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TRENDS IN INEQUALITY USING CONSUMPTION-EXPENDITURES: THE U.S. FROM 1960 TO 1993

BY DAVID JOHNSON AND STEPHANIE SHIPP

U.S. Bureau of Labor Statistics

While much of the evidence suggests that there was an increase in inequality in the U.S. during the 1980s, the reasons are less evident. Using the U.S. Consumer Expenditure Survey data, we find that the inequality of consumption-expenditures, as well as the inequality of other measures of resources, widened considerably during the 1980s. While previous studies suggest that increasing inequality is mainly due to increases in within group inequality, we show that by decomposing inequality by the interaction of family type and education almost three-fourths of the increase in inequality is accounted for by changes in inequality between groups and by shifts in the population.

I. INTRODUCTION

Much of the recent literature on inequality and economic well-being in the United States has focused on the apparent increase in inequality that occurred during the 1980s.[1] This research suggests, as the 1994 *Economic Report of the President* states, that "A trend toward greater equality in the 1960s and toward greater inequality in the 1970s and 80s is apparent both in income and consumption measures of economic well-being." In fact, the Gini coefficient using family income published by the Census Bureau rose only 2 percent from 1967 to 1980 (from 0.358 to 0.365) while it rose 8.5 percent from 1980 to 1990 (to 0.396) (Census, 1991).

While much of the evidence suggests that there was an increase in these types of inequality in the U.S. during the 1980s, the reasons are vigorously debated (Krugman, 1992). Some claim that this increase in inequality is due to changing demographics, including different family structures, the aging of the population and differing education levels. Using data from the Current Population Survey, Ryscavage *et al.* (1992) show that changes in the demographics in the U.S. can only account for a small part of the increased inequality (about 12 percent of the increase from 1979 to 1989). This suggests that much of the inequality occurred among similar groups. In fact, Levy and Murnane (1992) suggest that the main unsolved puzzle concerns the reason for the increase in *within* group inequality.

In this paper, the trend in inequality is examined using consumption-expenditure data from the U.S. Consumer Expenditure (CE) Survey. Most previous studies have used income to measure inequality (Ryscavage *et al.*, 1992; Levy and

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[1]See, for example, Karoly (1993), Ryscavage (1992, 1993, 1994), Levy and Murnane (1992), and Cutler and Katz (1991).

Murnane, 1992; Karoly, 1992 and 1993; Gottschalk and Moffitt, 1994). Recently, a few studies have extended their analysis to use expenditures (Slesnick, 1994; Cutler and Katz, 1991). The results of both the income and consumption studies are that overall inequality increased during the 1980s and within group inequality accounted for most of the increase in inequality. Some of the studies consider changes within demographic groups separately but do not examine the interaction of characteristics. The major finding in this paper results from decomposing inequality by the interaction of family type and education and showing that the *changes* in inequality during the 1980s are accounted for, in large part, by changes in inequality between groups and by shifts in the population. Within group inequality, while a large component of the level of total inequality in each period, accounts for less than 25 percent of the *change* in inequality over time. Between group inequality and shifts in the population account for the remaining increase in inequality during the 1980s.

A second finding of this paper results from the sensitivity analysis. The sensitivity analysis consists of comparing our results to different definitions of consumption-expenditures and measures of income inequality. The levels of inequality and rates of increase change, as expected, when using different definitions. However, the results from the sensitivity analysis show that inequality increases during the 1980s for all measures.

Using data from the U.S. Consumer Expenditure Survey, various inequality indices are examined for five time periods: 1960–61, 1972–73, 1980–81, 1989–90, and 1992–93. These indices indicate that consumption 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 moderated during the early 1990s. The mean log deviation inequality indices are decomposed by family type, education, and then by the interaction of these two characteristics to examine the between and within group inequality for each period. Finally, the changes in inequality are decomposed over time. Since the results in the first part of the analysis show large increases in inequality since 1980–81, the decomposition analysis focuses on the period between 1980–81 and 1992–93.

This paper is organized in six sections. The next section describes the issues involved in measuring inequality. Section III outlines the methodology used and section IV describes the CE Survey and definitions used in this study. Section V presents the empirical results. General measures of inequality using consumption-expenditures are presented first followed by a sensitivity analysis of these results. The mean log deviation index is decomposed by demographic group and then the changes in the indices are further decomposed over time. The final section presents conclusions.

II. Measuring Inequality: What are the Issues?

In measuring inequality in a society, there are two issues to be addressed: what resource is to be measured, and whose resources should be measured. 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 whether the inequality of households, families or individuals is measured.

A. *What Resource Should be Used to Measure Inequality?*

McGregor and Barooah (1992) distinguish between a household's standard of living and its level of resources as measures of economic well-being. Intuitively, income (that is, the level of resources) is a natural choice for measuring well-being because it is an indicator of a consumer's financial ability to purchase goods and services. However, the standard of living may be a better measure of economic well-being. Following McGregor and Barooah (1992), consumption is used as a better measure of the standard of living, while income is viewed as a better measure of the level of resources. Slesnick (1994) also argues that consumption is a more appropriate indicator of well-being because utility is derived from the consumption of goods and services. Sabelhaus and Schneider (1995) show that using consumption instead of income yields different results about economic well-being both across groups and over time.

The life-cycle hypothesis suggests that people smooth their consumption over their lifetimes so that even if income varies significantly over the life-cycle, consumption would be less variable than income from year to year. Poterba (1989) shows that household income measured over long horizons is less variable than annual household income. Using consumption data to measure inequality may be a better indicator of "permanent income" and a better measure of household well-being.

Results from the CE Survey have typically shown that when consumer units[2] are classified by income, the expenditure-to-income ratio is quite high for the lowest income group. The level of expenditures is about double the level of income for the lowest income group. This high expenditure to income ratio for low income groups has existed since expenditure data were first published in 1901. When consumer units are classified by income quintiles and by expenditure quintiles, Rogers and Gray (1994) find that about 14 percent of the consumer units ranked in the lowest income quintile are ranked in the top three expenditure quintiles.[3] These consumer units report low levels of income but high levels of expenditures. Conversely, 8 percent of those ranked in the highest income quintile are ranked in the lowest three expenditure quintiles. These consumer units report high levels of income but low levels of spending. Using income vs. expenditures as a measure of welfare identifies different sets of consumer units. On both a practical and theoretical basis, the use of consumption is a better measure of the standard of living and hence, better represents well-being.[4]

In this paper, consumption is measured using consumption-expenditures, which are defined as what the consumer unit actually spends for current consumption. Spending on items not actually consumed by the consumer unit are not included—these include life insurance, principal payments on mortgages, contributions to pensions and social security, and gifts to persons outside the consumer

[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.

[3]Rogers and Gray (1994) use a total outlays definition which is consumption expenditures as defined in this paper plus spending on life insurance, pensions and Social Security, gifts to people outside the consumer unit, mortgage principal, and principal payments on vehicle loans.

[4]McGregor and Borooah (1992) follow a similar approach to suggest that low spending is a better indicator of poverty.

unit. Consumption-expenditures is an approximation of consumption because the data do not measure the flow of services from ownership of a home and durable goods. Some researchers have adjusted the data to reflect the flow of services from these goods (Cutler and Katz, 1991; Slesnick, 1994). Consumption-expenditures are used because they are most similar to the data published by the Bureau of Labor Statistics and the definition does not require making additional assumptions to impute service flows of durable goods. In addition, the results of Cutler and Katz (1991) suggest that while the levels of inequality are different for different measures of consumption, the trends are similar.

To examine the sensitivity of the results to this definition of consumption, alternative definitions of consumption are used to calculate inequality. For example, consumption is defined using rental equivalence as a measure of housing services for homeowners as well as a measure of consumption that excludes expenditures on durables. The results below show that inequality increases for all measures of standard of living, no matter how defined.

B. *Should Inequality be Measured for 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.[5] The equivalence scale used is the one implicit in the official U.S. poverty thresholds for average family size (age and composition of the family are not taken into account).[6] The scale indicates that the consumption for a two-person family must be 28 percent more than that of a single-person family to have the same standard of living. Using individuals as the unit of analysis conforms to the welfare theory underlying inequality and poverty measures (Blundell and Preston, 1991). Inequality measures for individuals take into account economies of scale when there is more than one person in a household.[7] This distribution of consumption-expenditures is a better measure of aggregate well-being since each person in the population is counted.[8] Adjusting consumption-expenditures in this manner yields what is called "equivalent consumption-expenditures per person."

III. Methods and Assumptions

In order to gauge the level of consumption 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 (see Coulter

[5]Other analyses that use the equivalence scales implicit in the U.S. poverty thresholds to examine inequality include Cutler and Katz, 1991; Karoly, 1992 and 1993; Karoly and Burtless, 1995; U.S. Bureau of the Census, 1991; Congressional Budget Office, 1993; House Ways and Means Committee (The Green Book), 1994.

[6]See Table 2.1 in USDL2, 1995.

[7]This assumes equal sharing in the household. Changing this assumption can yield different levels of inequality (see Johnson, 1997).

[8]See Karoly (1993) and USDL2 (1995) for examples of studies that use this method.

et al., 1992) are given by the following formulas:

$$(1) \qquad I_\alpha(c, N) = \begin{cases} \dfrac{1}{N\alpha(\alpha-1)} \sum_i [(c_i/\bar{c})^\alpha - 1] & \alpha = 2, \\ \dfrac{1}{N} \sum_i (c_i/\bar{c}) \times \log (c_i/\bar{c}) & \alpha = 1, \\ \dfrac{1}{N} \sum_i \log (\bar{c}/c_i) & \alpha = 0, \end{cases}$$

where c_i is the consumption-expenditures of the i-th individual, N is the population size and $\bar{c}$ is the mean consumption-expenditures. These formulas correspond to half the square of the coefficient of variation ($\alpha = 2$), the Theil entropy coefficient ($\alpha = 1$), and the Theil mean logarithmic deviation ($\alpha = 0$), in which α is the share-distance parameter.

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. Hence, increases in inequality that occur because the very rich become richer relative to the middle class do not increase the mean logarithmic deviation as much as increases in inequality caused by the poor becoming even poorer relative to the middle class. 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 trends in inequality.

We divide the equivalent consumption-expenditure distribution of the entire population into mutually exclusive groups to decompose the inequality into two parts. A "between" part, calculated using each group's mean consumption-expenditures and its share of the population, gives a sense of how much average individuals in each of the groups differ. A "within" part is a weighted sum of the inequality within each group, which suggests how much individuals within a particular group differ. 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, 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.

To formally measure the within and between group inequality, we consider a decomposition of a population of N persons into K mutually exclusive subgroups (indexed by $k = 1, \ldots, K$), defined by the characteristics of the consumer unit, with N_k persons in each subgroup. By denoting c and c_k as the vectors of consumption-expenditures defined over all persons in the population and in the k-th subgroups and w_k as the population weights, an additively decomposable inequality index can be given by:

$$(2) \qquad I(c, N) = \sum_k w_k I(c_k, N_k) + B.$$

The first term is a measure of the within-group inequality where each $I(c_k, N_k)$ is the index for the group. The second term, B, is a measure of the between-group inequality. Shorrocks (1980) shows that the Generalized Entropy family of inequality indices are additively decomposable. In this paper, we decompose the mean logarithmic deviation. Using (1) and (2), the mean logarithmic deviation decomposes as:

$$I_0(c, N) = \sum_k \left(\frac{N_k}{N}\right) \times I(c_k, N_k) + \frac{1}{N} \sum_i N_k \log (\bar{c}/\bar{c}_k) \tag{3}$$

such that $\bar{c}_k$ is the mean consumption-expenditures for the k-th subgroup and the weight, w_k, is the population share (N_k/N) of the k-th subgroup.

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 over time into components that reflect changes in the differences "between" groups and components that reflect changes in the differences "within" groups.

$$\begin{aligned}
\Delta I_0(c^k, N_k) &= I_0(t+1) - I_0(t) \\
&= \sum_k \bar{w}_k \Delta I(c^k, N_k) && \text{term A} \\
&\quad + \sum_k \bar{I}_0(c^k, N_k) \Delta w_k && \text{term B} \\
&\quad + \sum_k \left[\frac{\bar{c}^k}{c} - \log_k \frac{\bar{c}^k}{c} \Delta w_k \right] && \text{term C} \\
&\quad + \sum_k \left[\overline{w_k \cdot \left(\frac{c^k}{c}\right)} - \bar{w}_k \right] \Delta \log (c^k) && \text{term D,}
\end{aligned}$$

where $w_k = N_k/N$ is the population share of the k-th subgroup and the overbars represent the averages between periods, e.g. $\bar{I}_0 = (I_0(t+1) + I_0(t))/2$.

Term A reflects the changes in inequality that occurs within groups; terms B and C reflect changes in inequality resulting from changes in the population distribution, and term D reflects changes in the relative consumption-expenditure levels of different 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 or less 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 Consumer Expenditure 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 and reconstructed the relevant year's expenditures. Expenditures and income were reconciled using 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 a quarterly basis for 1972–73, they were totalled 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 database. (See Jacobs and Shipp (1993) for a history of the CE surveys.)

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 20 percent begin. The first interview is a bounding interview to reduce telescoping so the data are not used in estimation (USDL1, 1995).

While comparisons across time periods are possible, the differences in methodology may affect the results. The 1960–61 and 1972–73 data are presented annually whereas the 1980–93 continuing CE surveys are quarterly. Due to 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 their first interview begins and/or depending on whether the consumer unit continues to participate. 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 yields expenditure data that are more comparable to 1960–61 and 1972–73 while still representing the population distribution. The demographic data used for the annualized sample represent responses from the last quarter the consumer unit was interviewed—even if they changed throughout the year.[9]

Our analysis is conducted using equivalent consumption-expenditures which are obtained by dividing the consumer unit's consumption-expenditures by an equivalence scale. The weights are then multiplied by consumer unit size. 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[10] include expenditures for food, housing,[11]

[9]The weights and characteristics used are those from the last interview quarter for the consumer unit, to make the data as comparable as possible to 1960–61 and 1972–73.

[10]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.

[11]Housing includes expenses associated with owning or renting a home or apartment, including rental payments, mortgage interest and charges, property taxes, maintenance, repairs, insurance, and utilities. Expenditures for other lodging and household operations are in the miscellaneous items category. Expenditures for principal payments for mortgages are excluded.

transportation,[12] apparel, medical care,[13] entertainment,[14] and miscellaneous items[15] 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 the flows of services provided by durable goods are not measured. The CE survey records what families spend for consumption, not what they actually consume. The sensitivity analysis shows that different measures of consumption yield different levels and rates of change in inequality.

V. Results and Analysis

It is well documented that income and 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-expenditure has slowed considerably and became negative between 1989 and 1993.[16] These changes, however, are dissimilar for different family types and education levels (see Table 1). Married couples and the college-educated have fared well during the 1980s while those with a high school degree or less have seen a decline in real consumption. (See (USDL2, 1995) for more discussion of these changes.)

Table 2 presents the population distributions for the two sets of demographics that are used in this analysis. The data in this table shows that the population has become increasingly more educated—45 percent have at least some college education in 1992–93 compared to 21 percent in 1960–61. The proportion without a high school degree has fallen by half, but still remains a significant proportion of the population at 23 percent. Family composition has changed as well—the most dramatic change is the decline in the percent of married couple households with children while the percent of singles and "other" consumer units increased considerably (see also USDL2, 1995).[17]

Four inequality measures are presented in Chart 1. These inequality measures indicate that inequality was roughly constant between 1960–61 and 1972–73, rose

[12]Transportation includes expenditures for the net purchase price of vehicle, finance charges, maintenance and repairs, insurance, rental, leases, licenses, gasoline and motor oil, and public transportation. Public transportation includes fares for mass transit, buses, airlines, taxis, school buses and boats.

[13]Medical care expenditures are for out-of-pocket expenses including payments for medical care insurance.

[14]Entertainment expenditures are for fees and admissions, televisions, radios, sound equipment, pets, toys, playground equipment, and other entertainment supplies, equipment and services.

[15]Miscellaneous expenditures are for personal care services, reading, education, tobacco products and smoking supplies, alcoholic beverages, other lodging, and house furnishings and equipment.

[16]One referee questioned the difference in growth in consumption as reflected by the PCE compared to the CE between 1980 and 1993. On first glance, the PCE growth rate appears much larger. However after subtracting out components that differ conceptually, adjusting to a per capita basis, and converting to 1993 dollars, the growth rates are quite similar: PCE consumption grows by 13 percent and CE by 11 percent.

[17]*Other* family type includes families that do not exactly meet the definition of the preceding family types. For example, a single parent family that includes related persons other than children or a grandmother living with a husband–wife family is classified as *Other*.

TABLE 1

EQUIVALENT CONSUMPTION-EXPENDITURES PER PERSON

By Characteristic of Consumer Unit or Reference Person in Consumer Unit, in Constant 1993 Dollars—Adjusted Using CPI-U-X1)

				Percent Change		
	1980–81	1989–90	1992–93	1980–89	1989–93	1980–93
Family Type						
Single	$13,717	$15,709	$14,981	14.52	−4.64	9.21
Single parent	10,806	11,274	10,994	4.33	−2.49	1.74
Married couple	18,326	21,661	20,357	18.20	−6.02	11.08
Married with children	14,933	17,365	16,667	16.29	−4.02	11.61
Other married couples	13,127	13,975	12,810	6.45	−8.33	−2.42
Other consumer units	13,070	13,875	13,352	6.15	−3.77	2.15
Education						
Less than high school	$11,002	$11,161	$10,747	1.44	−3.70	−2.31
High school graduate	14,619	14,646	14,019	0.18	−4.28	−4.11
Some college	15,898	18,148	17,072	14.15	−5.93	7.38
College graduate	20,503	24,055	22,427	17.31	−6.77	9.37

Note: Equivalent consumption-expenditures per person are calculated by dividing total consumer unit consumption-expenditures by the equivalence scale implicit in the official poverty scales and then multiplying by family size.

slightly between 1972–73 and 1980–81, widened considerably during the 1980s and levelled off during the early 1990s.

The levelling off of inequality in the early 1990s is consistent with the Census inequality figures as analysed in Ryscavage (1994). Many factors appear to have contributed to the slowdown in the growth in inequality—including the increase in the minimum wage, the slowing of the growth of single parents and number of working wives, and the fact that the 1990–91 recession affected white-collar workers more than blue-collar workers—all factors described as "simply circumstantial" but that highlight the interrelated nature of the economy (Ryscavage, 1993). Real consumption-expenditures have fallen for all groups for the 1989–93 period (see Table 1)

TABLE 2

PERCENT DISTRIBUTION OF PERSONS IN CONSUMER UNITS DEFINED BY THEIR DEMOGRAPHIC GROUP

Demographic Group	1960–61	1972–73	1980–81	1989–90	1992–93
Family type					
Single	4.7	7.3	9.1	11.4	12.1
Single parent	6.2	5.6	5.8	7.2	8.3
Married couple	13.7	15.2	16.1	16.3	16.7
Married with children	64.2	58.1	48.9	44.1	41.2
Other married couples	8.9	8.6	9.8	7.6	8.4
Other consumer units	2.3	5.2	10.2	13.4	13.4
Education					
Less than high school	53.0	40.4	31.9	23.8	23.2
High school graduate	26.1	31.6	31.6	31.3	31.7
Some college	9.6	13.0	18.5	22.5	22.6
College graduate	11.3	15.0	18.0	22.4	22.5

Note: These tables show distributions of individuals within families.

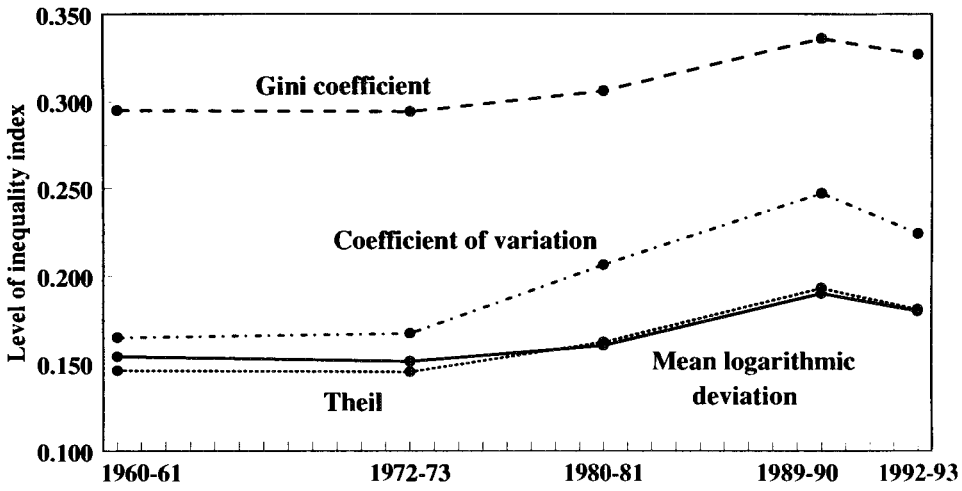

Chart 1. Consumption Expenditure Inequality Indexes (Equivalent Consumption-Expenditures per Person)

which may help to explain the levelling off of the inequality indices. In addition, the slight decrease in the early 1990s may reflect reductions in spending due to changes in savings and pension contributions (see USDL2). Contributions to savings and pensions are not included in the consumption-expenditure definition.

The findings presented in Chart 1 are also similar to those found by Cutler and Katz (1991), using similar, but not identical sample and consumption/expenditure definitions. Our measure of consumption-expenditures yields a Gini coefficient which lies between the Gini coefficients obtained by Cutler and Katz using expenditures and consumption. The main difference between our results and those of Cutler and Katz is due to 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 Cutler and Katz consumption definition adjusts housing and vehicle expenditures to take into account service flows from these goods. Using either definition, however, Cutler and Katz find that inequality increases about 10 percent between 1980 and 1988. As these results indicate, inequality measures depend on the definition of well-being and its measurement, yet most studies agree that there is an increase in inequality in the 1980s.

A. *Sensitivity to Measurement Issues*

As mentioned in section II, these inequality results may be sensitive to the measure of well-being used to assess inequality as well as the method used to adjust for family size. In this section, both the level and rate of change in inequality are sensitive to the well-being measure and equivalence scale used, however, inequality still increases from 1980–81 to 1992–93.

To examine the sensitivity of these measures on inequality, the mean log deviation is calculated using various definitions of well-being. Table 3 shows the

TABLE 3

SENSITIVITY ANALYSIS: A COMPARISON OF MEAN LOG DEVIATION (MLD) INEQUALITY INDICES WITH EQUIVALENT PRE-TAX INCOME AND WITH DIFFERENT DEFINITIONS OF EQUIVALENT CONSUMPTION-EXPENDITURES PER PERSON

Well-being measure	1980–81	1992–93	Percent change
Equivalent pre-tax income	0.282	0.352	24.8%
Equivalent total expenditures	0.176	0.202	14.8
Equivalent consumption-expenditures	**0.160**	**0.180**	**12.5**
Equivalent consumption including only non-durables	0.137	0.156	13.9
Equivalent consumption including only necessities (food, shelter, utilities and clothing)	0.126	0.135	7.1
Well-being measure	**1982–83**	**1992–93**	**Percent change**
Equivalent consumption-expenditures	0.166[1]	0.180	8.4
Comparison using rental equivalence:			
Equivalent consumption using rental equivalence for homeowner cost	0.157[1]	0.172	9.5
Equivalent consumption using rental equivalence and excluding vehicle purchases	0.140[1]	0.150	7.1

[1]The MLD represents inequality for 1982–83 since the rental equivalence variable was not introduced until 1982 (the 1982–83 sample is similar to the 1992–93 sample and includes all consumer units with more than one interview between the last quarter of 1982 to the last quarter of 1983).

mean log deviation for well-being measures using various measures. These resources include income before taxes and total expenditures.[18] Consumption is then defined in different ways to see how various components affect the level of inequality. Consumption-expenditures are defined using all household expenditures (similar to the Cutler and Katz definition), using only nondurables and finally including only "necessities" (food, shelter and clothing). The equivalent consumption-expenditures in bold is the measure used in this paper.

The first part of this table shows that the percent increase in consumption inequality is about one-half the increase in income inequality. If consumption-expenditures are a better measure of permanent income, then these results are consistent with the results in Gottschalk and Moffitt (1994) that one-third to one-half of the increase in inequality is due to increases in transitory income. The results in this table are consistent with the notion that the level of inequality is lower for well-being measures that more closely gauge service flows from consumption. While the level of inequality is largest for total expenditures and smallest for nondurables, the increase in inequality is similar for total expenditures, consumption-expenditures, and nondurables. As expected, the level and increase in inequality is smaller when only necessities are included.

In the second part of Table 3, a measure of rental equivalence is first used to measure home-ownership costs and then this definition is further changed to exclude vehicle purchases. These two definitions are used to approximate service flows for housing and durable expenditures. Similar to Cutler and Katz (1991), the level of inequality is smaller for consumption measures that more closely capture the service flows from consumption, however the increases in inequality

[18]Total expenditures is consumption-expenditures plus expenditures for gifts, cash contributions, pensions and Social Security, and life insurance.

are similar.[19] Hence, the results of the sensitivity analysis show that inequality increases during the 1980s, albeit at slightly different rates when using different measures of inequality.

Previous research shows that the choice of equivalence scale will change the level of inequality.[20] These studies use equivalence scales of the form: (family size)^e, where e is called the scale elasticity. Notice that if e equals one, then the scale equals family size and the equivalent consumption-expenditures are simply the per-capita consumption-expenditures. Alternatively, if e equals zero then there is no adjustment for family size.

Scales of this form have an interesting effect on inequality indices such as the mean logarithmic deviation. Research has shown that the mean logarithmic deviation has a U-shaped relationship with the parameter e. That is, inequality is highest for scales with a scale elasticity of one and zero and lowest for values in between, such as 0.5. Chart 2 shows this U-shaped relationship between e and the level of mean logarithmic deviation for both 1980–81 and 1992–93. This figure also illustrates that inequality increases between these periods for each of the scale elasticities.

Chart 3 shows how the percentage change in inequality between 1980–81 and 1992–93 for each index depends on the scale elasticity. This figure suggests that the mean logarithmic deviation is fairly insensitive to the scale while the coefficient

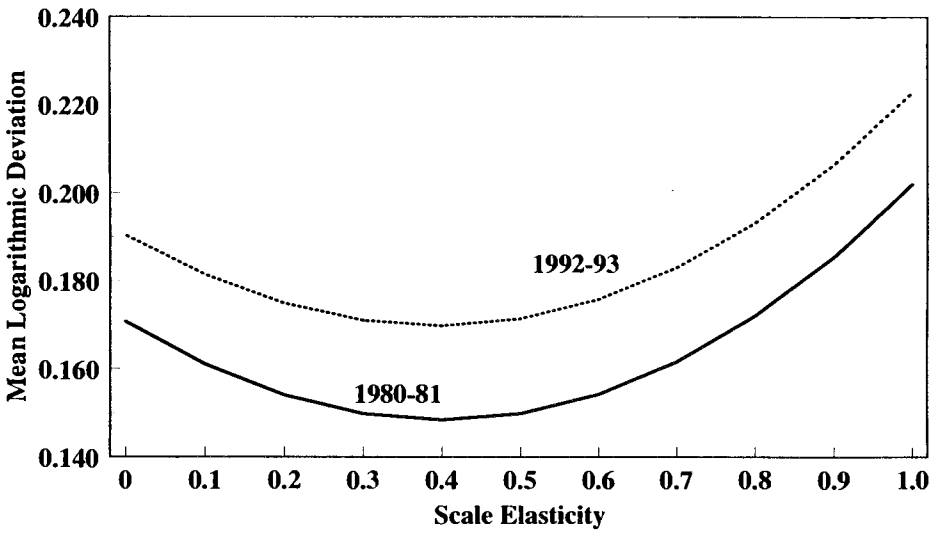

Chart 2. MLD by Scale Inelasticity for 1980–81 and 1992–93 (Equivalent Consumption-Expenditures per Person)

[19]This is also shown in Johnson and Shipp (1997) using the Gini coefficient which is not as sensitive as the mean log deviation to changes in the definition of the well-being measure.

[20]See Buhmann *et al.* (1988), Coulter *et al.* (1992), Johnson, D. (1997).

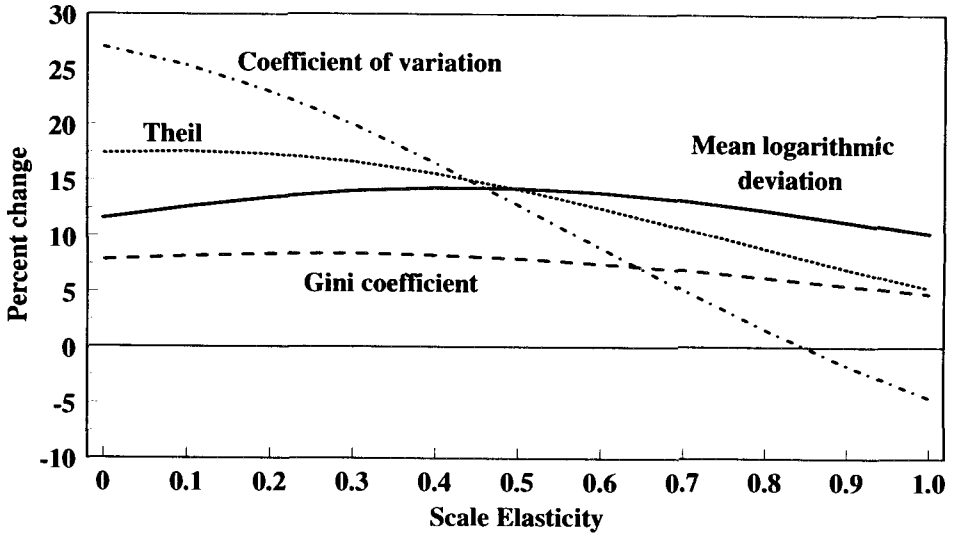

Chart 3. Percent Change in Consumption Inequality Between 1980–81 and 1992–93 by Scale Elasticity (Equivalent Consumption-Expenditures per Person)

of variation is most sensitive. For the Theil, Gini and mean log deviation, inequality increases for all scale elasticities.

B. *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 (Jenkins, 1995). This allows an examination of 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. Within and between group inequality are first examined for each period by family type, by education level and then by the interaction of the two.[21] Then changes in within and between group inequality are examined over time.

Within Group Inequality by Family Type. Family type 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 singles and other family types. The growing single population have lower consumption-expenditure levels, while

[21]Several demographic characteristics were examined. The results for family size are similar to the family composition results. Between group inequality has increased slightly when examined by race and within group inequality has increased for blacks. Karoly (1993) has similar results when looking at pre-tax income data from the Current Population Survey.

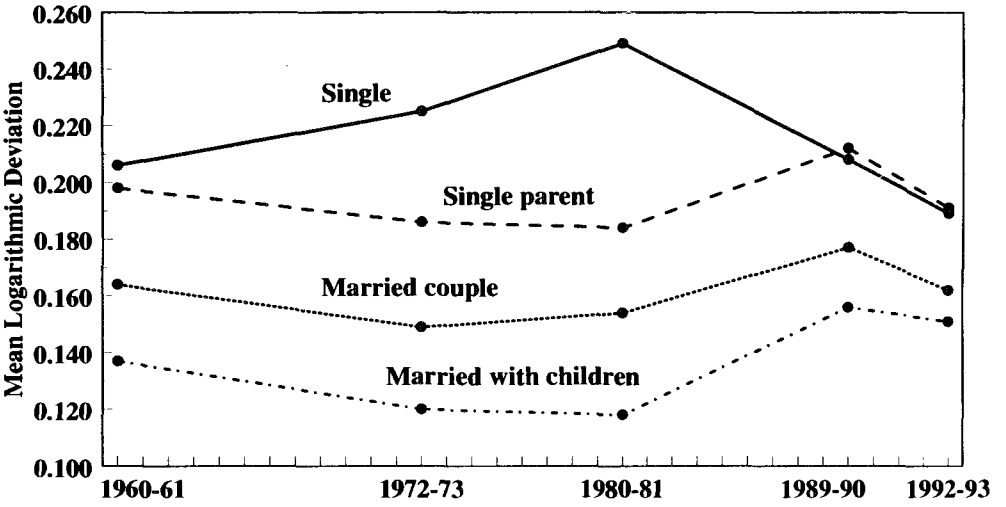

Chart 4. Within Group Inequality by Family Type (MLD Computed Using Equivalent Consumption-Expenditures per Person)

married couple households predominantly have higher consumption-expenditure levels (see USDL2, 1995).

The results in Chart 4 show that the level of within-group inequality is lowest for married couples with children and highest for singles. Inequality generally declined during the 1970s and increased during the 1980s except for singles who followed a reverse trend. By 1992–93, inequality had fallen back to the 1960–61 levels, except for married couple consumer units with children whose level of inequality was slightly higher than 30 years ago.

Within Group Inequality Decomposition by Education Level. Differences in the level of education have been cited as one of the main reasons for increasing inequality during the 1980s. 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 1993, almost 40 percent of college graduates were in the top quintile for consumption-expenditures while over 40 percent of those with less than a high school education were in the bottom quintile (USDL2, 1995). More significantly, high school graduates, which have increased as a share of the population, are increasingly in the bottom consumption-expenditure quintile.

Between 1960–61 and 1989–90 within-group inequality increased for all groups, except for those with less than a high school education (see Chart 5). During this period, inequality for the less than high school group remained higher than the other educational groups. Within group inequality increased slightly for consumer units with less than a high school education between 1989–90 and 1992–93 while it declined sharply for high school graduates.

Interaction of Family Type and Educational Level. One suggested cause of increasing inequality is the fact that similarly educated people marry each other (see Ryscavage *et al.*, 1992 and Cancian *et al.*, 1993). The combined income of

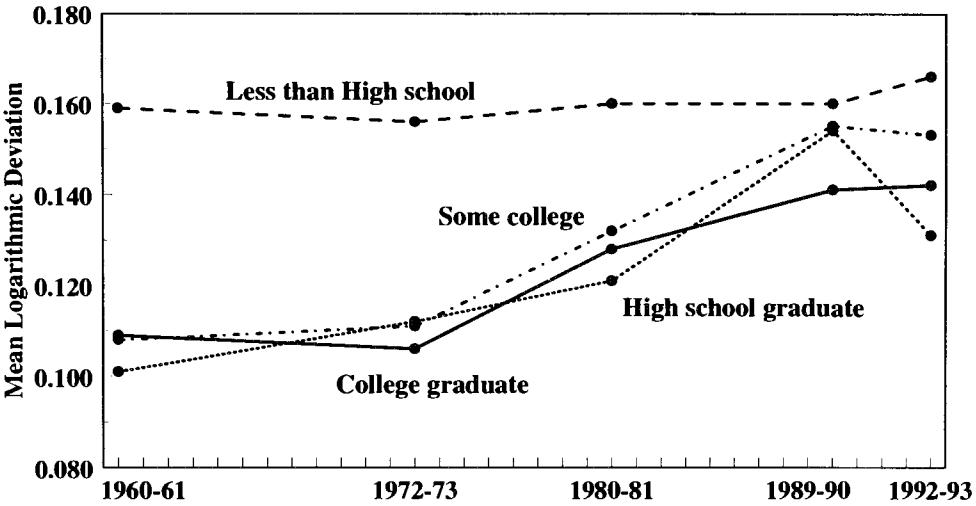

Chart 5. Within Group Inequality by Education Level (MLD Computed Using Equivalent Consumption-Expenditures per Person)

two professionals (such as doctors or lawyers) far exceeds the income of those who have a high school education and even those with a college degree. The lifetime earnings for professionals is two times higher than for those with a bachelor's degree and three time higher than those with a high school degree (U.S. Bureau of the Census, 1994).

The result of the phenomena of two people marrying who have similar educational backgrounds is to increase both within group inequality and between group inequality. The data in Table 4 show the trends in within group inequality between

TABLE 4

WITHIN GROUP INEQUALITY DECOMPOSED BY EDUCATION FAMILY/TYPE: 1980–81 TO 1992–93

(Mean Log Deviation Inequality Index computed using Equivalent Consumption-Expenditures per Person)

Family type/Education	1980–81	1989–90	1992–93	Percent change: 89–90/80–81	Percent change: 92–93/80–81
Single; no college	0.224	0.175	0.143	−21.9	−36.2
Single; some college	0.241	0.200	0.180	−17.0	−25.3
Single parent or Other families; no college	0.193	0.173	0.175	−10.4	−9.3
Single parent or Other families; some college	0.166	0.171	0.162	3.0	−2.4
Married couple; both no college	0.130	0.137	0.122	5.4	−6.2
Married couple with children; both no college	0.112	0.136	0.133	21.4	18.8
Married couple; one with college	0.130	0.112	0.112	−13.8	−13.9
Married couple with children; one with college	0.108	0.117	0.123	8.3	13.9
Married couple; both some college	0.125	0.155	0.137	24.0	9.6
Married couple with children; both some college	0.100	0.132	0.133	32.0	33.0

1980–81 and 1992–93. The results are somewhat mixed when comparing married couples with and without children. As shown in Chart 4 and in Table 4, inequality increases by the largest amount for married couples with children.

Between Group Inequality. The result that variations in consumption-expenditures *within* each family type group contribute the most to inequality is consistent with other studies (Cowell, 1984, Karoly, 1993). However, *between* group inequality accounts for a small but increasing share of total inequality when examined by family composition (see Table 5).

TABLE 5

TOTAL AND BETWEEN GROUP INEQUALITY, DECOMPOSED BY EDUCATION AND FAMILY TYPE: 1980–81 TO 1992–93

(Mean Log Deviation Inequality Index Computed Using Equivalent Consumption-Expenditures per Person)

	1960–61	1972–73	1980–81	1989–90	1992–93
Total inequality	0.154	0.151	0.160	0.190	0.180
Between group inequality (and percent of total)					
by family type	0.004	0.007	0.008	0.015	0.015
	(2.6%)	(4.7%)	(5.3%)	(7.9%)	(8.3%)
by education level	0.020	0.002	0.023	0.037	0.033
	(13%)	(14.6%)	(14.4%)	(19.5%)	(18.3%)
by family type and educational level	—	—	0.025	0.043	0.038
			(15.6%)	(22.6%)	(21%)

Inequality *between* education level groups is large when compared to other demographic characteristics—18 percent in 1992–93 compared to 8 percent when examined by family composition.[22] The interaction of family composition and education, however, explains the largest amount of between group inequality—increasing from 16 percent in 1980–81 to 21 percent in 1992–93. In 1989–90, married couples, who both do not have any college, spend about 40 percent less while married couples, where at least one of them has some college spend about 20 percent less than married couples who both have some college. All other families whose reference person does not have any college education spend the least amount—over 50 percent less than married couples who both have some college.

The changing structure of inequality over time. The percent change in the mean logarithmic deviation 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. The changes in inequality are decomposed for two time periods: 1980–81 to 1989–90 and then 1989–90 to 1992–93 (see Table 6). The results of this decomposition, when examined for each demographic group separately, are consistent with the findings of other studies. That is, the majority of the increase in inequality is due to an increase in inequality *within* each of the groups. (See Karoly, 1993; Levy and Murnane, 1992; Ryscavage *et al.*, 1992).

[22]Other demographic variables studied include family size, race and ethnicity.

TABLE 6

DECOMPOSITION OF CHANGES IN INEQUALITY OVER TIME

(Mean Log Deviation computed using Equivalent Consumption-Expenditure per Person)

	Changes in Within-Group Inequality (Term A) (%)	Changes in Relative Mean Consumption-Expenditures between Groups (Term D) (%)	Changes in Population Shares (Terms B + C) (%)	Total Percentage Change (%)
Changes between 1980–81 and 1989–90				
Education	11.3	9.1	−1.9	18.5
Family type	11.4	3.4	3.7	18.5
Family type and education	4.2	9.5	4.8	18.5
Changes between 1989–90 and 1992–93				
Education	−3.1	−1.7	−0.2	−5.0
Family type	−5.6	−0.4	1.0	−5.0
Family type and education	−2.7	−3.2	0.9	−5.0
Changes between 1980–81 and 1992–93				
Family type and education	0.8	5.9	5.8	12.5

Note: *See section III, Methods and Assumptions for definitions of terms.*

Consistent with other studies, the results in Table 6 show that disparities between education levels have had the largest effect on inequality during the past decade (see Ryscavage *et al.*, 1992; and Karoly, 1993). Differences in education levels contributed almost 50 percent of the increase in inequality in consumption-expenditures during the 1980s.[23] Ryscavage *et al.* (1992) also find that increases in the educational attainment of some groups contributed to increasing income inequality.

Decomposing the change in the inequality 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 account for almost 18 percent of the increase in inequality. In addition, changes in family composition during the 1980s account for 20 percent of the increase in inequality. Karoly (1993) also finds that the compositional makeup of the population shifted toward families with lower average income and higher inequality and that these population changes accounted for about one-third of the increase in inequality from 1967 to 1987.

Decomposing the percent change in the inequality index for *family types by educational level* explains a large proportion of the increase in inequality during the 1980s. In contrast to other studies that examine changes in family composition and educational level separately, it is the interaction of these two demographic characteristics that explains the surge in inequality during the 1980s. It has been well documented that the increase in single parents and single households and the decline in married couple households have contributed to increasing inequality.

[23]For example, 9.1 percent/18.5 percent = 49 percent for the 1980–81 to 1989–90 period.

Further exacerbating the increase is that within married couple households, the educational level of both spouses has increased, while it has not increased as much for the heads of other families.

Thus decomposing the *change in inequality* between 1980–81 and 1989–90 for different family types by educational level shows that *between group* inequality accounts for the largest portion of the change (over 50 percent), shifts in the population account for over 25 percent, and *within group* inequality accounts for the remaining change (see Table 6). The interaction of these two characteristics explains a significant portion of the surge in inequality during the 1980s.[24]

Cancian, Danziger, and Gottschalk (1993) address the effect of working wives on inequality but they find that the net effect of wives' earnings is to reduce inequality among couples. They acknowledge a change in two trends: the participation rate of wives whose husbands have the highest earnings has increased disproportionately (traditionally, it was men with low earnings whose wives worked), and the "upward drift" in the correlation of spouses' earnings, since men tend to marry women with similar education. They show that even though these trends are occurring, they are offset by the increasing labour force participation of women. This has an equalizing effect on family incomes and thus more than offsets the increased correlation of husband–wife earnings. While these findings are different than the results presented above, they don't address the fact that wives' earnings might increase inequality in the population as a whole, even though wives' earnings may decrease inequality *among* couples.[25]

VI. Conclusion

While many studies have examined inequality using income as a measure of well-being, inequality using consumption-expenditures is examined in this paper since consumption-expenditures may be a better proxy for economic well-being. Using data from the U.S. Consumer Expenditure Survey, four measures of consumption-expenditure inequality are computed 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. The four inequality indices examined indicate that inequality for individuals was fairly stable between 1960–61 and 1972–73, rose between 1972–73 and 1980, widened considerably during the 1980s, and fell during the early 1990s.

The results of an in-depth sensitivity analysis show that our inequality results are consistent with the results of others who use different definitions of consumption or other measures of well-being such as income. That is, inequality increases during the 1980s no matter how it is measured. Finally, changes in the demographic characteristics of families are decomposed to evaluate their effect on the inequality of consumer expenditures. While the level of inequality increased over this 30 year period, studies have found that most of the inequality in each period is due to inequality *within* the demographic groups. We also find this to be true

[24]The change in inequality using the interaction of family type and number of earners also indicates that within group inequality accounts for only half the change in inequality.

[25]Ryscavage *et al.* (1992) and Blackburn and Bloom (1994) make a similar observation.

when examining demographic groups separately; however when examining the *interaction* of two demographic characteristics—family type and education—we find that within group inequality accounts for less than one-fourth of the increase in inequality, while between group inequality and shifts in the population account for three-fourths of the change. The higher education level of married couples, compared to less educated married couples, single parents, and singles accounts for most of the change in inequality.

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