Chicago Fed Letter

Consumer credit trends by income and geography in 2001–12

by Gene Amromin, senior financial economist and research advisor, Leslie McGranahan, senior economist and research advisor, and Diane Whitmore Schanzenbach, associate professor of human development and social policy, Northwestern University, and research associate, National Bureau of Economic Research

As economists have tried to understand the causes of the Great Recession[1] and its consequences for households and firms, a consensus has emerged: The severity of the recession was amplified by the rapid buildup in consumer credit leading up to it and the subsequent credit retrenchment.[2] However, the credit cycle played out unevenly among individuals of different financial means and across different parts of the U.S. Thus, one potential key to understanding the Great Recession is documenting how credit trends varied across the distribution of income and across geography, as well as across the two measures jointly.

In this *Chicago Fed Letter*, we present information on credit growth rates at the zip code level for different types of consumer


1. Average annual growth in real per capita debt, by zip code income decile

A. 2001:Q4–2008:Q3
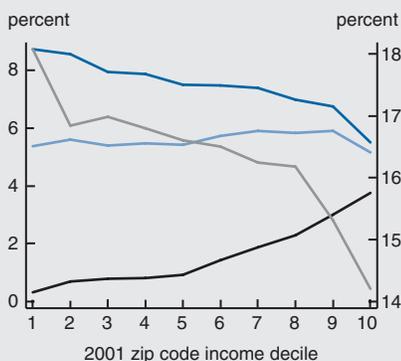
B. 2008:Q3–2012:Q4
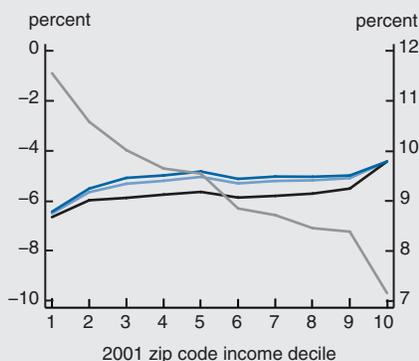
Mortgage debt (LHS)
Student loans (RHS)
Total excluding student loans (LHS)
Total excluding mortgage debt and student loans (LHS)

NOTES: On the horizontal axis, 1 represents the lowest-income decile, while 10 represents the highest-income decile. LHS means left-hand scale. RHS means right-hand scale. See the text for further details on the debt measures.
SOURCES: Authors' calculations based on data from the Internal Revenue Service, Federal Reserve Bank of New York Consumer Credit Panel/Equifax, U.S. Census Bureau, and Haver Analytics.

debt (mortgages, student loans, and other credit). We show how the level and composition of debt changed during the credit run-up period (2001:Q4–2008:Q3)

and also during the credit retrenchment period (2008:Q3–2012:Q4). To better understand *whose* credit use changed over time, we show how the credit cycle played out across income classes by grouping zip codes by their decile rank in the national income distribution. In addition, to understand *where* credit use changed over time, we show how the credit cycle played out across states. We then cross-tabulate both measures, which allows us to show the connection between credit growth during the credit cycle's boom years and the subsequent credit retrenchment across the income distribution in different parts of the nation. This exercise may be particularly relevant to those interested in understanding the impact of the Great Recession on low-income families.[3]

Data

We use three primary sources of data to investigate credit patterns across zip codes with different average incomes in the 50 states (and the District of Columbia). First, in order to group zip codes by income, we use Internal Revenue Service (IRS) zip-code-level data on annual adjusted gross income

2. Average annual growth rate in real total debt, by state, 2001:Q4–2008:Q3
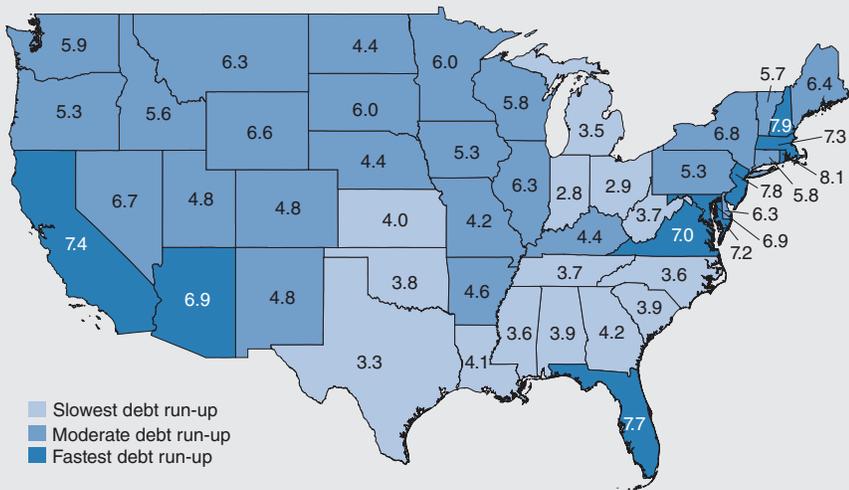
NOTES: All values in the figure are in percent. Student loans are excluded from the analysis for this figure. The District of Columbia is included in the sample. Although not shown, Hawaii (with 5.4% debt growth) and Alaska (with 4.4%) fall into the moderate debt run-up group.

SOURCES: Authors' calculations based on data from the Internal Revenue Service, Federal Reserve Bank of New York Consumer Credit Panel/Equifax, U.S. Census Bureau, and Haver Analytics.

increases in revolving home equity lines of credit—which play more of a central role in the debt profile of higher-income individuals—drive this pattern. On balance, total non-student-loan debt growth was *flat* (at about 5.5% per year) across the income deciles during the run-up period, although the sources of debt growth differed across the deciles.

Note that these comparisons are for debt *growth rates* across the income deciles. *Levels* of mortgage and nonmortgage debt were increasing by income throughout the run-up period. Total per capita indebtedness in the lowest-income zip codes remained far below the total in the highest-income zip codes.

We next turn to investigating patterns of debt decline following the credit peak—specifically, from 2008:Q3 through 2012:Q4.[10] As mentioned before, this was a period of credit retrenchment. Panel B of figure 1 displays the average annual percentage decline (and growth) in real per capita debt during this period on a scale comparable to that in panel A. Note that while other forms of debt experienced sizable declines, student loan debt (measured on the right-hand axis) continued to see steady growth. Just as in the run-up period, the growth rates of student loan debt were the highest in the lowest-income zip codes. However, mortgage debt and total debt excluding mortgage debt and student loans decreased across the board, with slightly larger rates of decline at the bottom of the income distribution.

Comparing panels A and B of figure 1, we note that the lowest-income zip codes experienced the greatest rates of decline in total debt excluding mortgage debt and student loans, despite having experienced minimal growth in these loan types in the period leading up to the credit peak. This pattern is particularly acute for credit cards—per capita debt in that category fell during both the run-up and retrenchment periods in the lowest-income zip codes and did so by more than in other zip codes, according to our calculations.

We do not discuss patterns of student loan debt in the remainder of this article. We believe that the massive increases

per tax return for 2001 and 2012. Second, we use 2001–12 data from the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP) database to construct quarterly credit aggregates for zip codes.[4] Third, we use annual data on zip code population from the U.S. Census Bureau. We restrict our analysis to zip codes that consistently have data from all three sources over time and whose boundaries and position in the income distribution have been fairly stable.[5] The result is a balanced panel of 25,946 zip codes. We group zip codes into population-weighted deciles (i.e., each decile has the same number of *individuals*) based on their average adjusted gross income per tax return in 2001, and hold each zip code's income category assignment constant over time.

We analyze credit measures for zip code income deciles, states (which we group according to the pace of state-level credit run-up in 2001:Q4–2008:Q3), and state groups by deciles. We measure all credit values in per capita terms—defined as total credit for a group of zip codes divided by total U.S. Census population in those zip codes.

Debt patterns by income decile

We begin by looking at the increase in debt across the income distribution in

the period 2001:Q4–2008:Q3. We start in 2001:Q4 because the CCP data stabilize by that date. Prior to late 2001, some of the patterns appear to be driven by improvements and refinements in data collection. We end our calculation in 2008:Q3 because that is the quarter in which national aggregate consumer credit peaked.[6] In figure 1, panel A, we display average annual percentage growth in real per capita debt, by zip code income decile, for the following: mortgage debt (defined as mortgages plus home equity installment loans), student loans, total debt excluding student loans, and total debt excluding mortgage debt and student loans (thus primarily composed of revolving home equity, auto, and credit card debt).[7]

In figure 1, panel A, we show what we and others have noted previously[8]—namely, that mortgage debt growth rates are highest at the bottom of the income distribution during the run-up period while nearly monotonically declining across the deciles.[9] Student loan growth rates (captured on the right-hand scale) display a similar pattern. However, looking at growth rates in debt excluding mortgage debt and student loans, we find the opposite pattern: The growth rates for such debt are highest at the top of the income distribution. Large

A. Mortgage debt in 2001:Q4–2008:Q3

percent

2001 zip code income decile

B. Nonmortgage debt in 2001:Q4–2008:Q3

percent

2001 zip code income decile

C. Total debt in 2001:Q4–2008:Q3

percent

2001 zip code income decile

D. Total debt in 2008:Q3–2012:Q4

percent

2001 zip code income decile

— States with slowest debt run-up
— States with moderate debt run-up
— States with fastest debt run-up
— U.S. total

NOTES: On the horizontal axis, 1 represents the lowest-income decile, while 10 represents the highest-income decile. Student loans are excluded from the analysis for this figure. See the text for further details on the debt measures. See the text and figure 2 for details on the state aggregate debt growth groups.
SOURCES: Authors' calculations based on data from the Internal Revenue Service, Federal Reserve Bank of New York Consumer Credit Panel/Equifax, U.S. Census Bureau, and Haver Analytics.

in student loan debt—across the income distribution—merit additional independent investigation.[11]

Debt patterns by geographical groupings

We next turn to the geographical pattern of debt growth to investigate whether the heterogeneity documented across income groups also exists across different areas. We divide the states into three population-weighted groups (i.e., each group has the same number of individuals) based on the magnitude of the increase in state-level aggregate real per capita debt (excluding student loans) between 2001:Q4 and 2008:Q3. Figure 2 displays the three different sets of states according to the average annual percentage growth of real total debt (excluding student loans) in each

state. The nine states with the fastest debt growth during the run-up period (along with the District of Columbia) had rates ranging from 6.9% to 8.1% per year. Given mortgage debt makes up the dominant share of consumer credit, it is not surprising that the set of states with the fastest growth in aggregate credit includes most locations that had rapidly rising home prices: California, Arizona, Florida, and several states on the Eastern Seaboard. The 14 states with the slowest debt growth had rates ranging between 2.8% and 4.2% per year, and were largely concentrated in the South and the Midwest's Rust Belt.

Debt patterns by income and geography

Panels A–C of figure 3 display the dynamics of debt by income decile for the three groups of states defined by their

aggregate debt growth rates during 2001:Q4–2008:Q3 (as displayed in figure 2). With student debt excluded, these panels break down the aggregate patterns displayed in figure 1, and show that the fairly flat growth in total debt across the income distribution in the aggregate numbers masks some differential debt growth rates by income across state groups.

Panel A of figure 3 focuses on mortgage debt by zip code income decile for the three state groups. We note that the states with the fastest aggregate debt growth had the steepest income gradient. That is, in states with the fastest debt growth, the increase in mortgage debt was highest among low-income deciles, with the bottom four deciles in these states each averaging over 10% annual mortgage debt growth. Panel B of figure 3 depicts trends in nonmortgage debt. There, we note that nonmortgage debt actually declined during the run-up period for almost all income deciles in the states with the slowest aggregate debt growth. We also note a fairly high rate of increase in nonmortgage debt at the top of the income distribution in states with the fastest debt growth. Combining mortgage debt and other non-student-loan debt

in figure 3, panel C, we see total debt growth rates generally decreasing by income decile for states with the fastest debt growth but generally increasing by income decile for states with the slowest debt growth. Taken together, these patterns form a fairly flat debt growth profile across income deciles for the entire U.S. (see figure 1, panel A).

In figure 3, panel D, we show the patterns of the decline in total debt (excluding student loans) during 2008:Q3–2012:Q4 across income deciles for the three state groups. The rate of debt decline is fairly consistent at around 4% per year—with little variation across income deciles—for states with the slowest and moderate debt growth. By contrast, the rate of decline in debt is more than twice as high at the bottom of the income distribution than at the top for states with the fastest debt growth. We observe a similar pattern if mortgage and non-mortgage debt (excluding student loans) are investigated separately.[12]

Conclusion

We demonstrated how average annual real debt growth differed across debt types and across the income distribution— during both the credit run-up period (2001:Q4–2008:Q3) and the credit retrenchment period (2008:Q3–2012:Q4). During the run-up period, relative to individuals at the top of the income distribution, those at the bottom saw faster growth in mortgage debt but slower growth in nonmortgage debt (excluding student loans). During the retrenchment period, individuals in low-income zip codes saw a larger percentage decline across all forms of debt (except student loans) than did those in higher-income areas. We then showed that the rate of debt increase during the run-up period varied dramatically across the states. Combining income and geographical information, we found that in the retrenchment period, the sharpest rates of decline in all types of debt were for individuals living in the lowest-income areas in states with the fastest debt growth during the run-up period. These facts are potentially useful for understanding the role of the credit market in the Great Recession—and the downturn's impact on low-income individuals. Where low-income people live may play a large role in their ability to access credit in the wake of the recession.

[1] According to the National Bureau of Economic Research, the Great Recession lasted from late in 2007:Q4 through 2009:Q2.

[2] See, e.g., Atif Mian, Kamalesh Rao, and Amir Sufi, 2013, "Household balance sheets, consumption, and the economic slump," *Quarterly Journal of Economics*, Vol. 128, No. 4, November, pp. 1687–1726; Michael Greenstone, Alexandre Mas, and Hoai-Luu Nguyen, 2014, "Do credit market shocks affect the real economy? Quasi-experimental evidence from the Great Recession and 'normal' economic times," National Bureau of Economic Research, working paper, No. 20704, November, available at http://www.nber.org/papers/w20704; Marco Di Maggio and Amir Kermani, 2015, "Credit-induced boom and bust," Columbia Business School, research paper, No. 14-23, June 7; and John Mondragon, 2015, "Household credit and employment in the Great Recession," Northwestern University, Kellogg School of Management, working paper, January 21, available at https://sites.google.com/site/johnnelsonmondragon/.

[3] See, e.g., Marianne Bitler and Hilary Hoynes, forthcoming, "The more things change, the more they stay the same? The safety net and poverty in the Great Recession," *Journal of Labor Economics*, and Patricia M. Anderson, Kristin F. Butcher, and Diane Whitmore Schanzenbach, 2015, "Changes in safety net use during the Great Recession," *American Economic Review*, Vol. 105, No. 5, May, pp. 161–165.

[4] The CCP consists of a nationally representative 5% sample of U.S. individuals with credit reports and Social Security numbers (for more details, see http://www.newyorkfed.org/microeconomics/ccp.html). While not designed to measure zip code credit, CCP-reported credit levels within a zip code can be multiplied by 20 to approximate zip code credit totals.

[5] In particular, we drop zip codes that move more than four deciles in the income distribution between 2001 and 2012, zip codes that are missing all U.S. Census data in 2000 or 2010, and zip codes that have outlier changes in their geographical centroid or land mass area.

[6] http://www.newyorkfed.org/householdcredit/2014-q1/data/pdf/HHDC_2014Q1.pdf.

[7] However, we should note that mortgage debt represents by far the largest category of consumer credit, accounting for over 70% of the total ($8.03 trillion) by the end of our sample period, in 2012:Q4. Moreover, in 2012:Q4, student loans make up about 7% of the aggregate debt ($966 billion); auto loans, about 7% ($783 billion); credit card debt, 6% ($679 billion); and revolving home equity lines of credit, 5% ($563 billion). These values are from http://www.newyorkfed.org/research/national_economy/householdcredit/DistrictReport_Q42012.pdf and http://www.newyorkfed.org/householdcredit/2015-q2/data/xls/HHD_C_Report_2015Q2.xlsx.

[8] Gene Amromin and Leslie McGranahan, 2015, "The Great Recession and credit trends across income groups," *American Economic Review*, Vol. 105, No. 5, May, pp. 147–153; and Atif Mian and Amir Sufi, 2011, "House prices, home equity-based borrowing, and the US household leverage crisis," *American Economic Review*, Vol. 101, No. 5, August, pp. 2132–2156.

[9] The aggregate data used to calculate this and the other figures are available at https://www.chicagofed.org/~/media/others/people/research-resources/mcgranahan-leslie/rr-cfl342-data-xlsx.xlsx.

[10] We chose this end date because subsequent expansions in the data sample might influence our findings. For instance, the number of credit reports increased by 4% between the end of 2013:Q2 and the end of 2013:Q3; it is not clear whether this jump was due to changes in sampling or an increase in individuals with credit.

[11] See, e.g., http://libertystreeteconomics.newyorkfed.org/2015/02/the_student_loan-landscape.html.

[12] An additional figure (A1) demonstrating this similar pattern for different debt types appears in the online appendix: https://www.chicagofed.org/~/media/others/people/research-resources/mcgranahan-leslie/rr-cfl342-appendix-pdf.pdf. We also examine debt patterns in the nine states and the District of Columbia that make up our fastest-debt-growth group (figure A2 in the appendix). We see the basic pattern—debt declining fastest at the bottom of the income distribution—holds for seven in the group (the exceptions being Virginia, New Hampshire, and the District of Columbia). In other words, this pattern is not driven by California or Florida alone.