TRENDS IN INEQUALITY USING CONSUMER EXPENDITURES: 1960 TO 1993

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I. Introduction

Although inequality of income has historically been the predominant measure of well-being, recently there has been a movement to expand consideration of well-being to include the distribution of consumption (Slesnick (1993), Cutler and Katz (1991)). In this paper, we examine inequality over time using consumption-expenditure data from the U.S. Consumer Expenditure (CE) Survey. Changes in the demographic characteristics of families are examined to determine their effect on the inequality of consumer expenditures.

Using data from the CE Survey, various measures of inequality indices are examined for five time periods: 1960-61, 1972-73, 1980-81, 1989-90, and 1992-93. Our indices indicate that inequality for individuals was fairly constant between 1960-61 and 1972-73, rose between 1972-73 and 1980-81, widened considerably between 1980-81 and 1989-90, and fell during the early 1990's. The mean log deviation inequality measure is then decomposed by demographic characteristics (family type and education). The main finding of this decomposition is that most of the inequality is due to within-group rather than between-group inequality and that within-group inequality increased over the 30 year period.

This paper is organized as follows. The next section describes the issues involved in measuring inequality. Section three outlines the methodology used and section four describes the CE Survey and definitions used in this study. Section five presents the results and the last section concludes.

II. Measuring inequality: what are the issues?

In measuring inequality in a society, there are several issues to be addressed: what resource is to be measured, for which time period, and whose resources. The first issue concerns whether we measure the inequality of income, income-potential, consumption or some other measure of well-being. The second issue is which time period should we use to measure resources. Finally, should measures of inequality be for households, families or individuals.

The first issue concerns whether we measure the inequality of income, income-potential, consumption or some other measure of well-being. Income before taxes as a measure of well-being is criticized for several reasons (see Joint Committee on Taxation (1993)). Income after taxes might be a more appropriate measure; however, a tax system changes an individual's level of work and savings (Burtless (1987)). Income received through in-kind transfers are not included in income and even if they were, imputing a value for some transfers, such as Medicaid, is difficult (Moffitt (1992)). Income under-reporting is a common problem in household surveys and is compounded by the growth of income earned in the underground economy and means-tested transfers.

Income is also more likely to be subject to transitory fluctuations. The life-cycle hypothesis suggests that people smooth their consumption over their lifetime so that even if income varies significantly over the life-cycle, consumption would be less variable from year to year than income. Poterba (1989) shows that household income measured over long horizons is less variable than annual household income. If households base their spending plans on their expected lifetime income, then consumption provides a more accurate picture of lifetime resources than does annual income. Thus, consumption is less subject to transitory variations and better reflects material well-being in terms of past, current, and expected future income.

In this paper, household well-being is measured using consumption-expenditures, which represent the expenditures by households on consumer goods and services. We believe that consumption-expenditures may be a better indicator of well-being and permanent income than is annual income before taxes. While consumption-expenditures can approximate consumption, the data do not measure the flow of services from ownership of a home and durable goods. To obtain a better measure of consumption, some researchers have adjusted the data to reflect the flow of services from these goods (Cutler and Katz (1991) and Slesnick (1993)).

The second issue is which period to use in measuring inequality. Most research examines the inequality of annual income (see Karoly (1993)). Problems with this approach were discussed above. Obtaining an estimate of life-time income may also be difficult. In terms of consumption-expenditures, these will also be more volatile, the shorter the period used. For example Garner (1993) shows that expenditures are more volatile on a quarterly basis and thus will show more inequality. Recent studies use panel data to obtain estimates of average income over longer periods (see Jenkins and Cowell (1993) and Slemrod (1993)).

The final issue is whether we should measure the inequality of households, families or individuals. Inequality measures for individuals in the U.S. are examined by adjusting the consumption-expenditures of a household by an equivalence scale and multiplying by household size. Thus the inequality measures for individuals take into account economies of scale when there is more than one person in a household. For example, if two families have the same level of consumption-expenditures but one family is twice the size of the other, individuals in the smaller family have access to a higher level of spending. The equivalence scale used is the one implicit in the poverty thresholds for average family size (age and composition of the family is not taken into account).[1] These scales indicate that for a two-person

[1] See Census (1991), Table A-3.

family to have the same standard of living as one person, their consumption only has to be 28 percent higher. This adjustment is made so that the impact of family spending on the well-being of individuals can be examined.

III. Methods and assumptions

In order to gauge the level of income inequality and its changes over time, it is necessary to have an appropriate yardstick. In this paper, we use four summary measures of inequality -- the Gini coefficient and three Generalized Entropy measures. The Generalized Entropy inequality measures are half the square of the coefficient of variation, the Theil entropy coefficient, and the Theil mean logarithmic deviation (see Coulter et al., (1992)).

The weighting schemes and implicit welfare functions vary across measures. For example, the mean log deviation is more sensitive to changes at the lower end of the distribution while the coefficient of variation is responsive to changes in the upper end. The Gini is sensitive to changes in inequality around the median. Consequently, these measures of inequality may not rank two distributions the same way nor will time series patterns necessarily be the same for different measures (Karoly 1992). By computing a variety of measures of inequality, even if the level and the percentage changes differ, if all indices are increasing or decreasing, one can draw conclusions about changes in inequality.

The mean logarithmic deviation has the property of *decomposability*. Decomposition is a desirable property because it facilitates an exploration of the factors behind the levels of inequality and the changes in such levels. To illustrate this property, let's suppose we divide the equivalent consumption-expenditure distribution into mutually exclusive groups that encompass the entire population, say, singles, individuals in married couple families, and other families. For each of these groups, it is possible to calculate: 1) a mean level of consumption expenditures 2) a measure of inequality for the group; and 3) the proportion of the population in each of the groups. An inequality measure is said to be decomposable if the measure of inequality for the entire population can be calculated using these three components and has the property that an increase in inequality in one group raises overall inequality. As an example of the last property, if the inequality of consumption-expenditures among those in married-couple families changes and everything else regarding the three components stays the same, then overall inequality must have increased when measured by a decomposable inequality measure.

Often times, it is convenient to use these three components to decompose the level of inequality into two parts. A "between" part, calculated using the mean consumption-expenditures and each group's share in the population, gives a sense of how much average individuals in each of the groups differ from each other. A "within" part is a weighted sum of the inequality within each of each groups, which suggests how much individuals within a particular group differ from each other. One useful aspect of decomposing inequality into "between" and "within" parts is that such calculations allow the source of inequality to be pinpointed. If the "between" share of overall inequality is rather large, then this indicates that the average consumption-expenditures for each of the family types are quite different, while the dispersion within each family type is fairly small. A large "within" share indicates the opposite.

In addition to being useful for examining levels of inequality, the ability to decompose is also useful for assessing changes over time. Using appropriate techniques, it is possible to divide changes in the total level of inequality into components that reflect changes in the differences "between" groups and components that reflect changes in the differences "within" groups.

Differences "between" groups can change if the shares of each population group change and average consumption expenditures for each of these groups become closer or further apart. Changes in the differences "within" groups can result from changes in the shares of each population group and consumption expenditures within each group becoming more disperse.

IV. The Consumer Expenditure Survey

Expenditure and demographic information are collected by the Census Bureau, under contract for the Bureau of Labor Statistics. The CE Survey has been collected on a continuous basis since 1980. Prior to 1980, CE data were collected at approximately 10 year intervals beginning in 1901. Data used in this paper are from the 1960-61 survey and forward. The 1960-61 survey collected expenditures using annual recall--an interviewer visited a consumer unit[2] and reconstructed the relevant year's expenditures. Expenditures and income were reconciled using a balancing criteria. The 1972-73 Interview survey collected data, on a quarterly basis, using two separate annual samples--one for each year. Although data were collected on quarterly basis for 1972-73, they were totaled to obtain annual values and only consumer units who completed all 4 interviews, or for whom expenditures could be reconstructed for a missed period, were included in the final estimates.

The Interview surveys conducted since 1980 are similar to the 1972-73 survey, except that a rotating sample design is used. Consumer units are interviewed once each quarter for five consecutive quarters. Twenty percent of the respondents complete their fifth interview as another twenty percent begin. The first interview is a bounding interview to reduce telescoping so the data are not used in estimation.

While comparisons across time periods are possible, the differences in methodology may have differential effects on the results. The 1960-61 and 1972-73 data are presented annually whereas the 1980-1993 continuing CE surveys are quarterly. Because of the rotating panel design of continuing surveys, a consumer unit may be in the sample from one to five times over the 1980-81, 1989-90, or 1992-93 period depending on the quarter in which

[2] A consumer unit comprises members of a household who are related or share at least two out of three major expenditures--housing, food, and other living expenses.

their first interview begins and/or depending on the response of each consumer unit. If a consumer unit misses an Interview, no attempt is made to reconstruct the expenditure data for that quarter. To obtain annual expenditures for these consumer units, families are selected if they participated in the survey for at least two of the last four interviews. Their expenditures are aggregated over the quarters they participated and then annualized. Including consumer units who participated in the survey for at least two interviews is more comparable to 1960-61 and 1972-73 while still representing the population distribution. The demographics used for the annualized sample are for the last quarter the consumer unit was interviewed--even if they changed throughout the year.

Consumption-expenditures are defined as the expenditures that a family makes for current consumption--that is, what the family actually spends for themselves. Consumption-expenditures[3] include expenditures for food, housing, transportation, apparel, medical care, entertainment, and miscellaneous expenditures for the consumer unit. Excluded are expenditures for life insurance, pensions (including social security), principal payments on mortgages, and gifts for people outside the consumer unit. Consumption-expenditures are not a measure of consumption in the economic sense because no attempt is made to measure the flows of services provided by durable goods. The CE survey records what families spend for consumption, not what they actually consume. As discussed in section II, expenditures are adjusted for family size, which yields a measure of equivalent expenditures per individual in a consumer unit. This adjustment is made so that the effect of family spending on the well being of individuals can be examined. The adjustment also moderates the level of inequality by taking into account the decline in household size.

V. Results and Analysis

It is well documented that incomes, and hence consumption, grew at a brisk pace after World War II. During the 1950s and 1960s income rose by one-third. Since the early 1970s, the growth in income and consumption slowed considerably and has become negative since the late 1980s. These changes, however, are dissimilar for different family types and education levels (see table 1). Married couples and the well-educated have fared well during the 1980s while single parents and those with a high school degree or less have seen a decline in real income and consumption.

Table 1.
Average Equivalent Consumption-Expenditures by Characteristics
(In constant 1993 dollars-adjusted using CPI-U-X1)

	1980-81	1989-90	1992-93
Family Type			
Single	13717	15709	14981
Married Couple	18326	21661	20357
Married with children	14933	17365	16667
Single Parent	10806	11274	10994
Other	13099	13911	13144
Education			
Less than High School	11002	11161	10747
High School Graduate	14619	14646	14019
Some College	15898	18148	17072
College Graduate	20503	24055	22427

Family Type	**Percentage change**		
Single	**1989-93**	**1980-93**	**1992-93**
Married Couple	14.52	-4.64	9.21
Married with children	18.20	-6.02	11.08
Single Parent	16.29	-4.02	11.61
Other	4.33	-2.49	1.74
	6.20	-5.51	0.34
Education			
Less than High School	1.44	-3.70	-2.31
High School Graduate	0.18	-4.28	-4.11
Some College	14.15	-5.93	7.38
College Graduate	17.31	-6.77	9.37

Real consumption expenditures have fallen for all groups for the 1989-93 period which may help to explain the leveling off of the inequality indices seen below.

The inequality measures for individuals indicate that inequality was roughly constant between 1960-61 and 1972-73, rose slightly between 1972-73 and 1980-81, widened considerably during the 1980s and leveled off during the early 1990s (see chart 1).

The slight decrease in the early 1990s may reflect reductions in spending due to changes in savings and pension contributions. Contributions to savings and pensions are not included in the consumption-expenditure definition. The fall in consumption-expenditure inequality is not always a socially desirable outcome since it could be that families are less well-off overall. This seems to be what is happening as the real value of consumption expenditures fell for all groups between 1989-90 and 1992-93 (see table 1). This could account for the decline in inequality yet mask the fact that the families within certain demographic groups are less well-off. In other words, although the inequality within a certain

[3] In general, 1992-93 definitions were used to define variables over the five time periods. The one exception to this was the inclusion of boats, bikes, and trailers in transportation rather than entertainment. This was done because the 1960-61 transportation variable could not be redefined to exclude these items.

demographic group, such as high school graduates, has fallen, it may be because the real income for this group, and hence consumption, has fallen for all families in this group.

Table 2
Inequality measures using person weighted equivalence consumption-expenditures

Year	Gini	Coefficient of Variation	Theil Entropy	Mean Log-Deviation
1960-61	0.295	0.165	0.146	0.154
1972-73	0.294	0.167	0.145	0.151
1980-81	0.306	0.206	0.162	0.160
1989-90	0.336	0.247	0.193	0.190
1992-93	0.327	0.224	0.181	0.180

The main difference between our results and those of Cutler and Katz is due to differences in how expenditures and consumption are defined. The Cutler and Katz expenditure definition includes more than our definition because they include gifts, life insurance, and contributions to retirement plans and social security. The increase in payroll taxes during the 1980's could account for some of the differences in the Gini since payroll taxes will tend to decrease inequality (Barooah and McGregor (1990) obtain a similar result using Irish data). The Cutler and Katz consumption definition adjusts housing and vehicle expenditures to take into account service flows from these goods. We do not do this. As these results indicate, inequality measures depend on the definition of well-being and its measurement, yet most studies seem to agree that there is an increase in inequality in the 1980's.

Decomposing the Mean Log Deviation Indices by Demographic Groups

Further analysis of these changes in inequality can be accomplished by decomposing the mean logarithmic deviation.[4] Decomposing the inequality index allows us to examine how much of the total inequality is contributed by differences in consumption-expenditures *within* each demographic group and how much is contributed by differences *between* these groups. Tables 3 and 4 present the decomposition results by family composition and educational level.

Inequality decomposition by family composition. Family composition influences the living standard a family enjoys since both the number of people in the consumer unit as well as the marital status contribute to the level of economic well-being achieved by a household. Since family composition has changed over the last 30 years, these changes may account for some of the increase in inequality. Families are smaller and an increasing percent of married couples are having fewer children or no children at all. In addition, there are more single parents and other family types. The growing single population is predominately in the lowest consumption group although their share in this group has declined over time. Married couple households are predominantly into the top two consumption groups.

[4] See Jenkins (1994) for a similar procedure.

Table 3
Decomposition by family composition using mean lLog-deviation

Family type	60-61	72-73	80-81	89-90	92-93
Single	0.206	0.225	0.249	0.208	0.189
Married without children	0.164	0.149	0.154	0.177	0.162
Married with children	0.137	0.120	0.118	0.156	0.151
Single parent	0.198	0.186	0.184	0.212	0.191
Other	0.157	0.175	0.180	0.184	0.174
Overall inequality (within + between)	0.150 + 0.004	0.143 + 0.007	0.152 + 0.008	0.175 + 0.015	0.165 + 0.015
Between group inequality as percent of overall	2.6	4.7	5.3	7.9	8.3

The results in table 3 shows that the within-group inequality for married couples with children has increased from .137 in 1960-61 to .151 in 1992-93. This decomposition also allows us to represent the overall inequality as the sum of within-group and between-group inequality. In 1992-93, within-group inequality is .165 and between-group inequality is .015 such that overall inequality is .180. The results show that most of the overall inequality in each period is due to inequality within each family type group--over 90 percent. Between-group inequality accounts for a much smaller but increasing share of inequality--almost 3 percent in 1960-61 and 8 percent in 1992-93. The result that variations in consumption-expenditure within each family type group contribute the most to inequality is consistent with other studies (Borooah and McGregor (1990), Cowell (1984)).

Inequality decomposition by educationlevel. Differences in the level of education have been cited as one of the main reasons for increasing inequality during the 1980's. Educational attainment has continued to increase over this 30 year period; the percentage of the population completing some schooling beyond high school has steadily increased. In 1992-93, 36 percent of college graduates are in the top consumption group while 43 percent of those with less than a high school education are in the bottom consumption group. More significantly, the high school graduates which have increased as a share of the population are increasingly in the bottom consumption group.

Table 4.
Decomposition by education using mean log-deviation

Education	60-61	72-73	80-81	89-90	92-93
Less than H. S.l	0.159	0.156	0.160	0.160	0.166
H.S Graduate	0.101	0.112	0.121	0.154	0.131
Some College	0.108	0.111	0.132	0.155	0.153
College Graduate	0.109	0.106	0.128	0.141	0.142
Overall inequality (within + between)	0.134 + 0.020	0.129 + 0.022	0.137 + 0.023	0.153 + 0.037	0.147 + 0.033
Between group inequality as percent of overall	13.0	14.6	14.4	19.5	18.3

While variations in consumption-expenditures within each group account for most of the total inequality, the inequality between education level groups is large when compared to other demographic characteristics. Between 1960-61 and 1989-90 within-group inequality increased for all groups, except for those with less than a high school education. Inequality for this group was already high when compared to other educational groups and the fact that inequality does not increase, as it does for the other groups, could indicate that individuals in this group are more equally *less* well off. Ryscavage et al. (1992) also found that increases in educational attainment contributed to increasing income inequality.

The changing structure of inequality. While the level of inequality increased over this 30 year period, most of the inequality in each period is due to disparities in consumption-expenditure levels within the demographic groups examined here. The mean logarithmic deviation inequality index can also be decomposed across the time periods to indicate how much of the change in inequality is due to pure changes in inequality within each group, changes in the composition of the population, and changes in the relative consumption-expenditure levels between groups.[5]

The changes in inequality are decomposed for two time periods: 1980-81 and 1989-90 and then 1989-90 to 1992-93. The results of this decomposition, given in Table 5 confirm the findings of other studies that the majority of the increase in inequality is due to an increase in inequality *within* each of the groups.[6] Also confirming other studies, disparities between educational levels have had the largest effect on inequality during the past decade.[7] Differences in education levels contributed 60 percent of the increase in inequality in consumption-expenditures during the 1980's. Education appears to have helped decrease inequality during the early 1990's.

Decomposing the index over time by family composition also shows that most of the increase in inequality is due to increasing disparity within each family type. However, changes in the relative consumption-expenditure levels between family types do account for almost 20 percent of the increase in inequality. In addition, changes in family composition over the twenty years (the increase in single parents and married couples without children) account for 15 percent of the increase in inequality.

[5] See Jenkins (1994).
[6] See Karoly (1993), Levy and Murnane (1992), Ryscavage et. al. (1992).
[7] See Ryscavage et al. (1992). See also references in Karoly (1993).

Table 5
Decomposition of percent change in overall consumption-expenditure inequality between 1980-81 and 1989-90 using mean-log deviation

Between 80-81 and 89-90	Changes in within-group inequality	Changes in relative mean consumption expenditures	Changes in population shares	Total percent change
Family type	12.2%	3.5%	2.7%	18.4%
Education	11.2%	9.1%	-1.9%	18.4%
Between 1989-90 and 92-93				
Family type	-5.7%	-0.4%	1.1%	-5.0%
Education	-3.1%	-1.7%	-0.2%	-5.0%

VI. Conclusion

Many studies have examined inequality using income as a measure of well being. In this paper, we examine inequality using consumption-expenditures instead. Consumption-expenditures may be a better proxy for well-being. Using data from the U.S. Consumer Expenditure Survey, we examine various measures of inequality for five time periods between 1960-61 and 1992-93. As Levy and Murnane (1992) discuss, a study's conclusion should be invariant to the inequality measure chosen. Thus, using four summary measures of inequality, we find that inequality for individuals was fairly stable between 1960-61 and 1972-73, rose between 1972-73 and 1980 and widened considerable during the 1980's, and fell during the early 1990's.

We decomposed the mean log deviation inequality measure by demographic characteristics (family type and education) and found that most of the inequality is due to within-group rather than between-group inequality and that within-group inequality first increased during the 1970's and then increased by an even larger amount during the 1980's, and fell slightly during the early 1990's. Between-group inequality accounted for a small share of total inequality, increasing moderately when examined by family type. Between group inequality increased by a larger amount when examined by educational level of the household head.

With the availability of data from the ongoing Consumer Expenditure Survey, future research will involve examining the annual changes in inequality that have occurred since 1980 to try to identify when the change in inequality occurred and, if possible, the source of the increase.

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