

Wall Street and the Housing Bubble

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September 2012

Abstract

We analyze whether mid-level managers in securitized finance were aware of the housing bubble in 2004-2006 using their personal home transaction data. We find little evidence of them timing the bubble or exercising cautious behavior in purchasing homes on average, relative to two uninformed control groups: one composed of non-real estate lawyers and the other of non-housing equity analysts. Our findings cast doubt on the popular “inside job” view of the recent financial crisis that Wall Street employees knowingly ignored warning signs of the housing bubble.

JEL Codes: G01, G20, G21, G23, G24

Appendices available online

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The authors thank Vu Chau, Kevin Chen, Andrew Cheong, Tiffany Cheung, Alex Chi, Andrea Chu, Wenjing Cui, Christine Feng, Kelly Funderburk, Elisa Garcia, Holly Gwizdz, Jisoo Han, Bret Herzig, Ben Huang, Julu Katticaran, Olivia Kim, Eileen Lee, Yao Lu, Shinan Ma, Amy Sun, Stephen Wang, and Daniel Zhao for excellent research assistance. The authors are also grateful to Nick Barberis, Roland Benabou, Harrison Hong, Atif Mian, Amit Seru, and seminar participants at the Federal Reserve Bank of Philadelphia, NBER Behavioral Finance Meeting, NBER Summer Institute, and University of Michigan for helpful discussion and comments.

Following financial crises, concerns often arise about insiders having taken advantage of outsiders by first pumping up asset prices and then selling before prices crash. In the aftermath of the collapse of the Internet bubble in early 2000s, charges of conflicts of interest among sell-side analysts within investment firms resulted in lawsuits and settlements in the billions of dollars. After the collapse of Enron and WorldCom, outrage regarding executives and directors enriching themselves by selling their shares shortly before their companies' failures led to the Sarbanes-Oxley Act of 2002. These concerns have resurfaced after the recent crisis on Wall Street. A popular view posits that moral hazard caused Wall Street employees to ignore clear warning signs about the presence of an unprecedented housing bubble and the imminent risk of the bubble bursting. According to the Financial Crisis Inquiry Report (2011) of the Financial Crisis Inquiry Commission formed by the U.S. Congress:

“In the decade preceding the collapse, there were many signs that house prices were inflated, that lending practices had spun out of control, that too many homeowners were taking on mortgages and debt they could ill afford, and that risks to the financial system were growing unchecked. Alarm bells were clanging inside financial institutions, regulatory offices, consumer service organizations, state law enforcement agencies, and corporations throughout America, as well as in neighborhoods across the country. Many knowledgeable executives saw trouble and managed to avoid the train wreck.”

The Academy Award-winning documentary “Inside Job” vividly attributes the crisis to Wall Street insiders taking advantage of uninformed borrowers and investors and blames employees in securitized finance for selling securities backed by dubious-quality subprime mortgage loans to uninformed investors. Building on the premise that Wall Street employees anticipated the housing bubble earlier than others, this inside job view holds that the crisis was avoidable if appropriately designed incentives and necessary government oversight were in place.

However, there are open disagreements among policy makers and academic researchers about this view, and, in particular, whether Wall Street employees were truly aware of the housing bubble. Interestingly, one of the two minority reports contained in the Financial Crisis Inquiry Report (2011) challenges the premise that warning signs were clear to people in finance, and instead attributes them to hindsight:

“There always are [warning signs] if one searches for them; they are most visible in hindsight, in which the Commission majority, and many of the opinions it cites for this proposition, happily engaged.”

Motivated by this disagreement and the importance of this issue, we examine the following question: What did Wall Street employees know about the housing bubble and when did they know about it? The challenge in addressing this question lies with how to isolate their beliefs about the housing market from their job incentives.

This paper confronts this challenge by exploiting the special nature of personal transactions in housing markets. Different from typical financial assets, residential homes are an indispensable part of everyone's life. A home typically exposes its owner to house price risk in the hundreds of thousands of dollars. As a result, even employees in the financial industry, despite their relatively high incomes, should have maximum incentives to make informed home-transaction decisions regardless of any potentially biased incentive from their jobs. Building on this insight, we use their personal home transactions during the housing bubble to extract information about their beliefs regarding the housing markets at the time.

We focus on a sample of mid-level managers who worked directly in the securitization business, a central part of the housing bubble. Several reasons motivate us to analyze mid-level managers rather than top C-suite executives. Chief of all, mid-level managers make many important business decisions in financial firms. In contrast, as revealed by the recent risk management failure of JP Morgan, the top executives may be detached from operations of individual groups inside their firms. Furthermore, the relatively large sample of mid-level managers makes it possible to statistically compare their behavior against other control groups.

We sample a group of securitization investors and issuers from a publicly available list of conference attendees of the 2006 American Securitization Forum, the largest industry conference. These investors and issuers, whom we refer to collectively as securitization agents, comprise vice presidents, senior vice presidents, managing directors, and other non-executives who work both at major investment houses and boutique firms. Using the Lexis-Nexis Public Records database, which aggregates information available from public records, such as deed transfers, property tax assessment records, public address records, and utility connection records, we are able to collect the personal home transaction history of these securitization agents.

We address the question of whether securitization agents were more aware of the housing bubble by comparing their home transactions to those of uninformed control groups, which

arguably had no private information about housing and securitization markets. We distinguish between two forms of awareness, a strong form and a weak form. Under the strong form, securitization agents knew about the bubble so well that they were able to time the housing markets better than others. That is, securitization agents who were homeowners anticipated the housing price crash and divested homes before the bust in 2007-2009. Given the difficulties of timing the market, however, any awareness of a bubble might appear in a weaker form, where securitization agents who were non-homeowners knew enough to be cautious and thus avoided entering the housing markets during the bubble period of 2004-2006.

We construct two uninformed control groups. The first control group consists of a random sample of lawyers who did not specialize in real estate law. The people in this group are part of the general public with a relatively high income, and who were not directly involved in housing markets as part of their job. A nuanced issue for our analysis is that securitization agents received large bonuses during the bubble years. The large income shocks can motivate them to buy houses despite their potential awareness of the housing bubble. To address this concern, we choose the second control group to be a sample of equity analysts covering non-homebuilding companies in the S&P 500. Due to their work outside the securitization and housing markets, they were less likely to be informed about the housing bubble than securitization agents but arguably experienced income shocks similar to those experienced by securitization agents during the bubble period.

Our analysis shows little evidence of securitization agents' awareness of the bubble in their own home transactions. Compared to both control groups, securitization agents who were non-homeowners had similar rates of first home purchases and home divestitures during the 2004-2006 period, with slightly lower rates of divestiture and higher rates of first home purchase during 2006. However, securitization agents who were homeowners were significantly more likely to either purchase an additional home or move into a more expensive house during this period. This indicates that securitization agents were not more alerted by the housing bubble than analysts working outside the securitization and housing markets.

One might argue that, even if securitization agents were well informed of the housing bubble, they might have chosen to ride the bubble rather than immediately selling out. This argument

implies that while they might not have sold their homes exactly at the peak of the bubble, they should have done better in timing the bubble than the control groups. We construct a performance index for each individual in our samples to quantitatively measure the returns of the individual's home transactions across our entire sample, from the beginning of 2000 through the end of 2010. The performance index is defined by the difference between a person's home portfolio return in 1999-2010 and the buy-and-hold return of his initial 2000 home position during the same period. On a dollar-weighted basis, both the gross return and performance index of securitization agents' home portfolios was significantly worse over this period relative to equity analysts. Securitization agents' performance was also worse than lawyers, although the effect is not statistically significant. This again indicates that securitization agents were not more aware of the housing bubble.

We compare the performance of sub-groups within our securitization sample to investigate whether specific groups exhibited awareness of the housing bubble. Comparing the performance of issuers versus investors reveals that issuers experienced significantly worse gross returns in their housing portfolios over 2000-2010, particularly during the 2006-2010 period, and had a significantly lower performance index. This is inconsistent with the average person on the sell-side knowing more about bad mortgages in securitized tranches than the average person working on the buy-side. People who worked at public firms whose stock prices performed poorly during the crisis experienced particularly poor returns during the 2006-2010 period and had worse overall performance in their housing portfolios compared to those at firms who did well, inconsistent with the idea that the average person working at a firm that went bust was able to do well in their own housing transactions.

We are also able to obtain income information for a subset of people in our samples in the year they purchased a home by matching the year of their purchase, their mortgage amount, and property location with the information provided in the 2000-2010 Home Mortgage Disclosure Act (HMDA) mortgage application data. Indeed, during the bubble period, home purchasers in the securitization agent group experienced income shocks larger than those in the lawyer group but comparable to those in the equity analyst group. To the extent that awareness of the housing bubble should have led securitization agents to realize that their income shocks were unlikely to persist, the inside job view implies that securitization agents should have acquired homes with

more conservative value-to-income ratios than the control groups. We find little evidence of securitization agents being less aggressive in this quality dimension. However, we confirm their income shocks were transitory, as the income of home purchasers dropped dramatically in the bust period, despite experiencing increases that were of comparable magnitudes as our sample of equity analysts. Finally, we find that securitization agents who purchased homes during the boom divested homes at a higher rate than the control groups during the bust. This suggests that purchasers in 2004-2006 did not live happily ever after in the homes they recently purchased.

Taken together, our analysis gives little support to the inside job view that securitization agents knowingly ignored warning signs of the bubble, as they on average failed to either time the housing markets or exercise cautious behavior in the timing and size of their personal home purchases relative to other less informed groups.

We emphasize that our results do not contradict the existing evidence that bad incentives caused loan officers and securitization agents to relax lending standards and seek unwarranted risk without the knowledge of the housing bubble (e.g., Keys, et al. (2010), Berndt and Gupta (2009), and Agarwal and Ben-David (2012)). Instead, our analysis highlights that the role played by over-optimism and distorted beliefs, as emphasized by the theoretical work of Gennaioli, Shleifer, and Vishny (2011) and Benabou (2011), should not be dismissed, but rather, taken seriously. In this sense, our results reinforce the analysis of Gerardi, et al. (2008) and Foote, Gerardi and Willen (2012), who document that issuing firms of mortgage-backed securities kept a large amount of risk on their own books, which later resulted in large losses. By comparing personal home transactions of securitization agents to lawyers and equity analysts, our micro-level evidence isolates securitization agents' beliefs from their job incentives.

Our analysis complements the literature on the link between bank performance during the financial crisis and executive incentives before the crisis. On one hand, Bebchuk, Cohen, and Spamann (2010) show that the top-five executives of Bear Stearns and Lehman Brothers cashed out large amounts of short-term performance based compensation during 2000-2008 even though their companies eventually failed in 2008. They interpret this finding as evidence for governance failure leading to short-termist managerial behavior. On the other hand, Fahlenbrach and Stulz (2011) find no evidence of better performance during the crisis by banks with CEOs whose

incentives were better aligned with the shareholders. Similarly, Cheng, Hong and Scheinkman (2011) find evidence that banks' risk-taking behavior was consistent with shareholders' demands. Our analysis does not aim to test the effects of incentives in isolation of Wall Street employees' beliefs about the housing bubble. Instead, our findings highlight that overstating Wall Street employees' knowledge of the housing bubble is likely to lead to exaggeration of any effects attributed to failures in governance.

The paper proceeds as follows. Section 1 introduces our empirical hypotheses. Section 2 describes the data, and Section 3 summarizes descriptive statistics. Section 4 reports the empirical analysis, while Section 5 concludes.

1. Empirical Hypotheses

1.1. Competing views of the crisis

Loosely speaking, Wall Street employees might have contributed to the recent financial crisis through two related yet distinct forces, one due to their incentives and the other through their beliefs. The recent academic literature has put great emphasis on the poorly designed incentives of financial firms. Acharya, et al (2010) provide an overview of bad incentives originating from different sources. One of the commonly mentioned sources of bad incentives is the lack of skin in the game in the originate-and-distribute lending model. The securitization boom allowed mortgage lenders to pass on the mortgage loans they originated to investors down the securitization chain, which in turn loosened their incentives to scrutinize borrowers (e.g., Keys, et al. (2010), Berndt and Gupta (2009), and Agarwal and Ben-David (2012)). Another potential source is short-term performance-based compensation schemes for Wall Street executives and traders. As they are compensated by short-term profits based on their positions at the year end and do not get penalized for future losses, they have incentives to pursue short-term gains even at the expense of greater future losses (e.g., Bebchuk, Cohen, and Spamann (2010)). Finally, to prevent systemic failures of the financial system, the government gives both explicit and implicit guarantees to bail out banks and financial firms, which, in turn, encourages them to seek systemic risk (e.g., Rajan (2010)).

A small strand of the literature emphasizes that behavioral biases and cognitive dissonance might have caused Wall Street employees to be too optimistic to fully comprehend the risk presented by the housing bubble. Barberis (2012) discusses this view and emphasizes that Wall Street employees might have over-extrapolated the past growth of home prices during the housing bubble. Gennaioli, Shleifer and Vishny (2011, 2012) build a theory of shadow banking in which local thinking bias causes investors and financial intermediaries to ignore unlikely tail risk during normal times and only realize the risk after a bad shock, which in turn exacerbates the downturn. Benabou (2011) develops a model of groupthink, in which the interaction structure in groups and organizations makes wishful thinking (denial of bad news and warning signs) contagious across agents. Finally, Bolton, Scheinkman and Xiong (2006) emphasize that shareholders tend to be optimistic about firms' fundamentals and, as a result, prefer hiring optimistic executives and incentivize them to pursue aggressive investment strategies.

The inside job view is a strong form of the bad incentives view as it posits not only poorly designed incentives but also Wall Street employees' recognition of the housing bubble. Our analysis aims to test this latter necessary condition of the inside job view. Any evidence against this view would not necessarily reject the more general bad incentives view, but would suggest that distorted beliefs might have played a more important role than assumed under the inside job view.

1.2. Empirical design

The emphasis of our analysis is to examine the extent to which Wall Street employees anticipated the housing bubble. Figure 1 depicts the housing price indices of U.S. and three metropolitan areas: New York, Chicago, and Los Angeles, in 2000-2011. Los Angeles had the most dramatic boom and bust cycle with housing prices increasing by over 150% from 2000 to the peak in 2006 and then crashing down by over 30% in 2006-2009. New York also had a severe cycle with prices increasing by over 100% in 2000-2006 and then dropping by over 20% in 2006-2009. Chicago and the overall U.S. market had less dramatic but nevertheless pronounced cycles with prices increasing by over 60% in 2000-2006 and then falling by over 15% in 2006-2009. Despite the differences in magnitudes, the cycles across different regions

were fairly synchronized, with rapid price expansions in 2004-2006, which we define as the bubble period in our analysis, gradual declines in 2007, followed by steeper falls in 2008-2009.

We focus on the behavior of mid-level managers in the securitization business as our object of study. As securitization was an indispensable part of the housing bubble, understanding the beliefs of securitization agents about the housing markets is important. There are several reasons to analyze the beliefs of mid-level managers rather than C-level executives. First, they made many important business decisions for their firms. It is well known that the positions taken by a few mid-level managers of AIG Financial Products and UBS during the housing bubble led to losses in tens of billions of dollars, which eventually caused financial distress in these firms. Second, mid-level managers were closest to the housing markets. There is a growing notion that perhaps mid-level managers knew about the problems in the housing markets even if C-level executives did not – for example, Joseph Cassano of AIG FP or Fabrice Tourre of Goldman Sachs. Third, even if the top executives and group heads were more informed about the structural problems in the housing markets, we expect their concerns to affect their subordinates. This motivates us to directly test whether selling dubious-quality mortgage backed securities and taking massive risks despite anticipating a crash was a systematic problem at the middle levels of management. Finally, the large sample of mid-level managers makes it possible to statistically compare their behavior against other control groups.

We use a revealed belief approach based on people's personal home transactions. A home is typically a significant portion of a household's balance sheet. As our data will confirm later, this is true even for the mid-level securitization agents in our sample. To the extent that homeowners have thick skin in their homes, they have maximum incentives to acquire information and make informed buying and selling decisions. In particular, for financial sector employees, we do not expect the aforementioned bad incentives from their jobs to affect their personal home transactions. This is a key feature that allows us to isolate their beliefs from their job incentives.¹

Our analysis focuses on testing whether securitization agents were more aware of the housing bubble than uninformed control groups. Their awareness may present itself in two

¹ Home transactions are also more informative of individuals' beliefs than buying and selling of their companies' stocks, which is contaminated by potential signaling effects of disloyalty and lack of confidence to their bosses and colleagues.

possible forms, one strong form and another weak form. Under the strong form, the securitization agents knew about the bubble so well that they were able to time the housing markets better than others. This means that securitization agents who were homeowners anticipated the housing price crash in 2007-2009 and reduced their exposures to the housing prices by either divesting homes or downsizing homes in the bubble period of 2004-2006.

There are two caveats in testing this market-timing form of awareness. First, the cost of moving out of one's home, especially the primary residence, is high, and may prevent securitization agents from actively timing the housing price crash. Second, even if securitization agents knew about the presence of a housing bubble, they might not be able to precisely time the crash of housing prices. While these caveats reduce the power of using the securitization agents' home divestiture behavior to detect their awareness of the bubble, it is useful to note that the cost of moving out of second homes is relatively low and should not prevent the securitization agents from divesting their second homes. More importantly, the cost of moving and inability to time the crash should not prevent alerted non-homeowners from avoiding buying homes, particularly second homes and from moving into more valuable houses. This consideration motivates a weaker form of awareness that securitization agents knew enough to be cautious and thus those who were non-homeowners avoided acquiring homes during the bubble period of 2004-2006.

We use two uninformed control groups, one group from the general population outside the housing and finance industries, and the other group from inside the finance industry but outside the securitization and housing business. We choose lawyers as the control group from outside finance because lawyers are well-educated and sophisticated professionals, and because they also have relatively high incomes among the general public. We separate lawyers specialized in real estate from non-real estate lawyers and use only non-real estate lawyers as the first of our uninformed control groups. In selecting these lawyers, we also make sure that they are matched with similar ages and geographic locations as the securitization agents in our sample.

We recognize that securitization agents experienced large income shocks during the financial market boom that accompanied the housing bubble and lawyers did not experience such income shocks. Thus, it is useful to have another control group which experienced similar income shocks as those by securitization agents. We choose financial equity analysts who

covered non-housing companies in the S&P 500 index as such a control group. These equity analysts also had large bonuses during the boom years. Since their work is not directly related to housing and securitization business, we expect them to be less informed about the housing bubble than securitization agents.

Taken together, we test the following hypothesis regarding whether securitization agents were aware of the housing bubble:

Hypothesis 1 (Inside Job View): Securitization agents exhibited more awareness of the housing bubble relative to lawyers and non-housing equity analysts in two possible forms:

- A. (market timing form) Securitization agents who were homeowners were more likely to divest homes and down-size homes in 2004-2006.*
- B. (cautious form) Securitization agents who were non-homeowners were less likely to acquire homes in 2004-2006.*

Overall, securitization agents had better performance after controlling for their initial holdings of homes at the beginning of 2004.

We also compare groups of agents within our securitization group to further isolate the inside job view. One salient view from the inside job hypothesis is that those who were selling mortgage-backed securities and CDOs knew that the asset fundamentals were worse than their ratings suggested. To test this view, we separate the issuers from investors in our sample and test whether the issuers either timed the market or were more cautious than investors, as suggested by the inside job hypothesis. We also test whether people who worked at firms that performed the worst during the crisis, such as Lehman Brothers and AIG, fared poorly in their housing portfolios, both in an absolute sense and relative to people working at firms who fared better. The inside job hypothesis would suggest that people working at firms who performed poorly during the crisis escaped the fall in asset prices on their own housing portfolios, either in an absolute sense, or relative to others, since the high exposure in their firms would have alerted them to the crisis.

A nuanced issue in our analysis is that securitization agents received large bonuses during the bubble period. The large income shocks might have induced them to acquire homes despite their awareness of the bubble. The housing finance literature (e.g., Yao and Zhang (2005), Cocco (2005), and Ortalo-Magne and Rady (2006)) provides models to analyze individuals' home purchase decisions in the presence of income shocks, credit constraints, and life-cycle and investment portfolio considerations. To the extent that large bonuses received by securitization agents during the bubble period relaxed their credit constraints by allowing them to afford the down payments of home purchases, one might interpret their home purchases during the period as a reflection of relaxed credit constraints rather than their expectations of the future housing prices. We partially control for this concern by using equity analysts, who experienced similar income shocks, as a control sample.

The models also imply the size of houses purchased by securitization agents as an indicator of their expectations of the persistence of their incomes. To the extent that a home provides a utility stream over time and is costly to swap, a household should choose an optimal size based on its expected permanent income rather than the current income. Thus, the awareness of the housing bubble, posited by the inside job view, should have led securitization agents to realize that their current incomes were unlikely to persist and purchase homes with more conservative value-to-income ratios than the control groups, which we test directly. We also test whether securitization agents who purchased homes in the 2004-2006 period "lived happily ever after" by testing whether they divested more heavily than other groups during the housing bust.

2. Data

2.1. Data collection

We begin by collecting names of people working in the securitization business as of 2006. To do so, we obtain the list of registrants at the 2006 American Securitization Forum's (ASF) securitization industry conference, hosted that year in Las Vegas, Nevada, from January 29, 2006 through February 1, 2006. This list is publicly available via the ASF website.² The ASF is the

² As of this writing, this list appears to be no longer available on the web. The authors have copies of the webpages available.

major industry trade group focusing on securitization. It published an industry journal and has hosted the “ASF 20XX” conference every year since 2004, which has historically attracted a broad range of participants from around the world who work in the securitization business. Since the crisis, they have continued to support the interests of its member institutions in foreclosure litigation with position papers and testimony before Congress by its Executive Director, Tom Deutsch.³ The conference in 2006 featured 1760 registered attendees, with 1015 representing the investor (buy) side and 715 representing the issuer (sell) side, and over 30 lead sponsors, ranging from every major US investment bank (e.g., Goldman Sachs, Lehman Brothers, and so forth) to large commercial banks such as Bank of America and Wells Fargo, to international investment banks such as Societe Generale, UBS and Credit Suisse, and to monoline insurance companies such as MBIA and XL Capital.

We begin by randomly sampling a list of 340 names, with 184 names from the buy side and 156 from the sell side. The registration list includes the name and position of each person, the name of the firm for which the person worked, and whether they are an issuer or investor. We then oversample 215 names – 105 buy-side, 110 sell-side – of people at twenty-one institutions that were prominent in the crisis, such as Lehman Brothers and Citigroup, for a total of 555 potential names.⁴ Between the initial random sample and oversample, our sample includes all people working for those twenty-one firms who attended the ASF that year. Of the 555 total names, 12 were C-level executives, and 76 worked for companies clearly not involved in housing, so we eliminate them from our sample.

We use the Lexis-Nexis Public Records data to collect the background information of our sample. This data aggregates information available from public records, such as deed transfers, property tax assessment records, public address records, and utility connection records. We provide a detailed description of the system and available information in Appendix A. We summarize a few key features of the data here. First, the system aggregates information from public records into a report about a person and typically contains the month and year of a

³ Testimony before the Senate Committee on Banking, Housing, and Urban Affairs, Wednesday, December 1, 2010, available online at <http://banking.senate.gov/>.

⁴ We oversample names from the following banks: AIG, Ambac, Bank of America, Barclays, Bear Stearns, Citigroup, Countrywide, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Lehman Brothers, MBIA, Mellon Financial, Merrill Lynch, Morgan Stanley, UBS, Wachovia, Washington Mutual, Wells Fargo,

person's date of birth. Second, the system not only displays information on every property a person has ever owned, but also allows us to look up all historical deed transfer records and tax assessment records associated with each property. This allows us to scan the history of each property to see if a house was transacted under a spouse's name or trust instead. These records often have the transaction date, transaction price, names of parties involved, and, in many cases, the mortgage amount associated with the purchase. Finally, even if a person does not ever own property, the person is often still in the Lexis/Nexis database, as it tracks other types of records such as utility connection records. This allows us to identify people even if they never own property.

We collect data for all properties a person has ever owned, including the location, the date the property was bought and sold, and the transaction price, when available.⁵ Our data collection began in May 2011 and we thus have all transactions for all people we collect through this date. Our analysis focuses on the period 2000-2010, the last full year we have data. We do, however, collect data for any transactions we observe, even if they are after 2010. This mitigates any bias associated with misclassifying the purpose of transactions, as we discuss below. To ease data collection requirements, we skip properties sold well before 2000, as they are never owned during the 2000-2010 period and are thus immaterial for our analysis.

To construct our sample of lawyers, we select a set of matching lawyers for each person in our securitization sample from the *Martindale-Hubbell Law Directory*, an annual national directory of lawyers which has been published since 1868. Each entry in the directory typically includes information such as the lawyer's name, employer, position, address of the employer, date of birth, legal fields of specialization, and the law school from which the lawyer graduated. We exclude lawyers who operate in real-estate-related fields as real estate lawyers may have potentially been informed about conditions in housing markets. For each person in the securitization agent sample, we randomly choose matching lawyers at most five years older or younger and working at firms located in counties in the same MSA as the matched person. Our

⁵ If we do not find a record of a person selling a given property, we verify that the person still owns the property through the property tax assessment records. In cases where the property tax assessment indicates the house has been sold to a new owner, or if the deed record does not contain a transaction price, we use the sale date and sale price from the property tax assessment, when available.

matching procedure is described in more detail in Appendix A. We have 438 total names that we search for within Lexis/Nexis.

Our sample of equity analysts consists of analysts who covered companies during 2006 that were members of the S&P 500 anytime during that same period, excluding homebuilding companies. These people worked in the finance industry but were less directly exposed to housing, where the securitization market was most active. We download the names of analysts covering any company in the S&P 500 during 2006 outside of SIC codes 152, 153 and 154 from I/B/E/S. These SIC codes correspond to homebuilding companies such as Toll Brothers, DR Horton, and Pulte Homes.⁶ There are 2,978 analysts, from which 349 names are randomly selected to collect information about their home transaction history.

2.2. Classifying home purchases and sales

Our starting point for understanding home purchase behavior is a broad framework to categorize the purpose of a transaction for a given person. We think of person i at any time t as either being a current homeowner, or not. If he is not a current homeowner, he may purchase a house and become a homeowner (which we refer to generically as “buying a first home”). Note that one may have been a homeowner at some point in history and still “buy a first home” if one is currently not a homeowner. If a person is currently a homeowner, he may do one of the following:

- A) Purchase an additional house (“buy a second home”),
- B) Sell a house and buy a more expensive house (“swap up”),
- C) Sell a house and buy a less expensive house (“swap down”),
- D) Divest a home but remain a homeowner (“divest a second home”),
- E) Divest a home and not remain a homeowner (“divest last home”).

⁶ Our references for SIC codes is CRSP, so a company needs to have a valid CRSP-I/B/E/S link.

To operationalize this classification of transactions, we define a pair of purchase and sale transactions by the same person within a six month period as a swap, either a swap up or a swap down based on the purchase and sale prices of the properties.⁷ If either the purchase or sale price is missing, we classify the swap generically as a “swap with no price information.”⁸

The purchases that are not swaps are either non-homeowners buying first homes, or homeowners buying second homes.⁹ We use the term “second” to mean any home in addition to the person’s existing home(s). Divestitures are classified similarly: among sales that are not involved in swaps, if a person sells a home and still owns at least one home, we say he is divesting a second home; if he has no home remaining, we say the person is divesting his last home. When classifying transactions in 2010, we use information collected on purchases and sales in 2011 to avoid over-classifying divestitures and first-home/second-home purchases and underclassifying swaps in the final year of data.

2.3. Transaction intensities

Our main analysis centers on the annual intensity of each transaction type – that is, the number of transactions per person per time period – and the relative differences in these

⁷ Specifically, we sort home transactions for each person in order of purchase date. We then examine the purchase date of each home transaction and see if there was any transaction whose sale date was within a six month period of the purchase date, on either side. If there was, we have a pair of swap transactions. We classify the purchase transaction in the pair as a “swap buy” leg of the swap, and the sale transaction in the pair as a “swap sell” leg of the swap. We take care to ensure that one buy or sell transaction is not counted in two swaps. We also require the purchase date of the “swap sell” house to be before the purchase date of the “swap buy” leg. This is to rule out the following case. Suppose a person buys home A in January, buys home B in February, and sells home B in March. Homes A and B would be linked as a swap in our algorithm, with the purchase of home A in January as the swap buy leg and the sale of home B in March as the swap sell leg, but this is clearly not a swap. One person in our sample did this once. If multiple homes were sold within a six month window of a purchase, the house with the closest sale date to the date of a purchase in absolute terms is paired with the purchase. If multiple homes were sold on the same day in a six month window, we pair the house bought earlier with the purchase (“first in, first out”); this is extremely rare.

⁸ We allow a person in a swap to buy first and sell later as well as to sell first and buy later. In the latter case, the person was not in possession of any property after he sold his current home but before he bought the next one. However, for our later analysis, we still think of this person as a “homeowner” in the sense that we think of this person as having planned to buy a replacement house when he sold his current home. That is, we think of the set of homeowners at any time t as the set of people who either currently own homes plus those people who do not own any homes but are in the middle of swap transactions. The set of non-homeowners are people who do not own any homes and are not in the middle of a swap transaction.

⁹ If a home is on record for an individual, but the home does not have a purchase date, we assume the owner had the home at the beginning of our sample, January 2000.

intensities across groups.¹⁰ We focus on an annual frequency to avoid time periods with no transactions. Formally, the intensity of one type of transaction in year t in a sample group is defined as the number of transactions of that type in year t divided by the number of people eligible to make that type of transaction at the beginning of year t :

$$Intensity_t = \frac{\# Transactions_t}{\# people\ eligible\ for\ the\ transaction_t}.$$

For example, the intensity of buying a first home is determined by the number of first home purchases during the year divided by the number of non-homeowners at the beginning of the year (people eligible for this type of transaction). An important feature of our data is that we observe not only transaction activity but also transaction *inactivity*, due to the comprehensiveness of the public records tracked by Lexis/Nexis. This allows us to test the hypothesis that one group was more cautious (i.e., bought less) than other groups, as we can compute the number of transactions of a certain type normalized by the total number of people who could have made that transaction, rather than only the number of people who actually did make that transaction.

A complication in this calculation is that, in a given year, a person may make multiple transactions. As a result, the number of non-homeowners at the beginning of the year does not fully represent the number of people eligible for buying a first home during the year, because, for instance, a homeowner may sell his home in February and then buy another home in September. To account for such possibilities, we define “adjusted non-homeowners,” who are eligible for buying a first home during a year, to be the group of non-homeowners at the beginning of the year plus individuals who divest their last homes in the first half of the year. We similarly adjust the number of homeowners and multiple homeowners, and provide detailed description of the adjustments in Appendix A. We use these adjusted groups as the basis for evaluating our intensities.

2.4 Income data

¹⁰ We focus on the intensity of transactions rather than the probability of an eligible person making a given transaction because one person may make multiple transactions of one type in one year. However, focusing instead on probabilities yields nearly identical results.

We are able to observe income for a subset of people in the year they purchase a home by matching information we observe about the year of their purchase, their mortgage amount, and property location with the information provided in the 2000-2010 Home Mortgage Disclosure Act (HMDA) mortgage application data. The HMDA information contains data on the income relied on by the originating institution to underwrite the loan. Although most identifying information – such as the borrower’s name, exact date of origination and property address and zip code – are not provided, the data provides the mortgage amount (up to the thousands) as well as the census tract of the property. Census tracts (a six digit code) form a very fine within-county geographical classification that is specifically constructed by the Census Bureau every ten years to be relatively homogeneous with respect to population characteristics, economic status, and living conditions.¹¹

We match purchases to the income reported at the time of purchase using the following procedure. We first use the ArcGIS geocoding software to obtain the census tract associated with each property address. For each purchase, we then look for records in HMDA with the same mortgage amount in the year of purchase within the census tract of the property. In HMDA, we search within the set of mortgage applications where the loan was originated and where the purpose of the loan was a purchase.¹² If we successfully find a match, we take the stated income on the HMDA application as the income of our person at the time the purchase was made.

One concern is that, even given an exact mortgage amount (e.g., \$300K), census tract, and purchase year, there may be multiple matches within HMDA. However, the average number of matches per purchase is roughly three, and the median match is unique.¹³ Given the economic construction of census tracts, we average income over all matches in HMDA as the income for

¹¹ Further information on census tract definitions come from http://www.census.gov/geo/www/cen_tract.html. Relative to zip codes, which are designed to meet the operational needs of the US Postal Service, census tracts are designed around economic characteristics. Discussion about how zip codes compare to census tracts may be found online at <http://www.census.gov/geo/www/tiger/tigermap.html>. We use 2000 census tract definitions, as the purchases we are trying to match come from the 2000-2010 period.

¹² Although HMDA reports the gender and ethnicity of the applicant, we chose not to match on this information as the public records information do not contain this and we did not wish to hazard guesses for a number of names.

¹³ A similar concern theoretically arises about multiple distinct purchases within the same year that we are trying to match having the same mortgage amount and census tract. This does not arise in our data.

that purchase. One can repeat the analysis using only unique matches, which reduces our sample by slightly less than half, and obtain qualitatively similar results that are more influenced by a small number of observations at the tail ends of the distribution.

3. Descriptive Statistics

Table 1, Panel A presents the number of people in each sample. After eliminating people who are C-level executives, who work for companies clearly unrelated to housing (e.g., student loan companies), who we could not find in Lexis/Nexis, who we could not confidently isolate, and people lived internationally, we are left with 361 people in our securitization group.¹⁴ After similarly eliminating people for the other sample groups, we have 295 equity analysts and 425 lawyers in our sample. Panel B presents the age distribution for these people. The median ages in 2011 for the securitization agent, equity analyst, and lawyer samples are 45, 44, and 46, respectively. Chi-square tests of homogeneity fail to reject the hypothesis that the distributions presented in Panel B are different.

We present additional details about the people in our securitization sample in Table B1 in Appendix B. We summarize a few key features here. Our sample features people from 153 distinct firms, of which we are able to match 55 as publicly traded companies in CRSP during the 2007-2008 period. Because we oversample all people associated with major firms, our sample is tilted towards these companies. The most prominent companies in our sample are Washington Mutual (with 26 people), Wells Fargo (26), Citigroup (15), JP Morgan (15), AIG (12), Countrywide (10), Merrill Lynch (10), Deutsche Bank (9), Lehman Brothers (9), and UBS (9). The most common position titles are Vice President (80), Senior or Executive Vice President (56), and Managing Director (37). In addition to the large firms, a number of regional lenders such as BB&T, smaller mortgage originators such as Fremont General and Thornburg Mortgage, and buy-side investors such as hedge funds and investment firms are present as well.

Turning our attention to properties, Table 2, Panel A breaks down the number of properties owned over 2000-2010. Our data spans 600 properties owned by securitization agents during the

¹⁴ Our search involves first searching for a person's LinkedIn profile, which contains self-reported current location information. If we find that they report an overseas location, we exclude them from our sample.

2000-2010 period, 446 by equity analysts, and 633 by lawyers. Of these, the majority were bought during the same period; for example, securitization agents bought 388 properties during this period. Roughly 35% of these were sold during this period; for example, securitization agents sold 231 properties during this period.¹⁵

Figure 2 presents a map of properties in our sample. The most represented areas for all groups are the Middle Atlantic (NJ-NY-PA) and Pacific areas (dominated by California). The New York combined statistical area (roughly the NJ-NY-CT tri-state metro area plus Pike County, PA) is the most prominent metro area, followed by Southern California (Los Angeles plus San Diego). Equity analysts tend to be concentrated more in New York. Table B2 in Appendix B presents the geographical distribution in detail.

Table 2, Panel B summarizes the results of our income matching procedure. For the securitization sample, we have mortgage and census tract information for 292 purchases out of 388 we observe from 2000-2010. Of these, 200 are matched, an unconditional success rate of 52%; for the equity analyst and lawyer groups, this rate is 52% and 45%, respectively. Over the entire 2000-2010 period, the average income level at purchase was \$345K for the securitization sample, \$409K for the equity analyst sample, and \$186K for the lawyers. All income figures are reported in 2006 dollars adjusted using the Consumer Price Index (CPI) All Items series as of the end of December 2006.

There are a number of caveats in analyzing our observed income figures. First, one concern is that these numbers appear a bit too “small” relative to what is commonly perceived as finance industry pay. The income reported in HMDA represents income used by the bank to underwrite the loan, which may often include only taxable income provided by the mortgage applicant and is thus likely downward biased. Forms of compensation not taxable during the year, such as employee stock option grants, would not be included. What matters for our subsequent analysis is whether the time variation in the bias is homogeneous across our samples. If there is a constant amount of underreporting within each group across time, comparing the time-variation in income across groups is a valid exercise. However, if the amount of underreporting varies

¹⁵ There are a small number of properties for which we have no purchase date. A missing purchase price reflects missing data, which we deal with below. There are a substantial number of properties with either no sale date or a sale date after December 31, 2010; these are homes that were still owned as of that date.

across time, the bias becomes problematic. Second, even if this reporting issue were not present, observed income levels are not unbiased representations of the true distribution of underlying income because we only observe income at purchase, and not income in other years (and for non-purchasers). Finally, our analysis does not represent income of the same people at repeat purchases, and the small sample size makes it difficult to draw definitive conclusions. However, with these caveats in mind, we view this as a useful descriptive exercise that allows us to compare the time-variation in purchase income across groups and assess whether the securitization and equity analyst groups received similar shocks across time.

Table 3 breaks down average income observed at purchase into three bins, corresponding to the pre-housing boom (2000-2003), housing boom (2004-2006), and housing bust (2007-2010).¹⁶ Our securitization agents received large income shocks from the pre-boom to the boom period, with average income rising by \$145K, over 50% of average pre-boom income. Equity analysts also received income shocks, with average income at purchase rising by \$51K. Median incomes rose for both groups by more comparable magnitudes. These results are roughly consistent with our initial hypothesis that the two finance industry groups received positive income shocks, although securitization agents received a slightly larger average shock.

Table 4 summarizes transaction prices each year. Through 2004, the average purchase price for securitization agents increases from \$525K to \$944K in 2004, declining thereafter. Equity analysts' purchase prices are higher than the securitization group on average, even before the housing boom; the average purchase price in 2000 was \$850K. Average purchase prices for lawyers began with \$454K in 2000, rising slightly to a peak of \$583K in 2005 and falling slightly thereafter.

Examining annual purchase and sale activity is reduced form in that it masks the underlying choices of individuals. Table 5 breaks down purchases and sales by transaction type over the entire period 2000-2010. The number of purchase transactions exceeds the number of sale transactions, since a number of people may be still living in homes they purchased. The most common purchase type observed is buying a first home. Buying a second home and swapping a

¹⁶ Because we are interested in average income per person, we first average within person over purchases to obtain a person-level average income for the period before averaging over people in each period.

home for a more expensive one are the next most common purchases. Among sales, a sale involved in any type of swap is the most common transaction.¹⁷

4. Empirical Results

4.1. Were securitization agents more aware of the bubble?

Figure 3 plots the housing stock of each group through time as a ratio relative to the housing stock for each group at the end of 1999. Both the securitization agent and equity analyst groups nearly doubled their stock of houses through 2007, with a decline through the end of 2009 for the securitization group before rising again. This already suggests that there is little evidence of the securitization agent sample being cautious as a group, as their housing stock if anything grew the most aggressively through time.

To more formally analyze the inside job hypothesis, we first examine whether securitization agents divested houses in advance of the housing crash. This is a necessary condition for timing the bubble successfully. Table 6 presents the divestitures per person per year for each group through time. These intensities are also plotted in Figure 4. The raw divestiture intensities for the securitization agent sample are, if anything, lower than the divestiture rates of equity analysts and lawyers during the bubble period. On an unadjusted basis, the rate of divestiture is qualitatively lower for the securitization agent sample compared to both of the equity analysts and lawyers in every year from 2003-2006, with the exception of 2004, and higher during the bust period, 2007-2009.¹⁸

To account for heterogeneity in the age profiles of each group, we compute regression-adjusted differences in intensities. We do this by constructing a strongly-balanced person-year panel that tracks the number of divestitures each year for each person, including zero if no

¹⁷ The total number of swap sales and swap purchases over 2000-2010 may not exactly match as there may be corresponding swap legs six months before and after this period. In this case, there was one swap where the sale leg was executed in 2000 while the purchase leg was executed in 1999 for securitization agents, and vice versa for one swap pair of lawyers.

¹⁸ The raw number of divestitures each year may be read off by multiplying the intensity in a given year from Table 6 by the number of homeowners in that year given by Table B3 in Appendix B. For example, in 2008, there were eighteen divestitures (0.065 times 276) in the securitization sample. In contrast to our regression-adjusted differences, we do not condition on having age information when reporting these raw intensities.

divestiture was observed. We then estimate the following equation for each possible pairing of the securitization group with other groups using OLS:

$$E[\#Divestitures_{it} | HO_{it-1} = 1] = \alpha_t + \beta_t \times Securitization_i + \sum_{j=1}^7 \delta_j Age_j(i, t) + \lambda MultiHO_{it-1}. \quad (1)$$

The variable $\#Divestitures_{it}$ is the number of divestitures for individual i in year t , $Securitization_i$ represents an indicator for whether individual i is part of our securitization agent sample, $Age_j(i, t)$ represents an indicator for whether individual i is part of age group j in year t (where eight age brackets are defined according to Table 1, Panel B, and one age group is excluded), and $MultiHO_{it}$ represents whether individual i was also a multi-homeowner in year t . We use indicators for age brackets instead of a polynomial specification for age as it makes the regression easily interpretable as a difference in means. In each year t , we condition the sample such that only the adjusted homeowners for year t (i.e., those who started year t as homeowners or became a homeowner during year t) are included in the estimation. The coefficients β_t are thus the annual difference in average divestitures per person within the homeowner category across samples, adjusted for these age and multi-homeownership factors. We cluster standard errors by person.¹⁹

Table 6 presents these regression-adjusted differences. Rates of divestiture are statistically similar in every year of the sample. Economically, divestiture rates are lower for the securitization group in 2006 and higher in 2007-2009. Overall, there is little evidence that suggests people in our securitization agent sample sold homes more aggressively prior to the peak of the housing bubble relative to either equity analysts or lawyers.

¹⁹ The effective sample size (number of people contributing to the variation) of this estimation will be the total number of people who we ever observed as adjusted homeowners during the 2000-2010 period for whom we have age information across these two groups. This may be read off from the last row of Table B3, Panel B. For example, when estimating equation (1) for the securitization sample and the equity analyst sample, the number of people will be 517 (292 plus 225). The number of homeowners contributing to the variation each year may similarly be read off from the same table, which lists the number of homeowners and non-homeowners each year with age information. For example, when estimating (1) for the securitization agent and equity sample, the number of people observed in 2000 is 343 (195 plus 148).

We next examine whether non-homeowners among securitization agents were cautious in purchasing homes in 2004-2006, the “cautious form” of Hypothesis 1. This alternative story emphasizes that they knew about the bubble, but that the optimal response was to avoid purchasing homes given the difficulty in timing the crash. Table 7 examines the intensity of first home purchases among eligible non-homeowners. We compute regression-adjusted differences following the same specification as in equation (1), replacing the number of first home purchases as the left-hand side variable, conditioning the panel each year to non-homeowners, and omitting the $MultiHO_{it}$ term as it does not apply to non-homeowners. Figure 5, Panel A plots the raw intensities through time. The securitization agent sample had a very similar rate of first home purchases compared to the equity analysts and lawyers. If anything, there is a slightly higher rate of first home purchase in 2006, and much higher rate of first home purchases in 2010. This latter result is consistent with the high rate of divestiture observed above. If securitization agents lost their jobs and needed to move, it makes it more likely that they would have to divest a home and move into a new house at a much later date.

Homeowners in the securitization agent sample also showed a similar lack of cautious behavior when swapping up or purchasing second homes. Table 8 tabulates the raw intensities and also regression-adjusted differences in intensities of buying a second home or swapping up to a more expensive home. Figure 5, Panel B plots the raw intensities through time. The regression-adjusted differences are computed using a specification analogous to equation (1) where we replace the left-hand side variable with the number of second home purchases plus swap-up transactions for individual i during year t . The raw difference implies that the rate of transactions per person per year was 0.07 higher in 2005 for the securitization group relative to both the equity analysts and the lawyers. On a regression-adjusted basis, the difference in intensities is nearly 0.09 between the securitization sample and the equity analyst sample and 0.06 for the lawyer sample, with the former statistically significant at the 1% level and the latter at a 5% level.

4.2. Robustness

We perform the following robustness checks on this result, reported in Table 9. First, we exploit the fact that we observe 91 securitization agents and 127 equity analysts working at a

common set of 16 firms to remove company-specific effects. For this test and for other tests, we pool together intensities every other year (2000-2001, 2002-2003, and so forth) to mitigate the concern that our results are driven by spurious differences between a small number of transactions we may observe during a single year when we condition the sample tightly. We estimate the following equation:

$$\begin{aligned}
 E[\#BuySecondOrSwapUp_{it}|HO_{it-1} = 1] & \quad (2) \\
 & = \gamma_j + \alpha_{s(t)} + \beta_{s(t)} \times Securitization_i + \sum_{j=1}^7 \delta_j Age_j(i, t) + \lambda MultiHO_{it-1},
 \end{aligned}$$

where γ_j represents company-specific effects and $s(t) = 0$ if $t=2000$ or 2001 , $s(t) = 1$ if $t=2002$ or 2003 , and so forth. The first column of Table 9 shows that, on average, purchase intensities for second homes and swap-ups are higher for securitization agents before the bust, even controlling for firm effects.

Heterogeneity in property locations is a concern, since the magnitude of the housing bubble was very heterogeneous across areas, as shown previously in Figure 1. Although our sample of lawyers is location matched with our securitization agents, equity analysts are relatively more concentrated in the New York metro area. If securitization agents lived in areas where it was cheaper or easier to purchase a second home or swap up, this location effect may drive our previous results. To check whether this is the case, we condition the sample of homeowners each year to those who own property in the New York metro region at the end of the previous year, and estimate the following model:

$$\begin{aligned}
 E[\#BuySecondOrSwapUp_{it}|HO_{it-1} = 1, PropNYC_{it-1} = 1] & \\
 & = \alpha_{s(t)} + \beta_{s(t)} \times Securitization_i + \sum_{j=1}^7 \delta_j Age_j(i, t) + \lambda MultiHO_{it-1}, \quad (3)
 \end{aligned}$$

where $PropNYC_{it-1}$ is an indicator for whether person i owns property in the New York metro area at the end of year $t-1$. We find that, even within this smaller subsample, securitization

agents were more aggressive with purchases of second homes and swap-ups in 2004-2005 relative to equity analysts, an effect that is statistically significant at the 10% level.

We repeat this exercise for people who live in Southern California, our second most represented metro region. We find that securitization agents were more aggressive before the bubble burst in purchasing second homes and swapping up than equity analysts and slightly more aggressive than lawyers, although the sample size is smaller than in the New York metro area test. However, the difference in intensities between securitization agents and the control groups is larger in Southern California than New York. Given that southern California had a much larger boom-bust cycle than New York, this suggests that securitization agents were even less aware of the bubble in areas where the bubble was very pronounced relative to areas where the bubbles were not pronounced.

To further test this insight, we compare the behavior of securitization agents living in Southern California with that of securitization agents living in New York by estimating:

$$E \left[\begin{array}{l} \#BuySecondOrSwapUp_{it} | HO_{it-1} = 1, Securitization_i = 1, \\ (PropSoCA_{it-1} = 1 \text{ or } PropNYC_{it-1} = 1) \end{array} \right] \\ = \alpha_{s(t)} + \beta_{s(t)} \times PropSoCA_{it-1} + \sum_{j=1}^7 \delta_j Age_j(i, t) + \lambda MultiHO_{it-1}, \quad (4)$$

where $PropSoCA_{it-1}$ is an indicator for whether person i owns property in the Southern California region at the end of year $t-1$. We exclude a handful of people with properties in both regions to isolate whether people who lived in Southern California were truly more aggressive than those who lived in New York. We perform this exercise both with the number of second home purchases and swap ups on the left hand side (Column 6 of Table 9) as well as just the number of second home purchases (Column 7 of Table 9), since we are worried that we may mechanically classify more purchases as swap-ups in areas with larger price bubbles. In both cases, securitization agents in Southern California were more aggressive than those in New York. Although there may be other interpretations as to why there is different behavior across Southern California and New York, these results are consistent with the idea that securitization

agents living in areas which experienced larger boom/bust cycles were even more aggressive than their counterparts in regions with more moderate cycles.²⁰

4.3. Net trading performance

We next systematically analyze which groups fared better during this episode by comparing their trading performance during the housing boom and bust. Our strategy is to compare their performance based on the relative differences in the location and timing of their sales and purchases alone from the beginning of our sample onwards to see whether trades subsequent to this date helped or hurt each group on average. This strategy puts all groups on equal footing in terms of leverage, alternative investment opportunities, and performance gains from home improvements, the latter two of which we do not observe, and the first of which is similar across groups, as suggested by Panel B of Table 2. Our test is only focused on the performance of their purchase and sale behavior along the timing and location dimensions.

Our thought experiment is the following: if we assume agents follow a self-financing strategy where the available investments are houses in different metro areas and a risk-free asset, how did their observed performance compare with that of a hypothetical buy-and-hold strategy as of the beginning of 2000? We begin by assuming time flows quarterly, and we mark the value of each house up or down every quarter from its actual observed purchase price and date in accordance with quarterly zip-code level home price indices from Case-Shiller.²¹ We then proceed with the following assumptions. First, we assume that agents each purchase an initial supply of houses at the beginning of 2000 equal to whichever houses they are observed to own in each metro area. Second, agents have access to a cash account which earns the risk-free rate. Specifically, cash is invested at the end of each quarter in a 3-month Treasury bill with yield

²⁰ There were insufficient observations in the Arizona/Nevada/Florida regions to conduct this type of test. We chose New York and Southern California both because New York experienced a much more moderate bubble than Southern California, but also because of practical considerations given how many observations we have.

²¹ For houses that fall outside areas followed by Case-Shiller, we use FHFA county-level home price indices if available, followed by FHFA CBSA home price indices, followed by the national home price index as a last resort. This latter case only arises for 58 houses out of 1,679 in our sample, or 3.5% of houses. If no purchase price is available, or if the purchase date falls before the first date that we have an available index value, we mark the value of each house in every quarter up or down from the sale price on the sale date, if the house has been sold. Failing this, we try to assign the value based on the purchase price and the first available home price index. When all else fails, we assign the initial value of the house as the median initial value of all houses within each sample computed under the above method. As a robustness check, we also evaluate performance where we equal weight each house by assigning the value of each house in the initial quarter to be \$1, and results are similar.

equal to the observed 3-month T-bill yield, which we obtain from the Federal Reserve Board H.15 series. Third, we endow each agent with enough cash to finance the entirety of their future purchases and thus abstract away from differences in leverage.²² This last assumption errs on the side of conservatism in isolating performance differences arising from the timing of home purchases.

We compute both the return from the self-financed strategy and the return from a counterfactual buy-and-hold strategy, where agents purchase their initial set of houses and then subsequently never trade. We denote the difference between the returns of these two strategies as the performance index for each individual. The performance index captures whether trading subsequent to the initial date helped or hurt the individual relative to a simple buy-and-hold strategy.

We then compute the average dollar performance for each group by taking the weighted average of the performance index across individuals, where we weight by the initial value (wealth) of each individual's portfolio. Weighting by the initial portfolio value economically captures the value-weighted performance of each group. We compare the performance across groups by projecting the performance index onto an indicator for the securitization group and indicators for the age categorizations using ordinary least squares in the cross-section of individuals, with sampling weights equal to their initial wealth and heteroskedasticity-robust standard errors. Intuitively, this methodology is a "difference-in-difference" where the first difference is over the buy-and-hold performance and the second difference compares the securitization agents' value-weighted performance with the control group's value-weighted performance.²³

²² We endow each agent with enough initial cash to cover all future transactions in the following way. We first compute the maximum amount of debt that each agent would incur over the entire period to finance their positions if each agent began with no cash. We then endow the agent with this amount of cash in a "second pass" from which we compute their trading performance. We endow agents who do not ever trade (and thus would issue zero debt) with the mean cash level of agents in their sample who do trade houses over this period. This approach essentially fully collateralizes all future trades and assumes that agents who do not trade earn the risk-free rate. We can easily assume that agents follow a given leverage policy into our framework although it only magnifies the magnitude of differences.

²³ Due to the skewed nature of the distribution of initial wealth, we have experimented with winsorizing the distribution of initial wealth, as well as weighting by non-linear transformations such as the square root of wealth. Both exercises yield statistically and economically similar results. Not weighting at all and computing the average per-person performance yields qualitatively similar results although the differences are smaller. This suggests that, while per-person differences in performance were smaller between the two groups, dollar differences were larger.

Table 10, Panel A presents summary statistics for our exercise. The average initial portfolio value (cash plus houses) was roughly \$1.1M per person in the securitization sample. Equity analysts began 2000 with more valuable portfolios, at \$1.6M per person, while lawyers began on average with \$660K per person. Panel B tabulates the wealth-weighted average return, buy-and-hold return, and performance index per person for each group, as well as the regression-adjusted differences, while Figure 6, Panel A illustrates the comparative evolution of the performance indices. What is apparent is that all groups, including securitization agents, were worse off at the end of 2010 relative to a buy-and-hold strategy that began in 2000q1.

In fact, the securitization group experienced significantly worse gross returns than the equity analyst group, a difference of 5.4% on a regression-adjusted basis. Although part of this is due to a difference in the buy-and-hold return across the two groups (2.7%), the remaining difference of 2.7% quantifies the net trading underperformance of the securitization group, a difference which is statistically significant at the 5% level.²⁴ In particular, the gross return during the 2007-2010 bust period for the securitization group was particularly poor. Differences with the lawyer group were more modest, although still negative.²⁵ In summary, the observed trading behavior of securitization agents hurt their portfolio performance both in an absolute sense and also relative to that of other groups.

Table 11 evaluates the net trading performance of subgroups of securitization agents relative to other subgroups. This “within-securitization” analysis further isolates the inside job view by controlling for unobserved heterogeneity between securitization agents, equity analysts, and lawyers, as well as by examining more nuanced predictions. Table 11, Panel A compares the performance of sell-side agents (issuers) with agents from the buy side (investors). Figure 6, Panel B plots the comparative evolution of the performance index for these two subgroups. Of our 361 securitization agents, 153 work on the sell side and 208 work on the buy side.

²⁴ In interpreting this magnitude, it is worth recalling that our performance evaluation fully collateralizes all purchases and endows agents with large amount of cash, so that this difference likely significantly understates the true difference in portfolio performance across the two groups.

²⁵ We have also experimented with different initial dates for the performance evaluation. For starting dates between 2000q1 and 2004q4, results are very similar. Differences between the two groups when using a starting date of 2005q4 and 2006q4 manifest mostly in the gross return, with the securitization group doing worse, with little difference in the performance index across groups. This suggests that the trading performance between the beginning of 2006 through 2010 is largely dominated by the buy-and-hold performance, underlining the point that securitization groups were unable to divest homes before the crash.

Evidently, sell-side analysts performed much more poorly compared to their buy-side peers, with a performance index 6% lower, a difference that is statistically significant at the 5% level. This is inconsistent with the view that the average person working to issue mortgage-backed securities and CDOs knew that asset fundamentals were worse than their ratings suggested.

Table 11, Panel B compares the performance of people working at firms who performed well during the crisis and those who did not, while Figure 6, Panel C plots the comparative evolution of their performance indices. The idea is to test whether people whose firms did poorly were nevertheless able to escape the crisis themselves. We hand-match our list of companies to CRSP and sort them into terciles of buy-and-hold stock performance from July 2007 through December 2008, the period over which a significant portion of the crisis develops. In total, we have 153 distinct companies for which we are able to match 55 as publicly traded companies in CRSP, covering 170 people in the lowest and highest terciles of stock price performance. Low-performing companies include Lehman Brothers, Washington Mutual, Bear Stearns, and Countrywide. Better-performing firms include BB&T, Wells Fargo, and Blackrock. The results show that people working at poorly-performing firms, if anything, did worse in their own housing portfolios than people working at better-performing firms. In particular, the gross return during the 2007-2010 period was particularly poor for the people working at firms who performed poorly.

4.4. Consumption and income shocks

One concern is that these results may be consistent with securitization agents being aware of the bubble if they knowingly bought houses that they anticipated would fall in value due to the consumption stream provided by housing as a durable good. For example, if agents are credit constrained, then large income shocks during the bubble period would enable them to purchase homes even if they anticipated a decline in value later as long as the consumption stream was large enough.

On the one hand, comparing the securitization agents to the equity analyst sample partially controls for income shocks to the extent that they both work in the financial sector; even conditional on wanting to consume out of income shocks, one would expect a group that was aware of the housing bubble to either time the market better or be more cautious. However,

there may be heterogeneity within the financial sector, so this issue is worth exploring in more detail.

In particular, one concern is that the income shocks are large enough as to make cautiousness difficult to detect by analyzing only the timing of home transactions. We explore two more tests to isolate whether agents exhibited any cautiousness. First, we examine whether the securitization sample was less aggressive than other groups in terms of the value-to-income ratio of their purchases. From Table 3, income was ex post transitory, as both median and average incomes for securitization agents fell from the boom to the bust period. *Ceteris paribus*, if securitization agents expected their income shocks to be transitory but uninformed equity analysts did not, we should observe securitization agents purchase homes at lower value-to-income ratios, where current income is in the denominator.

We compute the value-to-income (VTI) ratio for the subsample of purchases where we have both income data from HMDA and an observed purchase price.²⁶ Table 12 tabulates the mean and median VTI for each group in each of the three periods. The average VTI for purchasers in the securitization sample increased from 3.1 to 3.4; the median showed a slight decrease from 3.0 to 2.9, suggesting there are some purchasers who purchased homes at a very large VTI ratio, even after trimming out those with low incomes. The average VTI among equity analyst purchasers increased from 3.0 to 3.4, while the median increased from 2.8 to 3.2. Row A reports the increase in average going from the pre-boom to the boom period within each group, while Row B reports the differences in differences with the securitization sample. The average VTI for purchasers among securitization agents rises only slightly less than that of equity analysts. Overall, the evidence does not display any strong pattern consistent with the hypothesis that the securitization agents were much more conservative.

One caveat to analyzing the value-to-income ratio is that our measures of income are likely downward biased, as noted in Section 3. Because our analysis focuses on the comparing the change in value-to-income across groups, the change in VTI will be mis-measured if the bias in underreporting income itself varies across time. We thus also examine whether there were differential patterns of selling during the bust across our groups within the subsample of

²⁶ Due to the nature of VTI as a ratio, we require a minimum nominal reported income of \$100K in the year of purchase to avoid drawing conclusions based on possible extreme tails overly influencing our analysis.

purchasers during the 2004-2006 period. If purchasers during this period divested their houses during the housing bust, this would cut against the hypothesis that securitization agents bought houses during the boom for the consumption stream despite knowing that there would be a crash in housing markets, since the consumption stream was short-lived.

Table 13, Panel A reports the number of properties purchased during this period and the number of purchasers for each group. For this analysis, we do not condition on having income data. Panel B reports the percentage of properties purchased in 2004-2006 remaining after each year starting in 2007 as well as the percentage of properties sold in each year. We find that securitization agents, if anything, sell off these properties more aggressively during this period relative to equity analysts, and at a similar rate with lawyers. At the end of 2007, 89% of the housing stock remains for the securitization agent group; by the end of 2010, only 75% remains. If anything, in the prime crisis years (2007 and 2008), securitization agents seem to sell off larger proportions of the initial stock of 2004-2006 purchases than either lawyers or equity analysts, as can be seen in Figure 7, which plots the percentage of properties bought during 2004-2006 still remaining each year. The bulk of these sales were divestitures.

Panel C computes the intensity of sales, or number of sales per purchaser, during the bust, for each group, by the end of 2010. The number of sales per person was higher for the securitization group than other groups. For example, per person, intensity of home sales during the bust was 0.22 for the securitization group, while it was 0.11 for equity analysts. These homes were largely not replaced: the intensity of net sales was higher for securitization agents than equity analysts, whose negative net sale intensity indicates equity analysts actually accumulated more homes during the bust. Taken together, these results suggest that people in the securitization group who purchased during the 2004-2006 period did not live happily ever after in the homes they recently purchased.

5. Conclusion

Although there was certainly unsavory behavior on Wall Street during the housing boom – Fabrice Tourre and Bernie Madoff, for example – we find little systematic evidence that the average securitization agent was aware of the severity of problems in the housing markets. They

neither managed to time the market nor exercised caution, relative to non-real estate lawyers and non-housing S&P 500 equity analysts. Our evidence thus lends little support to the view that the average securitization agent anticipated the crash earlier than most. One caveat to our analysis is that it is possible that securitization agents did not anticipate the spread of problems from the subprime market to the prime market despite being more aware of problems in the subprime market. Nevertheless, our research points towards the need to understand how beliefs were formed among people in finance during the bubble.

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Figure 1: Home Price Indices

This figure plots the home price Federal Housing Finance Agency (FHFA) home price indices from 1999q4 through 2011q4, where we normalize 1999q4 to be 100.

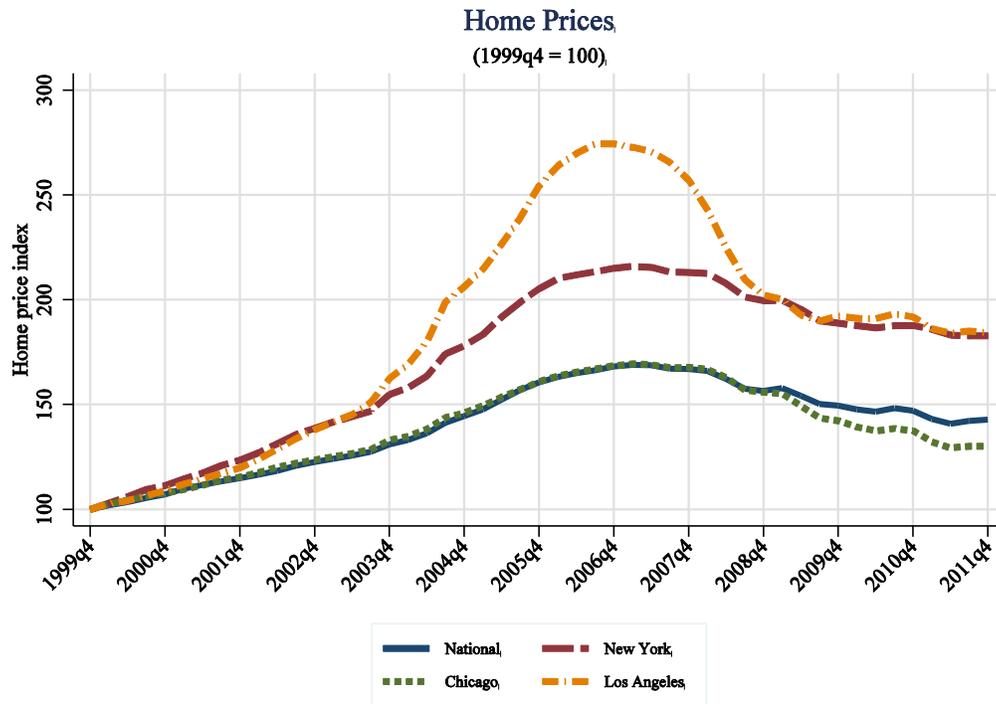


Figure 2: Property Locations

This figure displays the locations of properties collected in our sample.

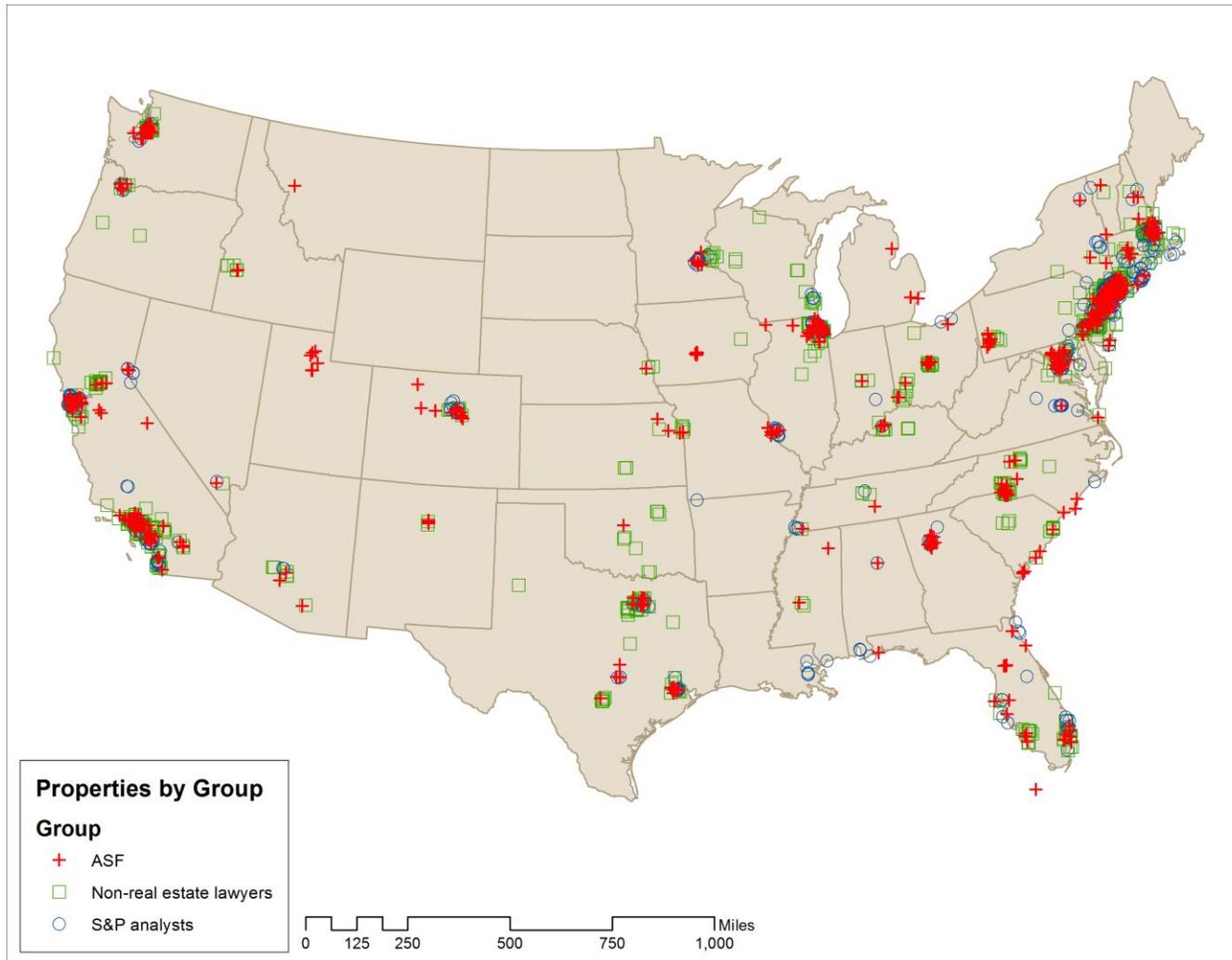


Figure 3: Housing Stock

This figure plots the ratio of total houses owned at the end of each year to total houses owned at the end of 1999.

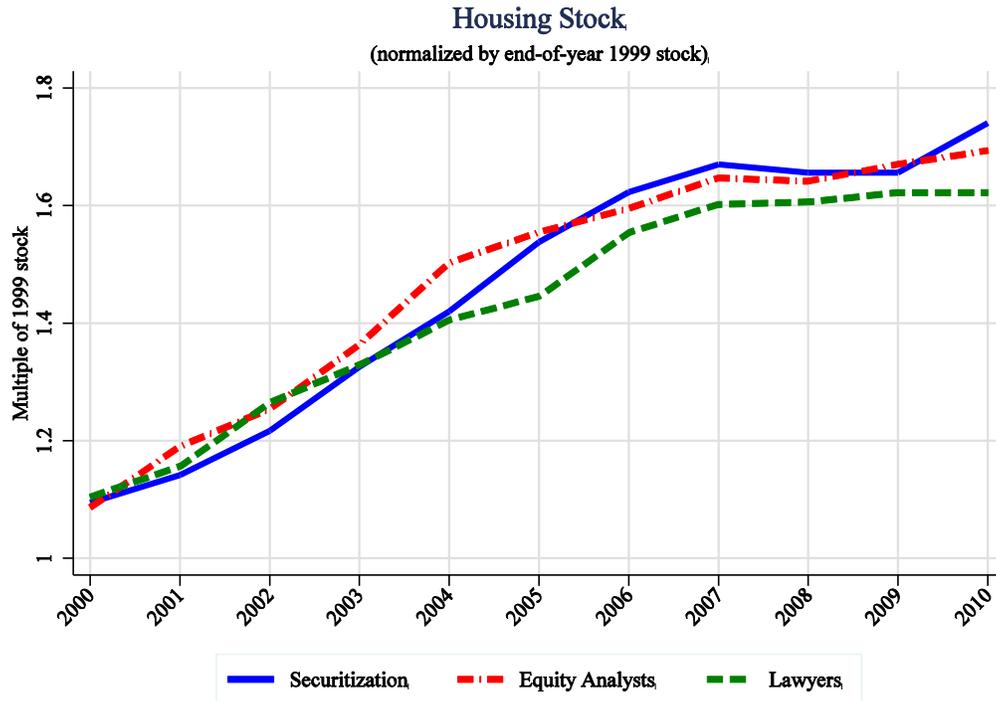


Figure 4: Divestitures

This figure plots the intensity of divestitures through time, defined as the number of divestitures per adjusted homeowner each year, for each sample.

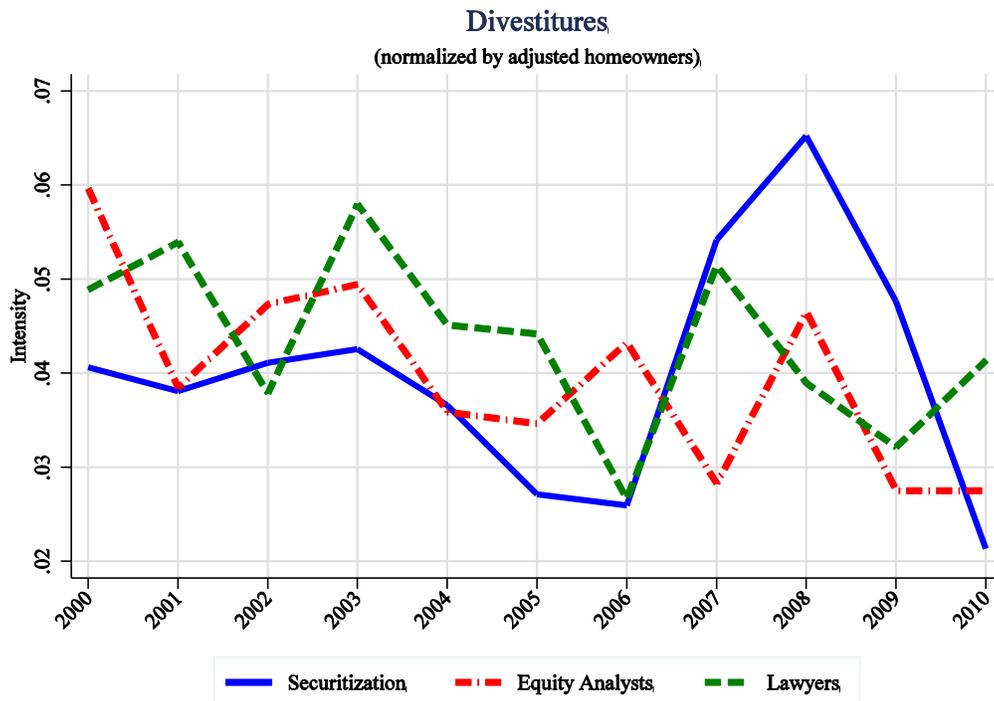
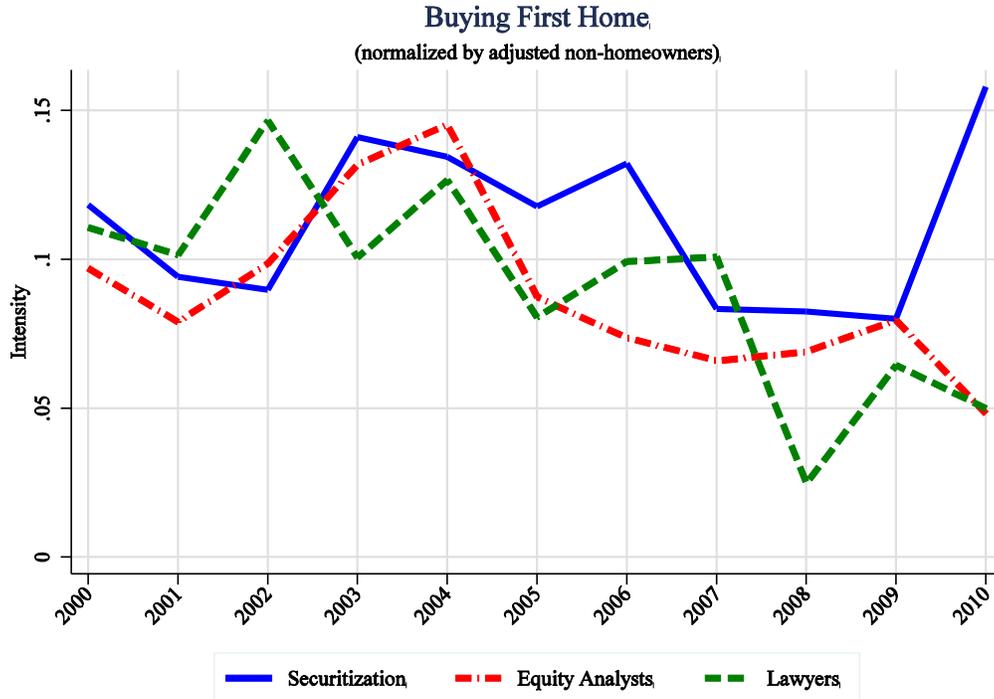


Figure 5: Purchases

Panel A plots the intensity of first home purchases, or the number of first home purchases per adjusted non-homeowner, through time. Panel B plots the intensity of buying a second home or swapping up, the number of second home purchases plus swap-up transactions per adjusted homeowner, through time.

Panel A: Buying First Home



Panel B: Buying Second Home or Swapping Up

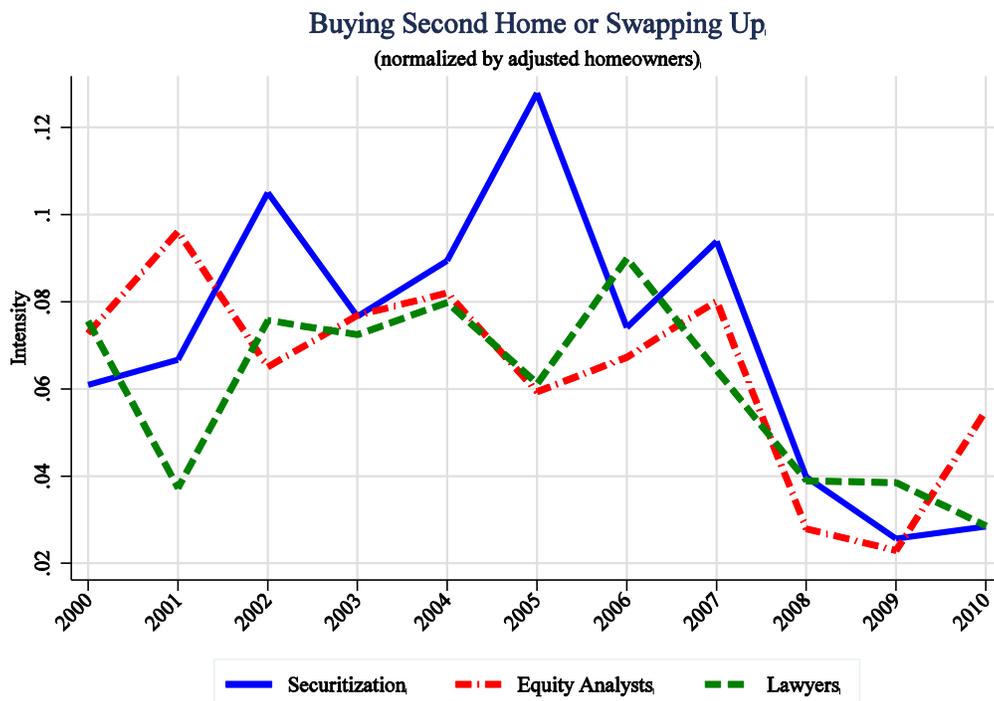
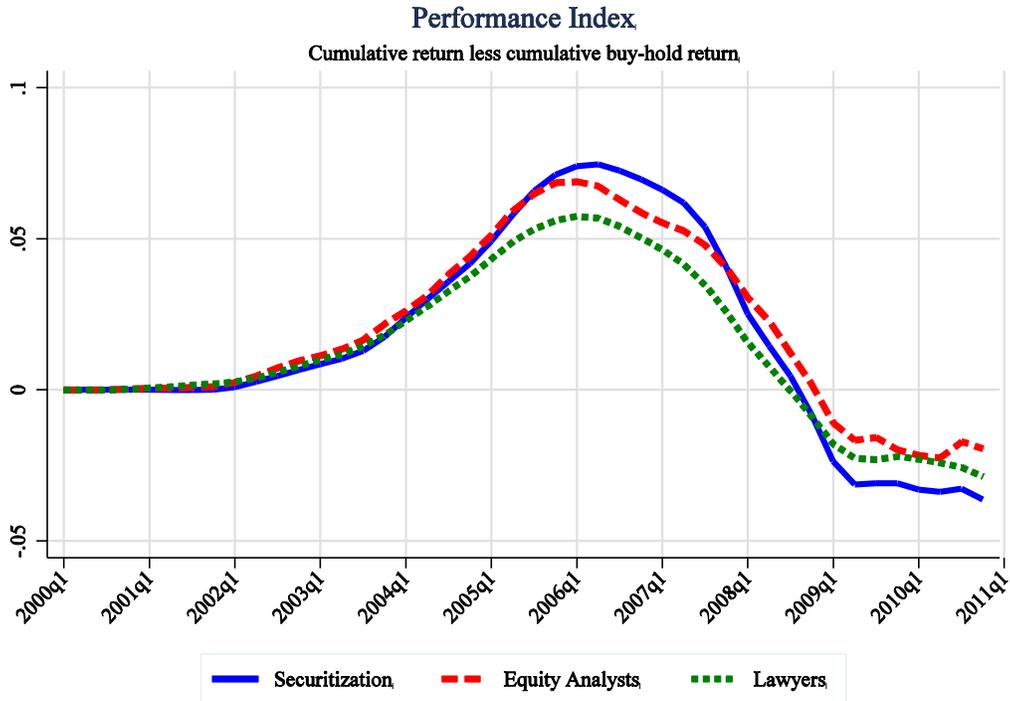


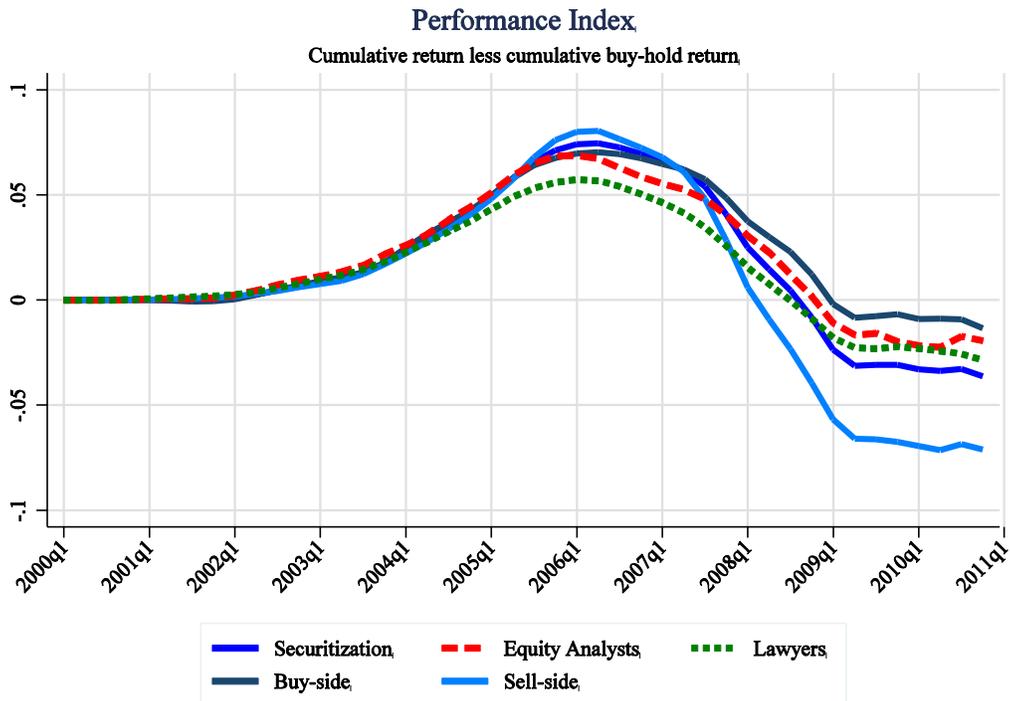
Figure 6: Trading Performance Indices

This figure plots the average performance index, defined as the initial-wealth weighted average cumulative return on the self-financed trading strategy less the buy-and-hold return of the initial stock of houses, where 2000q1 is taken as the initial quarter and houses are marked-to-market using quarterly zip-code level home price indices.

Panel A: Securitization Group, Equity Analysts, and Lawyers



Panel B: Sell-side and Buy-side



Panel C: Securitization Agents at Best and Worst-Performing Firms

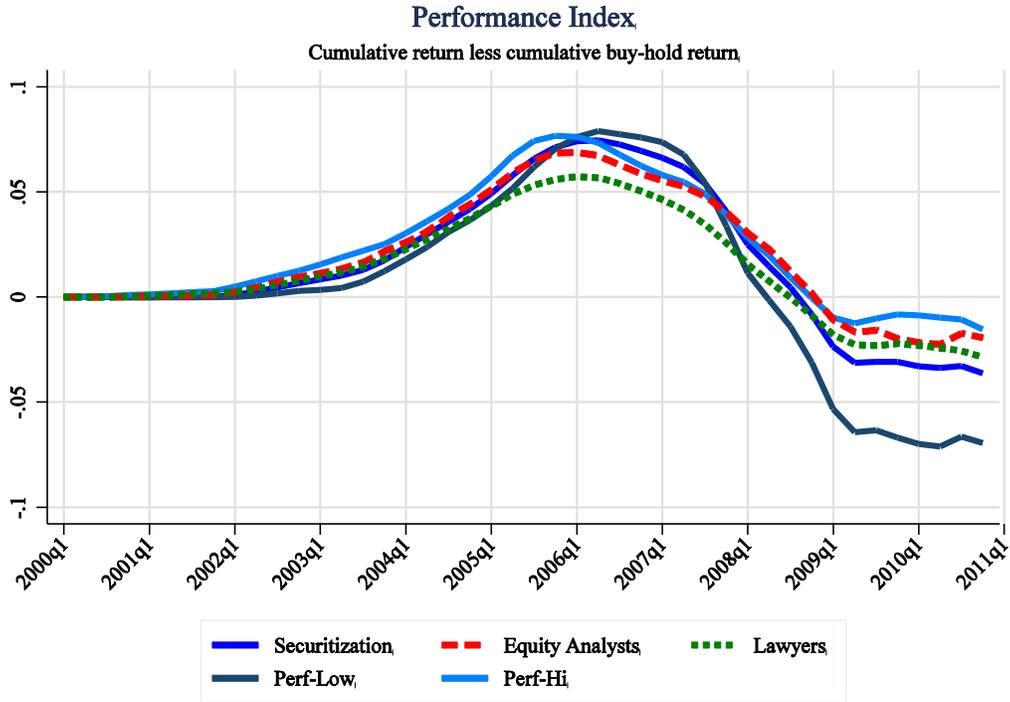


Figure 7: Properties Still Owned

This figure plots the percentage of properties purchased in 2004-2006 still owned at the end of each year. Note that a house bought in 2004 may be sold before 2006, hence the proportion is not 1 at the end of 2006.

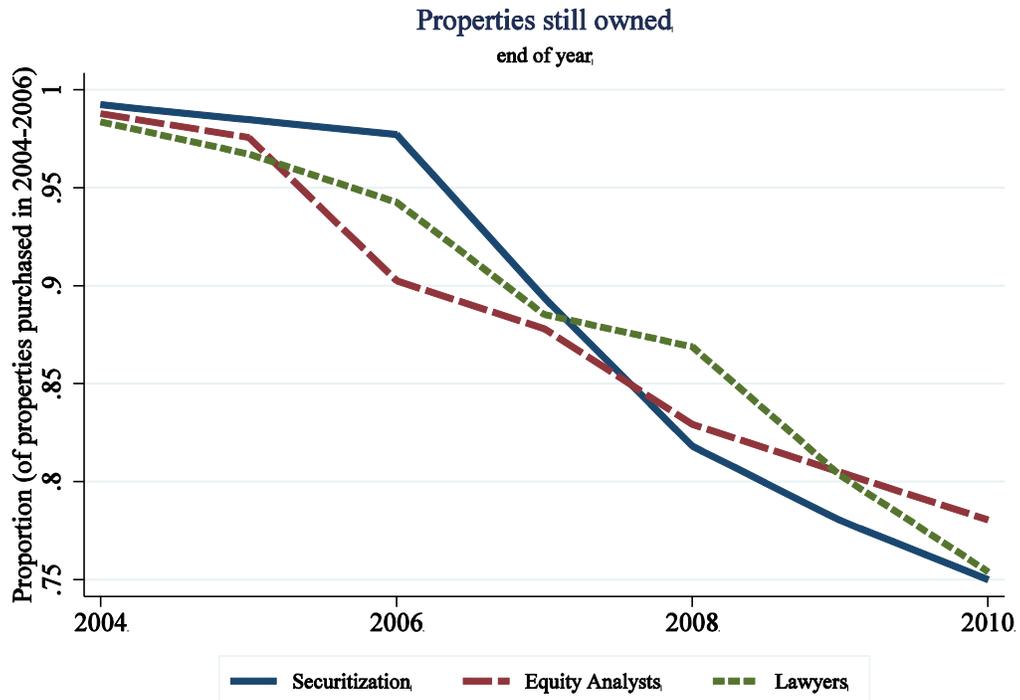


Table 1: People

This table lists the number of people for which we gathered information in each of three samples: Securitization Analysts, Equity Analysts, and Lawyers. Panel A shows the number of names we searched for, found, and had properties in our sample. Panel B shows the age distribution of people in our sample.

Panel A: Number of People

Sample	Securitization	Equity Analysts	Lawyers
Number of names	555	349	438
Not mid-level manager	12	N/A	N/A
Not housing	76	N/A	N/A
Not found in public records	29	14	9
Multiple found in public records	50	22	2
International	27	17	0
Deceased	0	1	2
People in sample	361	295	425
Person found, but no homes owned	56	59	73
People who sold all properties before 2000	2	1	4
People who only own homes beginning after 2010	3	3	1
People in sample owning at least one home, 2000-2010	300	232	347

Panel B: 2011 Age Distribution

Age	Securitization	Equity Analysts	Lawyers
30 and under	0.88%	0.35%	1.43%
31 to 35	7.06%	7.02%	3.81%
36 to 40	15.88%	20.00%	17.14%
41 to 45	26.76%	33.33%	25.71%
46 to 50	23.82%	20.00%	20.00%
51 to 55	13.82%	11.23%	16.43%
56 to 60	6.18%	3.16%	8.57%
Over 60	5.59%	4.91%	6.90%
Total with age data	340	285	420
Missing age data	21	10	5
Chi-Square Test of Homogeneity with Sctzn Sample	N/A	9.34	8.56
Homogeneity Test, p-value	N/A	0.23	0.29
Median age	45	44	46

Table 2: Properties

This table provides summary statistics for properties owned anytime over 2000-2010. Dollar amounts are reported in December 2006 CPI-adjusted real thousands. Panel A presents the fraction of people owning more than one address over 2000-2010. Panel B presents summary statistics for our matching process with mortgage applications.

Panel A: Total Properties, Purchases and Sales

	Securitization	Equity Analysts	Lawyers
Total properties ever owned, 2000-2010	600	446	633
Total purchases, 2000-2010	388	273	384
with purchase price	346	232	297
average purchase price	749.70	1113.00	493.11
Number of homes with no purchase date	75	81	70
Total sales, 2000-2010	231	153	229
with sale price	205	131	160
average sale price	631.29	854.25	436.65
Number of homes with no sale date or sold after Dec 31 2010	369	293	404

Panel B: Mortgage Applications

	Securitization	Equity Analysts	Lawyers
Purchases, 2000-2010	388	273	384
with mortgage info	292	182	253
mean, median LTV	0.72 / 0.80	0.72 / 0.76	0.77 / 0.80
with income from HMDA match	200	141	174
income at purchase, property average	345.3	409.1	185.6
People purchasing, 2000-2010	246	181	250
with income from any HMDA match	154	109	139
Average # HMDA mortgage applications per match	2.7	2.5	3.1
Median # HMDA mortgage applications per match	1	1	2

Table 3: Income

This table presents average income in three three-year periods for each group. We first average values from purchases observed within each person-period before averaging across people to obtain an average income for each period. Dollar amounts are in December 2006 CPI-adjusted thousands. Row A tests whether the boom minus pre-boom difference in averages was positive by projecting person-level income onto an indicator for the boom period in a two-period panel of person-level income. Row B tests whether the difference in difference is significant across groups. Standard errors are clustered at the person level. */**/** denotes significant at the 10%, 5%, and 1% levels, respectively.

		Income		
		Sctzn.	Equity Analysts	Lawyers
Pre-Boom period (2000-2003)	Mean	233.2	345.0	150.4
	Median	186.1	224.2	128.5
	SD	191.7	274.7	89.8
	People	63	55	54
Boom period (2004-2006)	Mean	377.9	396.2	186.7
	Median	223.6	245.6	142.9
	SD	567.9	463.6	146.4
	People	70	39	58
Bust period (2007-2010)	Mean	277.5	503.0	228.3
	Median	195.6	336.1	162.4
	SD	286.2	366.6	248.8
	People	54	41	49
A) Boom-PreBoom	Point Est.	144.7	51.26	36.30
	t-stat	[2.32]**	[0.63]	[1.73]*
	N	133	94	112
	R2	0.028	0.005	0.022
B) DID	Point Est.		93.45	108.4
	Sctzn. minus		[0.91]	[1.65]
	Control		227	245
	R2		0.025	0.069

Table 4: Purchase and Sale Prices

Panel A tabulates the mean purchase price for each group, by year. Panel B tabulates sale prices. The price is reported in December 2006 CPI-adjusted thousands and the number of transactions is reported. For non-securitization groups, t-statistics associated with a t-test of the null hypothesis that the Sectzn. minus other group purchase price equals zero are reported in brackets. The N is the number of transactions that year for which price data are recorded. */**/** represent significant at the 10%, 5% and 1% level, respectively.

Panel A: Purchases, 2000-2010

	Securitization		Equity Analysts			Lawyers		
	Average Price	N	Average Price	t-test	N	Average Price	t-test	N
2000	525.217	34	850.094	[-0.85]	23	454.895	[2.14]**	29
2001	705.838	30	851.531	[-1.09]	27	509.773	[2.77]***	40
2002	649.374	36	1137.487	[-1.62]	26	570.219	[1.98]*	26
2003	740.035	40	1230.190	[-1.19]	27	541.466	[2.72]***	32
2004	944.145	40	1149.130	[-1.48]	26	518.849	[1.35]	33
2005	812.574	45	1011.697	[-0.75]	21	583.876	[1.11]	13
2006	875.253	32	1313.698	[-3.05]***	20	560.055	[0.65]	18
2007	700.022	34	1742.437	[-2.90]***	22	483.905	[1.97]*	15
2008	793.126	20	967.776	[-0.79]	12	319.478	[1.07]	25
2009	721.161	15	1486.944	[-3.05]***	13	389.281	[0.73]	26
2010	728.290	20	418.150	[1.07]	15	513.919	[-0.99]	40
Total	749.704	346	1113.001	[-5.37]***	232	493.106	[5.98]***	297

Panel B: Sales, 2000-2010

	Securitization		Equity Analysts			Lawyers		
	Average Price	N	Average Price	t-test	N	Average Price	t-test	N
2000	476.153	16	612.425	[0.04]	9	382.725	[0.06]	19
2001	620.271	18	675.449	[-2.56]**	17	531.820	[2.22]**	23
2002	363.106	22	796.195	[-2.84]***	13	484.586	[0.20]	16
2003	386.567	18	1337.380	[-1.42]	9	500.265	[1.14]	10
2004	934.332	23	972.613	[-1.64]	12	514.391	[0.17]	16
2005	506.025	23	619.896	[0.86]	12	250.273	[1.74]*	4
2006	921.891	16	841.760	[-1.41]	14	480.089	[1.83]*	12
2007	534.937	25	1645.190	[-1.91]*	10	450.262	[1.88]*	10
2008	645.398	21	641.520	[0.96]	8	314.367	[1.03]	15
2009	884.552	14	1014.542	[-0.20]	14	337.784	[0.26]	17
2010	943.936	9	409.934	[0.52]	13	425.080	[0.41]	18
Total	631.289	205	854.250	[-2.65]***	131	436.650	[3.83]***	160

Table 5: Transaction Types

We tabulate the number of purchases (Panel A) and sale transactions (Panel B) across all samples over the period 2000-2010, with transaction types defined in the text.

Panel A: Purchase Transactions, 2000-2010

	Securitization		Equity Analysts		Lawyers	
	Count	Fraction	Count	Fraction	Count	Fraction
Buy a First Home	158	40.72%	115	42.12%	167	43.49%
Buy a Second Home	106	27.32%	89	32.60%	122	31.77%
Swap Up Purchases	88	22.68%	44	16.12%	65	16.93%
Swap Down Purchases	14	3.61%	7	2.56%	8	2.08%
Swap Purchase- Missing Price	22	5.67%	18	6.59%	22	5.73%
Total	388		273		384	

Panel B: Sale Transactions, 2000-2010

	Securitization		Equity Analysts		Lawyers	
	Count	Fraction	Count	Fraction	Count	Fraction
Divest Last Home	52	13.40%	35	12.82%	60	15.63%
Divest Second Home	58	14.95%	48	17.58%	75	19.53%
Swap Up Sale	87	22.42%	44	16.12%	64	16.67%
Swap Down Sale	14	3.61%	8	2.93%	8	2.08%
Swap Sell- Missing Price	20	5.15%	18	6.59%	22	5.73%
Total	231		153		229	

Table 6: Divesting Houses

The first three columns tabulate the number of divestitures per person for each group, by year. Z-statistics from a two-sample test of differences in proportions with the securitization sample are reported each group-year for the two control groups. The next two columns report regression-adjusted differences in the number of divestitures per person each year, where we control for the eight age groups defined in Table 1 as well as an indicator for whether someone is a multi-homeowner at the start of the year, and the sample period is 2000-2010. The number of people in-sample each year is the number of homeowners at the beginning of each year for the two groups that are compared. T-statistics computed from person-clustered standard errors are reported in brackets below each difference. */**/** represents statistically significant at the 10%, 5%, and 1% levels, respectively.

Year	Divestitures per person			Regression-Adjusted Difference	
	Securitization	Equity Analysts	Lawyers	Equity Analysts	Lawyers
2000	0.041	0.060 [-0.77]	0.049 [-0.39]	-0.0164 [-0.63]	-0.00721 [-0.34]
2001	0.038	0.038 [-0.02]	0.054 [-0.76]	0.00728 [0.36]	-0.0145 [-0.71]
2002	0.041	0.047 [-0.30]	0.038 [0.18]	-0.000461 [-0.021]	0.00617 [0.34]
2003	0.043	0.049 [-0.32]	0.058 [-0.61]	-0.00291 [-0.13]	-0.0134 [-0.55]
2004	0.037	0.036 [0.04]	0.045 [-0.45]	0.00463 [0.26]	-0.00893 [-0.48]
2005	0.027	0.035 [-0.43]	0.044 [-1.07]	0.000163 [0.0094]	-0.0210 [-1.30]
2006	0.026	0.043 [-1.04]	0.027 [-0.06]	-0.0149 [-0.85]	-0.000950 [-0.070]
2007	0.054	0.028 [1.40]	0.051 [0.14]	0.0291 [1.57]	0.00152 [0.075]
2008	0.065	0.047 [0.89]	0.039 [1.10]	0.0218 [1.05]	0.0215 [0.87]
2009	0.048	0.028 [1.15]	0.032 [0.96]	0.0272 [1.58]	0.0170 [0.99]
2010	0.021	0.028 [-0.41]	0.041 [-1.32]	-0.00473 [-0.30]	-0.0226 [-1.39]
			Multi-homeowner?	0.0562 [6.96]***	0.0738 [7.61]***
			Age Indicators?	Y	Y
			N	4703	5677
			R-Squared	0.020	0.024
			People	517	636

Table 7: Buying a First Home

The first three columns tabulate the number of first home purchases per person for each group, by year. Z-statistics from a two-sample test of differences in proportions with the securitization sample are reported each group-year for the two control groups. The next two columns report regression-adjusted differences in the number of first home purchases per person each year, where we control for the eight age groups defined in Table 1. The number of people in-sample each year is the number of non-homeowners at the beginning of each year for the two groups that are compared, and the sample period is 2000-2010. T-statistics computed from person-clustered standard errors are reported in brackets below each difference. */**/** represents statistically significant at the 10%, 5%, and 1% levels, respectively.

Year	First home purchases per person			Regression-Adjusted Difference	
	Securitization	Equity Analysts	Lawyers	Equity Analysts	Lawyers
2000	0.118	0.097 [0.64]	0.111 [0.23]	0.0230 [0.64]	0.0150 [0.43]
2001	0.094	0.079 [0.48]	0.101 [-0.24]	0.0295 [0.88]	-0.000531 [-0.016]
2002	0.090	0.099 [-0.26]	0.147 [-1.62]	-0.00649 [-0.18]	-0.0545 [-1.50]
2003	0.141	0.132 [0.21]	0.101 [1.07]	0.0170 [0.36]	0.0507 [1.25]
2004	0.134	0.145 [-0.25]	0.127 [0.20]	0.00329 [0.068]	0.0135 [0.32]
2005	0.118	0.087 [0.74]	0.081 [1.02]	0.0518 [1.09]	0.0500 [1.19]
2006	0.132	0.074 [1.35]	0.099 [0.80]	0.0895 [1.85]*	0.0376 [0.81]
2007	0.083	0.066 [0.45]	0.101 [-0.44]	0.0137 [0.32]	-0.0303 [-0.73]
2008	0.082	0.069 [0.34]	0.025 [1.94]*	0.0451 [1.01]	0.0584 [1.59]
2009	0.080	0.080 [0.01]	0.065 [0.42]	0.0174 [0.37]	0.0176 [0.41]
2010	0.158	0.048 [2.39]**	0.050 [2.68]***	0.138 [2.65]***	0.123 [2.53]**
			Age Indicators?	Y	Y
			N	2322	2891
			R-Squared	0.024	0.023
			People	361	458

Table 8: Buying a Second Home or Swapping Up

The first three columns tabulate the number of second home/swap up purchases per person for each group, by year. Z-statistics from a two-sample test of differences in proportions with the securitization sample are reported each group-year other than the securitization group. The next two columns report regression-adjusted differences in the number of second home/swap up purchases per person each year, where we control for the eight age groups defined in Table 1 as well as an indicator for whether someone is a multi-homeowner at the start of the year. The number of people in-sample each year is the number of homeowners at the beginning of each year for the two groups that are compared, and the sample period is 2000-2010. T-statistics computed from person-clustered standard errors are reported in brackets below each difference. */**/* represents statistically significant at the 10%, 5%, and 1% levels, respectively.

Year	Second home/swap up purchases per person			Regression-Adjusted Difference	
	Securitization	Equity Analysts	Lawyers	Sctzn. minus:	
				Equity Analysts	Lawyers
2000	0.061	0.073	0.076	-0.000172	-0.0146
		[-0.42]	[-0.57]	[-0.0065]	[-0.64]
2001	0.067	0.096	0.037	0.00242	0.0370
		[-0.99]	[1.35]	[0.086]	[1.84]*
2002	0.105	0.065	0.076	0.0682	0.0338
		[1.38]	[1.12]	[2.69]***	[1.50]
2003	0.077	0.077	0.072	0.0201	0.00263
		[-0.01]	[0.16]	[0.79]	[0.12]
2004	0.089	0.082	0.080	0.0253	0.00433
		[0.26]	[0.37]	[0.97]	[0.19]
2005	0.128	0.059	0.061	0.0864	0.0566
		[2.35]**	[2.55]**	[3.39]***	[2.40]**
2006	0.074	0.067	0.090	0.0305	-0.0196
		[0.27]	[-0.66]	[1.30]	[-0.90]
2007	0.094	0.080	0.064	0.0340	0.0262
		[0.49]	[1.05]	[1.35]	[0.96]
2008	0.040	0.028	0.039	0.0248	-0.00379
		[0.72]	[0.05]	[1.44]	[-0.22]
2009	0.026	0.023	0.039	0.0159	-0.00531
		[0.19]	[-0.83]	[1.02]	[-0.33]
2010	0.028	0.055	0.029	-0.0148	-0.00332
		[-1.50]	[-0.01]	[-0.79]	[-0.22]
			Multi-homeowner?	0.245	0.264
				[18.2]***	[18.5]***
			Age Indicators?	Y	Y
			N	4703	5677
			R-Squared	0.183	0.191
			People	517	636

Table 9: Robustness

We report the regression-adjusted differences in the annual intensity of a second home purchase or swap-up, where we pool together intensities every other year in our sample, as in equations (2) through (4). Column 1 compares the intensity of securitization agents versus equity analysts among the sample of people who work at common firms, and includes firm effects. Columns 2-3 report differences where we condition the sample to homeowners in the New York City area. Columns 4-5 report differences where the sample is conditioned to homeowners in the Southern California. Column 6 reports differences between securitization agents with property in Southern California and none in New York, and agents with property in New York and none in Southern California. Column 7 reports this same intensity but for second home purchases only. Standard errors clustered at the person level are reported below in brackets. */**/** represents statistically significant at the 10%, 5%, and 1% levels, respectively.

	Firm Effects	NYC Homeowners		S. CA Homeowners		Within Securitization	
	Sctzn. Minus	Securitization minus:		Securitization minus:		SoCal minus NYC	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Equity Analysts	Equity Analysts	Lawyers	Equity Analysts	Lawyers	Second Home or Swap Up	Second Home Only
2000-2001	0.00608 [0.19]	0.00567 [0.19]	-0.00278 [-0.10]	-0.00520 [-0.049]	-0.00576 [-0.070]	0.0234 [0.42]	-0.0369 [-1.70]*
2002-2003	0.0782 [2.39]**	0.0380 [1.36]	-0.0465 [-1.31]	0.0915 [0.60]	0.137 [1.69]*	0.0993 [1.21]	0.0918 [1.09]
2004-2005	0.0438 [1.33]	0.0559 [1.92]*	0.0248 [0.72]	0.242 [4.22]***	0.0920 [1.70]*	0.0819 [1.66]*	0.0952 [2.06]**
2006-2007	0.0755 [1.94]*	0.0323 [1.14]	0.0108 [0.39]	0.0259 [0.39]	-0.0203 [-0.47]	-0.0146 [-0.41]	-0.00414 [-0.12]
2008-2009	0.0345 [1.34]	0.0105 [0.56]	-0.00749 [-0.32]	0.0840 [1.58]	-0.0753 [-1.57]	-0.0222 [-0.66]	-0.0173 [-0.58]
2010	-0.0129 [-0.39]	-0.0545 [-2.22]**	-0.0342 [-1.32]	-0.0260 [-0.24]	-0.0464 [-1.08]	0.00252 [0.10]	0.000613 [0.036]
Multi-homeowner?	Y	Y	Y	Y	Y	Y	Y
Age Indicators?	Y	Y	Y	Y	Y	Y	Y
Firm Effects?	Y	N	N	N	N	N	N
N	1482	1613	1275	312	573	908	908
R-Squared	0.186	0.123	0.165	0.206	0.185	0.183	0.121
People	168	199	158	44	73	117	117

Table 10: Performance Index

Panel A presents summary statistics for the performance index exercise where home values are assigned based on observed transaction values. Averages per person are reported while standard deviations are reported below in parentheses. Dollar amounts are in nominal thousands. Panel B reports average performance and regression-adjusted differences in performance weighted by the initial portfolio value. Regression-adjusted differences are the coefficient on an indicator for the securitization group in a regression of the dependent variable indicated in first column of the row on a securitization group indicator and indicators for age controls, with samplings weights equal to the initial portfolio value and robust standard errors reported in brackets. ***/*** denotes statistically significant at the 10%, 5% and 1% levels, respectively.

Panel A: Summary Statistics

	Securitization		Equity Analysts		Lawyers	
	2000q1	2010q4	2000q1	2010q4	2000q1	2010q4
Number of properties per person	0.598 (0.705)	1.022 (0.785)	0.590 (0.741)	0.993 (0.833)	0.584 (0.713)	0.951 (0.798)
Value of properties	237.3 (396.0)	747.2 (869.4)	329.6 (611.2)	1072.2 (1285.3)	172.7 (240.4)	460.0 (501.7)
Cash account	848.9 (841.8)	693.8 (986.1)	1240.7 (1149.6)	1056.5 (1094.2)	489.7 (428.4)	428.3 (389.2)
Portfolio value	1086.2 (1008.8)	1441.0 (1567.5)	1570.3 (1282.5)	2128.7 (1771.1)	662.5 (461.4)	888.3 (615.8)
Number of people	361		295		425	

Table 10, continued

Panel B: Performance, 2000q1-2010q4

	Means and Standard Deviations			Reg.Adj. Differences	
				Sctzn. minus:	
	Securitization	Equity Analysts	Lawyers	Equity Analysts	Lawyers
Return	0.327 (0.197)	0.356 (0.176)	0.341 (0.206)	-0.0543 [-3.03]***	-0.0169 [-0.80]
Buy-and-hold return	0.363 (0.118)	0.375 (0.120)	0.370 (0.119)	-0.0268 [-2.44]**	-0.00856 [-0.88]
Performance index	-0.0363 (0.150)	-0.0194 (0.113)	-0.0286 (0.153)	-0.0276 [-2.07]**	-0.00834 [-0.51]
Return, 2006q4-2010q4	-0.0721 (0.109)	-0.0456 (0.0924)	-0.0671 (0.120)	-0.0212 [-2.35]**	-0.00903 [-0.96]
N	361	295	425	625	760
R-squared on perf. index				0.033	0.017

Table 11: Within-Securitization Performance Index

This table reports average performance and regression-adjusted differences in performance within subgroups of the securitization sample, weighted by the initial portfolio value. Regression-adjusted differences are the coefficient on an indicator for the securitization group in a regression of the dependent variable indicated in first column of the row on a securitization group indicator and indicators for age controls, with samplings weights equal to the initial portfolio value and robust standard errors reported in brackets. */**/** denotes statistically significant at the 10%, 5% and 1% levels, respectively.

Panel A: Sell-side vs. Buy-side

	Means and SDs		Reg.Adj Diff.
	Sell-side	Buy-side	Sell-Buy
Return	0.275 (0.183)	0.361 (0.198)	-0.0887 [-2.70]***
Buy-and-hold return	0.346 (0.114)	0.374 (0.119)	-0.0285 [-1.86]*
Performance index	-0.0711 (0.174)	-0.0134 (0.126)	-0.0602 [-2.26]**
Return, 2006q4-2010q4	-0.0982 (0.121)	-0.0548 (0.0974)	-0.0416 [-3.08]***
N	153	208	340
R-squared on perf. index			0.079

Panel B: Worst and Best Performing Firms

	Means and SDs		Reg.Adj Diff.
	Worst	Best	Worst-Best
Return	0.273 (0.152)	0.333 (0.199)	-0.0474 [-1.38]
Buy-and-hold return	0.343 (0.128)	0.349 (0.0995)	0.00747 [0.32]
Performance index	-0.0695 (0.158)	-0.0154 (0.145)	-0.0549 [-1.76]*
Return, 2006q4-2010q4	-0.0907 (0.100)	-0.0633 (0.105)	-0.0365 [-2.10]**
N	102	68	164
R-squared on perf. index			0.089

Table 12: Value-to-Income

This table presents average VTI in three three-year periods for each group. We first average values from purchases observed within each person-period before averaging across people to obtain an average VTI for each period. Row A tests whether the boom minus pre-boom difference in averages was positive by projecting person-level income onto an indicator for the boom period in a two-period panel of person-level income. Row B tests whether the difference in difference is significant across groups. Standard errors are clustered at the person level. ***/*** denotes significant at the 10%, 5%, and 1% levels, respectively.

		VTI		
		Sctzn.	Equity Analysts	Lawyers
Pre-Boom period (2000-2003)	Mean	3.1	3.0	2.9
	Median	3.0	2.8	2.7
	SD	1.3	1.6	1.3
	People	47	48	28
Boom period (2004-2006)	Mean	3.4	3.4	3.0
	Median	2.9	3.2	2.5
	SD	2.1	1.6	1.4
	People	60	28	35
Bust period (2007-2010)	Mean	3.1	3.1	2.9
	Median	3	3.1	2.8
	SD	1.1	1.4	1.4
	People	43	39	40
A) Boom-PreBoom	Point Est.	0.353	0.421	0.0890
	t-stat	[1.05]	[1.13]	[0.27]
	N	107	76	63
	R2	0.010	0.017	0.001
B) DID Sctzn. minus Control	Point Est.		-0.0674	0.264
	t-stat		[-0.13]	[0.56]
	N		183	170
	R2		0.014	0.018

Table 13: 2004-2006 Purchasers

This table provides details on the differences between groups in the sales of properties purchased in the years 2004 through 2006. Panel A provides the number of properties purchased by each group in 2004-2006 and the number of people that purchased properties in 2004-2006. Panel B provides a year-by-year breakdown of what percentage of the properties purchased in 2004-2006 by each group were sold and what percentage are remaining. Panel C shows the results of various t-tests performed on the sales transactions done by each group during the crisis period. For non-securitization groups, t-statistics associated with a t-test of the null hypothesis that the Scctzn. minus other group purchase price equals zero are reported in brackets. */**/* represent significant at the 10%, 5% and 1% level, respectively.

Panel A: Sample sizes

Sample	Securitization	Equity Analysts	Lawyers
Number of properties purchased in 2004-2006	132	82	122
Number of people who purchased in 2004-2006	117	74	104

Panel B: Percent of properties purchased in 2004-2006 sold, by year

Year	Securitization		Equity Analysts		Lawyers	
	% sold	% remaining	% sold	% remaining	% sold	% remaining
2007	8.33%	89.39%	2.44%	87.80%	5.74%	88.52%
2008	7.58%	81.82%	4.88%	82.93%	1.64%	86.89%
2009	3.79%	78.03%	2.44%	80.49%	6.56%	80.33%
2010	3.03%	75.00%	2.44%	78.05%	4.92%	75.41%

Panel C: Sales during the bust

Statistic	Securitization	Equity Analysts	Lawyers
Sales of 2004-2006 properties per purchaser	0.2222	0.1081 [1.95]*	0.1635 [1.04]
Net sales of all properties per purchaser	0.1026	-0.0135 [1.49]	0.0865 [0.22]