

What Really Happened to Consumption Inequality in the United States?

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Inequality in the U.S. since 1980

- ▶ There exists a large literature studying the dynamics of inequality in the U.S. during the 80s and 90s
- ▶ Most research focuses on wage or income inequality
- ▶ There is broad agreement among economists that income and wage inequality rose sharply in the early 80s, then continued to rise modestly through the 80s and 90s
- ▶ The dynamics of consumption inequality are much less studied and much less agreed upon

Evolution of Income Inequality

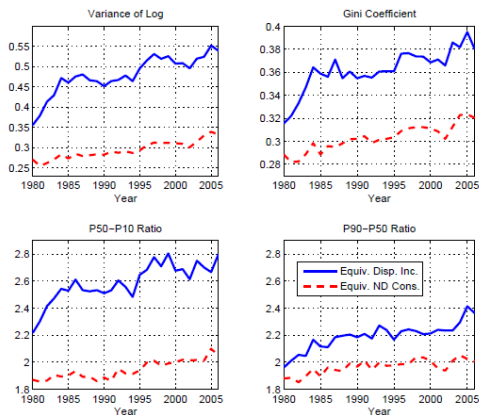


Figure 13: From disposable income to consumption (CEX)

Focus on Consumption Inequality

Why are the dynamics of consumption inequality important?

- ▶ Consumption is a better indicator of welfare than income
- ▶ Measures of consumption reflect income insurance
- ▶ Dynamics of consumption inequality yield information on history of agent welfare

Research Question

Has consumption inequality mirrored the rise in income inequality in the U.S. since the 1980s?

- ▶ Economists are divided over the answer
- ▶ For example, Slesnick (2001) and Kruger and Perri (2006) say consumption inequality was essentially flat
- ▶ Among others, Cutler and Katz (1991) and Aguiar and Bils (2009) say consumption inequality rose significantly

Source of Dispute

The main reason for disparate estimates is differing use of the Consumer Expenditure Survey (CEX) data.

- ▶ The CEX is collected mainly to compute weights of the CPI, not to study consumption inequality
- ▶ There are two completely separate surveys to accomplish this: the Interview Survey (IS) and the Diary Survey (DS)
- ▶ The BLS believes some items are better measured in retrospective interviews and others by daily diary entries
- ▶ Different surveys provide very different consumption inequality dynamics

Paper Contribution

The authors provide a *unified* picture of the dynamics of consumption inequality in the U.S. between 1986 and 2001.

- ▶ The key is to use the information that some items are better measured in the IS and some in the DS
- ▶ Using assumptions on the nature of measurement error in the two surveys, they combine data from the IS and DS
- ▶ They find consumption inequality increased more than indicated by the IS, but less than that indicated by the DS

IS vs. DS

The DS and IS consist of two separate and independent samples of households representative of the same population.

- ▶ The IS is a rotating panel of $\approx 5,000$ consumer units (CUs) each quarter
- ▶ In the IS, each CU is asked to report data for the previous quarter for 4 consecutive quarters
- ▶ The DS is a repeated cross section of $\approx 4,500$ CUs collecting data over 2 weeks
- ▶ Both surveys are exhaustive of all consumer expenditures

Consumption Inequality Dynamics: Separate Surveys

The levels and trends of consumption inequality are very different between the IS and DS (flat in IS, rising in DS).

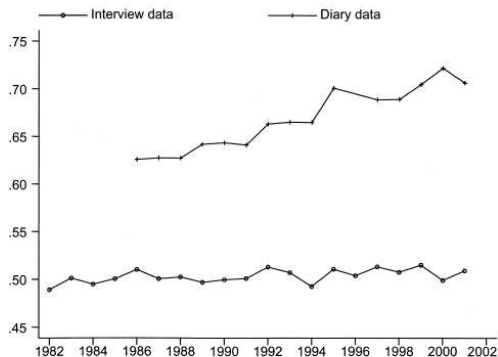


Fig. 17.1 Standard deviation of log per capita monthly expenditure

Consumption Mean Dynamics: Separate Surveys

The disparity in inequality dynamics is even more puzzling because the means evolve similarly across surveys.

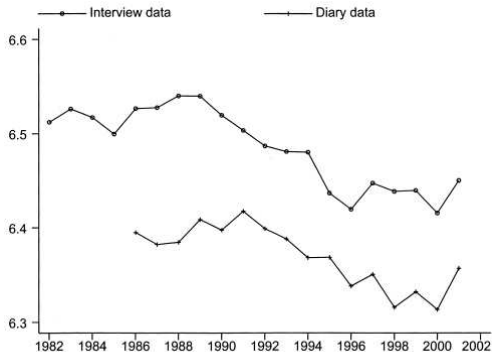


Fig. 17.3 Mean of log monthly expenditure on nondurable goods (2001 dollars)

BLS Good Notation

When computing aggregate statistics, the BLS uses info from the IS for more durable and less frequently purchased goods and uses the DS for more frequently purchased goods.

- ▶ Let D denote goods better measured in the DS
- ▶ Let C_D denote expenditures on D goods
- ▶ Let R denote goods better measured in the IS
- ▶ Let C_R denote expenditures on R goods

Variance in D goods

The squared coefficient of variation increases in both surveys.

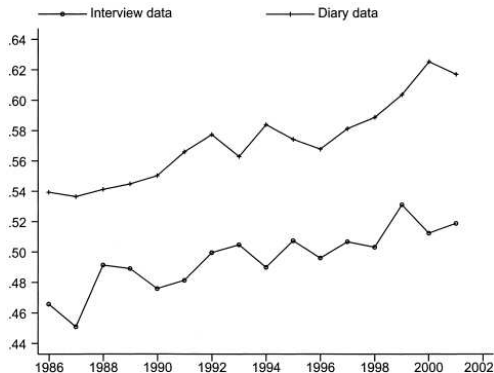


Fig. 17.6 Squared coefficient of variation for D goods

Variance in R goods

The squared coefficient of variation increases slightly in the DS and is flat in the IS after 1990.

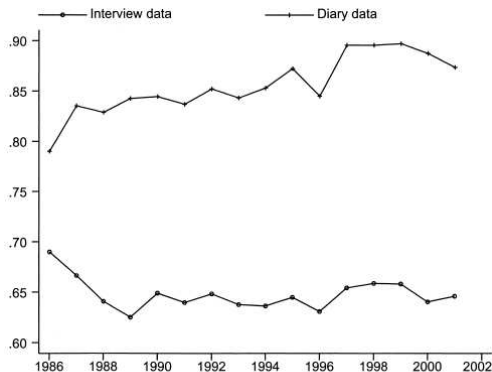


Fig. 17.7 Squared coefficient of variation for R goods

Standard Data Prep

- ▶ Convert household consumption to individual levels using an adult equivalency scale
- ▶ Deflate data by CPI
- ▶ Seasonally correct data
- ▶ Trim outliers
- ▶ Use population weights

Consumption Accounting: Variable Definitions

CUs are either in DS **or** IS, but buy both D **and** R goods.

- ▶ Let C^* be true total ND expenditures
- ▶ Let C^d be total ND expenditures reported in DS
- ▶ Let C^r be total ND expenditures reported in IS

$$C^* = C_D^* + C_R^*$$

$$C^d = C_D^d + C_R^d$$

$$C^r = C_D^r + C_R^r$$

Variable of Interest

Estimation focuses on the coefficient of variation squared.

$$CV(C^*)^2 = \frac{\text{var}(C^*)}{E[C^*]^2} = \frac{\text{var}(C_D^*) + \text{var}(C_R^*) + \text{cov}(C_D^*, C_R^*)}{[E(C_D^*) + E(C_R^*)]^2}$$

- ▶ If $C^* \sim LN$, then

$$\text{var}(\ln C^*) = \ln \left[\frac{\text{var}(C^*)}{E[C^*]^2} + 1 \right]$$

- ▶ Otherwise, $CV(C^*)^2$ is a good approximation to $\text{var}(\ln C^*)$

From C^* to C^d, C^r : Measurement Error

Motivated by BLS methodology, assume the extreme:

$$C_D^d = C_D^*$$

$$C_R^r = C_R^*$$

then

$$v_R^d := C^d - C^*$$

$$v_D^r := C^r - C^*$$

i.e., there is no measurement error in “well measured” goods

- ▶ Identifies $E[C^*]$, $var(C_D^*)$, and $var(C_R^*)$
- ▶ Need to identify $cov(C_D^*, C_R^*)$

Identification

Combined with ME assumption, simple algebra reveals the following sufficient identification condition:

$$\Delta cov(C_D^d, C_R^d) = \Delta cov(C_D^r, C_R^r) = 0$$

i.e.,

$$\Delta cov(C_R^*, v_D^r) = \Delta cov(C_D^*, v_R^d) = 0$$

Note: Only the changes are identified, not the level.

Estimates of $CV(C^*)^2$: DS vs. IS

Need info on $cov(C_D, C_R)$. Can use IS or DS.

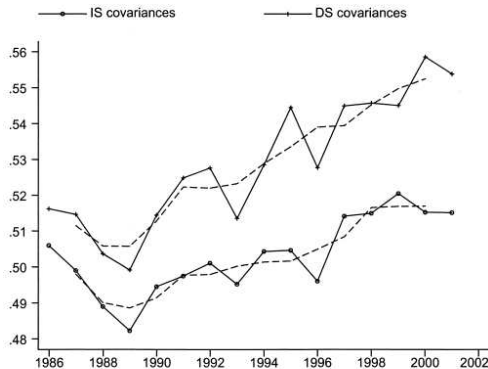


Fig. 17.8 Inequality growth using observed covariances

- ▶ DS yields larger increase than IS.

Combining DS and IS Estimates

Let $\hat{\theta}_R$ and $\hat{\theta}_D$ be estimates of $CV(C^*)^2$ using IS and DS, respectively.

$$\hat{\theta} = \alpha \hat{\theta}_R + (1 - \alpha) \hat{\theta}_D$$

where,

$$\alpha_t = \arg \min var(\hat{\theta}_t)$$

Minimization yields:

$$\alpha = \frac{cov(\hat{\theta}_D, \hat{\theta}_D - \hat{\theta}_R)}{var(\hat{\theta}_D - \hat{\theta}_R)}$$

United Estimates: $\hat{\theta}$

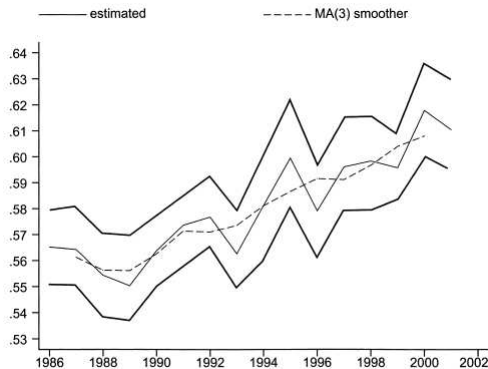


Fig. 17.9 Inequality growth using combined information

For 1990 to 2000: $\Delta \hat{\theta} = 5.4\%$, $\Delta DS = 8\%$, $\Delta IS = 0\%$,

Conclusion

This paper helps us understand the sources of division in the field and suggests a way to bridge the gap.

- ▶ Show the differences in IS vs. DS and R vs. D goods
- ▶ Propose a methodology for combining IS and DS data
- ▶ Provide a first pass at a unified measure of the increase in consumption inequality

Table 17.2 **Commodity Split**

Commodities better measured in the Diary Survey: *D* goods

Food and nonalcoholic beverages at home
Food and nonalcoholic beverages away from home
Alcoholic beverages (at home and away from home)
Nondurable goods and services

Commodities better measured in the Interview Survey: *R* goods

Housing and public services
Tobacco and smoking accessories
Clothing, footwear, and services
Heating fuel, light, and power
Transportation (including gasoline)

Potential Sources of Differences

- ▶ Changes in survey methodology
- ▶ Increase in zeros in the DS
- ▶ Time varying response accuracy
- ▶ Survey nonresponse
- ▶ Changes in sample compositions

CEX Aggregation Caveat

There are large discrepancies between CEX aggregations and NIPA data, in levels and in trends.

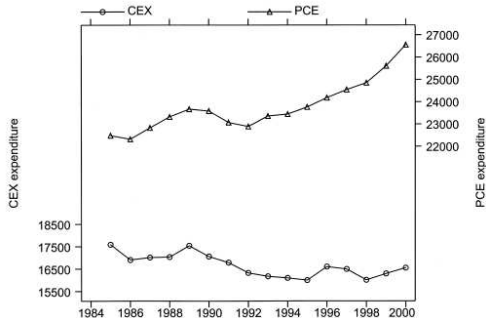


Fig. 17.2 Nondurable expenditures in 2000 dollars—Consumer Expenditure Survey (CEX) and Personal Consumption Expenditures (PCE)