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DECONSTRUCTING HOUSEHOLD WEALTH TRENDS IN THE UNITED STATES, 1983 - 2013

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ABSTRACT

I use the Survey of Consumer Finances (SCF) to analyze wealth trends from 1983 to 2013. Asset prices plunged between 2007 and 2010 but then rebounded from 2010 to 2013. Median wealth plummeted by 44 percent over years 2007 to 2010 and wealth inequality was up sharply. These two movements can be traced to the high leverage of middle class families, the high share of homes in their portfolio, and the drop in house prices. There was virtually no change in median wealth and wealth inequality from 2010 to 2013 according to the SCF despite the recovery in asset prices. A decomposition analysis based on "pseudo-panels" indicates that for the middle three wealth quintiles, capital revaluation explained virtually all of the change in simulated mean wealth over the 1983-1989, 1989-2001, 2001-2007, 2007-2010, and 2010-2013 periods, and implicit savings were negative. Trends in inequality as measured by the change in the P99/P2080 ratio largely reflected differences in rates of return and savings rates between the top one percent and the middle three wealth quintiles. Over 1983-1989, the higher savings rate of the top group explained all the increase. Over 1989-2001, 2001-2007, and 2010-2013, their higher savings rate led to an increase in the P99/P2080 ratio but this was offset by the higher rate of return of the middle group, which lowered inequality. Over years 2007-2010, both the higher savings rate of the top group and their higher rate of return contributed about equally to the rise in the P99/P2080 ratio.

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1. Introduction

The paper explores wealth trends in the U.S. from 1983 to 2013 on the basis of the Survey of Consumer Finances (SCF), with particular attention paid to the "middle class," defined here as the three middle wealth quintiles, and to the 2007-2010 and 2010-2013 periods. The paper has two main parts. The first provides background on household wealth trends in the U.S. from 1983 to 2013. The second provides a decomposition of wealth trends based on "pseudo-panels" into changes from real rates of return on wealth, household savings, and net inheritances and gifts.

The division of wealth changes into a savings and capital gains component is largely motivated by a desire to understand the sources of wealth accumulation over the lifetime. If savings (income less consumption) play the predominant role, then it seems possible that a family starting from scratch can amass considerable resources over the lifetime. Conversely, if capital appreciation is the principal element, then inherited wealth (and future capital gains on it) is likely to play the prime role in accounting for the accumulation of wealth over the lifetime.[1] Piketty and Zucman (2014, p. 1286), for example, concluded that new savings explained 72 percent of the accumulation of national wealth in the U.S. between 1970 and 2010.

A special feature of the paper is that savings estimates will based on the SCF. There are two other principal sources of savings data. The first is the National Income and Product Accounts (NIPA), which is the standard source of data on *overall* personal savings. However, it does not provide details on savings by income class or demographic characteristic. The second is the Consumer Expenditure Survey (CE), which is now the only source available to provide information on savings by income class and other demographic characteristics. The CE also collects information on assets and liabilities to help assess changes in expenditures. One of the main problems with the asset and liability data from this source is that missing data for these items are not imputed, unlike entries for missing income and expenditures (see, for example, Sabelhaus , et. al., 2015 for a discussion of the reliability of the CE income data). Thus, the use of the CE data for assessing net worth is limited.

The basic method relies on decomposition analysis, as established in Wolff (1999). Not only do I investigate the savings of the middle wealth class but I will also examine time trends in the

savings of the very rich (the top one percent of the wealth distribution) and the rich (the next 19% of the wealth distribution).

A little background is in order. From 1983 to 2007, median net worth (the wealth of the average household) grew robustly, averaging 1.6 percent per year in real terms. However, from 2007 to 2010, when asset prices collapsed, median wealth plummeted by an astounding 44 percent. From 2010 to 2013, there was no recovery in median wealth even though asset prices largely recovered.

The key to understanding the plight of the middle class (in this case, the middle three wealth quintiles) over the Great Recession was their high degree of leverage and the high concentration of assets in their home. The steep decline in middle class net worth between 2007 and 2010 was attributable mainly to a very high negative rate of return on net worth (-10.6 percent per year). This, in turn, was due to the precipitous fall in home prices (by 24% in real terms) and the very high leverage of the middle class (a ratio of debt to net worth of 0.61).

However, this is not the whole story. On the basis of the returns on wealth, middle class wealth should have fallen by only 27 percent, instead of the actual 44 percent. The discrepancy is due to a high rate of *dissavings* (negative savings). This took the form of plunging asset ownership rates (their homeownership rate, for example, plummeted from 77 to 68 and the proportion with a pension account from 53 to 46 percent) and drawing down the remaining balances on their assets.

With regard to the failure of median net worth to show any improvement over years 2010 to 2013, the whole story is dissavings. Asset prices more than recovered from 2010 to 2013, except for housing, which was still up by 8 percent (in real terms). On the basis of rates of return, median net worth should have increased by 36 percent. Substantial dissavings over this period accounted for the failure of wealth to grow. This can be traced to the depletion of assets. The homeownership rate fell from 68.0 to 66.7 percent, holdings of pension accounts from 45.8 to 44.4 percent, that of unincorporated businesses from 8.2 to 6.6 percent, and that of stocks and financial securities from 15.3 to 14.2 percent.

There was some good news over the Great Recession: the middle class was paying down its debt and the debt of the middle class declined markedly (by 31 percent in real terms from 2007 to 2013). Part of the asset depletion over these years was to reduce its debt. However, the reduction in assets was greater than the reduction of debt.

The likely reason for the high dissavings rate of the middle class over both the 2007-2010 and the 2010-2013 periods is income stagnation (actually, a reduction in median income over these

[1] See, for example, Blinder (1988) for a discussion of this issue.

years). It appears that the middle class was depleting its assets to maintain its normal level of consumption. I will also rely on the CE to provide some help in addressing this issue. I will look at published estimates of expenditures over this time period in order to uncover difference over time by income group. If it is true that expenditures (in constant dollars) varied relatively little over this time period, then my hypothesis that the middle class was maintaining its regular level of consumption will be confirmed.

The collapse in middle class wealth from 2007 to 2013 is a key factor in explaining middle class "malaise" (and, perhaps, the rise of Donald Trump). Net worth and savings are important elements in economic security. While the middle class has been paying down its debts it has also been draining its assets. The depressing state of its balance sheets appears to be a major reason for middle class insecurity.

The rest of the paper is organized as follows: Section 2 provides historical background on wealth trends from 1962 to 2013. This section will provide motivation for the decomposition analysis of Section 3. Conclusions are drawn in Section 4.

2. Background on wealth trends, 1983 to 2013.

This section considers household wealth trends from 1983 to 2013. Particular attention is given to the years of the "Great Recession," 2007 to 2013, and to how the middle class fared in terms of wealth over these years. Years 2007 to 2010 saw one of the sharpest contractions in stock and real estate prices, while years 2010 to 2013 witnessed a recovery in asset prices. The debt of the middle class exploded from 1983 to 2007, already creating a very fragile middle class in the United States. Did their position deteriorate even more over years 2007-2013?

Four specific issues are addressed here. (1) What happened to median household wealth, particularly from 2007 to 2013? (2) Did the inequality of household wealth rise over time, particularly over the Great Recession? (3) Did the debt of the middle class increase over time? (4) What are the trends in home ownership and home equity and what happened from 2007 to 2013? By 2013, we are able to see the fall-out from the financial crisis and associated recession.

One of the key features of this section is to highlight the role of "leverage" (the ratio of debt to net worth) in explaining movements in household wealth. It will be seen that the collapse in median wealth between 2007 and 2010 was largely due to the high leverage of the middle class (as well as the steep drop in house prices). Moreover, the sharp jump in wealth inequality over these years can be traced to *differential* leverage between the rich and the middle class.

The rest of this section is organized as follows. Section 2.1 provides some historical

background on asset price movements. Section 2.2 discusses the measurement of household wealth and describes the data sources used for this study. Section 2.3 presents results on time trends in median and average wealth holdings, Section 2.4 on changes in the concentration of household wealth, and Section 2.5 on the composition of household wealth. In Section 2.6 I provide an analysis of the effects of leverage on wealth movements, particularly in regard to how it impacted households during the Great Recession. Section 2.7 summarizes the findings of Section 2.

Previous work (see Wolff, 1987, 1994, 1998, 2002, and 2011), using the SCF, presented evidence of sharply increasing household wealth inequality between 1983 and 1989 followed by little change between 1989 and 2007. Both mean and median wealth holdings climbed briskly from 1983 to 2007. However, most of the wealth gains from 1983 to 2007 were concentrated among the richest 20 percent of households. Moreover, despite the buoyant economy over the 1990s and 2000s, overall indebtedness rose among American families, particularly those in the middle class.

In this section, I look at wealth trends from 1983 to 2013. Asset prices plunged between 2007 and 2010 but then rebounded from 2010 to 2013. The most telling finding is that median wealth plummeted by 44 percent over years 2007 to 2010, almost double the drop in housing prices, and by 2010 was at its lowest level since 1969. The inequality of net worth, after almost two decades of little movement, was up sharply from 2007 to 2010. Relative indebtedness expanded from 2007 to 2010, particularly for the middle class, though the proximate causes were declining net worth and income. In fact, the average debt of the middle class fell by 25 percent in real terms. The sharp fall in median net worth and the rise in overall wealth inequality from 2007 to 2010 are traceable primarily to the high leverage of middle class families and the high share of homes in their portfolio. Rather remarkably, there was virtually no change in median wealth from 2010 to 2013 despite the rebound in asset prices. The proximate cause was the high dissavings of the middle class. Relative indebtedness fell for the middle class as outstanding debt continued to drop.

2.1 Recent trends in asset prices

The last two decades witnessed some remarkable events. Perhaps, most notable is the housing value cycle which first led to an explosion in home prices and then a collapse, affecting net worth and helping to precipitate the Great Recession, followed by a modest recovery. The median house price was virtually the same in 2001 as in 1989 in real terms.[2] However, the homeownership

[2] The source for years 1989 to 2007 is Table 935 of the *2009 Statistical Abstract*, US Bureau of the Census, available at http://www.census.gov/compendia/statab/. For years after 2007, the source is: National Association of Realtors, "Median Sales Price of Existing Single-Family Homes for Metropolitan Areas," available at:

rate shot up from 62.8 to 67.7 percent according to SCF data. Then, in 2001 house prices took off, with the median sales price of existing one-family homes spurting by 17 percent. From 2004 to 2007 housing prices slowed, with the median price advancing only 1.7 percent. Over years 2001 to 2007 housing prices gained 19 percent. The home ownership rate continued to expand, though at a somewhat abbreviated rate, to 68.6 percent.

Then, the "Great Recession" and the associated financial crisis hit. The recession "officially" began in December, 2007, and "officially" ended in June, 2009.[3] Over this period, real GDP fell by 4.3 percent and then from the second quarter of 2009 to the second quarter of 2013 it gained 9.2 percent. The unemployment rate shot up from 4.4 percent in May of 2007 to a peak of 10.0 percent in October of 2009 but by February of 2014 it was down to 6.7 percent.[4]

One consequence was that asset prices plummeted. From 2007 to 2010, in particular, the median home price nose-dived by 24 percent, and the share of households owning their own home fell off, from 68.6 to 67.2 percent. This was followed by a partial recovery, with median house prices rising 7.8 percent through September 2013, though still way below their 2007 value. However, the homeownership rate continued to contract, falling to 65.1 percent.

In contrast to the housing market, the stock market boomed during the 1990s. On the basis of the Standard & Poor (S&P) 500 index, stock prices surged 159 percent between 1989 and 2001.[5] Stock ownership spread and by 2001 over half of U.S. households owned stock either directly or indirectly. However, between 2001 and 2007 the S&P 500 was up 6 percent, and the share of households who owned stock directly or indirectly fell to 49 percent. Then stock prices crashed by 26 percent from 2007 to 2010, and the stock ownership rate declined to 47 percent. The stock market rose after 2010 and by 2013 the S&P 500 index was up 39 percent over 2010 and above its previous high in 2007. However, the stock ownership rate continued to drop, to 46 percent.

What have all these major changes in asset prices wrought in terms of household wealth, particularly over the Great Recession? This is the subject of the remainder of Section 2.

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http://www.realtor.org/sites/default/files/reports/2012/embargoes/2012-q1-metro-home-prices-49bc10b1efdc1b8cc3eb66dbcdad55f7/metro-home-prices-q1-single-family-2012-05-09.pdf [accessed October 17, 2014].The figures are based on median prices of existing houses for metropolitan areas only. All figures are in constant dollars unless otherwise indicated.

[3] The source is: http://www.nber.org/cycles/cyclesmain.html [accessed April 20, 2014].

[4] The source is the U.S. Bureau of Labor Statistics at: http://data.bls.gov/timeseries/LNS14000000 [accessed April 10, 2014].

[5] The source for stock prices is Table B-96 of the *Economic Report of the President, 2013*, available at http://www.gpoaccess.gov/eop/tables13.html, with updates to 2013 from: http://us.spindices.com/indices/equity/sp-composite-1500 [both accessed October 17, 2014].

2.2 Data sources and methods

My primary data source is the SCF, conducted by the Federal Reserve Board. Each survey consists of a core representative sample combined with a high-income supplement. The wealth (net worth) concept used here is marketable wealth, defined as the current value of all marketable or fungible assets less current debt. Assets are the sum of: (1) housing; (2) other real estate; (3) bank deposits, certificates of deposit, money market accounts, and the cash surrender value of life insurance plans (collectively "liquid assets"); (4) financial securities; (5) defined contribution pension plans, including IRAs, Keogh, and 401(k) plans; (6) corporate stock and mutual funds; (7) unincorporated businesses equity; and (8) trust fund equity. Liabilities are the sum of: (1) mortgage debt, (2) consumer debt such as auto loans, and (3) other debt such as student loans.

This measure reflects wealth as a store of value and therefore a source of potential consumption. I believe that this is the concept that best reflects the level of well-being associated with a family's holdings. Thus, only assets that can be readily converted to cash (that is, "fungible" ones) are included. As a result, consumer durables such as automobiles are excluded here, since these items are not easily marketed. Another justification for their exclusion is that this treatment is consistent with the national accounts, where purchase of vehicles is counted as expenditures, not savings. Also excluded is the value of future Social Security benefits the family may receive upon retirement ("Social Security wealth"), as well as the value of retirement benefits from defined benefit pension plans ("defined benefit pension wealth"). Even though these funds are a source of future income to families, they are not in their direct control and cannot be marketed. [6]

2.3 Median wealth plummets over the Great Recession

Table 1 documents a robust growth in wealth from 1983 to 2007 (also see Figure 1). Median wealth increased at an annual rate of 1.1 percent from 1983 to 1989, about the same at 1.2 percent from 1989 to 2001, and then much faster at 2.9 percent from 2001 to 2007.[7] Then between 2007 and 2010, median wealth plunged by a staggering 44 percent! Indeed, median wealth was actually

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[6] It should be noted that for consistency with earlier data for 1962 and 1969 MESP, the 1983 and 1989 SCF files are aligned to national balance sheet totals (the methodology for the 1983 SCF differs to some extent from that for the 1989 SCF, while the same methodology is used for SCF files for 1989 and onward). My baseline estimates also exclude vehicles. Moreover, my calculations are based on the "public use" samples provided by the Federal Reserve Board, which are to some degree different from the internal files maintained by the Federal Reserve. As a result, my figures on mean and median net worth, as well as on wealth inequality, will in general be at variance from the "standard" estimates provided by the Federal Reserve Board which include the value of vehicles in their statistics (see, for example, Kennickell and Woodburn, 1999, and more recently Bricker et. al., 2014).

[7] Unless otherwise indicated, all dollar figures are in 2013 dollars.

lower in 2010 than in 1969 (in real terms). The primary reasons, as we shall see below, were the collapse in the housing market and the high leverage of middle class families. There was virtually no change from 2010 to 2013.[8] The share of households with zero or negative net worth, after falling from 18.2 percent in 1962 to 15.5 percent in 1983, increased to 18.6 percent in 2007 and then even more sharply to 21.8 percent in 2010, where it remained in 2013 (Panel A).

[Table 1 and Figure 1 about here]

Mean net worth also grew vigorously from 1983 to 1989, at an annual rate of 2.27 percent per year, about double the growth rate of median wealth. Over the years 1989 to 2001, the growth rate of mean wealth was 3.02 percent per year, even higher than in the preceding periods. Its annual growth rate accelerated even more, reaching 3.10 percent between years 2001 and 2007. This acceleration was largely due to the rapid (19 percent) increase in housing prices over the six years Overall, its 2007 value was almost double its value in 1983 and about three quarters larger than in 1989. Another point of note is that mean wealth grew about twice as fast as the median between 1983 and 2007, and the inequality of wealth widened over these years.[9]

The Great Recession also saw an absolute decline in mean household wealth. However, whereas median wealth plunged by 44 percent between 2007 and 2010, mean wealth fell by (only) 16 percent.[10] In this case, the main cause was both falling housing and stock prices (see below). However, here, too, the relatively faster growth in mean wealth than median wealth (that is, the latter's more moderate decline) was coincident with rising wealth inequality. There was again virtually no change in mean wealth from 2010 to 2013.

Median household income (based on Current Population Survey data) advanced at a fairly solid pace from 1962 to 1983, at 0.61 percent per year (also see Figure 2). Then, after gaining 2.03 percent per annum between 1983 and 1989, its annual growth dipped to only 0.48 percent from 1989 to 2001 and then to 0.26 percent from 2001 to 2007, for a net change of 22 percent (overall) from 1983 to 2007. However, from 2007 to 2010, it fell off in absolute terms by 6.7 percent. Though this is not an insignificant amount, the reduction was not nearly as great as that in median

[8] The percentage decline in median net worth from 2007 to 2010 is lower when vehicles are included in the measure of wealth – "only" 39 percent. The reason is that automobiles comprise a substantial share of the assets of the middle class. However, median net worth with vehicles remained virtually unchanged from 2010 to 2013.

[9] As Stephen Jenkins noted to me in an email of September 19, 2016, there is not likely to be a direct theoretical connection between movements in the ratio of mean to median and the change in the Gini coefficient. However, it does appear as an empirical regularity. Here, it holds for the change in the Gini coefficient for net worth in four cases but not 1989-2001 and that for the Gini coefficient for income in three cases but not 2001-2007 and 2007-2010.

[10] The decline in mean net worth is 16 percent when vehicles are included in net worth.

wealth. From 2010 to 2013, median income slipped by another 1.3 percent (overall). Mean income also dropped in real terms from 2007 to 2010, by 5.2 percent, slightly less than that of median income, but gained 0.9 percent from 2010 to 2013.

[Figure 2 about here]

In sum, while household income virtually stagnated for the average American household from 1989 to 2007, median net worth grew strongly. The Great Recession, on the other hand, saw a massive reduction in median net worth but more modest declines in mean wealth and both median and mean income.

2.4 Wealth inequality jumps in the late 2000s

Wealth is highly concentrated, with the richest one percent owning 37 percent of total household wealth in 2013 and the top 20 percent owning 89 percent (see Panel C of Table 1 and Figure 3). Wealth inequality climbed sharply between 1983 and 1989, with the share of wealth held by the top one percent rising by 3.6 percentage points and the Gini coefficient increasing from 0.80 to 0.83. Between 1989 and 2007, the share of the top percentile actually declined, from 37.4 to 34.6 percent, though this was more than compensated by an increase in the share of the next four percentiles. As a result, the share of the top five percent increased from 58.9 percent in 1989 to 61.8 percent in 2007, and the share of the top quintile rose from 83.5 to 85.0 percent. Overall, the Gini coefficient was virtually unchanged -- 0.832 in 1989 and 0.834 in 2007.

[Figure 3 about here]

In contrast, the years 2007 to 2010 saw a very sharp elevation in wealth inequality, with the Gini coefficient rising from 0.834 to 0.866. Interestingly, the share of the top percentile showed a smaller relative gain -- less than a one percentage point. Most of the rise in wealth share took place in the remainder of the top quintile, and overall the share of wealth held by the top quintile climbed by almost four percentage points. From 2010 to 2013 there was a very small rise in the Gini coefficient, from 0.866 to 0.871. The share of the top one percent did increase by 1.6 percentage points but there was virtually no change in the share of the top quintile.

The top one percent of families (as ranked by income on the basis of the SCF data) earned 20 percent of total household income in 2012 and the top 20 percent accounted for 62 percent -- large figures but lower than the corresponding wealth shares.[11] The time trend for income inequality also contrasts with that for net worth (also see Figure 3). Income inequality increased sharply

[11] It should be noted that the income in each survey year (say 2013) is for the preceding year (2012 in this case).

between 1982 and 1988, with the Gini coefficient rising from 0.48 to 0.52 and the share of the top one percent from 12.8 to 16.6 percent.[12]

Inequality again surged from 1988 to 2000, with the share of the top percentile rising by 3.4 percentage points, the share of the top quintile up by 3.0 percentage points, and the Gini index advancing from 0.52 to 0.56. As a result, the years from 1989 to 2001 saw almost the same degree of increase in income inequality as the 1983-1989 period. Inequality once again rose from 2001 to 2007, though the pace slackened. The Gini coefficient increased from 0.562 to 0.574, the share of the top one percent was up by 1.3 percentage points, and the share of the top quintile was also up by 1.7 percentage points. All in all, the period from 2001 to 2007 witnessed a moderate increase in income inequality and a small rise in wealth inequality.

In contrast, the years 2006 to 2009 witnessed a rather sharp contraction in income inequality. The Gini coefficient fell from 0.574 to 0.549 and the share of the top one percent dropped sharply from 21.3 to 17.2 percent. Property income and realized capital gains (which is included in the SCF definition of income), as well as corporate bonuses and the value of stock options, plummeted over these years, a process which explains the steep decline in the share of the top percentile. Real wages actually rose over these years, though the unemployment rate also increased. As a result, the income of the middle class was down but not nearly as much in percentage terms as that of the high income groups. In contrast, transfer income such as unemployment insurance rose, so that the bottom also did better in relative terms than the top, and overall income inequality fell over these years.

The second half of the Great Recession saw a reversal in this trend, with income inequality once again increasing sharply. The Gini coefficient increased by 0.025 points to 0.574, the same level as in 2007. The share of the top percentile rose to 19.8 percent, slightly below its level in 2007, while the share of the top quintile was up to 61.8 percent, slightly above its 2007 level. The same set of factors, though in reverse, help explain this turnaround in income inequality. Property income, realized capital gains, and associated income rose sharply over these years as the stock market recovered, accounting for the sharp rise in the share of the top percentile. The unemployment rate fell over these years but real wages were down, according to the BLS figures. As a result, the income of the middle class rose but not as much in percentage terms as that of the high income groups. Transfer income such as unemployment insurance fell, as the extensions of benefits enacted

[12] Gini coefficients from the SCF are considerably higher than those from the CPS because income in the former includes capital gains and is based on a stratified sample whereas the latter use a representative sample (see ttp://www.census.gov/hhes/www/income/data/historical/household/). .

in the early days of the recession ended.

All in all, income inequality increased much more than net worth inequality over years 1983 to 2013. On the basis of the Gini coefficient, net worth inequality was up by nine percent, while income inequality rose by 20 percent.

2.5 Household debt finally recedes

In 2013, owner-occupied housing was the most important household asset in the average portfolio breakdown for all households shown in Table 2, accounting for 29 percent of total assets. However, net home equity -- the value of the house minus outstanding mortgages -- amounted to only 17 percent of total assets. Real estate, other than owner-occupied housing, comprised 10 percent, and business equity another 18 percent. Liquid assets made up 8 percent and pension accounts 17 percent. Bonds and other financial securities amounted to 2 percent; corporate stock, including mutual funds, to 13 percent; and trust fund equity to 3 percent. Debt as a proportion of gross assets was 15 percent, and the ratio of total household debt to net worth was 0.18.

[Table 2 about here]

There were some notable changes in the composition of household wealth over time. First, the share of housing wealth in total assets, after fluctuating between 28 and 30 percent from 1983 to 2001, jumped to 34 percent in 2004 and then declined to 29 percent in 2013. Two factors explain this movement. The first is that the homeownership rate rose from 63 percent in 1983 to 69 percent in 2004 and then fell off to 65 percent in 2013. The second is that the median price of existing one-family homes climbed by 18 percent between 2001 and 2004 but plunged by 17 percent from 2004 to 2013.[13] A second and related trend is that net home equity fell from 24 percent in 1983 to 17 percent in 2013. The difference between the two series (gross versus net home values) is attributable to the changing magnitude of mortgage debt on homeowners' property, which increased from 21 percent in 1983 to 39 percent in 2013.

Third, relative indebtedness first increased, with the debt-net worth ratio climbing from 15 percent in 1983 to 21 percent in 2010, and then fell off to 18 percent in 2013. Likewise, the debt-income ratio surged from 68 percent in 1983 to 127 percent in 2010 but then dropped to 107 percent in 2013. If mortgage debt on principal residence is excluded, then the ratio of other debt to total assets actually fell off over time from 6.8 percent in 1983 to 4.0 percent in 2013.

[13] It may seem surprising that the share of housing in gross assets declined very little between 2007 and 2010, given the steep drop in housing prices, but the prices of other assets also fell, particularly those of stocks and business equity.

The large rise in *relative* indebtedness among all households between 2007 and 2010 could be due to a rise in the absolute level of debt and/or a fall off in net worth and income. As shown in Table 1, both mean net worth and mean income fell over the three years. There was also a slight contraction of debt in constant dollars by 4.4 percent. The steep rise in relative indebtedness over the three years was almost entirely due to reductions in wealth and income. In contrast, from 2010 to 2013, relative indebtedness declined. In this case, both net worth and incomes were relatively unchanged, so that the proximate cause was a sizeable reduction in household debt by 13 percent.

A fourth change is that pension accounts rose from 1.5 to 16.5 percent of total assets from 1983 to 2013. This increase largely offset the decline in the share of liquid assets in total assets, from 17.4 to 7.6 percent, so that it is reasonable to infer that households to a large extent substituted tax-deferred pension accounts for taxable savings deposits. Fifth, if we include the value of stocks indirectly owned through mutual funds, trusts, IRAs, 401(k) plans, and other retirement accounts, then the value of total stocks owned as a share of total assets more than doubled from 11.3 percent in 1983 to 24.5 percent in 2001 but then fell to 20.7 percent in 2013. The rise during the 1990s reflected the robust stock market as well as increased stock ownership, while the decline in the 2000s was due to a sluggish stock market as well as a drop in stock ownership.

2.5.1 Portfolio composition by wealth class

The tabulation in Table 2 provides a picture of the average holdings of all families in the economy, but there are marked class differences in how middle-class families and the rich invest their wealth. As shown in Table 3, the richest percentile invested almost three quarters of their savings in investment real estate, businesses, corporate stock, and financial securities in 2013. Corporate stocks directly or indirectly owned comprised 25 percent. Housing, liquid assets, and pension accounts together made up 24 percent. Their ratio of debt to net worth was only 3 percent and their ratio of debt to income was 38 percent.

[Table 3 about here]

Among the next richest 19 percent, housing comprised 28 percent of their total assets, liquid assets 8 percent, and pension assets another 22 percent. Investment assets -- real estate, business equity, stocks, and bonds – made up 41 percent and 23 percent was in the form of stocks directly or indirectly owned. Debt amounted to 12 percent of net worth and 97 percent of income.

In contrast, over three-fifths of the assets of the middle three quintiles of households was invested in their own home in 2013. However, home equity amounted to only 31 percent of total assets, a reflection of their large mortgage debt. Another quarter went into monetary savings of one

form or another and pension accounts. Together housing, liquid assets, and pension assets accounted for 87 percent of the total assets of the middle class. The remainder was about evenly split among non-home real estate, business equity, and various financial securities and corporate stock. Stocks directly or indirectly owned amounted to only 10 percent of their total assets. The ratio of debt to net worth was 64 percent, substantially higher than for the richest 20 percent, and their ratio of debt to income was 125 percent, also much higher than that of the top quintile. Finally, their mortgage debt amounted to about half the value of their principal residences.

Almost all households among the top 20 percent of wealth holders owned their own home, in comparison to 67 percent of households in the middle three quintiles. Three-quarters of very rich households (in the top percentile) owned some other form of real estate, compared to 44 percent of rich households (those in the next 19 percent of the distribution) and only 12 percent of households in the middle 60 percent. Eighty-nine percent of the very rich owned some form of pension asset, compared to 84 percent of the rich and 44 percent of the middle. A somewhat startling 77 percent of the very rich reported owning their own business. The comparable figures are 26 percent among the rich and 7 percent of the middle class.

Among the very rich, 84 percent held corporate stock, mutual funds, financial securities or a trust fund, in comparison to 60 percent of the rich and only 14 percent of the middle class. Ninety-four percent of the very rich reported owning stock either directly or indirectly, compared to 85 percent of the rich and 41 percent of the middle. If we exclude small holdings of stock, then the ownership rates drop off sharply among the middle three quintiles, from 41 percent to 30 percent for stocks worth $5,000 or more and to 25 percent for stocks worth $10,000 or more.

Table 4 looks at the wealth composition of the middle three wealth quintiles and asset ownership rates. Perhaps, the most striking development is in the homeownership rate, which after rising almost continuously over time from 72 percent in 1983 to 78 percent in 2004, plunged to 67 percent in 2013. This trend was more pronounced than that among all households, among whom it dropped from 69 percent in 2004 to 65 percent in 2013. A similar trend is evident for the share of homes in total assets. It remained virtually unchanged from 1983 to 2001 but then rose sharply in 2004. This increase was largely a result of rising house prices and continued gains in homeownership. The share then declined from 2004 through 2013 as housing prices fell and the homeownership rate plummeted. It might once again seem surprising that despite the steep drop in home prices from 2007 to 2010, housing as a share of total assets actually fell only slightly. The reason is that the other assets fell even more than housing. While the mean value of housing among

households in the middle three quintiles fell by 31 percent in real terms, the mean value of other real estate was down by 39 percent and that of stocks and mutual funds by 47 percent. Likewise, despite the modest recovery in housing prices from 2010 to 2013, the share of housing in total assets dropped by 2.3 percentage points, as other asset prices recovered even more.

[Table 4 about here]

The share of pension accounts in total assets rose by 15 percentage points from 1983 to 2013, while that of liquid assets declined by 13 percentage points. These trends were more or less continuous over time. This set of changes paralleled that of all households. In contrast, the share of middle class households holding a pension account, after surging from 12 percent in 1983 to 53 percent in 2007, collapsed to 44 percent in 2013. The stock ownership rate among the middle class shot up from 17 percent in 1983 to 51 percent in 2001, when it peaked, and then declined steeply to 41 percent in 2013. The share of all stocks in total assets mushroomed from 2.4 percent in 1983 to 12.6 percent in 2001 and then fell off to 9.5 percent in 2013, reflecting trends in stock prices and the stock ownership rate. Likewise, the proportion of these households owning corporate stock, financial securities, mutual funds or personal trusts rose from 22 percent in 1983 to 28 percent in 2001 and then collapsed almost by half to 14 percent in 2013. Much of the decline took place between 2007 and 2010, as middle class households got scared off by the stock market collapse.

2.5.2 Middle Class Debt

The rather staggering debt level of the middle class in 2013 raises the question of whether this is a recent phenomenon or whether it has been going on for some time. The debt-income ratio peaked in 2010 and then receded in 2013, while the debt-net worth ratio peaked in 2007 and then contracted substantially in 2010 and a bit more in 2013.

There was a sharp rise in the debt-net worth ratio of the middle class from 37 percent in 1983 to 61 percent in 2007. The debt to income ratio skyrocketed as well, more than doubling. In constant dollar terms, the mean debt of the middle class shot up by a factor of 2.6 between 1983 and 2007, the mean mortgage debt by a factor of 3.2, and the average value of other debt by a factor of 1.5. The rise in the debt-net worth ratio and the debt-income ratio was much steeper than those for all households. In 1983, for example, the debt to income ratio was about the same for middle class households as for all households but by 2007 the ratio was much larger for the former.

Then, the Great Recession hit. The debt-net worth ratio continued to rise, reaching 72 percent in 2010 but there was actually a retrenchment in the debt to income ratio, falling to 134 percent in 2010. The reason is that from 2007 to 2010, the mean debt of the middle class actually

contracted by 25 percent in constant dollars. Average mortgage debt declined by 23 percent, as families paid down their outstanding balances, while the mean value of other debt plummeted by 32 percent, as families paid off credit card balances and other forms of consumer debt. The significant rise in the debt-net worth ratio of the middle class between 2007 and 2010 was due to the steeper drop off in net worth than in debt, while the decline in the debt-income ratio was almost exclusively due to the sharp contraction of overall debt.

Both the debt-net worth and the debt-income ratios fell from 2010 to 2013. The proximate cause was a decline in overall mean debt, which fell by 8.2 percent in real terms over these years. This, in turn, was due to a decline in average mortgage debt, which dropped by 10.4 percent. The average balance on other debt actually increased slightly, by 1.6 percent.

As for all households, net home equity as a percentage of total assets fell for the middle class from 1983 to 2013 and mortgage debt as a proportion of house value rose. The decline in the former between 2007 and 2010 was relatively small despite the steep decrease in home prices, a reflection of the sharp reduction in mortgage debt. There was virtually no change from 2010 to 2013. On the other hand, the rise in the ratio of mortgage debt to house values was relatively large over years 2007 to 2010 because of the fall off in home prices. This ratio actually contracted somewhat from 2010 to 2013 as outstanding mortgage debt fell.

2.6 The role of leverage in explaining wealth trends

In previous work, Wolff (2002), it was found in regression analysis that wealth inequality was positively and significantly related to income inequality and to the ratio of stock prices to housing prices, since stocks are heavily concentrated among the rich and homes are the chief asset of the middle class. Consequently, there are six puzzles (two of which have been addressed above). The first is why median wealth surged from 2001 to 2007 while median income was sluggish. The second is why wealth inequality was flat over these years when income inequality grew. The third is why there was such a steep plunge in median wealth, of 44 percent, between 2007 and 2010, despite a moderate drop in median income and smaller declines in housing and stock prices, of 24 and 26 percent in real terms, respectively.

The fourth is why there was such a steep increase of wealth inequality, of 0.035 Gini points, over years 2010 to 2013, since income inequality actually fell and the ratio of stocks to housing prices remained virtually unchanged. The fifth and, perhaps most perplexing one, is why median (and mean) wealth failed to recover in years 2010 to 2013 when asset prices surged. The sixth is why wealth inequality increased so moderately from 2010 to 2013 when income inequality shot up

and the ratio of stock to house prices climbed by 29 percent.

Most of these puzzles can be largely explained by the high leverage (that is, debt to net worth ratio) of the middle class. This is particularly the case for the strong gains in median net worth over the 2001 to 2007 period and its steep fall over years 2007 to 2010. Trends in wealth inequality are largely accountable by *differential leverage* between the rich and the middle class. This factor can help explain the constancy of wealth inequality over the 2001-2007 and 2010-2013 periods and its spike over years 2007 to 2010. With regard to the fact that median net worth showed no improvement over years 2010 to 2013, a different explanation is called for. It appears that substantial dissavings over this period accounts for the failure of wealth to grow over these years.

Table 5 shows average annual *real* rates of return for both gross assets and net worth from 1983 to 2013. Results are based on the average portfolio composition over the period and assume that all households receive the same rate of return by asset type. The average annual rate of return on *gross assets* among all households rose from 2.33 percent in the 1983-1989 period to 3.33 percent in the 1989-2001 period and then fell slightly to 3.10 percent in the 2001-2007 period before plummeting to -6.38 percent over the Great Recession. This was followed by a substantial recovery to 4.83 percent over years 2010 to 2013.

[Table 5 about here]

The average annual return on *net worth* among all households also increased from 3.32 percent in the first period to 4.35 percent in the second , declined somewhat to 4.04 percent in the third and then fell off sharply to -7.28 percent in the 2007-2010 period. Once again, there was a strong recovery to 6.20 percent in the 2010-2013 period. It is first of note that the annual rates of return on net worth are uniformly higher – by about one percentage point – than those on gross assets over the first three periods and the last period, when asset prices were generally rising. However, in the 2007-2010 period, the annual return on net worth was about one percentage point lower than that on gross assets. These results illustrate the effect of leverage, raising the return when asset prices rise and lowering the return when asset prices fall. Over the full 1983-2013 period, the annual return on net worth was 0.83 percentage points higher than that on gross assets.

When we next consider rates of return by wealth class, we see some striking differences. The highest rates of return on *gross assets* were generally registered by the top one percent of wealth holders, followed by the next 19 percent and then by the middle three wealth quintiles. Differences are quite substantial. Over the full 1983-2013 period, the average return on gross assets for the top one percent was 0.59 percentage points greater than that of the next 19 percent and 1.52 percentage

points greater than that of the middle quintiles. The differences reflect the greater share of high yield investments like stocks in the portfolios of the rich and the greater share of housing in the portfolio of the middle class (see Table 3). Indeed, in the 2010-2013 period, there was a huge cleavage in returns between the top one percent and the middle group of 2.63 percentage points, reflecting the much higher gains on stocks and investment assets than on housing in those years.

This pattern is almost exactly reversed when we look at rates of return for *net worth*. In this case, in the first three periods and the last when asset prices were generally rising, the highest return was recorded by the middle three wealth quintiles while in the 2007-2010 period, when asset prices were declining, the middle three quintiles registered the lowest (that is, most negative) rate of return. The exception was the first period when the top one percent had a slightly higher return than the middle class. The reason was the substantial spread in returns on gross assets between the top one percent and the middle group – 1.72 percentage points.

Differences in returns between the top one percent and the middle three quintiles were quite substantial in some years. In the 2001-2007 period, the average annual rate of return on net worth was 5.58 percent for the latter and 3.92 percent for the former – a difference of 1.67 percentage points. The spread was less over years 2010 to 2013, only 0.79 percentage points. The smaller difference was due to the much higher returns on gross assets held by the top percentile than by the middle group. On the other hand, over years 2007 to 2010, when asset prices declined, the rate of return on net worth was -6.52 percent for the top one percent and -10.55 percent for the middle three quintiles – a differential of 4.04 percentage points in favor of the top one percent.

The spread in rates of return between the top one percent and the middle three quintiles reflects the much higher leverage of the middle class. In 2013, for example, the debt-net worth ratio of the middle three quintiles was 0.64 while that of the top one percent was 0.026.

The huge negative return on net worth of the middle group was largely responsible for the precipitous drop in median net worth between 2007 and 2010. This factor, in turn, was due to the steep drop in housing prices and their very high leverage. The very high return on net worth of the middle group over years 2001-2007 played a significant role in explaining the robust advance of median net worth, despite sluggish gains in median income. This in turn, was a result of their high leverage coupled with the boom in housing prices. However, puzzling is the fact that the rate of return on net worth of the middle group was very high over years 2010 to 2013 – in fact, the highest of any period – and yet median wealth stagnated. We shall return to this issue later.

The substantial differential in rates of return on net worth between the middle three wealth quintiles and the top quintile (our percentage points lower) helps explain why wealth inequality rose sharply between 2007 and 2010 despite the decline in income inequality. Likewise this differential over the 2001-2007 period (a spread of 1.67 percentage points in favor of the middle quintiles) helps account for the stasis in wealth inequality over these years despite the increase in income inequality. The higher rate of return of the middle than the top group over years 2010 to 2013 also helps account for the relative constancy in wealth inequality despite the rise in income inequality.

2.7. Summary of Section 2

The paper highlighted the role of leverage in explaining trends in household wealth over the Great Recession. In particular, it was seen that the collapse in median wealth between 2007 and 2010 was largely due to the high leverage of the middle class (as well as the steep drop in housing prices). Moreover, the sharp jump in wealth inequality over these years was traced to *differential* leverage between the rich and the middle class.

After a period of robust growth, median wealth continued to climb by 19 percent from 2001 to 2007, even faster than during the 1990s and 1980s. Then the Great Recession hit, with house prices falling by 24 percent in real terms, stock prices by 26 percent, and median wealth by a staggering 44 percent from 2007 to 2010. From 2010 to 2013, asset prices recovered, with stock prices up by 39 percent and house prices by 8 percent. Despite this, median wealth stagnated.

Wealth inequality, after remaining relatively stable from 1989 to 2007, showed a steep advance over years 2007 to 2010, with the Gini coefficient climbing from 0.834 to 0.866 and the share of the top 20 percent from 85 to 89 percent, even though house prices and stock prices collapsed at about the same rate. The Gini coefficient for net worth, on the other hand, remained relatively unchanged between 2010 and 2013 despite the fact that stock prices recovered much more than house prices.

Another notable development was the sharply rising debt to income ratio during the early and mid 2000s, reaching its highest level in almost 25 years, at 119 percent among all households in 2007. The debt-net worth ratio was also way up, from 14.3 percent in 2001 to 18.1 percent in 2007. Most of the rising debt was from increased mortgages on homes. From 2007 to 2010 both ratios continued to rise, the former moderately from 119 to 127 percent and the latter more steeply from 18.1 to 20.6 percent. This was true despite a moderate retrenchment of overall average debt of 4.4 percent and reflected the drop in both mean wealth and income. Both ratios fell off sharply by 2013, to 107 percent and 17.9 percent, respectively, as outstanding debt continued to shrink, by 13 percent.

Among the middle three wealth quintiles, there was a huge increase in the debt-income ratio from 100 to 157 percent from 2001 to 2007 and of the debt-net worth ratio from 46 to 61 percent. The debt-net worth ratio was also much higher among the middle group in 2007, at 0.61, than among the top one percent, at 0.028. From 2007 to 2010, while the debt-net worth ratio continued to advance to 69 percent, the debt to income ratio actually fell off to 134 percent. The reason is the substantial retrenchment of average debt among the middle class over these years, as overall debt fell by 25 percent in real terms. The fact that the debt-net worth ratio rose over these years was a reflection of the steep drop in median net worth. Both ratios dropped from 2010 to 2013 as outstanding debt fell by 8 percent.

The key to understanding the plight of the middle class over the Great Recession was their high degree of leverage, the high concentration of assets in their home, and the plunge in housing prices. The steep decline in median net worth between 2007 and 2010 was primarily due to the very high negative rate of return on net worth of the middle three wealth quintiles (-10.6 percent per year). This, in turn, was attributable to the precipitous fall in home prices and their very high degree of leverage. High leverage, moreover, helps explain why median wealth fell more than house (and stock) prices over these years and declined much more than median income.

However, this is not the whole story. On the basis of the rates of return computed for the middle three wealth quintiles, median wealth should have fallen by only 27 percent, instead of the actual 44 percent. If we ignore net flows of inheritances and gifts over the period (see Section 3 below), this discrepancy must be due to dissavings. Indeed, the results imply substantial dissavings over this period.

The fact that median net worth showed no improvement over years 2010 to 2013 calls for a different explanation – namely, dissavings. Asset prices more than recovered from 2010 to 2013, except for housing, which was still up by 8 percent (in real terms). On the basis of rates of return computed for the middle group, median net worth should have gained 36 percent. It appears that substantial dissavings over this period accounts for wealth stagnation.

The stagnation of median wealth from 2010 to 2013 can be traced to the depletion of assets. This shows up, in particular, in reduced asset ownership rates – from 68.0 to 66.7 percent for homes, from 45.8 to 44.4 percent for pension accounts, from 8.2 to 6.6 percent for businesses, and from 15.3 to 14.2 percent stocks and financial securities.

Speculatively, at this point, it appears that the likely reason for the high rate of dissavings of the middle class over both the 2007-2010 and the 2010-2013 periods is income stagnation (actually,

a reduction in median income over these years). It appears that the middle class was depleting its assets to maintain its previous level of consumption. The evidence, moreover, suggests that middle class households, experiencing stagnating incomes, expanded their debt (at least until 2007) mainly in order to finance normal consumption expenditures rather than to increase their investment portfolio.

The large spread in rates of return on net worth between the middle and the top (over four percentage points) also largely explains why wealth inequality advanced steeply from 2007 to 2010 despite the decline in income inequality and constancy in the ratio of stock to housing prices (both declined at about the same rate over these years). It was thus the case that the middle class took a bigger relative hit on their net worth from the decline in home prices than the top 20 percent did from the stock market plunge. This factor is also reflected in the fact that median wealth dropped much more in percentage terms than mean income. In contrast, there was relatively little change in wealth inequality from 2010 to 2013. This is true despite a large increase in income inequality and a sharp rise of 29 percent in the ratio of stock to housing prices. The offsetting factor in this case was the higher rate of return on net worth of the middle class than the top one percent (a 0.79 percentage point difference).

3. Decomposing wealth trends, 1983 – 2013

What are the factors that affect both movements in mean and median wealth and those of wealth inequality? I analyze these trends by conducting a decomposition analysis of wealth trends into a savings, capital gains, and net wealth transfer components.

As shown in Section 2, there was a very steep drop in median net worth of 44 percent between 2007 and 2010. There was also a smaller decline in mean net worth of 16 percent. Rates of returns on net worth were negative over these years -- -7.3 percent per year overall and -10.6 percent per year for the middle three wealth quintiles. In Section 2.7 I surmise that the sharp fall in median net worth was largely but not completely due to the very high negative return on net worth. In fact, a rough calculation indicates this factor would have caused a 26.8 percent fall in median wealth and therefore explained about three fifths (26.8/43.9) of the decline in median net worth. The other two fifths are presumably due to a very high dissavings rate over these years. Likewise, while mean net worth fell by 16 percent over this period, it should have dropped by 20 percent on the basis of returns on the average household portfolio. In this case, positive savings may have offset the effects of the high negative rate of return.

3.1 Decomposition analysis

I begin with the basic wealth relationship as established in Wolff (1999):

(1) $\Delta W_{ct} \equiv W_{ct} - W_{c,t-1} = r_{ct}W_{ct-1} + s_{ct}Y_{ct} + G_{ct}$.

where W = net worth (in constant dollars), r = real rate of return on wealth, Y = household income (in constant dollars), s = savings rate out of household income Y, and G = net inheritances and gifts (in constant dollars). With further algebraic manipulation we obtain:

(2) $s_{ct} = (\Delta W_{ct} - r_{ct}W_{ct-1} - G_{ct}) / Y_{ct} = S_{ct} / Y_{ct}$

where S_{ct} is total savings over the period. Equation (2) provides the basic formulation for estimating the savings rate.

On the basis of Equation (1), the change in wealth over a period can be decomposed into capital revaluation (existing wealth multiplied by the rate of return), savings, and net intergenerational transfers. The analysis will be divided into five sub-periods: 1983-1989, 1989-2001, 2001-2007, 2007-2010, and 2010-2013.

The decomposition of mean wealth will also tell us the relative importance of capital gains and savings in explaining changes in wealth over time. Greenwood and Wolff (1992), for example, estimated that about 75 percent of the growth of overall household wealth over the period 1962 to 1983 arose from capital gains (appreciation) of existing wealth and the remaining 25 percent from savings (income less consumption expenditures). Later work confirmed this approximate breakdown between capital gains and savings – Wolff (1999) for years 1962 to 1992 and Wolff (2015) for years 1983 to 2007. Ad discussed above, Piketty and Zucman (2014) had a very different result, with capital gains accounting for 28 percent of the growth in national wealth in the U.S. between 1970 and 2010. However, it should be noted that their definition of national wealth is much more extensive than household wealth and includes agricultural land, other domestic capital goods and net foreign assets, while their definition of savings includes retained earnings of corporations.

The same decomposition can be used for the wealth of the top one percent, the next nineteen percent, and the middle three wealth quintiles. I use changes in the mean wealth of the three middle wealth quintiles as a proxy for changes in median wealth.[14] For my inequality analysis, I will consider changes over time in the *ratio* of mean wealth of top one percent to that of the middle three wealth quintiles. I can then also determine what portion of the change in this difference is due to capital gains and what portion is due to savings and net wealth transfers.

[14] The mean wealth of three middle wealth quintiles is not necessarily equal to median wealth. In 2007, for example, median wealth was $115,100 while the latter was equal to $155,200. The reason that the latter was higher was that the middle three wealth quintiles incorporates the wealth of the fourth quintile, which was generally considerably higher than that of the middle quintile. However, the two series trended very closely over time in terms of percentage change.

A key feature of the model is that the simulation is conducted by birth cohort for each of the five sub-periods enumerated above: (i) 1983-1989, (ii) 1989-2001, (iii) 2001-2007, (iv) 2007-2010, and (v) 2010-2013. In the initial year of each simulation, households are first divided into 12 age groups: (1) 20-24; (2) 25-29; (3) 30-34; (4) 35-39; (5) 40-44; (6) 45-49; (7) 50-54; (8) 55-59; (9) 60-64; (10) 65-69; (11) 70-74; and (12) 75 and over. The simulation then follows the same age group over the period of investigation.

As an example, consider age group 25-29 in 1983. I first compute the mean wealth of the age group in 1983. Second, I calculate the average rate of return on their wealth holdings in 1983. This figure is based on the portfolio composition of the age group in 1983 and rates of return by asset type over the 1983-1989 period. This calculation leads to total capital gains over the period: $r_{ct}W_{ct-1}$. Third, in 1989 this birth cohort now spans ages 31 to 35. The change in the mean wealth of this birth cohort (ΔW_{ct}) is set equal to the difference between the mean wealth of age group 31-35 in 1989 and age group 25-29 in 1983. Fourth, the total savings of this birth cohort over years 1983 to 1989 can then be computed as $S_{ct} = \Delta W_{ct} - r_{ct}W_{ct-1}$. Fifth, I can then calculate the mean income of this birth cohort over the 1983-1989 period as the average of the mean income of age group 25-29 in 1983 and the mean income of age group 31-35 in 1989. Sixth, the savings rate s_{ct} can be computed according to equation (2).

There are several important methodological issues regarding the implementation of this model that should be addressed before the actual results are shown.

3.1.1 "Pseudo-panels." Let us first consider changes in *aggregate* household wealth from time t to t+1. W_t is the total wealth held by households living in the U.S. at time t and W_{t+1} is the total wealth held by households living in the U.S. at time t+1. If this were a closed economy, then generally speaking the only sources of change, ΔW_t, would be from savings and capital appreciation. However, there may be some "leakages" and additions for a few reasons. First, a household could make a charitable contribution, which would subtract from current household wealth. Second, someone could die in this time interval and pay estate taxes or leave a charitable bequest. Third, there may also be outflows if an American resident emigrates from the U.S. and takes wealth out of the U.S. over this interval. Fourth, there may be additions to the stock of household wealth if immigrants bring new wealth in. However, if these effects are small, then changes in aggregate wealth are due generally to only savings and capital gains on wealth at time t.[15]

[15] Zucman (2013) presents convincing evidence that substantial wealth was transferred from domestic accounts to foreign ones over time ("offshoring"). In principle, offshoring should not present a problem for the SCF data since the

In order to analyze the sources of wealth change, it might seem that the appropriate technique is to compare household wealth holdings in time t and t+1. However, this technique is flawed since over time a given group of households gets older ("ages") and, normally, their wealth rises. A comparison of mean wealth in the two years would thus reflect not only this aging process but the entry of new households into the population. As a result, the appropriate analysis would be to look at only the same group of households in the two years.

The method used here provides us with a "pseudo-panel" over time from multiple cross-sections since we are following up the same birth cohort over time. A very similar technique was first employed by Sabelhaus and Pence (1999). They used six age cohorts beginning in 1989 and followed them over time through 1995. Their results were also based on the SCF, as well as rates of return estimated from the Flow of Funds Accounts (now called The Financial Accounts of the United States.) Their analysis was conducted for the full population of households. What distinguishes the work here is that I conduct a similar set of decompositions by wealth class.[16]

In principle, in the simulation by age group, we want the *same* representative group of households in the second year as in the first year. For the simulation involving all households, this is not too much of a problem since households are simply being "aged" over time. However, there are a couple of provisos. First, some deaths may occur between the two years, so that the households in the second year may contain fewer households than in the first year. In the example above, there may be fewer households in age group 31-35 in 1989 than in age group 25-29 in 1983. Second, more subtly, since households are classified according to the age of the household head, a change in marital status (a couple divorcing, for example) may change the number (and identity) of the households over the period. Third, some households in an age group may emigrate and new households may come into an age group from immigration. Though it is likely that these effects are

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SCF asks questions about asset holdings in foreign accounts. This problem appears more germane to aggregate data like the Financial Accounts of the United States since these accounts are based on only domestically held assets.

[16] An alternative approach is to use actual panel data. In the case of the SCF, there were two panels conducted covering the period 1983-1986 and 2007-2009. Unfortunately, the coverage is not sufficient to provide much historical analysis of trends in capital gains and savings over the full 30-year time period. Another source is the Panel Study of Income Dynamics (PSID), which covers years 1984 to 2013. There are a number of problems that make the SCF data preferable. First, and most notably, the PSID is weak on wealth coverage of the top end of the wealth distribution, particularly the top one percent. Since an important objective of this study is to decompose wealth trends between the top percentile and the middle three wealth quintiles of the wealth distribution, the SCF is definitely preferable on this score.

Second, the decomposition analysis relies heavily on the portfolio composition of each wealth, income, and demographic group (in order to compute the average rate of return of the group, r_{ct}). Here, also, the SCF is by far a superior source compared to the PSID since the SCF questionnaire contains several hundred questions on assets and liabilities held by each household. In contrast, the PSID has only 17 to 19 questions in total (depending on the year) on this topic.

relatively small, in order to ensure consistency between the two years I standardize the age distribution in the second year on the basis of the age distribution in the first year. Thus, if 12 percent of households are in age group 25-29 in 1983 (as was the case in actuality), then I standardize the 1989 age distribution so that 12 percent of households are in age group 31-35 in 1989. In other words, in computing overall mean wealth in 1989, I use the age distribution weights of 1983. Overall mean wealth in 1989 is then equal to the mean wealth by age group in 1989 (say, age group 31-35) weighted by the share of households in the corresponding age group in 1983 (in this case, age group 25-29).

In the case of wealth classes, the same issues of attrition and new entrants may apply as in the case of all households for computing the overall mean. In addition, households may shift their wealth class over time. For example, the households in the top one percent say in 1983 may not be the same as those in the top one percent in 1989. There is a regression to the mean over time, and some households in the top one percent in 1983 may have slipped to the next 19 percent, say. As a result, the estimated change in mean wealth over the period may, in fact, be less than actual change in mean wealth if we followed exactly the *same households* over time. Since savings is imputed as a residual, this may bias *downward* the estimated savings for that wealth class over the period. Conversely, if households move up into a higher wealth class over the period, the estimated change in mean wealth may be greater than the actual change. This may be the case for the middle three wealth quintiles or the next 19 percent. In that case, estimated savings may be biased upward.

However, shifting wealth classes is not a problem if we are interested in explaining the change in wealth of, say, the top one percent over time. As noted above, households in the top one percent of the wealth distribution may be different in the two years. In that case, as long as we select households in the second year based on their birth cohort in the first year (say, age group 31-35 in 1989 and age group 25-29 in 1983) and standardize mean wealth by age group in the second year (age group 31-35 in 1989) by the share of households in the corresponding age group in the first year (ages 25-29 in 1983), then we make sure that the household *groups* in the two years are the same (if not exactly the same households). This procedure will allow us to calculate unbiased estimates of the portions of the *standardized* change in the mean wealth of this group due to capital gains, savings, and net wealth transfers.

3.1.2 Income. The income concept used here is the Census Bureau's standard gross money

measure.[17] It is true that more comprehensive income measures have also been used in the literature by Bitler and Hoynes (2010), as well as Armour, Burkhauser, and Larrimore (2013). Their work suggests that the middle of the income distribution as well as the bottom quintile were much more protected from the reduction in market income during and following the Great Recession by substantial gains in in-kind transfers and tax credits that are not capture by standard money income. Without a full accounting for a more comprehensive measure of income one could misinterpret the difference between full income and consumption.

This point is quite true. Unfortunately, data in the SCF do not allow an imputation of in-kind government transfers and tax credits like the EITC. However, despite this, the term S_{ct} in equation (1) would not be affected by the use of a more limited or expanded income concept. The income definition, however, would affect the measurement of s_{ct} (see Equation 2).

3.1.3 Wealth levels. I use the SCF wealth data for the standard analysis. However, there appears to be a major discrepancy between the SCF data on household wealth for 2010 and 2013 and that from the Financial Accounts of the United States (FFA). In particular, the SCF data indicate that mean net worth per household rose only 0.6 percent over these years (in total), while the aggregate household balance sheet data based on the FFA shows a 20.3 percent jump in net worth per household over this interval.[18] While it is beyond the scope of this paper to reconcile the two series, this section will compare time trends in mean net worth per household from the two sources over the full period from 1983 to 2013 to see whether similar discrepancies exist for other sub-periods as well. Moreover, to test the sensitivity of the decomposition results, I will also use the FFA estimates of mean wealth in place of the SCF figures to determine how sensitive estimates of savings per period are to the choice of data source.

3.1.4. Gifts and inheritances. The SCF contains several questions on (*inter-vivos)* gifts and inheritances received as well as gifts given to others and donations to non-profits and other charitable organizations. Net wealth transfers are defined as gifts and inheritances received minus gifts and donations given. The data are available in the SCF from 1989 onward. On the basis of these variables, one can estimate *net* wealth transfers received by household by period.

3.1.5 Rates of return. The method used in the simulation assumes a single rate of return by asset type. Differences in rates of return by wealth level are then based solely on differences in

[17] Though the standard SCF income measure includes realized capital gains, this component is excluded here since it is already partially captured in the term $r_{ct}W_{ct-1}$.
[18] The source is https://www.federalreserve.gov/releases/z1/. The wealth concept excludes all consumer durables.

portfolio composition. However, it may also be the case that rates of return by asset type differ across wealth classes. If the rich receive higher returns on their stock holdings than middle class households and/or experience higher appreciation on their homes, then rates of return for the rich will be biased downward and those for the middle class will be biased upward. As a consequence, capital appreciation will be understated for the rich and overstated for the middle class and correspondingly savings will be overstated for the rich and understated for the middle class.

There is limited evidence on the variation of rates of return across wealth classes (or income classes, age groups, race/ethnic groups, educational groups, and family types). One rather dated study, Blume et. al (1974, p. 26), looked at the relation of dividend yield to household income in 1969. The study found that dividend yield, rather interestingly, varied inversely with income but the range was very small (2.51 percent to 2.78 percent).[19]

3.1.6 Confronting Piketty's r>g proposition . This part of Section 3 confronts Piketty's (2014) now famous "law" that wealth inequality rises if r>g – namely, if the rate of return on capital, r, is greater than the rate of real output growth, g – and conversely. In fact, the Piketty condition is not generally met, at least in the case of the U.S. over years 1983 to 2013. This finding is evident from Table 6. For Piketty's "r" I use my own computation of the average annual real rate of return on household wealth from Table 5. For "g" I use the average annual growth of real GDP derived from the National Income and Product Accounts. A couple of anomalies stand out. First, from 1983 to 1989, r equaled 3.32 percent and g was 4.29 percent, so that the Piketty law would imply a decline in wealth inequality. In fact, the Gini coefficient rose rather sharply (by 0.029 points). Second, over the 2007-2010 period, r was -7.28 percent and g was -0.20 percent, so that again the Piketty law would indicate a drop in inequality. Instead, the Gini coefficient again showed a vigorous increase of 0.032 points. Indeed, the overall correlation coefficient between the difference r – g and the change in the Gini coefficient is actually strongly negative, -0.81. Though these results are hardly definitive since they are based on only five data points and my interpretation of "r" and "g", they do cast some doubt on the reliability of Piketty's law.[20]

A better rule of thumb is afforded by looking at the relation between r_t, the rate of return on the portfolio of the top one percent of wealth holders and r_m, the rate of return on the portfolio of the

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[19] Saez and Zucman (2016) also used average rates of return when capitalizing income streams from dividends and interest into corresponding asset values.

[20] In fairness to Piketty it should be noted that for Piketty r is the net return to production and financial capital while g is the world output growth rate.

middle three wealth quintiles. Instead, it appears to be the case that wealth inequality rises if the rate of return on wealth is greater for the top one percent than for the middle class. As we saw in Table 5, there are striking differences in rates of return on net worth between these groups. For example, from 2001 to 2007 when inequality remained relatively stable, the annual real rate of return on net worth for the middle three wealth quintiles was 5.6 percent whereas it was only 3.9 percent for the top percentile. In contrast, from 2007 to 2010, when the Gini coefficient for wealth shot up by 0.032, the rate of return for the former was -10.6 percent but "only" -6.5 percent for the latter. In fact, the simple correlation between the difference r_t, - r_m and the change in the Gini coefficient is now positive and quite strong, 0.74. Wealth inequality thus tends to decline or remain stable when the return on wealth for the middle class is greater than that of the very rich and, conversely, increase when the opposite is the case.

3.2 Decomposition results

Results are shown in Table 7. It is first of interest that the simulated change in mean net worth (NW) both overall and by wealth class by period was greater than the actual change (with one exception) since wealth generally increases with age. Not surprisingly, the differences were larger the longer the time period. For example, for the 1989-2001 period the simulated change in overall mean NW was $262,200, compared to the actual change of $152,000 – a difference of $106,700.

[Table 7 about here]

Generally speaking, capital revaluation explained the bulk of the change in overall mean NW (see Panel C). It accounted for 80 percent (22.0/27.6) of the total growth in mean wealth over the 1983-1989 period, 91 percent (68.5/75.3) over years 1989-2001, and 78 percent (27.4/35.4) over the period from 2001 to 2007. From 2007 to 2010, capital losses would have caused mean wealth to decline by 19.6 percentage points, compared to the 10.6 percentage point drop in simulated mean wealth. From 2010 to 2013, capital gains by themselves would have caused mean NW to climb by 20.4 percentage points, whereas simulated mean wealth increased by only 6.4 percentage points.

Net wealth transfers were relatively small in each of the five periods.[21] Savings are then computed as a residual. Its contribution to wealth growth was much lower than that of capital gains in the first three periods, accounting for only 12 percent (3.4/27.6) of the overall growth in mean

[21] Generally speaking, for the population as a whole, total gifts given would equal total gifts received. However, there are two offsetting factors. First, since the simulations are performed over time, it is possible for an *inheritance* to be received over the period with no corresponding negative entry since the household is no longer in the population. Second, donations to charities and non-profits are subtracted in the calculation of net wealth transfers received. The net wealth transfer figures are adjusted so that the total *gifts* reported received in a given year for the full population are

wealth over years 1983 to 1989, 6.8 percent (5.1/75.3) over 1989-2001, and 15 percent (5.4/35.4) over 2001-2007. Over 2007-2010, estimated savings would have caused mean wealth to grow by 9.1 percentage points, offsetting in part the 19.6 percentage point decline emanating from capital losses. In contrast, the results for 2010-2013 indicate very high dissavings, causing a 15.5 percentage point fall in mean wealth over these years. This finding seems peculiar and suggests that aggregate data may provide a more realistic view of wealth trends over these years, as we shall see below.

The implied annual savings rates (the ratio of the annualized savings over the period to the average of the mean income of the first year and the simulated mean income of the second year) do not line up very well with overall savings rates computed from NIPA.[22] It would not be expected that the two are equal for two reasons. First, the NIPA savings rate is defined as income minus consumption expenditure. If a household sells an asset or withdraws from a savings account, say, $1,000, the NIPA concept would not consider this change in the household's balance sheet as dissavings. However, this would show up in the SCF concept as dissavings of $1,000. Likewise, if a household reduces its debt by $1,000, this change would show up as added savings in the SCF concept but not be captured in the NIPA definition. For these reasons, the SCF savings concept should be considered superior to the NIPA definition.

Second, the NIPA savings rates are computed from annual data whereas my estimates are based on pseudo-panels (over time). Nonetheless, my estimates are quite far from the NIPA benchmark in all five periods, particularly 2007-2010 and 2010-2013. For the last period, my estimated savings rate is actually negative and quite large (-30.8 percent) whereas the NIPA figure is positive. This discrepancy is another indication that the aggregate FFA wealth data may be more reliable for this period.

How do the results for years 2007-2010 and 2010-2013 line up with the data from Section 2.3? Among all households, there was a modest reduction of overall average debt by 4.4 percent in constant dollars from 2007 to 2010 (Table 2). This could be a source of some of the savings indicated above. However, there was also a downward trend in asset ownership over these years, which was tantamount to dissavings. Over the 2010-2013 period, on the other hand, there was a major retrenchment in average debt (in constant dollars) of 12.6 percent, as well as a continued,

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equal to the total *gifts* reported given to other households (typically, the greater of the two figures).

[22] I use here the ratio of total personal savings to personal income from NIPA, rather than the ratio to personal *disposable* income, which is the more usual concept, in order to maintain consistency with the SCF data.

though more modest, negative trend in asset ownership. Both these factors should have led to positive savings over these years, in contrast to the negative savings seen in Table 7.

Results for the top one percent, shown in Panel 2, are quite similar to those for all households, with capital revaluation accounting for the bulk of wealth growth in the first three periods and savings making a much smaller contribution. Over 2007-2010, capital losses would have caused a 17.8 percentage point decline in the mean wealth of the top percentile but savings would have led to a 6.8 percentage point gain, whereas over years 2010-2013, capital gains made a very strong contribution to wealth growth but savings once again had a strong negative effect. Here, too, it is hard to believe that the top one percent had such a high negative savings rate.[23]

Among the next 19 percent (percentiles 80 to 99), capital gains accounted for more than 100 percent of their wealth growth over the first three periods, with dissavings making a negative contribution in these cases. Over 2007-2010, capital losses would have caused an 18.0 percentage point decline in their mean wealth, almost exactly the same as that of the top percentile but savings would have caused a 4.7 percentage point advance. Over 2010-2013, capital gains would have once again have caused a very sizeable gain in mean wealth but dissavings in this case more than offset the capital gains effect, causing an overall decline in wealth. The savings rates of this group were uniformly negative over the five periods, except for 2007-2010 when it was positive and quite high.

The results for the middle three wealth quintiles were different. Capital appreciation once again accounted for more than 100 percent of the change in mean wealth over the first three periods, and dissavings once again made a negative contribution. However, the relative magnitudes were quite a bit larger, with dissavings reducing wealth growth by 32.0 percentage points in the 1989-2001 period and by 16.4 percentage points over years 2001 to 2007. Over 2007-2010, capital losses accounted for a 27.1 percentage point decline in the mean wealth of this group (87 percent of the total decline) but in this case dissavings added another 3.1 percentage point to the overall decline (10 percent of the total). These results do differ from the rough estimate noted in Section 2.7 that capital losses accounted for three fifths of the decrease in median wealth and savings the remaining two fifths. In 2010-2013, capital gains would have caused mean wealth to rise by 22.8 percentage

[23] Net wealth transfers once again made a small contribution to the wealth changes of the top one percent. Net wealth transfers were negative for the first four periods, since gifts given to other households (plus charitable donations) were greater than gifts and bequests received by the top one percent. The flow was positive in the fifth period because of several large inheritances reported by these families over the 2010-2013 period.

points by itself but this was almost exactly offset by dissavings over these years. The implied savings rates of the middle wealth group were uniformly negative across the five periods.

How do the savings results for the 2007-2010 and 2010-2013 periods compare to the data on asset holdings and debt of the middle three wealth quintiles from Table 4? There was a substantial retrenchment of their average debt by 25 percent in constant dollars from 2007 to 2010, so this should have translated into positive savings. However, there was also a major reduction in asset ownership over these years – for example, 8.9 percentage points for homes and 7.7 percentage point for pension accounts -- as well as sizeable declines in the value of these assets. These two changes would have translated into substantial dissavings. It appears that the latter effect dominated debt reduction and led to net dissavings over this period. From 2010 to 2013, there was a more modest decrease in average debt (in constant dollars) of 8 percent, as well as a continued, though more moderate decline, in asset ownership. These two factors partially offset each other but led to net dissavings over these years.

3.2.1 Decomposition results with data aligned to the national balance sheets. I repeat the analysis with household wealth data aligned to aggregate time series data of household wealth. This series is based on the Financial Accounts of the United States (FFA). The procedure is to adjust the household wealth data in the SCF proportionally by the ratio of the FFA aggregate wealth total to the SCF wealth total in that year. I use a proportional adjustment since it is not possible to estimate wealth holding by wealth class or any other characteristic from the FFA balance sheet data.

It is at once apparent that trends in mean household wealth differed between the SCF and the FFA data, particularly for the 1983-1989 and the 2010-2013 periods. For the first, the SCF data show a 14.6 percent rise in average net worth, while the aligned data indicate a 29.3 percent increase. For the 2010-2013 period, the former indicate a 0.6 percent (total) growth while the latter show a 20.3 percent advance. There was a less marked difference for years 1989 to 2001, when the SCF data point to a 44 percent increase in mean net worth and the aligned FFA data a 35 percent gain. The trends for the other two periods lined up reasonably closely. Decomposition results therefore differ mainly for the earliest, second, and last period.

Indeed, as shown in Table 8 that is largely the case. For the 1983 to 1989 period savings accounted for 43 percent of the growth in mean wealth for all households, in contrast to 12 percent based on the (unaligned) SCF data.[24] Moreover, the implied savings rate leaped from 2.5 to 11.1

[24] By construction, the contribution of capital gains to the overall percentage growth in mean net worth remains unchanged in the two decompositions, as does the contribution of net wealth transfers.

percent. For the 1989-2001 period, changes in results were relatively minor. With the aligned data, savings were negative and would have caused a 5.3 percentage point decline in mean wealth and the savings rate was negative, -1.7 percent. With the SCF data, savings were positive and accounted for a mere 6.8 percent of wealth growth over these years and the savings rate was positive but small, at 1.9 percent. For the 2010-2013 period, the aligned FFA data indicate positive savings, accounting for 19 percent of the change in mean wealth (5.1/27.2) and a positive savings rate of 8.6 percent. Results from the unaligned data, in contrast, show a huge negative contribution of savings to wealth growth, accounting for a 15.5 percent drop, and a huge negative savings rate of -30.8 percent.

[Table 8 about here]

Which results seem more sensible? For the 1983-1989 period, the aligned data, given asset price movements over these years, imply an enormous savings rate, which does not appear believable. For years 1989 to 2001, the unaligned estimates seem more reasonable since they point towards a positive savings rate over the period, which is more consistent with the NIPA results. Results for the next two periods are quite close from the two simulations. On the other hand, for the 2010-2013 period, the aligned FFA estimates seem more credible than the unaligned ones since they indicate a positive savings rate over these years whereas the latter show a very high rate of dissavings. I therefore rely on the unaligned estimates for the first four periods but the aligned FFA estimates for years 2010-2013.

For the 2010-2013 period, on the basis of the aligned figures, capital gains accounted for 73 percent (20.3/27.9) of the growth in the mean wealth of the top one percent and savings for 19 percent, and the implied savings rate was 18.9 percent (as opposed to negative for the unadjusted figures). For the next 19 percent, capital gains explained a little over 100 percent of the growth in their mean wealth in 2010-2013, savings made a very small negative contribution, and the implied savings rate was -5.3 percent (in contrast to -60.2 percent with unadjusted data). Among the middle three wealth quintiles, capital gains caused their average wealth to grow by 27.7 percentage points but this was offset by a 7.7 percentage point reduction in their mean wealth due to dissavings. As with the unadjusted data, their savings rate was negative – in this case, -4,2 percent as opposed to -15.1 percent from the unadjusted data.

3.2.2 Decomposing changes in wealth inequality. The next step is to decompose changes in wealth inequality over time into three components: capital revaluation, savings, and net wealth transfers. As far as I can tell, there is no simple analytical decomposition of Equation 1 into these

three components. As a result, the technique I use is to set the value of each component equal to its overall average (that is, its value for all households) and then re-compute the change in simulated wealth over the period. The difference between the original simulated change and the newly re-computed simulated change is then the measure of the contribution of that component to the simulated change in net worth.

The index of wealth inequality that I use in this exercise is the ratio of the mean wealth of the top one percent of wealth holders to the mean wealth of the middle three wealth quintiles (60 percent) of wealth holders. I call this ratio the P90/P2080 ratio. This measure seems to provide the most straightforward decomposition compared to alternative measures like the Gini coefficient.

The first concern is how well the actual P90/P2080 ratios line up with the Gini coefficients for net worth shown in Table 1. The former show a modest increase between 1983 and 1989 (7.7 percent) while the Gini coefficient shows a fairly large rise of 0.029 Gini points (see Table 9). Between 1989 and 2001, the P90/P2080 ratio had a larger advance (11.1 percent) while the Gini coefficient declined slightly. Over the 2001-2007 period, the former grew modestly (6.6 percent), while the Gini coefficient had a modest upturn (0.008 Gini points). For years 2007 to 2010, both measures show an upsurge (the former by 27.0 percent and the latter by 0.032 Gini points), while over the last three-year period, both rose moderately (6.7 percent and 0.005, respectively). All in all, the two measures line up surprisingly well over years 1983 to 2013. The next issue is how well the simulated change in the P90/P2080 compares to the actual change in the P90/P2080 ratio. In this case, also, the two line up extremely well (compare lines IIA and IIB).

[Table 9 about here]

The third and major issue is how much of the change in inequality is accounted for by the three components. I first consider differences in rates of return on net worth between the top one percent and the three middle wealth quintiles ("the middle"). As shown in Table 5, there was relatively little variation in annual rates of return between the two groups over the 1983-1989 period, though the top one percent had a slightly higher return (3.45 versus 3.35 percent). In this period, the percentage change in the P99/P2080 would have been 0.6 percentage points *smaller* (114.4 – 113.8) if rates of return were the same for the two groups (line IIIC) and, as a result, differences in returns made a small but *positive* 0.6 percentage point contribution to inequality, increasing the percentage change in the P99P2080 ratio by 6.6 percent (line IVA). Over 1989-2001, there was a larger spread in returns between the two groups – a difference of 0.48 percent per year – but in this case the return was higher for the middle group. If returns had been the same for the two

groups, the P99/P2080 ratio would have risen by 8.3 percentage points more (line IIIA), and, consequently, differences in returns *reduced* wealth inequality by 8.3 percentage points, lowering the percentage increase in the P99/P2080 ratio by 45 percent (line IVA).[25]

Over years 2001-2007, there was an even larger gap in rates of return, 1.67 percentage point, in favor of the middle and this component lessened the percentage gain in the P99/P2080 ratio by almost 90 percent.[26] Years 2007 to 2010 saw negative returns for the two groups but in this case the annual returns were much lower for the middle group – a discrepancy of 4.04 percentage points. If rates of return had been identical for the two groups, the percentage change in the P99/P2080 ratio would have been 15.1 percentage points smaller. As a consequence, differences in returns augmented inequality over these years, accounting for over half (52.6 percent) of the percentage rise in the P99/P2080 ratio (line IVA).[27] Finally, over years 2010 to 2013, the annual returns became positive again and were greater for the middle than the top percentile – a spread of 0.79 percentage points. This gap reduced the percentage change in the P99/P2080 ratio by 84 percent (line IVA).

How well do these results accord with the analysis of Section 2? Here I speculated that disparities in annual returns between the two groups were a major contributory factor to the spike in wealth inequality from 2007 to 2010 but moderated the rise in inequality in the 2001-2007 and 2010-2013 periods. This new analysis confirms the speculations of Section 2.

The next row shows the contribution made by differences in the ratio of net wealth transfers to net worth between the two groups.[28] As I noted above, the *net* wealth transfers of the top one percent were negative except for years 2010 to 2013. This results implies that the very rich gave away more of their wealth in terms of *inter-vivos* gifts and donations then they received in gifts and inheritances.[29] The exception, as noted above, was 2010-2013, when *inter-vivos* gifts and donations

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[25] Note that a negative value in Panel IV indicates that the component *reduces* inequality whereas a positive value indicates that the component *increases* inequality.

[26] The results, in more detail, show that the overall rate of return over years 2001-2007 was 4.04 percent. If the return for the top one percent is set to this rate from its actual 3.92 percent, as in line IC, then the mean net worth of the top one percent increased from $21,492,000 to $21,646,000 in 2007 or by 0.7 percent (since the rate of return is now higher), and that of the middle fell from $168,700 to $152,200 or by 9.8 percent (since the return is now lower). As a result the ratio between the two rose from 127.4 to 142.2 in 2007 or by 11.6 percent, as shown in lines IB and IC. Actual rates of return therefore reduced the rise in the ratio from 11.6 percentage points to 1.4 percentage points or by 88 percent.

[27] The results in greater detail are as follow: The overall rate of return over 2007-2010 was -7.28 percent. If the return for the top one percent is set to this rate from its actual -6.52 percent, as in line IC, then the mean net worth of the top one percent fell from $18,438,000 to $18,050,000 in 2010 or by 2.1 percent, and that of the middle advanced from $106,900 to $118,6200 or by 10.9 percent. As a result the ratio between the two dropped from 172.4 to 152.2 by 11.7 percent, as shown in lines IIA and IIB.

[28] I use this measure rather than total net wealth transfers since actual levels in net transfers depend very heavily on the wealth level of a group.

[29] It is of interest that most of the literature on gifts and inheritances emphasizes the fact that the very rich receive higher

from the top wealth percentile were down considerably (though the group still received some inheritances and gifts over these years). The more crucial dimension is the ratio of net wealth transfers to net worth. In this case, the net wealth transfer ratio was lower for top one than the middle for all periods (including 2010-2013) with the sole exception of years 2007-2010. Here, the ratio was somewhat higher for top one percent than the middle group (-0.004 versus -0.010).

As a result, when the ratio of net worth transfers to net worth is set to the overall average, which was positive in all periods except 2007-2010, the mean wealth of the top one percent rose (since wealth transfers are now positive instead of negative). However, the mean wealth of the middle group also increased, since their net transfers were less than the overall average (except, again, for the 2007-2010 period), but the mean wealth of the former increased more in percentage terms than that of the latter. As a result, setting a uniform ratio of wealth transfers to net worth for both wealth groups raised the simulated ratio of mean wealth between the two groups over all periods except for years 2007-2010 (see Line IID). Consequently, the gap in the ratio of net transfers to net worth between the two groups had an equalizing effect on the mean ratio (negative entry in Line IVB) except for 2007-2010 where the effect was positive (disequalizing) but very small. The effect of the difference in the net transfer ratio was also relatively small over years 2001-2007 (a difference of 3.7 percentage points in the percentage change in the P99/P2060 ratio, as shown in line IIIB) but the percentage contribution was large because of the very small change in the simulated P99/P20 ratio over these years (1.4 percentage points, as shown in line IIB).

Simulated savings rates were much higher for richer households. If we substitute the aggregate FFA results for the SCF data in the 2010-2013 period, then over the five sub-periods, the average savings rate was 15.3 percent for the top one percent but only -4.2 percent for the middle three wealth quintiles. The overall average over the five sub-periods was 7.7 percent. Equalizing savings rates for the two groups by setting them equal to the overall average should thus lower the mean wealth of the top percentile and raise the mean wealth of the middle. This procedure should thus be equalizing and, consequently, the *difference* in savings rates should contribute positively to inequality.

The results confirm this prediction. Instead of using the standard savings rate (the ratio of savings to income) in the simulation, I use the ratio of savings to net worth in order to be consistent with the other two components (the rate of return and the ratio of net wealth transfers to net worth).

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amounts than lower wealth groups (see Wolff, 2015, for example). However, in point of fact, when the outflows are also taken into account, the rich are net donors rather than net recipients.

Over the 1983-1989 period, imposing a uniform savings rate lowered the percentage increase in the simulated P99/P2080 ratio from 9.0 to -1.6 or by 10.6 percentage points (IIIC). Thus, the differential in savings rates between the two groups was disequalizing, accounting for 118 percent of the rise in the P99/P2080 ratio over these years (line IVC). For 1989-2001, setting a uniform savings rate lowered the rise in the P99/P2080 ratio by 25.3 percentage points (line IIIC), and the disparity in savings rates explained 137 percent of the advance in the P99/P2080 ratio over these years (line IVC). In 2001-2007, the simulated P99/P2080 ratio advanced by 1.4 percent, whereas it would have actually declined by 12.0 percent if savings rates were equal – a difference of 13.4 percentage points (line IIIC). The discrepancy in savings rates between the two groups in this case accounted for 971 percent (13.4/1.4) of the rise in the P99/P2080 ratio – a high figure because of the very low base.

The period 2007-2010 saw a large jump in the simulated P99/P2080 ratio of 28.7 percent. If savings rates were uniform across wealth classes, the P99/P2080 ratio would have risen by only 13.4 percent – a 15.3 percentage point differential (line IIIC). For these years, the differential in savings rates accounted for 53 percent of the rise in the P99/P2080 ratio (line IVC). There was a modest growth in inequality over years 2010 to 2013. If savings rates were equal for the two wealth classes, then the P99/P2080 ratio would have decreased by 3.7 percent instead of rising by 3.5 percent, for a 7.3 percentage point difference (line IIIC). The savings rate difference explained 206 percent of the rise in the P99/P2080 ratio over these years (line IVC).

Looking at each period separately, we can now see that the biggest contributor to the upturn in the P99/P2080 ratio in the 1983-1989 period was the difference in savings rates between the top and middle groups. The higher returns received by the top group also made a slight positive contribution but this was offset by the higher ratio of net wealth transfers to net worth of the middle group. Over 1989-2001, the higher rate of return of the middle group relative to the top percentile helped lower the rise in wealth inequality, as did the higher net wealth transfer ratio of the latter. However, the higher savings rate of the top group relative to the middle added to the upswing in the P99/P2080 ratio. Over the 2001-2007 period, the simulated upswing in the P99/P2080 ratio was very small (1.4 percentage points). Both the higher returns of the middle group and their higher ratio of net wealth transfers to net worth relative to the top group helped offset the growth in the P99/P2080 ratio, whereas the higher savings rate of the top group exacerbated the advance.

Over 2007-2010, there was a sharp escalation in wealth inequality. All three factors made positive contributions: the higher (less negative) rate of return of the top one percent, their slightly higher net wealth transfer ratio, and their higher savings rate. However, by far the two largest

contributions came from differences in rates of return and savings rates, which each accounted for about half of the advance. These results for the 2007-2010 period accord with those of Section 2 where it is surmised that these two factors both contributed to the sharp jump in wealth inequality over these years. These new results indicate that the two factors made about equal contributions. Over 2010-2013, the P99/P2080 ratio showed a small enlargement. Both the higher return of the middle group and their higher net wealth transfer ratio helped reduce this advance whereas the higher savings rate of the top group augmented the upswing. These results also conform to those of Section 2 in which I speculate that rate of return differences contributed negatively to the advance of wealth inequality while differences in savings rate had a positive effect.[30]

4. Summary and concluding remarks

4.1 Change in wealth by wealth group. On the basis of the (unadjusted) SCF data, capital revaluation explained the bulk of the change in overall simulated mean NW – 80 percent or more over the 1983-1989, 1989-2001, and 2001-2007 periods. From 2007 to 2010, capital losses lowered mean wealth by 20 percent, compared to the 11 percent drop in simulated mean wealth. Over 2010-2013, capital gains raised simulated mean wealth by 20 percent, compared to its actual increase of 6.1 percent. Savings accounted for only 12 percent of the overall growth in simulated mean wealth in 1983-1989, 7 percent over 1989-2001, and 15 percent over 2001-2007. Over 2007-2010, savings caused mean wealth to grow by 9 percent, in contrast to the 11 percent fall in simulated mean wealth. For 2010-2013, very high dissavings caused a 16 percent fall in simulated mean wealth according to the unadjusted SCF results. However, on the basis of the SCF aligned to FFA data, savings made a positive contribution to wealth growth, leading to a 5 percent increase in mean wealth and accounting for 19 percent of the change in mean wealth over this period. The FFA aligned data seem more reasonable for this period at least.

Results for the top one percent were quite similar, with capital appreciation accounting for the lion's share of wealth growth in the first three periods and savings making a much smaller contribution. Over 2007-2010, capital losses lowered the simulated mean wealth of the top group

[30] The same analysis was redone using the simulated change in net worth on the basis of the survey data aligned to the FFA (from Table 8) for 2010-2013. The new results are very similar to those based on the unadjusted SCF data for the contributions made by differentials in rates of return and the net wealth transfer ratio (see the last column of Table 9). However, there are differences for the savings rate differentials. In this case, the simulated P99/P2080 ratio fell by 6.3 percent with a uniform savings rate instead of 3.7 percent with the SCF data (line IIE). This result implies that the savings rate differential made a larger contribution to the upswing in the P99/P2080 ratio than reported on the basis of the unaligned data (accounting for 277 percent of the increase compared to 206 percent from the unaligned results).

by 18 percent but savings increased it by 7 percent. Over 2010-2013, on the basis of the FFA aligned data, capital gains made a very strong contribution to wealth growth, accounting for 73 percent of its gain, while savings had a positive effect and accounted for 19 percent. Among the next 19 percent, capital appreciation accounted for more than 100 percent of wealth growth over the first three periods, with dissavings making a negative contribution. Over 2007-2010, capital losses reduced mean wealth by 18 percent while savings led to a 5 percent advance. Over 2010-2013, capital gains caused a very sizeable gain but dissavings had a small negative impact.

The results for the middle three wealth quintiles were different. Capital appreciation once again accounted for more than 100 percent of the change in mean wealth over the first three periods, and dissavings made a negative contribution. Over 2007-2010, capital losses caused a 27 percentage points decline in their mean wealth and dissavings added another -3.1 percentage points. In 2010-2013, capital gains increased mean wealth by 28 percent on the basis of the FFA aligned data but this was partially offset by dissavings which lowered wealth by 7.7 percent.

4.2 Inequality Trends. Trends in inequality as measured by the P99/P2080 ratio were largely influenced by differentials in rates of return and differences in savings rates. Disparities in returns generally helped lower inequality whereas the variance in savings rates uniformly exacerbated inequality. Over 1983-1989, the simulated P99/P2080 ratio rose by 9.0 percentage points. The biggest contribution was from the differential in savings rates between the top and middle groups, explaining over 100 percent of increased inequality. The fact that the top one percent had a slightly higher return on its investments also made a small positive contribution (7 percent). Over 1989-2001, the simulated P99/P2080 ratio increased by 18.5 percentage points. The higher rate of return of the middle group relative to the top group lowered the rise in wealth inequality (by 45 percent). However, the higher savings rate of the top group relative to the middle added substantially to the rise in the P99/P2080 ratio (137 percent). Over the 2001-2007 period, the simulated upturn in the P99/P2080 ratio was very small (1.4 percentage points). The relatively higher rate of return of the middle group lowered the advance in the ratio (by 11.8 percentage points). However, the lower savings rate of this group relative to the top group caused a 13.4 percentage point increase in the ratio, more than offsetting the effect of the rate of return differential.

Years 2007 to 2010 saw a substantial elevation in wealth inequality, with the simulated P99/P2080 ratio climbing by 28.7 percentage points. In this case, both factors contributed to this phenomenon: the higher (that is, less negative) rate of return of the top one percent, which accounted for about half of the rise, and their higher savings rate, which explained the other half.

From 2010 to 2013, the simulated P99/P2080 ratio showed a small advance of 6.7 percentage points. Over these years, the return on the wealth of the middle group was higher than that of the top percentile and this differential slowed the advance by 2.9 percentage points. However, the higher rate of savings of the top group added strongly to this trend, by 7.3 percentage points.

These findings illustrate the power of leverage, particularly for the middle class. This factor was most evident for the 2001-2007 and 2007-2010 periods. In the earlier period, (real) housing prices advanced at an annual rate of 3.02 percent. However, because of high leverage (ratio of debt of net worth), the annual real rate of return on the net worth of the middle three wealth quintiles averaged 5.58 percent over these years. As a result, while the simulated mean net worth of this group advanced by 26.9 percentage points, capital appreciation by itself would have caused a 39.8 percentage point gain (though this increase was offset by a 16.4 percentage point decline resulting from dissavings). Over 2007-2010, homes prices were down at an annual rate of 8.77 percent. However, again because of leverage, the annual return on their net worth was even lower, -10.55 percent per year. The simulated net worth of this group plummeted by 31.1 percentage points. Capital losses explained 27.1 percentage points or 87 percent of the total decline, with an additional 10 percent due to dissavings. It is of note that this split was much more one-sided than the crude decomposition performed in Section 2.7, which seemed to indicate a 61 percent contribution from the rate of return effect and a 39 percent contribution from the dissavings effect. In other words, leverage coupled with the steep fall in housing prices accounted for fully 87 percent of the collapse of median wealth over these years, instead of 61 percent as calculated in Section 2.7.

With regard to inequality trends as measured by the simulated P99/P2080 ratio, the higher leverage of the middle group relative to the top and strong gains in housing prices led to a 1.67 percentage point divergence in rates of return between the two groups over 2001-2007 and this difference reduced the increase in the P99/P2080 ratio from 11.6 percentage points to 1.4 percentage points or by 88 percent.(The equalizing effect was offset by an even stronger disequalizing effect from differences in savings rates between the two groups, leading to a net rise in inequality over these years). From 2007 to 2010, the simulated P99/P2080 ratio shot up by 39 percentage points. In this case, high leverage coupled with the housing market collapse led to 4.04 percentage point gap in rates of return in favor of the top one percent relative to the middle group. This factor accounted for about half the rise in the simulated P99/P2080 ratio over these years, with the other half emanating from differences in savings rates.

4.3 Middle class savings. On another note, it is useful to consider what implications these

simulation results have with regard to savings among the middle class. In Section 2.7 I argue that the middle class, experiencing stagnating incomes, enlarged their debt in order to finance normal consumption expenditures. From 2001 to 2007, despite the huge expansion of debt, the average expenditures in constant dollars of the middle income quintile inched up by a mere 1.7 percent (in total).

Implied savings rates (the ratio of savings to the average income over the period) among the three middle wealth quintiles were negative in all five periods used in the analysis: -1.9 percent in 1983-1989, -5.5 percent in 1989-2001, -6.4 percent in 2001-2007, -3.0 percent in 2007-2010, and -4.2 percent in 2010-2013 on the basis of the FFA-aligned data.

In Section 2.7 I state that the likely reason for the dissavings of the middle class over both the 2007-2010 and the 2010-2013 periods was income stagnation (actually, a reduction in median income in both periods). It appears that the middle class was dissaving in order to maintain its normal level of consumption. Data from the Consumer Expenditure Survey (CE) does indeed show that the average expenditures in real terms of the middle income quintile actually fell by 7.7 percent from 2007 to 2010 and by another 3.5 percent from 2010 to 2013.[31] Moreover, for the 2001-2007 period, as noted above, average consumer expenditures in real terms rose by only 1.7 percent. So it appeared that the middle class was not exactly splurging over these years.

What about years 1983-1989 and 1989-2001? Again, according to the CE, average expenditures in real terms were up by 2.6 percent from 1984 to 1989 and by 13.2 percent from 1989 to 2001.[32] The period from 1989 to 2001 is interesting since it alone shows a marked increase in consumer spending. It also turns out that this period stands out because there was a 9.0 percent spurt in real median family income. It thus appears that the consumption expenditures of the middle class rise only when incomes also grow.

This last result leads to the question of whether the middle class will ever save again. This seems possible only if real median income also increases. However, this is only a necessary condition since it is it still possible (maybe even likely) that rising income will be absorbed by rising consumption.

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[31] Consumer expenditure data are from the Bureau of Labor Statistics' Consumer Expenditure Survey, available at: http://www.bls.gov/cex/, various years [accessed January 28, 2016]. Data on expenditures are available only by income class, not wealth class.

[32] There was no Consumer Expenditure Survey in 1983, so I use 1984 data instead. It should also be noted that unlike later years the tabulation of expenditures by income class was not available by income quintile but by fixed dollar income levels. Estimated mean expenditures of the middle quintile is based on interpolation between the two middle income classes.

4.4 Piketty's law. This paper also confronts Piketty's (2014) "law" that wealth inequality rises if the rate of return on capital, r, is greater than the rate of real output growth, g – and conversely. I use my computation of the average annual rate of return on household wealth for r and the average annual growth of real GDP for g. In the case of the U.S. over years 1983 to 2013, the correlation coefficient between the difference (r – g) and the change in the Gini coefficient over five periods is actually negative and quite high, -0.81. These results cast some doubt on the reliability of Piketty's law. In contrast the simple correlation between the difference in the annual rate of return on the wealth of top one percent and that of the middle three wealth quintiles (r_t, - r_m) and the change in the Gini coefficient is positive and quite strong, 0.74. This result suggests a better rule of thumb that wealth inequality tends to decline or remain stable when the return on wealth for the middle class is greater than that of the very rich and, conversely, increase when the opposite is the case.

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Table 1: Wealth and Income Trends, 1983-2013

(Dollar figures are in thousands, 2013 dollars)

Variable	1983	1989	2001	2007	2010	2013
A. Net Worth						
1. Median	78.0	83.5	96.7	115.1	64.6	63.8
2. Mean	303.8	348.1	500.0	602.3	505.7	508.7
3. Percent with zero or negative net worth	15.5	17.9	17.6	18.6	21.8	21.8
B. Income (CPS)[a]						
1. Median	46.4	52.4	55.6	56.4	52.6	51.9
2. Mean	56.5	66.2	76.6	76.0	72.0	72.6
C. Net Worth Inequality						
1. Gini coefficient	0.799	0.828	0.826	0.834	0.866	0.871
2. Share of the Top 1%	33.8	35.2	33.4	34.6	35.1	36.7
3. Share of the Top 5%	56.1	58.0	59.2	61.8	62.5	64.8
4. Share of the Top 20%	81.3	83.0	84.4	85.0	88.6	88.9
D. Income Inequality						
1. Gini coefficient	0.480	0.521	0.562	0.574	0.549	0.574
2. Share of the Top 1%	12.8	16.6	20.0	21.3	17.2	19.8
3. Share of the Top 5%	26.1	30.0	35.2	37.2	33.7	36.2
4. Share of the Top 20%	51.9	55.6	58.6	61.4	59.1	61.8

Memo: Growth Rates

	Annual Growth Rates (percentage)						Percentage Change	
	1983-1989	1989-2001	2001-2007	2007-2010	2010-2013	1983-2013	2007-2010	2010-2013
A. Net Worth								
1. Median	1.13	1.22	2.91	-19.27	-0.39	-0.67	-43.9	-1.2
2. Mean	2.27	3.02	3.10	-5.83	0.20	1.72	-16.0	0.6
B. Income (CPS)[a]								
1. Median	2.03	0.48	0.26	-2.32	-0.45	0.37	-6.7	-1.3
2. Mean	2.66	1.21	-0.14	-1.78	0.29	0.84	-5.2	0.9

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF.
Wealth figures are deflated using the Consumer Price Index (CPI-U).

a. Source for household income data: U.S. Census of the Bureau, Current Populations Surveys, available at: http://www.census.gov/hhes/www/income/data/historical/household/

Table 2. Composition of Total Household Wealth, 1983 - 2013

(Percent of gross assets)

Wealth component	1983	1989	2001	2007	2010	2013
Principal residence	30.1	30.2	28.2	32.8	30.7	28.5
Other real estate	14.9	14.0	9.8	11.3	11.6	10.2
Unincorporated business equity	18.8	17.2	17.2	20.1	17.7	18.3
Liquid assets[a]	17.4	17.5	8.8	6.6	7.7	7.6
Pension accounts[b]	1.5	2.9	12.3	12.1	15.1	16.5
Financial securities[c]	4.2	3.4	2.3	1.5	1.8	1.5
Corporate stock & mutual funds	9.0	6.9	14.8	11.8	11.2	12.7
Net equity in personal trusts	2.6	3.1	4.8	2.3	2.4	3.2
Miscellaneous assets[d]	1.3	4.9	1.8	1.7	1.7	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Debt on principal residence	6.3	8.6	9.4	11.4	12.7	11.2
All other debt[e]	6.8	6.4	3.1	3.9	4.4	4.0
Total debt	13.1	15.0	12.5	15.3	17.1	15.2
Selected ratios in percent:						
Debt / equity ratio	15.1	17.6	14.3	18.1	20.6	17.9
Debt / income ratio	68.4	87.6	81.1	118.7	127.0	107.1
Net home equity / total assets	23.8	21.6	18.8	21.4	18.1	17.3
Principal residence debt as ratio to house value	20.9	28.6	33.4	34.9	41.2	39.3
Stocks, directly or indirectly owned as a ratio to total assets[f]	11.3	10.2	24.5	16.8	17.5	20.7

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF.

a. Checking accounts, savings accounts, time deposits, money market funds, certificates of deposits, and the cash surrender value of life insurance.

b. IRAs, Keogh plans, 401(k) plans, the accumulated value of defined contribution pension plans, and other retirement accounts.

c. Corporate bonds, government bonds (including savings bonds), open-market paper, and notes.

d. Gold and other precious metals, royalties, jewelry, antiques, furs, loans to friends and relatives, future contracts, and miscellaneous assets.

e. Mortgage debt on all real property except principal residence; credit card, installment, and other debt.

f. Includes direct ownership of stock shares and indirect ownership through mutual funds, trusts, and IRAs, Keogh plans, 401(k) plans, and other retirement accounts

Table 3. Composition of Household Wealth by Wealth Class, 2013
(Percent of gross assets)

Asset	All Households	Top One Percent	Next 19 Percent	Middle 3 Quintiles
Principal residence	28.5	8.7	28.0	62.5
Liquid assets (bank deposits, money market funds, and cash surrender value of life insurance)	7.6	6.1	8.4	8.1
Pension accounts	16.5	9.2	21.7	16.1
Corporate stock, financial securities, mutual funds, and personal trusts	17.4	27.3	16.3	3.4
Unincorporated business equity and other real estate	28.5	46.9	24.2	8.6
Miscellaneous assets	1.5	1.9	1.4	1.2
Total assets	100.0	100.0	100.0	100.0
Memo (selected ratios in percent):				
Debt / equity ratio	17.9	2.6	11.8	64.0
Debt / income ratio	107.1	38.2	96.6	125.0
Net home equity / total assets[a]	17.3	7.3	19.7	31.4
Principal residence debt / house value	39.3	16.5	29.5	49.8
All stocks / total assets[b]	20.7	24.6	22.7	9.5
Ownership Rates (Percent)				
Principal residence	65.1	96.9	95.1	66.7
Other real estate	17.4	75.5	44.0	12.4
Pension assets	49.2	88.7	84.0	44.4
Unincorporated business	10.4	76.6	25.6	6.6
Corporate stock, financial securities, mutual funds, and personal trusts	21.5	84.4	59.5	14.2
Stocks, directly or indirectly owned[b]	46.1	94.0	84.6	41.0
(1) $5,000 or more	36.4	92.9	81.7	30.3
(2) $10,000 or more	32.4	92.8	79.7	25.3

Source: author's computations from the 2013 SCF. Households are classified into wealth class according to their net worth. Brackets for 2013 are:

Top one percent: Net worth of $7,766,500 or more.
Next 19 percent: Net worth between $401,000 and $7,766,500.
Quintiles 2 through 4: Net worth between $0 and $401,000.

Also, see Notes to Table 2.
a. Ratio of gross value of principal residence less mortgage debt on principal residence to total assets.
b. Includes direct ownership of stock shares and indirect ownership through mutual funds, trusts, and IRAs, Keogh plans, 401(k) plans, and other retirement accounts

Table 4. Composition of Household Wealth of the Middle Three Wealth Quintiles, 1983-2013

(Percent of gross assets)

Asset	1983	1989	1998	2001	2004	2007	2010	2013
Principal residence	61.6	61.7	59.8	59.2	66.1	65.1	64.8	62.5
Liquid assets (bank deposits, money market funds, and cash surrender value of life insurance)	21.4	18.6	11.8	12.1	8.5	7.8	8.0	8.1
Pension accounts	1.2	3.8	12.3	12.7	12.0	12.9	13.9	16.1
Corporate stock, financial securities, mutual funds, and personal trusts	3.1	3.5	5.5	6.2	4.2	3.6	3.1	3.4
Unincorporated business equity and other real estate	11.4	9.4	8.8	8.5	7.9	9.3	8.9	8.6
Miscellaneous assets	1.3	2.9	1.8	1.2	1.4	1.3	1.3	1.2
Total assets	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memo (selected ratios in percent):								
Debt / equity ratio	37.4	41.7	51.3	46.4	61.6	61.1	69.2	64.0
Debt / income ratio	66.9	83.0	101.6	100.3	141.2	156.7	134.3	125.0
Net home equity / total assets[a]	43.8	39.2	33.3	33.8	34.7	34.8	31.4	31.4
Principal residence debt / house value	28.8	36.5	44.4	42.9	47.6	46.6	51.5	49.8
All stocks / total assets[b]	2.4	3.3	11.2	12.6	7.5	7.0	8.1	9.5
Ownership Rates (Percent)								
Principal residence	71.6	71.5	73.3	75.9	78.2	76.9	68.0	66.7
Other real estate	15.4	15.5	13.7	13.2	13.6	14.7	12.4	12.4
Pension assets	12.2	27.3	48.5	52.9	51.4	53.4	45.8	44.4
Unincorporated business	8.5	8.4	8.5	7.9	8.1	8.8	8.2	6.6
Corporate stock, financial securities, mutual funds, and personal trusts	21.6	24.2	26.7	27.5	27.1	23.1	15.3	14.2
All stocks[b]	16.5	29.4	46.6	51.1	49.7	47.8	41.4	41.0
Mean Debt (thousands, 2013$)								
Debt on principal residence	23.5	34.2	33.2	49.7	71.4	76.1	58.5	52.4
All other debt	12.5	10.5	9.2	12.2	15.1	19.2	13.1	13.3
Total debt	36.0	44.7	42.4	61.9	86.5	95.2	71.6	65.7

Source: author's computations from the 1983, 1989, 1998, 2001, 2004, 2007, 2010, and 2013 SCF.
Households are classified into wealth class according to their net worth. Also, see Notes to Table 2.

a. Ratio of gross value of principal residence less mortgage debt on principal residence to total assets.
b. Includes direct ownership of stock shares and indirect ownership through mutual funds, trusts, and IRAs, Keogh plans, 401(k) plans, and other retirement accounts

Table 5. Average Annual Real Rates of Return by Period and Wealth Class, 1983 - 2013
(percentage)

	1983-1989	1989-2001	2001-2007	2007-2010	2010-2013	1983-2013
A. Gross Assets						
1. All Households	2.33	3.33	3.10	-6.38	4.83	2.27
2. Top 1 Percent	3.07	3.92	3.75	-6.37	5.91	2.88
3. Next 19 Percent	2.33	3.44	2.88	-6.07	4.78	2.29
4. Middle 3 Quintiles	1.35	2.32	2.71	-7.07	3.28	1.36
B. Net Worth						
1. All Households	3.32	4.35	4.04	-7.28	6.20	3.10
2. Top 1 Percent	3.45	4.19	3.92	-6.52	6.16	3.11
3. Next 19 Percent	3.00	4.09	3.46	-6.63	5.66	2.83
4. Middle 3 Quintiles	3.35	4.67	5.58	-10.55	6.94	3.30
Memo: difference between top 1% and middle quintiles	-0.10	0.48	1.67	-4.04	0.79	0.18

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF.
Households are classified into wealth class according to their net worth.
Calculations are based on household portfolios averaged over the period.
Miscellaneous assets are excluded from the calculation.

Table 6. Confronting Piketty's Law
(percentage)

	Change in	Average Annual Rate of Return[a]			Piketty Variables		
Period	Gini Coeff.	Top 1% (r_t)	Middle ($r_{m)}$	Diff.	r^a	g^b	Diff.
1983-1989	0.029	3.45	3.35	0.10	3.32	4.29	-0.97
1989-2001	-0.001	4.19	4.67	-0.48	4.35	3.06	1.29
2001-2007	0.008	3.92	5.58	-1.67	4.04	2.66	1.38
2007-2010	0.032	-6.52	-10.55	4.04	-7.28	-0.20	-7.08
2010-2013	0.005	6.16	6.94	-0.79	6.20	2.03	4.17
Correl. with Change in Gini Coeff.				0.74			-0.81

a. Source: Table 5.

b. Source NIPA Table 1.1.3 Real Gross Domestic Product, Quantity Indexes, available at:
http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1

Table 7. Decomposing Wealth Trends by Wealth Class, 1983 - 2013

	Period					
	1983	1989	2001	2007	2010	1983
Wealth Class	1989	2001	2007	2010	2013	2013
A. Actual Change in Mean NW by Wealth Class						
1. All Households	44.2	152.0	102.2	-96.6	3.1	204.9
2. Top One Percent	1,985	4,456	4,123	-3,233	1,038	8,369
3. Next 19 Percent	113.5	465.5	256.1	-175.0	-25.9	634.2
4. Middle 3 Wealth Quintiles	10.8	26.1	22.2	-51.8	-0.8	6.6
B. Simulated Change in Mean NW by Wealth Class						
1. All Households	84.0	262.2	177.0	-63.7	32.1	
2. Top One Percent	2,855	8,097	4,785	-2,355	1,222	
3. Next 19 Percent	132.7	503.5	253.2	-205.6	-22.4	
4. Middle 3 Wealth Quintiles	17.0	43.8	35.7	-48.2	3.4	
C. Contribution by Component to Percentage Growth in Simulated Mean NW over Period (percentage)						
1. All Households						
Percentage Growth in Simulated Mean NW	27.6	75.3	35.4	-10.6	6.4	
Contribution of Capital Gains (losses)	22.0	68.5	27.4	-19.6	20.4	
Contribution of Net Wealth Transfers	2.3	1.7	2.6	0.0	1.4	
Contribution of Savings (implied)	3.4	5.1	5.4	9.1	-15.5	
Memo: Annual Savings Rate (implied)[a]	2.5	1.9	4.9	20.7	-30.8	
Memo: NIPA Personal Savings rate[b]	6.9	4.7	2.5	3.9	4.8	
2. Top One Percent						
Percentage Growth in Simulated Mean NW	28.3	67.0	28.6	-11.3	6.9	
Contribution of Capital Gains (losses)	23.0	65.3	26.5	-17.8	20.3	
Contribution of Net Wealth Transfers	-1.6	-5.0	-1.1	-0.4	1.9	
Contribution of Savings (implied)	6.9	6.7	3.2	6.8	-15.3	
Memo: Annual Savings Rate (implied)[a]	13.0	6.4	5.6	32.5	-64.6	
3. Next 19 Percent						
Percentage Growth in Simulated Mean NW	17.4	57.4	18.9	-12.9	-1.6	
Contribution of Capital Gains (losses)	19.7	63.3	23.1	-18.0	18.5	
Contribution of Net Wealth Transfers	1.6	3.1	3.2	0.5	1.2	
Contribution of Savings (implied)	-3.9	-9.0	-7.5	4.7	-21.3	
Memo: Annual Savings Rate (implied)[a]	-4.1	-4.7	-9.7	14.4	-60.2	
4. Middle 3 Wealth Quintiles						
Percentage Growth in Simulated Mean NW	17.7	41.0	26.9	-31.1	3.3	
Contribution of Capital Gains (losses)	22.3	75.2	39.8	-27.1	23.2	
Contribution of Net Wealth Transfers	1.3	-2.3	3.5	-0.8	2.9	
Contribution of Savings (implied)	-5.9	-32.0	-16.4	-3.1	-22.8	
Memo: Annual Savings Rate (implied)[a]	-1.9	-5.5	-6.4	-3.0	-15.1	

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF.

Households are classified into wealth class according to their net worth. Decompositions are then based on the change in the mean wealth of the wealth class over the period. The method is to "age" households over the period. Households in, say, age group 25-29 in 2001 are aged to age group 31-35 in 2007. I also assume that the age distribution of the first year (2001) remains unchanged over the period (2001-2007). Overall mean wealth in 2007 is then equal to the mean wealth by age group in 2007 (age group 31-35) weighted by the share of households in the corresponding age group in 2001 (in this case, age group 25-29).

a. The savings rate is defined as the ratio of the annualized savings over the period to the average of the mean income of the first year and the simulated mean income of the second year.

b. Ratio of NIPA personal savings to NIPA personal income (not personal disposable income): period average.

Table 8. Decomposing Wealth Trends by Wealth Class on the Basis of Data Aligned to the Financial Accounts of the United States (FFA), 1983-2013

	Period					
	1983	1989	2001	2007	2010	1983
Wealth Class	1989	2001	2007	2010	2013	2013
A. Actual Change in Mean NW by Wealth Class						
1. All Households	69.9	108.7	82.0	-76.6	86.0	270.0
2. Top One Percent	2,792	3,233	3,295	-2,523	3,928	10,725
3. Next 19 Percent	177.6	342.8	204.9	-135.1	207.7	797.9
4. Middle 3 Wealth Quintiles	19.3	16.2	17.7	-42.2	16.2	27.2
B. Simulated Change in Mean NW by Wealth Class						
1. All Households	105.1	200.7	143.9	-49.1	115.1	
2. Top One Percent	3,547	6,129	3,874	-1,823	4,109	
3. Next 19 Percent	194.7	374.5	202.5	-160.7	211.2	
4. Middle 3 Wealth Quintiles	24.8	31.0	28.9	-39.2	20.4	
C. Contribution by Component to Percentage Growth in Simulated Mean NW over Period (percentage)						
1. All Households						
Percentage Growth in Simulated Mean NW	44.0	65.0	34.5	-9.8	27.2	
Contribution of Capital Gains (losses)	22.0	68.5	27.4	-19.6	20.4	
Contribution of Net Wealth Transfers	2.9	1.9	3.1	0.0	1.7	
Contribution of Savings (implied)	19.1	-5.3	4.0	9.8	5.1	
Memo: Annual Savings Rate (implied)[a]	11.1	-1.7	3.0	18.6	8.6	
Memo: NIPA Personal Savings rate[b]	6.9	4.7	2.5	3.9	4.8	
2. Top One Percent						
Percentage Growth in Simulated Mean NW	44.8	57.2	27.8	-10.6	27.9	
Contribution of Capital Gains (losses)	23.0	65.3	26.5	-17.8	20.3	
Contribution of Net Wealth Transfers	-2.0	-5.6	-1.3	-0.5	2.3	
Contribution of Savings (implied)	23.8	-2.4	2.6	7.6	5.3	
Memo: Annual Savings Rate (implied)[a]	35.3	-2.0	3.8	30.3	18.9	
3. Next 19 Percent						
Percentage Growth in Simulated Mean NW	32.4	48.2	18.1	-12.1	17.7	
Contribution of Capital Gains (losses)	19.7	63.3	23.1	-18.0	18.5	
Contribution of Net Wealth Transfers	2.0	3.5	3.9	0.5	1.5	
Contribution of Savings (implied)	10.7	-18.6	-8.9	5.4	-2.3	
Memo: Annual Savings Rate (implied)[a]	8.8	-8.6	-9.7	13.6	-5.3	
4. Middle 3 Wealth Quintiles						
Percentage Growth in Simulated Mean NW	32.8	32.7	26.0	-30.5	23.6	
Contribution of Capital Gains (losses)	28.4	84.8	47.7	-32.7	27.7	
Contribution of Net Wealth Transfers	1.7	-2.6	4.2	-1.0	3.5	
Contribution of Savings (implied)	2.8	-49.6	-25.9	3.2	-7.7	
Memo: Annual Savings Rate (implied)[a]	0.7	-7.6	-8.4	2.6	-4.2	

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF and the FFA.
See notes to Table 7 for details on methodology.
a. The savings rate is defined as the ratio of the annualized savings over the period to the average of the mean income of the first year and the simulated mean income of the second year.
b. Ratio of NIPA personal savings to NIPA personal income (not personal disposable income): period average.

Table 9. Decomposing Trends in Wealth Inequality, 1983 - 2013

	Year						FFA
	1983	1989	2001	2007	2010	2013	2013
I. Ratio of Mean NW of Top 1% to Mean NW of Middle Three Wealth Quintiles (P99/P2080 Ratio)							
A. Actual Ratio	105.0	113.1	125.7	134.0	170.2	181.6	181.6
B. Simulated Ratio		114.4	134.0	127.4	172.4	176.2	176.2
C. Simulated Ratio with Uniform Rate of Return[a]		113.8	143.4	142.2	152.2	181.2	180.4
D. Simulated Ratio with Uniform Ratio of Net Wealth Transfers to Net Worth[b]		117.0	135.7	132.0	171.2	178.0	178.0
E. Simulated Ratio with Uniform Ratio of Savings to Net Worth[c]		103.3	105.3	110.6	152.0	163.8	159.5
		Period					FFA
		1983	1989	2001	2007	2010	2010
		1989	2001	2007	2010	2013	2013
II. Percentage Change in the P99/P2080 Ratio							
A. Actual Ratio		7.7	11.1	6.6	27.0	6.7	6.7
B. Simulated Ratio		9.0	18.5	1.4	28.7	3.5	3.5
C. Simulated Ratio with Uniform Rate of Return		8.4	26.8	13.1	13.6	6.5	6.0
D. Simulated Ratio with Uniform Ratio of Net Wealth Transfers to Net Worth		11.5	20.0	5.1	27.7	4.6	4.6
E. Simulated Ratio with Uniform Ratio of Savings to Net Worth		-1.6	-6.8	-12.0	13.4	-3.7	-6.3
III. Contribution to the Percentage Change in the P99/P2080 Ratio (in percentage points)[d]							
A. Differences in Rates of Return		0.6	-8.3	-11.8	15.1	-2.9	-2.5
B. Differences in the Ratio of Net Wealth Transfers to Net Worth		-2.5	-1.5	-3.7	0.9	-1.1	-1.1
C. Differences in the Ratio of Savings to Net Worth		10.6	25.3	13.4	15.3	7.3	9.8
Total		8.7	15.5	-2.0	31.3	3.3	6.3
IV. Percent of Actual Percentage Change in the Simulated P99/P2080 Ratio[e]							
A. Differences in Rates of Return		6.6	-44.9	-851.8	52.6	-83.5	-69.5
B. Differences in the Ratio of Net Wealth Transfers to Net Worth		-27.4	-8.2	-267.1	3.3	-30.2	-30.3
C. Differences in the Ratio of Savings to Net Worth		117.7	137.0	971.4	53.2	205.9	276.9
Residual		3.1	16.1	247.6	-9.1	7.8	-77.2

Source: author's computations from the 1983, 1989, 2001, 2007, 2010, and 2013 SCF and the Financial Accounts of the United States (FFA).

a. The rate of return of each wealth class is set equal to the overall average rate of return.

b. The ratio of net wealth transfers to net worth of each wealth class is set equal to the overall average ratio. This ratio is defined as the ratio of net wealth transfers to the average of the actual mean net worth of the first year and the simulated net worth of the second year.

c. The ratio of savings to net worth of each wealth class is set to the overall average. This ratio is defined as the ratio of savings to the average of the actual mean net worth of the first year and the simulated net worth of the second year.

d. A positive entry indicates that the component increases the P99/P2080 ratio while a negative entry indicates that the component reduces the P99/P2080 ratio.

e. The components (including the residual) sum to 100 percent.

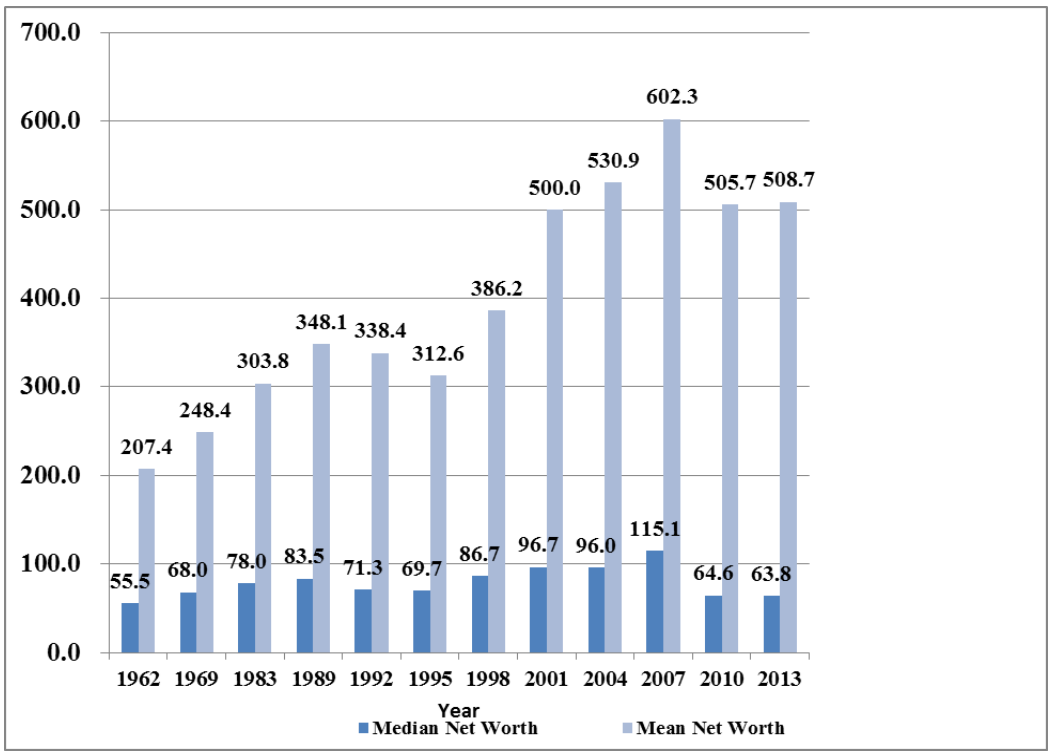

Figure 1. Mean and Median Net Worth (in thousands, 2013 dollars)

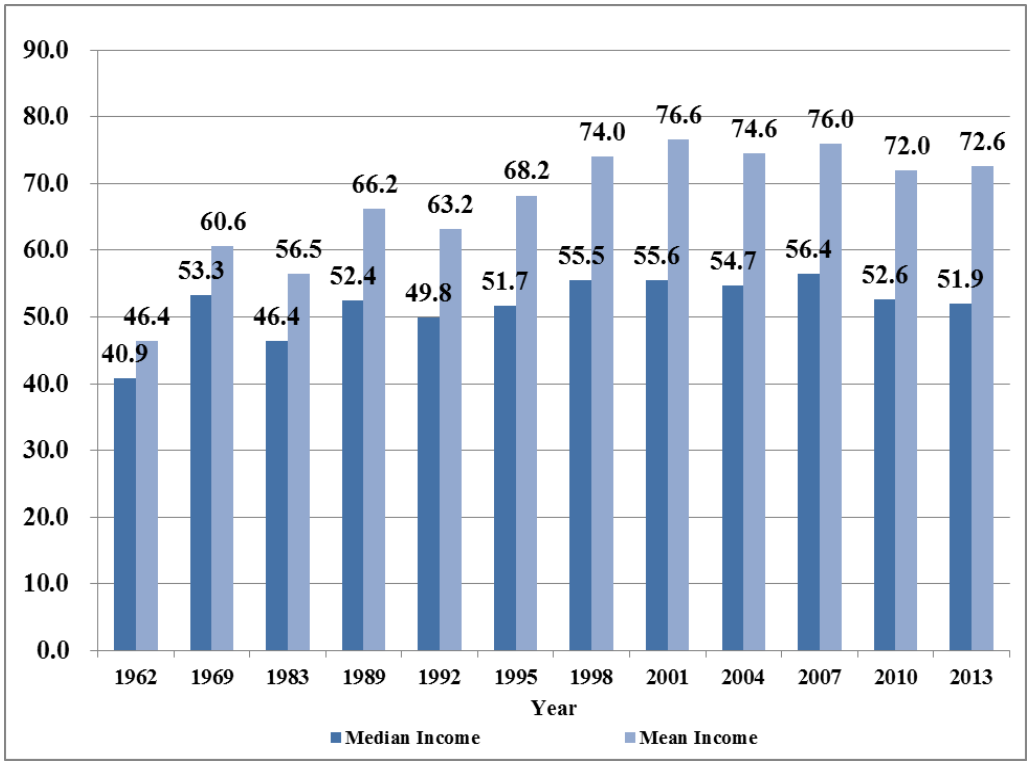

Figure 2. Mean and Median Household Income (in thousands, 2013 dollars)

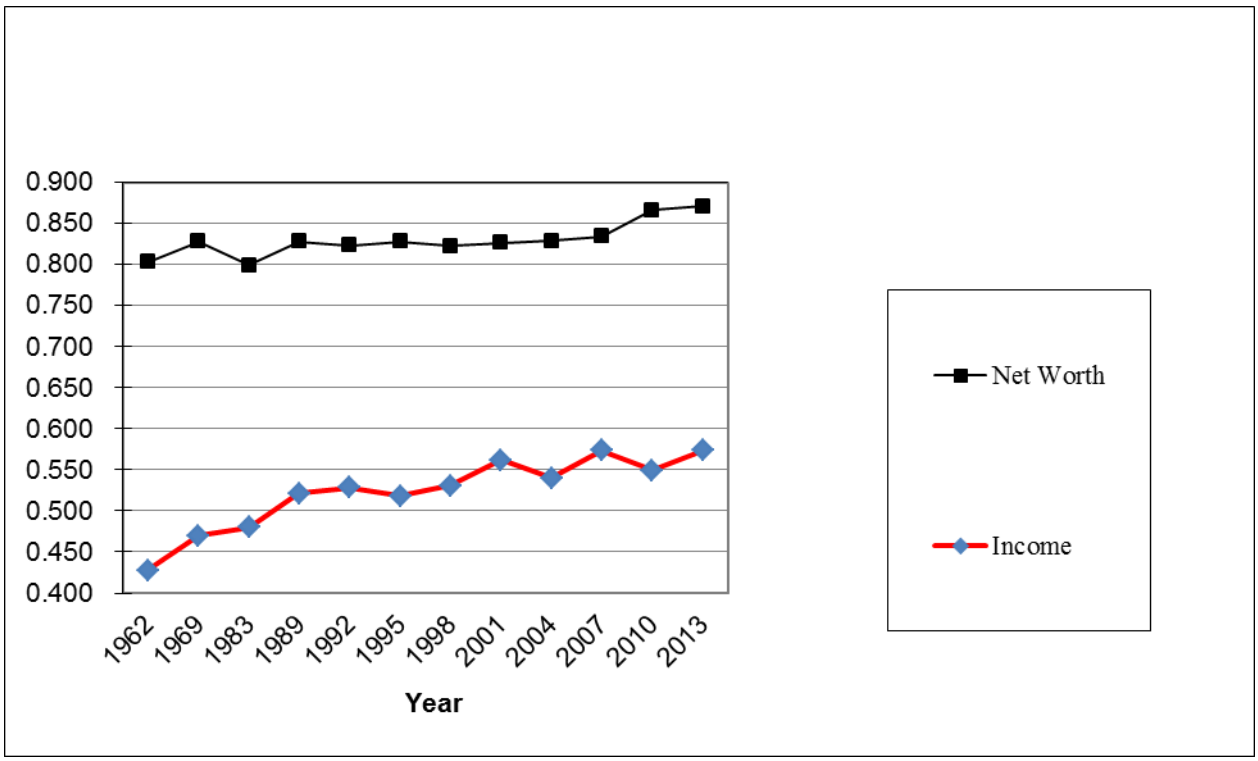

Figure 3. Wealth and Income Inequality (Gini coefficients)