lenders in the mortgage market could be made in these other markets as well.

The subprime market, however, has one unique feature relative to these other credit markets. The loans were unwittingly structured to be systemic in nature. To understand this point, note that the majority of subprime loans were structured as hybrid 2/28 or 3/27 ARMs. These loans offered a fixed teaser rate for the first few years (i.e., two or three years) and then adjustable rates thereafter, with a large enough spread to cause a significant jump in the rate. By design, therefore, these mortgages were intended to default in a few years or to be refinanced assuming that the collateral value (i.e., the house price) increased. Because these mortgages were all set around the same time, mortgage lenders had inadvertently created an environment that would lead to either a systemic wave of refinancings or one of defaults.

The growth in structured products across Wall Street during this period was staggering. While residential mortgage-related products were certainly a large component, so too were asset-backed securities using commercial mortgages, leveraged loans, corporate bonds, student loans, and so forth. For example, according to Asset-Backed Alert, securitization worldwide went from \$767 billion at the end of 2001 to \$1.4 trillion in 2004 to \$2.7 trillion at the peak of the bubble in December 2006. It has fallen dramatically over the past few years, with the drop being over 60 percent from the third quarter of 2007 to the third quarter of 2008. A common feature of most of these structures was that the rating agencies sanctioned the products (and their credit risk) by providing ratings for the different tranches within these

securities. It is very clear that the greatest demand for these products came through the creation of the AAA-rated tranches that would appeal to a host of potential investors. Since the rating agencies described the tranche ratings as comparable to other rating classes, their role in this process cannot be overlooked. To this end, Chapter 3, “The Rating Agencies: Is Regulation the Answer?” describes the history of how the rating agencies were formed, their role in the current crisis, and suggestions with respect to future regulation.

Nevertheless, we believe that, although the originate-to-distribute model of securitization and the rating agencies were clearly important factors, the financial crisis occurred because financial institutions did not follow the business model of securitization. Rather than acting as intermediaries by transferring the risk from mortgage lenders to capital market investors, these institutions themselves took on this investment role. But unlike a typical pension fund, fixed income mutual fund, or sovereign wealth fund, financial firms are highly levered institutions. Given regulatory oversight, how did the major financial firms manage to do this, and perhaps more important, why did they do it?

Chapter 2, “How Banks Played the Leverage Game,” addresses the former question. Specifically, in order to stretch their capital requirements, commercial banks set up off-balance-sheet asset-backed commercial paper (ABCP) conduits and structured investment vehicles (SIVs), where they transferred some of the assets they would have otherwise held on their books. ABCPs and SIVs were funded with small amounts of equity and the rolling over of short-term debt. These conduits had credit enhancements that were recourse back to the banks. Investment banks, however, did not have to be so clever. Following the investment banks’ request in the spring of 2004, in August of that year the SEC amended the net capital rule of the Securities Exchange Act of 1934. This amendment effectively allowed the investment banks to lever up, albeit with potentially more scrutiny by the SEC.

With now much higher leverage ratios, financial firms had to address the likely increase in their value at risk. The firms found relief by switching away from loans into investments in the form of AAA-rated tranches of collateralized debt obligations (CDOs) and collateralized loan obligations (CLOs). These highly rated CDOs and CLOs had a significantly lower capital charge. In fact, about 30 percent of all AAA asset-backed securities remained *within* the banking system, and if one includes ABCP conduits and SIVs that had recourse, this fraction rises to 50 percent.

Why asset-backed securities? At the peak of the housing bubble in June 2006, AAA-rated subprime CDOs offered twice the premium on the typical AAA credit default swap of a corporation. Therefore, financial firms would be earning a higher premium most of the time; by construction, losses would

occur only if the AAA tranche of the CDO got hit. If this rare event occurred, however, it would almost surely be a systemic shock affecting all markets. In effect, financial firms were writing a large number of deeply out-of-the-money put options on the housing market. Of course, the problem with writing huge amounts of systemic insurance like this is that the firms cannot make good when it counts—hence, the financial crisis.

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CHAPTER 1

Mortgage Origination and Securitization in the Financial Crisis

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1.1 INTRODUCTION: THE U.S. MORTGAGE MARKET

There are three main types of mortgages: fixed rate mortgages (FRMs), adjustable rate mortgages (ARMs), and hybrids. ARMs have an adjusting interest rate tied to an index, whereas hybrids typically offer a fixed rate for a prespecified number of years before the rate becomes adjustable for the remainder of the loan. Mortgage loans fall into two categories, prime and nonprime. We discuss each category in turn.

Prime Mortgages

There are three main types of prime mortgages. Loans that conform to the guidelines used by Fannie Mae and Freddie Mac for buying loans are known as conforming loans. The guidelines include a loan limit, currently \$417,000 for one-family loans, and underwriting criteria on credit score (FICO score), combined loan-to-value ratio and debt-to-income ratio. Loans that roughly conform to all the guidelines for a conforming loan except the loan limit are known as jumbo loans. The interest rate charged on jumbo mortgage loans is generally higher than that charged on conforming loans, most likely due to the slightly higher cost of securitizing such loans without the implicit government guarantee that backs conforming-loan mortgage-backed securities (MBSs). The third type of prime mortgages is FHA/VA

loans. FHA loans are insured by the Federal Housing Administration (FHA) and may be issued by federally qualified lenders. The FHA primarily serves people who cannot afford a conventional down payment or otherwise do not qualify for private mortgage insurance. VA loans are guaranteed by the Department of Veterans Affairs and are available to veterans and military personnel. FHA/VA loans are also regarded as conforming loans.

Nonprime Mortgages

There are three main types of nonprime mortgages. Although there is no standardized definition, subprime loans are usually classified in the United States as those where the borrower has a credit (FICO) score below a particular level and whose rate is much higher than that for prime loans. Alt-A loans are considered riskier than prime loans but less risky than subprime loans. Alt-A borrowers pay higher rates than prime borrowers but much lower rates than subprime borrowers. With an Alt-A loan, the borrower's credit score is not quite high enough for a conforming loan, or the borrower has not fully documented his or her application, or there is something a little out of the ordinary with the deal. Lender criteria for Alt-A vary, with credit score requirements being the most common area of variance. Finally, a home equity loan (HEL) or home equity line of credit (HELOC) is typically a second-lien loan. A HELOC loan differs from a conventional mortgage loan in that the borrower is not advanced the entire sum up front, but uses a line of credit to borrow sums that total no more than the agreed amount, similar to a credit card and usually with an adjustable rate. In contrast, a HEL is a one-time lump-sum loan, often with a fixed interest rate.

Securitization

Securitization in the mortgage market involves the pooling of mortgages into mortgage-backed securities (MBSs) in which the holder of these securities is entitled to some fraction of all the interest and principal paid out by the portfolio of loans. Some of these securities are straight pass-throughs, while others are collateralized mortgage obligations (CMOs) or collateralized debt obligations (CDOs) in which the pools are tranching and cash flows get paid out according to some priority structure. The size of the residential mortgage market in the United States is well over \$10 trillion, with over 55 percent of it being securitized. Interestingly, after explosive growth in the 1980s with the development of mortgage-backed pass-throughs and CMOs, the fraction of securitization has held relatively constant since the early 1990s, hovering between 50 percent and 60 percent.

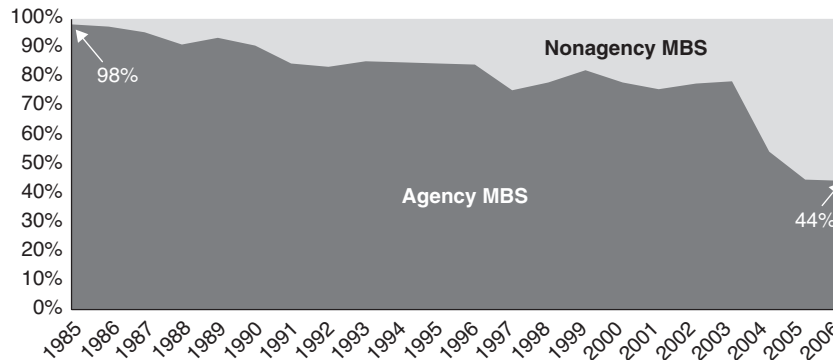


FIGURE 1.1 Nonagency Securitized Mortgage Issuance, 1985–2006

This chart presents the percentage of securitization issuance coming from nonagency mortgage-backed securities (MBSs). Nonagency MBSs include private-label jumbo, Alt-A, and mortgage-related ABSs.

Source: FDIC, UBS, PIMCO.

Government-sponsored enterprises (GSEs) purchase and securitize mortgages. While GSEs are privately funded, their government sponsorship implies a presumption that their guarantor function is fully backed by the U.S. government. There are three GSEs: the Federal National Mortgage Association (Fannie Mae); the Federal Home Loan Mortgage Corporation (Freddie Mac); and the Federal Home Loan Bank (FHLB) system consisting of 12 regional banks. The contribution of the GSEs to securitization of mortgages is startling. In the early 1980s, agency MBSs represented approximately 50 percent of the securitized market, by 1992 a 64 percent share, and by 2002 a 73 percent share.

However, after 2002, the mortgage market and, in particular, the securitization market changed dramatically, with nonagency MBSs representing 15 percent in 2003, 23 percent in 2004, 31 percent in 2005, and 32 percent in 2006 of the total securities outstanding. In fact, in terms of new issuance of MBSs, the share of nonagency securitization was for the first time larger than that of agency-backed securitization, reaching 56 percent in 2006. A considerable portion of this issuance consisted of subprime and Alt-A loans. Figure 1.1 illustrates these points.

1.2 SOME SALIENT FACTS

In this section, we describe some of the important characteristics of the mortgage market and securitization of this market over the period 2001 to 2007.

The Mortgage Market

There has been enormous growth in nonprime mortgages. Table 1.1 reports data on the size of the U.S. mortgage market from 2001 to 2006. Nonprime mortgage originations (subprime, Alt-A, and HELOCs) were more than \$1 trillion annually in 2004, 2005, and 2006. They rose as a share of total originations from 14 percent in 2001 to 48 percent in 2006. Many of these subprime loans were adjustable rate loans, due to be reset in the period 2007–2009, which may be part of the reason for the foreclosure crisis.

The quality of mortgages has declined considerably over the past five years. From 2002 to 2006, loan-to-value ratios increased dramatically in all three major loan categories (prime, Alt-A, and subprime), while the prevalence of loans with full documentation decreased dramatically. At the same time, debt-to-income ratios increased dramatically only for prime loans, while FICO scores were largely unaffected in all major loan categories. The following numbers are taken from Zimmerman (2007) and the data source is Loan Performance data.

- There has been substantial growth in the average *combined loan-to-value* (CLTV) ratio of loans in all three major loan categories. For prime ARMs, this ratio has increased from 66.4 percent in 2002 to 75.3 percent in 2006, while for Alt-A ARMs, it has increased from 74.3 percent in 2002 to 85.0 percent in 2006. Finally, for subprime ARMs, this ratio has increased from 81.2 percent in 2002 to 86.7 percent in 2006.
- There has been dramatic growth in the fraction of loans whose *CLTV exceeded 80 percent* in all three major loan categories. For prime ARMs, the fraction has increased from 4.1 percent in 2002 to 26.2 percent in 2006, while for Alt-A ARMs, it has increased from 20.8 percent in 2002 to 55.5 percent in 2006. Finally, for subprime ARMs, it increased from 46.8 percent in 2002 to 64.0 percent in 2006.
- There has been dramatic growth in the fraction of loans that are *interest only* in all three major loan categories. For prime ARMs, the fraction has increased from 46 percent in 2002 to 91 percent in 2006, while for Alt-A ARMs, it has increased from 26 percent in 2002 to 87 percent in 2006. For subprime ARMs, the fraction has increased from 1 percent in 2002 to 20 percent in 2006.
- There have been substantial declines in the fraction of loans that have *full documentation* in all three major loan categories. For prime ARMs, the fraction has declined from 56.0 percent in 2002 to 33.6 percent in 2006, while for Alt-A ARMs, it has declined from 29.3 percent in 2002 to 19 percent in 2006. For subprime ARMs, the fraction has declined from 66.9 percent in 2002 to 54.6 percent in 2006.

TABLE 1.1 U.S. Mortgage Market Originations, 2001–2006 (\$ Amounts in Billions)

	Conforming	Jumbo	FHA/VA	Subprime	Alt-A	HELOCs	Total	ARMs	Refinance	Prime	Nonprime	% Nonprime
2001	\$1,280	\$450	\$175	\$120	\$60	\$130	\$2,215	\$355	\$1,298	\$1,905	\$310	14%
2002	1,711	576	176	185	67	170	2,885	679	1,821	2,463	422	15
2003	2,460	650	220	310	85	220	3,945	1,034	2,839	3,330	615	16
2004	1,210	510	130	530	185	355	2,920	1,464	1,510	1,850	1,070	37
2005	1,090	570	90	625	380	365	3,120	1,490	1,572	1,750	1,370	44
2006	990	480	80	600	400	430	2,980	1,340	1,345	1,550	1,430	48

Source: Inside Mortgage Finance.

- There has been substantial growth in the *average debt-to-income ratio* of households holding prime ARMs but more modest growth for those holding Alt-A ARMs and subprime ARMs. While the ratio for prime ARMs has increased from 31.0 percent in 2002 to 37.2 percent in 2006, it was 35.4 percent in 2002 and 38.3 percent in 2006 for Alt-A ARMs and it was 40.0 percent in 2002 and 42.1 percent in 2006 for subprime ARMs.
- There has been little change in the fraction of loans with FICO scores less than 700 in all three major loan categories. For prime ARMs, the fraction was 20.7 percent in 2002 and 19.5 percent in 2006, while for Alt-A ARMs, it was 46.4 percent in 2002 and 44.2 percent in 2006. For subprime ARMs, the fraction was 93.4 percent in 2002 and 91.8 percent in 2006. Demyanyk and Van Hemert (forthcoming) show that FICO scores on subprime loans actually went up.

The patterns for fixed rate mortgage loans over the same five-year period are similar, except that prime FRMs contain a much larger fraction of full-documentation loans.

Loan quality continued to decline in 2007. According to a survey by the National Association of Realtors, the median down payment on home purchases was 9 percent in 2007, down from 20 percent in 1989. Twenty-nine percent of buyers put no money down. And many borrowed more than the price of the home to cover closing costs.

Prior to the current situation, the U.S. economy witnessed an unprecedented boom in home values. Between June 1996 and June 2006, the Case-Shiller house price index for the 10 largest metropolitan areas in the United States almost tripled from 77.8 to 226.3, a growth rate of 17 percent per year. From the peak of June 2006 until September 2008, the index fell from 226.3 to 173.3, a decrease of 23.4 percent. The broader 20-city index and nationwide indexes from different sources showed similar declines of 21.8 percent and 21.0 percent. The decline was moderate at first and concentrated in a few regional markets such as Miami and Las Vegas. However, over the last 12 months, the decline has accelerated (–18.6 percent) and spread to all regions. Not a single one of the 20 largest regions saw its house prices increase over the last year, and only Charlotte and Dallas saw a decline of less than 5 percent. House prices are now back at 2004 values. Supporting this picture, Federal Reserve Flow of Funds data show that aggregate residential real estate wealth increased from \$10 trillion to \$21.8 trillion over the 1996–2006 period, an increase of almost \$200,000 in housing wealth per homeowner. Residential wealth then peaked at \$22.4 trillion in the third quarter of 2007 and has since fallen back to \$21.4 trillion in the third quarter of 2008.

As house prices have dropped, the number of loan originations has fallen in 2007 and 2008. The number of loan originations fell 25 percent in 2007 to 3.5 million, according to data released under the Home Mortgage Disclosure Act. According to the Mortgage Bankers Association, loan originations fell 22 percent in November 2008 compared to November 2007.

Simultaneously, mortgage delinquencies and defaults have started to mount. Delinquencies on the GSE portfolio (Freddie Mac and Fannie Mae) almost tripled from 0.48 percent in 1999 to 1.15 percent in 2007. Data from the Mortgage Bankers Association show that at the end of 2007, 2.56 percent of all prime fixed rate mortgages and 5.51 percent of all prime adjustable rate mortgages were delinquent. The corresponding foreclosure rates were 0.55 percent and 2.59 percent, up from 0.40 percent and 0.88 percent at the end of 2002. Subprime delinquencies (60 to 90 days late) are much higher and stand at 11.6 percent at the end of 2007, according to CreditSights.

Finally, based on Mortgage Bankers Association data, Table 1.2 lists the largest mortgage originators in 2007 as well as their market shares. There has been substantial consolidation in the mortgage origination business over the past 10 years. The share of the top three originators nearly doubled from 19.4 percent in 1998 to 36.6 percent in 2007. This trend accelerated in 2008 when several large mortgage originators such as Countrywide, Washington Mutual, and Wachovia were taken over by Bank of America, JPMorgan Chase, and Wells Fargo, respectively, and several others, such as IndyMac, disappeared.

TABLE 1.2 Largest Mortgage Originators

Name	2007 Rank	2007 Market Share
Countrywide	1	16.8%
Wells Fargo	2	11.2
Chase Home Finance	3	8.6
Citi/CitiMortgage	4	8.1
Bank of America	5	7.8
Washington Mutual	6	5.7
Wachovia	7	4.0
Residential Capital	8	3.9
IndyMac	9	3.2
SunTrust	10	2.4
<i>Total Top 10</i>		<i>71.7%</i>

Source: Mortgage Bankers Association data.

Securitization

Coincident with the underlying growth in nonprime mortgages (see Table 1.1) and, in particular, subprime mortgages, there was a surge in securitizations of subprime mortgages. Table 1.3 reports data on the relative size of the subprime origination and securitization market from 2001 to 2006. Over this period, subprime originations tripled from \$190 billion to \$600 billion annually, going from a market share of 8.6 percent to 20.1 percent. More important to the current financial crisis, however, is the fact that the proportion of securitization went from 50.4 percent to 80.5 percent. In other words, almost all the subprime mortgages ended up in a structured product.

The benefits of securitization are well understood. It allows for a credit risk transfer from the originators of the loans to capital market investors willing to hold the risk, thus allowing the particular market for credit to expand. In theory, the balance sheet of the bank or mortgage lender is no longer an impediment to the loan being made. If (a big if) the potential incentive problems between originators, securitizers, and investors have been minimized through contracting, then large amounts of securitization are evidence that capital markets may actually be working.

Table 1.4 lists the largest issuers of collateralized debt obligations (CDOs), primarily made up of nonprime residential mortgage-backed securities (RMBSs) and commercial mortgage-backed securities (CMBSs), from 2004 to 2008. The table is organized by the top 12 firms based on the year 2007 and lists their total issuance in billions of dollars and their market shares. Several observations are in order. First, across all the major CDO players, there was a remarkable growth in CDO issuance over the period through 2007, mirroring the aggregate results given in Table 1.3. Second, in each period, the top five firms took approximately 40 percent of the market share, so that the issuance was concentrated in just a few institutions.

TABLE 1.3 Subprime Origination and Securitization, 2001–2006
 (\$ Amounts in Billions)

	Total	Subprime	Share %	Subprime MBS	% Securitized
2001	\$2,215	\$190	8.6%	\$ 95	50.4%
2002	2,885	231	8.0	121	52.7
2003	3,945	335	8.5	202	60.5
2004	2,920	540	18.5	401	74.3
2005	3,120	625	20.0	507	81.2
2006	2,980	600	20.1	483	80.5

Source: Inside Mortgage Finance, Gorton (2008).

TABLE 1.4 Book Runners of Worldwide CDOs, 2004–2008
 (\$ Amounts in Billions / % Market Share)

	2004	2005	2006	2007	2008 (thru Sept.)
	\$ / %	\$ / %	\$ / %	\$ / %	\$ / %
Citigroup	7 / 5.6	27 / 12.5	40 / 8.3	40 / 9.7	5 / 6.9
Merrill Lynch	16 / 12.5	27 / 12.4	54 / 11.3	38 / 9.3	5 / 6.4
Deutsche Bank	12 / 9.4	9 / 4.6	31 / 7.5	31 / 7.7	12 / 15.7
Barclays	0 / 0.0	17 / 7.9	18 / 3.7	28 / 6.8	2 / 2.6
Wachovia	11 / 8.3	15 / 6.8	24 / 4.9	24 / 5.9	2 / 2.8
Goldman Sachs	7 / 5.7	13 / 6.0	33 / 6.9	24 / 5.8	5 / 6.1
ABN Amro	0 / 0.0	3 / 1.3	5 / 1.0	23 / 5.6	1 / 1.9
UBS	8 / 6.3	7 / 3.2	22 / 4.6	20 / 4.8	0 / 0.0
Lehman Brothers	6 / 4.5	11 / 4.9	17 / 3.6	18 / 4.5	18 / 23.6
JPMorgan	7 / 5.4	9 / 4.1	22 / 4.5	18 / 4.4	3 / 3.7
Bear Stearns	7 / 5.5	12 / 5.8	25 / 5.1	16 / 3.9	0 / 0.0
Bank of America	4 / 3.4	10 / 4.6	23 / 4.7	15 / 3.8	2 / 2.0

Source: Asset-Backed Alert.

Third, the list of firms is a who's who of the current financial crisis: Many of the firms either went bust (e.g., Bear Stearns, Lehman Brothers, and Wachovia) or suffered huge write-downs that led to significant government intervention (e.g., Merrill Lynch, Citigroup, and UBS). Fourth, while it is well documented that the CDO market collapsed in the summer of 2007, the 2008 column shows just how severe the shutdown was. Among these 12 firms, CDO issuance dropped from \$314 billion in 2006 to \$295 billion in 2007 to just \$55 billion in 2008.

As can be seen from Table 1.4, commercial and investment banks were the primary financial intermediaries in the securitization market for subprime-based structured products such as CDOs. Depending on the tranche, fees on CDOs vary from 0.4 to 2 percent. Clearly, it was a very profitable business. The business model for securitization, however, is that the securitizing institutions act as intermediaries in the process and not as investors, otherwise defeating the purpose of the credit risk transfer rationale for securitization. This issue is discussed in the next section.

1.3 WHAT WENT WRONG?

One of the major scapegoats for the financial crisis is the “originate-to-distribute” model of securitization. That is, securitization allowed mortgage lenders (mortgage banks or brokers working on their behalf) to pass through

the loans and so reduced their incentive to screen and monitor the mortgage loans. It reduced their “skin in the game.” As the previous section demonstrates, lending standards slipped considerably in the five years leading up to the crisis. There are a number of careful academic papers that argued the case that securitization did indeed lead to a reduction in loan quality—for example, Dell’Ariccia, Igan, and Laeven (2008); Mian and Sufi (forthcoming); Berndt and Gupta (2008); and Keys, Mukherjee, Seru, and Vig (2008).

While this evidence cannot be ignored, the case against securitization is not so straightforward. Mortgage lenders do have “skin in the game” to the extent that a considerable portion of their income derives from mortgage servicing. For example, Countrywide (the largest originator according to Table 1.2) suffered huge write-downs from the loss of mortgage servicing rights as the crisis unfolded (Gorton 2008). On the securitization front, while the banks received large securitization fees, they also faced risk holding on to all the loans during the securitization process. This process lasts anywhere from two to four months. Finally, on the contractual side, as Gorton (2008) points out, a catastrophic decline in mortgage underwriting standards would have led to an increase in first payment defaults. These defaults, however, tend to get pushed back to originators in order to align incentives.

The other commonly cited culprit is predatory lending. There is no doubt that mortgage lenders sold very sophisticated products to unsophisticated investors who may not have understood what they were buying. Option-adjusted ARMs are just one example of the many complex products that were offered to households. The more sophisticated products were the ones that earned mortgage brokers the highest fees, creating perverse incentives. It is widely reported that these lenders often did not explain the risk of increases in payments upon termination of an initially low teaser rate, or an interest rate reset due to changing market interest rates. Sometimes they even failed to inform mortgage customers of the availability of government-subsidized home loans that offered lower rates than the subprime products they were offering, even though the customers were eligible. These sophisticated products were sometimes predatory. Often mortgage lenders did not insist on complete documentation. The failure to obtain complete documentation coupled with the predatory nature of many of these mortgages compromised the ability of many borrowers to pay. It is unclear at the current time what proportion of the subprime loans fall into this predatory category, but it will clearly end up playing its part in the overall analysis.

The immediate explanation for the rash of defaults and foreclosures in 2007 and 2008 was the fact that the vast majority of the loans made were 2/28 and 3/27 hybrid ARMs. These loans fix the initial interest rate at some teaser level for the first two (2/28) or three (3/27) years below what the borrower would pay for a fixed rate mortgage. After the initial period, the interest rate then floats based on a variable base rate (i.e., LIBOR,

Treasury bill rate, etc.) plus a significant margin (e.g., 6 percent). This jump in rate gives borrowers an incentive to refinance their mortgage before the reset date albeit at a cost due to prepayment penalties. Otherwise, without some jump in the borrower's income, it becomes difficult for the borrower to make the payments. Refinancing of the mortgage, however, is possible only if the house has appreciated in value. Therefore, the majority of subprime loans were predicated on the assumption that the housing market would appreciate (see Gorton 2008; Ashcraft and Schuermann 2008). Thus, it is not surprising that there was a wave of defaults when home prices started to fall in the summer of 2006. This is an example of how predatory lending can create systemic risk if the resulting defaults occur at or around the same time.

In this context, the two unanswered questions are:

1. Would lenders have made these risky loans (i.e., would a subprime market have existed) if securitization had not been available?
2. Did borrowers understand that they were essentially taking a short-horizon gamble on the housing market?

These are important questions, but answers to them will not by themselves explain the financial crisis. With massive defaults of subprime mortgages, one would have thought there would be two important outcomes. The first is that the portfolios of investors worldwide would be reduced in value. However, if these portfolios were well diversified, the effect would be a few percent here or there. After all, the size of the subprime and Alt-A markets was around \$2 trillion, a significant but not overwhelming number. The second effect would be an economic downturn. Because the majority of a household's wealth is tied up in a leveraged asset (i.e., their home), a shock to the housing market essentially wipes out the equity of the homeowner (especially one of the nonprime sort). This wealth shock would presumably affect spending patterns that would then ripple throughout the economy. But the drop in worldwide investor wealth and the ongoing recession do not explain the financial crisis.

The financial crisis occurred because financial institutions did not follow the business model of securitization. Rather than acting as intermediaries by transferring the risk from mortgage lenders to capital market investors, they became the investors. They put "skin in the game." But unlike your typical pension fund or fixed income mutual fund, financial firms are highly levered institutions. In theory, they can take on leverage only because the risk of their underlying assets is low through hedging and intermediation.

Table 1.5 lists the entities that were holding the various types of mortgage debt early in 2008 and how much of each type of debt they were holding. The table illustrates how financial institutions had become the investors in several ways. First, the overall exposure of the financial sector (i.e., banks,

TABLE 1.5 Holders of Mortgage Debt, 2008 (\$ Amounts in Billions)

	Loans	HELOCs	Agency MBSs	Nonagency AAA	CDO Subord.	Non-CDO Subord.	Total	
Banks and Thrifts	\$2,020	\$ 869	\$ 852	\$ 383	\$ 90		\$ 4,212	39%
GSEs and FHLB	444		741	308			1,493	14%
Broker-Dealers			49	100	130	24	303	3%
Financial Guarantors		62			100		162	2%
Insurance Companies			856	125	65	24	1,070	10%
Overseas			689	413	45	21	1,172	11%
Other	461	185	1,175	307	46	49	2,268	21%
Total	2,925	1,116	4,362	1,636	476	121	10,680	
	27%	10%	41%	15%	4%	1%		

Source: Lehman Brothers, Krishnamurthy (2008)

broker-dealers, monolines, and insurance companies) to real estate was \$5.8 trillion worth of mortgages. This was a majority of the mortgage market. Second, while some of this can be explained by banks holding whole loans, the surprising fact is that banks held \$1.325 trillion worth of securitized loans. Coupled with broker-dealers and the GSEs, there was \$2.644 trillion held by highly levered institutions. Third, only \$1.642 trillion of these MBSs were agency-backed, that is, of the prime loan type. Fourth, of the AAA-rated CDOs (backed by nonprime loans), a majority was held by the banks, GSEs, and broker-dealers, specifically \$791 billion worth or approximately 48 percent. This is the exact opposite of what should take place with securitization. Finally, the majority of exposure to the subordinated tranches of the CDOs was also held by banks, broker-dealers, and the monolines with \$320 billion of \$476 billion in total. The overall exposure might be even bigger, because these numbers do not include over-the-counter (OTC) derivatives. These derivatives may also have led to one-sided exposure, as was the case with AIG.

It is a puzzle why so many financial institutions took such a large gamble on real estate, thereby putting their own firms and, as it turns out, the system at risk. By holding on to such large amounts of the AAA-rated, non-agency-backed CDOs, these firms were for all economic purposes writing deep out-of-the-money put options on the housing market. That is, the firms

writing these options would receive a premium in most states of the world, and, in the rare event of massive defaults (i.e., a severe housing shock and/or recession), would be on the hook for them. Of course, if the event were to occur, it is not clear that firms could cover the roughly \$1 trillion exposure. This is not hindsight. The marketplace certainly priced the AAA securities this way. For example, at the peak of the housing market in June 2006, a comparison of the relevant spreads from the tranches of subprime MBSs (as described by the ABX index) to the average U.S. firm for a given rating shows for AAA-rated 18 basis points (bps) versus 11 bps, AA-rated 32 bps versus 16 bps, A-rated 54 bps versus 24 bps, and BBB-rated 154 bps versus 48 bps (Ashcraft and Schuermann 2008).

We present three possible explanations for why financial firms took the gamble. The first possibility is that there was poor governance within financial firms. The creation of structured product groups, and their meteoric success through the combination of fees and continued premiums from retaining these products, gave these groups a free hand to take big asymmetric bets.¹ The second possibility is that, because many of the firms had an explicit guarantee on their short-term debt (i.e., deposit insurance) and an implicit guarantee from being too big to fail, their funding costs for these types of risky investments were lower than they would have otherwise been. Thus, the AAA-rated security was the most attractive investment opportunity given (1) their capital and risk constraints and (2) artificially cheap funding sources. The third possibility is that the financial firms did not fully understand the nature of the loans they were securitizing because (1) they didn't fully appreciate how securitization had eroded loan quality, and (2) a lack of transparency about the quality of the loans meant they did not realize their mistake. Consequently, when housing prices started dropping, these institutions did not realize that the value of their MBS positions was declining dramatically and so did not unwind their positions in a timely fashion before the losses got too big.

Was securitization therefore really at fault? It clearly was the vehicle by which housing risk got transferred from those making the loans to the balance sheets of financial institutions. But this was an anathema to how it was supposed to work.

Arguably, the type of securitization that was performed has made the crisis much worse than it would have been even with the bank failures that we are seeing. There is so much complexity and therefore so little transparency with the securitized products that the effect of the crisis has been amplified. To understand the nature of the complexity, consider Figure 1.2, which shows in further detail how subprime loans work their way through the structuring process. A portfolio of subprime mortgages is pooled into a residential mortgage-backed security (RMBS). The RMBS has five tranches;

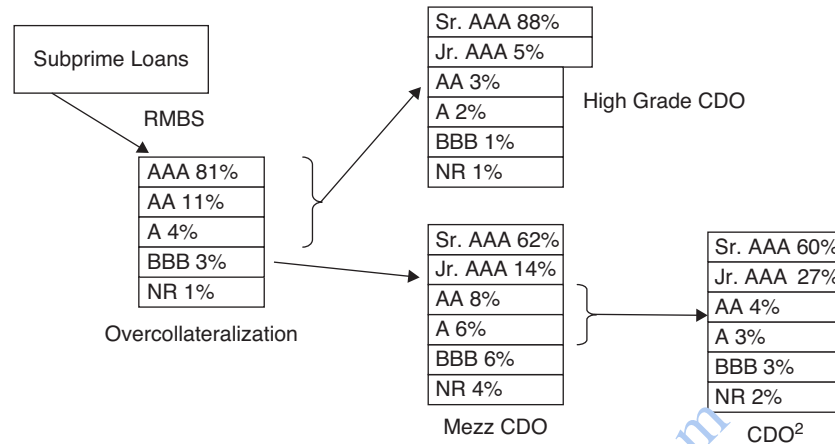


FIGURE 1.2 The Securitization Process of Subprime Mortgage Loans

Source: UBS (2007), Gorton (2008).

the priority of the tranches is based on seniority in terms of allocating default losses, ranging from the most protected tranche (AAA) down to the least protected one (BBB). At each point in the structure, the rating agency would determine the rating based on its assessment of each loan's default probability and, in theory, the correlation across defaults. Note that the top 96 percent of the cash flows go to a high grade CDO, which then splits into six tranches of different rating classes. The next 3 percent of the cash flows goes toward a mezzanine CDO, which in turn splits into six classes of different priorities. But it doesn't stop there. The middle 14 percent of this mezzanine CDO is structured into another CDO, which again is broken into six classes, the top 60 percent of which is the senior AAA tranche. The game was to try to generate as many AAA rated securities as possible. In this example, the original fraction of AAA-rated securities in the RMBS was 81 percent, while at the end of the securitization process, it was 91.93 percent. Knowing that there is now a significant probability of widespread defaults, the question is whether the market can price or understand the senior and junior tranches of the AAA CDO².

In the heat of this financial crisis, it is difficult for financial markets to operate if there is a lack of transparency. This is due to (1) agents not being able to price these complex CDOs and (2) uncertainty about who is holding them. Without being able to assess the solvency of the financial firms within the system, there is a complete lack of trust and confidence in counterparties, a spike in the overall level of risk aversion, and marketwide freezes without any source of liquidity.

1.4 PRINCIPLES

What should be the principles behind regulatory reform of the mortgage origination and securitization markets? We present a set of principles that can point to effective regulation and that guide the proposals we suggest in the next section.

Choice is good, but predatory lending is bad. It is important that households continue to have access to an array of mortgage products. Different households, by virtue of where they are in the life cycle and the properties of their labor income risk, will prefer different contracts. They should have at least this choice. But complicated contracts that offer no benefits and only confusion need to be prohibited. There is clearly a tension between providing mortgage customers with choice and innovation, and at the same time protecting them from predatory lending practices. Developing concrete proposals to promote choice while limiting predatory lending practices should be a policy priority.

Standardization is good; it promotes liquidity in the mortgage-backed securities market because standardization makes the securities easier to value. So while we need choice, the need for liquidity in the mortgage-backed securities market may be a reason to limit the menu of loans that can be securitized. The rule should be: If the pools of loans of a given type are not large enough to create a liquid market, then the mortgage-backed security should not be created. Standardization also limits abuse. The proliferation of products makes it more difficult to regulate mortgage products effectively. A smaller menu of options may facilitate more timely and effective oversight by regulators.

At the same time, nonstandard contracts can add value because of the inherent heterogeneity of mortgage customers along important dimensions like labor income profile and financial sophistication. The rationale for the new products with low initial payments that were created in the period from 2002 to 2006 was that they promoted home ownership for households previously excluded from home ownership. This was especially true for low-income households and for households with no regular paycheck (e.g., freelance workers).

Home ownership has many advantages, such as promoting the development of stable and safe neighborhoods. But it also has its costs, such as the reduction of household mobility, which makes labor markets less efficient. It is a controversial question whether the advantages of increasing the home-ownership rate from its current value of two-thirds outweigh the costs. But whatever the answer, a household's ability to obtain a mortgage loan should depend on the value of its entire human capital, not just its current labor income. It is important to develop proposals for how banks

can offer nonstandard products that are not predatory in nature without compromising the liquidity of the mortgage-backed securities market.

Loan originators and mortgage brokers need to have an incentive to internalize the externalities created by the deadweight costs associated with defaults and foreclosures. Making sure mortgage customers understand fully the terms of all loan products offered to them helps these customers to internalize the costs that they bear in the event of default or foreclosure. Including provisions for efficient renegotiation and reorganization of a loan in event of default can reduce the deadweight costs of foreclosure but can also make it more difficult to securitize the loan.² So there is a trade-off. The nature of the provisions is likely to be important.

1.5 PROPOSALS

Given the previous discussion of how mortgage origination and securitization may have contributed to the crisis (Section 1.3) and the principles developed in Section 1.4 for future regulation, we suggest the following policies.

Predatory Lending

The recent amendments to Regulation Z (Truth in Lending) by the Federal Reserve Board are a big step in the right direction of protecting consumers from predatory practices among mortgage banks and brokers in the sub-prime space. According to a press release by the Board of Governors on July 14, 2008, the amendments add four key protections for a newly defined category of “higher-priced mortgage loans.” The rule’s definition of “higher-priced mortgage loans” will capture virtually all loans in the sub-prime market, but generally exclude loans in the prime market. To provide an index, the Federal Reserve Board will publish the “average prime offer rate,” based on a survey currently published by Freddie Mac. A loan is higher-priced if it is a first-lien mortgage and has an annual percentage rate that is 1.5 percentage points or more above this index, or 3.5 percentage points if it is a subordinate-lien mortgage. The new protections are delineated as follows:

- A lender is prohibited from making a loan without regard to a borrower’s ability to repay the loan from income and assets other than the home’s value. A lender complies, in part, by assessing repayment ability based on the highest scheduled payment in the first seven years of the

loan. To show that a lender violated this prohibition, a borrower does not need to demonstrate that it is part of a “pattern or practice.”

- Creditors are required to verify the income and assets they rely on to determine repayment ability.
- Any prepayment penalty is banned if the payment can change in the initial four years. For other higher-priced loans, a prepayment penalty period cannot last for more than two years.
- Creditors are required to establish escrow accounts for property taxes and homeowner’s insurance for all first-lien mortgage loans.

Because flexibility and choice are valuable, it is important that the first two protections are construed literally and are not used to restrict the combinations of income and assets that creditors are allowed to find acceptable.

Standardization

Households should be offered an array of standardized products. Conforming loans should include, at the very least, a 30-year ARM with annual resetting of the rate, a 15-year FRM, a 30-year FRM, and a 5/25 hybrid with a fixed rate for the first five years and then an adjustable rate for the remaining 25 years of the loan. In addition to the current conforming loan criteria, it would be in the best interest of systemwide financial stability to place an upper limit on the loan-to-value ratios for these loans (e.g., 80 percent).

For households that do not qualify for a conforming loan because the loan is too big (jumbo mortgages) or their credit score is too low (Alt-A and subprime mortgages), the same effort toward standardization ought to be made. Households should also have access to nonstandardized products. These products should be designed to benefit a wide array of households that differ in terms of their age (stage of the life cycle) and labor income risk. These nonstandardized products should be subject to additional regulatory vetting to ensure no predatory lending.

Securitization

As they were in the past, loan originators should be able to securitize any of these standardized conforming mortgage products in the form of mortgage-backed securities.³ The markets for these mortgage-backed securities would be expected to be very liquid. The ease of securitization would make these products attractive for originators. This benefit will result in lower interest rates on mortgages for households and wider availability of mortgage credit in general. Loan originators should not be allowed to fully securitize (and

pass on the risk to others of) any nonconforming loan. Moreover, the heterogeneity in nonstandardized products makes them unlikely candidates for securitization due to concerns about illiquidity in the markets for the mortgage-backed securities that these products would be backing.

The question is whether regulation should compel originators of nonconforming loans to have “skin in the game,” given that this may have been a factor in the current crisis. There are a number of ways to align the incentives of originators, securitizers, and investors:

- One could compel mortgage originators to hold a fraction of each loan on their balance sheets, thus giving them the proper incentives to screen and monitor borrowers. Alternatively, in order to reduce the number of loans that originators should be compelled to hold, one could *randomly* determine which loans the originators must hold in full. Either way, reducing the fraction of loans that must be held reduces the cost incurred by the originator, which in turn lowers the interest rates that borrowers have to pay.
- Many mortgage lenders are not banking institutions and may not have a source of sustained capital, such as deposits. Another possibility would be to have the origination fee of the lenders be amortized over some period of the loan. Thus, if default occurs within a certain period of time (i.e., before the end of the amortization period), the originator would receive only a portion of the fee.
- The mortgage lender would not be able to sell the mortgage servicing rights. Servicing of mortgages typically commands a 0.50 percent fee and thus gives the lender an incentive to choose good loans and monitor them accordingly. Currently, the majority of major lenders do in fact service the loans.

Of course, securitization firms and asset-backed security (ABS) investors have the incentive to enter into contracts with lenders that achieve these goals. In general, there will be a trade-off between the amount of discipline imposed on the lender and the interest rate and the fraction of the principal of the loan that flows to the investor. At first glance, it is not readily clear why the government needs to get involved. One reason why is if the full costs of poor-quality loans are not being borne totally by the holders of the MBSs that these loans back (because their holdings of these MBSs cause systemic risk).

Another reason for government intervention is that many of the parties in the marketplace for securitized products (at least for mortgage-related securities) have some type of guarantee from the U.S. government: the implicit guarantee on the GSEs, the explicit guarantee on deposits by the FDIC for deposit institutions, or the very implicit guarantee of being too big to

fail that large, complex financial institutions (LCFIs) have. As long as one of these guaranteed entities is active in the securitization process—as either a lender, a securitizer, or an investor—incentives will be distorted. For example, the investor in prime MBSs that are guaranteed by the GSE does not care per se about the quality of the loan, because the principal will be paid regardless. Alternatively, if the investor is an FDIC-insured institution, then external discipline to not take on risky loans is diminished. Therefore, one possible proposal is that financial firms with government guarantees should only securitize or purchase nonconforming loans that have been originated by lenders with “skin in the game” of the sort described earlier. If the loan does not satisfy this criterion, it is still possible for it to be securitized, just not involving government-guaranteed firms anywhere in the securitization chain.

Conforming Loan Limits

According to provisions of the Housing and Economic Recovery Act of 2008 (HERA), the conforming national loan limit is set each year based on changes in average home prices over the previous year, but cannot decline from year to year. We support this calculation of the conforming national loan limit. People who want to buy a house today should not be penalized relative to those who wanted to buy last year, just because house prices have gone up.

At the same time, a case can be made for abolishing the conforming loan limit altogether. In particular, as long as the current GSE criteria on combined loan-to-value ratio, credit score, and debt-to-income ratio are satisfied, a jumbo loan is probably not much riskier than a conforming loan, an assertion that is supported by the fact that the rate on jumbo loans is typically only slightly higher than the rate on conforming loans. However, the implicit government guarantee associated with an MBS being backed by conforming loans makes conforming loans easier to securitize than nonconforming loans. To the extent that the fee charged by the GSE is less than the full value of the implicit guarantee, there is a subsidy for borrowers whose loans are conforming. And so removing the loan limit changes the amount of the subsidy as a function of the amount borrowed. Thus, there may be welfare-policy reasons for the conforming loan limit that are unrelated to any issue of systemic risk and that provide a rationale for leaving the conforming loan limit in place.

Even given the possibility of welfare-policy reasons for conforming loan limits, we also support the GSEs’ mandate under the government’s economic stimulus package to purchase loans beyond the conforming national loan limit in high-cost areas. People should not be penalized because they live

in an area with high property values, especially since those areas typically are some of the most productive areas. Under the stimulus package, loans originated in 2008 and the second half of 2007 are subject to loan limits equal to the maximum of the conforming national limit, which is currently \$417,000, and the “high-cost” area limit of 125 percent of the local price median, up to a maximum of \$729,750. For 2009, the Federal Housing Finance Agency (FHFA) has set loan limits for high-cost areas equal to 115 percent of local median house prices, and the amount borrowed cannot exceed \$625,500, 150 percent of the national limit. Thus, the conforming loan limit for 2009 is set equal to the maximum of the current general loan limit of \$417,000 and 115 percent of the median home price in that metropolitan area or \$625,500, whichever is smaller. We call for the GSEs’ mandate to purchase loans beyond the conforming national loan limit in high-cost areas to become a permanent mandate. We also support tying the conforming high-cost area limits to regional house price indexes. Since 125 percent of the median house price seems quite conservative, we favor that number over the more stringent 115 percent that has been adopted for next year. Finally, we support the abolition of the maximum dollar cap on the loan, since it penalizes people who live in high-cost areas.

Mortgage Brokers

Independent mortgage brokers selling mortgages on commission should have a fiduciary duty of disclosure to their mortgage customers that compels them to disclose the availability of any government-subsidized home loans that the household is eligible for, and to describe fully the terms and conditions of any product that they offer to them. As discussed earlier, brokers should be compelled to receive only a fraction of their sales fee up front. The rest of the fee should be paid out over the following several years and only as long as the loan payments are current. A similar principle is already used for insurance brokers. There should be tighter supervision on the certification of licensed brokers. Certification may require additional financial education and ethics guidelines.

Households

While this involves the application of federal versus states laws, a dialogue should be started as to whether households should suffer harsher penalties in the event of default or foreclosure. In particular, the impact of default or foreclosure on a household’s credit availability could be harsher. A first channel is to increase the length of time a default or foreclosure stays on a borrower’s credit report. Another channel available to make penalties

harsher is to strengthen the lender's ability to recover the debt from the household's other assets in the event of default and/or foreclosure (recourse). While strengthening recourse would unambiguously increase the collateral value of the mortgage, it may adversely affect the liquidity of the underlying mortgage-backed securities, particularly in the nonprime space. Giving lenders recourse to the borrower's other assets may make nonconforming mortgages more difficult to value because of increased uncertainty about the recovery rate, which now depends on the wealth of the borrower, in event of foreclosure.

Loan Agreements

Loan agreements should be required to include provisions for efficient renegotiation and reorganization of the loan in event of default. Provisions should be designed with an eye to their impact on the ease with which the loans can be securitized.⁴

1.6 CONCLUSION

One of the major catalysts for the current financial crisis was the spate of defaults and foreclosures in 2007 and 2008. And the two big reasons for all the defaults and foreclosures were the downturn in house prices coupled with a dramatic decline in the quality of mortgage loans. Loan quality declined in large part because of an unintended consequence of securitization—namely, that mortgage lenders did not bear the costs of these declines in loan quality, and so did not care about them. The financial crisis occurred because financial institutions did not follow the business model of securitization. Rather than acting as intermediaries by transferring the risk from mortgage lenders to capital market investors, they became the investors. We argue that securitization is still a valuable tool for the mortgage market because it allows loans to be offered at lower rates than they otherwise could be. Consequently, standardization is valuable because it facilitates securitization.

At the same time, it is important that mortgage lenders have an incentive to internalize the deadweight costs associated with defaults and foreclosures. This can be done by spreading their fees over time and making them hold a fraction of loans. To minimize the fraction of loans that lenders need to hold, the loans to be held could be randomly selected. Just as important, mortgage lenders need to help borrowers to internalize these deadweight costs by helping them to understand exactly what their obligations are under any loan offered to them. Last, the availability of nonstandard contracts allows the mortgage industry to accommodate heterogeneity across borrowers, which

is valuable. However, nonstandard contracts are not good candidates for securitization, because securities backed by nonstandard contracts are difficult to value, and so markets for these securities are likely to be illiquid. Moreover, nonstandard contracts need to be subject to additional regulatory vetting to ensure they are not predatory.

NOTES

1. See Chapter 7, “Corporate Governance in the Modern Financial Sector,” and Chapter 8, “Rethinking Compensation in Financial Firms.”
2. An unintended problem with securitization is that it inhibits the ability of households and banks to renegotiate the loans since by then the loans have been sliced and diced through the system.
3. See Chapter 4, “What to Do about the Government-Sponsored Enterprises?”
4. For a discussion as to which provisions should be included, see Chapter 16, “Mortgages and Households.”

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