Has Consumption Inequality Mirrored Income Inequality?

Executive Summary

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In this paper we revisit the issue of whether the increase in income inequality over the last 30 years has translated into a quantitatively similar increase in consumption inequality. Contrary to several influential studies, we find that consumption inequality has closely tracked income inequality over the period 1980-2007. Like most of the previous literature that argues the opposite, we base our conclusions on the Consumer Expenditure Survey's (CE) interview survey. However, we focus on two new measures of consumption that under our stated assumptions adjust for the systematic measurement error in the CE. The first measure is the CE's data on savings, from which we calculate consumption via the budget constraint. The second is a demand system, from which we estimate relative consumption growth using relative expenditures on luxuries and necessities. Both measures show a substantial increase in consumption inequality, similar in magnitude to the increase in income inequality. The increase is particularly large for the period 1980-1995, consistent with the view that changes in income inequality in this period reflected changes to permanent income.

The increase in income inequality since 1980 is well documented. The top line in figure 1 depicts the trend in labor earnings inequality for our CE sample. The figure depicts the ratio of the mean labor earnings for the 80-95th percentiles of the after-tax income distribution divided by the mean labor earnings of the 5-20th percentiles of the income distribution. There is substantial year-to-year movement, reflecting in large part sampling error, so we report the change over multiple years in table 1. Labor earnings for the top income group grew by 33 percent through 2007, while labor earnings for the low income respondents fell by 2 percent in real terms, resulting in a ratio of 7.10 in 2005-2007. This implies an increase in earnings inequality of 36 percent over the full period, almost all of which occurred in the first half of the sample period.

Inequality in total household income, after taxes and transfers, grew by nearly as much as earnings (Row 2 of table 1). However, after tax income displays a more steady trend over time, with 20 of the overall 35 percent increase in inequality occurring before the mid-1990s.

Figure 1 also depicts consumption inequality between the top income group and the bottom income group. The increase is much less than that of earnings or after tax income. In table 1, we see that consumption inequality increased by only 19 percent over the full

period, with 12 percent of that change occurring in the first half of the sample.

We reassess these facts using two alternative measures. Our first exercise is simply budget constraint accounting. The mirror image of the differential trends between income and consumption inequality is a growing gap in savings favoring high income households. (Our benchmark measure of income is total household income after taxes and transfers, which is designed to capture adjustments due to government programs and financial income.) Based on reported consumption expenditures, the high income group increased their savings rate from 27 percent to 39 percent between 1980 and 2007, while the low income group went from a savings rate of -27 percent to -24 percent. The implied savings rates using CE income and consumption are implausible. For the overall mean, the implied savings rate in the CE increases from 9 percent in 1980 to over 20 percent in 2007. This contrasts with savings out of disposable income reported in the national income and product accounts (NIPA), which falls from 10 percent to 2 percent, as well as is inconsistent with other micro data sets. This discrepancy is in line with the well documented decline in aggregate consumption reported in the CE relative to NIPA.

In addition to expenditures and income, the CE asks detailed questions on savings flows directly. These questions include net payments of loans, changes in deposit balances, purchases of stocks, etc. The average reported savings rate in the CE declines over time, consistent with NIPA but in contrast to the savings rate implied by the CE's consumption data. Calculating implied expenditure as income minus savings (denoted $Y - S$ in figure 1), we obtain an increase in relative consumption of 30 percent, close to the relative change in income of 35 percent. The CE's savings measures are noisy (particularly regarding new mortgages), and so we view them primarily as a consistency check on the reported consumption data, and only secondarily as an independent measure of consumption itself.

Our preferred measure of consumption inequality uses the CE's expenditure data, but allows for systematic measurement error. Our modeling of measurement error is fairly general. In particular, we allow for time-dependent multiplicative measurement error that is good specific as well as income-group specific. The former allows for the mis-measurement of particular goods to vary over time, such as the possibility that the under-reporting of luxuries has increased relative to the under-reporting of necessities. The latter allows for the measurement to be income-group specific, such as the possibility that the under-reporting of expenditure of high income households across all goods has increased relative to the under-reporting by low income households. This modeling of measurement captures systematic mis-measurement that is correlated with the characteristics of the good and the income-characteristics of the households. We also allow

for mis-measurement at the level of good-income group interaction (clothing of the rich versus clothing of the poor), but restrict this joint mis-measurement to be independent of the characteristics of the goods (in particular, the good's income elasticity).

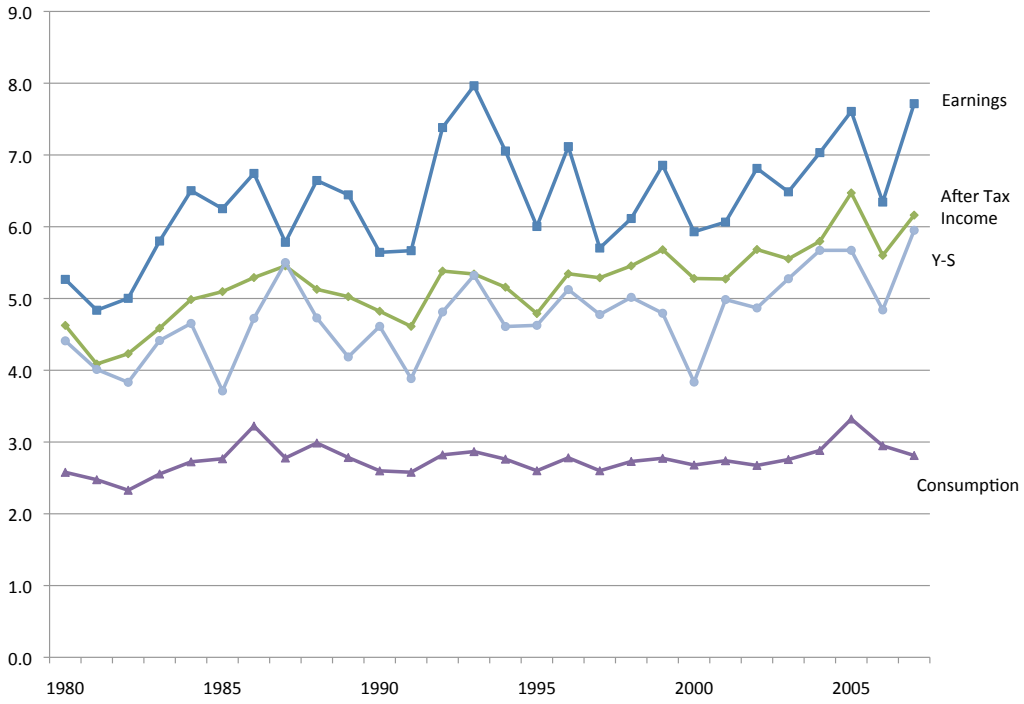
Our estimation procedure consists of two steps. First, we estimate good-specific income elasticities using a simple log-linear demand system. To do this, we use the 1972-73 CE, separating our first stage sample from the post-1980 period of focus. In the second stage, we consider the difference in expenditure growth across goods and across income groups. To see how this approaches addresses mis-measurement, take expenditures on food at home versus nondurable entertainment as an example. The relative expenditure on food at home across income groups remained essentially constant between 1980 and 2007. Given a non-zero estimated income elasticity of 0.49 for food at home, this suggests zero change in relative total expenditures. While comparing the same good across income groups controls for (multiplicative) mis-measurement of food in each period, it does not control for the possible mis-measurement correlated with income. For this, we can add a second good, nondurable entertainment. Over the same period, the high income-low income ratio of expenditure on nondurable entertainment increased by 0.8 log points. Given an estimated income elasticity of 1.94 for entertainment, this implies a change in relative expenditure of 41 percent. Again, this controls for good-specific measurement error, but not mis-measurement correlated with income. However, any mis-measurement that is specific to income groups, but that is uniform across goods, can be eliminated by differencing across goods. That is, the difference in relative expenditure growth rates will equal the difference in income elasticities times the change in total expenditure inequality (plus an idiosyncratic error term). Solving this equation, the relative growth in these two goods implies a change in consumption inequality of 55 percent. Our procedure is thus a difference-in-difference estimate, where one difference eliminates good-specific mis-measurement and the second difference eliminates income group-specific mis-measurement.

While food and entertainment are interesting due to their extreme income elasticities, the CE data contains expenditure on many goods. We therefore implement this procedure using all goods in a regression framework. Our estimates suggest that consumption inequality increased by 33 percent between 1980 and 2007, approximately the same as the change in income inequality, and slightly larger than that obtained from the budget constraint accounting (last line of Table 1). We find this estimate is stable across different subsets of goods, different weighting schemes across goods, and alternative first-stage income elasticity estimates.

We also consider trends in inequality in different sub-periods. We find that income

inequality increased by 20 percent between 1980 and the mid-1990s, and then by an additional 15 percent between 1995 and 2007. The inequality in reported CE expenditure increased by 12 percent in the first sub-period, and then by 7 percent in the latter half of the sample. Reported consumption inequality does not keep pace with income inequality in either sub-period. Using our demand system estimates, we find that consumption inequality increased by 27 percent between 1980 and the mid-1990s, and then by additional 6 percent through 2007, for a total increase of 33 percent. These estimates more closely track the profile of income inequality, with a larger increase in the 1980s, and a smaller but still significant increase thereafter. In this regard, our estimates support the interpretation that changes in inequality in the 1980s reflected shifts in permanent income, while the change in recent years may be weighted toward transitory changes. Our results suggest that this conclusion has actually been under-stated using reported CE consumption inequality.

Figure 1: Consumption Inequality Revisited



Note: This figure depicts the ratio of high income to low income respondents' reported earnings, after tax income, income minus savings, and consumption expenditures. High income refers to respondents who report after tax household income in the 80th through 95th percentiles. Low income refers to respondents in the 5th through 20th percentiles. See paper for full details.

Table 1: Trends in Inequality – Ratio of High Income to Low Income Respondents

	Log Change 1980-1995	Log Change 1980-2007
Labor Earnings	0.35	0.36
After Tax Income	0.20	0.35
Consumption Expenditures	0.12	0.19
Income minus Saving	0.20	0.29
Consumption Inequality using Demand System Estimates	0.27	0.33

Note: High income refers to respondents who report after tax household income in the 80th through 95th percentiles. Low income refers to respondents in the 5th through 20th percentiles. The log change refers to the difference in the log ratio of high income to low income between 1980-82 and 1992-1995, and the difference between 1980-82 and 2005-07, respectively. All variables are converted into constant dollars before averaging. The row labeled "Income minus Savings"is reported after tax income minus reported savings. The final row, labeled "Consumption Inequality using Demand System Estimation" reports the estimated change inequality using the two step demand system procedure. See paper for full details.