

Aggregate and Distributional Dynamics of Consumer Credit in the U.S.*

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Abstract

This paper develops stylized facts on the dynamics of consumer credit in the United States in the period 2001-2013. The data allows to separate two distinct period: Pre and post Great Recession. We place special emphasis documenting the participation decision (extensive margin), the volume (intensive margin), and default. The analysis of the data reveals some key findings: Between 1999 and 2013, the fraction of individual with only unsecured debt has been decreasing in terms of participation and the size of their balances. The balances for individuals with mortgages increased until 2008, but then dramatically decreased during the Great Recession. The evidence allows to test existing theories of consumer (unsecured) credit by checking their consistency with the data (at the aggregate and distributional levels). This allows determining the relative importance of different factors driving the dynamics of credit. The baseline model calibrated for the period 2001-2008 and tested to capture the deleverage episode during the Great Recession.

Keywords: Default, secured and unsecured credit

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1. Introduction

Consumer credit outstanding includes credit cards, auto loans, student loans, and other types of household debt, but excludes mortgages. Since 1990, consumer credit as a percentage of GDP increased from 14 percent to recently 18 percent. However, the Great Recession interrupted this trend as this ratio fell to a trough of 16.4 percent GDP. Some commentators have argued that the size and the length of this adjustment impact the economy's ability to recover after a recession, as well as having consequences for long-term growth. This position is consistent with the view that the U.S. economy could be facing a long period of very slow growth like Japan.

From a public policy perspective, a policy maker may be more interested in the impact on a household or a set of household's who receive a certain type of shock as well as the response of these individuals. An example would be how a young household with both secured and unsecured debt responds to a job loss or a large decline in their house value. Unfortunately, this type of question cannot be adequately answered by examining a data set such as the *Survey of Consumer Finance*. The reason is that this data set is not a panel. In this paper, we report on an ongoing project to develop a set of "facts" on household/individual holding of secured and unsecured debt over time. Besides tracking the level of both types of debt over time for individuals, we also want to develop statistics that indicate how debt levels are adjusted over time. The development of such facts has two immediate benefits. First, tracking these facts may have predictive content for eventual movements in the business cycle. Second, the existence of such facts can be used to evaluate the performance on the various quantitative heterogeneous models that are being developed. From a policy perspective, it is important to know whether the predictions of these models along a transition path align closely with actual data.

This paper develops stylized facts on the dynamics of unsecured credit in the United States in the period 2001-2013. We place special emphasis documenting the participation decision (extensive margin), the volume (intensive margin), and default. The key facts are organized into three sections. In the first section, we examine the participation rates, number of credit lines and balances at the aggregate level. The composition of credit is disaggregated by type (consumer, mortgage, automobile, and student loan levels) over time and by individual age. The next section examines the cross sectional distribution of unsecured and mortgage debt pattern over two sub-periods (pre and post-recession). The second sub-period allows studying the behavior of individuals during a period of deleveraging. The final section, attempts to develop some facts on how individual's reduced their debt levels by repaying outstanding balances or using legal options such as bankruptcy and/or foreclosure. The presence of these legal options is particularly important because researchers have long been interested in the implications of bankruptcy and foreclosure. Much of the initial research focused on the examined bankruptcy or the foreclosure decision. Other research examined the welfare implications of the existing legal environment.¹ The stylized facts provided in this paper can be used to evaluate existing theories of credit decisions by checking their consistency with the data (at the aggregate and distributional levels). Standard theory suggests

¹Fay, Hurst and White (2002) is one example of research that focuses on the bankruptcy decision, while Garriga and Schlagenhauf (2009) examine the foreclosure decision. Athreya (2002) is an example of a paper that examines the welfare implications of the Bankruptcy Reform Act of 1999.

that individual should borrow under different circumstances: i) future income growth, ii) insurance against shocks, iii) smooth the purchase of durable goods, and iv) maybe strategic default. The use of the model permits the determination of the relative importance of different shocks (preferences, income, expenditures) and loan pricing in the determination of the dynamics of credit. One of the challenges and interesting features of the data is the presence of two recessions (2001-02 and 2008-09). We test the baseline model calibrated for the period 2001-2008 to capture the deleverage episode during the Great Recession. This allows differentiating distinct patterns during these two episodes. The adjustment of the households' balance sheets can have important implications for the macroeconomy (output, consumption, and employment). The analysis using a quantitative model suggests that the adjustment of balance sheet affects aggregate demand affecting the shape and the speed of the recovery.

The analysis of the micro level data for the sample period 1999-2013 reveals important key findings:

1. The distribution of unsecured debt holding is also “hump-shaped” by age with a peak around the 41-55 age cohorts. Conditional on a particular age cohort, the distribution of debt balances is very skewed. Between 1999 and 2013, the fraction of individual with only unsecured debt has been decreasing in terms of participation and the size of their balances.
2. There are a non-trivial number of individuals in the sample with positive credit card balances and mortgage debt. Relative to the individuals that only have unsecured debt their balances are much larger. At the distributional level, the lowest 10 percent also has much larger balances of unsecured debt, but this is not true for the 90 percentile. Unlike the other group, the balances of unsecured and mortgage debt increased dramatically between 1999 and 2008. However, the Great Recession and its aftermath brought their levels of unsecured debt substantially lower than the 1999 levels. This is particularly large for individuals under 40 years of age.
3. The Great Recession caused a large deleverage episode for individuals with unsecured credit and mortgages. The data suggests that for individuals born between the years of 1969 and 1979 their deleverage behavior crucially depends on whether mortgage debt is an additional liability. In the absence of mortgage debt, most individual choose to reduce their unsecured debt balances but the amount reduced does not change as a result of the Great Recession. For individuals with mortgage debt, the majority does not default and reduce their unsecured balances in a similar fashion. However, the Recession triggers an increase in foreclosure rates used to deleverage secured and in some cases unsecured credit. The data suggests that in general, the bankruptcy option is not used as frequently as foreclosure because of the smaller size of unsecured debt relative to mortgage debt.
4. The data also suggests that during the Great Recession individuals tried to decrease unsecured debt levels but fail and use the bankruptcy option. This behavior was not observed prior to the Great Recession.

The Great Recession has spurred additional research in this area. Because of the various public policy issues that accompany either bankruptcy or foreclosure, much of the newer research has conducted their analysis in terms of quantitative heterogeneous agent economic models which allows policy issues to be discussed in terms of economic welfare. These models also allow the macroeconomic implications of asset choices, bankruptcy, and foreclosure to be better understood. In these models, households smooth because of life-cycle factors as well to be able to smooth various shocks that impact individuals and households. Bankruptcy and foreclosure are tools that are provided by the legal environment, with costs, that can aid in mitigating shocks. Some of the recent research that focuses on unsecured debt and bankruptcy includes Athreya, Tam, and Young (2012), Athreya, Tam, Sanchez and Young (2014), Chatterjee, Corbae and Rios-Rull (2007), and Chen (2012). With respect to secured debt and foreclosure, examples of quantitative model based research is Corbae and Quintin (2014) and Garriga and Schlagenhauf (2009). Mitman (2012) is one of the few papers that examine bankruptcy and foreclosure jointly.

2. An Overview of Debt Levels 1999-2013

This Section documents the dynamic properties of unsecured credit in the United States. The data for the analysis is from the Federal Reserve Bank of New York's Consumer Credit Panel (CCP). The CCP is a longitudinal database that tracks the liability side of consumers' balance sheets from quarter to quarter. It consists of a five percent random sample of credit reports provided by Equifax. The database contains individual level data on various unsecured and secured balances, payments, delinquencies, bankruptcies, foreclosures, as well as geographic markers. The sample begins in the first quarter of 1999 and is updated quarterly. In most of this paper, we will examine the panel for the first quarter of 1999, 2005, 2008, 2010 and the fourth quarter of 2013. All data used in the paper are inflation adjusted.

2.1. Aggregate Dynamics and Life-Cycle Dynamics

We start by summarizing some aggregate statistics of credit and provide a comparison in the pre- and post-crisis time period. Figure 0 examines the ratio of household debt to personal income from 1950 and 2013.

We observe that the ratio increase from near 25 percent to approximately 60 percent between 1950 and 1965. There was a period of time where the World War II and Korean War Veterans had returned and began families and thus were moving into housing. After the middle of the decade of the 60's, the debt to income ratio either declined until the middle 1970's. Between the middle years of the 1970's and 1980, the debt to income ratio increase once again to around 60 percent. This period coincided with the baby-boomer moving into housing. After a period following the severe recession of 1980, often referred to as the Volker Recession, where the debt to income ratio declined, this ratio steadily increased until 2000 when it reach about 80 percent. After 2000, the ratio increases at a much faster rate until 2008. At that date, the debt to income is near 120 percent. That is, household debt is 1.2 times larger than personal income. As the Great Recession takes hold, the debt to income ratio falls. The latest numbers indicate that this ration is once again below 100 percent.

This paper will focus on the period 1999 to the present and looks at microdata to try to understand the rise in households credit as well as the driver of the deleverage process during the Great recession. The data for the analysis come from the Federal Reserve Bank of New York Consumer Credit Panel (CCP). The CCP is a longitudinal database that tracks the liability side of consumers' balance sheets from quarter to quarter. It consists of a five percent random sample of credit reports provided by Equifax. The database contains individual and family level data over balances, payments, delinquencies, and a host of other variables over several secured and unsecured debt categories as well as geographic markers. The sample runs from the first quarter of 1999 to the present. The following exercise is meant to convey stylized facts about unsecured credit and provide a comparison in the pre- and post-crisis time period.

A natural place to start is to examine how individuals use credit cards and how this changed in the wake of the crisis. Figure 1 shows the percentage of individual consumers with credit cards on their credit reports as well as the percentage of those with positive balances.

Both series show a relatively stable trend until 2008. Roughly 65 percent of individuals' credit reports listed at least one credit card. After the crisis, there was a noticeable decline in both the percentage of people with credit cards and the percentage of those holding positive balances on those cards. As of the third quarter of the year, just less than 60 percent of the population had a credit card. Over the entire sample, the average consumer has had roughly 1.5 to 2 credit cards (see Figure 2).

From the early 2000's up until the crisis, the average remained constant at around 2 credit cards. However, in the wake of the crisis, borrowers have shed credit cards and now hold an average of 1.5 credit cards. In addition to decreasing of the number of credit cards held, consumers have also decreased their balances. Figure 3 shows the average real credit card balance for individuals. After the crisis, per capita balance dropped from approximately \$4,000 to approximately \$3,000, which translates to a 25 percent decline. During the same time frame delinquencies increased dramatically (see Figure 4), especially the number of balances that were turned over to collections.

The distribution of credit card debt shows a heavy right skew. Relatively few people take on large values of debt (see Figure 5a). Most consumers have balances below the mean. However, there is a no negligible amount of borrowers with (nominal) balances over \$20,000—around 3.5 percent.

We crosschecked the CCP estimates with the Survey of Consumer Finances (SCF). However, there are several inconsistencies between datasets. First, the balances in the CCP are pulled randomly, whereas the SCF asks what the balance was immediately after the last payment. To account for this, we have examined if charges in SCF were made during the previous month. If any charges were made, the balance was listed as positive. Second, the SCF unit of analysis is the family. To account for this, we have aggregated the CCP by household. After making the necessary adjustments, the CCP and the SCF are consistent. Further, the trends in both series look similar with drops in both series after 2008. Of note, the SCF always estimates lower rates of credit card holdings. This discrepancy may be explained by the fact that between eight and ten percent of adults do not have credit reports and will hence not show up in the CCP. If you assume that these individuals hold no credit card debt, then the series become much closer to the SCF. Figure 5b shows the distribution

of number of credit card trades as of 2010 with the SCF for comparison

Most families have between zero and two trade lines. After this, the distribution slowly decreases until the 15 credit cards. Also worth note is that the SCF and CCP provide similar results when taking into account the fact that not all adults have credit reports. Figure 6 shows the transition rates each quarter for going for both having trade lines and having positive balances on any card.

As before, the transitions were relatively constant prior to the crisis. During the crisis between 2008 and 2010, there was a spike in the percentage of individuals dropping credit cards as well as a decrease in the percentage of people transition into having credit cards.

In the wake of the crisis it looks like there have been less transitioning to and from being a credit card holder or holding a positive balance. The next set of stylized facts look at credit card holdings over the age distribution. There is a clear lifecycle component to credit card borrowing. Borrowers hold lower balances in younger ages, increasing these balances into their 40's and 50's, and then subsequently lower their real value of debt into old age. Across ages, credit was relatively constant in real terms prior to the downturn (see Figure 6b).

However, since the downturn, there has been a marked decrease in the per capita borrowing across the age spectrum. This decrease has occurred in two ways. The first is along the extensive margin: Fewer borrowers hold credit cards than have in the past. Figure 6c (left panel) shows the percentage of consumers at various ages with a positive number of trades.

Again, the standard hump shape for the life cycle persists. There was a downward shift along the entire extensive margin of age distribution. Across all ages, a lower percentage of consumers had credit cards. This gives evidence that fewer consumers were using credit cards as a form of payment or borrowing. This result also holds when looking at the percentage of consumers with positive balances on their credit card (See figure 6 right panel). With respect to the intensive margin, there is also a significant life cycle component to borrowing.

Figure 10 shows, at various age groups, the average real value of credit card debt conditional on having credit card debt. Prior to the crisis consumers held a relatively constant real value of debt across the age distribution.

In the wake of the crisis, borrowers lowered this burden by reducing the amount of balances on cards. This deleveraging was relatively uniform across the age distribution. The next place for analysis is credit cards and activity prior to delinquency. Prior to a 90+ day delinquency on any type of account (e.g. mortgages, HELOCs, student loans, credit cards, etc.), consumers seem to increase their balances. Figure 6d shows the average balance for credit cards contemporaneously, one year lagged, and two year lagged for both borrowers that listed having a 90+ day delinquency on their credit report.

Put differently, each quarter consumers are partitioned based on if they had a delinquency that quarter and none in the previous two years (the solid line) or had no delinquency that quarter and none the previous two years (the dashed line). Their credit card activity is then tracked. Borrowers that become significantly delinquent on accounts see large increases in the amount of credit card debt they carry over month-to-month in the two years prior to a delinquency. On average, prior to the crisis, balances were about what they were for current borrowers two years prior to a delinquency event at around \$4,000. In the subsequent timeframe, balances increased and were around \$7,000-\$8,000, on average at

time of entering delinquency. These figures increased during the crisis period and have come down significantly as of Q4 2013. As of this Q4 2013, based on average balances, credit card borrowers in delinquency look similar to borrowers who are current on all accounts. Figure 6e shows the average number of trades for borrowers prior to and at the time of delinquency. As with balances, borrowers seem to increase the number of credit cards that they have prior to a delinquency event.

2.2. Key Components of Debt

We now will change the focus to stylized facts dealing with credit card holdings over the age distribution. There is a clear life-cycle component to credit card borrowing. Borrowers hold lower balances in younger ages, increasing these balances into their 40's and 50's, and then subsequently lower their real value of debt into old age. In Figure 7, we examine how debt level varies by age. The upper left panel reports unsecured debt by age. Unsecured debt is defined as the sum of credit card debt, consumer credit and retail debt. For each sample, unsecured debt is characterized by a 'humped-shaped' pattern that peaks around age 53. Although the data set does not include an individual income measure, other research suggests that an individual's labor income peaks in the early fifties. Between 1999 and 2008, unsecured credit in general increased over each age level. After 2008:1 debt deleveraging is clearly occurring. Mortgage and Heloc debt patterns are presented in the upper right hand corner. Again, a humped shaped pattern is observed. For mortgage type debt, the debt holding seems to occur at an earlier age as compared with unsecured credit. The data for 2013 shows a much flatter humped shaped pattern which differs from prior years. As with the consumer credit diagrams, mortgage debt increases for most ages between 1999 and 2008. After 2008, we observe mortgage debt declines as deleveraging occurs. In fact, peak mortgage debt in 2008 is over \$100,000 at age 40 while in 2013 the mortgage debt for that age is approximately \$60,000.

Although not a focal point of this paper, we also examine debt changes for auto and student debt by age. Auto debt also has a humped shaped pattern. Between 1999 and 2008 we observe the humped shaped pattern increases and the peak seems occur at an early age. After 2008, the hump pattern declines indicated a decline in auto debt over most ages. The 2013 pattern is distinctly different from other years as hump is much flatter starting just prior to age 28.

Student debt peaks around age 28 over all samples and is skewed toward the younger age cohorts. In contrast to other types of debt, student debt grows substantially over the period 1999 to 2013. In 1999, an average individual at age 28 had student of approximately \$2,000. By 2013, the same aged individual had student debt of approximately \$12,000. The increase in student debt means individuals face larger debt obligations over their lifetimes.

3. Cross Sectional Distributional Facts

In this section, we use the Consumer Credit Panel to understand the patterns of debt dynamics before and after the financial crises. In contrast to the previous section, we create a set of facts on a sample of individuals who have may have unsecured debt and mortgage debt. The reason is that we fully want to understand the debt dynamics for this set of individuals prior

to adding a layer of dynamics from either automobile debt or student loans. This restriction may have larger implications for the debt dynamics of younger households, but allows to separate the behavior of subset of the individuals. Since the pattern of debt holdings can be different whether the individual has a mortgage, the sample is then segmented into individuals without mortgage debt and individuals with mortgage debt.²

3.1. The Period 1990:1-2008:1

This subsection considers the evolution of unsecured credit in the period prior to the Great Recession. We start by considering individuals who report not having mortgage debt and positive debt balances in this sub sample. The fraction of these individuals grouped by age cohorts is summarized in Table 1 for three different years (1999, 2005, and 2008). The data indicates that the fraction of individuals with positive balances of unsecured debt has a “humped-shaped” pattern over age. For example, 59.1 percent of the sample have a credit cards with positive balances with the complement having zero balances. For each year, the sample the peak level occurs for the age 56-65 age cohort. Over time, the data suggests that the percentage of individuals with only unsecured debt declines. The decline is quite significant for all age cohorts. Understanding the evolution of these different groups is important because changes in sample averages could be due to changes in the composition of these pools over time and not changes in the underlying borrowing behavior.

These numbers only capture the relative size of these individuals in the sample. The next step is to consider the level of unsecured debt by age cohorts for the 1999, 2005, and 2008 samples. Table 2 summarizes the average levels by age cohort, but also reports the average debt for the individuals that would have a debt level in the lowest 10 percent as well as average debt for individuals holding debt in the top ten percentile. Ideally one would condition the distribution of debt by income levels, unfortunately, income data is not available in the CCP. The distribution of unsecured debt holding is also “hump-shaped” by age with a peak around the 41-55 age cohorts (an exception is 2005 sample as the peak average debt level occurs in the 56-65 cohorts but this is partially due to grouping). The average balances of the 21-30 cohort is \$3,636, but for the lowest 10 percent is \$102 and the highest 90 percent is \$17,268. This shows that the distribution of each group is very skewed. In addition, the data shows that the average real debt levels for each cohort tends decline over the three samples years. For example, average debt in the 41-55 cohorts (peak level) is \$6,972 in the 1999 sample. By 2005, the average debt level for this cohort declined to \$6,513. In the 2008 sample, the average debt level of the 41-55 age cohorts was \$6,308. For the 21-30 age cohorts (youngest group), average debt is \$3,636 for the average individual and declines in 2008 to \$2,703.

It is known that a non trivial fraction of unsecured credit is subject to default risk. Table 2 also includes a fraction of cohorts that declare bankruptcy by age cohort. The highest bankruptcy rate occurs in the 41-55 age cohorts (the individuals with the largest debt balances). In the 1999 sample, the bankruptcy rate for this age cohort is 8.69 percent.

²We refrain from renter/homeowner dichotomy as we cannot identify if an individual without a mortgage is a renter or a homeowner that owns the home without debt. It is unlikely an average individual in the 21-30 cohort has a paid-off house, but it is more likely that individual around age 66-75 have paid-off their homes.

For the same age cohort, in 2005 the bankruptcy rate increases to 11.8 percent. By 2008, we find that the bankruptcy rate for this age cohort falls to 11.03 percent. In general the bankruptcy rate tends to fall over all age cohorts between 2005 and 2008. There are interesting distributional differences because the lowest 10 percentile is not always less prone to default than the highest 90 percentile. For the young and old cohorts this is not the case, but it is accurate for individuals between age 31 and 65.

There is a non trivial number of individuals in the sample with positive credit card balances and mortgage debt. Table 3 summarizes the number of individuals that hold unsecured and secured debt. In 1999, 8.2 percent of age 20-31 individuals have both types of debt. The pattern of joint holdings also has a “hump-shaped” pattern with the largest participation occurring in the 41-55 cohorts. The next issue is what happens to these fractions in 2005 and 2008 compared to 1999. In 2005 and 2008, the fraction of these individual is reduced for the cohorts less than 40 years of age, but increases for the older cohorts.

What do the debt holdings of individuals with mortgage debt look like? Table 4 is similar to Table 2, but now includes the unsecured debt balances, the amount of their mortgage debt balance as well as the fraction of individuals in the sample that default and/or foreclose. In 1999, the average debt holding of a 21-30 individual held \$6,027 of unsecured debt and \$112,353 of mortgage debt. For older cohorts, the data suggests that the average holdings of unsecured debt and mortgage debt increase until about age 65. The age cohort with the highest bankruptcy rate and foreclosure rate is the 31-40 cohort. Relative to the individuals that only have unsecured debt (summarized in Table 2), these balances are much larger. For example, an average individual between age 31-40 should have a balance of \$5,863 if it only has unsecured debt, but will have \$7,620 if it has a mortgage. These balances are about 30 percent larger when only comparing the levels of debt. At the distributional level, the lowest 10 percent also has much larger balances of unsecured debt, but this is not true for the 90 percentile.

There data also indicates a large dispersion of these two measures of debt (unsecured and secured). For example, in the 31-40 cohorts, the lowest 10% of the unsecured debt distribution has an average debt of \$4,316 while the highest 10% has average debt level of \$11,976. The spread in mortgage debt for the same cohort as the average range is \$22,838 for the lowest ten percent and \$408,035 for the highest ten percent. The data seems to indicate that during the housing boom 1999-2005, the individual shifted from unsecured credit to mortgage debt. In fact, the mortgage debt increases in the highest ten percent of each cohort increases by a large amount. This change in the pattern of debt holding does not show up in a substantive increase in foreclosure and bankruptcy rates.

With the collapse of housing prices in 2007, the individuals seem to maintain very large mortgage balances in the 2008 sample, but the average holdings of unsecured credit increased dramatically across all cohorts over 31. The larger total debt balances appears to cause increases in the foreclosure rate. The number of individual bankruptcies fall slightly compared to their respective 2005 levels.

3.2. The Period 2008:1-2013:4

The period 2008 through 2013 includes the peak of the Great Recession and the beginning of individuals removing excessive leverage from their balance sheets. We summarize the data

for this period by first examining individuals without mortgage debt and then individuals with mortgage debt. The discussion will be benchmarked to 2008.

As can be seen in Table 5, 50.2 percent of age 21-30 individuals had unsecured credit. Except for the 31-40 cohort where the fraction fell to 47.2, the fraction of unsecured debt in a cohort increases until the oldest cohort. If percentages per cohort are then examined in the 2010 and 2013 sample, we continue to see the trend of a decline the fraction of a cohort holding unsecured debt. This trend was also observed in the earlier samples.

The average levels of unsecured debt as well as the range in unsecured debt holdings by cohort are presented in Table 6. The humped shaped pattern of unsecured debt over age cohorts, with a peak at the 41-55 age cohorts, holds in the three samples. From the discussion in the prior section, we also know that the range in debt had been decreasing since 1999. The decline continued during the 2010 and 2013 samples. In 2010, the average debt levels in each cohort declines and the range between the lowest ten percent and highest 10 percent narrows across all age cohorts. The narrowing of debt range does not seem to be correlated this bankruptcy rate changes. The bankruptcy rate remains high, but has come down slightly across cohorts. The sample in 2013 indicates further decreases in average debt holdings across age cohorts. Debt ranges continue to narrow, perhaps as a result, bankruptcy rates decline in most cohorts. However, the rates continue to be high in the 31-40, 41-55, and 56-65 cohorts.

The fraction of individuals with positive balances of unsecured debt and mortgage is also reduced. This is particularly important for age cohorts between 21 and 65 as can be seen in Table 2. This indicates that during the Great Recession, a large fraction of individuals stopped carrying quarterly debt balances. The more important question is what has happened to the average level of debt. Table 8 sheds light on these issues. In 2010, average unsecured debt levels decrease in each age cohort. The spread between the distribution in the lower ten percent and highest ten percent of the distribution narrows. As a result, bankruptcy rates slightly decline. Average mortgage debt slightly declines in the two youngest age cohorts. In the three oldest cohorts average mortgage debt level is essentially unchanged. The spread in the distribution in each cohort does narrow. Foreclosure rate in each cohort decreased very slightly. Table 8 suggests substantial deleveraging of mortgage debt had occurred. Both average unsecured debt level and mortgage debt in each cohort declined. The spread the distribution in each age cohort also narrowed. As a result, the foreclosure rate tended to decline in each age cohort. The bankruptcy rate tended decline.

4. Model of Households' Unsecured Credit

This section describes different specifications of the household decision problem. The objective is to formalize the intensive and extensive margin of unsecured credit, this is completed in steps.

4.1. Agent's Problem - Both Extensive and Intensive Margins

Let $V(s)$ be the values of agents who enter subperiod 1 in state $s = (e, b, a, w, y, \zeta)$ and $W(\tilde{s})$ be the values of agents when they enter subperiod 2 with the updated state $\tilde{s} = (\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta)$.

4.1.1. Subperiod 1: Employed and Unemployed Agents

For employed agents, their values in subperiod 1 are given by

$$V(1, b, a, w, 0, \zeta) = \kappa W(0, b, a, 0, k, \zeta) + (1 - \kappa) \max \left\{ W(1, b, a, w, 0, \zeta), W(0, b, a, 0, k, \zeta) \right\}. \quad (4.1)$$

If they are separated exogenously from their jobs with probability κ , they continue to subperiod 2 with values of being non-employed $W(0, b, a, 0, k, \zeta)$. For agents who do not receive the separation shock, if the value of continuing with current jobs $W(1, b, a, w, 0, \zeta)$ is greater than the value of quitting $W(0, b, a, 0, k, \zeta)$, agents remain employed.

For non-employed agents, their values in subperiod 1 are given by

$$V(0, b, a, 0, k, \zeta) = \phi^b \int_w \max \left\{ W(1, b, a, w, 0, \zeta), W(0, b, a, 0, k, \zeta) \right\} G(dw) + (1 - \phi^b) W(0, b, a, 0, k, \zeta). \quad (4.2)$$

They receive a wage-rate offer w from a distribution $G(w)$ with probability ϕ^b and make the job-acceptance decision. They take the new job if the value of accepting $W(1, b, a, w, 0, \zeta)$ is greater than the value of rejecting $W(0, b, a, 0, k, \zeta)$. They may not have a new job offer with probability $1 - \phi^b$. In this case, they continue non-employed into subperiod 2 with a value of $W(0, b, a, 0, k, \zeta)$.

4.1.2. Subperiod 2

Agents make bankruptcy decisions $d \in \{0, 1\}$ in subperiod 2. Agents without a bankruptcy record ($b = 0$) can default if $a - \zeta < 0$. For agents with a bankruptcy flag ($b = 1$), default is available to them if repayment results in negative consumption.

The values of agents in subperiod 2 are given by

$$W(\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta) = \max \left\{ W^0(\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta), W^1(\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta) \right\} \quad (4.3)$$

Given their bankruptcy decisions, their values are given as follows:

1. If agents do not exercise the option of default, they can make the asset choice decisions a' . If they do not have a bankruptcy flag ($b = 0$), they can save or borrow. Otherwise, they can not borrow ($a' \geq 0$) and a fraction δ^b of their earnings may be garnished.

$$W^0(\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta) = \max_{(h, a')} u(c, h) + \beta \rho E_{(b', \zeta')|b} V(\tilde{e}, b', a', \tilde{w}, \tilde{y}, \zeta')$$

where $c = (1 - \tau)\tilde{w}h + \tilde{y} + a - \zeta - q(a', \tilde{s})a' \geq 0$.

2. If agents file for Chapter 7 bankruptcy to discharge their debt, they enter next period with zero assets but with a Chapter 7 bankruptcy flag. In the period of default, they

consume after-tax earnings.

$$W^1(\tilde{e}, b, a, \tilde{w}, \tilde{y}, \zeta) = \max_h u(c, h) + \beta \rho E_{\zeta'} V(\tilde{e}, 1, 0, \tilde{w}, \tilde{y}, \zeta')$$

where $c = (1 - \tau)wh + y$.

5. Agent's Problem - Only Intensive Margins

In subperiod 1, for employed agents, their values in subperiod 1 are given by

$$V(1, b, a, w, 0, \zeta) = \kappa W(0, b, a, 0, k, \zeta) + (1 - \kappa)W(0, b, a, 0, k, \zeta) \quad (5.1)$$

For non-employed agents, their values are given by

$$V(0, b, a, 0, k, \zeta) = \phi^b \int_w W(1, b, a, w, 0, \zeta) G(dw) + (1 - \phi^b)W(0, b, a, 0, k, \zeta). \quad (5.2)$$

6. Agent's Problem - Only Extensive Margins

If agents do not exercise the option of default, the value is given by the following when he is employed,

$$W^0(1, b, a, \tilde{w}, 0, \zeta) = \max_{a'} u(c, \bar{h}) + \beta \rho E_{(b', \zeta')|b} V(1, b', a', \tilde{w}, 0, \zeta')$$

where $c = (1 - \tau)\tilde{w}\bar{h} + a - \zeta - q(a', \tilde{s})a' \geq 0$. the value when this agent is unemployed is given by

$$W^0(0, b, a, 0, k, \zeta) = \max_{a'} u(c, 0) + \beta \rho E_{(b', \zeta')|b} V(0, b', a', 0, k, \zeta')$$

where $c = (1 - \tau)k + a - \zeta - q(a', \tilde{s})a' \geq 0$.

If agents file for Chapter 7 bankruptcy to discharge their debt, his value when employed is given by

$$W^1(1, b, a, \tilde{w}, 0, \zeta) = u(c, \bar{h}) + \beta \rho E_{\zeta'} V(1, b, 0, \tilde{w}, 0, \zeta')$$

where $c = (1 - \tau)w\bar{h}$. His value when unemployed is given by

$$W^1(0, b, a, 0, k, \zeta) = u(c, 0) + \beta \rho E_{\zeta'} V(0, 1, 0, 0, k, \zeta')$$

where $c = (1 - \tau)k$.

7. Quantitative Analysis

This Section analyzes the quantitative properties of the model. The model takes aggregate prices as given and explores the dynamic properties of the stationary equilibria in which decisions remain constant functions of the household's state over time.

7.1. Parametrization

To be completed

7.2. Accounting for Individuals Deleverage

The previous section suggests that deleveraging occurred in balance sheets of individuals with unsecured debt and mortgages.³ An equally important question is how did individuals accomplish deleveraging? Knowing the answer to this question is important for public policy makers as well as researchers. From a policy maker's perspective, early changes in household balance sheets may be an indicator of eventual aggregate development in the economy. For researcher who employed heterogeneous agent type models to study aggregate movements in the economies, a set of facts describing the dynamic adjustments that occur in an individual balance sheet is important to evaluate these types of models.

Now the focus is on individuals who were born between the years of 1969 and 1979. These individuals would be the 21-30 cohorts in 1999-Q1 sample. Again, the data is restricted to individuals with unsecured credit with and without mortgage debt.⁴ Our strategy is to examine the choices during the sample years, and then condition changes in behavior along the extensive and intensive margin after the Great Recession. This approach allows to identify the nature of the deleverage process in the sample.

The set of choices differ for individuals whether they have a mortgage or not. We start by examining individuals who start with only unsecured debt. We can think of such an individual as a renter, but acknowledge some homeowners could be included. This would be more likely to be true if the initial cohort being examined was older.

Set of Choices for Individual Deleverage

$b > 0 \ \& \ m = 0$ Initial Conditions	$\Rightarrow$	$\nabla b \ \& \ \Delta m \geq 0$	{	Foreclosure	Bankruptcy		
				No	No		
				No	Yes		
				Yes	No		
		$\Delta b \ \& \ \Delta m \geq 0$	{	Foreclosure	Bankruptcy		
				No	No		
				No	Yes		
				Yes	No		
					{	Yes	Yes
						Yes	Yes
		Deleverage Choices					

³It would be better to examine an individual entire balance sheet so that assets and liability adjustments could be jointly examined. At this time, such as data base is not readily available.

⁴While student and auto debt are important factors that likely have important interactions with unsecured and mortgage debt, but feel that the first step is to examine the interactions of adjustments in unsecured and mortgage debt for deleveraging.

An individual starting without a mortgage can remain without a mortgage or take out a mortgage. We include the individuals without a mortgage as part of the increase group to make the analysis manageable. This is why the mortgage decision in this Table 9 only includes upward arrows. The unsecured debt decision allows for either an increase or decrease in the debt position. An individual who does not change their debt position is included in the increase decision group. Given their debt position, an individual has many potential decisions they can make if bankruptcy and/or foreclosure options are allowed. Since we would like to know the role that bankruptcy plays in deleveraging, we allow for this option. A bankruptcy (or foreclosure) flag over the period is used to define a bankruptcy (or foreclosure) decision. In attempt to maximize observations, we employ the entire Consumer Credit sample.

Table 9 summarizes the decisions that individuals for this restricted set of individuals. The data shows that around ninety percent of actual decision falls into one of two decision categories. That is allowing mortgage debt to increase while unsecured debt is either increased or decreased. The participation decision suggests that between 2008 and 2010 most deleverage took place by reducing unsecured credit balances without filing for bankruptcy or foreclose on any mortgage originated after 1999-Q1. This option increase 7.6 percent, capturing individuals from all the other categories. However, the choice of filing bankruptcy became more important from 2010 forward where the fraction making this choice nearly doubles. The data indicates that for this group of individuals the foreclosure decision option was not terribly important, whereas bankruptcy was only been relatively relevant since 2010.

The question is how large are the adjustments for these individuals. The magnitude in terms of dollar value adjusted is summarized in Table 10. The data indicates that during the whole sample period (1999-2013), the individuals who decrease their unsecured debt without defaulting (bankruptcy or foreclosure) maintaining a relatively constant pattern of debt reduction, \$2,542-\$3,116. These are relatively small amounts but it should not be surprising given the age of the cohort being studied. The Great Recession did not seem to change this pattern of debt reduction for these individuals, but it did for the set of individuals that increase mortgage and unsecured debt balances. For these individuals, the rate of mortgage and unsecured debt balances grew at a much smaller rate. The numbers are quite large for these individuals, but particularly important for those foreclosing. In this case, the change in the average mortgage balance only increased by \$126,012 in the period 2008-10 instead of \$250,605 in the previous period. For unsecured debt, the numbers are \$5,783 instead of \$7,694. All the evidence suggests important changes in behavior along the extensive and intensive margin for both types of debt. The key issue is whether individuals born between the years of 1969 and 1979 with a mortgage balance in 1999-Q1 behaved differently.

Tables 11 and Table 12 summarize the decisions of these individuals along the extensive and intensive margin respectively. These individual also adjust downwards mortgage balances for any given level of unsecured debt resulting in sixteen possible decisions. However, only four appear to be the dominating decisions. When analyzing the change in behavior during the Great Recession, the data indicates that the large majority of the individuals reduced their debt obligations (unsecured and mortgage). The number of participants making this choice increased to 42.8 percent from the 36.7 percent observed in the period 2005-08. The adjustment of the credit card balances for these individuals is essentially the same (-\$3,779 instead of -\$3,983), but mortgage debt is adjusted in a lesser amount (-\$49,533 instead of

-\$70,098). This difference is partially accounted by the 16 percent increase in participation for this option. The other two observed strategies involve reducing all debt by foreclosing on the mortgage (5.2 percent instead of 2.0 percent), or foreclose on the mortgage but expand unsecured debt (2.3 percent instead of 0.7 percent). These two options associated to foreclosure involve every important reductions in mortgage debt balances (-\$210,898 instead of -\$114,607 and -\$199,003 instead of -\$120,633). For individuals that use the foreclosure option to reduce their unsecured debt balances, its average decline is around 36 percent between 2008-10, whereas a for those that expand their debt balances, the average increase is about 43 percent. After 2010, the data suggests that more individuals deleverage by using on of the default options. Bankruptcy increases from 1.2 to 2.5 percent, and joint defaults (bankruptcy and foreclosure) increase from 0.7 to 1.2 percent. In all the cases, the bankruptcy option does not seem to be used as frequently as foreclosure because of the smaller size of unsecured debt relative to mortgage debt.

The previous data presents evidence on how individuals in the youngest cohort reduce their debt obligations. Next, we examine how debt is adjusted prior to a legal event such as bankruptcy. For example, does an individual run up unsecured debt prior to a bankruptcy or does the individual work to decrease unsecured debt levels but fail and use the bankruptcy option? To maximize our sample size, we focus on any individual with unsecured and mortgage debt balances who has a bankruptcy flag in any of our five samples. We then collect quarterly data for each individual the two years prior to bankruptcy. In Figure 8, we plot average of debt decisions for the two years prior to a bankruptcy flag.

Prior to the Great Recession the path of debt had some small growth prior to filing bankruptcy. For these individuals balances increased from around \$11,000 eight quarters prior two declare bankruptcy to \$15,000. There is little evidence that these individuals attempted to reduce debt holding prior to bankruptcy. This does not seem to be the case in the sample for 2008-10. Despite having larger average balances, individuals increase the average debt holding between 8 and 4 quarters prior to file bankruptcy. Between quarters -4 and the filling time debt holdings are reduced. This effort to reduce debt disappears in the 2010-13 samples.

8. Conclusions

This paper develops stylized facts on the dynamics of consumer credit in the United States in the period 2001-2013. The ultimate goal is to understand the evolution of credit in “normal” and “turbulent” times. To understand the adjustment, we place special emphasis documenting the participation decision (extensive margin), the volume (intensive margin), and default. This last issue is closely related to the deleverage episode in the aftermath of the final crisis. The analysis of the data reveals some key findings: The distribution of unsecured debt holding is also “hump-shaped” by age with a peak around the 41-55 age cohorts. Conditional on a particular age cohort, the distribution of debt balances is skewed. Between 1999 and 2013, the fraction of individual with only unsecured debt has been decreasing in terms of participation and the size of their balances. There are a non-trivial number of individuals in the sample with positive credit card balances and mortgage debt. Relative to the individuals that only have unsecured debt their balances are much larger. At the distributional level, the lowest 10 percent also has much larger balances of

unsecured debt, but this is not true for the 90 percentile. Unlike the other group, the balances of unsecured and mortgage debt increased dramatically between 1999 and 2008. However, the Great Recession and its aftermath brought their levels of unsecured debt substantially lower than the 1999 levels. This is particularly large for individuals under 40 years of age.

The Great Recession caused a large deleverage episode for individuals with unsecured credit and mortgages. The data suggests that for individuals born between the years of 1969 and 1979 their deleverage behavior crucially depends on whether mortgage debt is an additional liability. In the absence of mortgage debt, most individual choose to reduce their unsecured debt balances but the amount reduced does not change as a result of the Great Recession. For individuals with mortgage debt, the majority does not default and reduce their unsecured balances in a similar fashion. However, the Recession triggers an increase in foreclosure rates used to deleverage secured and in some cases unsecured credit. The data suggests that in general, the bankruptcy option is not used as frequently as foreclosure because of the smaller size of unsecured debt relative to mortgage debt. The data also suggests that during the Great Recession individuals tried to decrease unsecured debt levels but fail and use the bankruptcy option. This behavior was not observed prior to the Great Recession.

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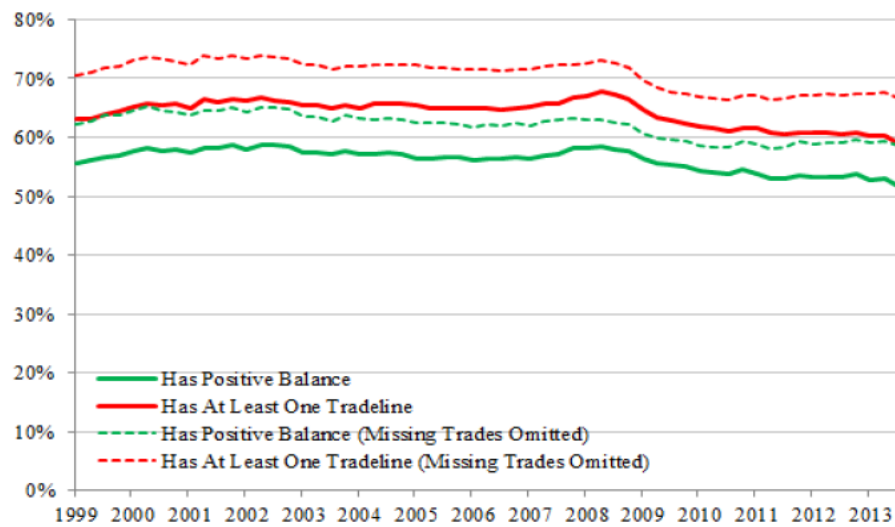
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Figure 0: Debt to Personal Income Ratio

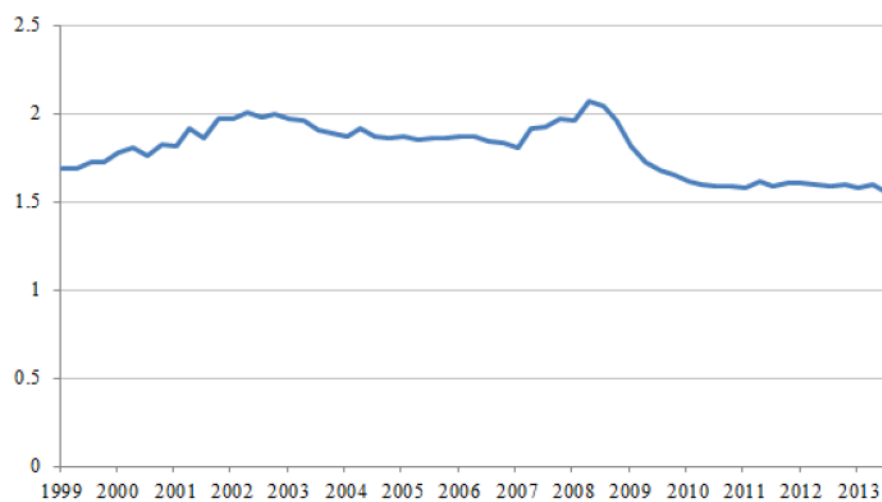


Figure 1: Percentage of Consumers with Positive Balances or Tradelines



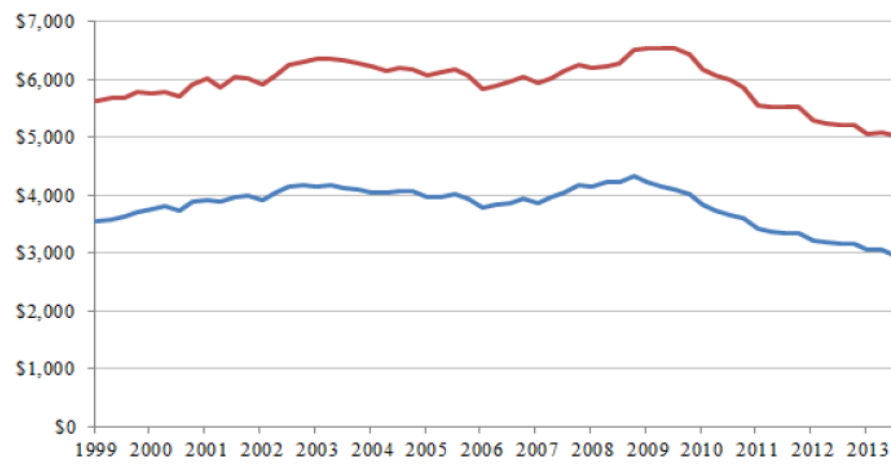
Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 2: Average Number of Tradelines



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 3: Average Real Credit Card Balances



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations
Notes: PCE adjusted to 2014. Joint accounts left as is

Figure 4: Percent of Credit Card Balances in Delinquency

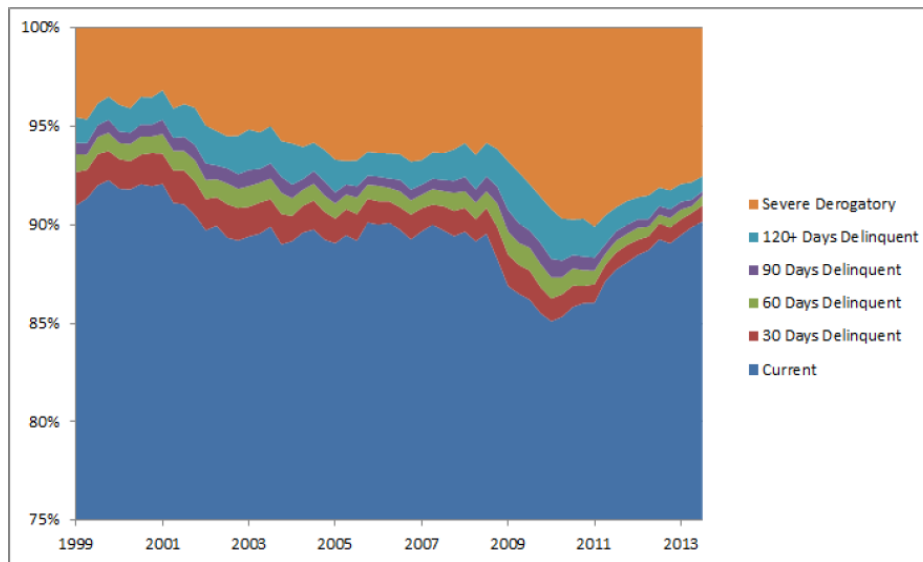
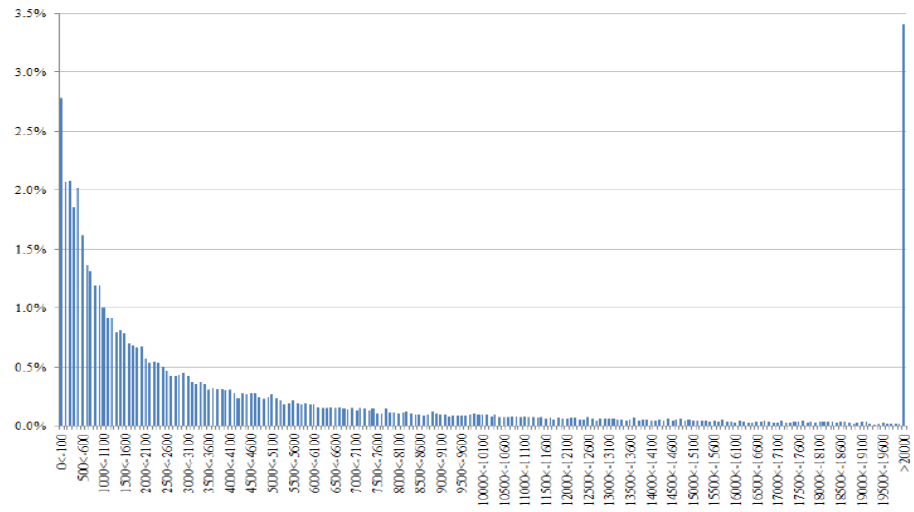
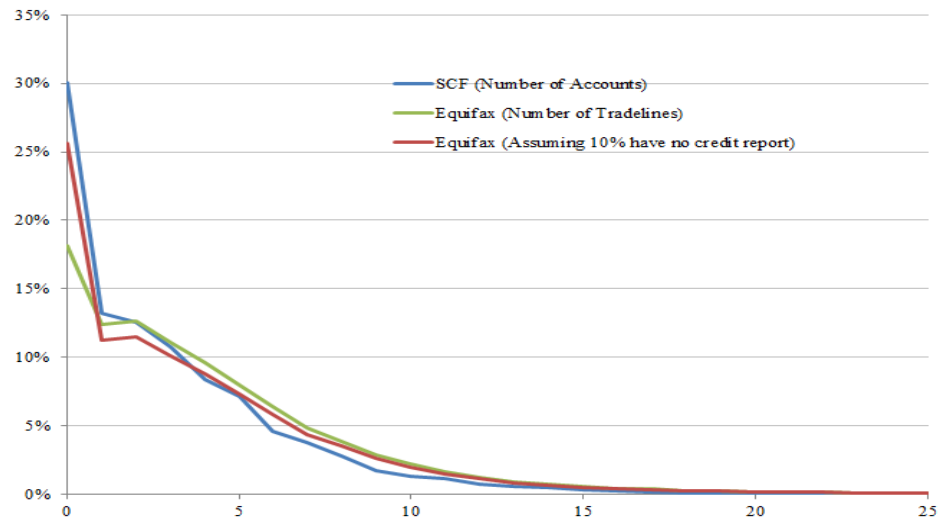


Figure 5a: Distribution of Positive Balances (Q4 2013)



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 5b: 2010 Family Distribution in Number of Credit Cards



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 6: Transitions for Tradelines and Conditional on Positive Balances

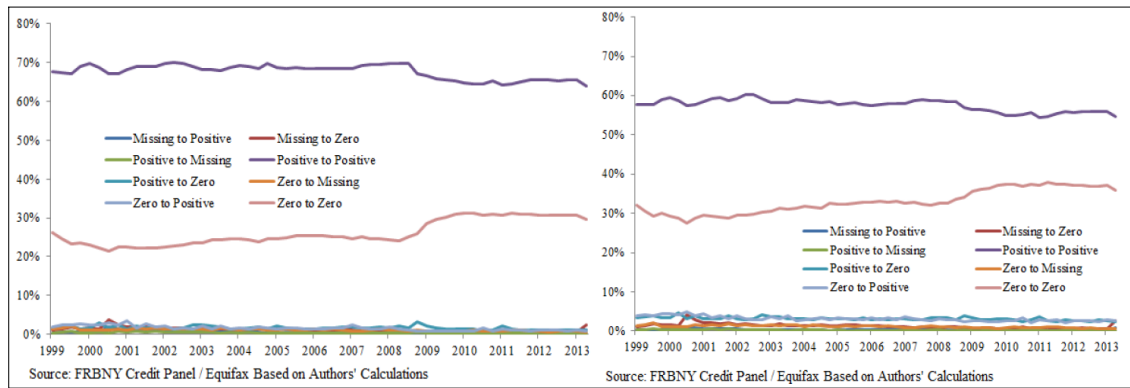
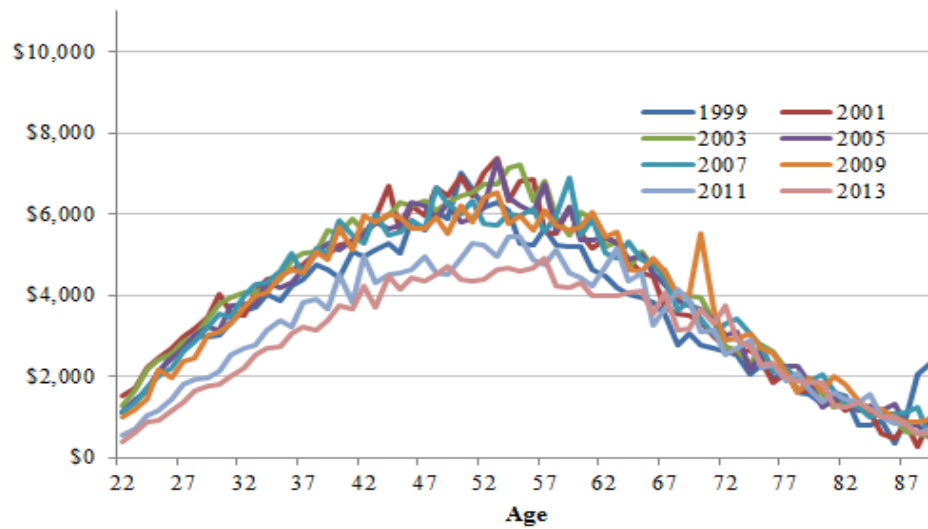
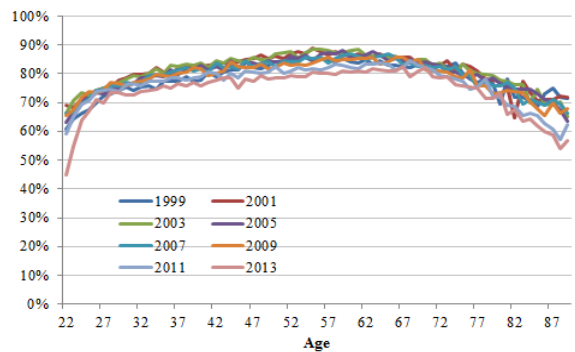


Figure 6b: Unconditional Average of Individuals' Balances by Age

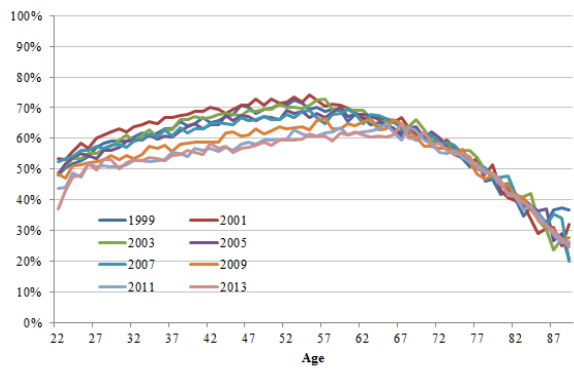


Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 6c: Percent of Individuals with at Least One Tradeline and with at a Positive Balance

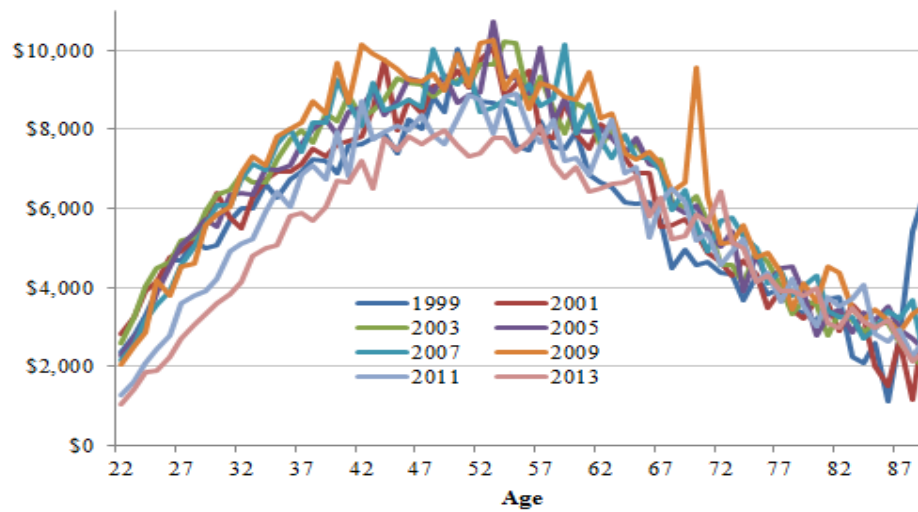


Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations



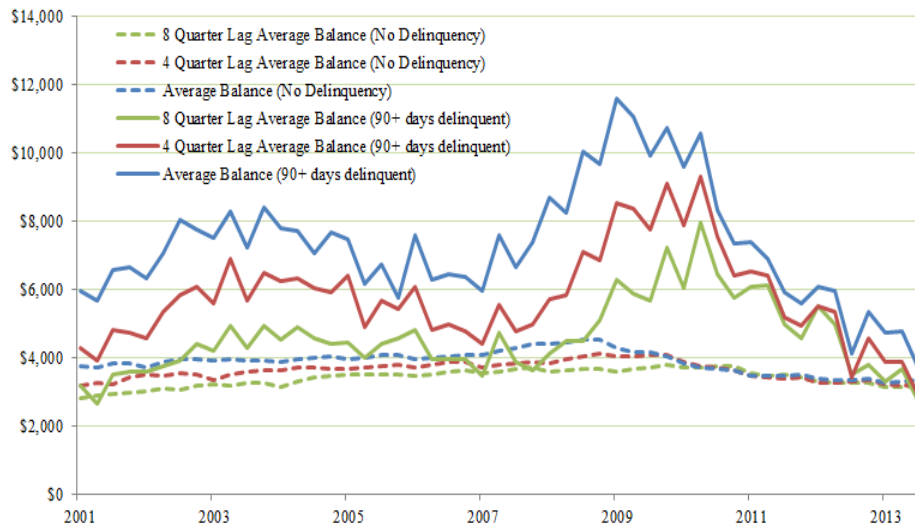
Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 6d: Average of Individuals' Balances by Age Conditional on having a Positive Balance

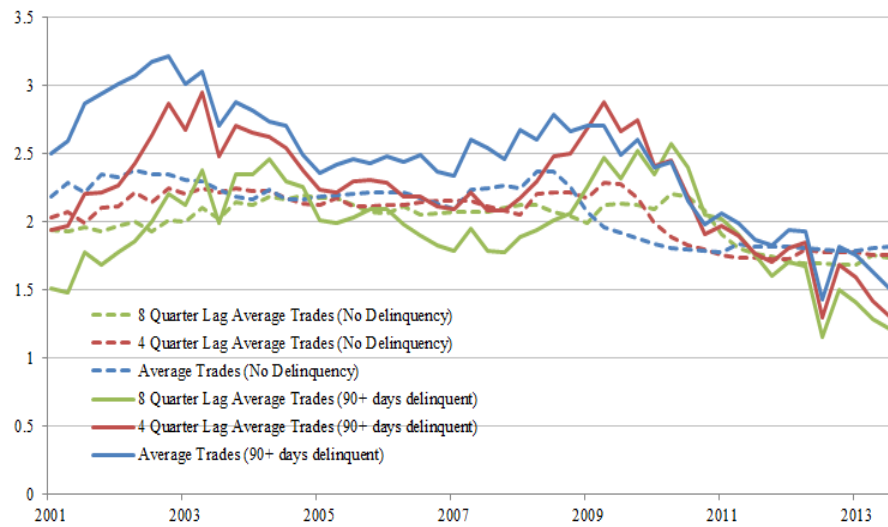


Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 6e: Average Credit Card Balances and Tradelines of Borrowers Delinquent on Any Type of Accounts



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations



Source: FRBNY Credit Panel / Equifax Based on Authors' Calculations

Figure 7: An Overview of Debt Level Changes by Age

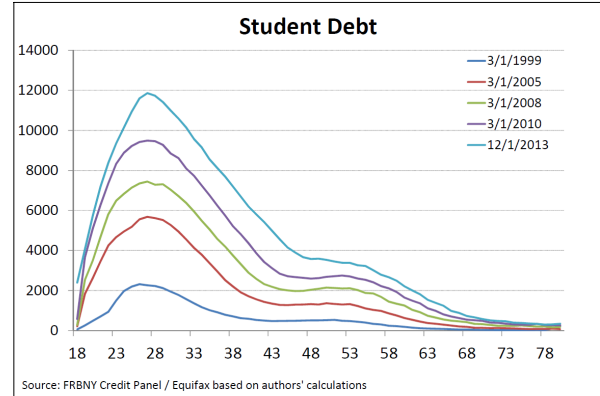
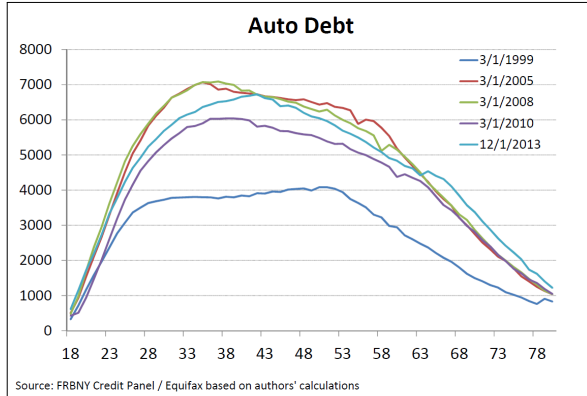
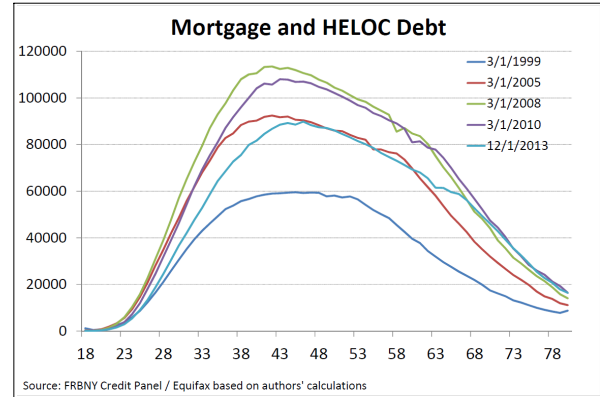
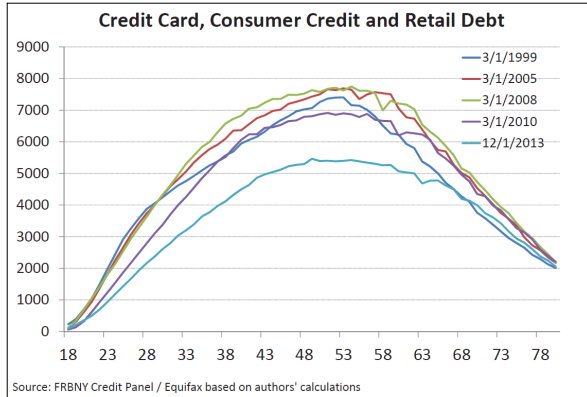
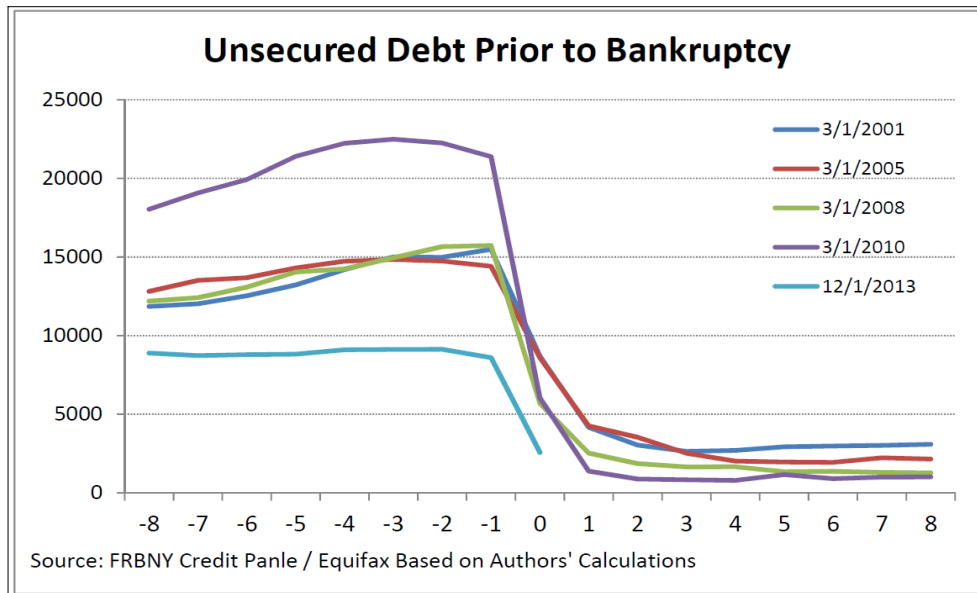


Figure 8: Unsecured Debt Adjustments Prior to Bankruptcy



**Table 1: Fraction of Individuals with Positive Balances
Unsecured Debt (No Mortgage Debt)**

Age	1999	2005	2008
21-30	59.1	50.0	50.2
31-40	59.4	51.2	47.2
41-55	64.2	56.5	51.8
56-65	67.1	61.1	56.9
66-75	63.4	58.6	56.5

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 2: Level of Unsecured Debt Balances (No Mortgage Debt)

Age	Distribution of Debt	1999			2005			2008		
		Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	
21-30	Lowest 10%	102	1.70	90	1.28	82	1.03			
	Average	3,636	3.93	3,020	3.01	2,703	1.94			
	Highest 10%	17,268	4.39	15,109	2.43	13,780	1.46			
31-40	Lowest 10%	127	6.38	117	9.41	106	8.17			
	Average	5,863	9.31	5,146	11.26	5,166	9.62			
	Highest 10%	28,049	5.38	26,917	7.77	27,849	8.17			
41-55	Lowest 10%	103	6.06	111	8.46	105	7.54			
	Average	6,972	8.69	6,513	11.80	6,308	11.03			
	Highest 10%	35,553	4.89	35,184	6.55	34,195	4.15			
56-65	Lowest 10%	67	2.47	70	4.43	70	4.45			
	Average	6,400	5.07	6,547	8.22	6,229	7.59			
	Highest 10%	36,399	3.50	38,315	4.50	36,800	4.42			
66-75	Lowest 10%	41	0.89	44	2.19	47	2.24			
	Average	4,120	2.52	4,359	4.41	4,625	4.09			
	Highest 10%	25,784	3.61	26,701	4.44	28,228	4.83			

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 3: Fraction of Individuals with Positive Balances of Unsecured Debt and Mortgages

Age	1999	2005	2008
21-30	8.2	7.1	6.8
31-40	26.9	25.0	24.7
41-55	33.9	33.8	34.1
56-65	26.7	31.1	31.7
66-75	14.7	18.8	20.4

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 4: Level of Unsecured Debt and Mortgage Balances (1999, 2005, and 2008)

Age	Distribution of Debt	1999			2005			2008		
		Ave. Debt	Ave. Mort.	Bank. %	Fore. %	Ave. Debt	Ave. Mort.	Bank. %	Fore. %	Fore. %
21-30	Lowest 10%	3,703	11,968	1.92	0.66	3,824	24,916	1.33	0.66	4.39
	Average	6,027	112,353	3.78	1.10	5,907	168,284	2.37	1.28	2.41
	Highest 10%	9,394	265,852	3.84	0.50	11,875	481,456	3.06	0.00	5.37
31-40	Lowest 10%	4,316	22,838	5.57	1.71	94	33,463	7.60	2.15	3.41
	Average	7,620	146,191	3.98	1.21	4,643	208,985	4.36	1.18	2.28
	Highest 10%	11,976	408,035	7.21	0.86	24,595	629,931	8.79	0.38	3.72
41-55	Lowest 10%	3,602	15,178	4.89	1.24	92	20,381	7.08	1.42	1.62
	Average	9,307	139,597	2.87	1.11	5,927	189,505	3.25	0.99	1.51
	Highest 10%	18,353	451,627	6.22	1.48	32,530	663,025	8.31	0.43	2.66
56-65	Lowest 10%	2,371	8,511	2.43	0.42	67	11,797	4.03	0.76	0.27
	Average	9,449	117,874	2.49	0.90	5,707	158,310	2.40	0.66	0.89
	Highest 10%	20,760	449,394	4.16	1.11	33,477	620,457	6.20	0.45	2.10
66-75	Lowest 10%	1,612	6,211	0.92	0.14	45	7,634	2.28	0.44	0.19
	Average	7,368	89,214	2.62	0.74	4,351	123,081	2.60	0.65	0.69
	Highest 10%	14,967	334,840	2.40	1.73	27,180	506,828	4.09	1.10	1.90

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

**Table 5: Fraction of Individuals with Positive Balances
Unsecured Debt (No Mortgage Debt)**

Age	2008	2010	2013
21-30	50.2	46.5	44.9
31-40	47.2	43.2	42.3
41-55	51.8	47.7	45.4
56-65	56.7	54.2	51.8
66-75	56.5	54.7	53.5

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 6: Level of Unsecured Debt Balances (No Mortgage Debt)

Age	Distribution of Debt	2008			2010			2013		
		Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	Average Debt	Bankruptcy Percent	
21-30	Lowest 10%	82	1.03	62	0.60	65	1.32			
	Average	2,703	1.94	2,349	1.39	1,936	1.34			
	Highest 10%	13,780	1.46	11,875	1.31	9,315	0.60			
31-40	Lowest 10%	106	8.17	94	7.04	92	5.99			
	Average	5,166	9.62	4,643	8.39	3,602	7.39			
	Highest 10%	27,849	8.17	24,595	4.33	17,840	2.35			
41-55	Lowest 10%	105	7.54	92	7.45	92	10.51			
	Average	6,308	11.03	5,927	9.84	4,949	9.93			
	Highest 10%	34,195	4.15	32,530	3.38	26,104	2.70			
56-65	Lowest 10%	70	4.45	67	4.39	78	5.96			
	Average	6,229	7.59	5,707	6.68	4,689	6.21			
	Highest 10%	36,800	4.42	33,477	3.86	25,125	1.71			
66-75	Lowest 10%	47	2.24	45	2.28	63	3.39			
	Average	4,625	4.09	4,351	3.84	4,127	2.36			
	Highest 10%	28,228	4.83	27,180	3.97	23,703	3.67			

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 7: Fraction of Individuals with Positive Balances of Unsecured Debt and Mortgages

Age	2008	2010	2013
21-30	6.8	6.2	5.5
31-40	24.7	22.9	18.5
41-55	34.1	32.7	27.9
56-65	31.7	31.4	27.6
66-75	20.4	21.5	21.0

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 8: Level of Unsecured Debt and Mortgage Balances (2008, 2010, and 2013)

Age	Distribution of Debt	2008				2010				2013			
		Ave. Debt	Ave. Mort.	Bank. %	Fore. %	Ave. Debt	Ave. Mort.	Bank. %	Fore. %	Ave. Debt	Ave. Mort.	Bank. %	Fore. %
21-30	Lowest 10%	3,519	30,074	1.10	4.39	3,067	34,446	0.57	4.25	3,018	38,236	1.22	1.74
	Average	6,025	198,456	1.60	2.41	4,714	179,581	0.96	3.68	3,553	165,560	0.53	1.67
	Highest 10%	11,365	631,466	1.95	5.37	6,430	475,217	1.37	7.93	4,268	413,661	1.26	1.74
31-40	Lowest 10%	4,256	36,836	6.32	3.41	3,923	36,168	5.82	4.95	3,798	35,670	5.25	4.10
	Average	8,756	243,851	2.82	2.28	8,041	234,736	2.85	3.91	5,875	215,335	1.90	2.71
	Highest 10%	15,516	773,184	7.34	3.72	13,897	712,575	6.38	7.06	7,703	634,577	5.59	2.96
41-55	Lowest 10%	3,691	22,282	5.77	1.62	3,543	23,557	5.68	2.12	3,743	22,363	8.33	2.64
	Average	9,769	226,315	2.30	1.51	9,454	227,249	1.89	2.97	8,299	211,309	1.27	2.91
	Highest 10%	18,903	844,351	7.33	2.66	18,381	818,982	6.21	7.30	14,440	715,332	6.21	4.52
56-65	Lowest 10%	2,865	12,738	3.66	0.27	2,541	14,786	3.67	0.67	2,671	12,141	4.98	1.02
	Average	9,816	188,152	1.87	0.89	9,373	188,448	1.44	1.86	7,891	168,962	0.85	2.25
	Highest 10%	20,593	767,989	5.44	2.10	20,607	749,094	4.70	6.01	14,892	647,611	4.30	4.75
66-75	Lowest 10%	2,052	8,500	2.03	0.19	1,814	9,352	2.26	0.25	2,101	8,506	3.16	0.55
	Average	8,271	153,384	2.15	0.69	8,297	158,496	2.06	1.18	7,385	151,087	1.23	1.99
	Highest 10%	18,656	661,430	3.62	1.90	19,517	660,458	3.31	4.26	15,326	591,081	2.96	5.30

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 9: Given Only Unsecured Debt, How Do Individuals Adjust?

Debt	Mortg.	Fore	Bank.	Percent Choosing			
				from '99 to '05	from '05 to '08	from '08 to '10	from '10 to '13
↓	↑	No	No	57.2	59.6	64.1	60.1
↓	↑	No	Yes	4.5	1.8	1.0	1.9
↓	↑	Yes	No	1.1	0.8	0.5	0.5
↓	↑	Yes	Yes	0.4	0.2	0.1	0.2
↑	↑	No	No	35.2	36.9	34.1	37.1
↑	↑	No	Yes	1.2	0.5	0.2	0.3
↑	↑	Yes	No	0.3	0.3	0.1	0.1
↑	↑	Yes	Yes	0.9	0.1	0.1	0.1

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 10: Given Only Unsecured Debt, How Much Do Individuals Liabilities Adjust?

Debt	Mortg.	Fore	Bank.	Period (Average)							
				From '99 to '05		From '05 to '08		From '08 to '10		From '10 to '13	
				$\Delta Mort$	$\Delta Debt$	$\Delta Mort$	$\Delta Debt$	$\Delta Mort$	$\Delta Debt$	$\Delta Mort$	$\Delta Debt$
↓	↑	No	No	24,230	-2,793	16,345	-2,713	8,274	-2,542	12,633	-3,116
↓	↑	No	Yes	8,100	-6,111	3,889	-9,283	1,885	-11,064	1,632	-11,728
↓	↑	Yes	No	14,036	-2,320	47,063	-2,121	19,506	-4,852	15,572	-6,262
↓	↑	Yes	Yes	20,424	3,039	26,052	-2,967	10,622	-2,832	2,667	-6,829
↑	↑	No	No	55,959	5,727	37,940	4,604	17,203	2,922	30,114	3,257
↑	↑	No	Yes	17,803	4,291	11,800	3,138	5,156	2,485	6,072	2,414
↑	↑	Yes	No	53,210	6,319	250,605	7,694	126,012	5,783	36,339	3,681
↑	↑	Yes	Yes	38,892	3,691	51,022	11,199	17,943	3232	42,401	724

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

Table 11 : How do Individuals Make Their Adjustments?

		Percent Choosing					
		from '99 to '05		from '05 to '08		from '08 to '10	
Debt	Mortg.	Fore	Bank.				
↓	↓	No	No	31.7	36.7	42.8	38.6
↓	↓	No	Yes	4.1	1.2	1.2	2.5
↓	↓	Yes	No	3.3	2.0	5.2	4.8
↓	↓	Yes	Yes	1.7	0.5	0.7	1.2
↓	↑	No	No	15.5	11.8	7.3	5.9
↓	↑	No	Yes	0.5	0.1	0.1	0.1
↓	↑	Yes	No	0.2	0.4	0.6	0.4
↓	↑	Yes	Yes	0.1	0.1	0.1	0.1
↑	↓	No	No	22.5	32.1	33.2	37.7
↑	↓	No	Yes	0.9	0.2	0.1	0.2
↑	↓	Yes	No	0.8	0.7	2.3	1.4
↑	↓	Yes	Yes	0.4	0.1	0.1	0.1
↑	↑	No	No	18.2	13.5	6.1	7.0
↑	↑	No	Yes	0.2	0.1	0.1	0.1
↑	↑	Yes	No	0.2	0.4	0.4	0.1
↑	↑	Yes	Yes	0.1	0.1	0.1	0.0

Source: FRBNY Credit Panel/Equifax Based on Authors' Calculations

