

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Economic Transfers in the United States

Volume Author/Editor: Marilyn Moon, ed.

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-53505-3

Volume URL: <http://www.nber.org/books/moon84-1>

Publication Date: 1984

Chapter Title: The Role of Income Transfers in Reducing Inequality between and within Regions

Chapter Author: David Betson, Robert Haveman

Chapter URL: <http://www.nber.org/chapters/c8811>

Chapter pages in book: (p. 283 - 326)

8 The Role of Income Transfers in Reducing Inequality between and within Regions

David Betson and Robert Haveman

8.1 Introduction

Convergence of per capita or per household income among states or regions in the postwar period is well known (see U.S. Department of Commerce 1978, 1981; Hanna 1957). Income growth rates in the South and the Southwest—the Sun Belt—have exceeded those in the older and richer northern and New England states—the Snow Belt. Traditionally northern industries such as textiles and furniture have migrated to the southern states while new technology industries have concentrated their growth in the South and the Southwest.

This narrowing of regional inequality has occurred simultaneously with two other postwar phenomena—an exceptionally rapid increase in public income transfers and the essential stability of the degree of inequality in the overall distribution of post-transfer income (see Danziger, Haveman, and Plotnick 1981). In this paper, we will explore the anatomy of the regional convergence of incomes and relate this convergence to the high and stubborn level of overall income inequality. In addition, we will explore the pattern of within-region inequality among the regions. The primary questions we will ask and attempt to answer are:

1. What role have income transfers played in the observed reduction of income inequality among regions of the country?
2. Which regions display the greatest income inequality, and for which regions has the inequality within the region changed the most over time?

David Betson is a professor of economics at the University of Notre Dame; and Robert Haveman is professor of economics at the University of Wisconsin, Madison.

This research was supported in part by funds granted to the Institute for Research on Poverty by the U.S. Department of Health and Human Services under the provisions of the Economic Opportunity Act of 1964. The authors wish to thank Lyle Nelson for his research assistance, and Luise Cunliffe for the preparation of the various data tapes.

3. To what extent have income transfers offset the high and growing inequality in the distribution of market income within regions?

4. In which regions have income transfers been used most effectively in reducing market income inequality?

5. What factors determine the impact of transfers in reducing inequality within states and regions?

The focus of this paper is on individual regions and differences among them. This focus deserves comment. What is there about regional groupings of people that makes them a relevant unit of analysis? While analyses of differences in average incomes or income inequality among racial groups or age groups are common fare and require little defense, studies of regional differences in average income or inequality are often viewed as suspect and artificial. What makes such studies worthwhile?¹

To be sure, individual members of racial or age groupings are inexorably identified with their group; membership in these clubs is not voluntary. Such is not the case with regions. Those not pleased with the opportunities implied by the average incomes or the income inequality in their current location are, in principle at least, free to choose another. While migration costs do exist and provide some rationale for focusing on regional groupings, immobility cannot be relied on as the sole basis for regional analysis; nor can the proposition that individuals view others in their region as a more accurate comparison group than members of their race or age cohort.

Our defense for analyzing income and inequality differences among regions, and the impact of income transfers on these differences, is a straightforward one. For whatever reason, people are interested in differences in regional performance; in whether the South is poorer or growing more rapidly than the North. Perhaps this reflects a view that a viable federalism requires that the variance in economic performance among regions be minimized. Perhaps it only reflects interest in the outcome of the competitive process that exists among states or regions in a federal system.

While this interest in regional performance exists generally among the population, it is apparently magnified among national policymakers. Legislative measures are typically designed with regional equity as an explicit objective, and congressional requests for analysis of regional impact are common. Indeed, in many legislative measures, considerations of regional performance form the primary bases for the allocation of funds. Revenue sharing is an important example. And in those measures the indicators of regional performance used are precisely those of this study: differences in average income among regions, differences in regional income growth, and differences in inequality among regions (as indicated by regional unemployment rates or regional rates of poverty incidence). Our regionally based measurements and estimates are designed to meet this interest.

8.2 Income Transfers and Their Growth, 1965–81

Public spending on income transfers is large and has grown rapidly in recent years as new programs have been enacted, benefit levels in existing programs have been increased, and eligibility requirements have been loosened. In 1981 expenditures on these programs are estimated to reach almost \$300 billion, an amount that is about 10 percent of the Gross National Product.

Table 8.1 lists the major income transfer programs and shows their expenditures for 1965 and 1979 and estimates for 1981. These programs are divided into two types: social insurance and public assistance. Within

Table 8.1 Expenditures on Major Income Transfer Programs

	Date Enacted	Public Expenditures (billions of current dollars)		
		1965	1979	1981 (estimate)
Social insurance				
Cash benefits:				
Social Security (OASDI)	1935	\$16.5	\$102.6	\$137.0
Unemployment insurance	1935	2.5	11.2	18.7
Workers' compensation	1908	1.8	9.9	14.8
Veterans' disability compensation	1917	2.2	6.8	7.5
Railroad retirement	1937	1.1	4.3	5.2
Black lung	1969	NE	0.6	0.9
In-kind benefits:				
Medicare	1965	NE	29.1	38.4
Public assistance (welfare)				
Cash benefits:				
Aid to Families with Dependent Children (AFDC)				
Children (AFDC)	1935	1.7	10.8	12.8
Supplemental Security Income (SSI) ^a	1972	2.7	6.8	8.5
Veterans' pensions	1933	1.9	3.6	4.1
General assistance	NA	0.4	1.2	1.5
In-kind benefits:				
Medicaid ^b	1965	0.5	21.8	27.6
Food Stamps	1964	0.04	6.8	9.7
Housing assistance	1937	0.3	4.4	6.6
Total expenditures		\$31.6	\$219.9	\$293.3
Total expenditures as a percentage of GNP		4.6	9.1	10.0

SOURCES: *The Budget of the United States Government, Fiscal Year, 1981*, and its appendix for 1979 and 1981 estimates. Plotnick and Skidmore (1975) for 1965 data. Social insurance programs condition benefits on contributions based on previous employment; public assistance programs condition benefits on current income and assets (means-tested).

NA = not applicable, varies by states.

NE = nonexistent.

^aAid to the Blind, Aid to the Permanently and Totally Disabled, and Old Age Assistance in 1965.

^bMedical Aid to the Aged in 1965.

each category are programs providing cash income and others providing in-kind benefits.

The programs have two basic objectives—replacing income losses from events that are largely outside an individual's control, and assuring a minimum level of economic support to those who have little other income. The first objective is largely served by social insurance programs for which eligibility and benefit levels depend on past contributions and some identifiable problem, such as old age, death of spouse, illness, disability, or unemployment. One does not have to prove financial need to claim benefits. Social insurance accounts for nearly three-quarters of the expenditures.

The second objective is served by the public assistance (welfare) programs for which inadequate economic means is the chief eligibility criterion. Receipt of welfare benefits is not conditioned on past contributions. Benefits are asset- and income-tested—they vary inversely with income from private sources and social insurance.

These income transfer programs have grown rapidly in recent years with expenditures increasing from 4.6 percent of GNP in 1965 to 10.0 percent in 1981. Table 8.2 shows the increase in both the number of beneficiaries of the cash transfer programs and the size of the average benefit and compares this growth with that of census money income. In 1965, 37 percent of all households received a cash transfer; by 1978, 42 percent were recipients. The last column shows that the average transfer for recipient households increased by 55.3 percent, while census money income increased by only 20 percent.

Given the targeting of income transfers on those experiencing income losses and those without adequate economic means, the growth in these expenditures would be expected to have narrowed income differences in a wide variety of dimensions. In this paper we will focus on two—income differences *within* regions (states) and income differences *among* regions (states).

8.3 Cash Transfers and Inter- and Intrastate Income Differentials—A Static View

Although the convergence of average state incomes has been well documented, substantial differences in average household incomes still exist among states. Table 8.3 presents the mean household income by four different income concepts in 1975 for the fifty states and the District of Columbia. The four income concepts are:

Y_1 = Cash income from wages, salaries, rents, dividends, interests, and miscellaneous sources (i.e., “market income”).

Y_2 = Y_1 plus social insurance income.

Y_3 = Y_2 plus welfare income (i.e., “post-transfer income”).

Y_4 = Y_3 minus taxes paid (i.e., “post-tax, post-transfer income”).²

Table 8.2 Cash Income Transfers and Census Money Income of Households^a in Constant 1978 Dollars, 1965 and 1978

	1965		1978		1965–78
	Mean for Recipient Households	Percent of Households Receiving	Mean for Recipient Households	Percent of Households Receiving	Real Growth of Mean
Social Security and railroad retirement	\$ 2407	22%	\$ 3747	26%	55.7%
Public assistance ^b	2006	5	2079	8	3.6
Other cash government transfers ^c	1801	18	2973	17	65.1
One or more cash transfers ^d	2532	37	3931	42	55.3
Total census money income	13767	—	16518	—	20.0
Cash transfers as a percentage of money income	6.8%	—	10.0%	—	—

SOURCE: Computations by authors from 1966 Survey of Economic Opportunity and March 1979 Current Population Survey.

^aHouseholds include families and unrelated individuals. The programs represented here differ from those in table 8.1. The Census does not gather data on in-kind transfers, nor does it disaggregate cash transfers by program to the extent shown in table 8.1.

^bIncludes Aid to Families with Dependent Children, Supplemental Security Income (Old Age Assistance, Aid to the Blind, and Aid to the Permanently and Totally Disabled in 1965), and General Assistance.

^cIncludes unemployment compensation, workers' compensation, government employee pensions, and veterans' pensions and compensation.

^dThe mean value in this row exceeds the mean for any individual category, and the percentage receiving one or more transfer is lower than the sum of rows 1–3, because some households receive more than one transfer.

Table 8.3 Mean State Household Income—1975

	Number of Households (in 1000)	Mean Income of State			
		Y_1	Y_2	Y_3	Y_4
Northeast	17458	13716	14994	15318	11997
1 ME	384.	10949.	12096.	12343.	10115.
2 NH	295.	12850.	14033.	14218.	11672.
3 VT	170.	11276.	12332.	12658.	10081.
4 MA	2083.	13736.	14966.	15246.	11864.
5 RI	329.	12497.	13844.	14110.	11288.
6 CT	1092.	15519.	16770.	16988.	13496.
7 NY	6699.	13564.	14787.	15175.	11535.
8 NJ	2438.	15487.	16777.	17067.	13690.
9 PA	4058.	12932.	14350.	14660.	11746.
Northcentral	19798	13854	14998	15245	12008
10 OH	3620.	13702.	14866.	15092.	12129.
11 IN	1827.	13688.	14790.	14962.	11917.
12 IL	3837.	14875.	15988.	16287.	12674.
13 MI	3085.	14157.	15447.	15769.	12419.
14 WI	1554.	14103.	15282.	15519.	11879.
15 MN	1340.	13788.	14891.	15113.	11548.
16 IA	1005.	13570.	14688.	14876.	11695.
17 MO	1730.	12111.	13216.	13476.	10792.
18 ND	209.	13822.	14783.	14945.	11763.
19 SD	226.	11951.	12900.	13128.	10902.
20 NB	549.	13426.	14384.	14576.	11553.
21 KS	816.	13457.	14549.	14695.	11643.
South	23847	12252	13269	13568	10890
22 DE	194.	15050.	16124.	16330.	12334.
23 MD	1385.	16874.	17771.	17981.	13516.
24 DC	287.	14609.	15335.	15725.	11361.
25 VA	1709.	14533.	15415.	15622.	12107.
26 WV	643.	10641.	12417.	12725.	10482.
27 NC	1862.	11554.	12463.	12795.	10103.
28 SC	896.	11541.	12500.	12830.	10338.
29 GA	1675.	11792.	12590.	13098.	10536.
30 FL	3241.	11881.	13309.	13561.	11223.
31 KY	1157.	10860.	12080.	12418.	10081.
32 TN	1460.	11174.	12196.	12489.	10281.
33 AL	1242.	10928.	11968.	12295.	9978.
34 MS	762.	9848.	10749.	11279.	9327.
35 AR	757.	9990.	11094.	11414.	9419.
36 LA	1225.	12018.	12900.	13313.	10803.
37 OK	996.	12105.	13103.	13368.	10563.
38 TX	4356.	12765.	13564.	13807.	11191.

Table 8.3 (continued)

	Number of Households (in 1000)	Mean Income of State			
		Y_1	Y_2	Y_3	Y_4
West	13851	14303	15342	15641	12054
39 MT	258.	13026.	14103.	14319.	11184.
40 ID	281.	12828.	13874.	14097.	11075.
41 WY	131.	14593.	15467.	15629.	12585.
42 CO	928.	14527.	15295.	15475.	11896.
43 NM	384.	12424.	13341.	13696.	11078.
44 AZ	803.	13096.	14252.	14483.	11400.
45 UT	382.	13779.	14684.	14910.	11816.
46 NV	224.	14756.	15651.	15847.	12602.
47 WA	1286.	14028.	15174.	15382.	12402.
48 OR	863.	12926.	14123.	14320.	11031.
49 CA	7943.	14556.	15608.	15961.	12160.
50 AK	111.	23407.	23916.	24234.	17055.
51 HA	257.	17444.	18404.	18833.	13905.
Total	75044.	13395.	14511.	14002.	11659.

The data in table 8.3 contain a number of patterns. First, for market income (Y_1), the gap between the highest and lowest state is substantial—\$9848 (Mississippi) to \$23,407 (Alaska). The ratio of the highest to the lowest is 2.4. For census income (Y_3), the gap is smaller—\$11,279 (Mississippi) to \$24,234 (Alaska)—and the ratio of the highest to the lowest falls to 2.1. Because of income transfers, the ratio is reduced by about 15 percent. When taxes are accounted for as well, the gap again narrows—from \$9327 (Mississippi) to \$17,065 (Alaska)—and the ratio of the highest to the lowest falls to 1.8. At a point in time, the tax-transfer system makes an important contribution to narrowing the regional disparity in average household incomes.

The above numbers document the substantial regional disparities in average incomes that still exist. Related questions concern the extent to which these disparities contribute to total inequality in the nation, and the role of the tax-transfer system in reducing these regional differentials. One measure of inequality that can be decomposed into a measure of inequality among states and inequality within the states is the Theil measure of income inequality (see appendix B for a description of the Theil index and its decomposition). Indeed, the Theil index of total inequality among households in the nation (T_T) has two components—the level of Theil inequality in per household income among regions (T_A) and the average level of Theil inequality in per household income within regions (T_W). Thus,

$$(1) \quad T_T = T_A + T_W.$$

Table 8.4 Theil Indices of Inequality for the Four Income Concepts, 1975

	Y_1	Y_2	Y_3	Y_4
T_w	.974	.531	.291	.220
T_A	.006	.005	.004	.003
T_T	.979	.536	.296	.223

For 1975 the total level of household income inequality (T_T) and its two components (T_A and T_w) are shown in table 8.4 for the four income concepts. Several patterns are clear in this table:

1. The major component of total inequality among households (T_T) for all of the income concepts is inequality among households within states (T_w) rather than inequality in mean household income among the states (T_A). For Y_1 , T_A accounts for only about .7 percent of T_T ; for Y_4 , T_A accounts for about 1.3 percent of T_T . If all differences in average incomes among states were eliminated while the level of inequality among households within states was left untouched, total inequality among households in the nation would decrease by less than 2 percent.

2. At a point in time, 1975, transfers cause a decrease in T_A inequality—from .006 to .004, a decrease of 23 percent. Transfers have a substantially larger effect on T_w —a decrease from .97 to .29, or 70 percent. For T_T , total income inequality, transfers effected a reduction of 69 percent. The tax-transfer system accounted for a reduction of 77 percent in T_w , 48 percent in T_A , and 77 percent in T_T .

Analogous to the question of inequality in the average income per household among the states is the question of the extent to which the states are similar to each other in terms of the level of income inequality within each state. Table 8.5 presents the pattern of inequality within states for all of the states. The four income concepts used in measuring this gap between the rich and poor within states are the Y_1 , Y_2 , Y_3 , and Y_4 concepts, and the Theil index within states is the indicator of inequality.

As with mean household income differences, states also differ substantially in terms of within state inequality. States in the South generally have the most substantial inequality, with the Northcentral region displaying the smallest gap between rich and poor. For market incomes (Y_1), the ratio of the most unequal distribution of income (Mississippi) to the least unequal (Wisconsin) is 2.2. For post-transfer income (Y_3), the disparity among states in terms of within-state inequality falls substantially, and the ratio of the most unequal to the least unequal decreases to 1.3. When taxes are accounted for, all states have even less within-state inequality. However, the ratio of the most unequal to the least unequal rises slightly to 1.4. Overall one can conclude that the tax-transfer system not only dramatically reduces the overall level of inequality within states, but also reduces the dispersion in within-state inequality. That is, the

Table 8.5 Theil Indices of Income Inequality Within States—1975

	Y_1	Y_2	Y_3	Y_4
Northeast	1.072	.608	.296	.223
1 ME	.970	.468	.286	.221
2 NH	.772	.408	.266	.214
3 VT	.947	.509	.292	.220
4 MA	.949	.549	.284	.216
5 RI	1.143	.546	.297	.227
6 CT	.844	.512	.307	.239
7 NY	1.225	.705	.307	.221
8 NJ	.919	.544	.282	.220
9 PA	1.058	.571	.281	.217
Northcentral	.888	.486	.278	.209
10 OH	.873	.458	.258	.198
11 IN	.775	.381	.263	.200
12 IL	1.021	.620	.296	.223
13 MI	.915	.540	.267	.204
14 WI	.697	.401	.260	.186
15 MN	.781	.421	.271	.196
16 IA	.789	.407	.284	.214
17 MO	1.102	.508	.303	.230
18 ND	.758	.404	.304	.230
19 SD	.815	.394	.287	.230
20 NB	.811	.418	.295	.224
21 KS	.750	.385	.276	.207
South	1.042	.531	.306	.235
22 DE	.822	.463	.280	.204
23 MD	.760	.482	.292	.222
24 DC	1.066	.690	.368	.256
25 VA	.763	.419	.285	.216
26 WV	1.301	.562	.277	.213
27 NC	.908	.477	.280	.206
28 SC	.999	.487	.261	.199
29 GA	1.221	.626	.288	.218
30 FL	.983	.498	.311	.247
31 KY	1.142	.569	.320	.250
32 TN	1.093	.518	.291	.228
33 AL	1.336	.613	.318	.247
34 MS	1.516	.655	.317	.246
35 AR	1.252	.503	.294	.227
36 LA	1.232	.669	.334	.262
37 OK	1.176	.553	.341	.249
38 TX	.878	.475	.295	.230

Table 8.5 (continued)

	Y_1	Y_2	Y_2	Y_4
West	.876	.575	.297	.216
39 MT	.799	.400	.283	.209
40 ID	.730	.388	.264	.195
41 WY	.690	.380	.279	.220
42 CO	.702	.429	.284	.216
43 NM	1.072	.589	.305	.233
44 AZ	.858	.465	.296	.227
45 UT	.730	.405	.270	.207
46 NV	.738	.419	.294	.229
47 WA	.796	.460	.284	.221
48 OR	.817	.430	.284	.208
49 CA	.933	.560	.301	.213
50 AK	.534	.430	.310	.226
51 HA	.784	.549	.294	.215

SOURCE: Calculations by authors from 1976 Survey of Income and Education.

tax-transfer system not only reduces the Theil index within all states, but it also tends to make states more similar in their levels of inequality.³

We have discussed how the tax-transfer system has affected the differences among states in two separate dimensions: average state income and the degree of within-state inequality. To bring together these two dimensions of regional inequality at a point in time, we have defined an indicator of the differences among states, which is the sum of the relative variation in these two dimensions. This indicator is based on the relative variance among states in each of the two dimensions. This summary index of income and inequality differences across states, RV_T , can be used to describe the overall role of transfers in the convergence of states—the convergence in average incomes among states ($RV_{\bar{Y}}$) and the convergence of within-state inequality (RV_{IN}).⁴ In table 8.6, we present RV_T along with its components for the four income concepts as computed from the 1975 Survey of Income and Education (SIE).

Table 8.6 Measures of Differences Among States, 1975

Income Concept	$RV_{\bar{Y}}$	RV_{IN}	RV_T
Y_1	.012	.031	.042
Y_2	.010	.027	.037
Y_3	.009	.004	.013
Y_4	.007	.005	.011

SOURCE: Computed by authors from the Survey of Income and Education, 1975.

Several interesting patterns emerge from the measures of the differences among states shown in table 8.6. First, when market income (Y_1) is used as the basis of comparison, the relative dissimilarity among states is caused primarily by differences in within-state inequality. But when transfers are accounted for (Y_3), the index of overall differences among states falls by 68 percent, primarily because of a dramatic fall in the component of the index attributable to inequality within states (RV_{IN}). Further, when Y_3 is the income concept used as the basis of comparison, relative dissimilarity in within-state inequality (RV_{IN}) is reduced to one-half the magnitude of $RV_{\bar{Y}}$. When income before transfers (Y_1) is the income concept used, RV_{IN} is three times $RV_{\bar{Y}}$. Second, after adding in the effect of taxes (Y_4), we see that states become even more similar, but the effect is not as dramatic as the effect of transfers. In summary, the measures of differences among states presented in table 8.6 suggest that the tax-transfer system does have a dramatic effect in reducing differences among states. This effect is primarily the result of the reduction of the dissimilarity among states in within-state income inequality.

These statistics, then, suggest a major role of income transfers and taxes in decreasing observed income inequality at a point in time. For 1975, the tax-transfer system reduced inequality in all the dimensions on which we are focusing: (1) among households in the nation (T_T), (2) among households within states (T_W), and (3) among states (T_A). Income transfers have decreased income inequality within states relatively more than they have decreased the inequality in average household income among the states. RV_{IN} falls from .031 to .004 in moving from Y_1 to Y_3 —a decrease of 87 percent. $RV_{\bar{Y}}$, however, drops from .012 to .009, a decrease of 19 percent. Transfers have caused states to be more alike in terms of the rich-poor disparity within states (RV_{IN}) than in terms of mean income differences among them. This suggests that the often noted convergence in regional incomes is caused in part by the growth in transfers, but that other factors have also played an important role. To answer this question more completely, changes in T_T inequality over time need to be decomposed.

8.4 Income Transfers and Intra- and Interstate Income Differences—A View across Time

Growing income transfers can affect inequality over time in a variety of ways. In this section we will try to identify the impact of the transfer system on a number of inequality measures over time. In particular, to what extent have transfers contributed to changes in:

1. inequality in household incomes within states (T_W) over time?
2. inequality in mean household income among states (T_A) over time?
3. inequality in household incomes within the nation (T_T) over time?
4. inequality in the rich-poor gap among states (RV_{IN}) over time?

Table 8.7 Theil Indices of Inequality within Regions (T_w), Inequality among Regions, (T_A), and Total Inequality (T_T) for Y_1 and Y_3 , 1967–79

Year	Y_1			Y_3		
	T_w	T_A	T_T	T_w	T_A	T_T
1967	.959	.008	.967	.348	.007	.355
1968	.916	.007	.924	.333	.006	.339
1969	.910	.007	.917	.336	.006	.342
1970	.996	.006	1.002	.350	.006	.356
1971	1.034	.006	1.040	.348	.005	.353
1972	1.052	.006	1.058	.349	.005	.354
1973	1.063	.005	1.069	.338	.004	.342
1974	1.100	.005	1.105	.337	.004	.341
1975	1.099	.005	1.104	.333	.004	.337
1976	1.099	.006	1.105	.332	.005	.336
1977	1.099	.005	1.104	.332	.004	.336
1978	1.049	.004	1.053	.335	.003	.339
1979	1.017	.004	1.022	.341	.003	.344

SOURCE: Calculations by authors from 1968–80 Current Population Surveys.

Table 8.7 presents Theil indexes for the years 1967–79 based on micro-data from the Current Population Surveys for 1968–80, with states aggregated to twenty regions. The indices for Y_1 and Y_3 are shown. Several patterns are of interest:

1. Total inequality in market income (T_T for Y_1) *increased* from 1967 to 1979 from .967 to 1.022. Its pattern was somewhat irregular—declining during the 1960s, increasing steadily until the mid-1970s, and falling in 1978 and 1979.

2. Total inequality in census money income (T_T for Y_3) was nearly constant at about .35, although a smaller negative trend can be observed, at least until 1977. Hence, the increasing inequality in market income is not observed for post-transfer income. Transfers contributed to this difference.

3. Inequality in market income among households within regions (T_w for Y_1) increased markedly from .959 to 1.017 from 1967 to 1979. The distribution of census money income within regions (T_w for Y_3) stayed approximately constant at about .34, again implying a strong offsetting role for income transfers.

4. Inequality in average household income among regions (T_A) decreased substantially from 1967 to 1979, irrespective of the income concept chosen. For market income (Y_1), a measure largely unaffected by transfers, the decrease was from .0080 to .0044, a decrease of 46 percent. For post-transfer income (Y_3), the decrease was from .0070 to .0035—a 50 percent reduction. Transfers have contributed little if anything to the convergence among states over time in average incomes.

The role of transfers in decreasing aggregate income inequality among households at a point in time (T_T) has increased over time. This is shown in table 8.8 in both absolute (column 1) and relative (column 2) terms. In absolute terms, income transfers reduced the aggregate Theil index among households in the nation (T_T) by about .6 points in the late 1960s. By the late 1970s, this impact had grown to about .7 points. In percentage terms, transfers reduced pretransfer inequality by about 63 percent in the late 1960s; by the late 1970s, this had increased to about 68 percent. The reason for this increased impact of transfers is shown in columns 3 and 4 of table 8.8. The percent of households receiving transfers increased from 34 to 43 percent from 1967 to 1979. During the same period, transfers as a percent of total census income rose from 6.2 to 8 percent.

The contribution of transfers to the reduction in overall regional differences is shown in table 8.9. The impact indicators shown are for (1) the absolute and percentage impact of transfers on the relative variance of average household income among regions ($RV_{\bar{Y}}$), (2) the absolute and percentage impact on the relative variance of within-region inequality among regions (RV_{IN}), and (3) the summary indicator of income and inequality differences among regions (RV_T). In column 4, transfers are seen to have reduced the relative variance of mean incomes among states by between 9 and 20 percent. This effect has been growing over time. In column 5, the impact of transfers on the reduction of the relative variance

Table 8.8 **Impact of Transfers on Total Inequality and the Growth of Transfers, 1967-79**

Year	Absolute Impact of Transfers on Total Inequality ($T_{TY_1} - T_{TY_3}$)	Percentage Impact of Transfers on Total Inequality $[(T_{TY_1} - T_{TY_3})/T_{TY_1}]$	Percent of Households Receiving Transfers	Percent of Y_1 Which is Transfer Income
1967	.613	63.4	34.1	6.2
1968	.584	63.3	35.2	6.5
1969	.575	62.7	36.2	6.3
1970	.646	64.5	39.4	7.2
1971	.687	66.0	40.4	8.0
1972	.704	66.6	30.6	8.2
1973	.727	68.0	40.2	8.5
1974	.764	69.1	43.1	9.5
1975	.767	69.5	45.7	9.2
1976	.769	69.6	44.1	8.9
1977	.768	69.6	42.5	8.5
1978	.714	67.8	42.1	8.2
1979	.678	66.3	43.0	8.0

SOURCE: Calculations by authors from the 1968-80 Current Population Surveys.

Table 8.9 Overall Differences among States and the Percentage Impact of Transfers on These Differences, 1967–79

Year	Differences among States in Y_1			Percentage Reduction in Differences Attributable to Transfers		
	$RV_{\bar{Y}}$	RV_{IN}	RV_T	$RV_{\bar{Y}}$	RV_{IN}	RV_T
1967	.015	.021	.036	11.3	48.3	32.8
1968	.014	.021	.035	11.4	62.2	42.3
1969	.013	.025	.038	11.4	41.1	30.9
1970	.012	.019	.031	9.1	34.2	24.7
1971	.011	.015	.026	11.6	49.5	33.4
1972	.011	.020	.031	14.1	50.8	37.8
1973	.010	.027	.037	17.7	70.3	56.0
1974	.010	.026	.035	18.1	61.9	49.8
1975	.009	.016	.025	14.6	54.1	39.8
1976	.011	.021	.032	18.9	59.7	45.9
1977	.009	.027	.035	17.0	78.3	62.9
1978	.008	.022	.030	17.7	72.1	58.3
1979	.008	.025	.033	20.2	74.1	60.8

SOURCE: Calculations by authors from the 1968 and 1980 Current Population Surveys.

of within-state inequality ranges from 48 to 78 percent and has been growing rapidly since 1967. The last column of table 8.9 shows the effect of transfers on overall convergence among states. The effect of transfers on this indicator is also growing over time, rising from 33 percent in 1967 to 61 percent in 1979.

From these comparisons, the following propositions would seem to hold. First, the convergence in average household market income among regions from 1967 to 1979 (indicated in table 8.7 by the decrease in T_{A,Y_1} or by the change in $RV_{\bar{Y}}$ in table 8.9) dampened the impact of the marked increase in within-region market income inequality during this period (indicated in table 8.7 by the increase in T_{W,Y_1}) on the level of overall inequality. Second, the substantial decrease in observed inequality in average income among regions from 1967 to 1979 (as indicated by the decrease in T_{A,Y_1} in table 8.7) is primarily the result of a decrease in market income inequality. This is indicated by the change in T_{A,Y_1} from .008 to .004 over the 1967–79 period—with little if any increase in the absolute impact of transfers on inequality among regions. While transfers decreased inequality in average household income among regions by .001 in 1967 (a 13 percent reduction), they accounted for a .0009 decrease in inequality between regions in 1979 (a 20 percent reduction). Third, the role of transfers in the overall convergence of states (as measured by decreases in RV_T over time) has been primarily through reducing the

disparity among states in the level of within-state inequality (i.e., in reducing RV_{IN}).

8.5 Patterns of Intraregional Inequality and the Impact of Transfers

In this section, we look more carefully at the patterns of intraregional inequality at a point in time, and changes in this pattern across time. In particular, we attempt to assess the impact of the level, growth, and distribution of transfers on intraregional inequality, both at a point in time and over time.

8.5.1 Regional Growth in Market Incomes and Transfers, 1967–79

The first three columns of table 8.10 show the pattern of regional growth in market income (Y_1) and income transfers over the period of 1967 to 1979. In the first column of table 8.10, the growth in real average household income (Y_1) is shown for the various regions. For the nation as a whole, average real market income grew 9.1 percent over the thirteen-year period. This overall average conceals substantial differences in regional growth rates. These extend from a negative 2.7 percent growth (New York) to growth of 20.8 percent in Alabama and Mississippi.

The second column in table 8.10 shows the real growth in transfer income per household from 1967 to 1979, by region and for the nation as a whole. While the percentage increase for the nation is 43 percent, it varies by region from -32 percent (Washington, D.C.) to 71 percent (Pennsylvania). The highest rates of increase occurred in the Northeastern states (58.7 percent); the Western states have had the lowest transfer growth rates (38.1 percent). The third column in table 8.10 shows the percentage change in the ratio of income transfers to market income (Y_1) for each of the regions from 1967 to 1979. For the United States, transfers as a percent of pretransfer income increased from 6.7 percent to 8.7 percent, a 31 percent increase. For individual regions (excluding Washington, D.C.), the change in the ratio of transfer income to Y_1 ranges from 7 percent to 67 percent.

Inspection of the table shows that the increase in transfers as a percent of income was greater over the period for states in the higher-income Northeast region than it was for the other regions, especially the South and West. This pattern reflects the more rapid growth in the market income denominator of the southern and western states than in the Northeast, as well as the somewhat slower growth of income transfers in the South. In short, the rapid increase in market incomes in the southern and western states (which account for over 90 percent of total income)

Table 8.10 Regional Growth in Incomes, Transfers, and Their Impact on Inequality: 1967–79

	Percentage Change in:					Transfer Impact Index ^a
	Y_1	Transfers	Transfer/ Y_1	T_{WY_1}	T_{WY_3}	
Northeast	4.1	58.7	52.5	16.1	.7	4.7
1 ME VT NH MA CT RI	10.2	38.5	25.7	.4	.8	-.1
2 NY	-2.7	62.8	67.4	24.8	.7	7.0
3 NJ	4.4	64.8	57.9	13.1	-7.1	7.6
4 PA	7.9	71.5	59.0	21.2	7.3	3.9
Northcentral	9.6	50.2	37.0	2.4	-1.9	1.5
5 OH	5.8	61.5	52.7	10.9	-5.2	5.7
6 IN	4.5	45.9	39.5	8.1	6.7	.4
7 IL	8.5	48.9	37.2	5.2	-1.4	2.3
8 MI WI	9.2	62.2	48.5	17.6	1.8	5.2
9 IA MN ND SD NB KS MO	16.3	36.1	17.0	-15.1	-3.9	-4.4

South	15.8	38.1	19.3	3.3	-7.5	3.8
10 DC	4.6	-32.0	-35.0	9.0	.3	3.1
11 DE MD VA WV	13.3	26.5	11.7	-2.4	-14.1	4.9
12 NC SC GA	16.1	50.0	29.2	16.9	-9.7	9.4
13 FL	11.5	19.5	7.2	-18.2	-6.6	-4.2
14 KY TN	13.6	67.3	47.3	17.8	-7.9	7.9
15 AL MS	20.8	42.1	17.7	6.8	-11.7	5.9
16 LA AR OK	20.3	34.8	12.1	-2.2	-1.5	-.2
17 TX	18.8	47.7	24.3	7.5	1.0	2.4
West	7.1	24.4	16.3	1.1	.7	.1
18 AZ NV MT ID WY CO NM UT	17.5	25.6	6.9	-7.9	8.0	-6.0
19 WA OR HA AK	12.8	34.3	19.0	-11.4	-11.1	-.2
20 CA	2.5	22.0	19.1	9.7	3.9	2.0
Total	9.1	43.2	31.3	6.0	-1.9	2.7

SOURCE: Calculations by authors from 1968 and 1980 Current Population Surveys.

^aSee text section 8.5.3 for description of this index.

from 1967 to 1979 overwhelms the impact of transfer income which grew somewhat more rapidly in the North than in other regions.

8.5.2 The Patterns of Change in Intraregional Inequality, 1967–79

In the fourth and fifth columns of table 8.10, we show an index of the change in within-region inequality in both Y_1 and Y_3 from 1967 to 1979 for each of the twenty regions and for the United States. The index shown is the percentage change in T_w from 1967 to 1979 for both Y_1 and Y_3 .

Several patterns are evident. Consider first the change in the pattern of within-region inequality in market income (Y_1). In fourteen of the twenty regions, market incomes became more unequal (as measured by T_{w,Y_1}) from 1967 to 1979. The percentage increase in inequality was the greatest for New York (+25 percent) and Pennsylvania (+21 percent). Florida and Iowa et al. displayed the greatest reduction in pretransfer inequality, with percentage changes of -18 and -15, respectively. Among census regions, the increase in Y_1 inequality within regions was the greatest for the Northeast (increasing 16.1 percent); the West recorded the smallest increase (1.1 percent).

For post-transfer income (Y_3), the pattern is quite different—eleven of the regions showed a reduction in inequality from 1967 to 1979. The greatest percentage reductions in post-transfer income inequality were experienced by Delaware et al. (-14 percent) and Alabama-Mississippi (-12 percent); the greatest percentage increases in post-transfer income inequality were recorded for Arizona et al. (+8 percent) and Pennsylvania (+7 percent). All of the southern regions recorded decreases in post-transfer inequality, except the District of Columbia and Texas. While the South showed a reduction in post-transfer inequality within the region of 7.5 percent, both the West and the Northeast had only slight reductions in post-transfer inequality.

8.5.3 The Contribution of Transfers to the Reduction of Within-Region Inequality Over Time

The patterns in table 8.10 suggest that in nearly all regions transfer income has worked to offset generally increasing inequality in the distribution of market income (Y_1). In some regions (e.g., Ohio, Illinois, North Carolina et al.), inequality in post-transfer income (T_{w,Y_3}) decreased from 1967 to 1979 in spite of an increase in pretransfer income inequality (T_{w,Y_1}); in other regions, census income inequality has increased from 1967 to 1979 in spite of increased transfers. And, in a few regions, post-transfer inequality increased from 1967 to 1979 by more than pretransfer inequality, suggesting that the growth in transfers did not contribute to a decrease in inequality.

The last column in table 8.10 is an attempt to indicate the role of transfers in decreasing the inequality in census income within states

(T_{W,Y_i}) over time. The index of the role of transfers used in the table is the difference between the percentage impact on inequality of transfers in 1967 and that recorded for 1979, that is,

$$\frac{T_{W,Y_1}^{1979} - T_{W,Y_3}^{1979}}{T_{W,Y_1}^{1979}} \times 100 - \frac{T_{W,Y_1}^{1967} - T_{W,Y_3}^{1967}}{T_{W,Y_1}^{1967}} \times 100.$$

For example, if for some region transfers reduced inequality between Y_1 and Y_3 by 40 percent in 1979, but only reduced it by 29 percent in 1967, a score of 11 would be recorded for this index.

Again, several patterns can be observed. First, in six of the twenty regions the index has a negative sign, indicating that transfers played a less strong equalizing role in these regions in 1979 than in 1967. Three options are possible here: (1) inequality in Y_3 increased by more than Y_1 inequality from 1967 to 1979, (2) inequality in Y_3 fell by less than Y_1 inequality from 1967 to 1979, and (3) inequality in Y_3 increased while Y_1 inequality decreased. All three options are represented in the six regions with negative indices. However, for fourteen of the twenty regions transfers played a more equalizing role in 1979 than in 1967.

Second, the reduction in inequality of post-transfer income beyond what would be expected if post-transfer inequality changed at the same pace as pretransfer inequality is greatest in New York, New Jersey, North Carolina et al., and Kentucky-Tennessee. Third, for the United States as a whole, transfers played a stronger role in decreasing within region inequality in 1979 than in 1967. The weighted average reduction in within-region inequality in post-transfer income from 1967 to 1979 is 8 percentage points greater than the weighted average change in within-region pretransfer inequality. Finally, transfers played a substantially greater role in reducing within-region inequality over time in the Northeast and the South than in the West and Northcentral regions.

These results document the increases in inequality in market income within regions from 1967 to 1979, and indicate the major role income transfers have played in mitigating that increase. A related question is: Have regions become more or less alike over time in the extent of the rich-poor gap within the region? Is there convergence or divergence among the regions in within-region inequality over time?

8.5.4 The Convergence in Intraregional Inequality, 1967–79, and the Role of Transfers

In table 8.11, the within-region inequality of each of the twenty regions is shown for each of the income concepts (Y_1 , Y_2 , Y_3), for 1967 and 1979. The Theil index (T_W) is the measure of the rich-poor gap within each region, and each regional Theil index is stated as a fraction of the weighted average within-region Theil for the United States. For 1967, the highest Theil within ratio for Y_1 is 1.45 (Louisiana et al.); the lowest is .84

Table 8.11 Ratio of within-Region Inequality to the Nation's Average, 1967 and 1979

	1967			1979		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Northeast	.974	.973	.952	1.069	1.115	.982
1 ME VT NH MA CT RI	.969	.858	.882	.917	.917	.906
2 NY	1.041	1.140	1.036	1.225	1.386	1.064
3 NJ	.871	.940	1.020	.929	1.001	.967
4 PA	.947	.869	.877	1.082	.993	.960
Northcentral	.930	.874	.930	.899	.921	.934
5 OH	.926	.903	1.007	.969	.980	.974
6 IN	.903	.686	.796	.921	.729	.866
7 IL	.897	.876	.918	.890	1.083	.923
8 MI WI	.843	.818	.899	.935	.990	.934
9 IA MN ND SD NB KS MO	1.037	.965	.964	.830	.792	.944

South	1.333	1.154	1.127	1.106	1.003	1.068
10 DC	1.119	1.438	1.191	1.150	1.579	1.218
11 DE MD VA WV	.978	1.084	1.089	.900	.892	.954
12 NC SC GA	.949	1.037	1.083	1.047	.951	.997
13 FL	1.283	.972	1.051	.989	.914	1.001
14 KY TN	1.097	1.118	1.095	1.218	.999	1.028
15 AL MS	1.420	1.398	1.327	1.431	1.201	1.195
16 LA AR OK	1.453	1.483	1.144	1.340	1.160	1.149
17 TX	1.024	1.080	1.117	1.038	.965	1.151
West	.923	.980	.967	.881	.971	.997
18 AZ NV MT ID WY CO NM UT	.906	.875	.864	.786	.781	.951
19 WA OR HA AK	.889	.921	1.011	.743	.874	.917
20 CA	.942	1.040	.995	.975	1.094	1.054

SOURCE: Calculations by authors from 1968 and 1980 Current Population Surveys.

(Michigan-Wisconsin). The difference is .61. For Y_3 , the highest 1967 ratio is 1.32 (Alabama-Mississippi); the lowest is .79 (Indiana). This is a difference of .53, substantially smaller than the high-low difference for Y_1 . The reduction in the range from .61 to .53 is attributable to income transfers.

The same pattern is observed for 1979. The highest ratio for Y_1 in 1979 is 1.43 (Alabama-Mississippi); the lowest is .74 (Washington et al.), for a difference of .69. This increase in the difference among regions in within-region inequality in Y_1 from 1967 to 1979 is consistent with earlier data indicating the increasing inequality in market incomes generally. The highest ratio for Y_3 in 1979 is 1.22 (D.C.); the lowest is .91 (Maine et al.), for a difference of .31. This decrease in the range from .69 to .31 is attributable to income transfers in 1979.

From these crude comparisons, it appears that:

1. There has been divergence in within-region inequality in pretransfer income from 1967 to 1979. The range in the within inequality ratio increased from .61 to .69 from 1967 to 1979.

2. There has been substantial convergence in the rich-poor gap in post-transfer income among regions from 1967 to 1979. The range in the within inequality ratio decreased from .53 to .31 from 1967 to 1979.

3. The switch from divergence to convergence in within-region inequality is attributable to the growth of transfers from 1967 to 1979.

4. In 1967 transfers reduced the range of within-region inequality among regions from .61 (Y_1) to .53 (Y_3), a 13 percent decrease. In 1979 transfers reduced the range of inequality among regions from .69 (Y_1) to .31 (Y_3), a 55 percent decrease.

The extent of convergence in the regional rich-poor gap (as measured by the Theil inequality index) among the regions, and the role of transfers in this convergence, is also shown in table 8.12. Comparing Y_1 and Y_3 , the same patterns are observed as described above for the range. Namely:

1. The regions *diverged* over time in terms of inequality in pretransfer income. The measure of variation among the regions increased from .021 to .025, an increase of 22 percent.

2. The regions *converged* over time in terms of inequality in post-transfer income. The measure of variation among the regions decreased from .011 to .007, a decrease of 39 percent.

Table 8.12 Index of the Relative Variance in the Extent of Within-Region Inequality (RV_{IN}), 1967 and 1979

	Y_1	Y_2	Y_3
1967	.021	.026	.011
1979	.025	.026	.007

3. The swing from a 22 percent *increase* in disparity among the states in within-region inequality (for Y_1) to a 39 percent *decrease* in disparity among the regions in within-region inequality (for Y_3) is attributable to the growth in income transfers and their improved targeting on low-income households.

4. In 1967, transfers accounted for the reduction from .021 to .011 in disparity among the regions in the rich-poor gap from Y_1 to Y_3 . This is a reduction of 48 percent. In 1979, transfers reduced the among-region disparity from .025 (Y_1) to .007 (Y_3), a reduction of 74 percent. The impact of transfers in reducing the disparity among the regions in the variation in the regional rich-poor gap in 1979 is more than 150 percent of the 1967 impact of transfers.

An important and puzzling pattern is observed in table 8.12. Within each of the years, the disparity in within-region inequality recorded for Y_2 is about the same as that for Y_1 . Social insurance transfers, it appears, do not serve to *reduce* the disparity among states in the extent of within-region inequality. This pattern can also be observed in table 8.11 where, in 1967, fifteen of the twenty regions are shifted away from a ratio of unity in moving from Y_1 to Y_2 ; for 1979, eleven of the twenty regions are so shifted. This pattern remains unexplained.

8.6 The Determinants of the Impact of Transfers in Reducing Within-Region Inequality—A Preliminary Examination

This evidence, then, suggests that transfers have resulted in a decrease in the dispersion of incomes within states, and that this contribution to reduced within-state income differences has increased over time. For nearly all states at any point in time, the distribution of pretransfer income (Y_1) is more unequal than the distribution of post-transfer income (Y_3). The contribution of transfers to this reduction in inequality—measured as $(T_{W,Y_1} - T_{W,Y_3})$ —varies substantially across states, however. For example, in 1975, this indicator ranged from .22 to 1.20. The question is: What determines the impact of transfers in reducing the inequality of income within states at a point of time?

Here we adopt two approaches in describing the role of transfers in decreasing within-state inequality. As appendix B shows, decomposing the change in Theil inequality from Y_1 to Y_3 suggests that the impact of transfers on within-state inequality depends largely on η (the percentage of the households within a state that are transfer recipients) and θ (the proportion of the total income of recipients accounted for by transfers). Our first approach focuses on this decomposition and measures the effect of both η and θ on the reduction of within-state inequality $(T_{W,Y_1} - T_{W,Y_3})$, which we will designate as I . In this formulation, then,

$$(2) \quad I = \delta_0 + \delta_1 \eta + \delta_2 \theta + \epsilon_1.$$

However, neither η nor θ are, themselves, exogenous variables. For example, the percentage of households that are recipients (η) depends on the demographic characteristics of the state. *Ceteris paribus*, states with more older or retired households, for example, would expect to have a larger proportion of households receiving transfers—a larger η . Similarly, states with larger family sizes would, *ceteris paribus*, have a larger ratio of transfer to total income for those receiving transfers—a larger θ . A more appropriate statement of the determinants of the impact of transfers on within-state inequality would then be:

$$(3) \quad \eta = \alpha'Z + \epsilon_2,$$

$$(4) \quad \theta = \beta'Z + \epsilon_3,$$

$$(2) \quad I = \delta_0 + \delta_1\eta + \delta_2\theta + \epsilon_1,$$

where Z is a vector of exogenous determinants of η and θ , chosen to reflect the characteristics of states likely to influence the number of transfer recipients in the state (η) and the benefits they on average receive (θ).

In this formulation, the true determinants of I are viewed as having their impact through η and θ , two instruments which can be thought of as the extensive margin of transfer reciprocity and the intensive margin, respectively. If η and θ are assumed to be the outcome of an implicit market for transfers, the Z vector must include state characteristics reflecting both the demand for transfers (e.g., the incidence in the population of groups likely to be eligible for transfers) and the supply of transfers (e.g., tastes of the population for poverty reduction).

If, in fact, the impact of transfers on inequality in the state is the outcome of this market process, the determinants of I could be understood by simply regressing I on Z .

$$(5) \quad I = \Pi'Z + \epsilon_4.$$

In what follows, results from both models are shown. In the first, the exogenous Z variables are viewed as having their impact on I through η and θ ; in the second, these factors are viewed as direct determinants of I . The estimates shown are for 1975 and rely on state data taken from the Survey of Income and Education. The vector of Z variables is:

1. the state unemployment rate (UR),
2. the percent of the state's household heads that is female (FEHD),
3. the percent of the state's population that is over 65 (AGED),
4. the average family size of the state's households (FSIZ).

Because transfer programs are targeted on the aged and families headed by a female, FEHD and AGED are demand-side variables. The family-size-conditioned nature of many transfers causes FSIZ to reflect the demand for transfers as well. UR captures both the demand for

transfers by those who are unemployed and covered by unemployment insurance and, insofar as it reflects the performance of a state's economy, the ability of the state to supply transfers.⁵

Consider first the framework in which the exogenous determinants of I are viewed as working through η and θ . The first three columns of table 8.13 present the regression results for this model. All of the exogenous variables have the expected sign in explaining the variance in both η —the extent of transfer reciprocity—and θ —the “depth” of transfer support. And all of them are significant. The AGED variable has the largest impact on both η and θ . A one percentage point increase in AGED increases both the percent of the population who are recipients and the percent of the income of recipients accounted for by transfers by more than one percentage point. While the unemployment rate (UR) has an important impact on the percent of the population receiving transfers (η), its effect on the relative level of transfers received by recipients (θ) is significant but small. The small effect on θ presumably reflects the role of UR in capturing both demand- and supply-side effects.

The third column shows that both η and θ are very significant determinants of I —the impact of transfers on inequality. Their relative magnitudes suggest that the role of transfers in reducing inequality works more strongly through the level of transfers received by recipients (θ) than through the number of households receiving transfers (η). This is as we would expect. Given the pro-poor character of transfers, a larger impact on inequality is expected from targeting an increment of transfers on existing recipients than from extending the number of recipients. In terms

Table 8.13 The Determinants of η , θ , and I , 1975 (*t*-values in parentheses)

Independent Variables	Dependent Variables				
	η	θ	$I^{*a,b}$	I^{*a}	\bar{Z}
CONSTANT	-.29 (2.4)	-.14 (1.3)	.07 (2.0)	-.41 (2.6)	—
UR	1.35 (5.8)	.41 (2.0)	—	1.10 (3.5)	.072
FEHD	.31 (2.1)	.39 (4.3)	—	.62 (4.5)	.16
AGED	1.23 (9.2)	1.03 (8.7)	—	1.48 (8.2)	.19
FSIZE	.15 (4.4)	.09 (3.1)	—	.22 (4.9)	2.82
$\bar{\eta}$	—	—	.58 (3.6)	—	.50
$\bar{\theta}$	—	—	.79 (3.8)	—	.40
R^2	.72	.66	.90	.66	—
N	51	51	51	51	—

^aThe impact variable (I^*) is expressed as the percentage change in the index of inequality $[(T_{w,y_1} - T_{w,y_3})/Y_{w,y_1}]$. The mean of I^* is .67, indicating that, on average, transfers reduced within-state inequality as measured by the Theil index by 67 percent. Among the states, I^* ranged from .42 to .79.

^bThis equation was estimated by two-stage least squares.

of inequality reduction, the intensive margin is more important than is the extensive margin.

The direct effect of the exogenous variables on the impact of transfers on inequality (I) is shown in the fourth column of table 8.13. All of the variables have the expected sign, and all are significant. As expected, the proportion of the population older than 65 (AGED) is the most significant variable in explaining the impact of transfers on inequality. The arc elasticities for the independent variables are:

$$\text{UR} \quad +.08$$

$$\text{FEHD} \quad +.10$$

$$\text{AGED} \quad +.29$$

$$\text{FSIZ} \quad +.07$$

Hence, a 1 percent increase in the share of the aged population increases the impact of transfers on inequality by .3 percent; relative increases in the other variables have a substantially smaller effect on the inequality reducing impact of transfers. While transfers, then, reduce inequality within all regions and states, their impact is greater the higher the unemployment rate of the region, the larger the average family size in the region, the higher the proportion of female-headed families in the region, and, especially, the larger the aged proportion of the region's population.

8.7 Summary and Conclusions

As is well known, income transfers are targeted on the low-income population and, hence, are equalizing. Moreover, the larger the transfers relative to nontransfer income are, *ceteris paribus*, the greater is the reduction in inequality for which they are responsible. Numerous studies have documented the impact of transfers in reducing poverty, reducing inequality in the size distribution of income, reducing inequality between groups (e.g., blacks and whites, elderly and nonelderly, intact and female-headed families), and reducing the inequality *within* particular groups, such as the elderly, blacks, and the disabled.

This study is in that tradition. We have focused on groups of individuals identified by their region of residence, sometimes by states and sometimes by regional groupings of states. A number of questions have been posed regarding the level and the dispersion of the incomes of these regional groupings of individuals—both across the groups and within the groups; both at a point in time and across time.

The questions posed and the results obtained are as follows:

1. How different are the states in terms of per household income?
 - In 1975 the gap between the states was substantial—in terms of pretransfer, pretax income (Y_1) the ratio of the highest to the lowest

state is 2.4. The ratio falls to 1.8 when post-transfer, post-tax income (Y_4) is used.

2. Does the inequality in average income among the states contribute very much to the aggregate level of inequality in the nation?

- Using the Theil index, the differences in average income among the states accounts for only about 2 percent of the total level of national income inequality. Inequality among people within states accounts for the rest.

3. How different are the states in the extent of inequality among their citizens?

- In terms of Y_1 , the ratio of the Theil index of the most unequal to the least unequal state is 2.2. The ratio falls to 1.4 when Y_4 is used. In sum, substantial disparity exists among states in the extent of within-state inequality, but the disparity is far less for post-transfer income than for pretransfer income.

4. Which states are the most unequal in the distribution of income among their citizens; which are the least unequal?

- The distribution of income is most unequal within the southern states; the northcentral and northeastern states have the least inequality. This is true irrespective of the income concept used.

5. At a point in time, have transfers contributed substantially to a reduction in average income differences among states?

- In 1975 the dispersion of average post-transfer income (Y_3) among states (as measured by the Theil index) was 23 percent less than the dispersion of average pre-transfer income (Y_1). Transfer income accounts for this reduction.

6. At a point in time, have transfers contributed substantially to a reduction in inequality within states?

- Again using the Theil index, transfers caused a very substantial decline of 70 percent in average inequality within the states in 1975.

7. To what extent have transfers caused states to converge over time in both income levels and income inequality?

- Consider the period from 1967 to 1979. Using an index of state differences which combine both average income differences and inequality differences, transfers caused an overall reduction in the index from .042 to .013, a reduction of 68 percent. Of this .029 reduction, about 90 percent was from a reduction of differences among states in inequality; about 10 percent was from a reduction in state average income differences.

8. To what extent has income inequality within regions changed over time?

- Using market income (Y_1), average inequality within states increased from 1967 to 1979. The Theil index of within-region inequality increased from .96 to 1.02. For fourteen of twenty regions, the Theil index for Y_1 increased from 1967 to 1979. For post-transfer income,

within-region inequality stayed at about .34. Eleven of the twenty regions showed a decrease.

9. Has the inequality in average incomes across regions declined over time?

- The Theil measure for Y_1 shows a decline of 46 percent from 1967 to 1979; that for Y_3 shows about a 50 percent reduction. Differences in average incomes among states have declined enormously from 1967 to 1979, irrespective of the income concept.

10. What role have transfers played in decreasing overall inequality over time?

- From 1967 to 1979 Theil inequality among all households increased from .97 to 1.02, using Y_1 . For Y_3 , the Theil index stayed constant at about .35. The effect of transfers has been to offset the growing inequality in market incomes over time. In the late 1960s, transfers reduced inequality by about 63 percent; this increased to about 68 percent in the late 1970s.

11. Regions have converged over time in both average incomes and inequality. What role has the transfer system played in this convergence?

- Using our index of state differences, transfers increased their impact in reducing the index of *overall* state differences (RV_T) from 33 percent in 1967 to 61 percent in 1979. The contribution of transfers in reducing income inequalities within states (RV_{IN}) increased from 48 to 74 percent over the same period. The impact of transfers in reducing state income differences ($RV_{\bar{Y}}$) was small, but increased from 11 to 20 percent. In sum, transfers contributed substantially and increasingly to decreases in overall income inequality and inequality within regions. The contribution of transfers to observed convergence in average incomes among regions was small over the entire period, but increased slightly. The bulk of the convergence in average incomes among states was the result of more rapid growth in Y_1 in the poorer southern regions over this period.

12. For which regions did transfers increase their impact in reducing inequality over time?

- The South and the Northeast experienced a growing impact of transfers in reducing inequality, relative to the remaining regions.

13. Has the impact of transfers in decreasing the differences among regions in within-region income inequality increased or decreased?

- From 1967 to 1979 states became more divergent in the inequality in the distribution of market income (Y_1), but converged in the inequality of post-transfer income (Y_3). The impact of transfers in reversing the divergence in market income inequality can be described in several ways:

—In 1967 transfers reduced the *range* among regions in within-region inequality by 13 percent; in 1979, by 54 percent.

—In 1967 transfers reduced the *relative variance* among regions in within-region inequality by 48 percent; in 1979, by 74 percent.

14. At any point in time, transfers contribute to a reduction in inequality within all states and regions. What characteristics cause the impact of transfers on inequality to be greater in some states than in others?

- At the margin, the impact of transfers on inequality is greater if the increment is used to increase the benefits of existing recipients, rather than enlarging the number of recipients. The marginal impact of transfers on inequality reduction is larger in states with higher unemployment rates, larger average family sizes, a higher proportion of female-headed families, and especially, a higher proportion of aged persons.

The equalizing role of transfers in the economy can be clearly seen in this region-based analysis, both at a point in time and over time. At a point in time (1975), transfers (1) reduce average income differences among states by about *13 percent*, (2) reduce inequality within states by about *32 percent*, and (3) reduce differences in within-state inequality among states by about *60 percent*. Over time, the transfer system has grown rapidly, both as a share of total income and in terms of the number of households who are recipients. As a result, from 1967 to 1979 transfers (1) reversed the trend toward overall inequality in market incomes, (2) increased their contribution to the reduction in overall inequality from 64 percent to 68 percent, (3) increased their contribution to reducing inequalities within states from 48 to 74 percent, (4) increased from 11 to 18 percent their contribution to the reduction in average income differences among states, (5) increased from 42 to 75 percent their contribution to the convergence in within-state income inequalities among regions, and (6) increased their contribution to reducing the overall index of state income differences from 33 to 61 percent.

A more vivid and broadbrush picture of the regional impact of transfers can be seen by focusing only on the income and inequality differences between the South and the North over time. The pattern of differences between these two regions and changes in these differences reflect the general national pattern, and clearly portrays the role of income transfers.

Across the entire period from 1965 to 1979, the South had both a lower average income and greater inequality in the distribution of income than did the North. Over that period, however, the South-North disparity in both average income and inequality was reduced. The convergence in average incomes was primarily caused by a more rapid increase in market incomes in the South than in the North over this period. The source of the

convergence was economic growth; income transfers had little to do with it. Indeed, while ratio of income transfers to market income was greater in the South than in the North over the entire period, the increase in this ratio in the northeast and northcentral states exceeded that in the South and the West over the period.

At the beginning of the period, market incomes in the South were distributed substantially more unequally than in the North. While market income inequality increased in both regions over the period, the trend toward more inequality was greater in the North than in the South. However, in both regions the distribution of census money income became slightly more equal from 1965 to 1979 and, indeed, the regions became more alike in their final income distributions. Both the reduction in census money income inequality and the convergence of the regions over the period are attributable primarily to the growth in and allocation of income transfers.

These transfer income patterns, while complex, do have policy implications. Here we will mention only the most prominent of them and do so in the form of questions:

1. If a continued downward trend in the degree of inequality among regions, or continued reductions in inequality within regions, is valued by society, what is the likely impact of reduced transfers on these indicators of economic performance? Will cuts in transfers promote increased inequality within regions and increase disparity in inequality among regions, or will the policy changes maintain the reductions in inequality in both dimensions that have already been achieved?

2. The growth in transfers over the past fifteen years has been dominated by the federal transfer system. What will be the effect of transferring discretion over the level and composition of transfers from the federal to state governments? Will the loss of federally mandated programs and benefit minima seriously erode the contribution of transfers to reducing within-region and total inequality, and to reducing the disparity among regions in within-region inequality.

3. To what extent will the renewed emphasis on economic growth continue to yield reductions in the inequality of average incomes among regions? Or will future economic growth reverse the pattern of impacts experienced over the last fifteen years?

4. Are policies other than income transfers available to mitigate or reverse the trend toward increased market income inequality within regions (and within the nation)? Is the future sectoral composition of growth, with its emphasis on high-technology, skill-intensive activities, likely to exacerbate this problem of growing market income inequality? And, if so, does this not call for continued emphasis on income transfers if the overall small reductions in final income inequality are to be maintained?

Finally, we would emphasize the tentative nature of our results. They clearly raise as many research questions as they answer. Our effort has largely been one of measurement and documentation; the causes of the changes we have uncovered here have only been briefly explored. While we have made a first effort to determine which regional characteristics have accounted for the within-region reductions in inequality attributable to transfers, the analysis neglected a number of higher moments of the Theil measure which could have played a role. Moreover, the determinants that we did identify are primarily permanent regional characteristics which have little to do with transfer policy measures that could be used to influence the inequality reduction potential of transfers.

A few extensions of this research are immediately obvious. First, our determinants analysis is based on cross-section state data for a single year, 1975. This analysis could be extended by enlarging the data base to the twelve years of available Current Population Survey tapes, though at the cost of regional detail in any year from 50 to 20. The variation introduced by the time series data could enable more precise identification of both the regional characteristics and policy variables affecting the distributional effects of transfers. Second, we have considered only a subset of the full range of transfers affecting regional incomes and the inequality of their distributions; in-kind transfers, additional cash transfers, and fringe benefits could be merged onto the data tapes, and the impacts of this more full-blown definition of transfers on regional incomes and inequalities could be analyzed. Finally, our analysis has looked only at first-round regional and distributional impacts of transfers and taxes. These policies generate both consumption reallocations and labor supply effects which, in a general equilibrium context, work their way through the economy, changing prices, outputs, and wages differentially by regions. Analytic models exist for exploring the regional and distributional implications of these second-, third-, and fourth-round effects of transfers (see Golladay and Haveman 1977). For simulated transfer policy changes less extensive than the transfers analyzed here, the full pattern of regional and distributional impacts have been found to vary substantially from the first-round effects.

Appendix A *Data Bases Used in Study:* *CPS and SIE*

Two separate data bases have been employed in this study. The major data source is the Survey of Income and Education (SIE) conducted in 1976. It contains demographic and economic information for roughly 150,000 households across the United States in calendar year 1975. This

data base was chosen as the primary data base for the sole reason that it is the most recent public-use data source that is statistically large enough to allow analysis to be performed on the state level.⁶ While the SIE does allow state-by-state analysis, it unfortunately provides but one point in time to view the regional dispersions in incomes. Thus, to see if the patterns observed in the SIE data for 1975 persist over time, we also employed a series of Current Population Surveys (CPS) from 1968 to 1980. This series of microdata bases allows us to track the regional dispersion of incomes for twenty regions (clusters of states) for the calendar years 1967 through 1979.

In this study we employed four different income concepts: market income (Y_1), market income plus social insurance benefits (Y_2), post-transfer income (Y_3), and post-tax and post-transfer income (Y_4). A more precise definition of each of these concepts is given in table 8.A.1. One should note that some difference does exist between the SIE and CPS

Table 8.A.1 Definitions of Income Concepts Used in Study

	SIE	CPS
Market Income (Y_1) =		
Wages and salaries +	X	X
Self-employment income +	X	X
Interest, dividends, and rental income +	X	X
Private employment retirement benefits +	X	X
Public employee retirement benefits +	X	
Alimony, child support and other	X	X
Market Income Plus Social Insurance (Y_2) =		
Y_1 +	X	X
Social Security and railroad retirement +	X	X
Worker's compensation +	X	X
Veterans' benefits +	X	X
Unemployment compensation +	X	X
Public employee retirement benefits		X
Post-Transfer Income (Y_3)		
Y_2 +	X	X
Aid to Families with Dependent Children +	X	X
Supplemental Security Income (OAA) +	X	X
General assistance +	X	X
Food Stamps +	X	
Earned income tax credit	X	
Post-Tax, Post-Transfer Income (Y_4) =		
Y_3 -		
Federal income tax -	X	
FICA payroll tax -	X	
State income tax	X	

"X" indicates that the income source was included in the income concept and data base.

Table 8.A.2 Control Totals for Y_1 (billions of dollars)

Year	Control Total	Value on CPS Tape	% Captured on Tape
1967	\$576	\$453.3	78.7
68	627	503.6	80.3
69	683	561.0	82.1
70	717	596.1	83.1
71	763	635.6	83.3
72	831	704.2	84.7
73	926	774.8	83.7
74	1006	826.9	82.2
75	1063	907.2	85.4
76	1167	1002.0	85.9
77	1293	1111.5	86.0
78	1457	1244.1	84.0
79	1630	1406.7	86.3
	Control total ^a	SIE tape ^a	
1975	1080	1004.9	93.0

SOURCES FOR Y_1 TOTALS: For 1970, 1972–79: *Statistical Abstract 1980*, p. 445, table 738. Y_1 control total = personal income – transfer payments + personal contributions for social insurance – other labor income. For 1968, 1969, 1971: *Statistical Abstract 1973*, p. 324, table 526. For 1967: *Statistical Abstract 1970*, p. 316, table 480.

^aPublic employee retirement included.

definitions, primarily with respect to public employee retirement benefits. In the SIE, we treated public employee benefits as private retirement benefits and included them in market income. However, the CPS data base did not allow us to separate public employee retirement benefits from other insurance programs; hence, they were included in the Y_2 measure of income on the CPS data base.

Tables 8.A.2 through 8.A.4 present control totals from other published sources and the amounts that we “capture” on the individual data bases for the three major sources of income. Table 8.A.2 provides this information on market income (Y_1), while tables 8.A.3 and 8.A.4 provide the same information for the two additions to Y_1 that comprise post-transfer income: namely, social insurance and cash welfare benefits. As one can see from the tables, the SIE provides the best “capture rate” on all three sources of income, which also suggests its use as a primary data source.

Table 8.A.3 Control Total for Social Insurance (billions of dollars)

Year	Control Total	Value on CPS Tape	% Captured on Tape
1967	37.710	26.512	70.3
68	42.482	30.589	72.0
69	46.131	33.130	71.8
70	55.609	40.486	72.8
71	65.687	47.976	73.0
72	72.781	55.412	76.1
73	84.821	64.191	75.7
74	98.556	77.218	78.3
75	123.431	80.432	65.2
76	135.289	85.174	63.0
77	145.452	90.231	62.0
78	155.391	97.877	63.0
79	n.a.	108.595	—
	Control total ^a	SIE tape ^a	
1975	106.286	83.741	78.8

SOURCES FOR SOCIAL INSURANCE TOTALS: For 1970, 1975, 1977–78: *Statistical Abstract 1980*, p. 336, table 539. For 1976: *Statistical Abstract 1979*, p. 332, table 530. For 1974: *Statistical Abstract 1977*, p. 324, table 507. For 1971–73: *Statistical Abstract 1975*, p. 285, table 453. For 1968–69: *Statistical Abstract 1971*, p. 275, table 435. For 1967: *Statistical Abstract 1970*, p. 280, table 420.

^aPublic employee retirement included.

Table 8.A.4 Control Totals for Cash Welfare (billions of dollars)

Year	Control Total	Value on CPS Tape	% Captured on Tape
1967	5.449	3.641	66.8
68	6.306	4.388	69.6
69	7.560	4.841	64.0
70	9.221	6.115	66.3
71	11.797	6.996	59.3
72	14.144	7.643	54.0
73	14.840	8.033	54.1
74	16.287	10.097	62.0
75	19.867	11.365	57.2
76	21.412	12.454	58.2
77	23.353	13.303	57.0
78	24.082	13.530	56.2
79	n.a.	14.237	—
	Control total ^a	SIE tape ^a	
1975	24.561	21.824	88.9

SOURCES FOR CASH WELFARE TOTALS: For 1970, 1973–78: *Statistical Abstract 1980*, pp. 332–33, table 534. Control totals calculated by subtracting Medicaid, Food Stamps (except SIE), and other from public aid total. For 1972: *Statistical Abstract 1975*, p. 281, table 447. For 1971: *Statistical Abstract 1973*, p. 287, table 461. For 1967–69: *Statistical Abstract 1970*, p. 277, table 416.

^aIncludes Food Stamps.

Appendix B *The Theil Index of Income Inequality*

Decomposition of the Theil Index by States

H. Theil (1967) proposed a measure of inequality containing a number of desirable properties and based on information theory. One of these properties was that the overall index could be easily decomposed into a measure of the extent of inequality between and within some specified groupings of the observations. The groupings used in this study were the states or regions in which households resided.

The Theil index of total income inequality in a population can be written as:

$$T = \sum_i \frac{1}{N} \ell_n(\bar{Y}/Y_i),$$

where N = the number of households, Y_i = the i th household income, and \bar{Y} = the mean income in the population.

Assume now that the population has been allocated according to the location of their residence, that is, their state (or region). Theil has shown that the aggregate index T_T can be decomposed as:

$$(A1) \quad T_T = T_A + T_W,$$

where

$$T_A = \sum_{j=1}^M \frac{1}{M} \ell_n(\bar{Y}/\bar{Y}_j),$$

$$T_W = \sum_{j=1}^M \eta_j \sum_{i \in S_j} \frac{1}{N_j} \ell_n(\bar{Y}_j/Y_i),$$

and M = the number of states, N_j = the number of households in the j th state, $\eta_j = N_j/N$, S_j = the set of individuals who reside in the j th state, and \bar{Y}_j = mean household in j th state.

Upon examination, T_A is the Theil inequality index of the states' mean level of incomes while T_W is the weighted average of within levels of income inequality for the M states. Thus the overall Theil index (T_T) can be decomposed into two separate components: the inequality between states (measured by their mean incomes), and the weighted average across the states of the individual inequality within states.

A Decomposition of the Impact of Transfers on the Theil Index of Inequality

In this paper, we measured the impact of transfers as the difference between census money income (Y_3) and market income (Y_1). Thus to describe the role of transfers in reducing overall inequality and inequality between and within states, we only have to consider the effect of changing

the income concept on equation (A1). We can decompose the effect of transfers in reducing overall inequality into two effects: the change in inequality in average income among states (change in T_A), and the change in the weighted average across states of the within-state level of inequality (change in T_W). That is:

$$\begin{aligned} T_{T1} - T_{T3} &= (T_{A1} - T_{A3}) + (T_{W1} - T_{W3}), \\ &= \Delta T_A \quad + \quad \Delta T_W \end{aligned}$$

where the second subscript refers to the income concept employed. The first term in this decomposition measures the extent to which overall inequality is reduced because of the reduced variation in state mean income attributable to transfers; the second term measures the extent to which the weighted average across states of within-state inequality is reduced by transfers. The second term can be rewritten as:

$$\Delta T_W = \sum_j \eta_j (T_{1j} - T_{3j}),$$

where

T_{kj} = the Theil inequality index for j th state defined for the k th income concept.

$$= \sum_{i \in S_j} \frac{1}{N} \ln(\bar{Y}_k / Y_{ki}).$$

Thus ΔT_W is the weighted average of the change in each state's own index of inequality using the state's share of the population as weights.

The decomposition of the impact of transfers on any individual state's inequality index requires some explanation. In order not to further complicate the notation, we will drop the subscript referring to the state, although it should be understood that the impact of transfers on inequality within a state is being decomposed.

To decompose the impact of transfers within a state, first divide the state's population into two groups: those households that receive transfers ($i \in S_R$) and those which do not ($i \notin S_R$). Using the decomposition procedure described above, but employing reciprocity of transfers as the grouping classification, the Theil index for income concepts Y_1 and Y_3 can be decomposed as follows:

$$\begin{aligned} T_k &= [\ln(\bar{Y}_k / \bar{Y}_{kNR}) + \ln(\bar{Y}_k / \bar{Y}_{kR})] + [\eta_R \sum_{i \in S_R} \ln(\bar{Y}_{kR} / Y_{ki}) \\ &+ (1 - \eta_R) \sum_{i \notin S_R} \ln(\bar{Y}_{kNR} / Y_{ki})] \end{aligned}$$

for $k = 1$ and 3 where \bar{Y}_k = mean state income for k income concept, \bar{Y}_{kR} = mean recipient income for k income concept, \bar{Y}_{kNR} = mean nonrecipient income for k income concept, R = number of households receiving transfers, and $\eta_R = R/N$ = the percent of the population receiving transfers.

Using this decomposition, we can interpret the first bracketed expression as an index of the difference in average income between the nonrecipient and recipient populations using the k th income concept (denoted as T_{kG}). The second bracketed expression is the weighted average of the inequality within the two groups (denoted as T_{kD}). Hence, the reduction in inequality resulting from transfers (I) can be written as

$$I = T_1 - T_3 = (T_{1G} - T_{3G}) + (T_{1D} - T_{3D}) = \Delta T_G + \Delta T_D.$$

Now note that since Y_1 equals Y_3 when $i \in S_R$, ΔT_D can be written as

$$\begin{aligned} \Delta T_D &= \eta_R \sum_{i \in S_R} \frac{1}{R} [\ln(\bar{Y}_{1R}/Y_{1i}) - \ln(\bar{Y}_{3R}/Y_{3i})] \\ &= \eta_R \left[\ln \left(\frac{\bar{Y}_{1R}/\bar{Y}_{3R}}{1 - \bar{\theta}} \right) + T_\theta \right], \end{aligned}$$

where θ_i = the share of the household's income which comes from transfers equal to

$$\frac{Y_{3i} - Y_{1i}}{Y_{3i}} = \frac{TR_i}{Y_{3i}},$$

TR_i = the household's transfers, $\bar{\theta}$ = the mean θ in the recipient population, and

$$T_\theta = \sum_{i \in S_R} \frac{1}{R} \ln \left(\frac{1 - \bar{\theta}}{1 - \theta_i} \right),$$

which is the Theil index of inequality of the relative share of market income in the recipient population.

Thus the total impact of transfers on within-state inequality can be decomposed as

$$I = \Delta T_G + \eta_R D_\theta,$$

where
$$D_\theta = \ln \left(\frac{\bar{Y}_{1R}/\bar{Y}_{3R}}{1 - \bar{\theta}} \right) + T_\theta,$$

which is an index of the dispersion of θ in the recipient population.

This decomposition can be given the following interpretation. The term ΔT_G can be interpreted as a measure of the degree to which the gap in incomes between the recipients and nonrecipients is reduced, on average. Thus, if transfers raise the incomes of recipients relative to nonrecipients, ΔT_G must be positive.

The second term, D_θ , requires some explanation. Consider the situation where every recipient receives a transfer such that $\theta_i = \bar{\theta}$, or equal to

$$TR_i = Y_{1i} \bar{\theta} / (1 - \bar{\theta}),$$

In this case, it can easily be demonstrated that D_θ is equal to zero. Hence, D_θ can be interpreted as the impact on total inequality of the divergence of actual transfers from the zero variance standard. The sign of D_θ is difficult to assign. The second term T_θ , since it is a Theil index, will always be positive. However, using Jensen's inequality, the first term of D_θ is seen to be positive only if, within the recipient population, transfers are not strongly positively correlated with pretransfer income.

One final decomposition of the impact of transfers can be noted:

$$\ell n(1 - X) = - \sum_{j=1}^{\infty} \left(\frac{X^j}{j} \right) \text{ where } 0 \leq X \leq 1.$$

Since θ_i will by definition always be between zero and one j

$$T_\theta = \sum_{i \in S_R} \frac{1}{R} \sum_{j=1}^{\infty} \frac{\theta_i^j - \bar{\theta}^j}{j}.$$

The fourth-order approximation of T_θ hence can be written as

$$T_\theta = \frac{\sigma_\theta^2}{2} + \frac{s(\theta)}{3} + \frac{k(\theta)}{4} + \frac{\sigma_\theta^2 \bar{\theta}}{2} (2 + \beta \bar{\theta}) + \bar{\theta} s(\theta),$$

where σ_θ^2 = variance of θ , $s(\theta)$ = skewness of θ , and $k(\theta)$ = kurtosis of θ . (Note: A fourth-order approximation will be needed if $\bar{\theta}$ lies between .3 and .6 and higher-order terms will be needed if θ lies above .6).

Hence T_θ can be interpreted as the index of the distribution of the relative importance of transfers in the recipient population. From empirical experience, $\bar{\theta}$ is the dominant moment in this decomposition, hence, given that $s(\theta)$ is sufficiently nonnegative, T_θ will be positively related to the average "dependency" of the recipient population on transfers ($\bar{\theta}$).

Notes

1. Our brief attention to this question here is a result of the helpful conference comments of Peter Gottschalk.

2. See appendix A for a detailed description of the definitions of the four income concepts and the data bases from which these numbers were computed.

3. Throughout this paper we have assumed that comparisons made between Y_1 and Y_3 are the appropriate comparisons to be made to assess the impact of transfers. However, we should note that the existence of transfer affects, through labor supply savings and consumption behavior, not only the level but also the distribution of market incomes. Thus the approximate basis of comparison would be the distribution of market incomes that exist in the absence of transfers. Work by Betson, Greenberg, and Kasten (1980) and Golladay and Haveman (1977) suggest that the use of Y_1 as a basis of comparison might tend to overstate the redistributive impact of transfers.

4. To derive this measure of overall convergence, let us first "standardize" the two dimensions of comparison as

$$\text{Rel}_{\text{Rich}} = \frac{\bar{Y}_S - \bar{Y}_T}{\bar{Y}_T}$$

= relative richness of the Sth state;

$$\text{Rel}_{\text{In}} = \frac{T_S - T_W}{T_W}$$

= relative inequality of the Sth state,

where \bar{Y}_S = mean income of the Sth state; T_S = within-state Theil inequality index of the Sth state; $\bar{Y}_T = \sum \eta_S \bar{Y}_S$ = average state mean income; $T_W = \sum \eta_S T_S$; and η_S = population share of the Sth state.

The summary measure of overall convergence can then be defined as:

$$\text{RV}_T = \sum \eta_S \left[\left(\frac{\bar{Y}_S - \bar{Y}_T}{\bar{Y}_T} \right)^2 + \left(\frac{T_S - T_W}{T_W} \right)^2 \right]$$

= $\text{RV}_{\bar{Y}} + \text{RV}_{\text{IN}}$,

where

$$\text{RV}_{\bar{Y}} = \frac{\sum \eta_S (Y_S - Y_T)^2}{\bar{Y}_T^2}$$

= the relative variance of the state's mean income;

$$\text{RV}_{\text{IN}} = \sum \eta_S \frac{(T_S - T_W)^2}{T_W^2}$$

= relative variance of within-state inequality.

One should note that $\text{RV}_{\bar{Y}}$ and T_A are both measures of the relative dispersion in mean state incomes. However, RV_{IN} and T_W are measuring quite different concepts. While RV_{IN} is a measure of the relative variance of within-state inequality (T_S), T_W measures the average within-state level of inequality.

5. A variety of other variables exists with some claim to reflecting supply- or demand-side influences on the volume of income transfers within a state, including race, health status, education, and relative income. Strong intercorrelations among these and between them and the included variables led to their exclusion from the final regression. The variables included reflect population characteristics that directly determine transfer eligibility and benefit awards.

6. The 1980 public-use census tapes which would be statistically large enough to perform state-by-state analysis are not yet available.

References

Betson, D., D. Greenberg, and R. Kasten. 1980. A microsimulation model for analyzing alternative welfare proposals: An application to the program for better jobs and income. In *Microsimulation models for public policy analysis*, ed. R. Haveman and K. Hollenbeck. New York: Academic Press.

- Danziger, S., R. Haveman, and R. Plotnick. 1981. How income transfers affect work, savings, and the income distribution: A critical review. *Journal of Economic Literature*, September. Vol. 19, pp. 975–1028.
- Golladay, F., and R. Haveman. 1977. *The economic impacts of tax-transfer policy: Regional and distributional effects*. New York: Academic Press.
- Hanna, F. 1957. Analysis of interstate income differentials: Theory and practice. In *Regional income: Studies in income and wealth*. Report of the National Bureau of Economic Research. Princeton, N.J.: Princeton University Press.
- Plotnick, R., and F. Skidmore. 1975. *Progress against poverty: A review of the 1964–1974 decade*. New York: Academic Press.
- Theil, H. 1967. *Economics and information theory*. Chicago: Rand McNally.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1978. Regional differences in personal income growth, 1929–1977. In *Survey of current business*, October. GPO.
- . 1981. Regional and state projections of income, employment, and population to the year 2000. In *Survey of Current Business*, November. GPO.
- U.S. Department of Commerce, Bureau of the Census. *Statistical abstract of the United States*. Washington, D.C.: GPO.

Comment Peter Gottschalk

The authors start from two well-known observations. First, there has been a convergence of mean incomes between states over the last decade. Second, transfer payments have increased substantially over the same period. This rise in transfers has served to offset the increasing inequality of market incomes leading to a fairly stable degree of inequality of post-transfer income. The authors ask whether the increased transfers explains not only the stability in the personal income distribution but also the convergence of average incomes across states.

Since the authors summarize their conclusions clearly, I will not repeat all their conclusions here. However, in case the massive amount of documentation hides what I consider to be the most interesting conclusion, let me stress it. Less than 2 percent of the overall inequality in market-generated income (or in any of their post-tax or post-transfer income concepts) is caused by inequality *among* states. This implies that

Peter Gottschalk is a professor of economics at Bowdoin College, Brunswick, Maine, and is affiliated with the Institute for Research on Poverty.

even if we were to institute a fully effective regional policy, which would totally equalize average incomes among states, this would have a negligible impact on overall inequality unless it also decreased within-state inequality. This is a striking conclusion of crucial importance in the debate about whether regional policy should be designed to achieve distributional goals.

My comments are divided into two parts. First, I review some of the specific measures used by the authors and suggest some changes. Second, I ask why one would be interested in decomposing changes in inequality into changes attributable to within-state differences and changes attributable to among-state differences.

Methodological Issues

I would like to raise two issues about the methodology used by the authors. The first focuses on the use of relative variances to describe convergence among states. The second focuses on the regressions used to determine the effectiveness of transfers in reducing inequality.

Index of regional inequality. In describing the convergence among states, the authors define an index which is equal to the sum of the variance of the states' relative incomes plus the variance of their relative Theil indexes. I consider each in turn.

The variance of relative mean income is simply an alternative to the among-state Theil index used in the rest of the paper. Since these conceptually measure very much the same thing, all conclusions are basically the same using either index of inequality.

The variance of the relative Theil indexes, however, does add a new dimension. The inclusion of transfers may make the distribution of post-transfer income more similar across states, not only by bringing mean incomes closer together but also by making the spread of these distributions more alike. The latter element is captured by the variance of the relative Theil indexes. Inasmuch as policymakers value having the same degree of inequality in all states, this attribute will enter their social welfare function.

To summarize the two elements of convergence (similar means and inequality), the authors compute the sum of these two relative variances. This part of the paper would have benefited from an explicit discussion of the normative basis for this particular summary measure. By taking the sum of two indexes, the authors implicitly assume that both dimensions have equal weight in the social welfare function. My guess is that the actions of policymakers would reveal a much higher value placed on equalizing incomes among states than on equalizing inequality. This implies that a composite index would place a higher weight on reducing the relative variance of means.

Determinants of regional inequality. The second methodological issue I would like to explore is the authors' explanation of factors that cause transfers to be more or less effective in reducing pretransfer inequality. The decomposition of the difference between the pre- and post-transfer Theil indexes in the appendix is a useful contribution. The authors show that when inequality is measured by the Theil index, the impact of transfers in reducing inequality depends on three factors: (1) the portion of the population receiving transfers; (2) the reduction in the income gap between recipients and nonrecipients, and (3) the dispersion of the distribution of the percentage of income that comes from transfers.

It is interesting to compare this decomposition with the decomposition of income sources, using the variance of log income as the measure of inequality. Using the authors' notation, and letting R be the ratio of post-transfer to pretransfer income, it can be shown easily that the impact of transfers in reducing the log variance is equal to

$$\text{var}(y_3) - \text{var}(y_1) = \text{var}(r) - 2 \text{cov}(ry_1),$$

where lower-case letters represent logarithms. The reduction in inequality from including transfers, therefore, depends on the amount of variation in the size of the transfers (as represented in the variance of r) and whether transfers are correlated with pretransfer income (as captured by the covariance). While I prefer the simplicity of the log variance measure, the authors have provided a useful service by showing us the counterpart using the Theil measure.

Their empirical work, however, is not closely linked to their theoretical appendix. The authors posit a linear approximation to the relationship between the reduction in inequality caused by transfers and two factors: the proportion of the population receiving transfers (η) and the *average* ratio of transfers to total income for recipients in the state (θ). Their appendix, however, shows that the reduction in inequality depends not only on the state means but also on higher-level moments.

This makes intuitive sense. Suppose a state had a larger proportion of people receiving transfers or that the average ratio of transfers to income was higher in the state. How much would this decrease inequality? The answer depends on the extent to which transfers go to people in the lower tail of the distribution. Using log variance to decompose makes this obvious, since there is a covariance term in the expression.

The paper would have been improved by calculating these upper-level moments. The authors could then have regressed all these components of I (the impact of transfers) on state characteristics. The total impact of the state characteristics could then have been calculated using the accounting framework developed in the appendix.

The regression results could also have been made more useful if the authors had included some instruments to reflect the endogenous, policy-

relevant variables which affect the effectiveness of transfers in reducing inequality. These would show what legislative changes could be made to improve the effectiveness of transfers. While states can do relatively little to change the age composition of their population, they can change benefit levels or expand AFDC to include families with an unemployed parent. Without such policy handles, the equations remain merely descriptive devices that do not suggest ways states can change their own destinies.

Normative Issues

The authors' are right in claiming that since policymakers are interested in regional distribution issues, for whatever reason, this is sufficient ground for being interested in the authors' study. However, it may be useful to further explore the underlying rationale to identify possible conflicts between the goal of regional equality and other goals. I will devote the rest of my comments to this issue.

As the authors point out, there is a long tradition of subdividing the population into groups and looking at the within- and between-group inequality. Notably, people have looked at the inequality between the races, among experience groups, and between sexes. The question is why one is interested in any specific grouping of the population. It is only a mechanical matter to calculate these between-group inequality measures. The question I am raising is whether grouping the population according to the state they live in has a clear normative basis.

We need to determine some normative reason for focusing on place of residence as a grouping variable. Any decomposition into between and among inequality implies that we care not only about the total inequality but also about the relative importance of the between and within inequality. To focus attention on this element, I propose that we think in terms of changes in the economy that would keep total inequality constant but change the mix of between and within inequality. Does the relative size of these two components of total inequality have any normative implication?

First, we may inherently be concerned about some types of between-group inequality. This is clearly the case when we think of black-white inequality. Equal average incomes across races might be a legitimate goal in itself. If we are forced to hold inequality constant, we would prefer to see a larger percentage of the inequality attributed to within-race inequality rather than between-race inequality. In this case we may be intrinsically interested in the size of the between-group inequality. Does this hold for states?

Do we feel better knowing that states are totally equal and that all inequality comes from differences in incomes within states? My answer to this question depends crucially on the amount of interstate mobility. If

people are born into a state and can never leave that state, then any increase in among-state inequality decreases the expected income of some people who are tied to a particular locale. In this sense it is equivalent to being black. It may, therefore, be of interest in its own right. On the other hand, if people are mobile, there may be little intrinsic reason to care whether inequality comes from differences among states or within states. Another way of stating this is that we may not be willing to accept greater total inequality in order to change the relative importance of among-state inequality.

A second reason we might be interested in this question focuses on within-state inequality. Suppose deprivation is relative. If persons living in poor states view their condition in relationship to other people in the same state, then we should applaud any decrease in the relative importance of within-state inequality. An *increase* in among-state inequality matched by offsetting reductions in within-state inequality may increase social welfare. Again, we are interested in the decomposition of inequality, but in this case we would like to see the relative size of the within inequality diminished.

While certain circumstances may arise where the relative size of these two components of inequality may enter the social welfare function, many popular arguments seem to view regional equalization only as a means to achieving the goal of reducing poverty or total inequality. In this light the authors' paper is extremely useful, for it shows that if regional development increases the mean income of poor states, but does nothing to the within-state inequality, it will have little impact on total equality. Only programs targeted at decreasing within-state inequality are likely to have a large impact. The question one would then want to raise is why these should be regional programs? Why should programs not be targeted at the poor directly if a reduction in their numbers is the goal?

Summary

The authors have presented a massive body of evidence which takes a good deal of time to digest. For anyone seriously interested in within- and among-state inequality, the authors have provided a gold mine. It seems difficult to imagine many additional numbers that anyone would still want to be calculated. The strength of the paper lies in its processing a huge amount of information and clearly presenting the results. What remains to be done by those in this field is to develop the normative foundations and the theoretical links between policy instruments and increases in this dimension of social welfare.