

Inequality, the Great Recession, and Slow Recovery

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Abstract:

Rising inequality reduced income growth for the bottom 95 percent of the income distribution beginning about 1980, but that group's consumption growth did not fall proportionally. Instead, lower saving led to increasing balance sheet fragility for the bottom 95 percent, eventually triggering the Great Recession. We decompose consumption and saving across income groups. The consumption-income ratio of the bottom 95 percent fell sharply in the recession, consistent with tighter borrowing constraints. The top 5 percent ratio rose, consistent with consumption smoothing. The inability of the bottom 95 percent to generate adequate demand helps explain the slow recovery.

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D31: Personal Income, Wealth, and Their Distributions

E21: Macroeconomics: Consumption, Saving, Production, Employment, and Investment

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The U.S. economy suffered a historic recession beginning in late 2007. While recovery officially started in mid-2009, growth in the aftermath of the Great Recession has been unusually slow.¹ This crisis was preceded by a falling personal saving rate, starting in the mid-1980s, and a household spending boom financed to a large extent by rising household debt. The end of this lend-and-spend dynamic caused household spending to collapse, which we argue was the proximate cause of the Great Recession. A second widely discussed trend, also starting in the early to mid-1980s, was a sharp rise in the share of income going to households at the top of income distribution.

This paper explores the connection between household spending, consumer debt, and rising income inequality since the 1980s. We introduce new data that decomposes income, consumption, and balance sheet measures between the bottom 95 percent and top 5 percent of the income distribution in order to address two related questions. First, did rising inequality contribute in an important way to the unsustainable increase in household leverage that triggered the collapse in consumer demand and the Great Recession? Second, has the rise of inequality become a drag on demand growth since the Great Recession that has held back recovery? Our answer to both questions is yes.

To link inequality to the Great Recession, we begin in section I by documenting the rise of inequality 1980 to 2012 between the bottom 95 percent and top 5 percent. At least since Keynes, economists have predicted that greater inequality would reduce consumption as a share of income because they assumed that saving rates tend to rise with income. Paradoxically, however, most of this period with rising income inequality was also a period during which the ratio of consumption to income *increased*.

¹ The Business Cycle Dating Committee, of the National Bureau of Economic Research dates the beginning of the recovery to June 2009. By the end of 2013, however, employment had yet to recover back to the pre-recession level.

In Section II, we address this paradox. We work with the fundamental identity that links household income, saving, and balance sheets. This exercise shows that any group can respond to income stagnation by reducing its consumption growth, its saving growth, or a combination of both. If saving growth declines demand drag is mitigated, but balance sheets also deteriorate as net worth declines and the debt-income ratio rises. These trends toward greater balance sheet fragility are ultimately unsustainable.

Section III presents our central empirical evidence that disaggregates balance sheet and consumption data for the bottom 95 percent and top 5 percent. We show that the decline of the bottom 95 percent share of aggregate income was generated in large part by a reduction in the growth of income for this group starting in 1980 (along with some acceleration of income growth for the top 5 percent). Original disaggregation of Survey of Consumer Finances data show that the increase in the debt-income ratio in the decades prior to the Great Recession was much more pronounced for the bottom 95 percent than it was for the top 5 percent. The net worth of the bottom 95 percent did not fall much behind the top 5 percent by 2007, but *financial* net worth that excludes the value of owner-occupied housing plummets for the bottom 95 percent even though it rises for the top 5 percent. The collision of these trends with limits on further leverage ultimately forced a historic collapse of consumption, leading to the Great Recession, as predicted in broad terms by Minsky's (1986) financial instability hypothesis.²

² Others have made similar arguments. Palley (2002) presents a prescient analysis that predicts many of the outcomes discussed here. In a comment on our earlier analysis of consumption behavior and debt in Cynamon and Fazzari (2008), Korty (2008) points out the likely role of unequal income growth in rising household debt. In another prescient and wide-ranging paper, Barba and Pivetti (2009) identify the same aggregate trends emphasized here and question their sustainability. Kumhof and Ranciere (2010) construct a theoretical model that links inequality, household debt, and financial crises. Rajan (2010) proposes how rising household debt could temporarily offset problems created by rising income inequality. Palley (2013a) and Setterfield

We develop new estimates of personal consumption spending of the bottom 95 percent and top 5 percent of the income distribution. Disaggregated data on consumption and saving are not easily obtained; we develop original methods to estimate these flows based on the approach proposed by Maki and Palumbo (2001) that combines aggregate information from the Flow of Funds Accounts, National Income and Product Accounts, and the Survey of Consumer Finances. These time series show that the relationship between spending and income of the two groups was very different in the recession. The consumption-income ratio for the bottom 95 percent contracts sharply during the crisis. This pattern did not occur in other recessions covered by our data. It is consistent with the interpretation that the cutoff of credit flows to the bottom 95 percent forced their spending down to trigger the Great Recession. For the top 5 percent, in contrast, the consumption-income ratio rises substantially from 2008 to 2010, consistent with other recessions. In 2011 and 2012, the ratio declines for the top 5 percent, as it did in other recoveries. This behavior is consistent with consumption smoothing of the top 5 percent and there is no indication that this group faced excessive leverage when the recession occurred.

These results show that the implications of rising inequality unfolded in ways that played an important role in generating the unusual macroeconomic dynamics that led to the Great Recession. Rising spending rates and deteriorating balance sheets began when income growth slowed for the bottom 95 percent in the early to mid 1980s. The subsequent increase in balance sheet fragility through 2007 was entirely concentrated in the bottom 95 percent as the spending rate of this group proceeded upward along trend. But when the Great Recession hit, the

(2013) consider the macroeconomic consequences of a persistent deviation of wage growth from productivity growth. Van Treeck and Sturn (2012) and Stockhammer (2013) provide an extensive surveys of research on income inequality and the macroeconomic forces that culminated in the Great Recession. Reich (2012) and Stiglitz (2012) provide broad overviews of the importance of inequality in modern U.S. society, including issues closely related to those taken up here.

collapse of spending relative to income occurred only in the bottom 95 percent, in a way unprecedented over the period covered by our data. The behavior of the top 5 percent during and after the crisis was fully consistent with what we observed in earlier recessions.

We conclude in section IV with a discussion of our second motivating question: Has the link between rising inequality and consumption demand constrained the U.S. recovery in the aftermath of the Great Recession? We show that by 2012 there was a massive shortfall of consumption spending relative to pre-recession trends for both the bottom 95 percent and top 5 percent, albeit for different reasons. Recognizing that U.S. aggregate demand growth was not excessive before the recession, we conclude that inequality has sharply constrained the spending of the bottom 95 percent of households, while the decline in the spending of the top 5 percent of households is primarily a response to the recession itself. We argue that demand drag caused by inequality is now constraining the U.S. economy. The result is aggregate consumption substantially below comparable trends for past U.S. recoveries. We consider several alternatives that might restore a healthy demand generation process, but we conclude that a robust recovery is unlikely without policy or other institutional change that at least stops, or even reverses, the trend toward greater income inequality. Without such changes, we question whether the U.S. economy can generate the demand growth necessary to maintain stable full employment.

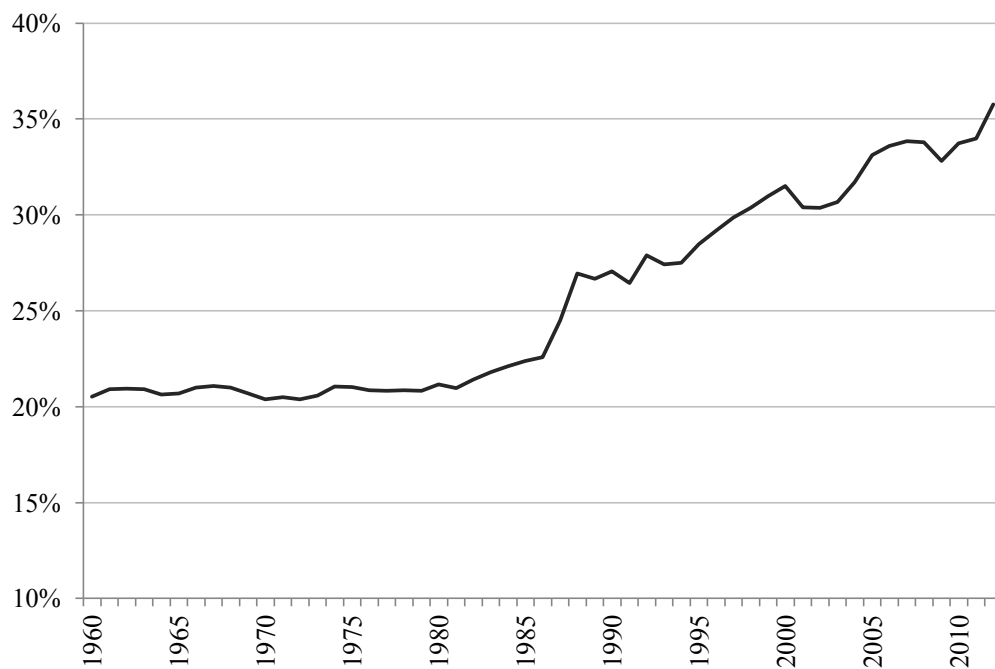
I. The Paradox of Rising Inequality and Higher Consumer Spending

A thread of macroeconomic thinking, going back at least to Michal Kalecki, identifies a basic challenge arising from growing inequality.³ This approach begins with the assumption that high-income households (usually

³ Recent work on this topic and extensive references to earlier research can be found in Setterfield (2010).

associated with profit recipients) spend a lower share of their income than others (typically wage earners). In this case, rising inequality creates a drag on demand that can lead to unemployment and even secular stagnation if demand is not generated from other sources.

Figure 1 – Income Share of Top 5 Percent



Source: Alvaredo et al. (2013)

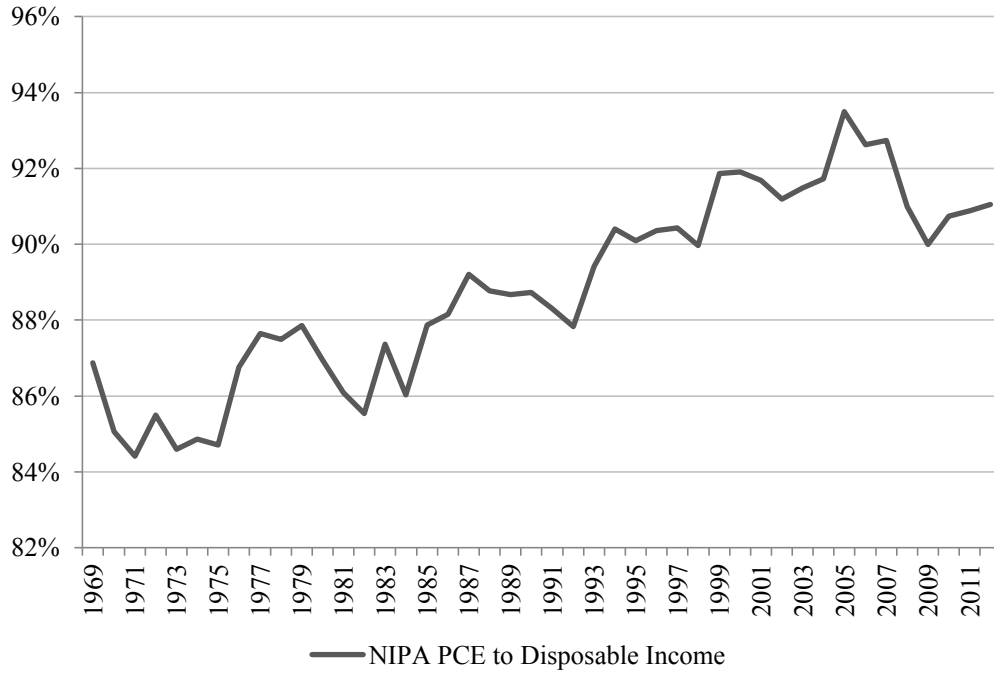
Figure 1 shows the top 5 percent income share from the “The World Top Incomes Database” (Alvaredo et al., 2013). After being virtually constant for more than 20 years, the top 5 percent share of before-tax income excluding capital gains began to rise in the early 1980s. By 2012, this share had risen about 15 percentage points. Using a large panel of tax returns from the Internal Revenue Service, DeBacker et al. (2013) also find increasing inequality of household income in the United States over the period 1987-2006, both before and after

taxes, and attribute the shift predominantly to permanent changes of income across households as opposed to changes in transitory shocks.

Despite this substantial shift of the income distribution that theory predicts could create demand drag, however, the U.S. economy performed reasonably well in the decades leading up to the Great Recession. Unemployment fell from high values in the late 1970s and early 1980s, and growth was relatively strong compared to other developed economies. Macroeconomic volatility declined and recessions were modest in what came to be known as the Great Moderation. What might be particularly surprising about this era, considering the massive shift in income distribution, is that personal consumption expenditure (PCE) was both the largest and the fastest growing component of GDP: real PCE grew almost 40 percentage points more than real GDP less real PCE from 1984 through 2007. Stable and rising household spending is necessarily a prime candidate to help explain the Great Moderation.

Figure 2 shows PCE relative to personal disposable income. In the years leading up to the Great Recession, there is a strong positive trend of demand relative to income. This trend, along with the significant rise of inequality shown in figure 1, presents a paradox that is a central theme of this paper. Rising inequality should theoretically reduce the consumption-income ratio if affluent households spend a smaller part of their growing share of aggregate income (see Brown, 2004, Boushey and Weller, 2008, and Barba and Pivetti, 2009, for example). But the period of rising inequality, starting roughly in the early 1980s, corresponds almost exactly with a historic *increase* in American household spending relative to income.

Figure 2 – Aggregate Personal Consumption Expenditure to Aggregate Disposable Personal Income



Source: Bureau of Economic Analysis, authors' calculations

II. Inequality, Income Growth, and Household Balance Sheets

How could consumption *increase* as a share of income at the same time that income inequality rose so much? To answer the question we need to carefully consider how rising income inequality affects income growth rates, how those with relatively stagnant income growth respond, and how this response affects household balance sheets. We begin by building a conceptual framework for understanding the links between income growth, consumption spending, saving, and household balance sheets.

Greater income inequality between two groups implies that the income growth of the two groups diverge because growth for the top group accelerates, growth of the bottom group declines, or some combination of both. Suppose that

the growth of the bottom group declines, which we will show happened when inequality began to rise in the early 1980s. Simple accounting implies that this group must reduce a combination of consumption growth and saving growth. Consider how this choice affects the saving rate. Saving is defined as

$$(1) \quad S = Y - C - rD$$

where Y is disposable income, C is consumption, and rD is debt service (the interest rate times the stock of debt).⁴ Differentiating the saving rate ($s = S/Y$) with respect to time yields

$$(2) \quad \dot{s} = (g_Y - g_C)(1 - s) + r(D/Y)(g_C - g_D)$$

where g_Y and g_C are the growth rates of income and consumption. Suppose we begin with a constant saving rate and then income growth declines. The first term in equation 2 shows that if households reduce consumption growth by less than the reduction in income growth, the saving rate falls. The second term shows that decline of the saving rate will be greater, because more of income must be allocated debt service.⁵

If households in the group with a falling income share save less their balance sheets become more fragile, threatening the sustainability of their financial position. Net worth (NW) is assets (A) less debt, and the change in net worth over time equals saving. Therefore, less saving means lower net worth. Another widely used measure of household balance sheets is the household leverage ratio, D/Y (see, in particular, the detailed discussion in Mason and Jayadev, 2013). We can assess the dynamics of this ratio beginning with the identity for change in net worth:

$$\dot{NW} = S = \dot{A} - \dot{D}$$

⁴ This definition ignores personal transfers without loss of generality for what follows. We include personal transfers in our empirical analysis.

⁵ See Mason and Jayadev (2013) for a detailed discussion of how changes in debt service affected households in various historical periods.

$$\begin{aligned}
\dot{D} &= \dot{A} - S = \dot{A} - Y + C + rD \\
d/dt(D/Y) &= (1/Y^2)(\dot{D}Y - \dot{Y}D) \\
&= (1/Y^2)[(\dot{A} + C - Y + rD)Y - \dot{Y}D] \\
&= \dot{A}/Y + C/Y - 1 + r(D/Y) - g_Y(D/Y) \\
(3) \qquad &= \dot{A}/Y - s - g_Y(D/Y)
\end{aligned}$$

Equation 3 implies that the debt-income ratio begins to rise indefinitely after a one-time fall in income growth, other things equal. If, additionally, households with lower income growth do not reduce consumption growth equivalently, D/Y rises even faster over time because the saving rate declines. Growth in D/Y could be mitigated by drawing down assets, but this action would also lead to greater balance sheet fragility.

In this simple framework, it is evident that stagnating income growth for any group of households need not create demand drag immediately, but the choice to keep consumption growth above declining income growth will lower the saving rate and increase the fragility of the group's collective balance sheet.⁶ Net worth cannot decline indefinitely, nor can debt rise indefinitely relative to income. While households may initially choose to respond to lower income growth by

⁶ This basic point is consistent with but recent empirical work. Boushey and Weller (2008) link rising inequality to higher credit card debt. Mian and Sufi (2010a) find that households in zip code areas that suffered relative income declines had the largest increase in mortgage originations. Other studies link rising inequality itself to the choice to maintain consumption and take on more debt. Carr and Jayadev (2012) provide evidence for "Veblen effects" that leverage rises faster for households lower in the income distribution. Bertrand and Morse (2013) find that faster income growth in the top part of a state's income distribution raises consumption for households in the middle of the distribution, holding middle incomes in the state constant. The International Institute for Labor Supply (2011), Kumhof et al. (2012), and Behringer and van Treeck (2013) link rising inequality to lower current account balances (suggesting higher consumption) in cross-country panel data. The latter paper also finds that higher inequality leads to falling saving rates in G7 countries.

reducing saving growth rather than reducing consumption growth this choice is not sustainable over some horizon: *eventually* rising debt forces households with lower income growth to cut back consumption to satisfy their intertemporal budget constraint.

III. Disaggregated Measures of Household Balance Sheets and Consumption

This section presents original data that explores how the dynamics of income growth, spending and balance sheets differ between the bottom 95 percent and top 5 percent of the U.S. income distribution during the period of rising inequality. We employ the framework developed in section II to focus on how these differences played out in the years leading up to the Great Recession and how the differences help explain the macroeconomic forces that caused the recession.

A. Balance Sheet Fragility for the Bottom 95 percent

By comparing the income growth of the top 5 percent and bottom 95 percent before and after 1980, we can see that greater inequality occurred largely due to a sharp drop in real income growth of the bottom 95 percent. We translated the income shares shown in figure 1 into levels of real income (multiplying the shares by aggregate real personal income).⁷ Annualized real income growth of the bottom 95 percent from 1960 to 1980 (3.9 percent) was very close to that for the top 5 percent (4.0 percent), which is consistent with the stable share data for the same period. While top 5 percent annualized real income growth accelerated to 5.0 percent from 1980 to the start of the Great Recession in 2007, there was a

⁷ We computed these growth rates with pre-tax income because it is difficult to get reliable income share data for disposable income. Tax redistribution may have reduced the gap between the top 5 percent and bottom 95 percent, but evidence on federal taxes from the U.S. Congressional Budget Office suggests these effects are relatively small and would not change the significant income stagnation of the bottom 95 percent.

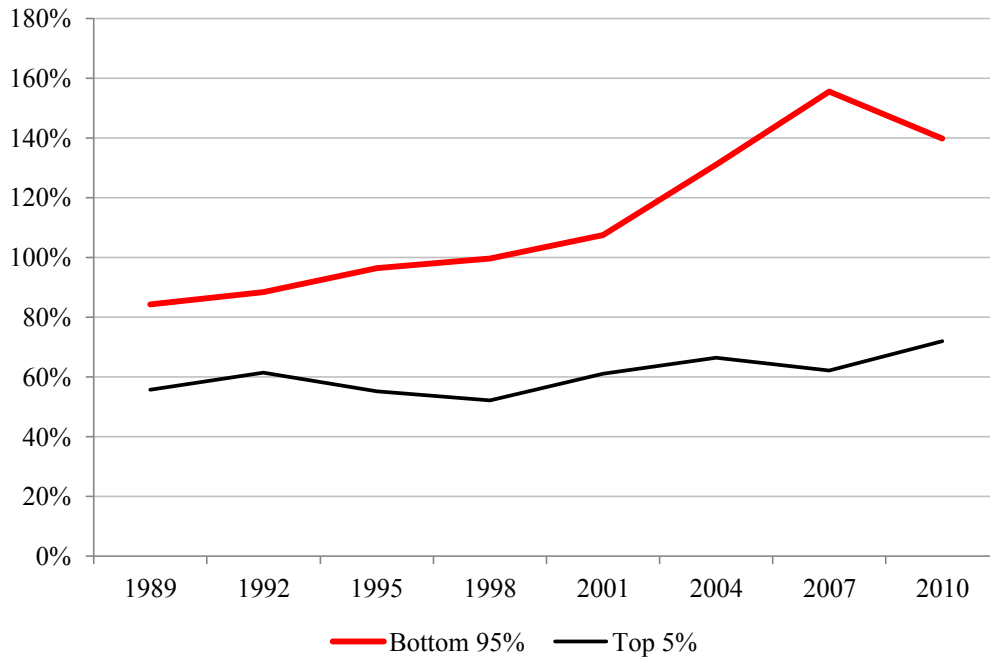
bigger effect on the growth of bottom 95 percent income, which fell to 2.6 percent.

The combination of slow income growth for the bottom 95 percent and fast aggregate consumption growth implies that the rise in leverage was likely more severe for households outside of the top of the income distribution. Figure 3 provides evidence that supports this hypothesis. The figure shows debt-income ratios for the lower 95 percent and top 5 percent. (More finely disaggregated groupings of the bottom 95 percent follow similar trends.) The debt measures come from disaggregating the Federal Reserve's Flow of Funds Accounts (FFA) personal sector credit market liability account based on the debt share of the lower 95 percent and top 5 percent from the Federal Reserve's Survey of Consumer Finances (SCF), which tracks individual household balance sheet and income information every three years. The income measures come from disaggregating the NIPA personal sector disposable income plus disaggregated realized capital gains from Congressional Budget Office data (see appendix A for further details about the income measures).

Compare the first observation in 1989 to 2007, the final observation before the onset of the Great Recession. The ratio nearly doubles for the bottom 95 percent, rising 71 percentage points.⁸ The increase for the top 5 percent is just 7 percentage points. This evidence provides further support that the unsustainable household balance sheet dynamics that spawned the Great Recession took place almost entirely within the bottom 95 percent. The figure also shows that significant deleveraging occurred for the bottom 95 percent by 2010, while the debt-income ratio actually rose for the top 5 percent in the Great Recession.

⁸ Also see Boushey and Weller (2008, table 4) who present somewhat different groupings across the income distribution and obtain results consistent with those in figure 3 through 2004.

Figure 3 – Debt-Income Ratios Across Income Groups



Source: Survey of Consumer Finances, Flow of Funds, authors' calculations

As equation 3 shows, we should consider the extent to which the rise in the debt-income ratio is affected by the change in assets. The equation shows that the relevant measure is the change in assets scaled by disposable income. We do not have disaggregated data prior to 1989, but aggregate data for this ratio have no trend from the early 1970s until the late 1980s.⁹ Between 1989 and 2000, this variable was quite stable for the bottom 95 percent (there was some decline for the top 5 percent). There is no evidence of a *rise* in the change in assets that would offset the rapid increase in the bottom 95 percent debt-income ratio which implies that faster asset accumulation was not the reason for rising balance sheet

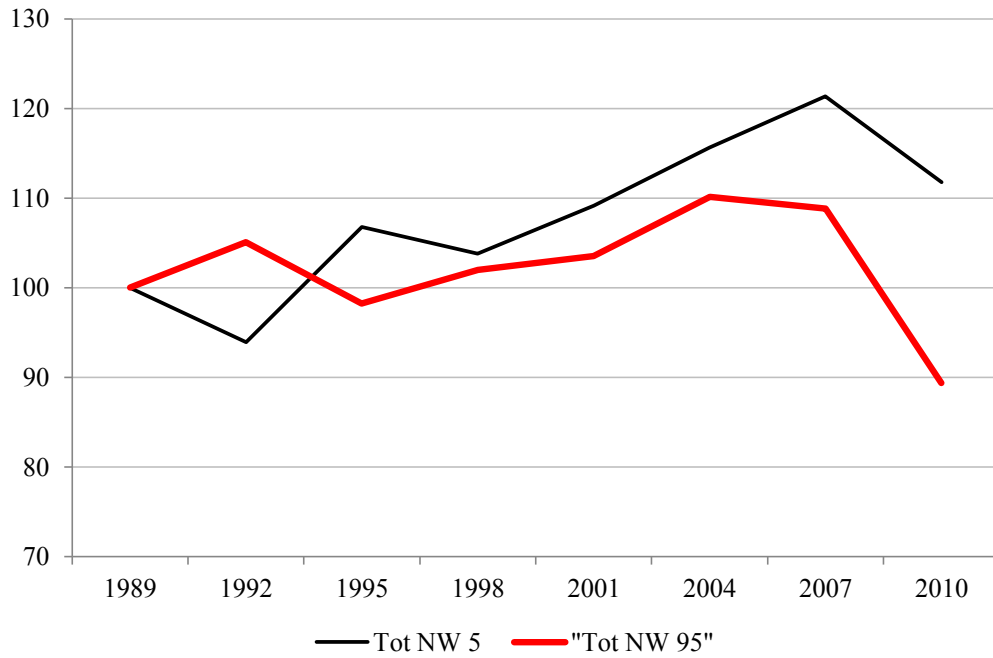
⁹ The accumulation of assets identified in equation 3 is “active” in the sense that it represents allocation of disposable income to the purchase of assets. It does not include capital gains or losses due to the change in the price of existing assets. We calculate these measures using table R.100 flow tables from the FFAs.

fragility of this group through 2000. From 2000 to 2007, the story is somewhat different. The change in assets to disposable income ratio for the bottom 95 percent increases on average by about 4 percentage points relative to the 1990s, most likely due to the ramping up of home construction and renovation after 2000. This asset accumulation explains a substantial part of the acceleration in the debt-income ratio for the bottom 95 percent between 2001 and 2007 evident in figure 3.

The two panels of figure 4 present some comparisons that support this conclusion and further demonstrate increasing balance sheet fragility for the bottom 95 percent. The figure presents an index of two measures of net worth to disposable income for the bottom 95 percent and top 5 percent groups. The index is set to 100 in 1989. If one looks at total net worth, which includes the market value of houses, the bottom 95 percent falls somewhat behind the top 5 percent between 1989 and 2007, but the difference is modest.¹⁰ When housing is excluded, however, a big difference emerges. For the top 5 percent the financial net worth index looks almost identical total net worth index. But for the bottom 95 percent financial net worth fell by more than 40 percentage points for after 1998.

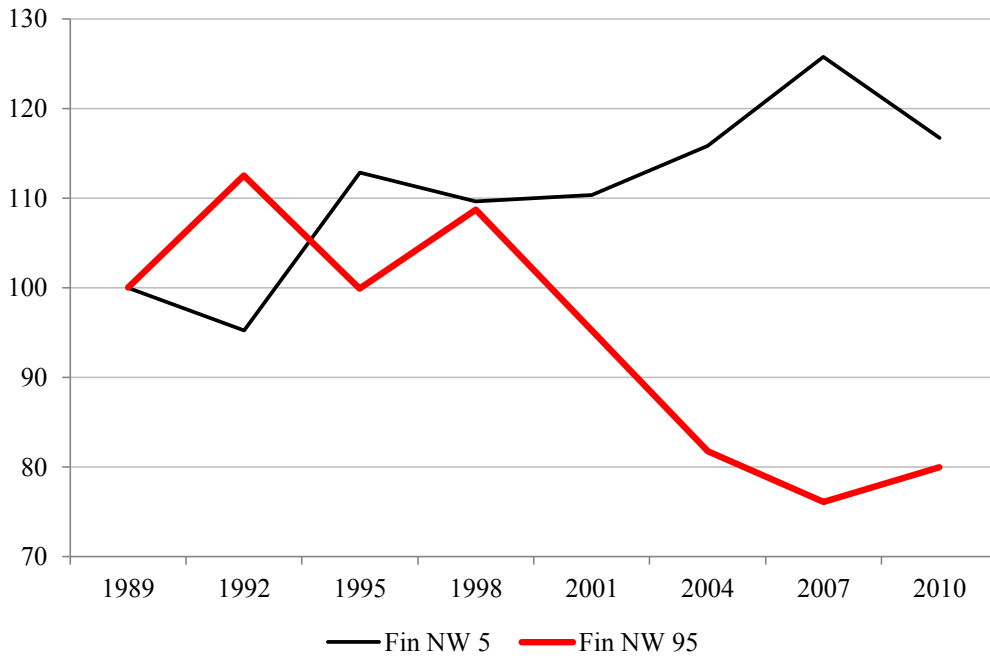
¹⁰ Not surprisingly, the difference in the levels of the asset-income ratio is significant. In 2007, the top 5 percent had an asset-income ratio more than double the ratio for the bottom 95 percent.

Figure 4a—Index of Total Net Worth to Disposable Income (1989=100)
(Includes Housing Assets at Market Value)



Source: Survey of Consumer Finances, Flow of Funds, authors' calculations

**Figure 4b—Index of Financial Net Worth to Disposable Income (1989=100)
(Excludes Housing Assets)**



Source: Survey of Consumer Finances, Flow of Funds, authors' calculations

Figures 3 and 4 demonstrate clear differences prior to the Great Recession in the changes of balance sheet fragility between the bottom 95 percent and top 5 percent of the income distribution. Prior to 2007 bottom 95 percent debt and financial net worth were on unsustainable paths.¹¹ Debt relative to income could not rise indefinitely for this group, even though it did rise steadily for at least two

¹¹ One might argue that debt could increase indefinitely if households use it to purchase assets (see equation 3). But unlike a business, asset purchases for consumption purposes (houses, most obviously) do not generate cash flows to service debt. Assets might be sold to pay off debt (at uncertain prices), but such sales will be to other households and therefore will not generate net cash flows for the household sector as a whole. Mian and Sufi (2011) provide strong evidence that home equity-based borrowing was not used to purchase income-generating assets. Also see Duca, Muellbauer, and Murphy (2010).

decades.¹² Eventually, greater balance sheet fragility cuts off lending and forces spending back into line with income, a process analyzed in detail in Hyman Minsky's financial instability theory (see Minsky, 1986, along with Wray, 2008, and Dymski, 2010). It seems clear that these trends required asset bubbles. In the 1990s, strong stock prices helped maintain financial net worth for the bottom 95 percent despite a significant rise in debt. This source of balance-sheet support crumbled after 2000, but the housing bubble stepped in immediately to help support further acceleration of bottom 95 percent debt growth. Bubbles burst, however, and the financial fragility created by unprecedented borrowing triggered the Great Recession when the inability to borrow more forced a drop in consumption. Mian and Sufi (2010b) and Dynan (2012) provide evidence that high debt accumulated by households prior to the Great Recession caused lower consumption for these households when the recession hit. Of course, the stock bubble and, to a lesser extent, the housing bubble also helped support the balance sheets of the top 5 percent. But there was virtually no increase in leverage for this group.

This evidence shows that the financial choices of the bottom 95 percent in response to the rise in inequality that began in the early 1980s were unsustainable. Balance sheets cannot deteriorate indefinitely; the “Minsky Moment” that marked the end of rising balance sheet fragility occurred on the eve of the Great Recession. Lending was cut off to the bottom 95 percent, home price growth stalled and then declined. The crisis had begun.¹³

¹² The SCF data that we use to disaggregate debt begin in 1989. The aggregate debt-income ratio, however, began to rise earlier, around 1984, after about two decades of stability. Because the rise in the debt-income ratio is almost entirely concentrated in the bottom 95 percent after 1989, it is likely that much of the rise in the aggregate debt-income ratio in the previous 5 years also took place in the bottom 95 percent.

¹³ These dynamics were largely predicted by Palley (2002) and Barba and Pivetti (2009); also see Palley (2013a, 2013b). In a recent paper closely related to the argument presented here, Kapeller and Schütz (2012) construct a model of Minsky financial instability that explicitly relies on

B. Consumption Rates for the Bottom 95 Percent and Top 5 Percent

This subsection considers how the consumption behavior of the bottom 95 percent and top 5 percent differ as the balance sheet dynamics presented in the section A played out prior to the Great Recession and, especially, once the borrowing spree of the bottom 95 percent ended and the collapse began. It is more difficult to obtain disaggregated data on the spending behavior of different income groups than it is to compile disaggregated balance sheet data. The most obvious source for such data, the Consumer Expenditure Survey, suffers from non-response and underreporting of both income and consumption, particularly at the high end of the income distribution (see Aguiar and Bils, 2011). The SCF over-samples high income households, but it does not contain measures of household spending. To estimate consumption and saving flows for the bottom 95 percent and top 5 percent we follow the approach of Maki and Palumbo (2001). They begin with the change in aggregate household assets and liabilities from the Federal Reserve’s Flow of Funds Accounts (FFA), and then disaggregate these changes across income groups using balance sheet information for different income groups from the SCF.¹⁴ With disaggregated data on income and the changes in household balance sheets, one can infer the amount that different groups of households spent and saved. Mark Zandi, of Moody’s Economy.com, has computed disaggregated saving rates using this procedure from 1989 through 2012. We use the saving rates from Zandi’s calculations, income shares from

inequality and Veblen’s “conspicuous consumption” to generate unsustainable increases in household borrowing in the growth phase of the business cycle. Setterfield and Kim (2013) also construct a model in which higher inequality generates higher consumption for the disadvantaged group. They present an empirically based simulation that assesses the feasibility of debt servicing and find that household debt conditions were sustainable during the “Golden Age” from 1943 to the late 1970s but became unsustainable thereafter.

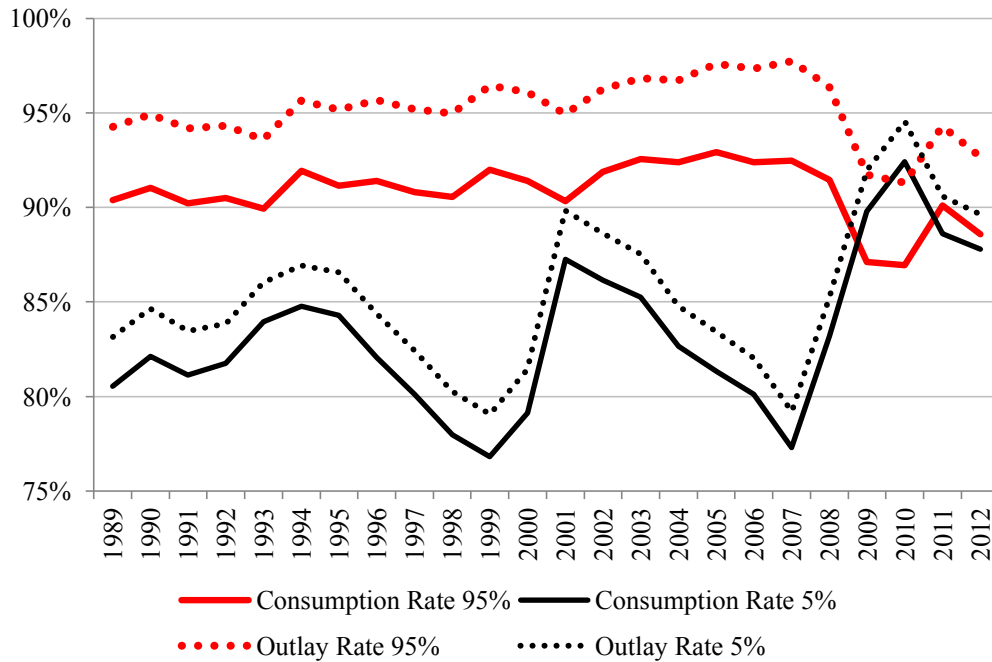
¹⁴ For example, the change in deposit balances for the top 5 percent and bottom 95 percent can be estimated from the aggregate change in deposit balances from the FFA by applying the share of deposits held by each group in the SCF. This procedure is applied to all household assets and liabilities.

Piketty and Saez, and several other data series from NIPA and the SCF to disaggregate NIPA PCE between the bottom 95 percent and top 5 percent. The details of our disaggregation approach are described in appendix A. We choose the 95 percent-5 percent split for two reasons. First, Zandi's calculations separate out the top 5 percent. Second, a detailed analysis of changing leverage rates across income groups from the SCF (see the discussion of figure 3 above) reveals that debt-to-income ratios rise at about the same rate for a wide variety of household groupings between the 20th and 95th percentiles of the income distribution.

Figure 5 presents our disaggregated estimates of the consumption-income ratio, defined as PCE divided by income available for households to spend and save. (The dotted lines in the figure are outlay rates, discussed in the next paragraph.) For this chart, the definition of income includes realized capital gains because households must make an active decision to spend, save, or transfer this income.¹⁵

¹⁵ The data in figure 5 extends through 2012, but the final 2012 capital gains data were not yet available at the time of this writing and are based on a CBO projection.

Figure 5 – Disaggregated Personal Consumption and Outlay Rates



Source: Mark Zandi, Bureau of Economic Analysis, Flow of Funds, authors' calculations

The figure shows several important differences between the two income groups. Not surprisingly, the bottom 95 percent consumes a substantially larger share of disposable income on average (also see Dynan, Skinner, and Zeldes, 2004). Prior to the large changes in the consumption-income ratios that start with the Great Recession, the average consumption rate for the bottom 95 percent exceeds that for the top 5 percent by about 8 percentage points. This result provides empirical support for the widely held view that, other things equal, rising inequality will create a drag on consumption spending. Perhaps somewhat surprisingly considering the rapid rise in the debt-income ratio for the bottom 95 percent, however, the consumption-income ratio for this group prior to Great

Recession has only a mild upward trend (2 to 3 percentage points from the beginning of our data to the eve of the recession).¹⁶

Furthermore, consumption is not the only household expenditure. As shown in equation 1 and discussed further in appendix A, households also make non-negligible transfers including personal interest payments on non-mortgage debt. The BEA defines PCE plus personal transfers as personal outlays. Personal saving is the difference between disposable income and outlays. The outlay rate for the bottom 95 percent rises somewhat more than the consumption rate (3 to 4 percentage points) from 1989 to 2008 because of rising interest payments, which implies a declining saving rate.¹⁷ These observations are consistent with our interpretation that the spending trend of the bottom 95 percent was unsustainable prior to 2008. In addition, the strong upward trend of the aggregate consumption rate before 1989 (see figure 2) coupled with the a rise in the aggregate debt-income ratio for the bottom 95 percent that began in the early 1980s suggests that much of the unsustainable shift in consumption growth relative to income growth preceded our sample period. We can see from the Piketty and Saez income share data that the trend of rising income inequality began well before 1989. And the mathematical exercise from the previous section implies that changes in the consumption rate around the time when the income growth first declined would lead to unsustainable balance sheet dynamics even at a constant, but low, saving rate.

¹⁶ Aggregate data show that the consumption-income ratio jumped up significantly in the mid-1980s, so it is likely that the ratio for the bottom 95 percent also rose in the several years prior to the beginning of our data.

¹⁷ The BEA treats mortgage interest for homeowners as a deduction from personal income rather than a transfer to be consistent with the implicit rent method of measuring homeowner consumption of housing services. The transfer component, and therefore the difference between outlays and consumption would be much larger if mortgage interest were treated like other household interest expenses.

A simple calculation based on equation 3 is helpful to put the trend in the outlay rate for the bottom 95 percent into perspective. The equation shows that a one-time fall in the saving rate (rise in the outlay-income ratio) causes the debt-income ratio to rise indefinitely, other things equal. Therefore, an upward trend in the outlay rate will cause an accelerating rise in the debt-income ratio. Using this framework, we calculate that what appears to be a modest upward trend in the bottom 95 percent outlay rate between 1989 and 2007 in figure 5 of 0.19 percentage points per year explains, by itself, a rise in the bottom 95 percent debt-income ratio of 32 percentage points, 45 percent of the actual increase.

The comparison the consumption-income and outlay-income ratios across the two groups during the Great Recession demonstrates the importance of household heterogeneity during the entire period covered by our data. The ratios for the bottom 95 percent drop sharply and quickly, in contrast with their smooth behavior in the previous 20 years. Compare, in particular, barely noticeable drops in the 1991 and 2001 recession years with the massive drops between 2008 and 2011. These original disaggregated consumption data are consistent with the interpretation developed previously based on aggregate spending and balance sheet data: a substantial share of the households in the bottom 95 percent were consuming at an unsustainable rate. Note that the drop in the bottom 95 percent consumption rate happens at the same time as the stall in debt-to-income growth. When the balance sheet bubble for this group burst in the Great Recession, the consumption rate of the bottom 95 percent collapsed, falling four and a half times more than the next largest decline in our sample (7.8 percentage points from 2005 to 2011 versus 1.7 points from 1999 to 2001).

The consumption rate for the top 5 percent behaves very differently. Its relatively volatile pattern is clear evidence that this group smoothed consumption relative to income. The first peak of the rate in 1993 and 1994 occurs during a period of slow income growth around the recession of 1990-91; top 5 percent real

income grew at an annual rate of just 1.9 percent from 1989 through 1994, less than half its long-term average from 1980 to 2007. When real income growth of the top 5 percent accelerates dramatically to an annual rate of 8.5 percent from 1994 through 2000 the top 5 percent consumption rate declines. The pattern is repeated almost exactly in the 2001 recession and the subsequent swift recovery of top 5 percent income during the middle 2000s (annualized top 5 percent real income growth was 7.5 percent from 2002 to 2007).

The contrast between the spending behavior of the top 5 percent and the bottom 95 percent in the Great Recession is striking. The collapse of the 95 percent spending rate, consistent with a forced end to this group's balance sheet expansion, is the exact opposite of the significant consumption smoothing evident for the top 5 percent, a group that did not appear to have balance sheet fragility problems on the eve of the Great Recession. The contrasting effects are so large that the top 5 percent actually spent a higher share of their disposable income than the bottom 95 percent in 2009 and 2010. In 2011 and 2012, the consumption-income ratio for the top 5 percent falls as the recovery takes hold while that for the bottom 95 percent rises somewhat, but remains well below historical norms. This heterogeneity provides further support for the hypothesis that inequality was central to the macroeconomic dynamics of the household sector before and during the Great Recession. If the spending rate of the bottom 95 percent had remained stable (or even risen like the top 5 percent), the demand drop that caused the recession would have been much less severe. But the fragile bottom 95 percent balance sheets, caused by the group's response to rising inequality, prevented any kind of consumption smoothing. Instead it forced the bottom 95 percent to reverse their borrowing and reduce demand.

C. Macroeconomic Significance of Falling Consumption in the Great Recession

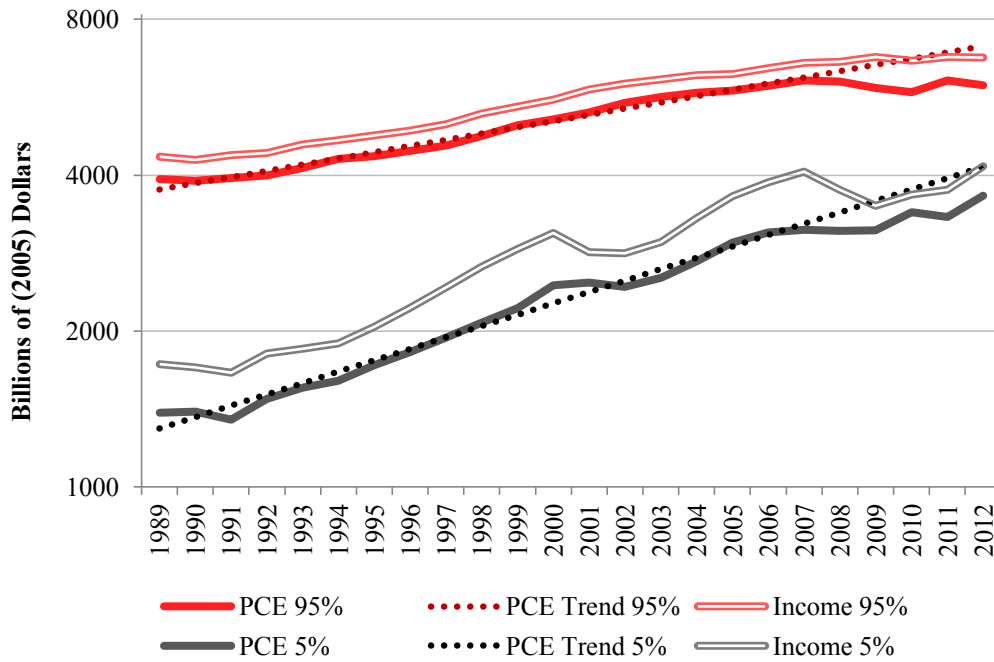
These changes in consumption have important macroeconomic implications. Figure 6 shows the real levels of income and PCE (deflated by the

chained personal consumption expenditure price index) for the two income groups on a log scale. The dotted lines are the exponential trends of the groups' PCE, estimated from 1989 through 2007 and then extended through 2012. The PCE of both groups followed these trends fairly closely until the Great Recession, although the trend of the top 5 percent grows substantially faster (5.2 percent per year versus 2.8 percent for the bottom 95 percent). Consumption falls away from the pre-recession trend significantly for both groups beginning in 2008. By 2012 the gaps are huge: \$1.1 trillion for the bottom 95 percent (16 percent of the 2012 trend value) and \$0.5 trillion for the top 5 percent (12 percent of 2012 trend). Despite the large sizes of both the 5 percent and 95 percent PCE demand gaps, however, they should be interpreted differently. Note the different behavior of real income shown in figure 6. For the bottom 95 percent real income growth decelerates, but the decline from an annual rate of 1.9 percent in the five years prior to the recession to 0.5 percent from 2007 to 2012 might be viewed as modest considering the severity of the recession. The main effect on the bottom 95 percent PCE seems to be the reversal of balance sheet expansion forcing the consumption rate to decline, as discussed earlier. For the top 5 percent, the massive increase in the consumption rate in 2008 and following years does smooth PCE to a large extent, but top 5 percent PCE growth nonetheless declines. The reason is a dramatic drop in disposable income growth from an annual rate of 7.5 percent from 2002 to 2007 to just 0.5 percent from 2007 to 2012.¹⁸ With top 5 percent income rebounding, real consumption for this group also seems to be recovering; by 2012 it was up 17% from its trough in 2008 and there is a good chance that it will accelerate to close the gap with the pre-recession trend over the

¹⁸ This significant decline in real income growth for the top 5 percent is partially, but not totally, the result of lower realized capital gains. Without capital gains, top 5 percent annual real income growth from 2002 to 2007 was 4.9 percent which declines to an annual rate of 1.0 percent from 2007 to 2012.

next few years. Bottom 95% real consumption in 2012 remains below its 2008 level and shows no sign of recovery. We have no reason to expect a return to trend for bottom 95 percent consumption in the absence of another debt bubble or a structural change that accelerates bottom 95 percent income.

Figure 6 - Real Personal Consumption Expenditure and Income



Source: Mark Zandi, Bureau of Economic Analysis, authors' calculations

Again, we argue that the relationship between inequality and economic crisis was not a coincidence. Both aggregate and disaggregated evidence implies that the bottom 95 percent responded to slower income growth in large part by maintaining consumption at the expense of saving.¹⁹ This outcome, in a sense, *temporarily* rescued the U.S. economy from the demand drag that many theories

¹⁹ Duca, Muellbauer, and Murphy (2012) link the rise and decline in the consumption-income ratio explicitly to consumer credit and housing collateral. We show that this effect was concentrated in the bottom 95 percent.

predict as a result of rising inequality. But the deteriorating balance sheets of the bottom 95 percent would eventually set the stage for the Great Recession.

A simple counterfactual exercise illustrates this point. According to our data the debt-income ratio of the bottom 95 percent rose from 0.84 in 1989 to 1.56 in 2007 on the eve of the Great Recession. By 2007, the debt of the bottom 95 percent was about \$5 trillion higher than the level that would have been required to keep the debt-income ratio constant at its 1989 level. The income share of the bottom 95 percent over the same period fell from roughly 74 percent in 1989 to 66 percent in 2007 (it had fallen from 79 percent to 74 percent between 1980 and 1989). How do these two major changes in the financial circumstances of the bottom 95 percent relate to each other? We calculate that if the income share of the bottom 95 percent had been frozen at 74 percent in 1989 the bottom 95 percent would have cumulatively earned \$5.8 trillion dollars more from 1989 through 2007, other things equal. This implies, again other things equal, that the bottom 95 percent could have consumed as much as they did in the two decades prior to the Great Recession *without an increase in the debt ratio* if this group's income share had not declined after 1989.²⁰ Of course, we cannot know what the bottom 95 percent would have done if their income share had not fallen after 1989, nor do we know how the consumption of the top 5 percent would have changed if they had not received a greater share of income after 1989. But these simple calculations show that the rise of inequality is easily large enough that it could *potentially account for the entire increase in bottom 95 percent debt leverage*, an increase that spawned the Great Recession. In short, inequality

²⁰ Feedback effects make this conclusion even stronger. First, with a smaller increase in debt the bottom 95 percent would have paid much less interest. Second, with higher income the bottom 95 percent could have taken on more debt without raising the debt-income ratio. A quantitative assessment of these effects would require a more detailed dynamic model.

played a central role in the macroeconomic dynamics of the U.S. economy over the past quarter century.

IV. Inequality and Barriers to Demand Growth After the Great Recession

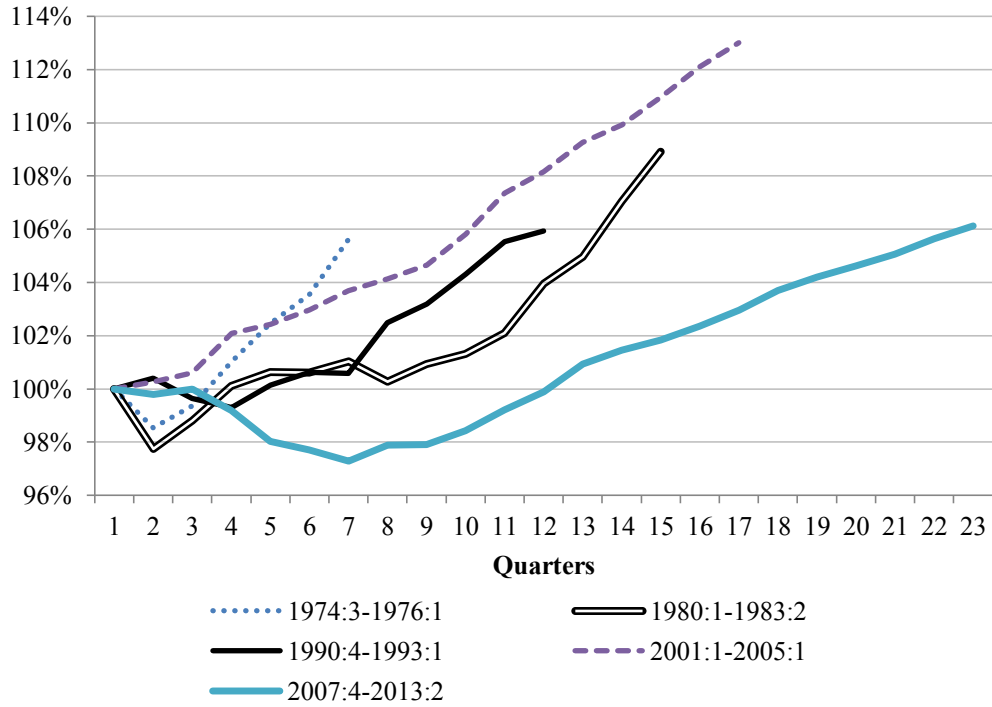
This paper links two major economic events of the past 30 years that began at almost the same time. The first is a dramatic rise of income inequality. The second is the onset of the falling saving rate and the rising household debt-income ratio that ended with the economic crisis of the Great Recession. Our argument is that this historical overlap of these two events is not a coincidence: we propose that rising inequality was an important part of what caused the unsustainable growth of household leverage that eventually triggered the Great Recession.

The support for this interpretation can be summarized in a few basic points:

- The most important reason for rising inequality during this period was slower income growth for the bottom 95 percent of the income distribution that forced this group to cut some combination consumption growth and saving growth.
- The bottom 95 percent responded in large part by reducing saving growth. This created unsustainable balance sheet dynamics. The end of rising household leverage of this group coincided with the onset of the Great Recession.
- The consumption-income ratio of the bottom 95 percent fell by an amount much greater than any movement in the previous 20 years as the recession unfolded, consistent with the view that their unsustainable debt accumulation was forced to end. In sharp contrast, the top 5 percent, who did not accumulate nearly as much debt relative to income, smoothed consumption, driving their consumption rate up as their income declined after 2007.

There is no sign that inequality has reversed since the onset of the recession. Indeed, the data in figure 1 show that after a pause in the increase of the top 5 percent income share from 2006 through 2009, it has once again risen steeply in recent years. Therefore, we fear that the demand drag from rising inequality that was postponed for decades by bottom 95 percent borrowing is now slowing consumption growth and will continue to do so in coming years. The data in figure 7 support this point. The figure shows the profile of real PCE for each U.S. recession since 1974-75. All the profiles are indexed to begin at 100 and the line for each recession continues for the number of quarters it took for employment to regain its pre-recession level (which has yet to occur for the recent period as of this writing). The unusually sluggish recovery of PCE in the Great Recession is immediately evident (also see Duca, Muellbauer, and Murphy, 2012). The analysis in this paper implies that the high level of income inequality is an important cause of this unfortunate history.

**Figure 7 – Real PCE Profiles During U.S. Recessions Until Pre-Recession
Employment is Restored**



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, authors' calculations

This evidence corroborates the large demand gaps created by slower PCE growth relative to the pre-recession trends, for both the bottom 95 percent and the top 5 percent, shown in figure 6. It is particularly troublesome because there is no reason to believe that demand growth prior to the recession was, in any sense, excessive in the aggregate. There was no indication that the economy was overheated in the middle 2000s. Inflation remained tame and interest rates were low by historical standards. The unemployment rate was low, but the employment-population ratio remained well below its late 1990s peak. For these reasons, it appears that the productive capacity of the economy could accommodate the growth of demand that took place in the years prior to the Great Recession. Indeed, one could argue that the economy *needed* PCE to grow along

the pre-recession trends to attain full employment. But the data presented here show that the way this demand was generated, by excessive spending and borrowing of the bottom 95 percent, was unsustainable before 2008. When it was withdrawn, high unemployment and a large output gap was the result. There are no obvious forces pushing PCE of the bottom 95 percent back toward the pre-recession trend. To the extent that the PCE demand gap is largely the result of elevated inequality, as argued in this paper, the economy faces a fundamental demand generation problem going forward. As Reich (2012, page xiii) writes “the so-called recovery has been one of the most anemic on record. That’s because the middle class still lacks purchasing power to keep the economy going and can no longer rely on borrowing.” We do not expect the rise of inequality to reverse in the next few years, nor do we expect a return to excessive borrowing by the bottom 95 percent.

Of course, the idea that the household sector must “deleverage” before strong demand growth can resume has been widely discussed, at least once the source and severity of the Great Recession became evident. For example, Dynan (2012, p. 302) writes that the process of deleveraging “held back consumption and the broader recovery over the past few years and will remain a headwind against economic growth for some time to come.” We agree, but we add two additional dimensions to this point. First, deleveraging must take place among the group that took on the debt in the first place, which is also the group that has lost out to rising inequality. This group is doubly disadvantaged in the aftermath of the Great Recession, because it must reduce consumption to both realign it to income growth and to pay down its debt if it is not to default. Second, deleveraging alone may not be adequate to remove the “headwind” to economic growth because the borrowing that raised the leverage of the bottom 95 percent masked the demand drag caused by rising inequality, a problem that the economy must now confront even as debt burdens return to more sustainable levels.

Can the U.S. economy attain the demand growth necessary to restore and maintain full employment in a sustainable way with the kind of income inequality that now prevails? There are several *possible* sources of demand growth to replace what has been lost from the bottom 95 percent. Of course, a conventional way to replace the demand lost by households is higher business investment through lower interest rates (see the discussion in Barba and Pivetti, 2009, section 3). But interest rates were already at historic lows for years after the Great Recession without business investment being nearly large enough to fill the gap created by the collapse in demand from the bottom 95 percent of households.²¹ U.S. net exports have improved significantly since the Great Recession. But the most likely explanation is that imports have fallen below their earlier trend because PCE has fallen dramatically relative to trend.²² We do not expect much further demand stimulus in the next few years from a declining trade deficit.

Stabilization policy can play an important role in supporting demand. Monetary policy has been aggressive, with years of near-zero nominal interest rates and unprecedented quantitative easing, but there has been no improvement in the civilian employment-population ratio between the end of the official recession and the end of 2013. In the aftermath of the Great Recession, what had been conventional wisdom—that monetary policy can assure sufficient demand growth—must face serious doubt. Fiscal policy could raise demand, but government spending is constrained by fears of rising public debt. These fears become especially salient as the need for more demand extends beyond a year or

²¹ This interpretation is consistent with Barbosa-Filho et al. (2008) who show that business investment has not typically led U.S. recoveries.

²² Using an approach for real imports and exports similar to what we did for PCE in figure 6, we find that 2012 exports are modestly below their 1989 to 2007 exponential trend (about \$160 billion) while imports are more than \$1 trillion below trend. This outcome suggests that perhaps as much as half of the massive PCE demand gaps from the top 5 percent and bottom 95 percent shown in figure 6 was offset for the U.S. by declining imports which implies that much of the U.S. PCE demand slowdown spilled over to the rest of the world.

two. To an extent, the common problem for both monetary and fiscal policy is that the economy needs more than “stabilization,” it needs a way to generate faster demand growth indefinitely.²³

The results in this paper suggest that the best way to repair the U.S. demand generation problem would be if the trend toward greater wage inequality is reversed, or at least stabilized, so that robust after-tax wage growth occurs across the income distribution. Redistributive tax policy could help to meet this goal, as discussed in Cynamon and Fazzari (2013b), although direct redistribution is politically contentious. A more attractive alternative is the “golden rule” for good economic performance proposed by Setterfield (2013); wage growth should keep up with productivity growth (also see Palley, 2013a). This condition was satisfied in the immediate postwar decades of broadly shared prosperity. It is far from obvious how to implement policies that would reach this goal, but there may be no other sustainable way to generate the demand necessary to escape stagnation.

Policy issues notwithstanding, a first step toward resolving the problem is to have a clear understanding that rising inequality goes beyond the issue of social justice. The data and interpretation offered here argues that greater inequality also compromises the basic demand engine that was necessary for acceptable macroeconomic results prior to the Great Recession, and greater inequality threatens demand growth and employment going forward.

²³ While the possibility that demand growth may be inadequate beyond the “short run” has been a major theme in some approaches to Keynesian economics for decades, it has recently appeared in more mainstream places. See, for example, the discussion of “secular stagnation” of demand by Lawrence Summers at his speech to the International Monetary Fund on November 8, 2013 and the associated November 17, 2013 column Paul Krugman column in the *New York Times*.

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Appendix A: Disaggregation of Consumption and Income

The original data presented in this paper were derived by disaggregating aggregate consumption and disposable income across two groups defined as the bottom 95 percent and top 5 percent of the income distribution as discussed below. As discussed in the text, this kind of disaggregation is challenging because of the lack of microeconomic panel data for American household consumption.

Our method infers the consumption of group j at any point in time from the identity:

$$(A1) \quad C_j = DI_j - S_j - Tr_j$$

where C_j is the personal consumption expenditures of group j , DI_j is disposable income of j , S_j is saving of j , and Tr_j is the personal transfers and non-mortgage interest payments made by j . This identity follows the accounting methods of the Bureau of Economic Analysis used to define personal saving. We estimate each of the three variables on the right side of equation A1 as the product of a share variable multiplied by a widely available aggregate. Our objective is for C_j and the other variables to correspond to the concept definitions in the National Income and Product Accounts (NIPA) so that they add up to the corresponding aggregates.

The most significant challenge is the definition of the saving share for each group. We begin with data obtained from Mark Zandi of Moody's Economy.com who updated the method presented in Maki and Palumbo (2001) to estimate saving rates across different groups defined by income distribution. This method estimates saving, not as published in the NIPA but as published in the Federal Reserve Flow of Funds Accounts (FFA) based on the NIPA concept that treats consumer durable purchases as consumption, not saving. While NIPA measures saving using income and expenditure, as shown in equation A1, FFA saving arises from changes in net worth on aggregated household balance sheets.

These two approaches to measuring saving should correspond with each other, but they differ in practice both because of measurement error and different accounting conventions. We define S_j^F as the saving of group j estimated from FFA data and we will adjust these measures to match the NIPA published saving measure as discussed below.

We begin with data from Zandi that estimate the contribution to the aggregate FFA saving rate for each group j denoted as α_j^F and defined as

$$(A2) \quad \alpha_j^F = S_j^F / DI$$

where DI is aggregate disposable income from the NIPA accounts. We solve for S_j^F from equation A2. The next step is to adjust the S_j^F to sum to the NIPA aggregate denoted simply by S (the absence of a superscript indicates that this variable is the NIPA measure, as opposed to the FFA measure; the absence of a subscript indicates that it is an aggregate rather than a group j variable). That is we want to solve for S_5 and S_{95} such that

$$(A3) \quad S_5 + S_{95} = S.$$

To do so we assume that the difference between the saving levels estimated from the FFA remains the same in the disaggregated NIPA saving estimates.²⁴ That is we impose the constraint that

$$(A4) \quad S_{95}^F - S_5^F = S_{95} - S_5.$$

With the estimates of disaggregated FFA saving S_j^F from the Zandi data and aggregate S we can solve A3 and A4 simultaneously to determine S_5 and S_{95} :

²⁴ Use of this difference constraint rather than some kind of ratio constraint is preferable in this case because the saving levels pass through zero and become negative for some periods. This assumption is further justified by the fact that while NIPA and FFA measures of saving differ from period to period, they imply similar levels of saving over longer horizons.

$$(A5) \quad S_5 = \frac{1}{2}(S + S_5^F - S_{95}^F)$$

$$S_{95} = \frac{1}{2}(S + S_{95}^F - S_5^F)$$

These figures are used in equation A1.

The next step is to disaggregate disposable income. Again, we begin with NIPA disposable income. There are a variety of data sources from which one could obtain income shares; the most useful sources provide pre-tax income shares. We use figures from “The World Top Incomes Database” based on the methods in Piketty and Saez (2007). Multiplying top 5 percent and bottom 95 percent shares from this source by aggregate disposable income provide the DI_{95} and DI_5 data for equation A1.²⁵

We disaggregate the transfer variable from equation A1 in two parts. Personal interest payments include interest on non-residential debt only.²⁶ We divide this item between the income groups according to the group share of non-residential debt in the SCF, interpolating shares for each year between the three-year SCF waves. Other personal transfers include charitable contributions, transfers to other persons (including transfers abroad), and other miscellaneous items. We divide this item between the groups according to the outlay rate. Outlays are disposable income less saving; the outlay rate for each group j (β_j) is defined as:

$$(A6) \quad \beta_j = (DI_j - S_j)/DI_j.$$

²⁵ Estimating post-tax shares of income in a way that is consistent with the aggregate NIPA disposable income concept would be complicated, if possible at all, considering federal, state, and local taxes as well as contributions for social insurance. Any bias from using pre-tax income shares is likely to overstate the disposable income of the 5 percent group relative to the 95 percent. Given saving and transfers of the 5 percent, overstating this group’s income would raise its consumption spending (see equation A1), and correspondingly lower the consumption spending of the 95 percent group. Therefore eliminating this bias would magnify the differences in the groups discussed in the text of the paper.

²⁶ Mortgage interest is treated as an expense in the homeowners’ imputed income calculation and is already deducted in the disposable personal income data.

With the income, saving, transfers disaggregated between the 5 percent and 95 percent groups, we can use equation A1 to compute disaggregated consumption (C_j), the variable that is used in the figures 5 and 6 in the text.

For figure 5 we also need a disaggregated income measure to compute the ratio of consumption to disposable income. Because the amount households have available to spend includes realized capital gains, we add realized capital gains to the NIPA disposable income variable discussed previously in this appendix. The Congressional Budget Office (CBO) provides data on aggregate realized capital gains (available through 2011 as of this writing). In a special report, Congressional Budget Office (2011), the CBO provided realized capital gains data disaggregated by income group from 1979 through 2009. We used these data for 1989 through 2009 for the bottom 95 percent and the top 5 percent. For 2010 and 2011 we used the group shares from the 2011 report, averaged over 2005 through 2009, to disaggregate the total figures. For 2012 we used an aggregate estimate of realized capital gains from the CBO (2013), again allocated with shares averaged over 2005 through 2009.²⁷

One final issue is that the definition of the top 5 percent used by the CBO is somewhat different than that used by Piketty and Saez to define the income shares we used to disaggregate NIPA disposable income. The share data from both sources is based on tax returns. But Piketty and Saez define a microeconomic unit for their study as one or more individuals filing a joint tax return while the CBO uses an “equivalized household” unit. This measure adjusts for household size by dividing income by the square root of the number of individuals in a

²⁷ We made an additional adjustment to the 2010 through 2012 data to account for the fact that revised aggregate capital gains in the most recent CBO (2013) report were, on average, 5.5 percent higher than the aggregates from the inequality report for the years in which they overlap. We therefore reduced the aggregate figures in 2010 and 2011 by 5.5 percent to match the more detailed data in the inequality report. This discrepancy has no impact on the interpretation of any results we present.

household. For our purposes, the only concern with this different definition is that it might distort the way we divide capital gains between the top 5 percent and bottom 95 percent because the two definitions might lead to a somewhat different population in the top 5 percent. A unit swapped out of the top 5 percent with the CBO method is likely to be a high-income household with a rather large number of individuals so that its income is adjusted downward. The replacement unit is likely to be a single-individual household with income near the cutoff between the bottom 95 percent and top 5 percent. We believe any distortion will be small. Data from the CBO show that 83 percent of the capital gains in their top 5 percent group are actually earned by the top 1 percent. The ratio of the minimum income for the top 1 percent to the minimum income of the top 5 percent in the CBO study implies that a household at the bottom of the top 1 percent would need to have more than 6 people to be pushed out of the top 5 percent by the equalizing adjustment. So the vast majority of capital gains will be earned by units who would fall in the top 5 percent using either the CBO or the Piketty-Saez definition. Furthermore, for each unit swapped out of the Piketty-Saez top 5 percent definition by the equalizing adjustment, another unit, likely an affluent single with income in current dollars around \$150,000 would be added. The added units will also have capital gains income.