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Decline in Mortgage Debt Using Consumer Credit Record Data**

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**Mortgage Debt and Household Deleveraging:
Accounting for the Decline in Mortgage Debt Using Consumer Credit Record Data**

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Abstract: One of the major reasons hypothesized for the tepid economic recovery thus far is the ongoing “deleveraging” process. From 2009:Q3 to 2011:Q3, aggregate household debt declined by about \$1.5 trillion in real terms, with mortgage debt falling by about \$1 trillion. Other than defaults, the factors driving the decline in aggregate debt are not precisely understood, in large part because the necessary data are not widely available. This paper draws on panel data consisting of individual credit records to better understand why mortgage debt has declined. I decompose changes in aggregate mortgage debt over two-year periods spanning the past decade into inflows (from individuals whose mortgage debt increases during a given two-year period) and outflows (from those who reduce or eliminate their mortgage debt over a period). The principal finding is that the drop in outstanding mortgage debt has more to do with shrinking inflows than with expanding outflows, including defaults. Even if outflows had not grown at all, mortgage debt would have declined over the past two years because inflows have been so weak. One factor dampening inflows is historically weak first-time homebuying, especially among those with less-than-excellent credit scores, suggesting tight credit supply has limited debt accumulation even among those who have little debt. On the outflows side, most of the expansion can be traced to financially distressed borrowers and mortgage defaults, with real estate investors playing a disproportionate role. Otherwise, there has not been much of an increase in outflows, implying that borrowers generally are not paying down their balances more aggressively than in the past.

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1. Introduction

One of the major reasons hypothesized for the tepid economic recovery thus far is the ongoing household “deleveraging” process, as households divert resources toward aggressively repaying debt built up in earlier periods (e.g. Eggertson and Krugman 2011, Mian et al. 2011). To track the pace of deleveraging, researchers must often rely on more widely available aggregate measures such as the ratio of household debt to disposable personal income (e.g. Glick and Lansing 2009). Exhibit 1 shows that this ratio has declined considerably since 2007, suggesting significant deleveraging by households. Other aggregate leverage measures such as the debt-to-asset ratio (not shown) demonstrate less progress, largely because house prices are well below their peak. Still, a lower debt-to-income ratio suggests that households can better manage debt service, putting the economy and financial system on a more sound footing.

Exhibit 2 shows the *level* of total household debt and mortgage debt in current dollars as of the end of the third quarter each year since 1999. Mortgage debt makes up the vast majority of household debt and was the primary determinant of rising household debt from the late 1990s to 2007 (Dyan and Kohn 2007). Since 2009, aggregate household debt has fallen by about \$1.5 trillion, with mortgage debt accounting for about \$1 trillion of that decline.¹

Although suggestive, these aggregate measures can give a false impression about the extent of household deleveraging. For example, the aggregate decline could largely reflect a lack of debt accumulation, because of tight credit conditions, by households who have little debt and would typically be building debt (younger, potential first-time homebuyers, for example), while already-indebted households only slowly amortize their debt.

Of course, defaults and charge-offs have been abnormally large, contributing to the decline in outstanding debt, as pointed out by Dynan (2012) and *The Economist* (2012). But defaults are just one part of the story; defaults are a subset of total outflows, and the change in outstanding debt reflects the combination of various inflows and outflows. Without measuring these other flows, it is difficult to precisely understand why aggregate debt has declined. For example, it cannot be determined from the aggregate data alone whether there has been considerable debt reduction by the vast majority of borrowers who have not defaulted.

¹ Aggregate household debt is measured using consumer credit record data (described in Section 2), and is somewhat lower than what is estimated in the Federal Reserve’s Flow of Funds (FF) because the FF includes debt attributed to non-profit organizations and the credit record data does not fully account for student loans. Nevertheless, the trends in the two series are very similar.

In this paper I draw on panel data consisting of individual credit records to help better understand why outstanding mortgage debt has been declining. These data have three key advantages for studying the mortgage market. First, they are representative of individuals with a credit record (nearly the entire U.S. adult population) and cover virtually all mortgages so that the sum of mortgage debt across sample borrowers inflates up to the national aggregate. Second, despite being detailed micro data, they are still timely and high frequency. Third, because they are a panel at the individual level, I can track the total mortgage debt of a given borrower over time and thus observe whether a borrower increases or reduces his mortgage debt – something that is not possible with more widely used mortgage micro data.²

I use these data to decompose two-year changes in the aggregate stock of mortgage debt into “inflows” and “outflows.” Inflows come from borrowers who increase their mortgage debt during a given two-year window, outflows come from borrowers who decrease their mortgage debt during that window, and the sum of inflows and outflows equals the change in outstanding debt. The overarching finding of the paper is that the recent drop in mortgage debt has considerably more to do with shrinking inflows than with expanding outflows, including mortgage defaults. In fact, even if outflows between 2009:Q3 and 2011:Q3 were at the same level as just prior to the recession, outstanding mortgage debt still would have declined during the 2009-2011 period because inflows were so weak.

A sharp reduction in first-time homebuying, despite policy efforts to bring down mortgage rates and to subsidize first-time homebuying through tax credits, has contributed to declining inflows. Tight credit conditions may have weakened the impact of these policy efforts. Mortgage inflows from potential first-time homebuyers with less-than-excellent credit scores have dropped dramatically compared to a period well before the peak of the market, and even in parts of the country where employment conditions are well-above average.

Another major source of declines in mortgage inflows appears to be from potential real estate investors and second-home buyers. Inflows from such borrowers were over \$600 billion lower during the two-year period from 2009:Q3 to 2011:Q3 compared to 2005:Q3 to 2007:Q3 – accounting for almost 30 percent of the shrinkage in inflows.

² For example, in mortgage data such as those from Lender Processing Services, borrowers are not linked across mortgages or over time, so it is impossible to follow a borrower after they pay off their mortgage because of a refinancing or because they move to a new house. It is also impossible to know how many mortgages a given individual has at any point in time. Finally, most mortgage datasets do not fully represent the entire market.

The more modest expansion in *outflows* appears closely related to increased financial distress and mortgage defaults, as one would expect, with real estate investors playing a disproportionate role. That said, a majority of mortgage borrowers exhibiting financial distress (identified by the fact that they have a recent severe delinquency on *any* type of credit account) seem to still be managing their mortgage payments as of 2011:Q3.

Finally, despite some evidence from industry sources on accelerated mortgage debt repayment, I do not find that aggregate outflows have expanded substantively since the period just before the recession beyond what can be traced to distressed borrowers and mortgage defaults. While few borrowers, compared to prior years, have been increasing their mortgage debt, they also do not appear to be aggressively paying down their mortgages. It is therefore possible that many borrowers might actually be credit constrained (they would like to increase their debt, but cannot find a willing lender and therefore must simply make minimum payments).³ Alternatively, borrowers could be focused on improving their balance sheets by increasing their assets rather than making accelerated principal payments.

Overall, the analysis suggests that a complex story underlies the decline in aggregate debt-to-income and one should be cautious when trying to draw conclusions about household borrowing and debt-repayment behavior based solely on such aggregate figures. At the same time, the credit bureau data, unfortunately, lack information on borrowers' income and assets and cannot provide a full understanding of where households are in the deleveraging process. The release of 2010 data from the Federal Reserve's Survey of Consumer Finances should help fill in some of these gaps.

The rest of the paper is organized as follows. In the next section I describe the credit record panel data in more detail. Section 3 lays out the framework for the analysis, defining four types of mortgage flows - two types of inflows and two types of outflows. The results section first discusses the overarching result of the paper regarding total inflows and outflows, and then analyzes each of the four flows in greater detail. The last section concludes.

³ This paper builds on work by Brown et al (2011) who use the same data, and my results are broadly consistent with theirs. In particular, they emphasize that there has been a substantial drop in *net* borrowing after accounting for "charge-offs." The inflow-outflow framework I build in this paper disaggregates the data more finely and helps show, for example, that paydowns and payoffs have not grown that much and that the contraction in inflows has really driven down net borrowing.

2. Consumer Credit Record Data

I use data from the Federal Reserve Bank of New York's Consumer Credit Panel (CCP), which is a nationally representative, ongoing longitudinal dataset with detailed information at a quarterly frequency beginning in 1999 on consumer debt and loan performance. The data are a 5 percent sample of all individual credit records maintained by Equifax using a methodology to ensure that the same individuals can be tracked over time, and each quarter a random sample of people who enter into their credit record database (younger people typically) are added to the sample so that it is representative of the universe of credit records each quarter.⁴

One of the major advantages of these data for studying the mortgage market is that they cover the vast majority of mortgages – regardless of lien status, and regardless of whether the loan is held in a bank's portfolio, sold to a government-sponsored enterprise (e.g. Fannie Mae and Freddie Mac) or sold into a private-label security – in a consistent way over a fairly long period of time. Thus, they can be used to reliably estimate total aggregate outstanding mortgage debt at many points in time over the past decade as in exhibit 2 (note that jointly held mortgages are given a weight of one-half when aggregating up loan balances).

Another advantage of these data are their timeliness despite having such granular details; the data for this paper run through 2011:Q3. One of the only other sources of panel data with balance sheet information is the Panel Study of Income Dynamics (PSID), but these data arrive with a considerable lag. The PSID also has far fewer observations than the CCP, and can suffer biases due to non-response and sample attrition.

Of course, the CCP data have some limitations. For one, lenders provide only a few details about each mortgage, such as the outstanding balance and whether it is open- or closed-ended. Other information, including the occupancy status (owner-occupied or not) and the location of the property securing the mortgage, are generally not available. Occupancy status would help in identifying borrowers who have mortgages on investment properties. Instead, such borrowers must be inferred based on the number and size of the mortgages they have on record, as will be discussed in more detail later.

⁴ For ease of data management, I use a 5 percent sample of the CCP for most of the analysis. For more information on the CCP, see Lee and van der Klaauw (2010). It is important to note that all individuals in the data are anonymous: names, street addresses and social security numbers have been suppressed. Individuals are distinguished and can be linked over time through a unique, anonymous consumer identification number assigned by Equifax. For information about Equifax, one of the three national consumer credit reporting agencies, see www.equifax.com/home/en_us.

Another limitation of the CCP data is that there is very little information beyond standard credit record information on each individual. Thus there are very few demographic variables and no information on employment, income or assets. One of the few demographic variables available is year of birth, which I will use.

3. Framework for Decomposition Analysis

As described earlier, I use the CCP data to decompose changes in the aggregate stock of mortgage debt into inflows and outflows. Over a given window of time, inflows come from those who increase their mortgage debt, outflows come from those who decrease their mortgage debt, and the sum of inflows and outflows equals the change in outstanding debt during that window. More precisely, for any two-year period, I classify individuals into four mutually exclusive groups – two inflow groups and two outflow groups.⁵

On the inflow side are:

- *Entrants* – This group is composed of people who went from a zero to positive mortgage balance over a two-year period. It not only includes first-time homebuyers, but also includes those who may have had a mortgage sometime in the past or own a house free and clear and decide to take out some equity.
- *Increases* – This group includes those who increased their total mortgage balance over the two-year period, for instance by extracting equity or by taking on another mortgage to buy another property.

On the outflows side are:

- *Exiters* – This group is comprised of those who went from a positive to zero total mortgage balance, for example by paying off their mortgages or by having them canceled after a default.
- *Decreasers* – These are individuals who decreased their total mortgage balance over the two year period, but did not completely erase such debt. This group includes those who do nothing but simply pay down their mortgages through scheduled payments.

In addition to these broad groupings of the data, I will also examine how flows from certain subgroups, such as “investors” and “distressed” borrowers, have changed.

⁵ Two-year intervals conveniently divide the 1999-2011 period into six sub-periods, with the first four sub-periods leading right up to the recession at the end of 2007 and last two periods covering the recession, financial crisis and aftermath. The inflow and outflow measures become more noisy at shorter intervals (one year, for example) because of refinancings and servicing transfers that artificially inflate entry and exit in particular. Somewhat longer intervals help smooth through these events.

4. Results

4.1. Main results

Exhibit 3 shows dollar inflows and outflows (adjusted to 2011:Q3 dollars) from the four groups over six consecutive two-year periods beginning 1999:Q3 and ending 2011:Q3. The four bars in a given period sum to the change in outstanding debt for that period. Thus, during the period from the end of 2005:Q3 through 2007:Q3, combined entrant and increaser inflows totaled almost \$3.5 trillion, outweighing combined outflows of \$1.8 trillion, for a net increase in mortgage outstandings of \$1.7 trillion. In contrast, during the 2009-2011 period, combined inflows were only \$1.4 trillion while combined outflows were \$2.4 trillion, yielding the decline in outstandings of \$1 trillion mentioned earlier. (These numbers and many of the numbers discussed later can be found in the appendix.)

Exhibit 3 thus shows that inflows have shrunk by \$2.1 trillion since the period just before the recession (from \$3.5 trillion to \$1.4 trillion as noted above) while outflows have expanded by just \$600 billion. This is the overarching result of the paper: the drop in inflows has played a relatively large role in the decline of aggregate mortgage debt. Even if outflows had held steady at \$1.8 trillion, outstanding debt would have declined over the past two years because inflows have been so weak at \$1.4 trillion.

One potential caveat is that inflows may have declined simply because house prices have declined. For example, a first-time homebuyer making a 10 percent downpayment would not need as large a loan in 2010 as he did in 2006. However, exhibit 4 shows that the *number* of entrants and increasers has fallen substantially. The number of entrants in the most recent period is about 40 percent lower than in the 2005-2007 period (not far from the 50 percent decline in dollar inflows from entrants), and the number of increasers has also dropped similarly. Thus, the contraction in dollar inflows appears to be closely related to a contraction in the number of entrants and increasers.

One final point relates to the somewhat anomalous jump in exit volume (both in terms of dollars and people) in the 2001-2003 period. This jump likely reflects the refinancing boom in 2003. When a borrower refinances, his mortgage balance may temporarily go to zero until his lender reports the new loan to the credit bureaus (thus he would look like an exiter if this happens near the end of a period). In general some of the exits in one period and entries in the subsequent period likely reflect refinance activity, thus slightly inflating exit and entry volume

each period, particularly exit in 2001-2003 and entry in 2003-2005. Nevertheless, the main conclusion in this paper that the contraction of inflows since 2005-2007 has far outweighed the growth in outflows is not an artifact of this data issue. The appendix table provides estimates of entry related to potential lags in data reporting (the row labeled “potential refinancers”) and suggests the effect is quite small.⁶

4.2. Entry and first-time homebuying

As noted earlier in section 3, entry as I have defined it can occur for a variety of reasons. First-time homebuyers, though, probably play a prominent role. In this section I focus more closely on first-time homebuying activity because of its importance as a source of incremental demand for owner-occupied housing.

Exhibit 5 shows the propensity of an individual to enter, or the likelihood that someone without a mortgage at the beginning of a two-year period gets one by the end of the period. To help focus on potential first-time homebuyers, I restrict the sample to those who have never had a mortgage. I also focus on a narrow cohort of relatively young people (29-34 years old at the beginning of a given two-year period) to help ensure that I study outcomes for similar people over time.

For conciseness, only data for three periods are shown: the beginning of the decade (1999:Q3-2001:Q3), the period just before the recession and when house prices peaked (2005:Q3-2007:Q3), and the most recent period (2009:Q3-2011:Q3). The top line of the table shows that the propensity to enter during the past two years was about 7 percent – just half of what it was at the beginning of the decade. The propensity also declined slightly from the first to the peak period, which may reflect the fact that the fraction of 29-34 year olds who never had a mortgage was somewhat lower in 2005:Q3 than in 1999:Q3 (see the last row of the table; in other words, people were probably entering at even younger ages during the boom). By 2009:Q3 the fraction without a mortgage was slightly above the level in 1999:Q3 at 58 percent. Nevertheless, the propensity to enter was quite weak over the next two years.

⁶ “Potential refinancers” are the subset of entrants who had positive mortgage debt two quarters before the start of the period and did not change their residential location (census block) from this point through the end of the period.

The next four rows show propensities by credit score group, where borrowers' credit scores are measured at the beginning of the period.⁷ The last two columns show that a large share of potential young entrants – both now and in the past – have scores below 680, and thus first-time homebuying reflects, to some extent, the housing demand and credit supply conditions for these lower score groups.

The highest score group (740+) exhibited a decline in the propensity to enter of 22 percent relative to the beginning of the decade, compared to a striking 77 percent decline for the lowest score group (<620). Even those with above-average scores of 680-739 posted a considerably sharper decline of 36 percent relative to the highest score group. On the one hand, the steep relationship between scores and declines in first-time homebuying is consistent with credit conditions having tightened substantially. On the other hand, the recession and continued weakness in labor markets may have hit lower score individuals harder and may therefore provide at least some explanation for their disproportionate decline.

As noted earlier, the CCP data lack information on individual income and employment experiences, but they do provide individuals' county of residence. Exhibit 6 presents declines in first-time homebuying by score, separately in the top and bottom quartile of counties in terms of the county's average unemployment rate during 2010. If labor market conditions were important in explaining the steep slope of the relationship between scores and the decline in first-time homebuying, then one would expect the slope to be less steep in counties where labor market conditions are relatively good. Exhibit 6, however, provides little evidence of such an interactive effect. In sum, the disproportionate declines in the propensity to get a mortgage among lower-score individuals, even in counties where labor market conditions are relatively good, suggests an important role for tight credit conditions throughout the country limiting first-time homebuying.

One might suspect that credit should be more widely available because the Federal Housing Administration (FHA) is generally willing to insure loans to borrowers with lower scores and other riskier characteristics such as relatively high debt-to-income ratios. While the FHA-insured share of home purchase mortgage originations has risen tremendously in recent

⁷ Credit scores for each individual are based on the Equifax 3.0 model, which is similar conceptually and numerically to the FICO score. The Equifax score ranges from 280 to 850, with higher scores associated with a lower expected likelihood of default. See https://help.equifax.com/app/answers/detail/a_id/244/noIntercept/1 for more information.

years, the total volume of home purchase originations nevertheless has languished (Avery et al 2010). Moreover, the average score among FHA borrowers has risen considerably, and anecdotal evidence suggests that lenders, for various reasons, have been reluctant to lend to riskier borrowers even under the FHA program.⁸

4.3. Inflows from borrowers who increase their balances

As shown earlier in exhibit 3, dollar inflows from balance increasers surged during the housing boom, but have since retrenched. Borrowers can increase their balance in numerous ways, including extracting equity when refinancing, taking on a larger mortgage to buy a more expensive home, or taking on an additional mortgage to buy a vacation home or investment property.

In exhibit 7, I divide increasers into two groups: “investors” and “non-investors.” Investors are defined as those who appear to have multiple properties secured by mortgages. As noted earlier, whether a borrower with multiple mortgages has multiple properties or just one property securing those mortgages is not explicitly observed in the data. Instead I infer investor status using information on the number, type and outstanding balance of mortgages on record.⁹ The percentage of people with at least one mortgage who I classify as an investor rose from about 8 percent early in the decade, to a peak of about 12 percent in 2007 and 2008, and has since dropped to about 10 percent.

Investors identified in the data unavoidably include those with a mortgage secured by a second home or vacation home – not necessarily a rental property or what one might consider a true investment property. That said, second-home buyers are important in terms of housing demand since they are purchasing another home for their own consumption.

Exhibit 7 shows that investors accounted for a large share of dollar inflows from balance increasers in all periods. (Note that the investor share includes inflows from those who became investors during the period, and those who were investors at both points in time.) At the peak in

⁸ Peters (2011) argues that large lenders who now dominate the market have not been offering FHA loans to riskier borrowers because it would require more manual underwriting. And Collins (2012) argues that FHA’s policy of monitoring lenders, which can lead to audits and indemnification demands for lenders with relatively high default rates, has pushed lenders to be cautious, especially in this environment where there is still considerable uncertainty about house prices and economic conditions going forward.

⁹ A borrower is classified as an investor if (1) he has exactly two closed-end mortgages where the smaller loan is at least one-third the size of the larger, (2) he has three or more closed-end mortgages with positive balances, or (3) he has two closed-end mortgages with positive balances and at least one home equity line of credit.

the 2005-2007 period, investors accounted for about half of the inflows, and exhibit 8 shows that these peak-level investor-based inflows were spread across a little over 5 million borrowers.¹⁰ Since then, dollar inflows from balance increasers have fallen sharply. Investor-based inflows in particular have fallen by about 75 percent, or \$610 billion – nearly 30 percent of the decline in total inflows since 2005-2007.¹¹

Inflows from non-investor increasers have also fallen substantially, and the number of such borrowers is far lower than in 2001-2003 – another period when interest rates fell substantially. Non-investor-increaser inflows largely reflect borrowers either taking on additional debt to finance the purchase of a more expensive home, or extracting home equity through a refinance or a junior lien loan or line of credit. Refinance activity in general has been quite weak of late, and cash-out refinancings have likely been rare due to lenders' risk aversion and many borrowers not having enough home equity to increase their mortgage debt even if they would like to do so.¹²

A more detailed examination of equity extraction and what people do with the money they extract is beyond the scope of this paper. One basic finding not shown, however, is that non-investor increasers' total debt (that is, mortgage debt plus other consumer debt) rose roughly dollar-for-dollar with mortgage debt every period, implying that, in aggregate, equity extracted is not used to pay down other debt that might be more expensive. This finding is consistent with recent research by Cooper (2010) and Mian and Sufi (2011), but somewhat inconsistent with survey evidence presented by Canner et al. (2002). As Cooper notes, the survey evidence may capture one-time pay offs of other debt using home equity that gets built back up fairly quickly.

4.4. Outflows from borrowers who exit

As shown earlier, outflows have expanded since the peak of the mortgage market (although not nearly to the extent that inflows have shrunk). One of the key questions addressed in this section and the next is how financial distress relates to the expansion of outflows. When a household experiences an income or wealth shock, it may need to reduce its housing consumption either by selling or defaulting, depending on its equity position. Thus one potential

¹⁰ The number of borrowers exceeds the number of families or households who are investors because of the presence of joint accounts among family members.

¹¹ Haughwaut et al (2011) study investor activity during the boom more closely using these and other data.

¹² See Avery et al (2011) for a more detailed analysis of refinance activity during 2010 compared to 2003.

reason for expanded outflows in recent years is that, because of the recession and its aftermath, income and wealth shocks have been more prevalent.

Another potential reason for expanded outflows is that borrowers, even those not experiencing financial distress, have simply been trying to reduce their debt more quickly, perhaps because of changing attitudes toward debt in recent years. Alternatively, maybe some people have decided to sell their house and become renters to protect their remaining equity from the risk of further price declines.

Exhibit 9 examines in greater detail outflows from exiters – those who erase their entire mortgage balance by the end of a given two-year period. Exiters and their corresponding outflows are divided into three groups: (1) borrowers not exhibiting financial distress, (2) non-investors exhibiting distress, and (3) investors exhibiting distress. (See section 4.3 for the definition of investor.) I define “distress” as having at least one recent 90-day delinquency on *any* type of account, including a mortgage, and “recent” means a 90-day occurrence anytime during the current or previous two-year period. A 90-day delinquency of some kind suggests that a borrower is having serious problems meeting his financial obligations, which should increase the probability of exit either through sale or default because of a need to reduce housing consumption.¹³ Of course, this distress measure also captures those who default on their mortgage simply because the value of the house is less than the value of the mortgage (so-called ruthless defaults).¹⁴

Exhibit 9 shows that outflows by borrowers exhibiting financial distress have expanded considerably over the past three periods, while dollar outflows by not-distressed exiters have been virtually unchanged. Exhibit 10 indicates that the overall number of exiting borrowers has held fairly steady over the past four periods, with the number of not-distressed exiters falling slightly and the number of distressed exiters increasing slightly (the numbers are available in the appendix table.) Finally, exhibit 11 shows that the likelihood of a distressed exiter having a recent foreclosure on record spiked in the last two periods. All together these results suggest that

¹³ Indeed, the likelihood of exit among those exhibiting distress was about 26 percent in 2005-2007, compared to 12 percent for those not in distress. The numbers are very similar in 2009-2011 (24 percent and 11 percent, respectively).

¹⁴ Research by Bhutta, Dokko and Shan (2011) and Foote, Gerardi and Willen (2008) suggests that the principal reason for defaults by owner-occupiers has been negative income shocks in combination with negative equity, rather than the ruthless variety. However, ruthless default could be more prevalent among investors.

the “marginal”, or additional, distressed exiters in 2009-2011 relative to 2005-2007 had much higher loan balances and were highly likely to have defaulted on their mortgages.

4.5. Outflows from borrowers who decrease their balances

Exhibit 12 shows dollar outflows from balance decreaseers – those who maintain or reduce, but do not erase, their balances over a given two-year period. Decreasers are divided into the same three subgroups as for exiters. Exhibit 12 indicates that the widening in these outflows over the last three periods can be traced largely to distressed investors. Additional investigation suggests that a large proportion of these outflows stem from borrowers reverting from investor to non-investor status, to some extent by defaulting on one of their two mortgages. Almost one third of these distressed investors in each of the last two periods had at least one recent foreclosure filing (not shown). In terms of the expansion of *total* outflows (that is outflows from both decreaseers and exiters), distressed investors account for a little over 40 percent.¹⁵ Thus, as noted at the outset, distressed investors have played a disproportionate role in the expansion of outflows.

Dollar outflows from distressed non-investors have more than doubled since 2005-2007, similar to the percentage increase in the *number* of such borrowers shown in exhibit 13. Many of these distressed borrowers may still be paying down their loans as scheduled. Indeed, over 70 percent of them in 2009-2011 were no more than 30 days behind on any mortgage account as of the end of the period (2011:Q3) and thus have been managing their mortgage payments despite showing signs of financial trouble (not shown).

Among the remaining 30 percent or so with delinquent mortgages or a recent foreclosure (about one-quarter of the 30 percent have a foreclosure), most had little to no reduction in their balance, while about one-in-ten had their balance drop by more than 20 percent. Some of these borrowers may have had some principal forgiven by their lender; for those with balance declines well in excess of 20 percent, the remaining balance may reflect a post-foreclosure deficiency.

More generally, it is worth noting that across *all* distressed non-investors (that is, not just decreaseers) with positive mortgage debt at the beginning of the 2009-2011 period, just over 50 percent neither exited nor had a mortgage delinquency in excess of 30 days. In other words, the

¹⁵ This 40 percent number can be derived from the numbers in the appendix table by taking the change in dollar outflows from distressed investors as a percentage of the change in total outflows.

majority of distressed borrowers appear to be managing their mortgage debt, as mentioned in the introduction.

Finally, dollar outflows from *not*-distressed decreasees have grown by less than 10 percent (exhibit 12) despite the number of borrowers in this group growing by nearly 25 percent (exhibit 13) since 2005-2007. Exhibit 14 shows the “median paydown rate,” or the fraction of mortgage debt paid off per year by the median not-distressed decreasee during each two-year period in nominal terms. The payoff rate has declined since 2005-2007 from just under 4 percent to just under 3 percent, despite evidence elsewhere of an increase in “cash-in” refinancings and borrowers making extra principal payments (Freddie Mac 2010). It may be that a change in the composition of decreasees is offsetting the effect of such paydowns. The other line in exhibit 14 shows that the decreasee share of borrowers has been rising, and it is likely that marginal or new decreasees are more liquidity constrained and do little more than make minimum required payments (after all, they were either entrants or increasees in previous periods). Nonetheless, if many borrowers were aggressively paying down their mortgages, one would expect aggregate dollar outflows from not-distressed borrowers to have expanded sharply, but they have not.¹⁶

5. Conclusions

In this paper, I take advantage of a panel of individual credit records to better understand why mortgage debt has declined in recent years. I decompose changes in aggregate mortgage debt into inflows and outflows and find that the recent drop in outstanding debt has more to do with shrinking inflows than with expanding outflows, including mortgage defaults. Thus the substantial amount of “deleveraging” seen in the aggregate data reflects, to a large degree, a sharp decline in debt accumulation.

First-time homebuying appears to be quite weak, and investor-based inflows have shrunk by about 75 percent since their peak. By all accounts, including some of the empirical results in this paper, credit has been difficult to get. That said, housing demand (and the demand for mortgage debt) has surely been hampered to some extent by the weak labor market. For example, household formation has been quite sluggish, as indicated by the jump in the fraction of

¹⁶ It would be useful to be able to compare actual mortgage payments to scheduled payments to examine the extent to which borrowers have been making accelerated principal payments over time. However, scheduled payments are not observed in the Equifax data, nor are many of the data items necessary to impute scheduled payments (loan term, contract rate, etc.) because lenders typically do not report such data to Equifax.

households “doubling-up” (e.g. adults living with their parents) since the beginning of the recession (exhibit 15). Disentangling credit supply and demand more precisely is challenging and beyond the scope of this paper, but is worthy of further research.

The growth in outflows can be traced largely to financially distressed borrowers exiting the mortgage market entirely (either through sale or default), and distressed investors getting rid of some or all of their mortgages. Otherwise, outflows in the 2009-2011 period were quite similar to outflows in the 2005-2007 period. Although far fewer borrowers than just before the recession have been increasing their mortgage debt, borrowers also are not aggressively paying down their balances so as to generate substantively greater outflows compared to that pre-recession period.

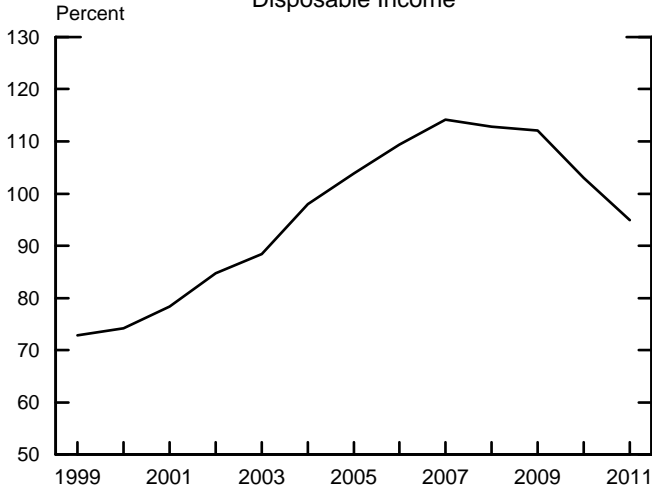
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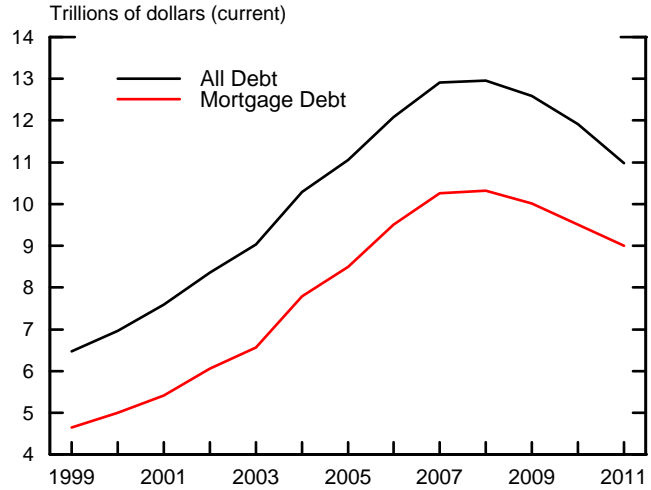
Exhibits

1. Household Debt, as Percent of Household Disposable Income



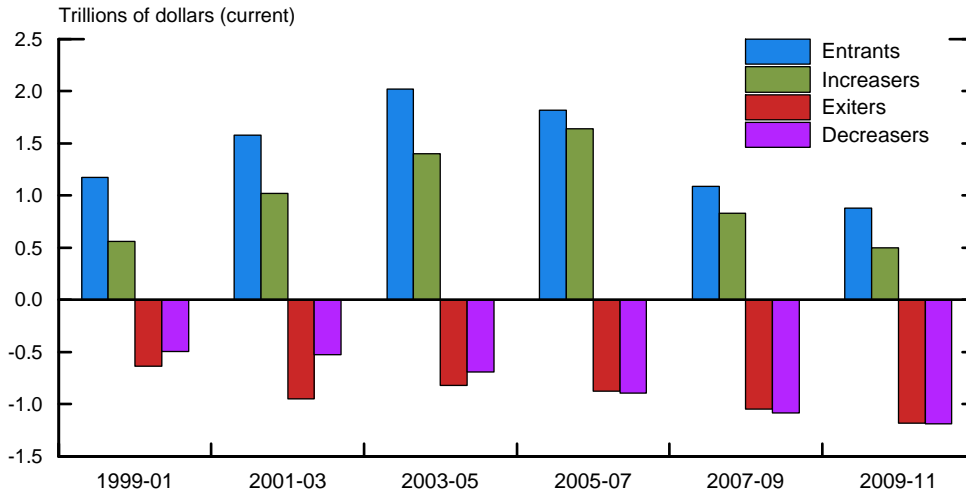
Note. Annual values as of 3rd quarter.
Source. FRBNY/Equifax Consumer Credit Panel & BEA.

2. Outstanding Household Debt



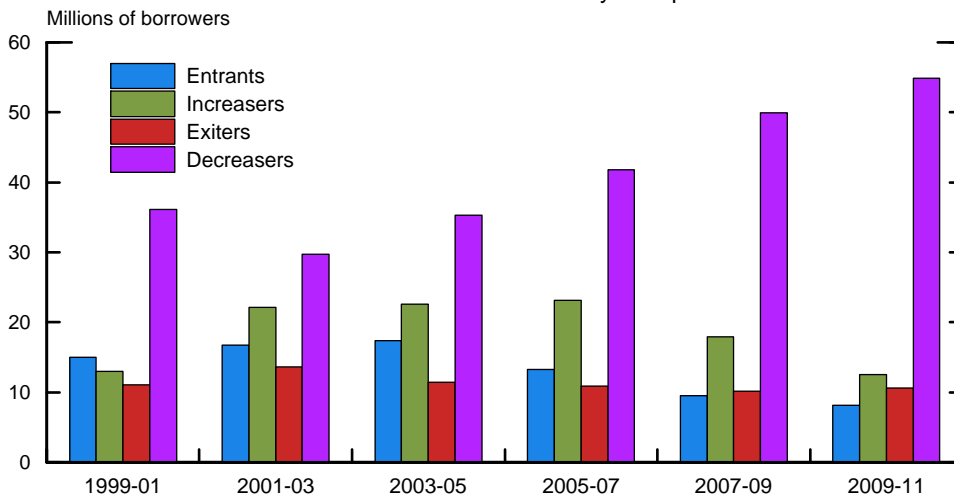
Note. Annual values as of 3rd quarter.
Source. FRBNY/Equifax Consumer Credit Panel.

3. Two-Year Dollar Inflows and Outflows



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions of each group.
Source. FRBNY/Equifax Consumer Credit Panel.

4. Number of Borrowers by Group



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions of each group.
Source. FRBNY/Equifax Consumer Credit Panel.

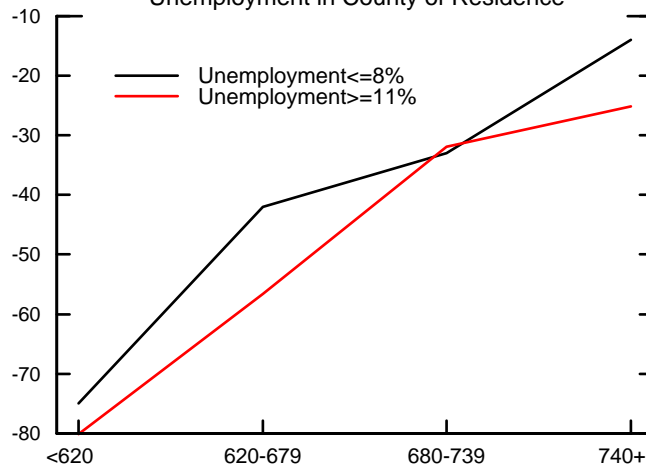
Exhibits (Cont.)

5. First-time Homebuying Activity: The Propensity of Young Individuals to Enter

Credit Score	1999-01	2005-07	2009-11	Percent Change 1999-01 to 2009-11	Memo: Share in 1999	Memo: Share in 2009
1. All	0.14	0.12	0.07	-51	100	100
2. 740+	0.20	0.19	0.16	-22	12	15
3. 680-739	0.20	0.19	0.13	-36	16	14
4. 620-679	0.18	0.16	0.09	-51	19	18
5. <620	0.09	0.07	0.02	-77	53	53
Memo: Fraction never had a mortgage	0.57	0.54	0.58			

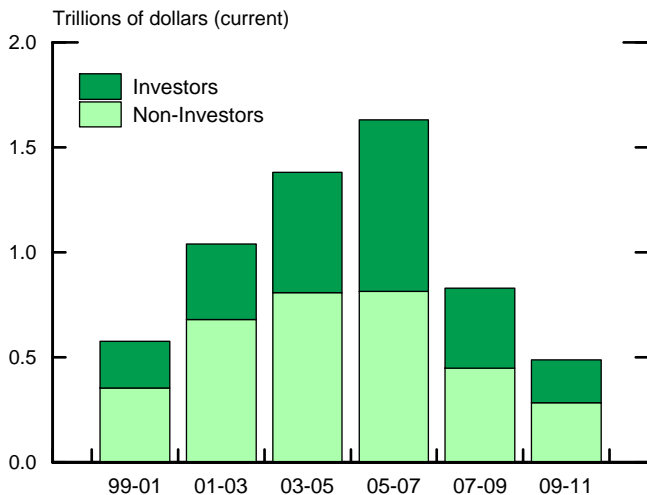
Note. 'Young' defined as 29-34 years old at the start of the period. Credit score measured at the start of each period. See text for details on how the propensity to enter is calculated. Periods are 3rd quarter to 3rd quarter.
Source. FRBNY/Equifax Consumer Credit Panel.

6. Percent Change in Propensity of Young Individuals to Enter from 1999-01 to 2009-11, Grouped by Degree of Unemployment in County of Residence



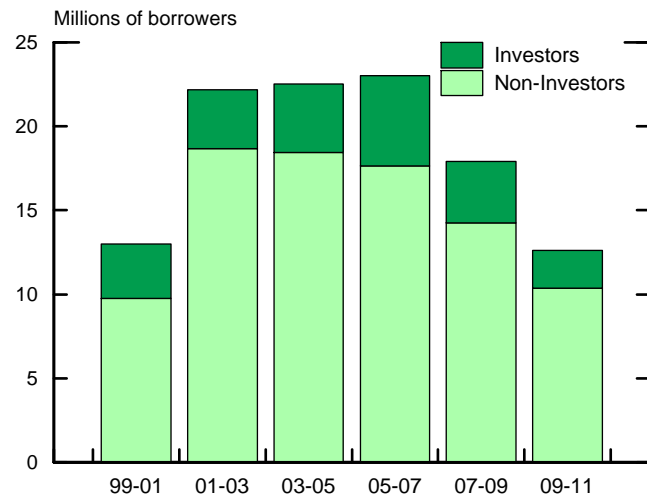
Source. FRBNY/Equifax Consumer Credit Panel & BLS.

7. Dollar Inflows from Balance Increasers



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

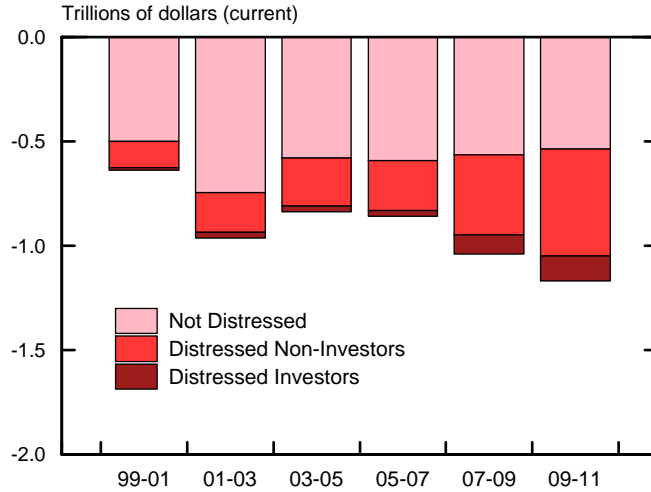
8. Number of Increasers



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

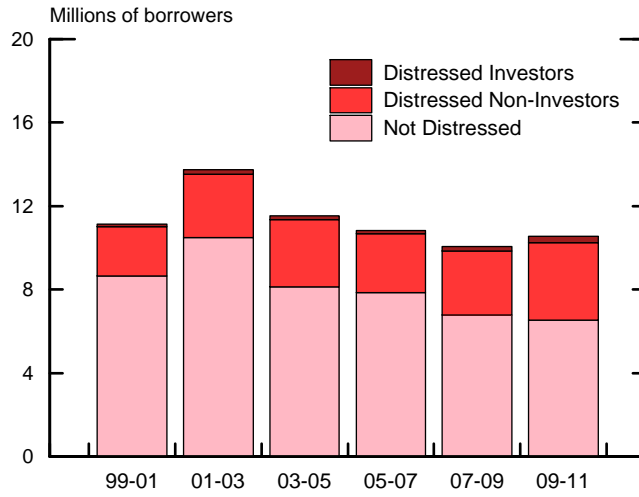
Exhibits (Cont.)

9. Dollar Outflows from Exitters



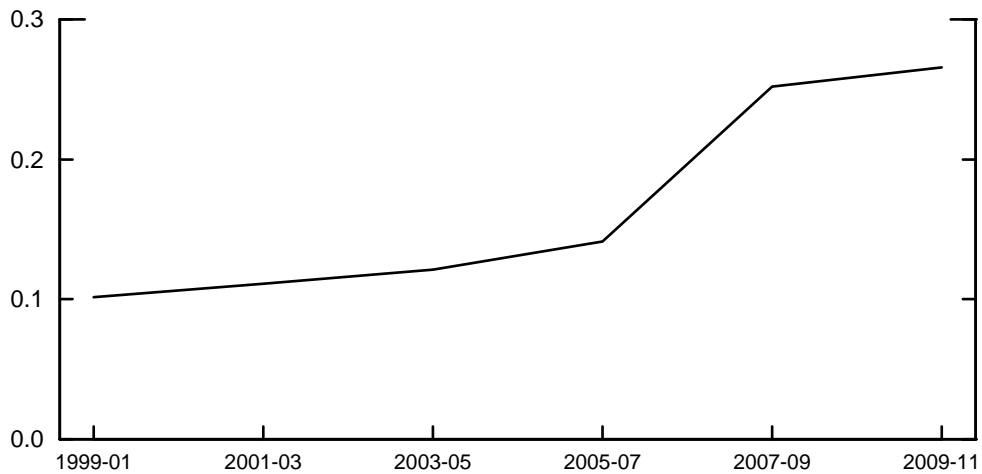
Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

10. Number of Exitters



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

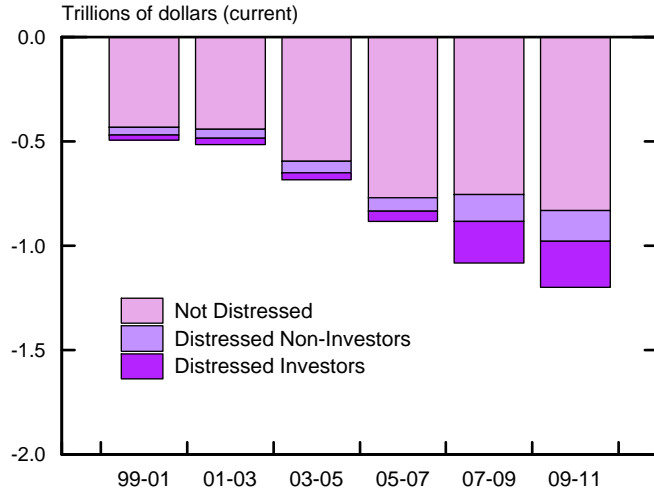
11. Fraction of Distressed Exitters with a Foreclosure



Note. Non-investors only. Periods are 3rd quarter to 3rd quarter.
Source. FRBNY/Equifax Consumer Credit Panel.

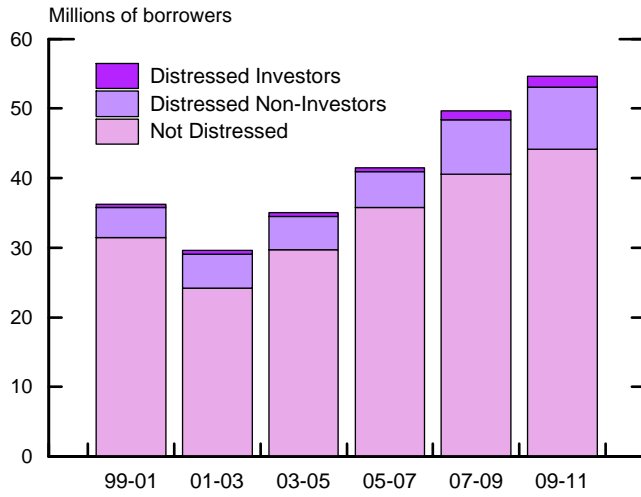
Exhibits (Cont.)

12. Dollar Outflows from Balance Decreasers



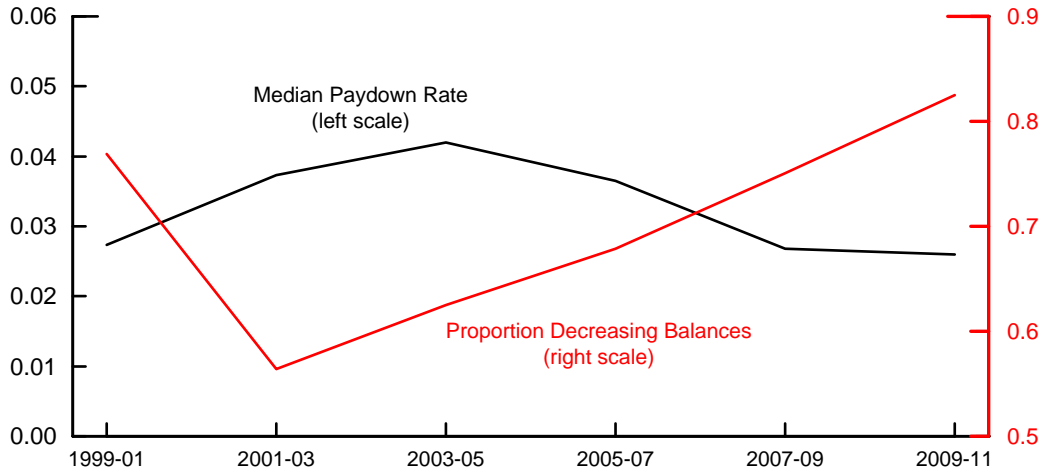
Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

13. Number of Balance Decreasers



Note. Periods are 3rd quarter to 3rd quarter. See text for definitions.
Source. FRBNY/Equifax Consumer Credit Panel.

14. Median Annual Paydown Rate Among Decreasers



Note. Not-distressed, non-investors only. Proportion decreasing equals the number of borrowers who decrease balances as a fraction of those who either increase or decrease balances. Paydown rate calculated excluding inflation. Periods are 3rd quarter to 3rd quarter.
Source. FRBNY/Equifax Consumer Credit Panel.

Exhibits (Cont.)

15. Share of Households 'Doubling-Up'



Source: IPUMS - CPS, March Surveys.

Survey year

Note. A household is 'doubled-up' if it has (a) three or more adults (18 years old and up), or (b) two adults who are neither married nor cohabiting partners.

Appendix

1. Mortgage Inflows and Outflows, 2005-2007 versus 2009-2011

	2005-2007		2009-2011	
	Dollars (trillions, current)	Number of borrowers (millions)	Dollars (trillions, current)	Number of borrowers (millions)
Inflows	3.46	36.40	1.38	20.71
Entrants	1.82	13.29	0.88	8.18
Potential Refinancers*	0.20	1.47	0.12	0.97
Increasers	1.64	23.11	0.50	12.53
Investors	0.82	5.38	0.20	2.26
Non-investors	0.81	17.64	0.28	10.36
Outflows	-1.77	52.69	-2.37	65.55
Exiters	-0.88	10.87	-1.18	10.61
Not-distressed	-0.59	7.84	-0.54	6.52
Distressed Non-investors	-0.24	2.83	-0.51	3.72
Distressed Investors	-0.03	0.15	-0.12	0.32
Decreasers	-0.89	41.82	-1.19	54.94
Not-distressed	-0.77	35.76	-0.83	44.15
Distressed non-investors	-0.07	5.13	-0.15	8.90
Distressed Investors	-0.05	0.59	-0.22	1.62

Note. See text for definitions of inflow and outflow subgroups. Subgroups may not add up to totals due to rounding. Periods are 3rd quarter to 3rd quarter.

* This row provides estimates of the subset of entrant-inflows from borrowers who have zero mortgage debt reported at the start of a period because they may have recently refinanced. See text at the beginning of Section 4 for more details.

Source. FRBNY/Equifax Consumer Credit Panel.