Household Size and the Distributional Implications of Taxes and Transfers

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Abstract: *This paper examines the distributional implications of tax and transfer programs in the United States using household income data from the Panel Study of Income Dynamics from 1981-91. Income inequality is measured for pre-tax/transfer and post-tax/transfer definitions of household income. To assess the impact of taxes and transfers on the size distribution of income, confidence intervals are constructed for various measures of inequality, and hypothesis tests are conducted to determine whether observed changes in the distribution of income, before and after taxes and transfers, are statistically significant. Using decomposable measures of inequality, the implications of number of exemptions and hence family size are investigated.*

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1. Introduction

This paper examines the impact of US tax and transfer programs on income inequality, with particular focus on inequality measures decomposed by number of exemptions claimed on household tax returns. To the extent that number of exemptions claimed is correlated with family size, and one can reasonably expect this correlation to be high, this allows us to address questions concerning the relationship between family size and US household income, and the impact of tax and transfer programs on this relationship.

Several significant changes in federal tax laws and transfer programs were implemented during the 1980's that have had an impact on the distribution of income in the US. For example, changes were legislated in the Economic Recovery Tax Act of 1981, the Tax Equity and Fiscal Responsibility Act of 1982, and the Tax Reform Act of 1986. Transfer programs have also changed quite dramatically over the years. During the 1980's, the distribution of income also changed as a result of changes in factors that are quite independent of taxation policy. Factors such as the age distribution and educational characteristics of the population come to mind.

There has been a fairly extensive literature examining the overall implications of these changes in tax laws and earnings on the distribution of federal tax liabilities, such as the studies by Bishop et al. (1997), Tuckman et al. (1978), Hayes et al. (1991), and Davidson and Duclose (1997). Recently, Auten and Robert (1999) identifies trends towards increasing inequality and the extent that tax changes during the 1980s may explain the rising inequality. Despite this literature, we are unaware of any previous studies which attempt to control for family size when examining the effects and impact of the tax structure on the distribution of income.

The main contribution of this paper is an attempt to address two specific questions. First, is family size a significant determinant of income inequality in the US? A priori we would expect family size to be a determinant of economic inequality, broadly defined, since as household size grows, each member of the household benefits from a smaller share of the total income earned by the household. However, we would not necessarily expect family size to be an important determinant of total household income, and hence of income inequality across households of different sizes.

The second question we attempt to answer is: does the US tax and transfer system have an equalizing effect across incomes of households of different sizes? That is, are the exemptions allowances effective in redistributing income across households of varying size, and if so, is this redistribution in the intended direction of making families of different sizes more equal in terms of broader definitions of economic inequality?

This paper utilizes a framework introduced in Mills and Zandvakili (1997), which allows statistical inferences to be drawn for inequality measures and their decompositions, and addresses some of the deficiencies in the previous literature on income inequality. [2]

2. Methodology

2.1 Measurement of inequality

Income is the most commonly used variable in analyses of inequality. Different definitions of income can be used for measurement, such as pre- and post tax and transfer income. The proper choice of economic unit is critical in measuring inequality; the individual is generally a poor choice; household and family are more suitable units of analysis. Although nonworking spouses and children do not have their own income, they are direct beneficiaries of household income. Thus the measurement of inequality at the individual level creates a

[2] See Mills and Zandvakili (1997) and Biewen (2002) for further discussion.

misleading picture. At the same time, however, measures based on per capita household or family income are not appropriate because not all individuals in a household enjoy the same economic well-being. Therefore, the problem must be addressed through an equivalence scale, see Fisher (1987). To use an equivalence scale, one must deflate household or family income for each extra member of the family unit. Equivalent income for a family or a household is equal to the observed income divided by the equivalence scale value for households or families similar to the one in question. The derivation of such scales is a problem: the choice is normative and must be justified on the basis of some consensus regarding the minimum level of consumption for households or families of similar type in each of these countries. The emergence of micro data at the unit level has generated another variable that requires attention. The proper weighting schemes must be used to assure that the observed data are representative of the population under consideration.

The impact of the choice of inequality measure must be kept in mind when estimating inequality. Because of their characteristics, inequality measures vary in their degree of sensitivity to different parts of the distribution. This feature affects the weights attached to individuals' income fluctuations in computations of inequality.

There is no single rule for selecting an appropriate inequality measure. The ranking of inequality measures is not feasible, although the selection process interests us because each of these measures possesses some desirable properties. The axiomatic approach to inequality measurement proposed by Sen (1973), Shorrocks (1980), Cowell and Kuga (1981) and Foster (1983) is a step in this direction. It is desirable for inequality measures to be a real valued function for a population, and to satisfy the properties of mean independence or income homogeneity, whereby the inequality measure will be sensitive to proportional changes in all incomes; anonymity or symmetry, which requires the inequality index to be independent of labels that are assigned to income shares of the population; the Pigou-Dalton principle of transfer, which requires that a transfer from a rich person to a poor person will reduce inequality, provided that the transfer is not so large as to reverse their positions; the principle of population, which ensures that the inequality measures depend on relative densities rather than on the absolute density; and decomposability, whereby the total inequality in the distribution of a population's income can be broken down into a weighted average of (on one hand) the inequality existing within subgroups of the population, and (on the other) the inequality between the groups.

Decomposability is a useful property, but not all decomposable measures are accurate measures of inequality.[3] Those inequality measures that satisfy decomposability, as well as the other desirable properties discussed above, are of particular interest, while in special cases one could use some inequality measures that violate any one of these requirements (such as the Gini coefficient, which is not additively decomposable). The weights given to the inequalities within the various subgroups distinguish the additively decomposable measures. Population and income shares are generally used for the weights.

A number of measures have been proposed in the literature. These fall into two categories: conventional measures with no explicit reference to the concept of social welfare, and measures that are based on some form of social welfare function. The conventional measures most commonly used in research include the variance measure, the coefficient of variation, and the Gini coefficient. These conventional summary measures violate some of the desirable properties described above. With each of these statistical measures, it would be preferable to

[3] See Bourguignon, 1979 and Shorrocks, 1984.

examine directly the social welfare functions that we wish to employ, rather than using implicit value judgments.

The inequality measures, which are homogeneous, symmetric, and decomposable, and which satisfy the Pigou-Dalton condition of transfer, belong to the class of generalized entropy measures and are given as:

Theil 1: T1 = $-\sum_{i=1}^{N} w_i s_i \log(ns_i)$

Between-Theil 1: BT1 = $\sum_{j=1}^{w} s_j^* \log\left(\frac{ns_j^*}{n_j}\right)$

Within-Theil 1: WT1 = $\sum_{j=1}^{w} s_j^* T1_j$

Theil 2: T2 = $\sum_{i=1}^{N} \frac{w_i}{n} \log(1/ns_i)$

Between-Theil 2: BT2 = $\sum_{j=1}^{w} \frac{n_j}{n} \log\left(\frac{ns_j^*}{n_j}\right)$

Within-Theil 2: WT2 = $\sum_{j=1}^{w} \frac{n_j}{n} T2_j$

where y_i = income of ith individual (observation), N_j = number of observations in jth group, $N = \sum_j N_j$, w_i = population weight for ith observation (one observation represents w_i individuals sampled from the total population), $w_i^j =$ population weight for ith observation in group j, $n_j = \sum_{i=1}^{N_j} w_i^j$ = sum of population weights for jth group (i.e. total population of jth group), $n = \sum_{j=1}^{w} n_j$ = total population, $s_i = y_i \Big/ \sum_{i=1}^{N} w_i y_i$, $s_i^j = s_i$ for the jth group,

$s_j^* = \sum_{i=1}^{N_j} w_i^j s_i^j$ = weighted income share of the jth group, $T1_j$ = Theil 1 for the jth group, and $T2_j$ = Theil 2 for the jth group, see Theil (1967).

It is generally accepted that progressivity in taxation reduces overall income inequality among households and it is perceived that the US tax system is progressive. However, a reduction in overall inequality provides us with only a partial picture in the sense that inequality between certain groups of households (the between-group component of inequality) could be decreasing while inequality among households in the same group (the within-group component of inequality) is rising. Thus, the decomposition of the post-tax/transfer inequality may move in a different direction to that of the pre-tax/transfer decomposition.

In this paper decompositions are based on the number of exemptions. This allows an interpretation of results that can be attributed family size. The comparison of the pre-tax/transfer and post-tax/transfer inequality will provide insights into the degree of tax progressivity and how it has changed over time. The decomposition properties of these measures enhance our view of the true implications of taxes.

2.2 Statistical inference using bootstrapping

The problem faced in conducting statistical inference for measures of inequality is that all of these measures are nonlinear, nonparametric functions of a random variable (usually income, earnings or wages). Consequently, the interval estimates available from asymptotic theory may not be accurate, and the small-sample properties of these intervals are usually not known. Furthermore, decomposable measures of inequality are bounded. For example, the Theil measures are bounded below by zero. Thus the application of standard asymptotic results may lead to estimated intervals that extend beyond the theoretical bounds of a particular measure (e.g., a negative lower bound for a Theil measure).

Bootstrapping, an alternative method for computing probability intervals, provides interval estimates drawn from the small-sample distribution. These intervals have been shown to be superior to asymptotic intervals both theoretically and in a variety of applications.[4] Bootstrap intervals are easy to calculate, the same method is applicable to all the inequality measures used in the literature, and the bootstrap method automatically takes into account any bounds that apply to a particular measure. Also, bootstrap intervals computed by the percentile method have a clear Bayesian interpretation, and hence they provide a straightforward solution to the Behrens-Fisher problem of comparing means from two distributions.

Herein we use the bootstrap for conducting hypothesis tests to compare before-tax and after-tax income inequality measures by first obtaining a bootstrap sample for the before-tax inequality measure, then obtaining a bootstrap sample for the after-tax inequality measure, and only then comparing the two bootstrap distributions. Because each distribution was obtained by using a cross-section sample of individuals, the independence assumption necessary for bootstrapping is not violated.

2.3 Data

Disaggregated data are used to identify and separate the effects of various income definitions and population characteristics on the distribution of income from the effect due to tax and transfer policy. We measure income inequality before and after taxes and transfers using the Panel Study of Income Dynamics (PSID) for the period 1981-1991. The data have been

[4] For a detailed discussion, see Hall (1992), Burr (1994), Mills and Zandvakili (1997) and Biewen (2002).

weighted to be representative based on the weights provided by the PSID. The household head's characteristics are used for the purpose of decomposition. All of the earnings variables are taken from the PSID and include a number of components.

We examine four definitions of income: taxable income (Y), taxable income plus public transfers (YP), taxable income plus public transfers and social security (YPS), and total income minus taxes (YN). The income inequality measures are then analyzed across income definitions in order to learn about the effects of such changes on the economic well being of households.

3. Comparison across income definitions with decompositions

We first measure inequality for each of the four definitions of income described above: taxable income (Y), taxable income plus income transfers (YP), YP plus social security (YPS), and YPS minus taxes (YN). Table 1 provides inequality measures from 1981 to 1991 based on the Theil 1 and Theil 2 measures of inequality and their associated decompositions based on number of exemptions for each household. The numbers in parentheses in Table 1 are bootstrap standard errors. The following interesting patterns can be observed in Table 1.

Inequality declines as we add transfer payments and social security, and subtract taxes, with social security appearing to have the biggest impact on reducing inequality (YP to YPS).

Most (virtually all) of the inequality is within groups (WT1 and WT2) not between groups (BT1 and BT2), so it appears that the number of exemptions, a measure of family size, does not affect inequality significantly. However, as transfer payments and social security are added, and taxes subtracted, within-group inequality declines and between-group inequality remains fairly constant, so between-group inequality becomes a larger proportion of overall inequality after taxes and transfers. This is an important finding. It suggests that taxes and transfers make similar families based on the number of exemptions more equal. Thus, by design, inequality among households of different size is rising.

There appears to have been a big jump in between-group inequality in the early 90s. Between-group inequality has thus become more important. We also notice that the tax and transfer structure seems to affect within-group inequality more than between-group inequality.

Looking across the years analyzed, we do not observe much of a trend over time. Inequality for gross income, Y, declines in the early 80s, and then increases in the late 80s, but there is little change in after tax income, YN. Again, social security seems to be the main equalizer.

Lastly, both the Theil 1 and Theil 2 measures follow similar patterns, though they are more pronounced for Theil 2 than for Theil 1. There is a large drop in inequality from YP to YPS (adding social security payments) using the Theil 2 measure, which is more sensitive than Theil 1 to changes in the tails of the income distribution.

A problem in the past literature that employs the various inequality measures is that often there has been very little effort to determine whether observed changes are statistically significant. Hence, we use the bootstrap to construct confidence intervals and conduct hypothesis tests. This allows us to determine whether the observed patterns mentioned above really exist, or are actually just due to random sample variation.

The changes in the measured inequality for all pairings of income definitions in a given year, from 1981 to 1991, are given in Table 2. The uppermost number in each block of three in Table 2 is the value of the change in the inequality measure between two definitions of income for that particular year, e.g. for Theil 1, the change in measured inequality that results from looking at income defined by Y versus YP, T1(Y)-T1(YP), is 0.024; the number below this is the bootstrap standard error of the estimated change, s.e.; the bottom number in each block of three is the probability that the measured change in inequality is negative, e.g. for 1981, *p* = Prob{T1(Y)-T1(YP) < 0]} = 0.274, so zero would lie within a 95% (or 90%) confidence interval around the point estimate of T1(Y)-T1(YP) (indicated by a value of *p* between 0.025 (0.05) and 0.975 (0.95)).

It is clear from Table 2 that, after transfers are made (Y-YP), the decline in inequality is insignificant. This is true for all the years based on the Theil 1 measure of inequality. However, this decline is observed to be significant if we measure inequality based on Theil 2. Thus, choice of inequality measure plays an important role in determining the significance of the observed changes. Since Theil 2 is more sensitive to changes in the tails of the income distribution, and transfer payments generally affect the lower tail, this finding is not surprising.

The observed changes for Y-YPS, Y-YN, YP-YPS and YP-YN are all statistically significant at the 5% level for both measures and all the years under consideration. However, for YPS-YN, the significance varies from year to year for both measures.

The changes in the between-group and within-group components of inequality across different income definitions are shown in Table 3. It is clear that the changes in between-group inequality, based on Theil 1, for all the pairings of income definitions from 1981 to 1989, are insignificant. However, the change in between-group inequality for Y-YPS, Y-YN, YP-YPS and YP-YN are statistically significant for 1990 and 1991.

The changes in within-group inequality follow the same pattern as those of overall inequality, i.e. observed changes for Y-YPS, Y-YN, YP-YPS and YP-YN are all statistically significant at the 5% level. This is due to the fact the within-group inequality constitutes a much larger proportion of overall inequality.

It is clear from our findings that income transfers are not that much of an equalizer, whereas social security appears to be the most important government transfer policy for reducing inequality. Further, the observed equalization due to social security and taxes are equalizing households of similar size. Thus, cross group equalization is minimal and insignificant. Lastly, we note that the change in inequality from YPS to YN (i.e. due to income taxes) is small and may actually be negative for 1991, so income taxes in the early 1990s may not have been progressive enough to reduce inequality at all.

Since changes in public policy on taxation and transfers may lead to changes in the overall distribution for a given definition of income, this can bring about radical shifts in household permanent income, and we may observe shifts in household portfolios. Therefore, we also tested the changes in inequality and their decomposition for the entire duration of the sample.

We found that most of the changes from year to year are very small in magnitude and statistically insignificant. This finding was consistent across definitions of income and decompositions. The exceptions are 1990 and 1991, where we observe significant increases in income inequality between family size groups for all definitions of income.

4. Summary & Conclusion

Decompositions by number of exemptions, as a proxy for household size (tax unit size), enable us to observe the consequences of the exemption allowances. Adopting the methodology of Mills and Zandvakili (1997), we investigated changes in the relative position of particular types of households in the distribution of income in each year and over time.

Regardless of our choice of inequality measure, we find that inequality declines as we add transfer payments and social security, and subtract taxes. The observed measures of inequality and their associated changes in a given year and over time are more pronounced with Theil 2 compared with Theil 1. This is because Theil 2 is much more sensitive to changes in the tails of the distribution. The impact of social security seems to be greater than those of income taxes and other transfer payments. This is true for all the years under consideration. Taxes are shown to have lost some of their progressivity after transfers are made.

The evidence indicates that family size does not appear to be a significant determinant of household income inequality. Further, decompositions by the number of exemptions indicate that the US tax and transfer structure brings about more equalization among tax units of a similar family size. While there is some evidence to suggest that income inequality among households of different sizes is rising, the tax and transfer structure does not appear to have had much of an impact on inequality across households of different sizes.

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Table 1: Decomposition by Number of Exemptions

	Theil 1				Theil 2			
	Y	***YP***	***YPS***	***YN***	***Y***	***YP***	***YPS***	***YN***
1981 T1	.553 (.046)	.529 (.046)	.431 (.044)	.372 (.048)	1.403 (.044)	1.104 (.040)	.526 (.024)	.461 (.023)
WT1	.519 (.048)	.495 (.047)	.397 (.045)	.338 (.049)	1.366 (.045)	1.067 (.039)	.489 (.023)	.423 (.049)
BT1	.034 (.005)	.034 (.005)	.034 (.004)	.035 (.004)	.036 (.005)	.037 (.005)	.037 (.004)	.038 (.004)
1982 T1	.501 (.025)	.475 (.024)	.379 (.023)	.312 (.023)	1.421 (.043)	1.070 (.035)	.521 (.020)	.450 (.019)
WT1	.467 (.026)	.441 (.025)	.345 (.024)	.277 (.023)	1.386 (.026)	1.034 (.036)	.484 (.019)	.413 (.018)
BT1	.034 (.004)	.034 (.004)	.034 (.004)	.035 (.003)	.035 (.004)	.035 (.004)	.037 (.004)	.038 (.004)
1983 T1	.525 (.039)	.501 (.039)	.403 (.037)	.350 (.041)	1.397 (.043)	1.076 (.037)	.553 (.022)	.491 (.022)
WT1	.494 (.038)	.470 (.037)	.371 (.036)	.316 (.039)	1.364 (.040)	1.043 (.034)	.519 (.021)	.455 (.020)
BT1	.031 (.005)	.031 (.004)	.032 (.004)	.034 (.004)	.032 (.005)	.032 (.005)	.034 (.005)	.036 (.005)
1984 T1	.495 (.019)	.469 (.019)	.374 (.018)	.319 (.016)	1.428 (.042)	1.051 (.034)	.539 (.020)	.481 (.019)
WT1	.462 (.017)	.437 (.017)	.340 (.019)	.286 (.013)	1.394 (.042)	1.018 (.034)	.504 (.019)	.445 (.018)
BT1	.033 (.004)	.033 (.004)	.033 (.004)	.034 (.003)	.034 (.004)	.034 (.004)	.035 (.004)	.036 (.003)
1985 T1	.521 (.030)	.498 (.030)	.404 (.028)	.353 (.028)	1.412 (.042)	1.079 (.038)	.548 (.022)	.494 (.021)
WT1	.493 (.032)	.470 (.032)	.374 (.030)	.323 (.031)	1.383 (.043)	1.050 (.038)	.516 (.021)	.461 (.021)
BT1	.028 (.004)	.029 (.004)	.030 (.004)	.031 (.003)	.029 (.004)	.030 (.004)	.032 (.004)	.033 (.003)
1986 T1	.519 (.023)	.500 (.023)	.401 (.022)	.350 (.021)	1.434 (.042)	1.118 (.037)	.558 (.021)	.508 (.020)
WT1	.495 (.023)	.475 (.023)	.374 (.021)	.322 (.020)	1.408 (.043)	1.092 (.036)	.529 (.021)	.478 (.018)
BT1	.024 (.003)	.024 (.003)	.027 (.003)	.028 (.003)	.026 (.003)	.026 (.003)	.029 (.003)	.030 (.003)
1987 T1	.518 (.022)	.498 (.023)	.399 (.021)	.347 (.020)	1.442 (.041)	1.139 (.037)	.553 (.020)	.501 (.019)
WT1	.499 (.023)	.478 (.023)	.377 (.022)	.323 (.021)	1.421 (.041)	1.118 (.036)	.528 (.020)	.476 (.019)
BT1	.019 (.003)	.019 (.003)	.023 (.003)	.024 (.003)	.021 (.003)	.021 (.003)	.024 (.003)	.025 (.003)
1988 T1	.559 (.044)	.541 (.044)	.439 (.042)	.398 (.046)	1.430 (.043)	1.157 (.038)	.564 (.024)	.525 (.024)
WT1	.536 (.043)	.517 (.043)	.412 (.041)	.369 (.044)	1.406 (.043)	1.132 (.038)	.536 (.021)	.493 (.022)
BT1	.023 (.005)	.023 (.005)	.026 (.005)	.030 (.005)	.025 (.005)	.025 (.005)	.028 (.005)	.032 (.005)
1989 T1	.586 (.044)	.566 (.044)	.460 (.042)	.420 (.045)	1.500 (.047)	1.194 (.041)	.560 (.023)	.520 (.023)
WT1	.561 (.045)	.541 (.045)	.433 (.043)	.391 (.046)	1.473 (.046)	1.166 (.040)	.529 (.023)	.488 (.023)
BT1	.027 (.005)	.026 (.005)	.028 (.004)	.029 (.004)	.028 (.005)	.028 (.005)	.030 (.004)	.032 (.005)
1990 T1	.574 (.030)	.554 (.030)	.443 (.029)	.391 (.024)	1.557 (.046)	1.246 (.041)	.582 (.022)	.555 (.022)
WT1	.492 (.027)	.473 (.026)	.376 (.025)	.325 (.021)	1.465 (.044)	1.155 (.039)	.507 (.020)	.481 (.020)
BT1	.081 (.006)	.081 (.006)	.067 (.005)	.066 (.005)	.092 (.008)	.092 (.008)	.075 (.006)	.074 (.005)
1991 T1	.551 (.017)	.532 (.017)	.411 (.015)	.378 (.013)	1.601 (.048)	1.322 (.043)	.560 (.018)	.620 (.024)
WT1	.463 (.015)	.445 (.015)	.339 (.018)	.308 (.012)	1.501 (.047)	1.224 (.041)	.479 (.018)	.544 (.024)
BT1	.088 (.006)	.088 (.006)	.072 (.004)	.069 (.004)	.099 (.007)	.098 (.007)	.080 (.005)	.077 (.005)

Table 2: Hypothesis Tests for Overall Inequality, Comparisons across Income Definitions

	Theil 1						**Theil 2**					
	Y-YP	***Y-YPS***	***Y-YN***	***YP-YPS***	***YP-YN***	***YPS-YN***	***Y-YP***	***Y-YPS***	***Y-YN***	***YP-YPS***	***YP-YN***	***YPS-YN***
1981	.024	.122	.181	.098	.157	.059	.299	.876	.942	.577	.643	.066
s.e.	.054	.053	.056	.053	.055	.054	.051	.041	.042	.041	.038	.028
p	.274	.006	.000	.028	.000	.130	.000	.000	.000	.000	.000	.014
1982	.026	.122	.188	.096	.163	.067	.351	.900	.971	.549	.450	.070
s.e.	.033	.033	.033	.032	.034	.031	.046	.042	.040	.035	.036	.023
p	.182	.000	.000	.002	.000	.026	.000	.000	.000	.000	.000	.002
1983	.024	.123	.176	.099	.151	.053	.321	.843	.906	.522	.584	.062
s.e.	.059	.054	.055	.055	.058	.058	.051	.042	.042	.038	.038	.029
p	.326	.006	.000	.048	.006	.170	.000	.000	.000	.000	.000	.018
1984	.025	.121	.175	.096	.150	.054	.376	.889	.947	.539	.571	.058
s.e.	.021	.019	.018	.020	.018	.017	.046	.041	.038	.034	.035	.022
p	.116	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002
1985	.023	.117	.168	.094	.145	.051	.333	.548	.918	.531	.585	.054
s.e.	.036	.035	.034	.035	.034	.034	.050	.041	.040	.037	.036	.025
p	.240	.000	.000	.008	.000	.054	.000	.000	.000	.000	.000	.020
1986	.019	.118	.169	.099	.150	.051	.316	.876	.926	.559	.609	.050
s.e.	.025	.025	.025	.026	.026	.024	.052	.039	.042	.035	.035	.024
p	.184	.000	.000	.000	.000	.014	.000	.000	.000	.000	.000	.024
1987	.020	.119	.171	.099	.151	.052	.303	.889	.940	.586	.637	.051
s.e.	.026	.025	.025	.025	.025	.024	.047	.039	.041	.035	.037	.023
p	.208	.000	.000	.000	.000	.012	.000	.000	.000	.000	.000	.010
1988	.018	.120	.161	.102	.143	.041	.273	.866	.905	.593	.632	.039
s.e.	.059	.066	.069	.065	.068	.066	.053	.045	.046	.043	.044	.032
p	.344	.028	.016	.044	.022	.252	.000	.000	.000	.000	.000	.106
1989	.020	.126	.166	.106	.146	.040	.307	.941	.980	.634	.674	.040
s.e.	.051	.050	.050	.047	.053	.049	.054	.047	.044	.042	.042	.029
p	.344	.006	.000	.012	.004	.222	.000	.000	.000	.000	.000	.072
1990	.020	.131	.182	.111	.163	.052	.311	.975	1.002	.665	.691	.027
s.e.	.037	.034	.032	.034	.032	.031	.053	.045	.044	.039	.041	.025
p	.332	.000	.000	.006	.000	.056	.000	.000	.000	.000	.000	.124
1991	.019	.140	.173	.121	.154	.033	.279	1.041	.981	.762	.702	-.061
s.e.	.021	.020	.019	.021	.019	.017	.055	.045	.050	.042	.041	.027
p	.170	.000	.000	.000	.000	.014	.000	.000	.000	.000	.000	.950

Table 3: Hypothesis Tests for Theil 1, Comparisons across Income Definitions

	Between Group						Within Group					
	Y-YP	*Y-YPS*	*Y-YN*	*YP-YPS*	*YP-YN*	*YPS-YN*	*Y-YP*	*Y-YPS*	*Y-YN*	*YP-YPS*	*YP-YN*	*YPS-YN*
1981	.000	.000	-.001	.000	-.001	-.001	.024	.122	.181	.098	.157	.059
s.e.	.005	.005	.005	.005	.005	.004	.055	.054	.057	.053	.056	.055
p	.508	.460	.554	.478	.520	.576	.272	.006	.002	.028	.002	.136
1982	.000	.000	-.001	.001	-.001	-.001	.026	.122	.190	.096	.164	.068
s.e.	.004	.004	.004	.004	.004	.004	.031	.031	.030	.031	.032	.029
p	.468	.548	.604	.522	.590	.552	.184	.000	.000	.002	.000	.010
1983	.000	-.001	-.003	-.001	-.003	-.002	.024	.123	.178	.099	.154	.055
s.e.	.005	.005	.004	.004	.005	.004	.056	.051	.052	.052	.055	.055
p	.446	.556	.644	.586	.714	.630	.324	.002	.000	.038	.006	.144
1984	.000	.000	-.001	.000	-.001	-.001	.025	.122	.176	.097	.151	.054
s.e.	.004	.004	.004	.004	.003	.003	.020	.018	.017	.019	.017	.016
p	.542	.544	.662	.552	.634	.542	.086	.000	.000	.000	.000	.000
1985	-.001	-.002	-.003	-.001	-.002	-.001	.023	.119	.170	.096	.147	.051
s.e.	.004	.004	.004	.004	.004	.004	.036	.035	.034	.036	.034	.034
p	.490	.636	.716	.646	.662	.532	.238	.000	.000	.006	.000	.054
1986	.000	-.003	-.004	-.003	-.004	-.001	.020	.121	.173	.101	.153	.052
s.e.	.004	.004	.003	.004	.004	.003	.025	.025	.025	.026	.026	.024
p	.514	.740	.788	.738	.748	.526	.182	.000	.000	.000	.000	.014
1987	.000	-.004	-.005	-.004	-.005	-.001	.021	.122	.176	.101	.155	.054
s.e.	.003	.003	.003	.003	.003	.003	.026	.025	.026	.025	.026	.024
p	.524	.826	.820	.792	.850	.650	.206	.000	.000	.000	.000	.012
1988	.001	-.003	-.007	-.003	-.007	-.004	.019	.124	.167	.105	.148	.043
s.e.	.005	.005	.005	.005	.005	.005	.056	.062	.066	.061	.064	.062
p	.490	.660	.838	.700	.840	.730	.334	.020	.012	.030	.018	.226
1989	.001	-.001	-.002	-.002	-.003	-.001	.020	.128	.170	.108	.150	.042
s.e.	.004	.004	.004	.004	.004	.004	.049	.048	.049	.045	.052	.047
p	.532	.678	.802	.644	.780	.664	.330	.002	.000	.004	.002	.198
1990	.000	.014	.015	.014	.015	.001	.019	.116	.167	.097	.148	.051
s.e.	.007	.007	.006	.007	.006	.006	.033	.032	.029	.031	.029	.028
p	.508	.012	.014	.024	.010	.502	.308	.000	.000	.006	.000	.038
1991	.000	.016	.019	.016	.019	.003	.018	.124	.155	.106	.137	.031
s.e.	.007	.006	.006	.006	.006	.005	.019	.017	.017	.019	.017	.015
p	.480	.004	.002	.004	.006	.388	.134	.000	.000	.000	.000	.080