



U.S. Household Deleveraging: What Do the Aggregate and Household-Level Data Tell Us?

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Abstract:

Deleveraging is the process by which households decide that their level of debt is inconsistent with their revised economic outlook and adjust their leverage accordingly, primarily by substituting debt repayment for consumption. Household deleveraging is a commonly cited reason for the sluggish consumption growth experienced during the current economic recovery from the Great Recession. This policy brief analyzes the impact of household debt repayment on consumer spending during and after the Great Recession by using aggregate and household-level data. Overall, the data show little evidence that deleveraging affected household consumption. Rather, movements in consumption prior to, during, and following the Great Recession are consistent with the standard relationships implied by fluctuations in household income and net worth.

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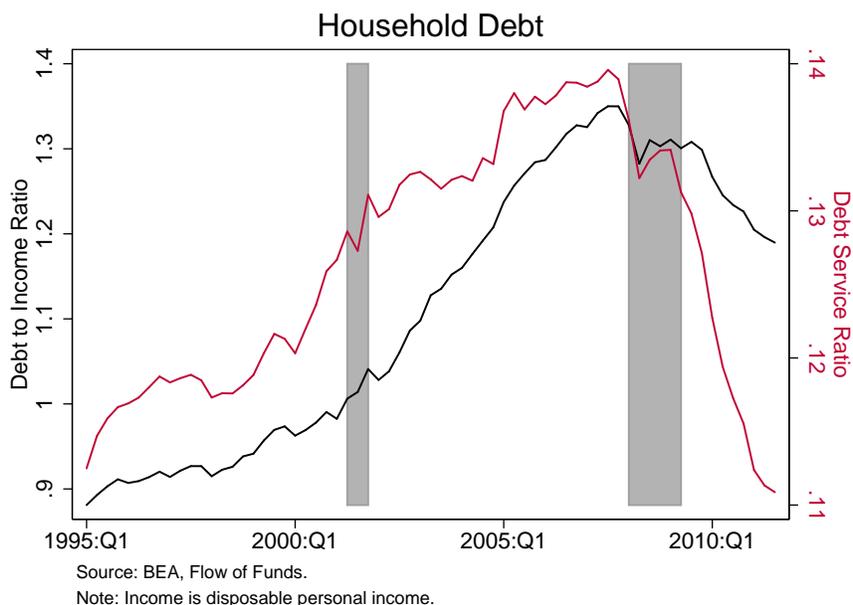
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1. Introduction

The U.S. recovery from the Great Recession has been sluggish at best, with a number of reasons having been offered to explain the lack of sustained and robust economic growth. Some have blamed the economy's lack of strength on so-called household deleveraging. The general idea behind this claim is that households were (and continue to be) highly indebted following the recession and have substituted debt repayment for consumption in order to improve their balance sheets. The drop in household debt relative to income, shown below in Figure 1, is often cited as evidence of household deleveraging.¹ Recent analysis of the deleveraging issue includes Dynan (2012), Mian and Sufi (2012), and Mian, Rao, and Sufi (2011).

FIGURE 1



Understanding whether or not deleveraging has occurred among U.S. consumers requires a more formal definition of what constitutes deleveraging. This policy brief defines household deleveraging as a deliberate household balance sheet debt adjustment that lowers consump-

¹Debt is defined as overall household borrowing-related obligations and includes secured debt such as home mortgages and unsecured debt such as student loans and credit card debt.

tion beyond what would be predicted on the basis of information embedded in current and past changes in income and asset valuations. This phenomenon could, for example, be a reaction to a previous phase of leveraging whereby households increased their consumption by taking on more debt via borrowing.

Prior to 2007 U.S. households may have increased their leverage based on optimistic expectations about future house price appreciation. “Leveraging” in this sense of the term is defined as consumption growth beyond what would have otherwise been expected given ongoing developments in income and net worth. Following this line of reasoning, a house price drop in mid-to-late 2006 made highly leveraged households realize that their debt burdens were inconsistent with their downwardly revised house price expectations, a reconsideration that prompted them to adjust their leverage accordingly. Given this logic, if such debt leveraging and deleveraging occurred, then the borrowing-fueled consumption not explained by the normal relationship between consumption, income, and household net worth present before the recession would result in a decline in consumption relative to the levels predicted by income and net worth during and after the recession.

This definition of deleveraging does *not* include household debt reduction due to foreclosure-related debt charge-offs. Such debt write-downs have accounted for at least 60 to 70 percent of the recent decline in mortgage debt.² Even if one believed that a significant amount of mortgage default and foreclosure was strategic, meaning undertaken deliberately by households, an individual household’s cessation of mortgage payments would actually raise the amount of income it has available for non-housing related expenditures. This counterintuitive effect works in the opposite direction of the standard assumption concern regarding household deleveraging, namely that increased debt repayment lowers a household’s available funds for consumption.

This paper’s concept of deleveraging does not include mortgage principal repayment as part of the amortization process and/or debt restructuring to take advantage of lower mortgage interest rates. For example, households might pay down some of their mortgage principal

²The 60 to 70 percent estimate is based on work by Karen Dynan, affiliated with the Brookings Institution, that relies on information from the Flow of Funds Accounts about how changes in households’ mortgage debt are calculated.

as a step in the process of refinancing in order to obtain a lower interest rate. These debt pay-downs are part of normal household balance sheet transactions and are not concerted efforts by households to reduce their perceived excessively high debt levels.

In addition, this paper does not define deleveraging as the decline in consumer debt that has occurred from mortgages being paid off by older households at the same time as home purchases have been limited among young households due to a slowdown in household formation and/or limited credit availability. Falling house prices, on their own, also do not prompt accelerated household debt repayment and a concomitant reduction in household expenditures. An incorrect but common assumption is that when house prices fall, banks force households to repay their debt and implicitly cut back on their consumption. In actual practice, such forced deleveraging does not occur since households can sustain negative home equity as long as they continue to pay their mortgage.

The definition of deleveraging used in this policy brief isolates the impact of deleveraging on consumption beyond the standard effect of fluctuating debt levels on household net worth. The goal of this brief is to examine whether household debt repayment has been impacting U.S. consumer spending beyond the standard relationship between consumption, income, and net worth and thus hindering the economic recovery from the Great Recession.

This brief uses aggregate and household-level data to examine evidence of household leveraging and deleveraging. The aggregate data come from the Bureau of Economic Analysis' National Income and Product Accounts (NIPA) as well as the Federal Reserve Board's Flow of Funds accounts (FOF). The household-level data come from the Panel Study of Income Dynamics (PSID).

Overall, there is little evidence in either the aggregate or household level data that deleveraging or any other non-fundamental factor has had a sizeable impact on U.S. consumer spending to date. That is, movements in consumption prior to, during, and following the Great Recession are consistent with the standard relationships implied by fluctuations in household income and net worth. In fact, there is evidence that suggests that households potentially *under* spent relative to income and net worth during the housing boom and have *over* spent since the Recession began. The remainder of this policy brief is divided between

aggregate-level analysis and household-level analysis.

2. Macro Analysis

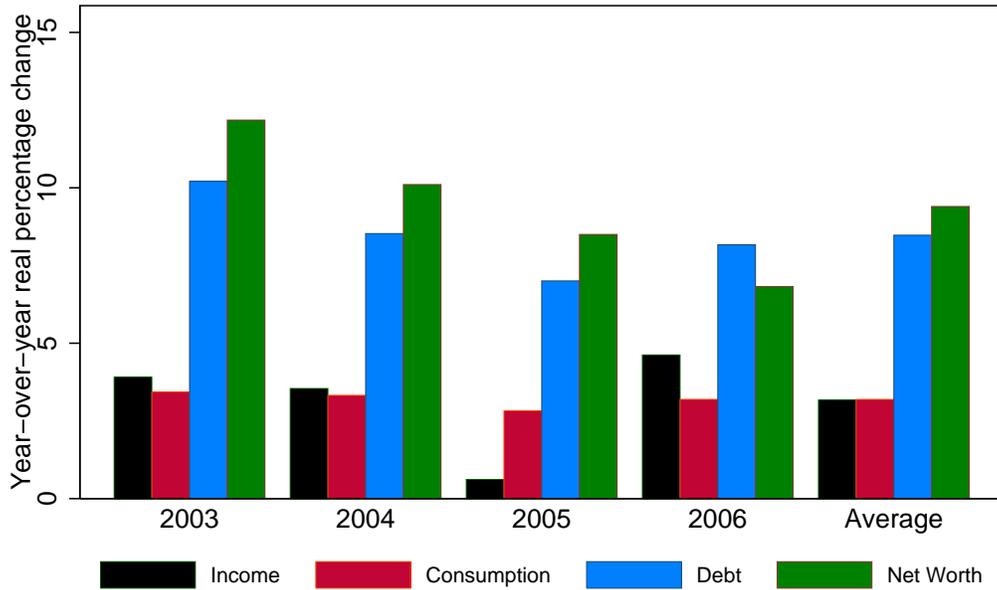
Figure 2 shows that between 2003 and 2006 real consumption growth in the United States was nearly identical to growth in real disposable income despite an average yearly increase in real household debt of about 8.5 percent. Household net worth also increased substantially during this period as housing prices rose rapidly. Upon inspection, Figure 2 offers little evidence of household leveraging during this period prior to the Great Recession, given how closely consumption growth tracked income growth. If households borrowed against their homes to fuel additional household spending then you would expect to see consumption growth well in excess of current and past income growth (and net worth growth).³ The noticeable increase in household debt over this period was likely due to a number of non-consumption-related reasons including households having to pay (and borrow) more to purchase homes as house prices appreciated rapidly. Households also likely borrowed over this period to finance home improvement (residential investment) projects. Either way, there is little evidence during these years that consumption grew in excess of what would be suggested by standard relationships between consumption and households' income and net worth.

Figure 3 shows disposable income, consumption, and net worth growth from 2007:Q4 (the official start date of the Great Recession) through 2011:Q3. Once again, consumption growth and income growth are very similar, although consumption growth is slightly less than income growth. One could potentially argue that consumption growth is being held back relative to income growth by debt repayment. In fact, the difference between consumption growth and income growth is somewhat larger through 2011:Q1—real disposable income grew roughly 2.4 percent between 2007:Q4 and 2011:Q1, while real consumption growth was only about 0.7 percent.

³Consumption growth is much higher than income growth in 2005, but this difference goes away when using alternative measures of household income such as personal income excluding transfer receipts. Some of the yearly growth differentials may therefore be due to certain government transfer payments and tax breaks being implemented and concluded.

FIGURE 2

Growth in Consumption, Income, Debt, and Net Worth

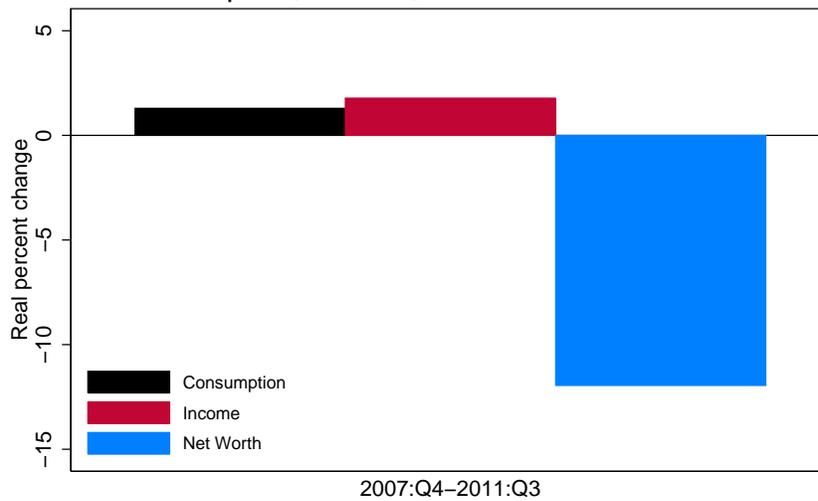


Source: BEA, Flow of Funds.

Note: Income is disposable personal income.

FIGURE 3

Consumption, Income, and Net Worth 2007–2011



Source: BEA, Flow of Funds.

Note: Income is disposable personal income.

It is hard to claim, however, that this 1.7 percentage point shortfall in consumption relative to income was due to a concerted effort by households to repay their debt. For one, the shortfall is spread over 15 quarters and amounts to less than a 0.1 percent effect on GDP growth per quarter—suggesting that any impact was not economically meaningful. In addition, Figure 3 also shows that real household net worth dropped sharply during this period, and this decrease should have had a negative impact on household spending, all else equal.

One could examine Figures 2 and 3 and argue that the standard relationship between consumption, income, and net worth broke down in the 2000s because income appears to very nearly explain all of the movement in personal consumption expenditures, both on the upside (Figure 2) and the downside (Figure 3), even though there were also sizeable swings in net worth. This raises a relevant question: what do the underlying movements in income and net worth imply about what consumption *should* have been during the recession and recovery if fluctuations in both measures mattered for household expenditures—as they have historically.

For example, consider the following stylized relationship between consumption, income, and net worth, where the percent change in consumption dC , which is a function of changes in income and net worth only,

$$dC = \alpha dY + (1 - \alpha) dW \ , \tag{1}$$

where dY is the percent change in income and dW is the percent change in household net worth. The coefficient α is constrained so that the percent change in income and the percent change in net worth exactly explain the total change in real U.S. consumption expenditures between 2003 and 2011 ($\alpha = 0.8275$). This simple relationship can be used to generate predicted consumption growth before the onset of the Great Recession (2003:Q1 to 2007:Q4), and since the recession began (2007:Q4 to 2011:Q3).

The results are shown in Table 1 below. If net worth mattered for consumer spending prior to, during, and after the end of the Great Recession, then households consumed *less* than

TABLE 1: Predicted versus Actual Consumption, 2003–2011

	2003–2011	2003:Q1–2007:Q4	2007:Q4–2011:Q3
	Cumulative Percent Change		
dC Actual	40.0	30.9	9.1
dC Predicted	40.0	34.7	5.3
dY	38.9	30.0	8.9
dW	9.1	57.5	–12.0

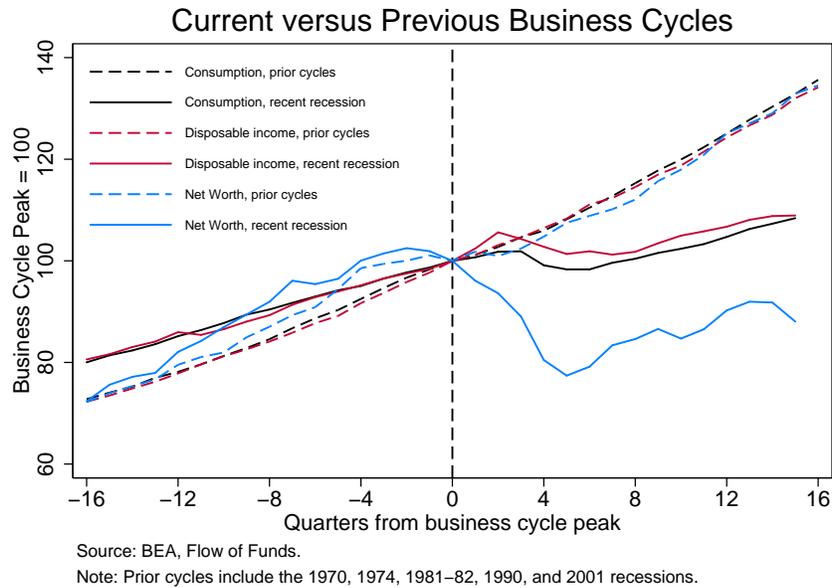
what the simple framework in equation (1) predicts in the years leading up to the recession, and they have consumed *more* since the onset of the recession than what their change in income and net worth would suggest. That is, the predicted change in consumption is 34.7 percent compared to an actual cumulative change of 30.9 percent prior to the recession, while consumer spending has risen roughly 4 percentage points more than predicted since 2007:Q4. These findings are at odds with what the household leveraging and deleveraging story would imply. For this story to hold true, a period of leveraging followed by deleveraging requires that households ramped *up* spending prior to the Great Recession beyond what actual movements in income and net worth would predict, and then consumed *less* than predicted during the recession and recovery as household debt fell.

Some researchers have cited the sluggish growth in consumption during this recovery when compared to previous ones as evidence that household deleveraging is holding back consumption. Figure 4 shows that consumption growth has indeed been sluggish relative to the previous five recessions and recoveries.⁴ Income growth, however, has also been very slow to rebound during this recovery although consumption has remained somewhat below income since the onset of the recession. Based on this latter fact, one could perhaps argue that deleveraging has restrained consumption growth relative to income growth. The obvious first-order reason for this shortfall in consumption relative to income, however, is extremely weak net worth readings during the recession and recovery as depicted by the solid blue line in Figure 4.

Finally, Figure 5 shows that the relationship between consumption-to-income and wealth-to-income remains in line with historical patterns since 1996:Q1. Since the late 1990s, U.S.

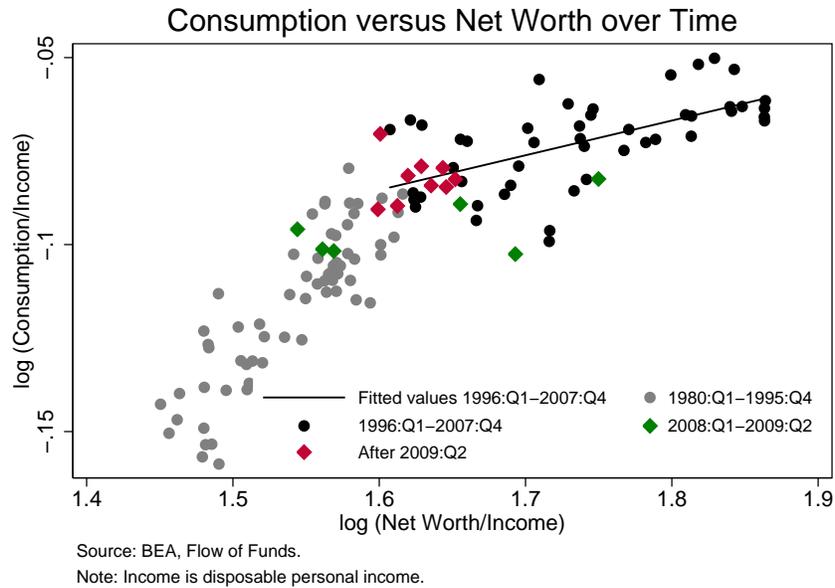
⁴This excludes the short-lived 1980 recession.

FIGURE 4



households' marginal propensity to consume (MPC) out of their net worth has moderated, and this pattern continues even with the more recent data points from the Great Recession and ensuing recovery. The relationship between net worth and consumption has shifted toward the origin of the graph since 2009:Q1, but this pattern is consistent with the sizeable decline in household net worth that has occurred in the wake of the Great Recession. Overall, the aggregate data in Figures 4 and 5 show little evidence of consumption deviating from its historical relationship with income and net worth, and it is not clear why a special factor such as deleveraging is needed to explain the sluggishness of consumption growth following the Great Recession.

FIGURE 5



3. Household-Level Data

3.1 Motivation

Even though the aggregate consumption data do not show much *prima facie* evidence of deleveraging, there are several reasons why it is worthwhile to examine the individual-level data. First, these data provide sufficient cross-sectional variation to determine whether household consumption behavior changed during the Great Recession—something that is not possible to gauge using a limited number of aggregate data points. This cross-sectional analysis is important to determine the extent that deleveraging taking place during and following the Great Recession might have been a one-time departure from the historical trends captured by the aggregate time-series data. Second, examining differences in consumption behavior across household groups, such as those with high versus low debt, could mitigate the simultaneity issue between consumption and income that plagues macro-level consumption analysis. In particular, a finding that spending behavior differs across household groups sidesteps the simultaneity issue, since simultaneity should apply fairly uniformly to all U.S.

households. Third, the micro data provide additional identification power by exploiting idiosyncratic income and wealth shocks, both of which are arguably exogenous.

3.2 Data Description

The PSID began in 1968 and follows households and their offspring over time. The data collection occurred annually through 1997 and biennially thereafter. The analysis in this policy brief utilizes the biennial data starting in 1999 because the waves from 1999 onward include an expanded measure of household consumption, and contain detailed household wealth data in each survey. Prior to 1999, the PSID only recorded data on households' food expenditures, and household net worth was recorded only every five years.

The PSID added additional expenditure data in 1999 and 2005 to make the available spending data in the survey more comprehensive and more consistent with the data available in the *Consumer Expenditure Survey*. The expenditure data added in 1999 include households' healthcare expenses, mortgage or rent payments, housing insurance costs, home transportation expenses, child care expenses, schooling costs, recurring automobile costs, and utilities. Data on households' home furnishing expenditures, recreation expenditures, clothing purchases, and vacation spending were added in 2005. The analysis in this section uses the expenditure data that is consistently available from 1999 to 2009 for estimates that span this entire time period. All the available expenditure data are used when the analysis focuses on the post-2005 period unless otherwise specified. The PSID also contains detailed household income, net worth, and debt data along with a myriad of household demographic information. The most recently available data are for 2009.

3.3 Analysis

Table 2 shows selected summary statistics for the periods preceding and during the Great Recession. U.S. household net worth fell 15 percent, on average, during the 2007-to-2009 period for those households reporting a net worth decline. This drop in net worth was 4 to 5 percentage points greater than in prior years, but it was not accompanied by a dramatic

acceleration in households’ debt repayment. Indeed, there is less than a 2 percentage point difference between the share of households that reported reducing their debt loads during the recent recession and the share that reported reducing their debt during the pre-recession period (2001–2007). The average dollar decline in leverage for debt-reducing households was only about 6 percent higher during the Great Recession than in prior years.⁵ Overall, these data are inconsistent with households substantially reducing their debt burdens in response to asset price declines and a downgraded economic outlook.

TABLE 2: Selected PSID Summary Statistics

	Avg. 2001–2007	2007–2009
Avg. Net Worth Decline (%)	11.1	15.0
Percent of Households w/ Debt Decline (%)	45.3	47.0
Avg. Debt Repayment (\$)	7,478	7,937

Note: Sample restricted to households 64 years of age or younger who did not move between PSID waves. Average net worth decline results are conditional on households’ reporting a wealth decline. Average dollars of debt repayment are conditional on households’ reporting a decline in debt, and are in constant 2000 dollars.

A key idea with the definition of deleveraging used in this policy brief is that before the recession households increased their leverage based on optimistic forecasts of future house price growth, and as home prices dropped deleveraged after realizing that their debt burdens were incompatible with their downwardly revised house price expectations. Table 3 examines whether highly indebted households who lived in zip codes with high house price growth (boom zip codes) behaved differently during the recession than low debt households and/or highly indebted households who had not experienced large run-ups in house prices (non-boom zip codes). Households are designated “high debt” if they had a debt increase in the top quartile of the debt change distribution between 2001 and 2005. Boom zip codes are the ones where house price growth was in the top quartile of the home price appreciation distribution between 2003 and 2007.⁶

⁵Household debt in the PSID is defined as mortgage debt inclusive of second liens (if any) for homeowners and noncollateralized debt for all households. Noncollateralized debt includes credit card debt, student loans, personal loans, and any other unsecured household borrowing.

⁶Detailed information on households’ location of residence comes from the confidential PSID Geocode

The data suggest that highly indebted households had similar consumption responses to changes in their net worth between 2007 and 2009 whether or not they lived in an area with high house price growth. This table is similar to one in Dynan (2012), though she only has information on house prices at the state level.⁷ Zip-code level house price data provide better variation across households since, for example, those households living in New York City experienced very different house price growth than those households living upstate in Rochester or Syracuse. The table further shows that low-debt households living in non-boom zip code areas exhibited the strongest consumption decline relative to their drop in net worth. This finding is inconsistent with the deleveraging story that highly indebted households became particularly concerned about their debt levels when house prices fell, and to repay some of their debt cut back on their consumption relative to other households.

TABLE 3: Change in Selected Ratios, 2007 to 2009

		$\frac{Cons.}{Y}$	$\frac{NetWorth}{Y}$	Impl. MPC
High Debt	Boom Zip	-0.06	-2.33	0.028
	Non-Boom Zip	-0.03	-1.01	0.027
Low Debt	Boom Zip	-0.03	-1.77	0.016
	Non-Boom Zip	-0.03	-0.72	0.037

Note: Household income is held fixed at 2007 levels. High debt is defined as households in the top quartile of the debt growth distribution between 2001 and 2005. *Cons.* is households' reported non-housing consumption following the definition in Dynan (2012). Non-housing consumption includes household spending on transportation, schooling, recurring automobile costs, home furnishings, food, and clothing.

Table 4 looks at households' consumption and debt changes during the 2007–2009 period. Households are divided based on whether the head of the household lost his or her job during this period, and whether or not they had high debt at the beginning of the period. Highly indebted households are those whose percentage run-up in total debt between 2001 and 2005 was in the top half of the debt increase distribution. Highly indebted job losers had the largest decline in spending between 2007 and 2009; however, job losers with low debt also

Match files. These data are available through a confidential data contract with the PSID. Local-level house price data come from Core Logic.

⁷The measure of household expenditures mimics that in Dynan (2012) and includes household spending on transportation, schooling, recurring automobile costs, home furnishings, food, and clothing. The results are similar using data on all household expenditures in the PSID.

TABLE 4: Change in Households' Consumption-to-Income and Debt-to-Income Ratios, 2007 to 2009

		$\frac{\text{Cons.}}{Y}$	$\frac{\text{Total Debt}}{Y}$	N
Job Loser	High Debt	-0.161	-0.037	18
	Low Debt	-0.090	-0.114	29
Non-Job Loser	High Debt	-0.025	0.103	709
	Low Debt	-0.023	0.031	683

Note: Income held fixed at 2007 levels. *Total debt* is total household debt. *Cons.* is reported household consumption and includes household spending on health care, housing, insurance, transportation, child care, schooling, recurring automobile costs, utilities, home furnishings, recreation, clothing, and vacations.

exhibited a sizeable decrease in their consumption. Moreover, in households where the head did not experience a job loss, consumption edged down, even though their total debt rose. Overall, changes in U.S. household spending between 2007 and 2009 appear more related to income dynamics than to debt repayment.

The final analytical exercise considers whether the sensitivity of consumption to income and/or to net worth changed during the Great Recession, based on estimates of equation 2.

$$\begin{aligned} \Delta C_{it} = & \alpha_0 + \alpha_1 \Delta Y_{it} + \alpha_2 \Delta NW_{it} + \alpha_3 age_{it} + \alpha_4 age_{it}^2 \\ & + \alpha_5 age_{it}^3 + \alpha_6 famsize_{it} + \alpha_7 year_t + \epsilon_{it} \end{aligned} \quad (2)$$

In particular, real consumption growth is assumed to be a function of income growth and net worth growth, along with household demographics, as is standard in short-run consumption models. The growth variables are calculated as log differences and are measured between PSID waves (for example, 2007 to 2009), while the demographic variables are measured as of the current wave (for example, 2009). Household deleveraging, to the extent it occurred and was related to ongoing developments affecting income and net worth, should have altered the sensitivity of consumption to those two fundamental variables across certain types of households. For instance, highly indebted households and/or homeowners should have adjusted their spending more drastically to pay off debt than less leveraged households and/or renters. Such deleveraging behavior by these indebted households would likely show up as

an increased consumption sensitivity to net worth (asset price declines) and/or a reduced sensitivity to changes in income growth.

Table 5 reports the baseline estimates of equation 2.⁸ The estimated consumption elasticities in both periods are consistent with previous household-level estimates in the literature. The sensitivity of households' consumption growth to income growth and net worth growth was a tad higher during the recession period (2007 to 2009) than during the pre-recession period (2001 to 2007). These small differences over time, however, are not statistically distinguishable. Overall, there is little evidence that deleveraging had a major impact on U.S. households' spending behavior during the recession.

TABLE 5: Impact of Growth in Income and Net Worth on Consumption

	All Households	
	2001–2007	2007–2009
Income Growth	0.10***	0.11***
Net Worth Growth	0.033***	0.040***
N	11,911	2,849
Adjusted R ²	0.02	0.03

Note: Sample is restricted to households 64 years of age or younger who did not move between PSID waves. Additional controls include a cubic term for the age of the head of household, family size, and year fixed effects. Robust standard errors; *** significant at the 1-percent level.

The empirical approach in equation 2 and the analysis thus far relies on household deleveraging being correlated with changes in households' income and net worth. It is hard to imagine that debt repayment is completely unrelated to the fundamental predictors of household expenditures, especially since debt repayment and net worth are related by construction. The idea that households substitute consumption for debt repayment is based on the fact that they have limited resources (income) in a given period. Therefore changes in income should impact the extent to which households can repay their debt.

If one assumes, however, that household deleveraging is completely decoupled from changes in household income and net worth, then this effect would be an unobserved variable in equa-

⁸The sample is restricted to all households with heads under 65 years of age who did not move between consecutive waves of the PSID. Excluding movers from the analysis isolates the impact of fundamentals on consumption growth from the confounding effect of households' adjusting their expenditures and balance sheets by changing their housing consumption.

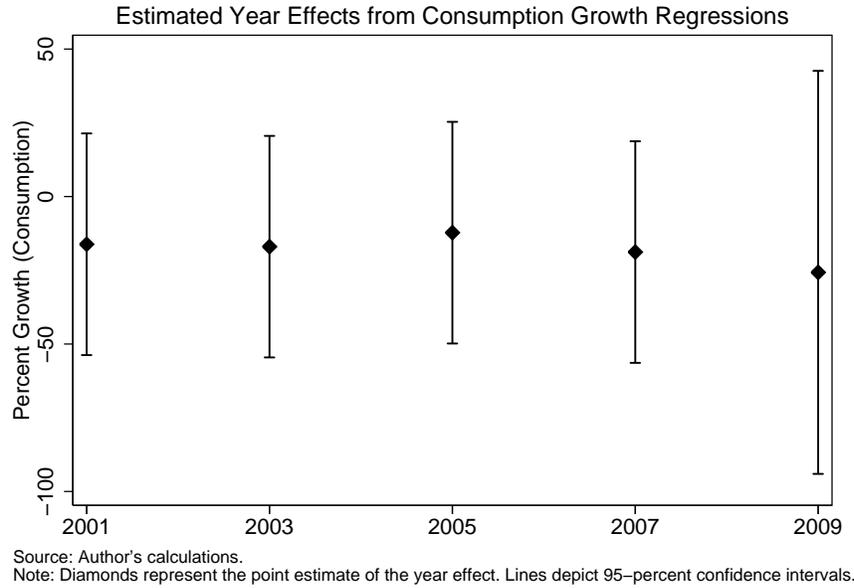
tion 2. In this case, deleveraging would show up in the constant term (α_0) and/or error term of the regression, with the constant capturing the conditional mean impact of deleveraging on spending growth across all households. This brief only considers the potential impact of deleveraging on the constant term since analyzing the time series properties of regression errors is difficult when using a short time horizon. To the extent that the deleveraging effect is embedded in the estimates of the constant term, then it should rise prior to the recession and fall with the onset of the recession.⁹ In other words, households on average should consume more than predicted by changes in income and net worth prior to the recession and consume less than what is suggested by fundamentals during the recession.

Figure 6 plots estimates of the constant term from equation 2 by year.¹⁰ The point estimates vary slightly over time, with the 2009 effect being the largest in absolute value. There is no noticeable pattern to the results, however, especially when the 95-percent confidence interval around the estimates is taken into account. Overall, these data are inconsistent with an unobserved factor, such as household deleveraging, shifting the conditional mean of households' consumption behavior during the 2000s.

⁹The impact of deleveraging on consumption may not be uniform across households, but the constant term should capture whether deleveraging moves the conditional consumption trend in one direction or another.

¹⁰Note that the 2007–2009 result is based on a constant included in the 2007–2009 regression while the pre-2007 regression includes four-year fixed effects and no constant term. The figure plots the value of those year effects.

FIGURE 6



An additional test of whether an unobserved factor impacted consumption during the Great Recession is to see whether predicted consumption growth for the 2007–2009 period differs noticeably when the pre-2007 parameter estimates of equation 2 are used rather than the actual 2007–2009 parameter estimates. Table 6 shows the relevant results. Using the pre-2007 parameter estimates the difference in mean and median predicted consumption growth is roughly 1 percentage point less negative than when using the fitted values from the 2007–2009 regression, and also about 1 percentage point less negative than actual PSID consumption growth during the recession.¹¹ Yet the difference between counterfactual and actual consumption growth is not huge, especially given the dispersion of households’ actual consumption growth between 2007 and 2009.

It is possible that deleveraging impacted the consumption of certain household groups, such as homeowners and/or those with high debt, even though there is little evidence of deleveraging affecting expenditures for all households. Table 7 shows that the spending

¹¹The counterfactual predicted values are somewhat sensitive to the base year used for $year_t$ in equation 2 since this impacts the constant of the regression. The results in Table 6 use 2007 as the base year, and thus compare households’ predicted behavior immediately prior to the recession versus during the recession.

behavior of homeowners was nearly the same prior to and during the Great Recession, while the sensitivity of renters' consumption growth to changes in net worth increased somewhat during the recession, although the differences between periods are not statistically significant. In addition, Table 8 reports that the sensitivity of consumption growth to income growth declined a bit for high-debt households during the Great Recession, while the sensitivity of their expenditures to changes in net worth increased a little.¹² In comparison, the sensitivity of consumption growth to income growth and net worth growth rose somewhat over time for low-debt households.

The differences within groups over time shown in Tables 7 and 8 are small and not precisely estimated. The absence of major differences in behavior between high-debt and low-debt households and homeowners versus renters argues against the story that a factor beyond developments in income and net worth impacted households' consumption behavior. In addition, the observed shifts in the sensitivity of consumption of highly indebted households to income and net worth that did occur had a very small effect on overall PSID consumption—less than 0.1 percent (not shown)—according to the data.¹³ This finding does not rule out households engaging in deleveraging, but it does suggest that deleveraging did not have a first-order effect on the consumption of highly leveraged households.

¹²High debt households are those with above median total debt holdings, while low debt households are those with median level debt or lower.

¹³This result is the difference between predicted consumption growth for high debt households between 2007 and 2009 compared with what spending growth would have been if households' consumption sensitivity to income and net worth did not change from the pre-2007 period. The implied dollar change in consumption is calculated by applying the difference in implied consumption growth to high debt households' *level* of spending in 2007. The percent decrease in spending is the dollar decline relative to total spending for high debt households.

TABLE 6: Actual and Predicted Consumption Growth 2007–2009 (in Percent)

	Mean	Median	Std. Dev
Actual PSID Cons. Growth	-3.7	-4.1	24.0
Predicted PSID Cons. Growth w/ 2007–2009 Coeffs	-3.7	-3.9	3.4
Predicted PSID Cons. Growth w/ pre-2007 Coeffs	-2.4	-2.5	3.9

Source: Authors calculations. Note: The results in rows 2 and 3 use the estimates of Equation 2 reported in column 3 and column 2, respectively, of Table 5 to calculate households' predicted consumption growth.

TABLE 7: Results by Homeownership Status

	Owners		Renters	
	2001–2007	2007–2009	2001–2007	2007–2009
Income Growth	0.08***	0.09***	0.11***	0.12***
Net Worth Growth	0.024***	0.024**	0.050***	0.073***
N	9,973	2,515	1,377	337
Adjusted R ²	0.02	0.02	0.02	0.06

Note: Owners own their home in consecutive PSID waves, while renters are tenants in consecutive waves. The sample is restricted to households 64 years of age or younger who did not move between PSID waves. Additional controls include a cubic term for the age of the head of household, family size, and year fixed effects. Robust standard errors; *** significant at the 1-percent level, ** significant at the 5-percent level.

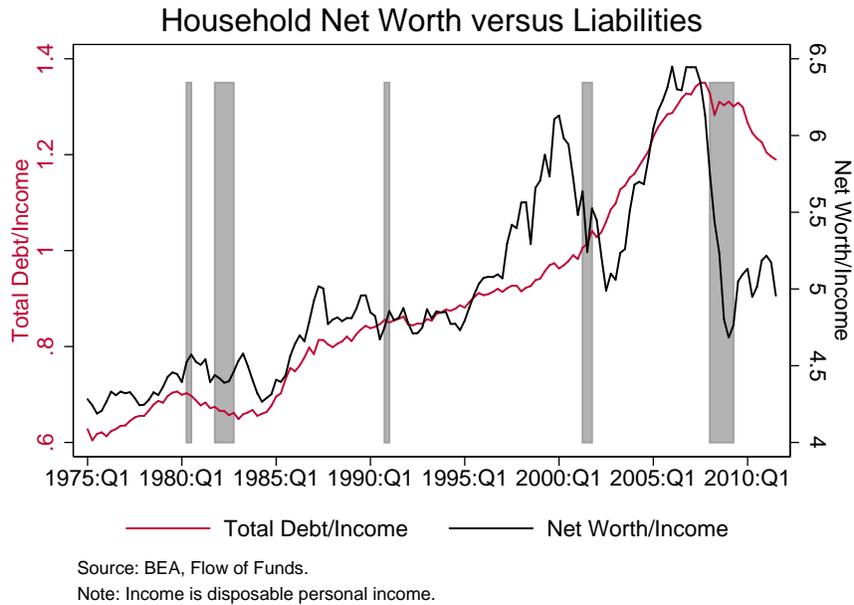
TABLE 8: Results based on Debt Holdings

	Above Median Debt		Below Median Debt	
	2001–2007	2007–2009	2001–2007	2007–2009
Income Growth	0.11***	0.10***	0.08***	0.12***
Net Worth Growth	0.018***	0.028**	0.044***	0.062***
N	5,707	1,627	6,114	1,307
Adjusted R ²	0.03	0.03	0.02	0.04

Note: Debt is total household debt and includes both collateralized and noncollateralized debt holdings. Sample is restricted to household heads 64 years of age or younger who did not move between PSID waves. Additional controls include a cubic term for the age of the head of household, family size, and year fixed effects. Robust standard errors; *** significant at the 1-percent level, ** significant at the 5-percent level.

Finally, it is possible that the Great Recession represented an anomalous period where household spending responded to debt directly, rather than indirectly through net worth. Indeed, as shown in Figure 7, household liabilities have been very elevated relative to net worth since the beginning of the Great Recession, especially compared with historical patterns. Table 9 reports estimates of equation 2 that control for households who reported a debt decline. The idea is to test whether those households repaying debt experienced consumption growth that was particularly sensitive to changes in income and net worth during the recession.¹⁴

FIGURE 7



The results show that, on average, the consumption growth of households who reduced their debt between waves of the PSID was lower than the consumption growth of other households. However, this pattern of behavior for debt-reducing households is essentially the same prior to and during the Great Recession. In addition, the share of consumption growth explained by the debt decline variable is stable over time. Households reporting a debt decline account for 24 percent of predicted consumption growth prior to the recession, and

¹⁴Dynan (2012) reports similar regressions where she controls for high debt households.

26 percent during the recession (not shown).¹⁵ The sensitivity of debt-reducing households' consumption growth to changes in the growth of income and/or net worth was also no greater than the sensitivity of non-debt-reducing households. It does not appear, therefore, that a substantial shift occurred recently—at least through 2009—in the consumption behavior of households who reduced their debt levels in an effort to improve their balance sheets. Debt repayment, on average, reduces households' consumption growth, but this effect did not increase substantially during the Great Recession as the deleveraging hypothesis would suggest.

TABLE 9: Consumption Growth Estimates: Households with Debt Declines

	All Households	
	2001–2007	2007–2009
Income Growth	0.09***	0.10***
Net Worth Growth	0.040***	0.036***
Households w/ Debt Decline [DD]	−0.024***	−0.027***
Income Growth x DD	0.007	−0.004
Net Worth Growth x DD	−0.006	0.018
N	11,639	2,849

Note: Sample is restricted to households 64 years of age or younger who did not move between PSID waves. Debt Decline [DD] is an indicator variable for households who report a debt decline between consecutive PSID waves. Additional controls include a cubic term for the age of the head of household, family size, and year fixed effects. Robust standard errors; *** significant at the 1-percent level.

4. Conclusion

This policy brief has explored the claim that reduced household spending in favor of deleveraging can partly explain the lackluster U.S. recovery. Overall, there is little empirical evidence during and/or following the Great Recession that factors other than ongoing developments in income and net worth had an impact on consumption. The PSID data only go through 2009, so it is possible that there has been a more recent shift in the consumer spending and debt

¹⁵This calculation is based on examining the share of predicted consumption growth explained by the debt decline indicator variable in each period.

repayment behavior of certain household groups. The more recent aggregate data, however, suggest that deleveraging has not had a first-order effect on consumption.

The household-level analysis suggests that there is a negative relationship between households' debt and/or debt repayment and consumption. This effect was evident, however, prior to the Great Recession when household debt levels started to decline. One could argue that deleveraging's overall effect on consumption may have been greater recently because of the sheer magnitude of household debt repayment, but the vast majority of the household debt decrease has been due to foreclosures and not consumers actively trying to reduce the liabilities on their balance sheet. In addition, households' debt service burdens (debt servicing costs relative to income) have fallen noticeably of late—as reported by the Federal Reserve Board—so it does not appear that debt servicing costs are a huge expense relative to households' current income (see figure 7). Overall, it appears that the standard postwar relationship linking consumption to income and net worth should continue to be a reasonable predictor of U.S. household spending.

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