Comments on “The Welfare Consequences of the Increase in Inequality in the United States”
By Dirk Krueger and Fabrizio Perri

Prepared for the NBER Macro Annual¹
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Krueger and Perri set their sights on a major question: What are the welfare consequences of the pronounced rise in U.S. wage and income inequality in recent decades? Presumptions about the answer play an important role in many policy discussions and underlie much of the interest in wage and income inequality. I applaud the authors for tackling the question in a way that makes assumptions explicit and that facilitates constructive criticism. The authors also deserve much credit for grappling with the data on consumption inequality, a challenging task. As it turns out, however, I think that a compelling answer to the question they pursue awaits further research.

The authors describe trend changes in the distribution of household consumption expenditures using data from the Interview Survey component of the Consumer Expenditure Survey (CEX). They find rising consumption inequality between groups defined by sex and educational attainment of the household head, but declining consumption inequality within groups. Overall consumption inequality changes little during the past three decades by their account – in striking contrast to a sharp rise in the inequality of wages, earnings and disposable incomes.

They proceed to calculate welfare effects associated with certain changes in the consumption distribution. To do so, they specify and estimate stochastic processes for group-level and idiosyncratic components of consumption, and they postulate standard preferences over consumption paths.² They then compute, as of 1972, consumption-equivalent welfare differences between estimated and counterfactual processes for consumption. They report these welfare differences as a function of education and initial position in the consumption distribution.

My remarks below develop two main themes. First, there are good reasons to doubt the basic characterization of consumption inequality trends offered by Krueger and

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¹ Orazio Attanasio, David Autor, Erik Hurst and Daniel Slesnick kindly supplied data for this comment and my remarks at the Macro Annual Conference. Daniel Slesnick provided several useful observations about the Consumer Expenditure Survey, and Erik Hurst provided valuable information about the Continuing Survey of Food Intakes. Thanks also to Dirk Krueger and Fabrizio Perri for many helpful communications about their work.

² Krueger and Perri also characterize the evolution of the hours worked distribution, and some of their welfare calculations consider preferences defined over consumption and leisure. However, their chief results involve consumption, and I limit my remarks to consumption-related issues.
I. Evaluating the Evidence on Trends in Consumption Inequality

Figure 6 in Krueger and Perri shows a striking divergence between the path of disposable earnings inequality and the path of consumption inequality. Figure 8 shows declining within-group consumption inequality in recent decades and, in particular, since 1987. This decline is strikingly at odds with the strong rise in the within-group inequality of disposable earnings, as depicted in Figure 5.

To evaluate these empirical results, I proceed as follows. First, I consider whether they fit comfortably with other evidence on consumption responses to income shocks, and conclude that they do not. Second, I take note of concerns about the quality of the Interview Survey component of the CEX and the possibility that it yields an inaccurate picture of consumption inequality trends. Third, I look to other sources of data on consumption inequality trends and find, in contrast to the CEX Interview Survey, that they point to rising consumption inequality.

Self insurance and the relationship of consumption inequality to earnings inequality

Consider the divergent paths of within-group earnings inequality (Figure 5) and within-group consumption inequality (Figure 8). The rise in within-group earnings inequality reflects some combination of greater dispersion in (the idiosyncratic components of) fixed earnings differences, persistent earnings shocks and transitory shocks. Fixed effects and persistent shocks cannot be smoothed over the life cycle by borrowing and lending. Hence, a perspective on the data informed by permanent income theory leads one to anticipate a close relationship between persistent earnings shocks and...
consumption responses. Many other theories that entail incomplete sharing of consumption risks carry the same implication.5

This implication finds support in the observed relationship between group-level earnings shocks, which are highly persistent, and group-level consumption responses. For example, Figures 5 and 8 show similar trend increases in between-group earnings inequality and between-group consumption inequality. Attanasio and Davis (1996) find that persistent changes in relative wages among groups defined by birth cohort and education lead to roughly equal-sized changes in consumption expenditures.

Many studies show that household consumption expenditures are sensitive to idiosyncratic earnings shocks. Two studies are especially pertinent here. First, Gruber (1997) investigates how consumption responses to unemployment vary with the generosity of unemployment insurance benefits. To estimate this relationship, he exploits the fact that the income replacement rates provided by unemployment benefits vary considerably across states and workers. Gruber’s study is noteworthy for our purposes because the U.S. unemployment insurance system is not designed to insure against persistent earnings shocks – benefits typically expire after 26 weeks. So, insofar as the consumption response to unemployment varies with the replacement rate, households are not smoothing transitory income variation. Using PSID data from 1968 to 1987, Gruber estimates that a 10 percentage point rise in the replacement rate reduces the unemployment-induced fall in food expenditures by about 3 percentage points. This is a big effect, and it implies a big departure from effective self insurance against transitory shocks. Gruber also notes that there has been a secular decline in the generosity of unemployment benefit levels, which is a force for greater consumption inequality and increased sensitivity of consumption inequality to earnings inequality.

Second, Sullivan (2002) investigates whether households use unsecured debt to smooth consumption responses to unemployment spells. He relies on panel data from the PSID for 1984 to 1993 and the Survey of Program Participation for 1996 to 2000. Using a sample of unemployment spells that aims to isolate transitory earnings shocks, he finds that households with assets increase unsecured debt, on average, by about 10 percent of the earnings loss associated with unemployment. However, for households with low initial asset levels, unsecured debt does not respond to the income loss associated with unemployment. These households account for about 13 to 18 percent of the sample, depending on the definition of low assets. In addition, Sullivan finds that the consumption response to unemployment-induced income shocks is larger for households with lower asset levels. He estimates that expenditure on food and housing for households with little or no financial assets is five times more sensitive to unemployment-induced earnings losses as compared to other households.

5 In principle, a properly structured portfolio of risky financial assets can insure against even the most persistent earnings shocks, but I am unaware of any evidence that households or their agents (e.g., pension fund managers) engage in this type of hedging behavior to a significant extent. Davis and Willen (2000) develop a theory of life-cycle portfolio choice with decision rules that exhibit this type of hedging behavior, and they present evidence that broad-based equity and bond funds have some limited potential as instruments for hedging occupation-level income shocks.
The Gruber and Sullivan studies indicate that many households do not effectively smooth transitory, idiosyncratic earnings shocks. Moreover, there are strong theoretical reasons, supported by empirical evidence, to think that households cannot smooth persistent earnings shocks. These considerations provide grounds for skepticism towards the Krueger-Perri evidence on consumption inequality trends, especially the decline in within-group consumption inequality coupled with strong increases in the within-group inequality of disposable earnings.

Conceivably, the effect of increased earnings inequality on within-group consumption inequality is overwhelmed by greater smoothing of transitory shocks. This interpretation is logically consistent, and it fits with the increasing availability of consumer credit, but the interpretation faces at least three problems. First, many households lack the financial means to smooth earnings shocks. Poorer households, in particular, often have little financial wealth, so they cannot draw down liquid assets to offset negative earnings shocks. Second, most forms of consumer credit carry high interest rates. Edelberg (2003, Table 1) reports mean consumer interest rates in 1998 of 8.0 percent per annum for first mortgages, 10.4 percent for second mortgages, 10.2 percent on auto loans, 14.5 percent for credit cards, and 12.9 percent for other consumer credit. Davis et al. (2003, Table 1) calculate that interest rates on unsecured forms of consumer credit exceed the three-year Treasury rate by 6 to 9 percentage points after netting out uncollected loan obligations. The high cost of consumer credit makes borrowing less useful for consumption smoothing, even when credit is available. The upshot of low financial wealth, incomplete access to credit markets and high borrowing costs is that many households are poorly equipped to smooth even transitory earnings shocks.

Third, and perhaps most important, the effect of greater access to credit markets or other self-insurance devices must be large in order to rationalize Krueger and Perri’s finding of a sharp divergence between within-group earnings inequality and within-group consumption inequality. Suppose that permanent shocks account for one-third of the rise in within-group earnings inequality. Then, on that account alone, Figure 5 suggests a secular rise of 3 or 4 log points in the standard deviation of consumption within groups. Instead, Figure 8 shows a decline of about 2 log points over the sample period. The implied gap between trend changes in earnings and consumption inequality is larger when we factor in a rising variance of transitory earnings shocks. This gap will be hard to explain in a model that matches the degree of consumption smoothing seen in the data.

Concerns about the CEX Interview Survey

The CEX has two independent components, a quarterly Interview Survey and a weekly Diary Survey, each with its own questionnaire and sample. The two components differ, but overlap, in their coverage of expenditure categories. The Interview Survey covers a broad range of expenditure categories, but it is “designed to obtain data on the types of expenditures respondents can recall for a period of 3 months or longer.”
The Diary Survey focuses on frequently purchased smaller items such as food and beverages, housekeeping supplies, tobacco, nonprescription drugs, and personal care products and services. Sample size in the Diary Survey is roughly one-third that of the Interview Survey. Following most previous research that uses CEX micro data, Krueger and Perri rely on the Interview Survey.

The CEX records out-of-pocket expenditures. Even when combined, the two CEX components miss a big fraction of consumption (e.g., most health care). There are large and growing discrepancies between expenditures in the CEX and Personal Consumption Expenditures (PCE), as measured in the National Income and Product Accounts. For example, Battistin (2003, Figure 1) reports a decline in the ratio of CEX to PCE per-capita expenditures on nondurables and services from 0.79 in 1985 to 0.63 in 2000. The CEX-PCE gap and its growth over time are even larger when attention is restricted to the Interview Survey. This can be seen in Slesnick’s (2001) Figure 3.2, which shows that the ratio of per-capita consumption in the CEX Interview Survey to the PCE declines from 0.80 in 1973 to 0.56 in 1995.

Slesnick (1992) investigates the discrepancy between CEX and PCE consumption measures. He finds that only one-half of the PCE-CEX gap reflects differences between the two sources in the definition of consumption, and the remaining half is unexplained. Underreporting in the CEX (in covered expenditure categories) appears to be a major problem. The time period covered by Slesnick’s study ends in 1989, after which the PCE-CEX gap grew much larger. Battistin (2003) provides evidence that the quality of Interview Survey data on frequently purchased smaller items, housekeeping supplies and personal care products and services has declined over time, and that the decline has been “particularly accentuated” in the 1990s.

All of this leads me to question whether the CEX provides a reliable basis for drawing inferences about trends in consumption inequality. Because the PCE-CEX gap has expanded markedly over time, I am especially reluctant to accept Interview Survey evidence on consumption inequality trends during the 1990s. Of course, the large and growing discrepancy between CEX and PCE consumption may partly reflect measurement problems in the National Income Accounts. It seems highly unlikely, however, that deterioration in the accuracy of the National Income Accounts can account for such a dramatic widening of the PCE-CEX consumption gap.

Consumption inequality trends in other data sources

In light of my foregoing remarks, it seems appropriate to look to other data sources for evidence on consumption inequality trends. I do so, but my brief treatment merely scratches the surface of an important issue.

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6 The CEX-based measure of per-capita consumption in Battistin appears to reflect both the Interview and Diary Surveys.
7 Slesnick confirms in a personal communication that his Figure 3.2 reflects CEX data from the Interview Survey only.
Attanasio (2002) compares the evolution of consumption inequality in the Interview and Diary Surveys. He plots the standard deviation of log consumption per household and per adult-equivalent for the overall population and for selected cohort-education groups. He finds that overall consumption inequality declines by about 2 log points from 1985 to 1998 in the Interview Survey, but it rises by 8 or 9 log points in the Diary Survey. His within-group plots also show rising inequality in the Diary Survey but flat or slightly declining inequality in the Interview Survey. Battistin (2003) reports similar results in his detailed analysis of the differences between the CEX Diary and Interview Survey components. In short, the CEX Diary Survey paints a picture of rising consumption inequality since 1985, in contrast to the flat or declining consumption inequality seen in Krueger and Perri’s Figures 6 and 8.

Fisher and Johnson (2003) report Gini coefficients for consumption per adult-equivalent using data from the CEX Interview Survey and the PSID. They impute total consumption for households in the PSID based on food expenditures, rent or mortgage, home ownership status and home value, utility expenses, demographic and family composition variables, the age and sex of the household head, and other variables. Table 1 reproduces their statistics for overall consumption inequality.

Table 1. Gini Coefficients for Consumption Per Adult Equivalent, 1984-1999
CEX Interview Survey Compared to the PSID

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<tr>
<td>PSID</td>
<td>.255</td>
<td>.243</td>
<td>.286</td>
<td>.278</td>
<td>9.1%</td>
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<tr>
<td>CEX</td>
<td>.267</td>
<td>.295</td>
<td>.289</td>
<td>.280</td>
<td>4.7%</td>
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Source: Reproduced from Table 3 in Fisher and Johnson (2003).

From 1984 to 1999, the rise in overall consumption inequality is nearly twice as large in the PSID as in the CEX Interview Survey. Consumption inequality declines over the 1990s according to the Interview Survey, but it rises from 1990 to 1994 and for the 1990s as a whole according to the PSID.

I also examined data on monthly food expenditures in the Continuing Survey of Food Intakes by Individuals (CSFII), which is conducted by the U.S. Department of Agriculture. The CSFII is a nationally representative sample with repeated cross sections for six years: 1989 to 1991 and 1994 to 1996. The survey response rate in the CSFII exceeds 85 percent, which compares favorably to CEX response rates. See Aguiar and Hurst (2003) for a detailed description of the CSFII and an interesting analysis that exploits separate CSFII measures of food expenditures and food consumption (e.g., caloric intake). I make use of data on food expenditures only.

Following Krueger and Perri, I restrict my analysis sample to households with a head between 20 and 64 years of age. To measure “overall” consumption inequality, I compute the 90-10 differential and the standard deviation of the residuals from yearly
cross-sectional regressions of log expenditures on controls for household size and a quartic polynomial in the head’s age. I follow the same procedure to measure within-group consumption inequality, except that the regressions also include dummy variables for the head’s education. For between-group inequality, I report estimated coefficients on the education variables.

As shown in Table 2, the CSFII shows a broad pattern of rising consumption inequality from 1989 to the mid 1990s. Overall inequality in food expenditures rises by about 8 percent from 1989 to 1996, within-group inequality rises by a bit less, and the education differentials expand in most cases.

(Table 2 here)

Summing up

Krueger and Perri’s characterization of consumption inequality trends is difficult to reconcile with other evidence on consumption responses to income shocks. Consumption measures based on the CEX Interview Survey show signs of deteriorating quality, and they cover a steadily declining share of Personal Consumption Expenditures in the National Income Accounts. Three other sources of consumption data – the CEX Diary Survey, the PSID and the Continuing Survey of Food Intakes – show rising consumption inequality during the 1990s and are at odds with the message from the Interview Survey.8 These observations cast doubt on Krueger and Perri’s basic characterization of consumption inequality trends.

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8 The other sources of consumption data cover a much narrower range of expenditure categories than the Interview Survey, which could account for the discrepancy in consumption inequality trends. This possibility merits careful investigation, but my other observations in the main text suggest that there is more to the story.
Table 2. Inequality in Log Monthly Food Expenditures, 1989 to 1996, U.S. Households with a Head between 20 and 64 Years of Age

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<tbody>
<tr>
<td>Log Standard Deviation</td>
<td>.505</td>
<td>.503</td>
<td>.528</td>
<td>.528</td>
<td>.523</td>
<td>.543</td>
</tr>
<tr>
<td>90-10 Log Differential</td>
<td>1.25</td>
<td>1.27</td>
<td>1.33</td>
<td>1.31</td>
<td>1.30</td>
<td>1.36</td>
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<tr>
<td>Log Standard Deviation</td>
<td>.489</td>
<td>.491</td>
<td>.505</td>
<td>.507</td>
<td>.509</td>
<td>.526</td>
</tr>
<tr>
<td>90-10 Log Differential</td>
<td>1.23</td>
<td>1.24</td>
<td>1.26</td>
<td>1.28</td>
<td>1.22</td>
<td>1.29</td>
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<th>C. Between-Group Inequality</th>
<th>Log Deviation from Households With a College-Educated Head</th>
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<tr>
<td></td>
<td>Head With Some College</td>
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<tr>
<td>1989-1991 Pooled Sample</td>
<td>-.155</td>
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<tr>
<td>1994-1996 Pooled Sample</td>
<td>-.135</td>
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Source: Author’s calculations using data from the Continuing Survey of Food Intakes by Individuals, U.S. Department of Agriculture.

Notes:

1. Food expenditures are the head’s report of household expenditures in the previous month on food purchased at the grocery store, food delivered into the home and food purchased at restaurants, bars, cafeterias and fast-food establishments.
2. All statistics are calculated from the “main sample” in the CSFII, a nationally representative sample of non-institutionalized persons residing in U.S. households. The CSFII is a repeated cross section for the indicated years.
3. The analysis sample contains households with a head between 20 and 64 years of age and non-missing observations for food expenditures and years of completed schooling. I deleted four observations that reported food expenditures in the previous month (in 1996 dollars) of less than 10 dollars, two of which reported no expenditures. The resulting sample ranges from 1076 observations in 1990 to 1352 observations in 1996.
4. “Overall Inequality” is computed from residuals in yearly cross-sectional regressions of log food expenditures on controls for household size and a quartic polynomial in the head’s age. “Within-Group Inequality” is computed from residuals in a regression specification that also includes dummy variables for the four indicated education categories. The log deviations reported under “Between-Group Inequality” reflect the coefficients on the education variables for the same regression specification, but including year effects as well.
II. Calculating Welfare Consequences

Summary of the Krueger-Perri procedure

It will be helpful to review the steps taken by Krueger and Perri in their welfare analysis. First, they obtain residuals from yearly cross-sectional regressions of log consumption on a constant and controls for age and race of the household reference person. Second, they regress these residuals on schooling and sex of the reference person, again by year. For each household-level observation, the second-stage regression expresses consumption as the sum of a predicted value and a residual value. Third, they sort predicted values into nine equal-sized groups (each year). This sorting defines the sex-education “groups” to which households belong. Likewise, they sort residuals from the second-stage regressions into nine equal-sized groups, which determines the household’s relative position within its group.

Krueger and Perri then model the evolution of group-level and within-group components as independent nine-state Markov chains. They allow for time-varying states denoted by $Y_t^g$ and $Y_t^d$ and time-invariant transition matrices $\pi^g$ and $\pi^d$, where $g$ indexes the groups defined in the paragraph above and $d$ indexes the within-group position. They set $Y_t^g$ to the median of the predicted values in group $g$ at $t$, and they set the values for $Y_t^d$ in the same way. To estimate the elements of the nine-by-nine transition matrices, $\pi^g$ and $\pi^d$, they use sample average transition rates from each state $k$ to each state $j$.

The state vectors $Y_t^g$ and $Y_t^d$, transition matrices $\pi^g$ and $\pi^d$ and initial conditions for group membership and within-group position determine a stochastic path $C$ for consumption. Given a utility function, the consumption path yields a welfare value $V(C)$. Altering one of the state vectors or transition matrices yields a different consumption path $\hat{C}$ and a different value $V(\hat{C})$. We can express the difference between $V(C)$ and $V(\hat{C})$ in consumption-equivalent terms by calculating the uniform percentage consumption variation $\Delta$ such that $V((1+\Delta)C) = V(\hat{C})$. The main welfare experiment in Krueger and Perri involves a counterfactual path for the state vectors $Y_t^g$ and $Y_t^d$. In particular, they generate $\hat{C}$ and $V(\hat{C})$ by fixing the state vectors at their 1972 values.

Evaluating the procedure

Calculations of this sort are potentially informative about the welfare consequences of changes in the process for consumption or earnings, and they can provide useful inputs into the analysis of inequality trends. The general approach is attractive because it requires one to be explicit about interpersonal and intertemporal utility comparisons, the economic environment that agents face and the counterfactual scenario. These features facilitate communication and help to sharpen our thinking.
That said, the particular approach in this paper has important drawbacks. First, Krueger and Perri do not adequately model uncertainty about group-level consumption. They assume perfect foresight about the evolution of the state vector $Y_t^x$, so that uncertainty about group-level outcomes stems entirely from nonzero off-diagonal elements of $\pi^x$. In the data, the rank ordering of consumption (and earnings) for sex-education groups is extremely stable over time. In fact, $\pi^x$ is essentially an identity matrix when estimated from data on households that have the same reference person in $t$ and $t+1$. Of course, when $\pi^x$ is the identity matrix, rising inequality translates directly into higher utility for groups with rising relative consumption and lower utility for those with declining relative consumption. That is basically what Krueger and Perri find.

In practice, they do not limit the sample to households with the same reference person in consecutive periods when estimating $\pi^x$. Instead, the identity and characteristics of the reference person can change in their sample, e.g., because of a change in marital status or living arrangements. This type of uncertainty is what Krueger and Perri capture in their specification of the group-level consumption and earnings processes. It is not what leaps to mind when policymakers and researchers ponder the welfare consequences of increased inequality among education groups.

Second, it is unwise to rely solely on the short-panel aspect of the CEX to characterize uncertainty about group-level consumption and earnings. We know that relative consumption and earnings among education groups, for example, display large low-frequency movements, and that there is much uncertainty about these movements looking ahead. The panel aspect of the CEX consists of two noisy observations, spaced nine months apart, on the same household. Asking such data to identify an adequate statistical model for relative consumption movements among education groups is probably asking too much.

Moreover, there is no need to rely (solely) on the short-panel aspect of the CEX to estimate the group-level processes. Instead, one can exploit repeated cross sections in the CEX (or other data source) to construct synthetic panel data on group-level outcomes. One can then follow groups defined by birth cohort and education over a period of 20 years or more. The long-panel aspect of such data makes them better suited for estimating the group-level processes, although nailing down the low-frequency properties remains a challenge.

It would also be useful to combine the CEX with longer panel data from other sources to characterize the dynamics of the idiosyncratic components of consumption and earnings. For example, one could use the PSID to estimate the degree of persistence in

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9 The authors confirm this fact in a personal communication. When estimated using households with no change in reference person, the diagonal elements of $\pi^x$ range from .95 to .98.

10 Their estimate of $\pi^x$ has important off-diagonal elements, although the diagonal elements remain large, ranging from .80 to .95.
idiosyncratic earnings or consumption changes and combine that information with the household-level changes observed in the CEX. In this way, one could decompose within-group inequality trends into separate components associated with transitory and persistent household-level changes. See Blundell et al. (2002) for an analysis that combines cross-sectional data in the CEX with panel data from the PSID.

To sum up, there are large gains from drawing on the information contained in CEX-based synthetic panels and longer true panels in other data sources. This information can be used to provide richer, more compelling characterizations of the consumption and earnings processes, which are key inputs into the welfare calculations.
References

Aguiar, Mark and Erik Hurst, 2003, “Consumption vs. expenditures.” Working paper, University of Chicago Graduate School of Business.


