Inequality, the Great Recession, and Slow Recovery

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Abstract:

Rising inequality reduced income growth for the bottom 95 percent of the US personal income distribution beginning about 1980. To maintain stable debt to income, this group's consumption-income ratio needed to decline, which did not happen through 2006, and its debt-income ratio rose dramatically, unlike the ratio for the top 5 percent. In the Great Recession, the consumption-income ratio for the bottom 95 percent did finally decline, consistent with tighter borrowing constraints, while the top 5 percent ratio rose, consistent with consumption smoothing. We argue that higher inequality and the associated demand drag helps explain the slow recovery.

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D12: Consumer Economics: Empirical Analysis

D31: Personal Income, Wealth, and Their Distributions

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The U.S. economy suffered a historic recession beginning in late 2007 and growth in the aftermath of the Great Recession has been unusually slow. The crisis was preceded by an approximate doubling of the household debt-income ratio from its 1980 level. The end of this borrowing boom caused household spending to collapse, which we argue was the proximate cause of the Great Recession. Another trend, also starting in the early 1980s, was a sharp rise in the share of income going to households at the top of personal income distribution.

This paper explores the connection between household spending, consumer debt, and rising income inequality. We introduce new data that decompose income, consumption, and balance sheet measures between the bottom 95 percent and top 5 percent of the personal income distribution to address two related questions. First, did rising inequality contribute in an important way to the unsustainable increase in household leverage in advance of the Great Recession? Second, has the rise of inequality become a drag on expenditure growth since the Great Recession that has held back recovery?

In section I, we document rising income inequality between the bottom 95 percent and top 5 percent and summarize theoretical perspectives on how inequality affects consumption. Section II exploits the identity that links household income, saving, and balance sheets to show that if inequality rises as the result of declining income growth of the lower group, this group must reduce its consumption-income ratio to keep its collective balance sheet stable. This analysis further shows that if the group with lower income growth does not cut consumption, its debt-income ratio will almost certainly be on an unsustainable path.

Section III presents our central empirical evidence that disaggregates balance sheet and consumption data. We show that the decline of the bottom 95 percent share of aggregate income was caused in part by lower income growth starting around 1980. To determine how the consumption-income ratio of the bottom 95 percent responded to rising inequality, we develop original methods to estimate disaggregated consumption data. Our estimates show that the bottom 95 percent consumption-ratio did not decline in response to rising inequality through 2006. The estimates also show strong evidence that the top 5 percent smoothed consumption by raising the consumption-income ratio in periods of slow or declining income growth.

Because the bottom 95 percent did not cut its consumption-income ratio, our analysis from section II predicts that this group's debt-income ratio should have increased. An original

disaggregation of Survey of Consumer Finances data strongly supports this implication. The debt-income ratio in the decades prior to the Great Recession rose dramatically for the bottom 95 percent, while the ratio for the top 5 percent was largely stable. We also show that the net worth of the bottom 95 percent and the top 5 percent both grew through 2007; but net worth excluding the value of owner-occupied housing and quasi-liquid retirement accounts declined significantly for the bottom 95 percent, even though it rose for the top 5 percent.

The collision of these trends with limits on further borrowing for the bottom 95 percent ultimately forced a historic collapse of consumption, leading to the Great Recession, as predicted in broad terms by Minsky's (1986) financial instability hypothesis.[1] In the recession the spending and income of the two groups was very different. The consumption-income ratio for the bottom 95 percent contracted significantly during the crisis. This pattern did not occur in other recessions covered by our data, and it is consistent with a cutoff of credit flows to the bottom 95 percent that forced their spending down. For the top 5 percent, in contrast, the consumption-income ratio *rose* substantially from 2008 to 2010, consistent with the consumption smoothing behavior of this group in earlier recessions and their immediate aftermath.

These results show that the implications of rising inequality unfolded in ways that played an important role in generating the macroeconomic dynamics that led to the Great Recession. Balance sheets began deteriorating when income growth slowed for the bottom 95 percent in the early 1980s. The subsequent increase in balance sheet fragility through 2007 was entirely concentrated in the bottom 95 percent. But when the crisis hit, the 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, in contrast, was fully consistent with earlier recessions.

Section IV strengthens the connection between rising inequality and the macroeconomic events of recent years by exploring the behavioral reasons that the bottom 95 percent allowed their balance sheets to deteriorate. We present a narrative model that connects research on how households make spending and financial decisions in a social context when they face uncertainty. Without clear knowledge of future incomes, asset prices, etc. households rely on heuristics or norms. By their very nature, these decision guides are slow to respond to changing conditions, leading households to maintain consumption trends as long as they can. Furthermore, some

[1] See section I for a survey of recent research that presents related arguments.

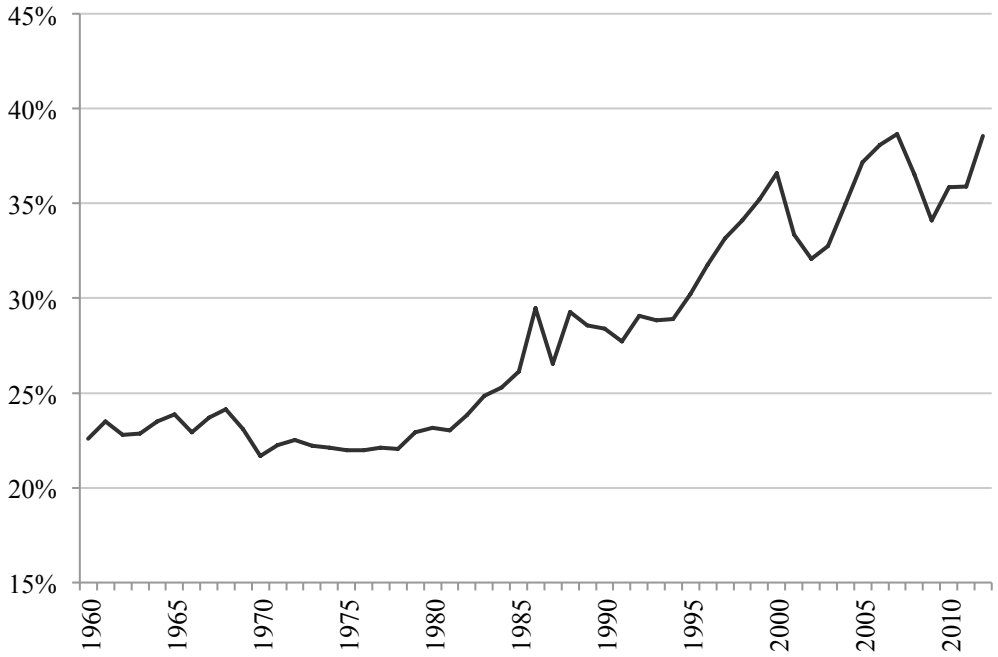
models imply that lower income groups follow the behavior of those above them in the income distribution as long as access to debt enables them to do so. We also survey recent empirical work that supports a behavioral link between rising inequality and household spending and borrowing.

We conclude in section V with a brief discussion of rising inequality and consumption 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. US aggregate demand growth was not excessive before the recession, but much of that demand growth has been lost now that the bottom 95 percent are no longer able to expand their balance sheets We argue that demand drag caused by inequality is *now* constraining the U.S. economy.

I. Rising Inequality and Consumer Spending

Figure 1 shows the pre-tax income share, including realized capital gains, of the top 5 percent. After being virtually constant for more than 20 years, that share began to rise in the early 1980s; by 2012, it had risen about 15 percentage points. Using a large panel of tax returns from the Internal Revenue Service, DeBacker et al. (2013) attribute rising inequality predominantly to permanent changes of income across households as opposed to changes in transitory shocks. Kopczuk et al. (2010) report similar results. For our purposes, we treat households in the top 5 percent and bottom 95 percent as distinct aggregated groups with substantially different levels and growth rates of permanent income for the households in each group. This approach follows Kumhof et al. (2013, page 7) by focusing on "one specific type of between-group inequality that can be clearly documented in the data, namely inequality between high-income households and everyone else."

Figure 1 – Income Share of Top 5 Percent



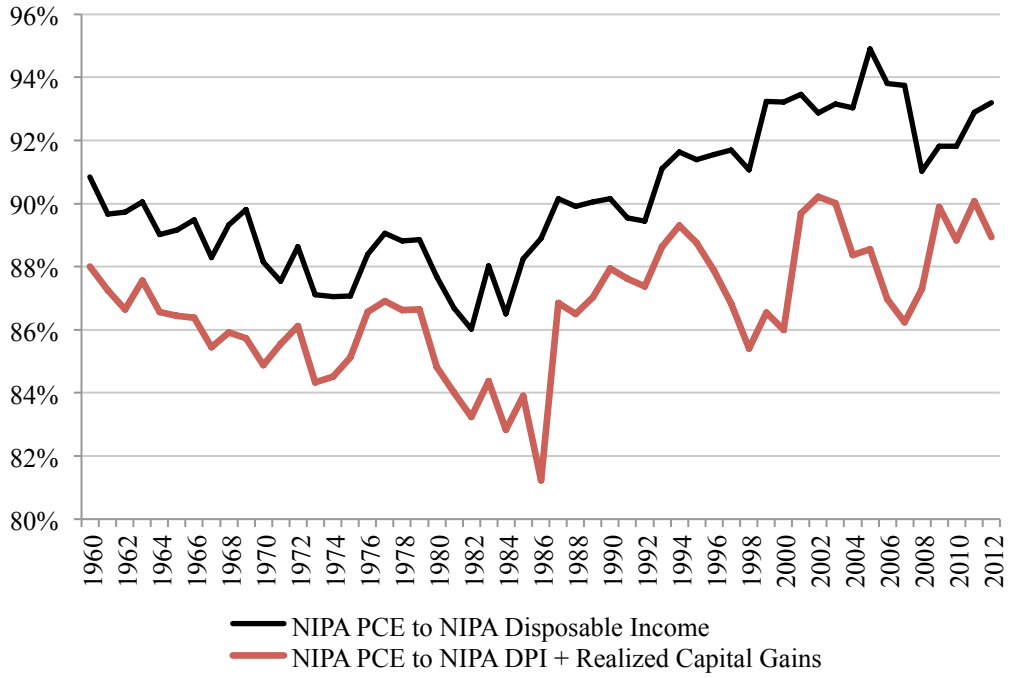
Source: Alvaredo et al. (2013)

A thread of macroeconomic thinking, going back at least to Michal Kalecki, identifies a basic challenge arising from growing inequality in the *functional* distribution of income (see Setterfield, 2010 for recent work and extensive references). In these models, the propensity to spend out of profit income is lower than out of wages. Thus, redistribution from wages to profits reduces aggregate demand. The data in figure 1 and the analysis in this paper focus on rising inequality in the *personal* distribution of income. But if we model the personal distribution across two different groups: high-income earners, with a low propensity to spend, and everyone else, with a higher propensity to spend, a rising income share in the top group creates a drag on demand, similar to the implication of models that focus on the functional distribution.

Despite this substantial shift of the income distribution, 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, macroeconomic volatility declined, and recessions were modest. Instead of a drag on demand, personal consumption expenditure (PCE) was the fastest growing component of GDP: real PCE grew almost 40 percentage points more than real GDP less real PCE from 1984 through 2007.

Figure 2 shows PCE relative to personal disposable income. The figure shows this ratio with NIPA disposable income in the denominator as well as a version that adds realized capital gains to the disposable income variable. In the years leading up to the Great Recession, there is a positive trend of consumption relative to income, which is more evident in the standard measure than in the more volatile series that includes realized capital gains. In any case, there is no evidence of a *decline* in the consumption-income ratio, a fact that presents a paradox from the point of view many theories of consumption and income distribution as discussed in other research (Brown, 2004, Boushey and Weller, 2008, Barba and Pivetti, 2009, and Onaran et al., 2011).

Figure 2 – Aggregate Personal Consumption Expenditure to Aggregate Disposable Income



Source: Bureau of Economic Analysis, Congressional Budget Office (2013), authors' calculations

Some theories of consumption, however, propose the possibility that greater inequality, specifically in the personal distribution of income, could encourage higher consumption propensities for at least some households. These ideas derive in large part from the relative income hypothesis of Duesenberry (1952) and developed in recent work on "expenditure cascades" (Levine et al., 2010; also see Belabed et al., 2013). In these models, households whose incomes are falling behind try to keep up with norms of spending set by those who benefit from rising inequality. As many authors point out, however, this kind of effect can lead to

unsustainable borrowing and balance sheet dynamics for households, an issue that we explore empirically in the next section.

Others have made similar arguments. Palley (2002), based in part on Palley (1994), presents a prescient analysis that predicts many of the outcomes discussed here. In Dutt (2006), household borrowing stimulates demand and output in the short run, but the accumulation of debt can eventually threaten expansion. Korty (2008) points out the likely role of unequal income growth in rising household debt. 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 (2013) consider the macroeconomic consequences of a persistent deviation of wage growth from productivity growth. Belabed et al. (2013) link rising inequality to higher household debt and falling current account balances. Van Treeck (2013) and Stockhammer (2013) provide surveys of research on income inequality and the macroeconomic forces that culminated in the Great Recession. Reich (2012) and Stiglitz (2012) discuss the importance of inequality in modern US society, including issues closely related to those taken up here.

II. Inequality, Income Growth, and Household Balance Sheets

How did rising income inequality relate to the macroeconomic dynamics that ultimately triggered the Great Recession? To answer the question we need to carefully consider income growth, the behavioral responses of households whose share of income declined, and the effect of these responses on household balance sheets. This section builds a conceptual framework for linking these variables that provides the foundation for the empirical analysis in section III

Our definition of income differs from income as defined in the National Income and Product Accounts (NIPA), because the NIPA measure does not fully account for the resources available to households or groups of households to finance their spending. The NIPA personal sector accounting identity sets disposable personal income (DPI), which excludes capital gains and losses, equal to personal outlays plus personal saving. Outlays consist of personal consumption expenditures (PCE) plus interest expense (which we represent as an average nominal interest rate i times the stock of debt D) and personal transfers:

(1) $DPI = Outlays + Saving = PCE + iD + Transfers + Personal\,Saving$

The NIPA definition of personal saving—calculated as a residual rather than estimated directly—also excludes capital gains.

However, the gains obtained from buying and selling assets can clearly finance outlays. With positive inflation and economic growth, the sum of realized gains and losses across the entire household sector will tend to be positive; we cannot ignore them for our study of income and consumption. But *unrealized* capital gains, by definition, do *not* finance outlays. Unrealized capital gains could lead a household to decide to increase consumption, but to *finance* that consumption the household would need to borrow, sell assets, or reduce the flow of funds into the acquisition of assets.

Because households fund spending with realized capital gains, we include them as income on the left side of equation 1. We maintain the accounting identity by replacing the NIPA personal saving definition on the right side of the equation with what we define as *active saving*, which is simply NIPA personal saving plus realized capital gains. [2]

(2) $DPI + Realized\ CG = PCE + iD + Transfers + Active\ Saving$

$Active\ Saving = Personal\ Saving + Realized\ CG$

This approach recognizes the fact that if capital gains are realized by households as part of their income, then they must make an active decision about how to use that income.

To understand the interaction of household finances with the macro economy, in particular the role played by household debt, we integrate the balance sheet into the relationship between income and consumption. To do so, it is helpful to draw a distinction between changes in the balance sheet caused by net purchases or sales of assets, which we refer to as *active* changes in assets, and changes in the balance sheet caused by the revaluation of assets due to changes in market prices. Consider the equation that equates sources and uses of funds for the household sector (or a subset of that sector):

(3) $DPI + Realized\ CG + New\ Borrowing = Outlays + Purchase\ of\ Assets$

$$-Sale\ of\ Assets + Principal\ Repayment$$

It is important for our purposes that the purchase and sale of assets—financial or residential—are measured *at book value*. For asset purchases, this point is trivial, an asset purchase goes on the

[2] One should not infer from this definition that all realized capital gains are necessarily saved. Realized capital gains income may be consumed in which case they will not affect active saving. Realizing and consuming capital gains, however, reduces NIPA saving.

balance sheet at market price. For sale of assets, however, the proceeds from the sale are divided into two parts: the value of the asset at the time it was acquired (book value) and any realized capital gains or losses. The latter component enters our definition of income and therefore moves to the left side of equation 2. Note that this treatment of capital gains and asset sales is entirely parallel to standard accounting principles for business. When a business acquires an asset it goes on the balance sheet at acquisition cost and remains there at that cost. When the asset is sold, the acquisition cost is removed from the balance sheet and any gain or loss on the sale is recognized as an addition or subtraction to income. If a household purchases assets or pays down debt, then that enters positively in active saving; if a household sells assets or borrows money, then that enters negatively in active saving.

Despite our emphasis on active saving, flows resulting from household decisions to save and acquire assets are not the only cause of changes in net worth; and for many households, in many years, it is not even the largest single driver of changes in net worth. Revaluation, changes in the prices of assets, affects household balance sheets. In addition, any household with substantial debt on its balance sheet could have a large increase in its net worth due to a default. This increase in net worth would not be "active" and would not appear in equations (2) or (3), because the change in net worth caused by the cancellation of debt cannot be spent on consumption or used to purchase assets.

One could reasonably ask whether the definition of income should include *all* capital gains (or losses), both realized and unrealized. Then the corresponding concept of saving would match the change in mark-to-market balance sheet net worth. We find this approach less useful for our purposes for three reasons. First, active saving and the realization of capital gains is an explicit behavioral choice, these actions do not happen passively by revaluation. Second, the practical implications of including unrealized capital gains as income would be to make the income concept much more volatile, so much so that it may become less useful for macroeconomic purposes, especially for a group of relatively high wealth households Third, linking unrealized capital gains to the income households allocate between outlays, asset acquisition, and debt repayment implicitly puts full faith in market prices as the correct valuation of the assets, where "correct" here relates primarily to the ability to realize the value of the assets in cash that can be used for other purposes. Such faith may not be justified, most obviously in an asset bubble. According to the concepts we use, it is the *realization* of the value of an asset by its

sale that is the ultimate "mark to market." It is realization that allows capital gains to be transformed into outlays or debt reduction.

We now analyze how rising income inequality connects with household balance sheets and consumption flows. The concept of financial fragility plays a central role in this analysis. We proxy financial fragility primarily by the household debt-income ratio, although we will also examine net worth measures below. The debt-income ratio is widely cited in discussions of the run-up of household financial fragility prior to the Great Recession. [3] We decompose the ratio dynamics with

$$(4) \qquad {}^{d}/_{dt}\left({}^{D}/_{Y}\right) = \left({}^{1}/_{Y^2}\right)\left(\dot{D}Y - \dot{Y}D\right)$$

where D is the stock of debt and Y is disposable income (including realized capital gains). As before, all variables are in nominal terms. From equations 1, 2, and 3 we can write the sources and uses identity as:

$$(5) \qquad Y + \dot{D} = C + iD + \dot{A}$$

where:

$$\dot{D} = New\ Borrowing - Principal\ Repayment$$
$$\dot{A} = Asset\ Purchases - Asset\ Sales\ (at\ book\ value)$$
$$iD = Nominal\ Interest\ Payments$$

For simplicity we ignore the empirically small category of personal transfers for now, although this item is included in our empirical work. Of course, actual debt changes will include defaults, which we consider in the empirical results to follow, but it is instructive to work with the sources and uses identity in the absence of defaults. Solving equation 5 for $\dot{D}$ and plugging into equation 4 gives:

$$(6) \qquad {}^{d}/_{dt}\left({}^{D}/_{Y}\right) = \left({}^{1}/_{Y^2}\right)\left[\left(C + iD + \dot{A} - Y\right)Y - \dot{Y}D\right]$$

[3] Palley (1994) explicitly associates household debt-income ratios with rising financial fragility. Mason and Jayadev (2014a) emphasize the importance of debt-income ratios for macroeconomic dynamics. Financial fragility obviously has other dimensions, however, including the liquidity of the balance sheet. Tymoigne (2014) constructs multivariate indexes of household financial fragility for several countries. The indexes for the US are highly correlated with the aggregate debt-income ratio.

$$= \dot{A}/_Y + C/_Y - 1 + i(D/_Y) - (g_Y + \pi)(D/_Y)$$
$$= \dot{A}/_Y + C/_Y - 1 + (i - \pi)(D/_Y) - g_Y(D/_Y)$$

where g_Y is the real growth rate of income and π is the inflation rate. Note that even though the accounting identities used to derive equation 6 are specified in nominal terms, the algebra reveals that it is the *real* interest rate and *real* income growth rate that govern the dynamics of the debt-income ratio. This equation is similar to the equation for the change in the debt-income ratio developed in Mason and Jayadev (2014a, b).

Equation 6 links rising income inequality and household financial fragility. When an era of stable personal income distribution changes to a period of rising inequality, the income growth rate of the top group must rise relative to the group with lower income. Suppose that the income growth rate of the lower group falls while the growth rate for the upper group rises, which we show below actually happened when US inequality began to rise in the early 1980s. In equation 6, the fall of g_Y induces the debt-income ratio to rise more quickly for the lower group, other things equal. As *D/Y* rises, the interest term in equation 6 becomes larger which magnifies the rise in financial fragility. If real interest rates rise then the impact is even more pronounced. Indeed, from the data in Mason and Jayadev (2014a, table 2) one can infer that the nominal interest rate effect less the inflation effect shown in the table was the most important factor in the acceleration of the aggregate household debt-income ratio in the early 1980s.

Even with rising real interest rates and slower income growth, however, households could adjust on other margins to stabilize the debt-income ratio. They might draw down assets. But if the drop in g_Y is permanent, the rate of asset accumulation would have to drop permanently to keep *D/Y* from rising. For a lower-income group, this response might well drive asset accumulation negative, which would be unsustainable. Even if asset accumulation remains positive, the group could get into trouble later if the rate of asset accumulation is insufficient to fund future expenses that may exceed future income, as in retirement. A more sustainable response, especially for households that have modest assets, would be to adjust to lower income growth or higher real interest rates by reducing the ratio of consumption to income. We examine the empirical behavior of consumption ratios by income group in section III.A.

Let us suppose that the group with lower income growth does not, or in some cases cannot, adjust asset accumulation or consumption enough to prevent *D/Y* from rising. What does the framework reveal about sustainability of the household balance sheets? The differential equation 6 has the steady-state solution

$$(7) \qquad \left(D/Y\right)^{*} = \frac{\left(\dot{A}/Y\right)^{*} + \left(C/Y\right)^{*} - 1}{g_Y - (i - \pi)}$$

where the ratios with asterisks represent steady-state values. The form of this equation is instructive. The difference between the real income growth rate and the real interest rate in the denominator is likely to be small. A substantial, permanent reduction in the real income growth rate is likely to cause a huge rise in the steady-state debt-income ratio. Therefore, a fall in the real income growth rate not accompanied by a decline in the consumption-income ratio is almost certainly unsustainable because the financial system will not tolerate a many-fold increase in the household debt-income ratio. In addition, note that in contrast to the analysis of steady-state sovereign debt ratios, which have a similar form, the real interest rate term is not the inflation-adjusted rate on government debt. Rather, it is the real interest rate charged to households, which empirically is usually substantially *higher* than the real growth rate of the income.[4] In this case, starting from stable *D/Y* any change in a single variable on the right side of equation 7 will cause indefinite growth in *D/Y*. Any drop of g_Y without a corresponding drop in *C/Y* is ultimately unsustainable, holding asset accumulation and real interest rates constant.

In this simple framework, it is evident that rising inequality, manifest by stagnating income growth for the lower-income group of households, need not create demand drag immediately, but if this group's consumption-income ratio does not decline, its collective balance sheet becomes more fragile, and, considering realistic parameters for income growth rates and real interest rates, this behavior is almost certainly unsustainable. *Eventually* rising debt forces households with lower income growth to cut back consumption growth and lower the consumption-income ratio.

[4] For example, in the relatively stable decade of the 1990s, the 30-year conventional mortgage rate less inflation measured by the PCE price index averaged 5.8% while aggregate real DPI growth was 3.1%. In the 2000s, despite extremely low mortgage rates, the average real mortgage rate was 4.2% versus 2.6% for real DPI growth (data from the Federal Reserve Bank of St. Louis FRED database).

III. Disaggregated Measures of Household Spending and Balance Sheets

This section presents original data on income growth, spending and balance sheets differed between the bottom 95 percent and top 5 percent of the U.S. income distribution during the period of rising inequality from the middle 1980s through 2007.

A. Income Growth and Spending Rates

We split the income groups at the 95th percentile of the personal income distribution reasons. First, the data we need cannot distinguish a top income group smaller than the top 5 percent. Second, a detailed analysis of debt-income ratios reveals that the ratios rose at about the same rate for a wide variety of household groupings between the 20th and 95th percentiles of the income distribution between 1989 and 2007.[5]

Because our disaggregated tax data are available only starting in 1979, we deviate slightly from the framework of section II, and analyze a pre-tax version of income based on NIPA personal income plus realized capital gains. We estimate that between 1960 and 1980, real income per household grew at an annualized rate of 1.9 percent for households in the bottom 95 percent of the income distribution and 2.1 percent for the top 5 percent.[6] The similar growth rates are consistent with the stable income share data for the same period shown in figure 1. Annualized growth of real income per household for the top 5 percent accelerated to 3.9 percent from 1980 to the start of the Great Recession in 2007 while it fell to 1.1% for the bottom 95 percent.

How did the two groups respond to this structural shift toward rising income inequality? The framework in section II shows that a key variable that connects income growth to balance sheet dynamics is the consumption-income ratio. Disaggregated consumption and spending data are not readily available for the US economy. 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,

[5] Similar results hold for other distributional splits of the data. In particular, we constructed the data presented in this section for the 80th to 95th percentiles. The results for this group are quite similar to the results presented in the text for the entire bottom 95 percent.

[6] We translated the income shares shown in figure 1 into levels of real income (multiplying the shares by aggregate personal income plus realized capital gains), then divided by the number of households in each group. These figures are before taxes and transfers; the data necessary to compute disposable income are not available prior to 1979.

2011). The Federal Reserve's Survey of Consumer Finances (SCF) over-samples high-income households, but it does not contain measures of household spending. To estimate consumption 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.[7] 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 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 this disaggregation are described in the appendix.

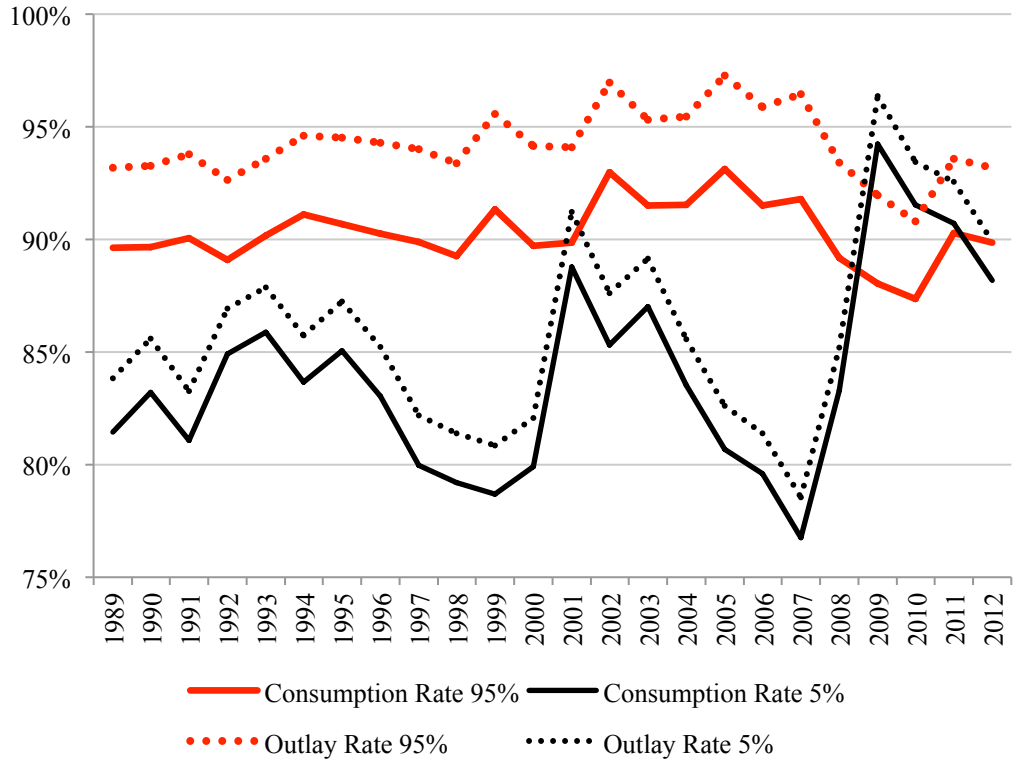
The solid "consumption rate" lines in figure 3 present our disaggregated estimates of the consumption-income ratio, defined as PCE divided by disposable income including realized capital gains.[8] The figure presents several important differences between the two income groups in the years prior to the Great Recession. Not surprisingly, the bottom 95 percent consumes a larger share of disposable income on average (Dynan, Skinner, and Zeldes, 2004, find similar results in their analysis of saving rates out of lifetime income). From 1989 through 2007, prior to the large changes that start with the Great Recession, the average consumption rate for the bottom 95 percent exceeds that for the top 5 percent by about 10 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. Furthermore, as the analysis in section II shows, when faced with slower income growth and higher real interest rates in the early 1980s, the bottom 95 percent needed to cut its consumption rate to prevent putting the debt-income ratio on a likely unsustainable path. Although our data do not begin until 1989, there is no evidence of a lower consumption rate until much later, in Great Recession, more than two decades after the

[7] 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.

[8] Figure 3 extends through 2012, but the final 2012 capital gains data were not yet available at the time of this writing and are based on projections inform the Congressional Budget Office (2013).

inequality began to rise. (We discuss the consumption rate during the Great Recession and its aftermath in detail in section III.C.)

Figure 3 – Disaggregated Personal Consumption and Outlay Rates



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

The consumption rate for the top 5 percent behaves very differently than the fairly smooth time series for the bottom 95 percent through 2007. The volatility of the top 5 percent rate provides clear evidence that this group smoothed consumption relative to income. The first peak of the rate in 1993 occurs during a period of slow income growth around the recession of 1990-91; our measure of top 5 percent real income grew at an annual rate of just 1.3 percent from 1989 through 1994, about a quarter its long-term average from 1980 to 2007. When real income growth of the top 5 percent accelerates dramatically to an annual rate of 8.2 percent from 1994 through 2000, their consumption rate declines. This consumption rate cycle is repeated almost exactly in the 2001 recession and the subsequent swift recovery of top 5 percent income during the middle 2000s (top 5 percent real income growth fell at an annual rate of 9.3 percent between 2000 and 2002 and then rose at 6.6 percent from 2002 to 2007). We argue below that heterogeneity in the dynamics of the consumption rate across the two groups is central to

understanding the role of inequality in the conditions that led up to and triggered the Great Recession.

Consumption is not the only household expenditure. As discussed in section II, 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 from 1989 to the eve of the Great Recession because of rising interest payments, which implies a declining saving rate. There is no evidence, prior to the Great Recession, that the outlay rate *fell* in response to slower income growth of the bottom 95 percent.

Following the framework developed in section II, slower income growth for the bottom 95 percent caused their debt-income ratio to rise, other things equal. Most likely, the only way for this group as a whole to prevent unsustainable growth in its debt-income ratio would have been to reduce its consumption rate so that its outlays relative to income decline (recognizing that outlays include interest, as emphasized by Mason and Jayadev, 2014). As we explain in more detail in the next subsection, drawing down assets is not likely to be a sustainable strategy for this group. The evidence in figure 3 shows that the bottom 95 percent *did not* reduce their consumption rate, and that their outlay rate actually rose modestly, as income inequality rose. These points taken together imply that the debt-income ratio for this group should have risen for the bottom 95 percent. But there is no reason to expect that there were unsustainable balance sheet dynamics for the top 5 percent: their income growth increased and their consumption and outlay rates, while volatile, do not appear to have any significant long-run trend.

B. Rising Balance Sheet Fragility for the Bottom 95 percent

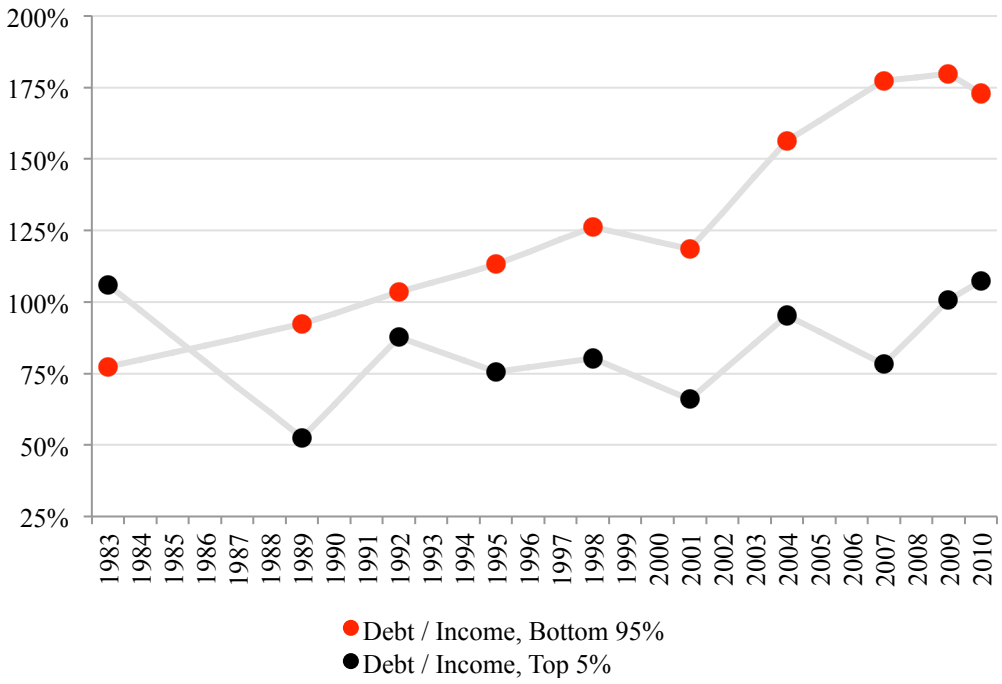
We now turn to analyze how balance sheet variables evolved for the two income distribution groups prior to the Great Recession. Figure 4 presents debt-income ratios. The data are taken from the SCF, which tracks individual household balance sheet and income information, usually every three years. (The first survey occurred in 1983 and the next comparable wave in 1989; a special survey was conducted in 2009.)[9] The SCF measure measures

[9] We thank Romain Ranciere for assistance in obtaining the earliest wave of the SCF data.

pre-tax income including realized capital gains; we use CBO (2013) data to subtract federal income and payroll taxes.[10]

Compare the first observation in 1983 to 2007, the final observation before the onset of the Great Recession. The ratio rises dramatically from 77 percent to 177 percent for the bottom income group. For the top 5 percent, there are some fluctuations, but the ratio is largely without trend.[11] This evidence provides further support that unsustainable household balance sheet dynamics that spawned the Great Recession were concentrated in the bottom 95 percent.

Figure 4 – Household Debt to Disposable Income



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

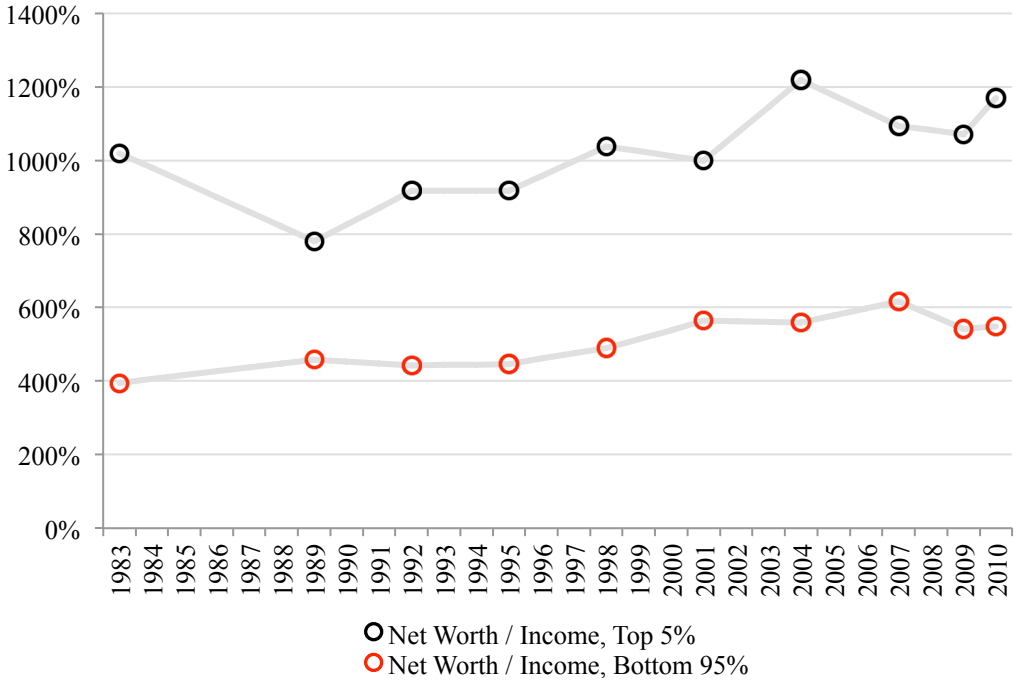
As equation 6 shows, we should consider the extent to which the rise in the debt-income ratio is possibly offset by the change in assets that could be liquidated to pay debt, which might make the rise in the debt-income ratio for the bottom 95 percent more sustainable. Figure 5

[10] The income numbers used in the denominators of figures 4 and 5 do not subtract state and local income taxes because the CBO does not provide data on these items by distribution group.

[11] Also see Boushey and Weller (2008, table 4) who present somewhat different groupings across the income distribution and obtain consistent results through 2004. Our interpretation differs from Krueger and Perri (2006) who propose that higher household debt results from consumption smoothing and rising variance in the transitory component of income. Two aspects of the data are inconsistent with this explanation. First, as discussed in section I, the increase of inequality derives mainly from rising inequality of permanent income. Second, figure 3 shows that consumption smoothing takes place in the top 5 percent, but this group's debt-income ratio did not increase.

presents the ratio of net worth at market value to disposable income for the two groups. The most obvious fact from the figure is that high-income households have much more wealth relative to income than everyone else (despite the fact that their income is much higher). Nonetheless, the net worth ratio for the bottom 95 percent rises over the sample period. This outcome, on the surface, suggests that the massive rise in bottom 95 percent debt shown in figure 4 was offset by rising assets and therefore might not raise sustainability issues. But a more detailed look at the composition of net worth for the bottom 95 percent leads to a different conclusion.

Figure 5—Household Net Worth (at Market Value) to Disposable Income



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

Consider owner-occupied housing. Because people need to live somewhere, rising equity in an owner-occupied home is offset by a rising opportunity cost of living in that house, unless the homeowner literally sells the house and moves into a less costly one. While households surely plan housing consumption by recognizing a tradeoff between residence type and housing expenditure, transaction costs are high enough and habit formation of residential consumption is strong enough that households do not move *en masse* to re-optimize their housing consumption every time housing prices rise. What they might do instead is tap home equity, by using it as collateral for borrowing, but that financial strategy essentially means the household is making a levered bet on continued price appreciation. Not only did faith in the continued rise of home

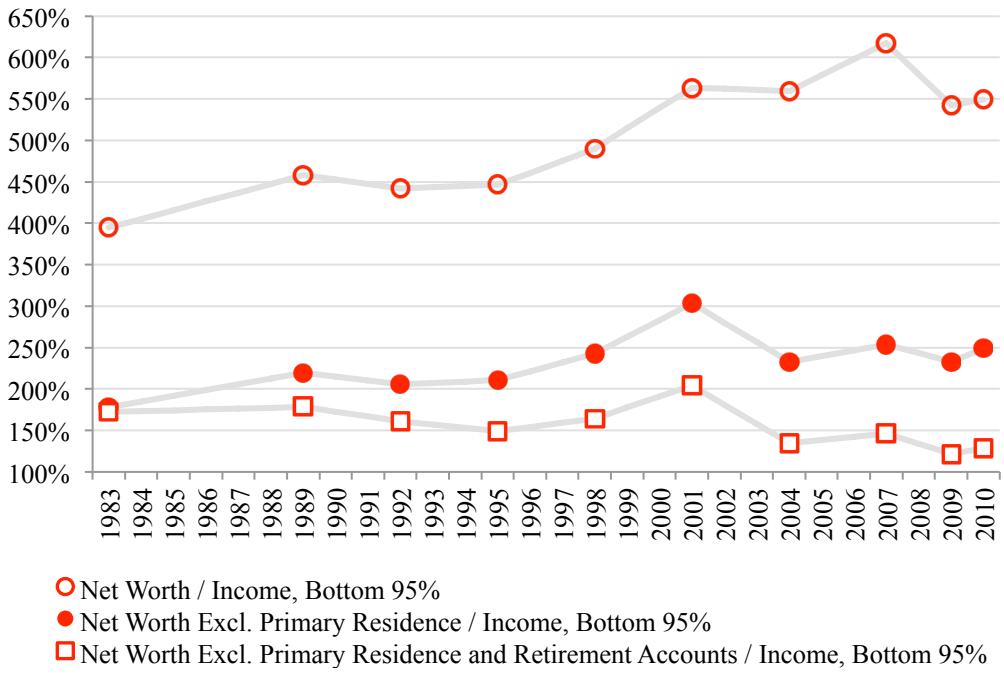
prices ignore evidence that US housing prices have not risen much faster than overall inflation in the long run, but it ignored the offsetting liability that rising home prices imply about rising future rental expense. Only households with very specific circumstances, those who for some reason may have owned substantially more housing than they wished to consume, would actually *choose* to sell their existing house, pay off debt, and not move to another equivalent home. Of course, some households may be *forced* by financial stress to sell a home and reduce housing consumption, but in this case their previous housing consumption turned out to be unsustainable. Effectively, our point is that even though an owner-occupied house appears as an asset on the balance sheet, in most cases it signals an intention to consume future housing services. It is very unlikely to be an asset in which most households park wealth that they intend to use later to pay down debt.

Assets in retirement accounts have similar features. The purpose of these assets is to fund a future consumption plan, not to offset a rise in debt. A simple thought experiment illustrates the point. Suppose that a household funds its retirement account by borrowing, rather than cutting current consumption. When this household reaches retirement, its asset nest egg will be offset by its debt. Unless the asset rate of return far exceeds the interest rate on debt, the household's consumption plan will be unsustainable. In addition, the data come from a period in which retirement finance programs for much of the population switched from defined benefit to defined contribution. Between 1987 and 2007, the number of participants in defined contribution plans increased from 34.9 million to 66.9 million workers and decreased in defined benefit plans from 28.4 million workers to 19.4 million workers (Treasury Inspector General for Tax Administration, 2010). This change means that retirement saving moved from employer balance sheets to the household balance sheets, so that the rise in household net worth is offset to some extent by a corresponding decline in assets held on their behalf by employers.

Figure 6 shows several definitions of the net worth-income ratio for the bottom 95 percent. The top line repeats the ratio with total net worth from figure 5 on a larger vertical scale. The middle line excludes the value of the primary residence (we did not exclude other residential real estate, which might be more easily liquidated). The value of the primary residence accounts for about half of total net worth for the bottom 95 percent and most of the upward trend in the ratio for this group goes away when it is excluded. The bottom line excludes both the value of the primary residence and quasi-liquid retirement assets, such as IRAs. Aside from the stock

price bubble in the late 1990s, this measure trends mostly downward, falling by about 30 percentage points from the beginning to the end of the sample. This time pattern contrasts with different net worth measures for the top 5 percent (not shown), all of which move across time in the same way as the total net worth-income ratio for the top 5 percent in figure 5.

Figure 6—Bottom 95 Percent: Measures of Household Net Worth to Disposable Income



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

These figures show that the rising debt of the bottom 95 percent was, to a large extent, not offset by assets that could be liquidated without reducing current or future consumption (also see Duca et al., 2012). Instead, the net worth evidence for this group along with dramatic rise in their debt and the increase in their outlay rate in the face of lower income growth supports the conclusion of unsustainable consumption by the bottom 95 percent in the aggregate that caused their collective balance sheet to deteriorate to the breaking point. These patterns contrast strongly with the top 5 percent for whom income growth accelerated, debt ratios were stable, and all measures of net worth rose relative to income prior to the Great Recession.

III.C Disaggregated Household Spending and the Great Recession

When the lending and balance sheet expansion of the bottom 95 percent stopped in 2007, the stage was set for the consumption of this group to be forced down, a historic shift that caused

the Great Recession. This kind of dynamic, in the aggregate, was predicted by Hyman Minsky's financial instability theory (see Minsky, 1986, along with Wray, 2008, and Dymski, 2010).[12] Mian and Sufi (2010b) and Dynan (2012) provide evidence that high debt accumulated by households prior to the Great Recession caused lower consumption when the recession hit. The focus in this section is on how the consumption collapse in the Great Recession and its immediate aftermath differed across income groups.

The framework developed in section II shows that the key variable that links household spending behavior to the debt-income ratio is the ratio of consumption to income. The comparison of the consumption-income and outlay-income ratios across the two groups during the Great Recession, from figure 3 above, demonstrates the importance of household heterogeneity as the crisis unfolded. The ratios for the bottom 95 percent drop substantially, in contrast with their behavior in the previous 20 years. Compare, in particular, the absence of any noticeable declines in the 1991 and 2001 recession years with the large drop between 2007 and 2010. This outcome is consistent with the interpretation that households in the bottom 95 percent were consuming and borrowing at unsustainable rates. When new borrowing dried up as the Great Recession began, the bottom 95 percent consumption rate was forced downward.

The contrast between this outcome and the consumption rate for the top 5 percent is striking. Instead of a decline, the top 5 percent consumption rate rises sharply. This group appears to have smoothed consumption, just like it did in earlier periods of slow or declining income growth. The contrasting effects are so large that the top 5 percent actually spent a higher share of their income than the bottom 95 percent in 2009 and 2010. In 2011 and 2012, the consumption and outlay rates for the top 5 percent fell sharply as the recovery takes hold while that for the bottom 95 percent rises somewhat in 2011, but remains well below the levels prior to the recession.

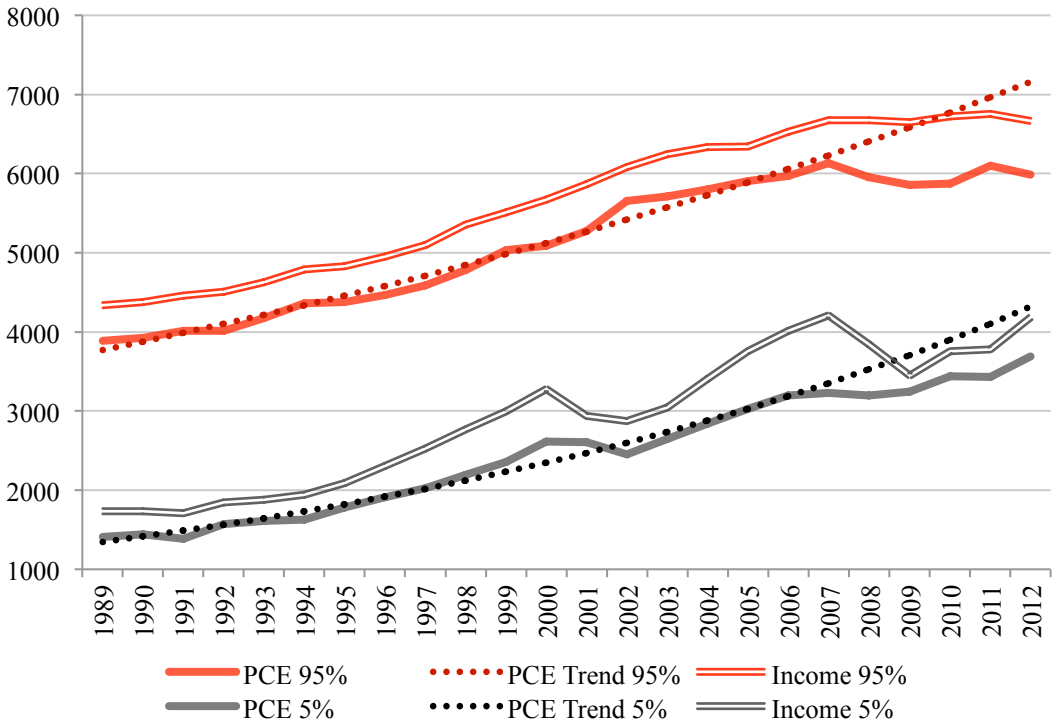
This heterogeneity supports the hypothesis that inequality was central to the macroeconomic dynamics of the household sector before and during the Great Recession. If the spending rate of the bottom 95 percent had remained stable (or even risen like the top 5 percent), the demand drop that caused the recession would have been much less severe. But the fragile

[12] These dynamics were largely predicted by Palley (2002) and Barba and Pivetti (2009); also see Palley (2013a, 2013b). In a series of "Strategic Analyses" published by the Levy Economics Institute, Wynne Godley and his coauthors identify unsustainable trends in household borrowing starting as early as 2004 (see Godley et al. 2008 and 2009 for summaries). Similar implications follow from the theoretical models in Kapeller and Schütz (2012) and Setterfield and Kim (2013).

bottom 95 percent balance sheets prevented any kind of consumption smoothing. Instead it forced the bottom 95 percent to reverse their borrowing and reduce demand.

These changes in consumption have important macroeconomic implications. Figure 7 shows the real levels of income (NIPA disposable personal income plus CBO realized capital gains) and PCE, both deflated by the chained personal consumption expenditure price index, for the two income groups. 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 (4.9 percent per year versus 3.1 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: $1.3 trillion for the bottom 95 percent and $0.5 trillion for the top 5 percent. 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 2.2 percent in the five years prior to the recession to 1.0 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 8.3 percent from 2002 to 2007 to 1.0 percent from 2007 to 2012. With top 5 percent income rebounding, real consumption for this group also seems to be recovering; by 2012 it was up 16 percent from 2009. Bottom 95 percent real consumption in 2012 is just 3 percent above its 2009 level.

Figure 7 - 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. The evidence implies that the bottom 95 percent responded to slower income growth and higher real interest rates, beginning in the early 1980s, by taking on more debt rather than by reducing consumption enough to keep its debt-income ratio stable. This outcome, in a sense, *temporarily* rescued the U.S. economy from the demand drag that many theories 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 0.92 in 1989 to 1.77 in 2007 on the eve of the Great Recession. By 2007, the debt of the bottom 95 percent was about $6.6 trillion higher than the level that would have been required to keep the debt-income ratio constant at its 1989 level. The income share (before taxes and transfers) of the bottom 95 percent over the same period fell from 71.5 percent in 1989 to 61.3 percent in 2007. How do these two major changes in the financial circumstances of the bottom 95 percent relate to each other? We estimate that if the before-tax income share of the bottom 95 percent had remained at 71.5 percent in 1989 the

bottom 95 percent would have cumulatively earned $7.4 trillion dollars more (after taxes and transfers) 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 and modestly *decreased its debt-income ratio* if this group's income share had not declined after 1989. 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.

IV. Why Did the Bottom 95 Percent Let Its Balance Sheet Deteriorate?

The data presented here support the argument that it simply was not possible for the bottom 95 percent to maintain their 1990s and 2000s rates of consumption and debt growth their income growth rate dropped. The results locate the balance sheet fragility and the subsequent demand collapse of the Great Recession in the group that lost ground as inequality in the personal distribution of income rose. We argue in this section that rising income inequality helps to *explain* why the bottom 95 percent did not cut consumption to stabilize its collective balance sheet. This argument rests on the influence of social interaction among consumers in a context of uncertainty, particularly comparisons with those who occupy a higher place in the income distribution. Social comparisons and expanded credit availability presented households with both the impetus and the means to pursue unsustainable consumption rates as inequality increased.

A model of consumption and saving should explicitly recognize the limitations that the decision makers face and the behavioral assumptions that arise from the tools households use in their best attempt to make decisions. Cognitive limitations may lead them to follow rules-of-thumb (Shefrin and Thaler, 1998), like saving a certain percentage of each paycheck or trying to avoid using debt for purchases of non-durable goods. These heuristics do double-duty: they lighten the cognitive load of decision making and they can eliminate the threats to self-control (see Schelling, 1984 and Ainslie, 2005).

There are at least two important implications of accepting that decision makers use heuristic rules to overcome their cognitive, information, and motivation limitations. First, when

circumstances change, they do not immediately recognize the changes and update their behavior to the new optimum; indeed one of the key virtues of strategies like rules-of-thumb is that they can be used again and again *without* incremental effort to observe and judge the particulars of the present decision. Second, individuals do not derive their heuristic rules from first principles. Rather, rules-of-thumb are learned from and validated by one's social environment, including families, friends, and the media.

The interactions between changes in the environment and behavior driven by rules-of-thumb are particularly important. Sometimes the environment deviates from the norm temporarily, in which case rules-of-thumb may perform well. Other times, the environment deviates from the norm steadily over time, and individuals may well fail to observe that the conditions relevant to their decisions have changed. For the same reason that individuals rely on heuristics in the first place, we should expect that they will have difficulty knowing when the map they are using no longer matches the features of the uncertain world.

We argue in Cynamon and Fazzari (2008, 2013a) that most consumption and saving decisions made by households consist of small adjustments to their prior plans, because most often the outside world typically delivers only small deviations from their prior expectations. We go one level deeper, though, and argue that the preferences that inform those longer-term plans in the first place are mediated by more fundamental—perhaps largely implicit—decisions people make about the communities that they reside in, the people that they socialize with, and lifestyles (as distinct from consumption bundles) that they strive to attain. These considerations dictate the consumption and financial choices that are modeled for households by others they look to for external validation. Household decision makers face uncertainty about future labor income, job security, asset market returns, longevity, etc. which muddles their choices about how much to spend and save and how to structure their balance sheets. To reach decisions in this foggy environment, people look to reference groups that dictate what they view as normal, an important force for anchoring expectations and behavior in the context of uncertainty. Reference groups provide conduits for modeling and exchanging information that inform basic preferences as well as decision-making heuristics.[13]

[13] Lavoie (1994) interprets a long literature, going back to Veblen (1899 [2001]), that proposes a model of household decision making under "procedural rationality," which he describes as an inherently social phenomenon in which consumer choices are made "in conformity with social norms" (page 545). Lavoie (2014, chapter 2, section

Agents have a limited ability to do one or more of the following: make, update, or follow through with an optimal intertemporal consumption and saving path. As a result, they test their expectations and consumption and saving habits against those of reference groups that they pick based on their identity. This identity is developed and shaped over time by repeated social interactions, and it helps individuals make consumption decisions by informing them about the consumption bundle that is normal.[14] Because the identity that governs one's reference groups and norms is crafted over a lifetime, it operates as ballast, making agents' plans quite sticky. Elsewhere, we have defined the *consumption norm* as the standard of consumption an individual considers normal based on his or her identity (Cynamon and Fazzari, 2008, 2013a). Consumption norms and related financial norms are so influential because they mimic in both purpose and form the rule-of-thumb tools that research has shown help individuals to make choices in complex and uncertain environments, and they share the characteristics of being acquired slowly over time and stubbornly resisting modification.

Returning to our main theme, we propose that this behavioral foundation links rising inequality of personal incomes directly to the unsustainable consumption and debt choices of the bottom 95 percent of the income distribution. First, when income growth slows, consumption norms do not deviate from recent patterns; households will have a strong tendency to maintain their consumption path if they can. This point follows from the "habit persistence theory" proposed by Marglin (1984). Second, rising income inequality itself tends to exert upward pressure on consumption norms as each person is more likely to reference aspects of costlier lifestyles displayed by others with more money.[15] This idea is captured by the "relative income hypothesis" proposed by Duesenberry (1952) and the concept of expenditure cascades developed by Levine et al. (2010). Their model is based on an asymmetry in the way people perceive the behavior of others to form consumption norms: "people generally look to others above them on the income scale rather than to those below" (page 7). In other words, there is a tendency for people to define their reference groups upward. This argument implies that the spending rate of the bottom 95 percent after their income growth slowed was to an important extent an attempt to

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3), Belabed et al. (2013) and van Treeck (2013) provide in-depth discussion and extensive references related to the topics discussed in this section.

[14] In the marketing literature, reference group effects have been examined by several researchers, including Bearden and Etzel (1982) and Childers and Rao (1992).

[15] See Frank (2005), Rajan (2011), and the survey in Van Treeck (2013).

follow persistent norms that pushed them to maintain their own historical consumption path and to keep up with reference groups whose incomes were rising more quickly.

This desire alone, however, was not sufficient to generate the spending and balance sheet dynamics of the bottom 95 percent. For these households to maintain or even increase their consumption and outlay rates (with the latter including interest on outstanding debt) after a decline of income growth they needed access to new borrowing, which expanded greatly during this period. New information technology made it easier to obtain (e.g., credit scores). Tax law changes spurred financial innovation that greatly increased the availability of home equity lines of credit. Securitization and other "supply side" innovations in credit gave lenders the incentive to expand household lending. And falling interest rates over two decades encouraged cash-out refinancing of mortgages. This enhanced access to credit interacted with another behavioral norm to feed ultimately unsustainable household finance (see Duca et al., 2012). The hyperbolic discounting model of Laibson (1997) shows that institutional constraints on access to debt can protect individuals from their impatience and tendency to spend in time-inconsistent ways. Financial products that encouraged mortgage equity withdrawal obliterated this constraint, providing "too much liquidity." We propose that it was the combination of the desire to maintain consumption norms, relative to both one's own history and relative to the behavior of others, together with greater access to credit that drove the unsustainably behavior of the bottom 95 percent.

Recent empirical work supports the prediction that rising inequality in the personal distribution of income is an important factor in explaining high consumption and debt growth of the middle class. 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. Carr and Jayadev (2012) provide strong evidence in favor of what they call "Veblen effects" that leverage ratios rise 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 significantly for households in the middle of the distribution. The International Institute for Labor Supply (2011), Kumhof et al. (2012), and Behringer and van Treeck (2013) link rising inequality in personal

income to lower current account balances in the US (suggesting higher consumption), a result that is predicted by the model in Belabed et al. (2013).[16]

These results support the view that the combination of rising income inequality and increasing access to credit help to explain the unsustainable balance sheet dynamics in the bottom 95 percent. It may have been unreasonable for these households to believe that the favorable macroeconomic trends necessary to justify their increasingly precarious financial positions (i.e., falling interest rates, easier lending terms, and rapidly appreciating home prices) would continue indefinitely. But in the context of a behavioral model of consumption and financial choices under uncertainty, these behaviors persisted not because they were the sustainable solution to a household's optimization problem, but because they were validated by experience, year-by-year for about two decades. For an extended period, middle-income households who were falling behind high-income households were able to drive their leverage up without deviating from established norms of behavior, in both spending and financing, that they observed in their reference groups. As the empirical results in section III demonstrate, however, these trends were on a collision course with reality. When the Great Recession hit, the bottom 95 percent could no longer maintain consumption norms by borrowing. Credit availability collapsed quickly, forcing deleveraging and reduced spending.

V. 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: a dramatic rise of income inequality and an increase in the household debt-income ratio. 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. In summary:

- Rising inequality in the personal distribution of income occurred in large part due to slower income growth for the bottom 95 percent.
- Slower income growth, along with rising real interest rates, implied that the bottom 95 percent would have to cut its consumption rate to maintain a sustainable debt-income ratio.

[16] Goda and Lysandrou (2014) propose that rising inequality helped cause the rise in debt to lower income groups because the reach for yield among wealthy individuals increased this group's demand for mortgage-backed assets and encouraged aggressive lending to lower-income households.

- Because the bottom 95 percent did not cut its consumption rate, its aggregate debt-income ratio exploded. The end of this unsustainable dynamic coincided with the onset of the Great Recession.
- The consumption rate of the bottom 95 percent fell significantly as the recession unfolded (unlike earlier recessions) as 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* after 2007.
- Research that explores the effect of social norms and positional effects on household behavior under uncertainty implies that rising inequality was likely an important reason that the bottom 95 percent maintained, even increased, their consumption rates despite the unsustainable consequences for their collective balance sheet.

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. 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 unusually sluggish recovery of consumption in the Great Recession is immediately evident in 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 7. We argue that the economy *needed* the pre-recession trend growth of PCE to attain full employment. But the data presented here show that this demand growth before 2008 could not continue due to the unsustainable way it was financed.

Of course, the idea that the household sector must "deleverage" before strong demand growth can resume has been widely discussed since the 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 add two dimensions to this point. First, the group that took on the debt in the first place must deleverage, which is also the group that lost out to rising inequality. It is doubly disadvantaged, because it must reduce consumption to both realign it to income and to pay down its debt. Second, deleveraging alone may not be adequate to remove the "headwind" to 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 US economy must now confront even as debt burdens return to more sustainable levels.

A first step toward resolving the problem is to have a clear understanding that rising inequality goes beyond the issue of social justice. The evidence and interpretations offered here argue that greater inequality also compromises the demand engine that was necessary for acceptable macroeconomic results in the US prior to the Great Recession, and greater inequality threatens demand growth and employment going forward.

References

Aguiar, M.A. and M. Bils. 2011. Has consumption inequality mirrored income inequality? Working paper no. w16807, National Bureau of Economic Research.

Ainslie, G. 2005. Précis of breakdown of will, *Behavioral and Brain Sciences,* vol. 28, no. 5, 635-673.

Alvaredo, F., A.B. Atkinson, T. Piketty, and E. Saez. 2013. The world top incomes database, retrieved October 30, 2013.

Barba, A. and M. Pivetti. 2009. Rising household debt: its causes and macroeconomic implications—a long-period analysis, *Cambridge Journal of Economics,* vol. 33, no. 1,113-137.

Barbosa-Filho, N.H., C. R. von Arnim, L. Taylor, and L. Zamparelli. 2008. Cycles and trends in US net borrowing flows, *Journal of Post Keynesian Economics,* vol. 30, no. 4, 623-648.

Behringer, J. and T. van Treeck. 2013. Income distribution, aggregate demand and current account: a sectoral perspective, IMK working paper 125-2013.

Belabed, C.A., T. Theobald, and T van Treeck. 2013. Income distribution and current account imbalances, IMK working paper 126-2013.

Bearden, W.O. and M.J. Etzel. 1982. Reference group influence on product and brand purchase decisions, *Journal of Consumer Research*, vol. 9, no. 2, 183–194.

Bertrand, M. and A. Morse. 2013. *Trickle-down consumption*. No. w18883. National Bureau of Economic Research.

Brown, C. 2004. Does income distribution matter for effective demand? Evidence from the United States. *Review of Political Economy,* vol. 16, no. 3, 291-307.

Boushey, H. and C.E. Weller. 2008. Has growing inequality contributed to rising household economic distress? *Review of Political Economy,* vol. 20, no. 1, 1-22.

Carr, M. and A. Jayadev. 2012. Relative income and indebtedness: evidence from panel data. manuscript, October (2012).

Childers, T.L. and A.R. Rao. 1992. The influence of familial and peer-based reference groups on consumer decisions. *Journal of Consumer Research*, vol. 19, no. 2, 198–211.

Congressional Budget Office. 2012. The distribution of household income and federal taxes, 2008 and 2009. Paper < http://www.cbo.gov/sites/default/files/cbofiles/attachments/43373-

06-11-HouseholdIncomeandFedTaxes.pdf> and Supplemental Tables < http://www.cbo.gov/sites/default/files/cbofiles/attachments/43373-Supplemental_Tables_Final.xls>, accessed September 10, 2012.

Congressional Budget Office. 2013. Individual income tax receipts and the individual tax base—February 2013 baseline. <http://www.cbo.gov/publication/43901>, accessed September 4, 2013.

Cynamon, B.Z. and S.M. Fazzari. 2008. Household debt in the consumer age: source of growth--risk of collapse, *Capitalism and Society,* vol. 3, no. 2.

_____ and _____. 2013a. Household spending and debt: sources of past growth—seeds of recent collapse, in Cynamon, B.Z., S.M. Fazzari, and M. Setterfield, eds., *After the Great Recession The Struggle for Economic Recovery and Growth*. New York: Cambridge University Press, chapter 6, 127-157.

_____ and _____. 2013b. No need to panic about U.S. government deficits, in Cynamon, B.Z., S.M. Fazzari, and M. Setterfield, eds., *After the Great Recession The Struggle for Economic Recovery and Growth*. New York: Cambridge University Press, chapter 11, 264-280.

_____, _____, and M. Setterfield. 2013. Understanding the Great Recession, in Cynamon, B.Z., S.M. Fazzari, and M. Setterfield, eds., *After the Great Recession The Struggle for Economic Recovery and Growth*. New York: Cambridge University Press, chapter 1, 1-30.

Debacker, J., B. Heim, V. Panousi, S. Ramnath, and I. Vidangos. 2013. Rising inequality: transitory or persistent? New evidence from a panel of US tax returns, *Brookings Papers on Economic Activity,* vol. 2013, no. 1, 67-142.

Duca, J.V., J. Muellbauer, and A. Murphy. 2012. *How financial innovations and accelerators drive booms and busts in US consumption*. mimeo, Federal Reserve Bank of Dallas.

Duesenberry, J.S. 1952. *Income, Saving and the Theory of Consumer Behavior*. Cambridge, MA: Harvard University Press, second printing.

Dutt, A.K. 2006. Maturity, stagnation and consumer debt: a Steindlian approach, *Metroeconomica*, vol. 57, no. 3, 339-364.

Dymski, G.A. 2010. Why the subprime crisis is different: a Minskyian approach. *Cambridge Journal of Economics,* vol. 34, no. 2, 239-255.

Dynan, K. 2012. Is a household debt overhang holding back consumption? *Brookings Papers on Economic Activity,* vol. 2012, no. 1, 299-362.

_____, J. Skinner and S.P. Zeldes. 2004. Do the rich save more? *Journal of Political Economy*, vol. 112, no. 2, 397-444.

Frank, R.H. 2005. Positional externalities cause large and preventable welfare losses, *American Economic Review,* vol. 95, no. 2, 137-141.

Goda, T. and P. Lysandrou. 2014. The contribution of wealth concentration to the subprime crisis: a quantitative estimation, *Cambridge Journal of Economics,* vol. 38, no. 2, 301-327

Godley, W., D.B. Papadimitriou, G. Hannsgen, and G. Zezza. 2007. The U.S. economy: is there a way out of the woods? Levy Economics Institute, Strategic Analysis, November, 2007.

Godley, W., D.B. Papadimitriou, and G.Zezza. 2008. Prospects for the United States and the world: a crisis that conventional remedies cannot resolve. Levy Economics Institute, Strategic Analysis, December, 2008.

International Institute for Labour Studies. 2011. Determinants of global imbalances, EC-IILS Joint Discussion Paper Series 4.

Kapeller, J. and B. Schütz. 2012. Debt, boom, bust: a theory of Minsky-Veblen cycles. No. 1214. Working Paper, Department of Economics, Johannes Kepler University of Linz.

Kopczuk, W., E. Saez, and J. Song. 2010. Earnings inequality and mobility in the United States: evidence from Social Security data since 1937, *Quarterly Journal of Economics*, vol. 125, no. 10, 91-128.

Korty, D. 2008. Comment on household debt in the consumer age: source of growth--risk of collapse (by Barry Z. Cynamon and Steven M. Fazzari), *Capitalism and Society,* vol. 3, no. 3.

Krueger, D. and F. Perri. 2006. Does income inequality lead to consumption inequality? Evidence and theory, *Review of Economic Studies,* vol. 73, no. 1, 163-193.

Kumhof, M. and R. Ranciere. 2010. Inequality, leverage and crises, IMF Working Paper.

Kumhof, M., C. Lebarz, R. Ranciere, A. Richter, and N. A. Throckmorton. Income inequality and current account imbalances. IMF Working Paper (2012).

Kumhof, M., R. Ranciere, and P. Winant. 2013. Inequality, leverage and crises: the case of endogenous default, IMF Working Paper.

Laibson D. 1997. Golden eggs and hyperbolic discounting, *Quarterly Journal of Economics,* vol. 112, no. 2, 443-477.

Lavoie, M. 1994. A Post Keynesian approach to consumer choice, *Journal of Post Keynesian Economics*, vol. 16, no. 4, 539-62.

_____. 2014. *Post-Keynesian Economics: New Foundations*, Edward Elgar.

Levine, A.S., R.H. Frank, and O. Dijk. 2010. Expenditure cascades, available at SSRN: http://ssrn.com/abstract=1690612 or http://dx.doi.org/10.2139/ssrn.1690612

Maki, D. and M. Palumbo. 2001. Disentangling the wealth effect: a cohort analysis of household saving in the 1990s. Federal Reserve Board Finance and Discussion Series working paper no. 2001-21.

Mason, J.W. and A. Jayadev. 2014a. 'Fisher dynamics' in US household debt, 1929-2011, *American Economic Journal: Macroeconomics*, vol. 6, no. 3, 214-34.

Mason, J.W. and A. Jayadev. 2014b. The post-1980 debt disinflation: an exercise in historical accounting, working paper, May.

Mian, A. and A. Sufi. 2010a. The great recession: Lessons from microeconomic data, *The American Economic Review,* vol. 100, no. 2, 51-56.

_____ and _____.2010b. Household leverage and the recession of 2007–09, *IMF Economic Review,* vol. 58, no. 1, 74-117.

_____ and _____. 2011. House prices, home equity-based borrowing, and the US household leverage crisis, *American Economic Review*, vol. 101, no. 5, 2132-56.

Marglin, S.A. 1984. *Growth, Distribution, and Prices*, Cambridge, MA: Harvard University Press.

Minsky, H.P. 1986. *Stabilizing an Unstable Economy*, New Haven: Yale University Press.

Onaran, Ö., E. Stockhammer, and L. Grafl. 2011. Financialisation, income distribution and aggregate demand in the USA, *Cambridge Journal of Economics,* vol. 35, no. 4, 637-661.

Palley, T.I. 1994. Debt, aggregate demand and the business cycle: an analysis in the spirit of Kaldor and Minsky, *Journal of Post Keynesian Economics,* vol. 16, no. 3, 371-90.

_____. 2002. Economic Contradictions Coming Home to Roost? Does the US Economy Face a Long-Term Aggregate Demand Generation Problem? *Journal of Post Keynesian Economics,* vol. 25, no. 1, 9-32.

_____. 2013a. America's exhausted paradigm: macroeconomic causes of the financial crisis and Great Recession, in Cynamon, B.Z., S.M. Fazzari, and M. Setterfield, eds., *After the Great*

Recession The Struggle for Economic Recovery and Growth. New York: Cambridge University Press, chapter 2, 31-60.

_____. 2013b. *Financialization: The Economics of Finance Capital Domination*. Palgrave Macmillan.

Piketty, T. and E. Saez. 2007. Income and wage inequality in the United States, 1913-2002. *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*.

Rajan, R.G. 2011. *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton University Press.

Reich, R.B. 2012. *Beyond Outrage: Expanded Edition: What Has Gone Wrong with Our Economy and Our Democracy, and How to Fix It*. Random House Digital, Inc.

Schelling, T.C. 1984. *Choice and Consequence*. Harvard University Press.

Setterfield, M., ed. 2010. *Handbook of Alternative Theories of Economic Growth*. Edward Elgar Publishing.

_____. 2013. Wages, demand, and U.S. macroeconomic travails: diagnosis and prognosis, in Cynamon, B.Z., S.M. Fazzari, and M. Setterfield, eds., *After the Great Recession The Struggle for Economic Recovery and Growth*. New York: Cambridge University Press, chapter 7, 158-184.

_____ and Y.K. Kim. 2013. Debt servicing, aggregate consumption, and growth.,Trinity College working paper No. 1316.

Shefrin, H.M. and R.H. Thaler. 1988. The behavioral life-cycle hypothesis, *Economic Inquiry*, vol. 26, no. 4, 609-43.

Stiglitz, J.E. *The Price of Inequality: How Today's Divided Society Endangers our Future*. WW Norton & Company, 2012.

Stockhammer, E. 2013. Rising inequality as a cause of the present crisis, *Cambridge Journal of Economics,* bet052.

Treasury Inspector General for Tax Administration. 2010. Statistical Trends in Retirement Plans. August 9, 2010. Reference Number: 2010-10-097.

Tymoigne, E. 2014. Measuring macroprudential risk through financial fragility: a Minskian approach, *Journal of Post Keynesian Economics,* vol. 36, no. 4, 719-44.

van Treeck, T. 2013. Did inequality cause the U.S. financial crisis? *Journal of Economic Surveys*, vol. 28, no. 3, 421-48.

_____, and S. Sturn. 2012. *Income inequality as a cause of the Great Recession? A survey of current debates*. ILO, Conditions of Work and Employment Branch.

Veblen, T. 1899. *The Theory of the Leisure Class*. New York: Random House Modern Library Edition, 2001. Originally published as *The Theory of the Leisure Class: An Economic Study of Institutions,* New York: Macmillan, 1899.

Wray, L.R. 2008. Lessons from the subprime meltdown, *Challenge,* vol. 51, no. 2, 40-68.

Appendix: 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) $$C_j = DI_j - S_j - Tr_j$$

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 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) $$\alpha_j^F = {S_j^F}\Big/{DI}$$

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) $$S_5 + S_{95} = S.$$

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.[17] That is we impose the constraint that

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

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

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

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

These figures are used in equation A1.

The next step is to disaggregate disposable income. We begin with NIPA personal 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 for pre-tax income including realized capital gains 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 the sum of NIPA personal income and aggregate realized capital gains (obtained from the CBO, 2013) yields disaggregated measures of personal income consistent with the conceptual framework presented in section II. The next step involves disaggregating NIPA personal transfer *receipts* and NIPA personal tax payments (the two items that account for the difference between personal income and disposable personal income) and adjusting our disaggregated measures of personal income to provide the DI_{95} and DI_5 data for equation A1.

[17] 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.

We disaggregate the transfer variable from equation A1 in two parts. Personal interest payments include interest on non-residential debt only. [18] 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 transfer payments 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) $$\beta_j = \left(DI_j - S_j\right)/DI_j.$$

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.

We also need a disaggregated income measure to compute the ratio of consumption to disposable income. As discussed in section II, 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 CBO provides data on aggregate realized capital gains (available through 2011 as of this writing). In a special report, Congressional Budget Office (2012), 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.[19]

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

[18] Mortgage interest is treated as an expense in the homeowners' imputed income calculation and is already deducted in the disposable personal income data.

[19] 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.

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 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 equivalizing 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 equivalizing 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.