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Donghoon Lee
Christopher Mayer
Joseph Tracy

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Abstract

We use data from credit reports and deed records to better understand the extent to which second liens contributed to the housing crisis by allowing buyers to purchase homes with small down-payments. At the top of the housing market, second liens were quite prevalent: As many as 45 percent of home purchases in coastal markets and bubble locations involved a piggyback second lien. Owner-occupants were more likely to use piggyback second liens than were investors. Second liens in the form of home equity lines of credit (HELOCs) were originated to relatively high-quality borrowers, and originations were declining near the peak of the housing boom. By contrast, characteristics of closed-end second liens (CES) were worse on all these dimensions. Default rates of second liens are generally similar to that of the first lien on the same home, although HELOCs perform better than CES. About 20 to 30 percent of borrowers will continue to pay their second lien for more than a year while remaining seriously delinquent on their first mortgage. By comparison, about 40 percent of credit card borrowers and 70 percent of auto loan borrowers will continue making payments a year after defaulting on their first mortgage. Finally, we show that delinquency rates on second liens, especially HELOCs, have not declined as quickly as those on most other types of credit, raising a potential concern for lenders with large portfolios of second liens on their balance sheets.

Key words: mortgage, second lien

Lee, Tracy: Federal Reserve Bank of New York (e-mail: donghoon.lee@ny.frb.org, wjoseph.tracy@ny.frb.org). Mayer: Columbia Business School and National Bureau of Economic Research (e-mail: cm310@columbia.edu). The authors thank Daniel Hubbard and James Witkin for excellent research assistance, Ethan Buyon for comments, and Dataquick and Equifax for providing critical data. The Milstein Center for Real Estate and the Richman Center for Business, Law, and Public Policy at Columbia Business School provided critical funding for this project.

Second liens represent an important segment of the credit markets in the US, but are often controversial and poorly understood. According to data from Equifax Credit Trends (August, 2011), consumers owe about $11.3 trillion to various lenders. Of that total, first mortgages represent about $8.16 trillion and second liens are another $800 billion.[5] The remaining $2.36 trillion includes auto and student loans and credit cards.

The run-up in second liens has often been blamed as a major contributor to the housing crisis, both because second liens facilitated a large increase in debt-financed consumption (Greenspan and Kennedy, 2008) and also because second liens allowed potentially poorly qualified buyers to purchase homes with little cash as a down payment. Our data show that second lien originations were always below $50 billion per quarter prior to 2001, but more than tripled to over $160 billion quarterly by 2005 and 2006. Total balances of second lien borrowings grew from under $200 billion to $1.1 trillion over the same time period. While much attention has been paid to piggyback second liens that helped borrowers purchase homes with small down payments, the bulk of the borrowing involved HELOCs (and CESs) that were taken out well after the borrower purchased the home. Such debt represented a tax-preferred way for many borrowers to use gains in home values to support increased consumption, help reduce other forms of debt, or to make improvements in their home.[6]

Today, since second liens rank as junior mortgage debt, they pose a potential risk to the banking system as most second lien loans reside on lenders' balance sheets. Total outstanding second liens represent more than one-half of all bank

[5] Of the outstanding second liens, the bulk ($595 billion) are home equity lines of credit, which are revolving credit lines. In total, HELOCs are about the same size as all other types of revolving credit (credit cards) and thus represent an important part of consumer credit. Closed end second liens are much smaller, representing about $158 billion, less than 10 percent of all other non-revolving debt.

[6] The tax deductibility of second liens depends on the use of proceeds. Generally speaking, interest on the first $100,000 of home equity borrowing is tax deductible regardless of the use of the proceeds as long as the owner does not exceed $1 million of total outstanding mortgages. Beyond $100,000, interest on the borrowing might be tax deductible depending on whether the borrower uses the proceeds for improving the home.

capital ($1.4 trillion according to FFIEC Peer Group Average Report). However, lenders argue that second liens are more comparable to other types of consumer debt, rather than mortgages, and were originated according to the same or stricter standards that they offered other types of consumer debt. A key question, therefore, in evaluating the capitalization of many banks is how second liens perform relative to first liens and other consumer credit.

An additional issue with second liens involves potential conflicts of interest for servicers who manage first and second liens. Investors complain that servicers of second liens act in ways that prioritize payments to second liens over first liens.[7] According to these concerns, the largest banks that hold many second liens on their balance sheets also act as servicers on the associated securitized first liens. These lenders face potentially conflicting incentives between their fiduciary responsibilities as servicers and their interests to protect their second liens by either aggressively modifying first liens (at great cost to mortgage bond owners) or encouraging borrowers to miss first lien payments while remaining current on their second liens.

In a related vein, many analysts argue that second liens represent a serious public policy challenge, based on a view that second lien holders often get in the way of high loan-to-value (LTV) refinancing programs such as the Home Affordable Refinance Program (HARP) by refusing to agree to "re-subordinate" to a newly issued first lien. As well, second liens are much more likely to be underwater than first liens, increasing the likelihood of a costly foreclosure. Martin Feldstein (2011) has proposed a program where the government would subsidize 50 percent of the cost of writing-down negative equity to 110 percent LTV, which might impact an appreciable portion of second liens that are the most junior position relative to the first lien. Levitan (2009) has suggested that bankruptcy judges should have the right to "cramdown" debt, forcing lenders to accept losses on the underwater portion of

[7] See Frey (2011).

the first and second lien. Mayer, et. al. (2009) propose a small "Second Lien Incentive Fee" to pay second lien holders to voluntarily surrender their claim rather than holding up the modification process. Mortgage-holders often take an even stronger view, arguing that giving any rights to second lien holders violates basic prioritization of claims. They suggest that second liens should be forced to accept a total write-off before first liens write off any principal or substantially reduce interest rates for borrowers.

On the other hand, banks argue that many (but not all) second liens, especially revolving home equity lines of credit (HELOCs)[8], were given primarily to the best quality borrowers and were underwritten to a great extent based on the credit quality of the borrower, not just the home value. Such mortgages are the equivalent to high quality credit card loans, where if the borrower does not pay the lender has a claim on the borrower and not just on the home. They suggest that no one would propose that a credit card be written down -when a borrower is underwater but remains current on the mortgage, even though credit cards are also unsecured debt and thus might have lower priority, so why should HELOCs be treated differently? While HELOCs and credit cards both impact the borrower's indebtedness and place demands on the borrower's cash flow, only HELOCs impact the borrower's equity position in the house. The equivalence of HELOCs and credit card debt depends on a critical question: Does the borrower's equity position have an independent impact on the probability of default on the HELOC, holding the borrower's total amount of debt constant?[9]

The law often supports the legal interpretation of second liens as personal

[8] A HELOC is a mortgage in which the lender agrees to give a borrower a line of credit up to some maximum amount, where the lender has a secured claim on the home in addition to a claim against the borrower.

[9] For example, a second lien or a credit card balance with the equivalent minimum monthly payment would both raise the borrower's back-end debt-to-income (DTI) ratio by the same amount. However, the second lien would also raise the borrower's LTV, whereas the credit card balance would not. The question of the equivalence of second liens and credit card balances can be restated as holding the borrower's back-end DTI constant, does the borrower's LTV impact the likelihood that the borrower will default? In addition, a borrower's credit card balances are not required to be paid off if the borrower moves, whereas any second lien balances must be paid off if the house is sold.

recourse debt with equivalent priority to credit cards or student loans. In states where borrowers face personal recourse if they default on a first mortgage, second liens also have personal recourse against the borrower and his/her other assets. Even in states where first liens have no personal recourse, borrowers still typically face personal liability for the second lien if they took out the second lien debt anytime after purchasing the home. That is, in non-recourse states a second lien that is taken out at a later date would be recourse while a piggyback second lien (that is, a second lien taken out at the same time as the first lien when the borrower purchases a home) would not have personal recourse to the borrower.

Government policies have attempted without much success to address problems with outstanding second liens. HAMP (Home Affordable Mortgage Program) offers to pay second lien holders a nominal amount to cover costs of modifying or writing off second liens, but has resulted in only 76,218 such modifications as of April, 2012, with fewer than 17,000 of them involving write-offs.[10]

While there has been relatively little empirical work that addresses these questions, three recent papers examine the prevalence and performance of second liens and provide the starting point for our analysis. Goodman et. al. (2010) document that second liens were an important source of credit during the boom, with about one-half of all privately securitized mortgages having a second lien and that second liens appear to perform better than privately securitized first liens. Andersson, et. al. (2011) examine data on mortgage payments and credit files (OCC Credit Bureau Data) for borrowers with non-prime, privately securitized mortgages combined with credit files from 2001 to 2009. The authors find that consumers have adjusted the relative order in which they pay their debts, moving from an environment where a default on credit card is much more likely to occur before a mortgage default to an environment where consumers are equally likely to initially miss mortgage or credit card payments. The authors attribute this finding to

[10] Treasury Department, March 2012 Making Home Affordable Report.

changes in the cost of servicing each type of debt, reduced or negative home equity, and the increased penetration of non-standard mortgage products. The changing pecking order suggests that borrowers may be acting strategically by defaulting on their first lien in an attempt to obtain a modification, even while remaining current on their other debts.[11]

Jagtiani and Lang (2011) merge together data on mortgage performance (from Lender Processing Services—McDash) with credit report files (from Federal Reserve Bank of NY Consumer Credit Panel) to examine the relative order of payments for first and second liens. The paper finds that a large portion of delinquent borrowers on first liens keep their second liens current. Such behavior is more prevalent for HELOCs, where they argue that the ability to maintain a credit line is quite valuable, but is also quite common for closed end second liens (CES), where the borrower takes out a mortgage for a fixed sum of money at one time.

Our paper considers a number of important issues with regard to second liens. We investigate these issues using information from Equifax credit reports and Dataquick deeds records. First, we look to understand the growth of second liens, including the credit quality of the borrowers. Next we examine where second liens were originated and how they might have contributed to (over) leverage during the boom. Finally, we consider how second liens perform relative to first liens. In particular, we examine why some borrowers choose to pay their second lien even as they are delinquent on their first lien.

Below we summarize our findings. In doing so, it is important to recognize that this paper presents an attempt to summarize the data so that policy makers and analysts can better understand the second lien market and to spur additional analysis among economists. While results are sometimes suggestive of certain interpretations, we cannot in this analysis distinguish between supply and demand for credit. Thus, it is impossible to know whether some of these patterns reflect

[11] This strategic behavior could be avoided if mortgage modifications were based on measures of payment stress such as the borrower's updated debt-to-income ratio regardless of the payment status of the borrower.

demand for second liens by various types of purchasers or constraints on the type of mortgages that lenders might approve.

i) Even though HELOCs and CESs are both classified as second liens, they are quite different. CESs account for between 30 to 40 percent of the total second lien balances between 1999 and 2011 and have similar characteristics to non-prime first mortgages; they were often originated to borrowers with low credit scores and were more likely to be originated simultaneously with a first lien (so-called piggy-back mortgage) and/or with non-prime first mortgages. CES mortgage issuance peaked between 2005 and 2007, a time when deteriorating credit standards and peaking house prices led to very high subsequent default rates. By contrast, HELOCs are more closely related to conforming/prime first mortgages; HELOCs were originated to people with high credit scores, were often originated to borrowers with no first lien or a prime first mortgage, and were often originated well after the first lien had been taken out. HELOC originations peaked in 2004, before the peak in home prices. Thus home-equity extraction, while important during the boom, seems to have taken place predominantly among relatively high quality borrowers.

ii) At the height of the housing market in 2006, as many as 40 to 45 percent of home purchases involved a piggyback second lien in coastal markets and bubble locations (Phoenix, Las Vegas, Miami). Slightly fewer piggybacks were used in more stable markets in the Midwest and South, and piggybacks were much less prevalent in declining markets like Cleveland and St. Louis. Second liens were strongly associated with the use of low down payments to purchase homes. While 10 to 20 percent of home purchases with a single mortgage involved a down payment of 5 percent of less (origination LTV≥ 95 percent), about two-thirds of all purchases with a piggyback second lien had a low down payment (origination CLTV≥95 percent). Thus piggyback second liens appear to

have contributed to home purchases at times and in locations where home values likely exceeded fundamental values, potentially helping to fuel the housing bubble. Contrary to some claims about the use of second liens for speculation, second liens were somewhat more prevalent among owner-occupants than investors.

iii) CESs performed similarly to non-prime mortgages, especially for CES originated between 2005 and 2007 and piggyback CES. HELOCs performed much closer to prime first liens. More than 25 percent of the piggyback CES become 90+ days delinquent as of 2010-2011, but only 8 percent of HELOCs had similar serious delinquencies during the same period. The timing of origination and the credit quality of borrowers appear to explain most of these differences. In the last few quarters, however, HELOC delinquencies have been flat while delinquencies were falling for most other types of consumer credit.

iv) We find a high correlation between the delinquency of first mortgages and their associated second liens. Borrowers are more likely to initially become delinquent on their first mortgages, but if the first mortgage delinquency persists, most second liens eventually default as well. For example, when a first mortgage reaches the 90 to 120 days delinquent stage, only about 21 percent of CES remain current four quarters later (31 percent for HELOCs). By contrast, about 70 percent of auto loans and 40 percent of all credit cards remain current four quarters after a serious mortgage delinquency.

I) Data

We utilize a variety of new datasets to examine aggregate trends in second lien usage, as well as individual use of second liens and subsequent repayment patterns. We start with Equifax Credit Trends 4.0 to examine overall credit usage. These data report information for all consumers whose credit records are reported to Equifax. Data are available from 2005 to present.

Next we turn to the Federal Reserve Bank of New York Consumer Credit Panel (CCP), which comprises an anonymous and nationally representative five percent random sample of US individuals with credit files and all of their household members. In all, the data set includes credit information for more than 15 percent of the population, or approximately 37 million individuals in each quarter. The panel allows us to track individual borrowers and their loan accounts including first mortgages, second liens, credit cards, auto loans and student loans over time. The CCP panel is based on Equifax consumer credit reports. Lee and van der Klaauw (2010) provides further details on the CCP data.

Due to the large size of the CCP data, we use a 0.1 percent sample of the population in our analysis. This includes about 240,000 individuals with credit reports in a given quarter. While joint accounts appear twice on the credit report, for example, one for the husband and a second for the wife, we combine these joint records into a single record where appropriate to remove any duplicates. Our sample for this paper runs from 1999:Q1 to 2012:Q1, thus covering a more stable period before the subprime run-up, the housing boom, and the subsequent bust.

We face a number of data issues, which are described below. The credit files do not always clearly identify whether a loan is a first mortgage or a CES. We classify the loans with narrative codes of Freddie, Fannie, FHA, and VA as first mortgages, and loans with narrative codes of home equity loan, home improvement loan, and second mortgage as second liens. We believe that at least 80 percent of Freddie and Fannie loans and 100 percent of FHA and VA loans have correct narrative codes .[12] HELOCs are easily identified since they are recorded as a Revolving account type. There are some installment loans with no narrative codes indicating the type of loan. Among these unclassified installment loans, we currently drop from the sample those with an origination amount of less than $40,000 from the sample (our results are robust to keeping these loans and classifying them as CES). We treat

[12]Some loans initially contain the narrative code "Real Estate Mortgage", and only later in the life of the loan the narrative code is expanded to say, for example, "Freddie". In these cases, we classify them retroactively as if we observed the expanded narrative code from the outset.

mortgages with an origination balance of at least $40,000 that do not have a narrative code indicating that they are Freddie, Fannie, FHA or VA loans as nonprime first liens. Care must be used in interpreting results for this class of loans. Non-prime first liens by construction in our data are a residual category, including not only subprime and alt-A mortgages (the traditional category of non-prime), but also jumbo-prime mortgages, some GSE prime mortgages that are not properly narrated, and some private label conforming loans. We have no way to externally validate differences among the various types of mortgages at this time.

The origination date is defined for our analysis by the quarter the loan appears on the credit report for the first time. However, there can be some delays between when a loan is actually originated and when it is reported to Equifax, so this classification may have some error in timing. The results are quite similar if we use the reported quarter of origination instead.

To examine the importance of second liens in financing of individual property purchases and, in particular, the extent to which second liens contributed to high leverage, we turn to Dataquick deeds records. Dataquick reports deeds records for the vast majority of home purchase and mortgage transactions. For this analysis, we examine purchase transactions only (no refinancings) and describe the financing of that purchase, including whether the transaction had a second mortgage (we combined HELOCs and CES for this analysis), and whether the transaction involved an investor (defined as an owner whose property tax bill is sent to a different location than the purchase address).[13] We include data from 2001 to 2011, although many figures we report are cut off after 2007 due to the very small number of transactions involving a second lien after that time period. Our sample covers the 40 largest metropolitan areas in the US outside of Texas, where sale prices are not reported in the public records. We use data from a subset of metropolitan areas as described below.

[13] Chinco and Mayer (2012) also define investor purchases based on the address of the property tax bill. In that paper, the authors show that the presence of outside investors helps cause price run-ups, contributing to bubbles in many housing markets.

II) Origination and Growth of Second Liens

Aggregate second lien lending patterns

To examine the overall growth of the second lien market, we start with evidence from the CCP data. Figure 1 plots the number and dollar volume of second liens outstanding quarterly from 1999:Q1 to 2012:Q1. With over 20 million borrowers and more than $800 billion of outstanding credit, second liens represent a large and important source of credit for US consumers. At its peak at the end of 2007, second liens represented over $1.0 trillion of credit. Greenspan and Kennedy (2008) pointed to second liens as a key vehicle that allowed homeowners to extract equity from their homes.

Figure 2 shows quarterly originations of second liens (Figures 4 and 5 plot originations for CES and HELOCs separately). Although overall dollar volume peaked at the end of 2005, the aggregate data masks variation across the two types of credit. HELOC originations peaked in 2005:Q4, and fell about 30 percent over the next two years, while CES originations continued rising, peaking in 2006:Q3 and remaining near their peak throughout 2007. Originations of new second liens fell off rapidly in 2008 and have since remained at about 15 to 20 percent of their level during the boom years. Second liens represented a strongly pro-cyclical form of credit.

Next we consider the credit quality of borrowers who took out second liens and compare them to other mortgage borrowers. Figure 3 shows the share of various types of mortgages with an origination credit score above 700, an indication of loans given to high quality borrowers. As with all types of mortgages, the share of high quality borrowers declined from 2004 to 2007, although the CES and HELOC share declined less. Since most second liens were held on balance sheet, these results are consistent with balance sheet lenders pursing slightly higher quality borrowers than securitized lenders. Consistent with results from the Federal

Reserve's Senior Loan Officer Survey[14], Figure 3 shows that residential mortgage credit standards had risen to the highest levels in our sample period by late 2010.

Comparing second liens to first liens, it appears that CES credit quality moved with non-prime first liens, while HELOCs were more closely linked with the credit quality of prime mortgages. Around 60 percent of CES in the boom went to borrowers with a risk score over 700, similar to the overall share of such borrowers for first liens, and slightly higher than the share of high quality borrowers in non-prime originations. HELOCs remained focused on the highest quality borrowers. About 75 to 85 percent of HELOCs in the boom went to borrowers with FICO scores over 700, a greater share of such borrowers than even prime mortgages.

The linkage of CES with lower quality borrowers and HELOCs with higher quality borrowers is further supported when we compare the types of first liens for CES and HELOC borrowers. Figures 4 and 5 show the share of CES and HELOCs going to borrowers with various types of first liens as an alternative measure of credit quality. The largest share of CES mortgages went to borrowers with relatively low quality non-prime mortgages. The large growth of CES mortgages in 2006 to 2007 primarily went to borrowers with non-prime first liens that would eventually default at very high rates. By comparison, HELOCs were more likely to go to borrowers with higher quality conforming mortgages or to borrowers without a first lien. HELOC originations declined over 2006 to 2007, with a much smaller increase as compared to CES going to borrowers with non-prime first liens.

Finally, we consider the role of second liens in financing the purchase of a home versus their origination at a later date, possibly to extract home equity as in Greenspan and Kennedy (2008). Figures 6 to 9 track originations of second liens based on the type of first lien and how close in time the second lien was originated relative to the date the first lien was taken out. We allow for a small reporting lag in second lien origination, so liens taken out within two months are coded as simultaneous ("piggyback") second liens, while loans originated 3 to 5 months after

[14] http://www.federalreserve.gov/boarddocs/SnloanSurvey/

origination are coded as being lagged one quarter, etc.

The data suggest that higher quality borrowers tended to take out second liens well after origination, whereas lower quality borrowers used second liens to help finance the purchase of the home. Following a prime first lien, most CES originations were taken out well after the origination date of the first lien. However, most CES originations for non-prime first liens were taken out as piggyback loans Relatively few HELOCs were taken out as piggyback mortgages. Even HELOCs associated with non-prime first liens were usually taken out well after the date that the non-prime first mortgage was originated.

Thus, the data show that second lien originations grew rapidly during the boom period, but were composed of two very different products. CESs represented a minority of all second liens, but these loans were riskier on all dimensions, including peaking later in the cycle, being originated to lower credit quality borrowers, including borrowers with riskier first liens, and being more likely to be taken out as a piggyback loan.

Use of second liens to enhance leverage for home purchases

Next we turn to deeds records data from Dataquick to examine the amount of leverage for home purchases that utilized second liens. Our results show that second liens allowed borrowers to make very small down payments and were broadly used across the country. As well, owner-occupants were more likely to use second liens than investors. Viewing piggyback seconds as an alternative to private mortgage insurance for a low down payment mortgage, then the relative pricing differences could create an advantage of using a piggyback second that would be increasing in the expected duration of the mortgage. If investors planned to resell the property quicker than owner-occupants, then they would receive less value from this arbitrage.

We divide our sample into four groups of metropolitan areas in a similar manner to Hubbard and Mayer (2009). These authors argue that mispricing was

most pronounced in bubble markets like Las Vegas, Miami, and Phoenix, whereas coastal markets followed a more typical pattern of house price appreciation from previous cycles. They show that other Midwest and Southern markets exhibited much less volatility over the cycle.

i. *Coastal cyclical markets*: Boston, New York, Washington D.C., Los Angeles, San Francisco, and San Diego
ii. *Midwest/South stable markets*: Charlotte, Atlanta, Chicago, Denver, and Minneapolis
iii. *Midwest declining markets*: Detroit, Cleveland, and St. Louis
iv. *Bubble markets*: Las Vegas, Phoenix, Tampa, and Miami

Figure 10 plots the share of home purchases financed by piggyback second liens in each group of markets. Second liens grew with the increase in home prices in all markets, with the largest share of purchases being financed by second liens in Bubble and Coastal cyclical markets, followed by a slightly smaller share of purchases in Midwest/South stable markets where home prices grew much less rapidly. The highest and most persistent use of second liens was in Coastal cyclical markets, where homes appeared least affordable to many buyers. By contrast, Midwest declining markets exhibited a much lower share of piggyback second lien originations. Affordability in these markets was also better than in most other parts of the country. The use of piggyback second liens did not appear more concentrated in Bubble markets than many other metropolitan areas. In all locations, purchases with piggyback mortgages fell off rapidly in 2008 and have not recovered.

We also examine the link between leverage and second lien use. Figures 11 to 14 show the impact of second liens on loan-to-value ratios (LTVs) for purchase mortgages. Our measure of loan-to-value includes both the first and second lien which we refer to as the cumulative LTV (or CLTV). The data show very high CLTVs even for purchases financed by a single mortgage, averaging over 80 percent in

almost all time periods.[15] Through much of the boom, purchases in Coastal cyclical and Midwest/South stable markets had slightly lower CLTVs than purchases in Bubble and Midwest declining markets. Nonetheless, the use of piggyback second liens was clearly tied to the lowest down payment purchases. Borrowers with a second lien had an average CLTV during the boom of at least 95 percent. About two-thirds of all such purchasers had a CLTV of 95 percent or more.

Figures 15 and 16 separate purchases between investors and owner-occupants. In all markets, second liens were more likely to be taken out by owner-occupants relative to investors. Among owner-occupants, second liens were most prevalent in Coastal cyclical and Bubble markets where prices increased the fastest during the boom, peaking at 50-55 percent of all purchases. Investors used second liens at a similar rate across all groups of markets with the exception of the declining markets, with usage peaking at 35-40 percent.

In summary, piggyback second liens grew rapidly in Bubble, Coastal cyclical, and Midwest/South stable markets during the housing boom. Mortgages with a piggyback second lien had very high origination CLTVs, with almost two-thirds of borrowers having a down payment of 5 percent or less, much higher CLTVs than for mortgages without a second lien. Owner-occupants more commonly used piggyback second liens than investors.

III) Performance of second liens and first liens with an affiliated second lien

Next we examine the performance of second liens relative to other types of consumer credit. As well, we provide evidence on the controversial claims that many borrowers appear to continue to pay their second lien while defaulting on

[15] The high LTVs in the recent time period are surprising given the secondary market dominance of GSE mortgages. However, the FHA finances about one-half of all recent purchase mortgages and FHA mortgages can have as little as a 3 percent down payment.

their first lien.[16]

Default performance of second liens

We turn back to the CCP data to examine the performance of second liens relative to first liens and other types of credit, examining the percentage of borrowers that are 90 or more days delinquent on various forms of debt. Figure 17 compares the performance of CES and HELOCs to various types of first liens. The data show a sharp rise in second lien delinquencies that mirrors delinquencies of similar types of first liens, consistent with serious credit problems resulting from the weakening of underwriting standards discussed earlier, the sharp decline in home prices, and the high unemployment created by the Great Recession. CESs were delinquent at a similarly high rate as non-prime first liens, which are also the most common type of mortgages that the CES are attached to as a piggyback. As well, HELOCs defaulted at a similar rate to GSE-backed mortgages, which were originated to higher credit quality borrowers and defaulted at much lower rates than mortgages granted to riskier borrowers.[17]

However, in the last year, there has started to be a divergence between the performance of first and second liens that bears monitoring by analysts and regulators. Delinquency rates for second liens have not fallen as much as for most first mortgages, suggesting a possible change in performance of senior and junior debt. One possible explanation is that some HELOCs have an initial period (often 5 years) where the borrower pays interest only, but then the borrower must start paying off the principal, raising payments. Such an explanation deserves further attention as it might preview poorer relative performance for HELOCs.

In Figure 18, we compare delinquency rates for second liens to other types of consumer debt. It is worth noting the sharp rise in serious mortgage delinquencies,

[16] We do not formally model the default decision on first liens. For a summary of this literature, see Elul, et. al. (2011), for example.

[17] Also of note is that after declining from the end of 2009 through mid-2010, 90+ delinquency rates for FHA mortgages have been rising for the past several quarters. See Gyourko (2011) and Caplin et. al. (2012) for more discussion of expected FHA credit losses.

especially CES delinquencies, relative to serious delinquencies for auto loans or credit cards. Even while exhibiting a sharper rise over the last several years, recent delinquency rates on HELOCs are comparable to auto loans, which are considered a relatively safe form of consumer lending. However, in the last couple of quarters, HELOC delinquency rates have remained flat even as delinquency rates for auto loans and credit cards have been declining. CES delinquency rates have declined relatively more than for HELOCs, possibly because the worst quality piggyback CES have now defaulted and the borrowers have lost their homes.

Finally in Figures 19 and 20 we turn to delinquency rates for piggyback second liens versus second liens taken out well after the home purchase while controlling for the year of origination. In all cases, piggyback second liens perform much worse than second liens taken out subsequent to the purchase. In fact, generally across origination years, the longer the period of time between the origination of the first lien and the second lien, the lower the rate of subsequent delinquency. This effect is more pronounced for CES. As well, like first liens, the origination date has a large effect on performance, with the worst loans originated in 2006 and 2007 at the height of the housing boom and also at a time that lending standards had slipped the most.[18] However, second liens originated prior to 2005 became delinquent at very low rates.

Default performance of matched first and second liens

Next we turn to the default rate of matched first and second liens. Some commentators have observed that borrowers appear to default on first liens while the second lien remains current, with the strong implication that such behavior is a strong rejection of prioritization between senior and junior debt. Jagtiani and Lang (2011) present striking evidence in this regard, especially for HELOCs, showing that an appreciable portion of borrowers who are delinquent on their first lien remain current on their second lien. While some of our results are similar to Jagtiani and

[18] See Mayer, Pence, and Sherlund (2009) and Demyanyk and Van Hemert (2011) for evidence on the deteriorating credit quality of non-prime loans over this time period.

Lang, we interpret the evidence somewhat differently. The data show that the performance of linked first and second liens is more similar than different, especially when comparing the performance of second liens to other types of unsecured debt. For example, a much larger share of defaulted first lien borrowers remain current on their credit cards and auto loans a year later than on their second liens. We also find an increasing trend towards being delinquent of the first lien but not the second lien.

Figure 21 reports 90+ days delinquency rates for HELOCs and CES and the accompanying first mortgages when both are matched together. The top two lines represent serious delinquency rates for a CES that also has an attached first lien, and similarly for a first lien that has an attached CES. The performance of both the CES and the attached first lien are very similar today, although in earlier periods, especially in 2008 and 2009, the first lien appears to have defaulted at higher rates than CES. The difference in performance between first and second liens is more pronounced for HELOCs, where first liens default at a much higher rate than the accompanying HELOC. This result is consistent with the possibility that borrowers might continue to rely on a HELOC for credit even after facing problems on the first lien, as is suggested in Goodman et al (2010) and Jagtiani and Lang (2011).

However, we do not believe that preserving access to HELOC credit is the most likely explanation for the lower default rates on HELOCs. For a borrower who is considering default, the safest way to preserve access to any remaining HELOC credit after a default on the first lien is to draw on the remaining HELOC credit ahead of the default, either paying down other debt or depositing the funds for later use.[19] Consistent with this possibility, by the time a default occurs on the first lien, most borrowers have very little available credit left on their HELOCs; on average, only 10 percent of the outstanding credit line is available at the time of the first lien default. As well, it is not very hard to remain current on a HELOC. Usually, the required HELOC payment is typically quite small, comprising only the interest

[19] This strategy would be more difficult for credit cards since they tend to have lower credit limits and they place restrictions on cash advances.

payment on the existing balance. In contrast, the first mortgage payment is much larger. Thus it is quite possible that the relatively high payment rate on HELOCs when the first mortgage is delinquent may be due to the low costs to keep the HELOC current, rather than to the borrowers' active attempt to maintain the access to the HELOC credit line when such access is likely quite uncertain when a borrower is facing a possible default.

To further explore the credit profile of borrowers who have defaulted on a first lien, Table 1 reports the delinquency rate of various types of credit in the five quarters following the default. The top panel of the table shows that, conditional on a first lien delinquency, about 80 percent of homeowners stop paying their CES within 5 quarters. While most HELOC borrowers also stop paying soon after a first lien delinquency, about 30 percent of HELOCs remain current even a year and a quarter later. This calculation removes first liens that cure after a 60+ delinquency. In our sample about 40 percent of first lien delinquencies cure within two quarters, consistent with the strong growth of mortgage modifications.

We also examine the impact of personal recourse on delinquency rates on second liens. Previous research by Ghent and Kudlyak (2011) suggests that borrowers on first liens default at a 30% higher rate in states that have no personal recourse relative to states where the borrower potentially faces personal liability for losses on the defaulted mortgage beyond the value of the foreclosed home.[20] Similar issues exist with second liens because of the differential personal liability associated with piggyback versus subsequent second liens in recourse states. In recourse states, the borrower always maintains personal liability on both the first and second lien to the extent that there is an unpaid balance on the second lien in a default. In other words, in recourse states, the extent of personal liability on a second lien is always the same as for the first lien. However, for non-recourse states, the existence of personal liability depends on when the second lien was taken out. For second liens taken out at the time of purchase to help finance the home, the

[20] See Ghent and Kudlyak (2011) Table 1 for a listing of recourse and non-recourse states.

borrower also maintains non-recourse status on the second lien. However, the borrower is personally liable for any subsequent second liens taken out after the purchase is completed.

The differential legal treatment of piggyback and subsequent second liens in non recourse states presents an opportunity to perform a simple differences-in-differences comparison: 1) How do piggyback versus subsequent second liens perform after the default on the first lien? 2) Does the difference in performance between the piggyback and subsequent second lien vary depending on whether the borrower is in a recourse or non-recourse state? This analysis allows us to control for differences in the types of borrowers in recourse versus non recourse states as well as differences between piggyback and subsequent second lien borrowers.

The first result in Table 1 is that second liens taken out subsequent to the first lien are more likely than piggyback seconds to remain current following a delinquency on the first lien. This difference is more persistent over time for a HELOC as compared to a CES. These findings are indicated by comparing piggyback and subsequent seconds in recourse states. To see if second liens that are recourse loans are even more likely to remain current, we compare the differences between subsequent and piggyback seconds across recourse and non-recourse states. If recourse is important, then we would expect this difference in difference to be positive. The data indicates that recourse does not appear to induce borrowers with CES loans or HELOC loans to be more likely to remain current subsequent to a delinquency on their first lien.[21]

Table 2 shows the performance of credit card and auto debt following a delinquency on a first mortgage. Borrowers appear to make many of these debt payments a year or more after defaulting on their first lien. Borrowers that default on their first mortgage remain current on their auto loan 70 percent of the time for a

[21] Over the first three quarters after the first lien delinquency, the difference in differences values are quite small for both HELOC and CES. While the values diverge a little bit from zero in the fourth and fifth quarters post delinquency, the number of observations diminishes and we do not put a lot of weight on the small reported differences.

year or more after a first mortgage delinquency. These findings are consistent with the findings of Andersson et. al. (2010) that homeowners have a hierarchy of debt payments where the mortgage payment is no longer the most critical payment.

For many consumers in trouble, the car loan is the most critical payment to make, given that a default on a car loan can result in a quick repossession. Without a car, most households would have a hard time getting to work or looking for a job. The results for credit cards are more mixed. About 40 percent of those who default on their first lien continue to pay their credit card. Credit cards can be a source of additional credit to an unemployed household and similar to HELOCs, the minimum payment to keep the credit card account current is relatively small. For example, Cohen-Cole and Morse (2010) find that the availability of credit is as important as house prices in predicting delinquency on a mortgage. In the event of a personal bankruptcy, credit card and HELOC debt would often be treated similarly. Unpaid HELOC debt (and most second lien debt) would typically be converted to unsecured debt in a bankruptcy if the total of all secured real estate debt (first liens plus all subsequent liens) exceeds the value of the home.

Finally, we examine changes in second lien performance over time when the first lien has defaulted. Table 3 shows that the performance of second liens once the first lien has become delinquent has improved since 2008. The improvement may be due to increased numbers of first lien borrowers seeking mortgage modifications while remaining current on their second lien.

We consider three possible explanations for why some borrowers remain current on their second liens even a year beyond a continuing serious delinquency on their first lien:

Behavioral cash-management- When facing a loss of income, some borrowers may follow a strategy of paying as many bills as possible each month. Given that the first lien mortgage has the largest monthly payment, these households will initially go delinquent on their first lien mortgage. These households plan to become current in the future when their income has been restored. As we noted earlier, the one

exception to the payment order by payment size strategy appears to be auto loans.

Strategic default- Borrowers may strategically default on their first lien, since most mortgage modification programs were targeted to seriously delinquent first liens. While some borrowers might have had resources to pay the first lien and strategically defaulted to obtain a modification[22], others might have only been able to cover a portion of their mortgage payments and chose the second lien to increase their chances of getting help. Modification flags were only added to our consumer credit panel data only starting in 2011 Q1. This initial modification information only indicates that a mortgage was modified, not when it was modified. For modifications that occur subsequent to 2011 Q1 we can ascertain the timing of the modification. This data limitation makes it difficult for us to investigate the merits of the strategic default hypothesis.

Personal liability- As noted above, most borrowers who default on a second lien, with the exception of those who have a piggyback CES in a non recourse state, still face personal liability on their debt, the same way they would if they defaulted on a credit card or student loan. Our simple difference in difference evidence does not find support for this hypothesis.

IV) Conclusion

We use data from credit report and deeds records to better understand the role of second liens in contributing to the housing boom and subsequent foreclosure crisis. Overall, second liens appear to have allowed borrowers to take on additional leverage, although it is not possible to say whether borrowers might have turned to higher LTV first liens if attractively priced second liens were not available. However, part of the reason that second liens were attractively priced is that many second liens were originated to higher quality borrowers than the average first lien

[22] See Mayer, Christopher, et. al. (2011). In this paper, the authors show that the offer of a mortgage modification program can increase default rates on a first lien by about 20 percent, with the biggest increase among borrowers who apparently have the financial resources to pay.

borrowers. Within the category of second liens, home equity lines of credit (HELOCs) appear to be the best credit quality, with relatively few piggyback originations, higher quality borrowers at origination, and a smaller percent originated near the peak of the housing boom. Closed end second lien characteristics were worse on all these dimensions. While home equity extraction appears to be large factor behind increased borrowings, especially for HELOCs, such borrowings went to relatively high quality borrowers who likely would have had access to some additional credit even without using a HELOC.

Second liens were quite prevalent at the top of the housing market, with as many as 45 percent of home purchases involving a piggyback second lien in coastal markets and bubble locations, but a somewhat smaller prevalence of piggyback second liens in more stable or declining markets in the Midwest and South. Second liens were strongly associated with the use of low down payments to purchase homes. Owner-occupants used second liens to help finance a higher percentage of purchases than investors. These data are consistent with the hypothesis that piggyback second liens allowed some borrowers to purchase homes with especially low down payments who might otherwise not been able to afford a home. That said, it is not possible to demonstrate a causal link between second liens borrowings and the housing bubble and subsequent collapse.

The default rate on a second lien is generally similar to that of the first lien on the same home, although about 20 to 30 percent of borrowers will pay the second lien for more than a year while remaining seriously delinquent on their first mortgage. By comparison, about 40 percent of credit card borrowers and 70 percent of auto loan borrowers will continue making payments a year after defaulting on their first mortgage. This behavior can be due to a combination of several reasons, including strategic default on the first lien to obtain a modification, behavioral explanations that depend in part of borrowers directing available funds to the accounts with the smallest minimum payments, and the fact that defaults on second liens very rarely result in the loss of a home.

Finally, we show that the relatively low delinquency rates for HELOCs have remained flat in recent quarters even as delinquency rates are falling for most other types of credit. Given that the bulk of outstanding second liens are HELOCs, such performance could signal that problems are not over for some lenders with large portfolios of HELOCs on their balance sheet.

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Table 1. Percent of balances remaining current after first lien delinquency

Credit type	1 Quarter	2 Quarters	3 Quarters	4 Quarters	5 Quarters
All states:					
CES	27.5	28.3	26.5	24.5	20.9
HELOC	43.2	39.8	36.5	36.6	30.9
Recourse states (R):					
CES	30.6	30.8	29.4	25.4	23.2
Piggyback	23.3	24.2	23.6	22.5	15.8
Subsequent	38.0	37.6	34.1	31.7	27.1
Difference	14.7	13.5	10.5	9.2	11.3
HELOC	46.1	42.7	40.1	39.3	31.6
Piggyback	37.4	36.7	30.3	31.5	31.7
Subsequent	48.8	44.9	42.2	39.7	34.5
Difference	11.4	8.2	11.9	8.3	2.8
Non-recourse states (NR):					
CES	22.8	24.4	21.7	23.0	16.4
Piggyback	16.5	17.4	18.2	23.6	18.3
Subsequent	29.2	33.3	27.4	25.2	14.3
Difference	12.7	15.9	9.2	1.7	-4.1
HELOC	40.0	36.8	31.9	33.1	29.6
Piggyback	32.4	28.8	21.0	18.1	17.6
Subsequent	43.6	37.9	36.4	37.6	38.5
Difference	11.2	9.1	15.4	19.6	20.9
CES: diff(NR) in diff(R)	-2.0	2.5	-1.3	-7.5	-15.4
HELOC: diff(NR) in diff(R)	-0.2	0.9	3.5	11.3	18.1

Note: Non-recourse states include – AK, AZ, IA, MN, MI, ND, OR, WA, WI, CA (purchase), and NC (purchase).

Table 2. Percent of balances remaining current after first lien delinquency

Credit type	1 Quarter	2 Quarters	3 Quarters	4 Quarters	5 Quarters
CES	27.5	28.3	26.5	24.5	20.9
HELOC	43.2	39.8	36.5	36.6	30.9
Auto loan	79.2	78.0	78.5	70.0	70.7
Credit card	46.8	41.8	43.8	40.2	38.9

Note: Sample includes all first liens that remain delinquent over the indicated period. About 40 percent of delinquent first liens "cure" within 4 quarters of first becoming delinquent.

Table 3. Change over time in payments on second liens when first lien is seriously delinquent

% current if first lien is 60+ delinquent	CES	HELOC
2008 Q2	16.2	29.2
2010 Q2	22.0	42.2
2011 Q2	25.7	37.8

Figure 1. Second lien balance ($B)

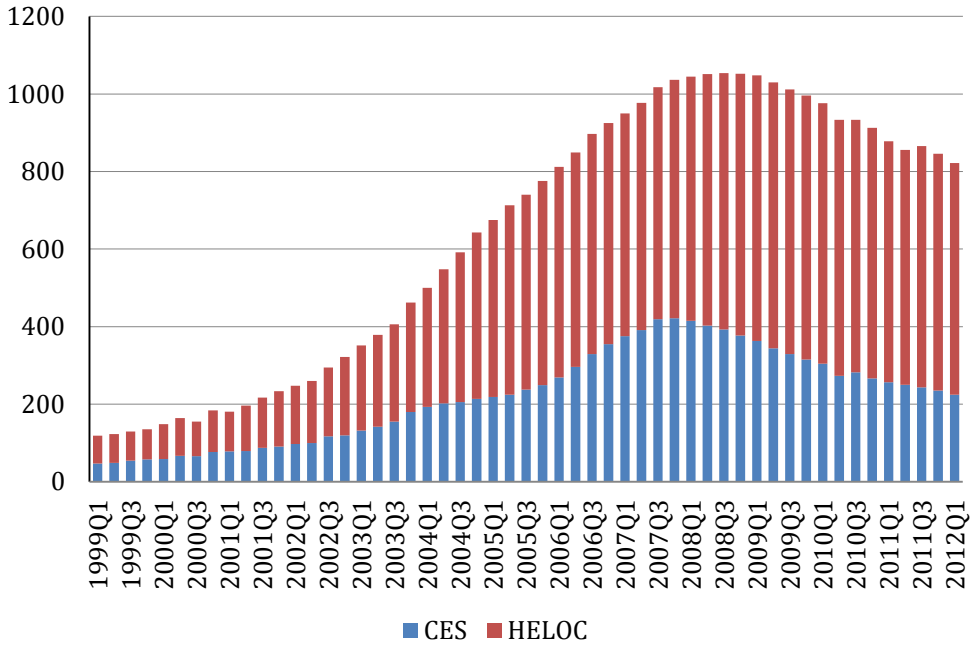


Figure 2. Second lien originations ($B)

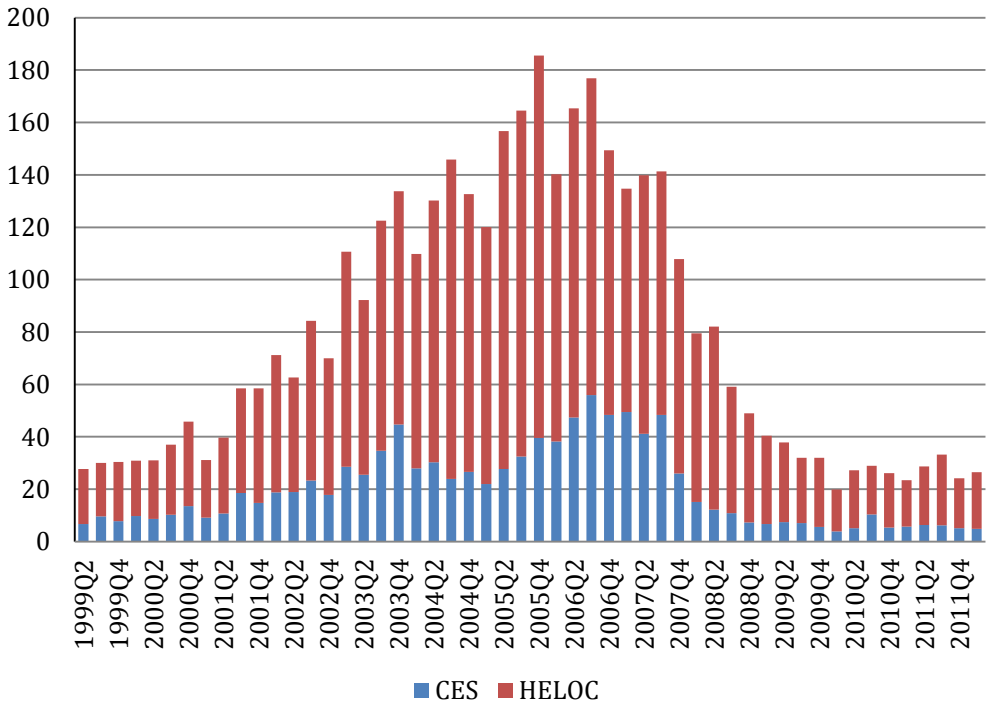


Figure 3. Share of balances with Equifax risk score >700 at origination

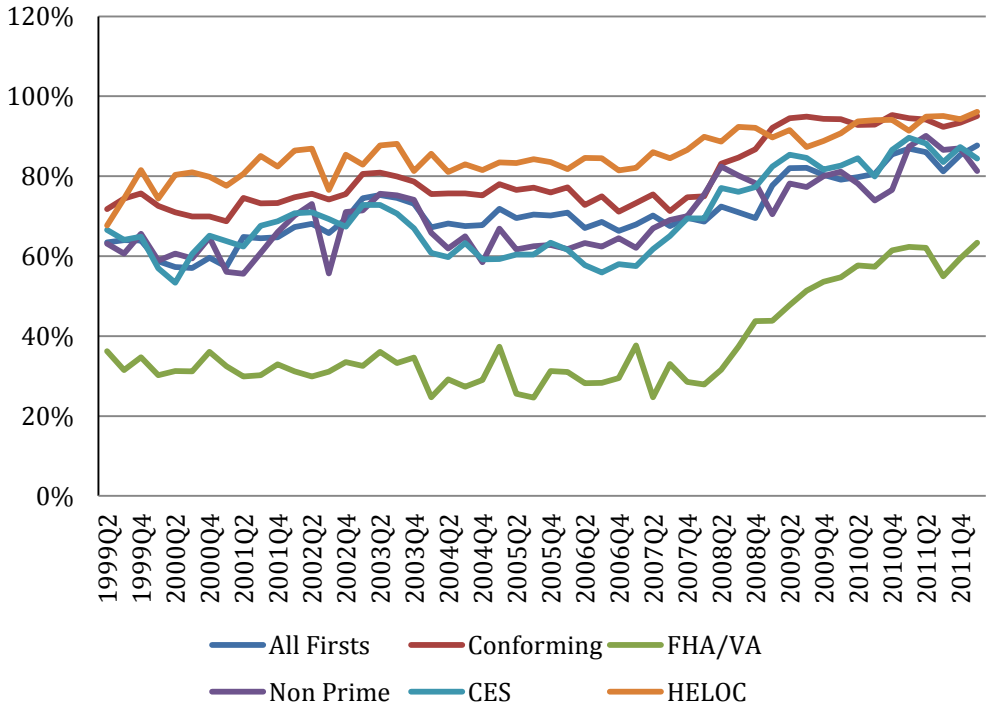


Figure 4. CES originations, by type of first-lien ($B)

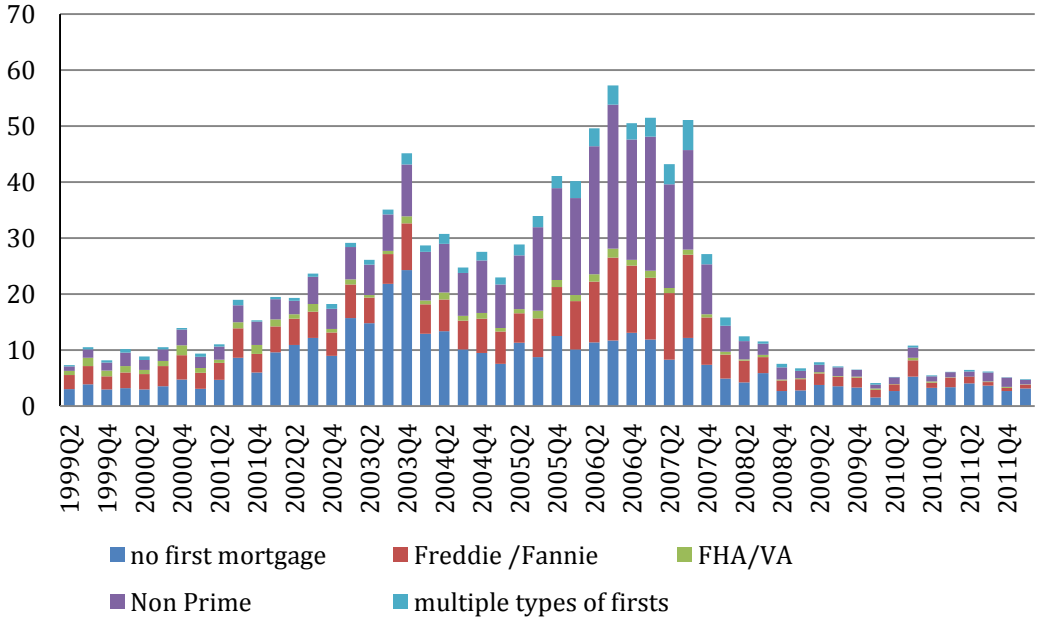


Figure 5. HELOC originations, by type of first-lien ($B)

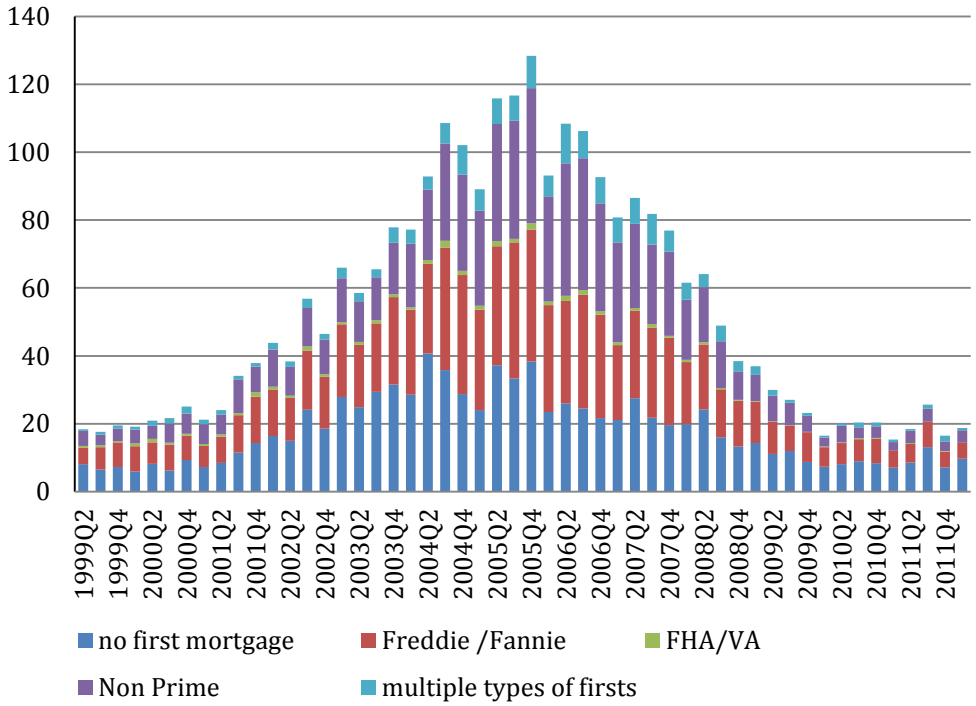


Figure 6. CES originations following prime first-liens ($B)

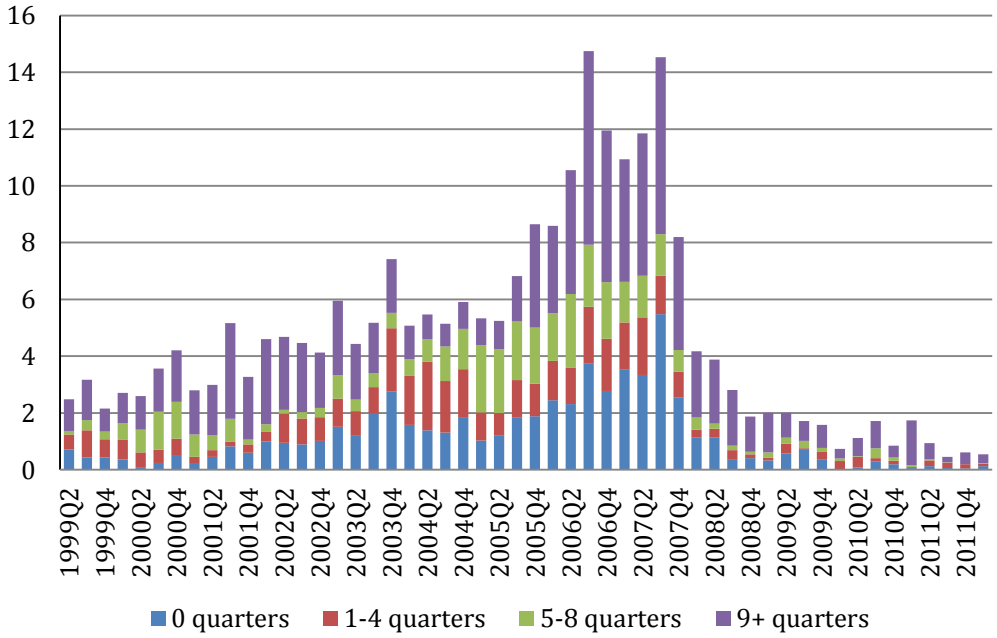


Figure 7. CES originations following non-prime first-liens ($B)

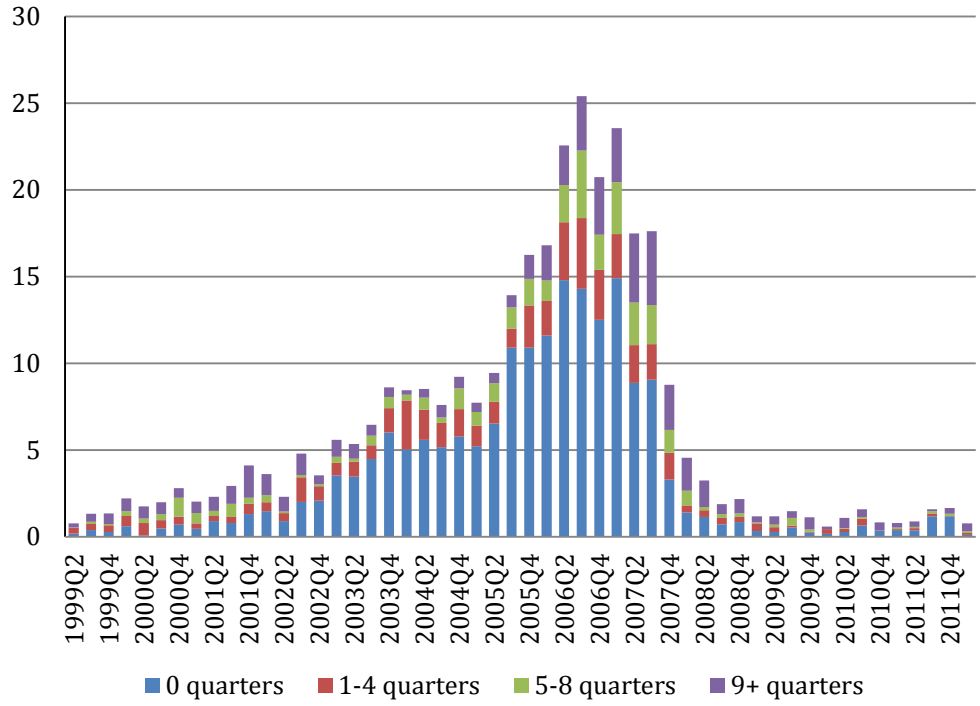


Figure 8. HELOC originations following prime first-liens ($B)

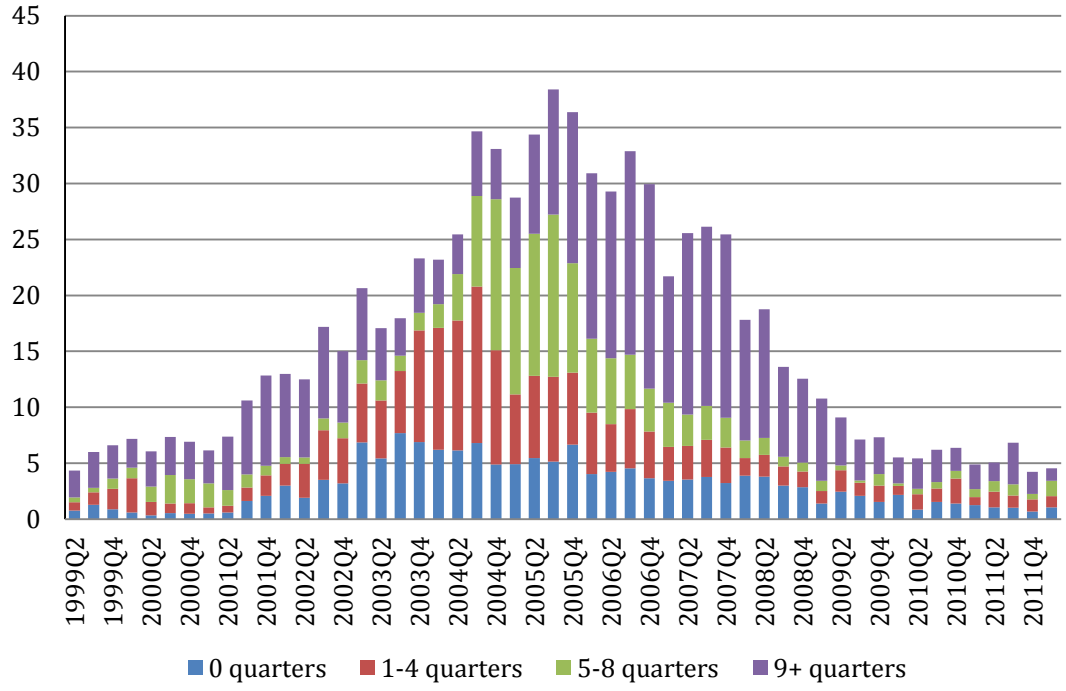


Figure 9. HELOC originations following non-prime first liens ($B)

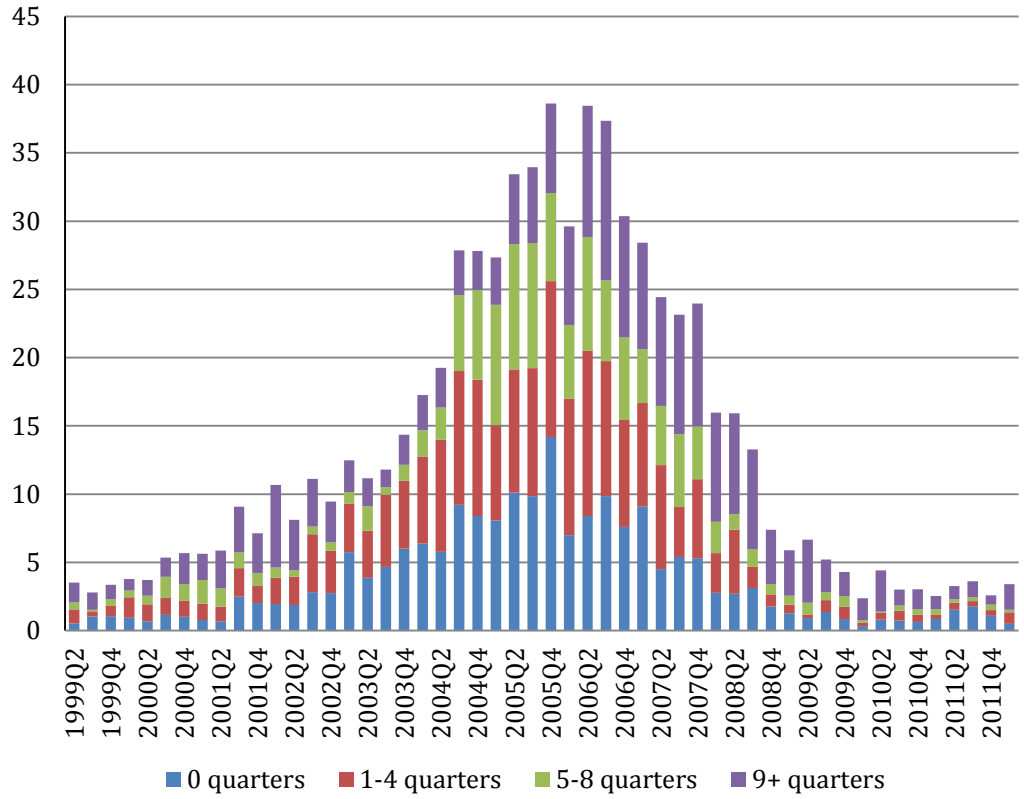


Figure 10. Share of purchases mortgages with a piggyback second-lien

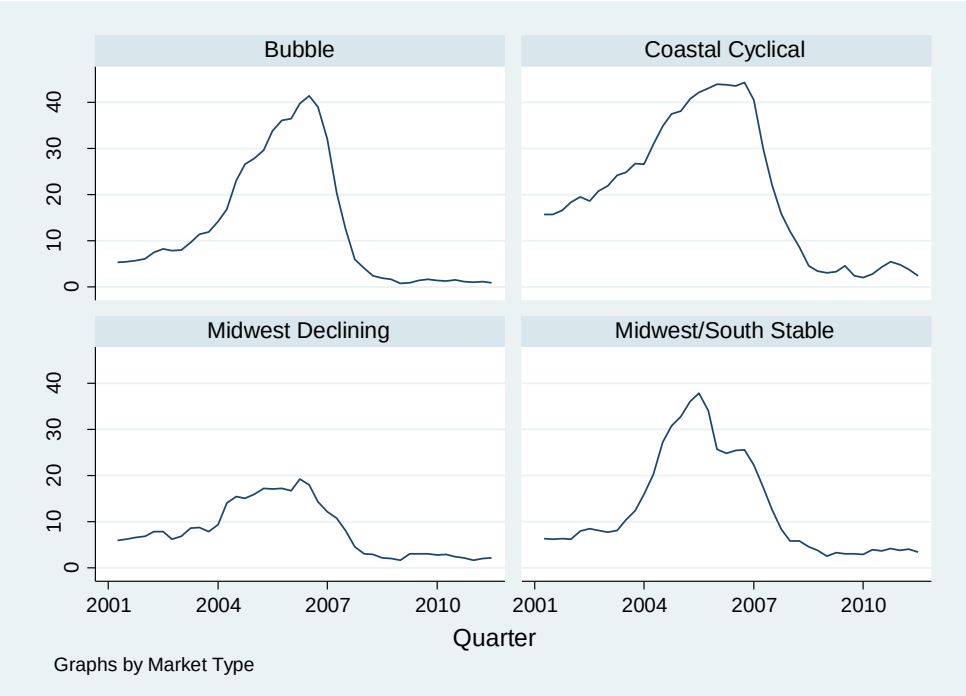


Figure 11. Average LTV, purchase mortgages without a second-lien

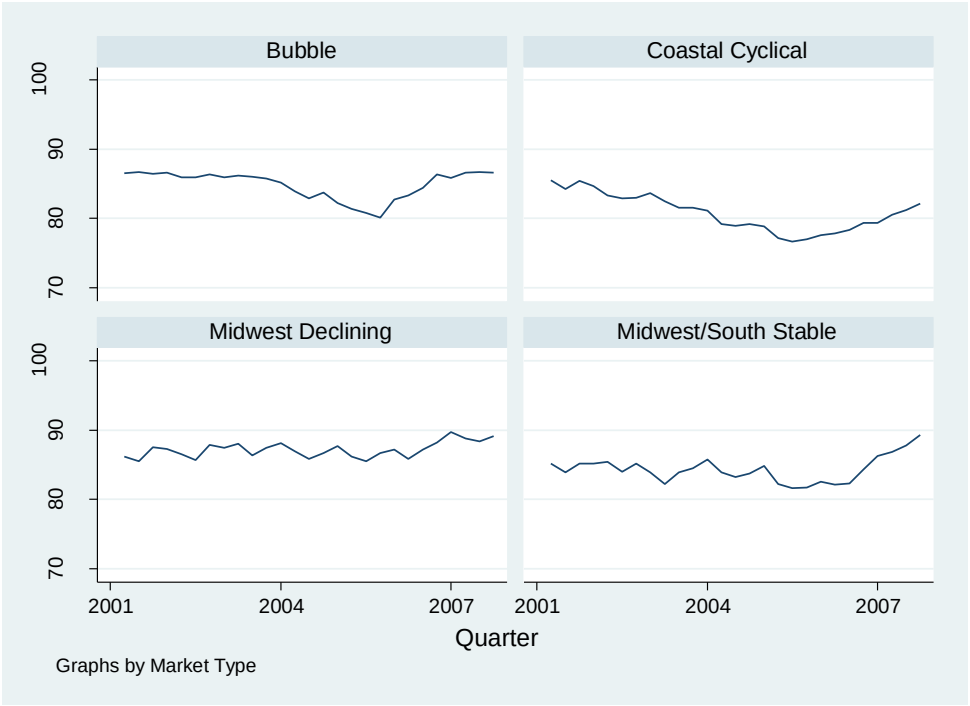


Figure 12. Share of purchases with one mortgage and with an LTV ≥ 95%

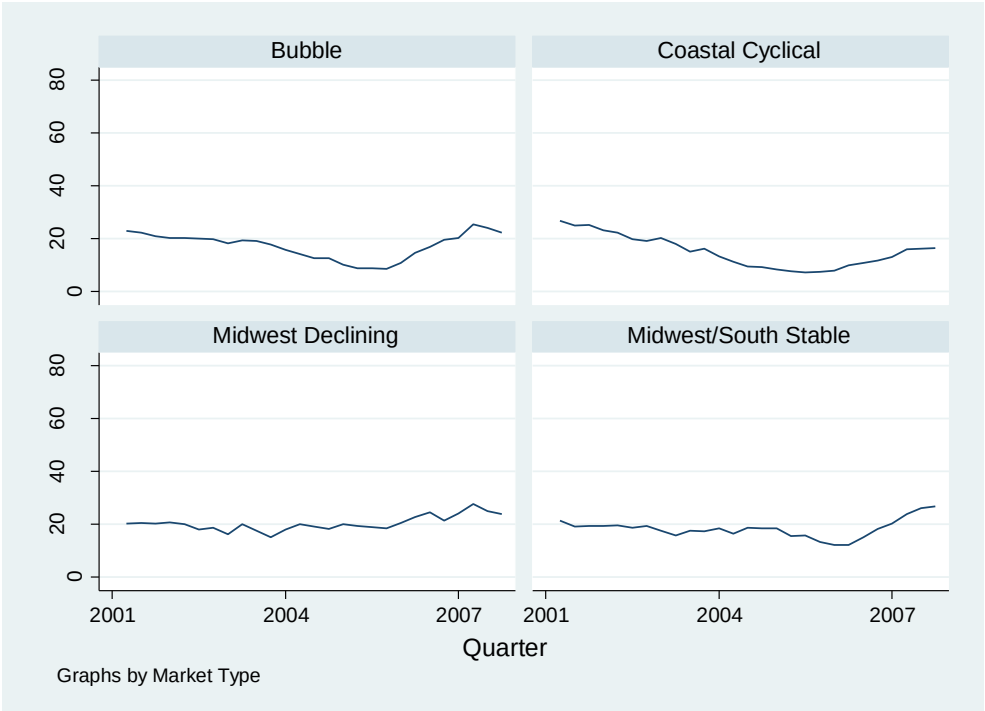


Figure 13. Average combined LTV, purchase mortgages w. second-lien

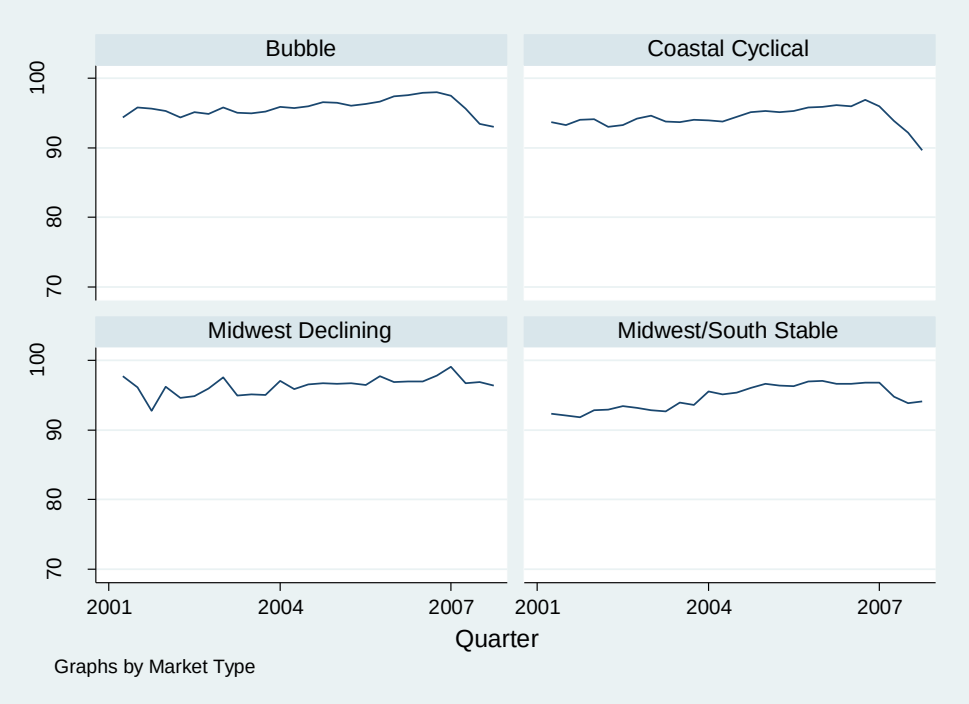


Figure 14. Share of purchases with multiple mortgages with combined LTV ≥ 95%

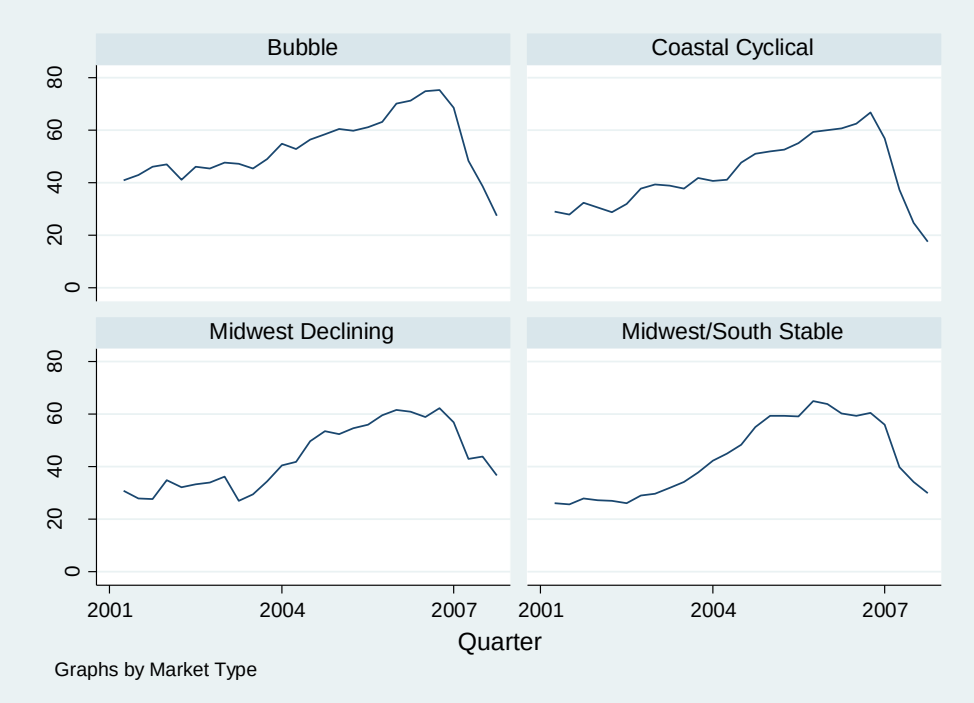


Figure 15. Share of owner-occupied purchases with multiple mortgages

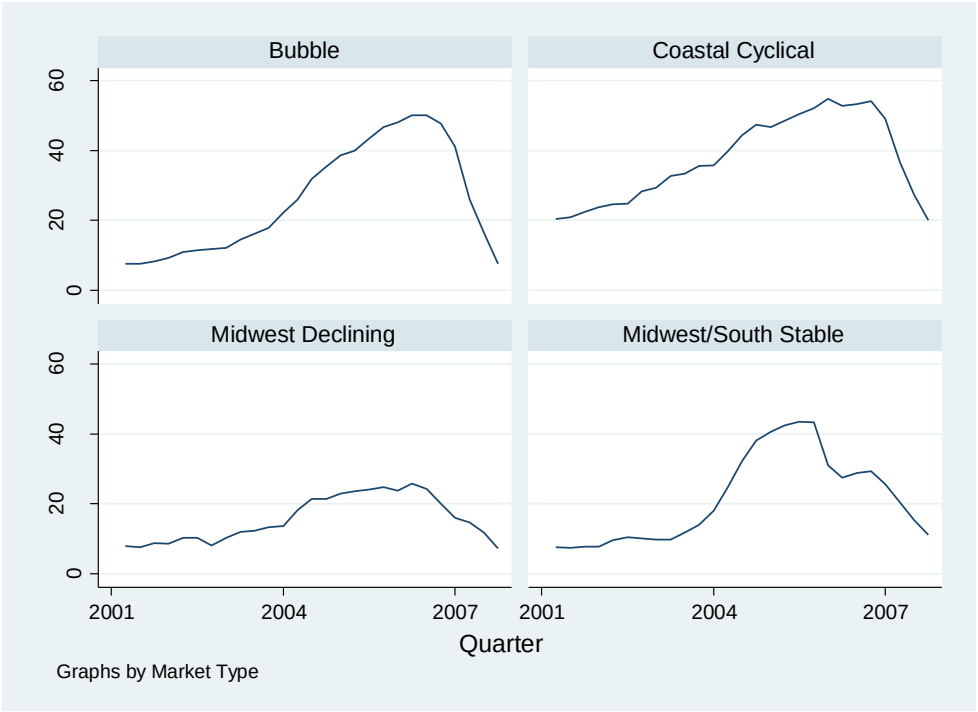


Figure 16. Share of investor purchases with multiple mortgages

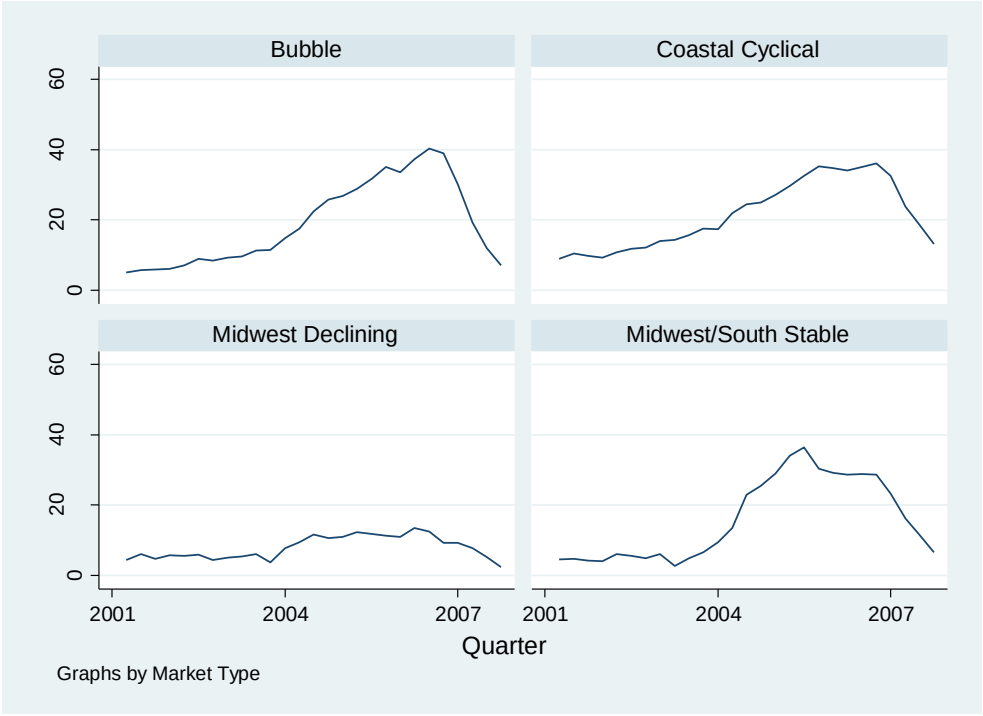


Figure 17. 90+ delinquency rates for CES, HELOCs, FHA/VA, Prime and non-prime

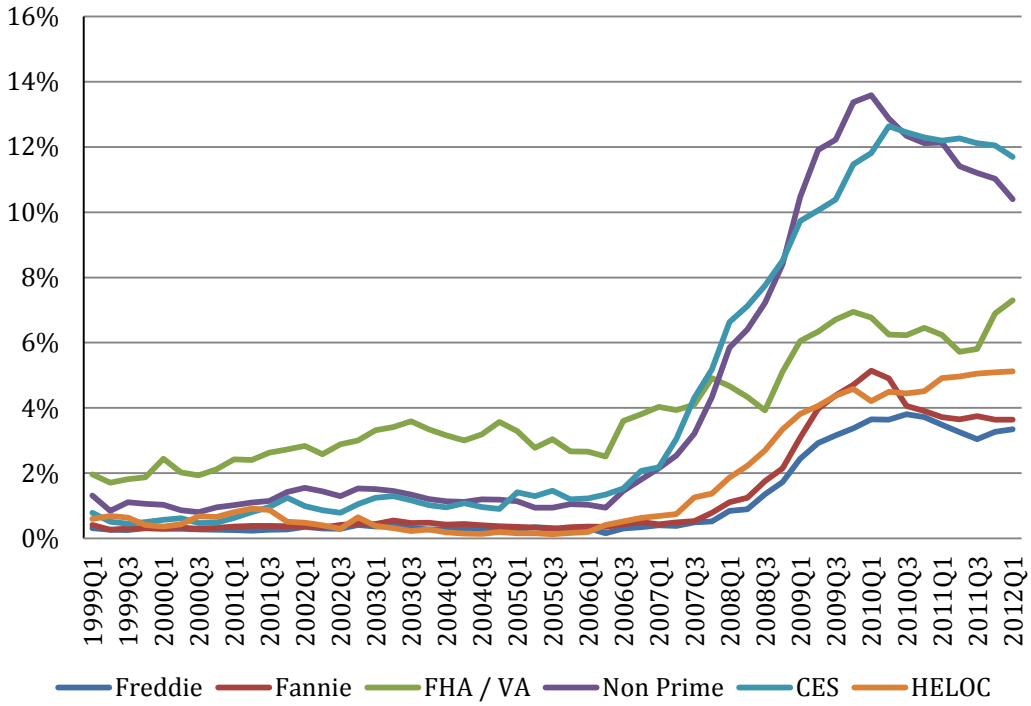
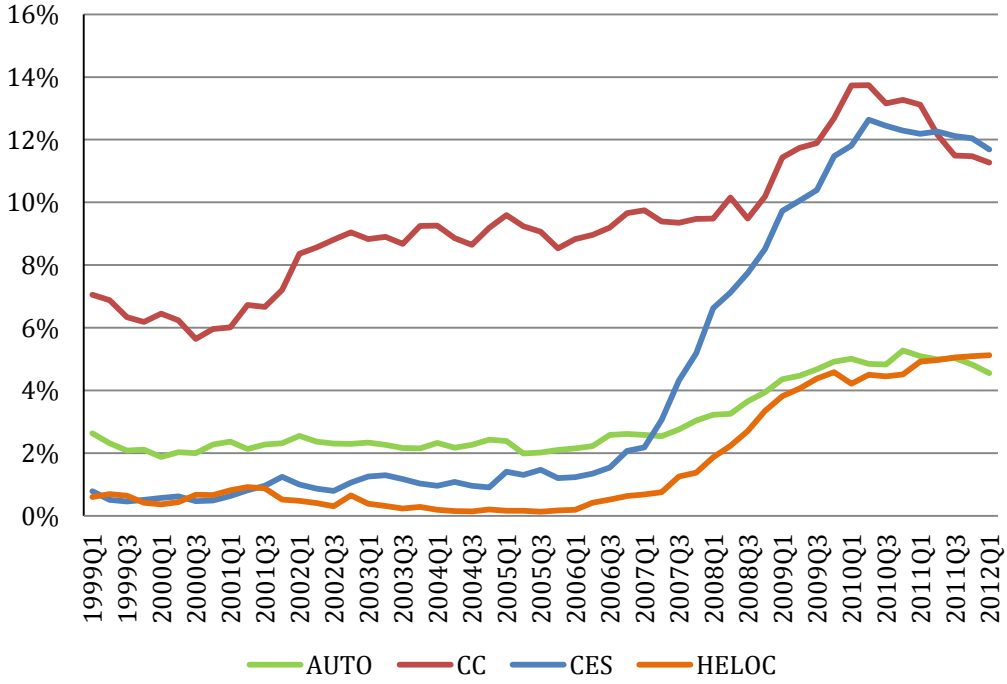
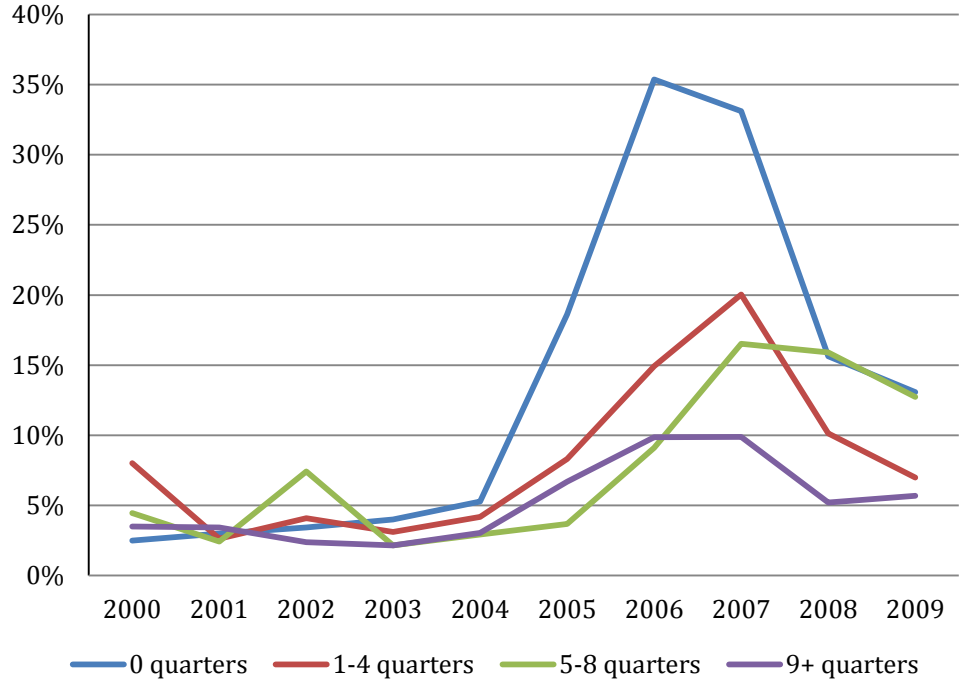


Figure 18. 90+ delinquency rates for CES, HELOCs, credit cards, and auto loans



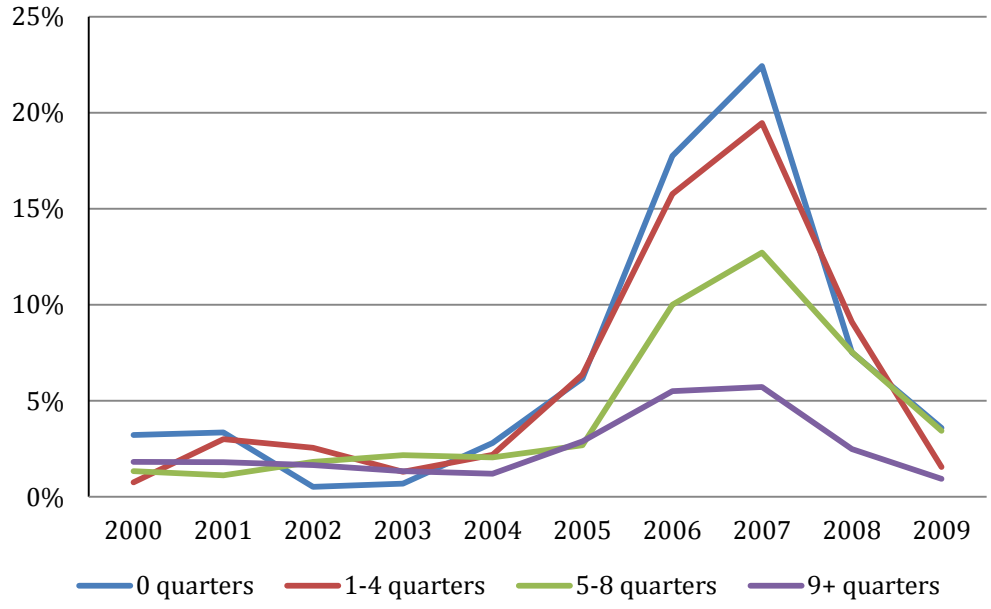
Note: Balance weighted

Figure 19. 90+ delinquency rates for CES originations, after the first-lien origination, based on year of origination



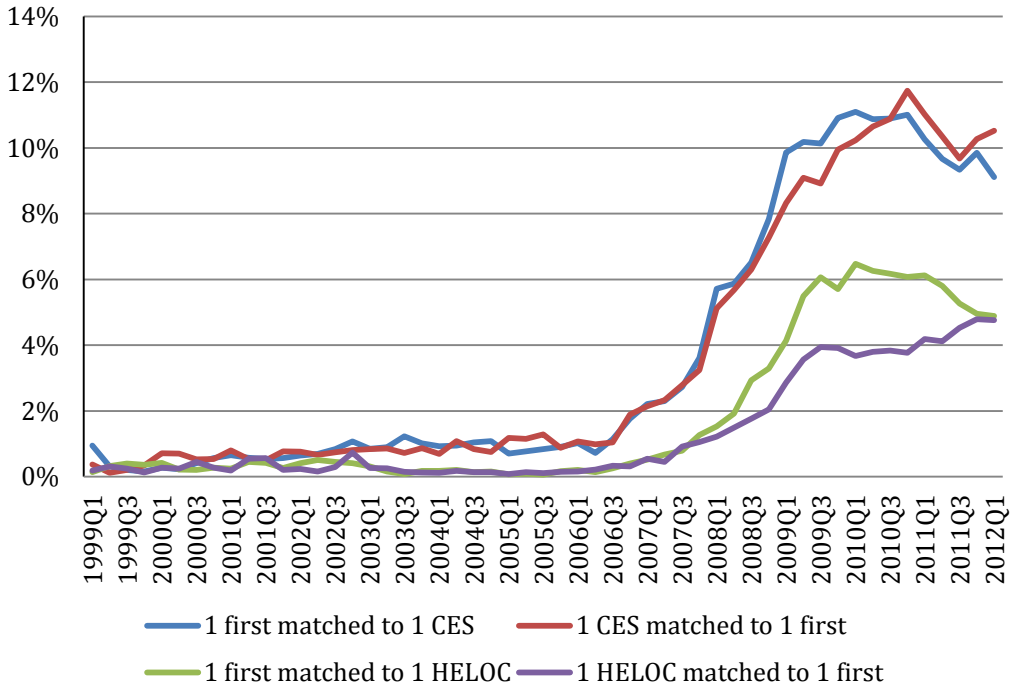
Note: Delinquency defined by the last observation of the life of the loan

Figure 20. 90+ delinquency rates for HELOC originations, after the first-lien origination, based on year of origination



Note: Delinquency defined by the last observation of the life of the loan

Figure 21. First mortgage, CES, HELOC 90+ delinquency rate



Note: Conditional on matching a first and a second.