The Effect of Race and Sex on Welfare Benefits

Howard Gensler

The organization of income-maintenance programs in the United States is mandated to a large extent by federal regulations, because most programs are funded by the federal government. However, the historically local nature of charity and relief in the United States has resulted in individual states and counties implementing most welfare programs.[1] The system is far from unified, with a host of relatively independent programs that differ in the nature of benefits, funding source, and control.

The U.S. welfare system is designed to relieve economic need, which depends on income and family size and varies by location and over time. Welfare is not awarded automatically, but is obtained through application and qualification that are affected by administration and organization. The issue this paper examines is whether, in practice, personal characteristics affect the allocation of welfare grants. The personal characteristics examined are race and sex.

Welfare depends on need, which is a function of family size and income. Larger families have greater need and qualify for more support. As income increases, need declines and support is curtailed. That basic relationship characterizes the nature and structure of the various welfare programs. Racial and sexual preferences have not been incorporated in the statutory criteria for the determination of welfare benefits. The American welfare system can be tested for race-based and sex-based welfare grant allocation disparities through an analysis of welfare and income data from the Current Population Survey (CPS).

There have been many studies of differentials in wages attributable to personal characteristics such as race and sex. The initial empirical

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[1]See LaFrance (1982), Drew (1987), and Peterson and Rom (1990).

studies noted a disparity in wages between the races and the sexes. This disparity shrank the more other things were held constant. Controlling for education, tenure, noninterruption of employment history, residence, and occupational choice, the disparity in wage rates between the races and the sexes declined significantly.[2] Although the earnings gap between the races and the sexes in the workplace has been well studied, similar attention has not been paid in the public arena. There have been no previous investigations into the neutrality of welfare allocations. Barr and Hall (1975) estimate the implicit tax rate of the Aid to Families with Dependent Children (AFDC) program. They include a "dummy variable" for race in their model of benefit determination. Of the nine cities which they analyze, race is statistically significant in only three cities, and of nontrivial magnitude in just one city.

This article employs the same type of analysis that Barr and Hall undertook, only with the specific aim of estimating the impact of group-specific characteristics on welfare grant allocations. After developing a general model of welfare benefits, a test for disparity in welfare allocations is proposed. The data analyzed in the study are then described, and the results are presented. Statistically significant disparities in the allocation of welfare based on personal characteristics such as race and sex are ascertained by the test.

A General Model of Welfare

Welfare consists of a guarantee level and an implicit tax rate at which benefits are forfeited as income is earned. Although most American welfare funding is federal, the benefit levels are set by the states and vary widely. As Moffitt (1992) notes, the AFDC benefit for a family of four in 1989 ranged from $144 per month in Mississippi up to $788 per month in California. Although the AFDC tax rate is mandated by Congress, the variation in implicit tax rates among the states is well documented.[3] Accordingly, welfare must be estimated at the state level. The general model for welfare is as follows:

$$W = \alpha + \beta K + \tau Y, \tag{1}$$

where W is the amount of welfare per year, K is the number of children, and Y is family income.[4] Here, α is interpreted as the guarantee amount

[2]See Blau and Ferber (1987), Blinder (1973), Cain (1986), Corcoran and Duncan (1979), Field and Wolff (1991), Flanagan (1974), Groshen (1991), Gwartney and Stroup (1973), Mincer and Polacheck (1974), Oaxaca (1973), and Roos (1981).

[3]See Lurie (1974) and Fraker, Moffitt, and Wolf (1985).

[4]See Appendix for specifications of the full model by family structure.

for the adult(s), β is the additional amount of welfare allowed per child, and τ is the tax rate on income.[5]

The Disparity Test

The magnitude of disparity in allocations of welfare due to race or sex can be ascertained by the inclusion of a dummy variable for the personal characteristic of interest in welfare-benefits model. Interactive terms between the personal characteristic dummy variable and the children variable determines the difference in welfare allocation per child by group. Interactive terms between the personal characteristic dummy variable and the income variables identifies differences in implicit tax rates between the groups. Differences in funding levels across time can be controlled for by including a vector of year dummy variables. Because welfare is administered at the state level, the model is estimated separately for each state. The basic test can be illustrated as follows:

$$W = \alpha + \gamma_p P + \beta K + \gamma_k PK + \tau_y Y + \gamma_y PY, \tag{2}$$

where P is the dummy variable for the personal characteristic. The coefficient on the personal characteristic dummy variable, γ_p, is the magnitude of disparity in base welfare allocations due to the personal characteristic. The coefficient on the children variable interacted with the personal characteristic dummy variable, γ_k, indicates the magnitude of the disparity in welfare allocations per child due to the personal characteristic. The coefficients on the income variable interacted with the personal characteristic dummy variable, γ_y, indicates the difference in the implicit tax treatment of income between the two groups.[6]

The Data

The data used in this study come from the U.S. Department of Commerce, Bureau of the Census' *Current Population Surveys: Annual Demographic Files* (1980–91).[7] The data set includes labor

[5]Because of the problem of left-censoring at the zero welfare benefit level, estimating welfare program parameters with ordinary least squares regression applied to a sample restricted to welfare recipients will provide biased estimates. The correct estimation technique is the Tobit procedure applied to a sample of welfare recipients and nonrecipients. See Maddala (1988); Amemiya (1973); and Fraker, Moffitt, and Wolf (1985).

[6]See Appendix for specifications of the full disparity test by family structure.

[7]The original collector of the data, the U.S. Bureau of the Census, and the distributor of the data, the Inter-University Consortium for Political and Social Research, bear no responsibility for uses of the data nor for interpretations or inferences based on such uses. All opinions, analyses, and conclusions are solely the author's.

force data, demographic information, and other economic information on persons older than 14. The population is limited to civilian residents of the United States living in noninstitutional circumstances and men in the Armed Forces residing in nonmilitary housing. Nearly 60,000 households across almost 2,000 counties are contacted each year.

For my study, I used a sample of low income, nonmilitary, nonfarm households derived from the March CPS files. Total household income was limited to twice the official poverty level. Because my study analyzes welfare, individuals with higher incomes were not included. The following comparisons were made: (1) Black and non-black households consisting of single females with children and also married couples with children were compared to determine whether there was a race-based disparity in welfare allocations; and (2) single females with no children were compared to single males with no children to determine whether there was sex-based disparity in welfare allocations. Although it would have been more interesting to compare single females with children to single males with children because welfare largely depends on the presence of children, there are so few single males with children in the sample that such a comparison could not be made. Subjects were further limited in age from 18 to 65. Alaska, Hawaii, and Puerto Rico were excluded, and the District of Columbia was included. CPS data are cross-sectional data collected annually. Economic data are from the previous year. Therefore, information for the years 1979 through 1990 was collected. The 12 annual independent data sets were pooled. All dollar figures are expressed in constant 1986–87 dollars.

For the study of single females with children, 20,281 pooled observations were analyzed. The average age of the single female was 31.5, with an average of 11.1 years of education. Thirty-three percent of the single females were black and 56 percent received some amount of welfare. Earned income averaged $3,616 per year. Unearned, nonwelfare income averaged $2,200 per year. Finally, 59 percent participated in the labor force. Those women received an average of $2,135 in welfare payments per year. Given that a single female household head received welfare, the average annual grant was $3,810.

For the study of married couples with children, 25,442 pooled observations were analyzed. The average age of husbands was 34, with an average of 11 years of education. The average age of wives was 32.1 years, with an average of 11 years of education. Eleven percent of the sample was black and 26 percent received some amount of welfare. Husbands earned an average of $9,935 per year; wives earned an average of $2,020 per year. Families had an average of $1,380 of unearned, nonwelfare income per year. Eighty-five percent

of husbands and 52 percent of wives participated in the labor force. Those families received an average of $601 of welfare per year. If the family actually received welfare, the average annual grant was $2,345.

The sample of 22,292 single persons with no children consisted of 12,567 single females and 9,725 single males. The average age of the single female was 41, with an average of 11.6 years of education. Of the women, 14 percent were black, 64 percent participated in the labor force, and 20 percent received some amount of welfare. Wage income averaged $3,248 per year, and nonwage, nonwelfare income averaged $1,911 per year. The group received an average welfare payment of $202 per year. Given that the subject was a welfare recipient, the average welfare payment per year was $1,024.

The average age of the single male was 34.9, with an average of 11.8 years of education. Of the men, 16 percent were black, 73 percent participated in the labor force, and 16 percent received some amount of welfare. Wages averaged $3,248 per year, and annual nonwage, nonwelfare income averaged $1,911. That group received an average welfare payment of $178 per year. Given that the subject was a welfare recipient, the average welfare payment per year was $1,080.

Welfare included the cash or cash-equivalent income support programs. Those programs include AFDC, food stamps, the low income home energy assistance program, emergency assistance, and general assistance. AFDC requires the presence in the home of a dependent child. In 1990, $21 billion was allocated through that program to 12 million people. Food stamps provided $18 billion in benefits in 1990, and energy assistance provided nearly $1.4 billion in subsidies that year. Emergency assistance, a federal program designed to prevent the termination of vital utility service caused by unforseen personal problems, provided nearly $350 million in assistance in 1990. General assistance, a county-based relief program, is the historical origin of welfare. Despite the rise of the federal dollar on the welfare scene, general assistance provided $2.9 billion in 1990. It is clear that a study of welfare cannot be limited to AFDC, which accounts for only about 50 percent of the income-maintenance programs in the United States.[8]

Results of the Disparity Tests

The data sets were analyzed separately for race and sex disparity as appropriate in welfare allocations at the national and state levels.

[8]Housing subsidies were excluded from this measure of welfare. Although housing subsidies are a cash-equivalent welfare program, they are difficult to value. Less than 7 percent of single female-household heads and less than 2 percent of the married couples with children received any amount of housing assistance, so the magnitude of the understatement should be small.

In the national test for single female household heads, blacks received $756 more per year than non-blacks. There was no statistically significant difference in welfare allocations per child between races. However, blacks paid 7 percent more tax on earned income and 14 percent more tax on unearned income. The results of the national-level test for single female household heads are presented in Table 1.

The results for the individual state-level tests for single female household heads are presented in Table 2. For single female household heads, 13 states had statistically significant base welfare allocation disparities attributable to race. Eleven states favored blacks, and two states favored non-blacks. Of the 11 states that favored blacks, only two gave a statistically significant smaller amount of money to black children than to non-black children (six more states gave less money to black children, but not at the statistically significant level of 95 percent). Both states that gave non-blacks more welfare gave a statistically significant smaller amount of money to non-black children. Another three states gave a statistically significant greater allocation to black children, and two more states gave a statistically significant greater allocation to non-black children. Assuming a two-child family with no income, the total disparity from the guaranteed level of benefits and the child allotment was computed for states where one or the other of the two factors was statistically significant. The results are presented in the final column of Table 2. Fifteen such states gave

TABLE 1

NATIONAL-LEVEL RACE-BASED DISPARITY: SINGLE FEMALE HOUSEHOLD HEADS

Variable	Coefficient	Std. Error	*t*
Race dummy	755.54	110.31	6.85
Children	1,247.86	27.82	44.85
Earned income	−.591	.009	−68.79
Unearned income	−.378	.009	−42.42
Race dummy × children	−17.67	40.69	−0.43
Race dummy × EI	−.067	.013	−5.05
Race dummy × UI	−.137	.014	−9.92
Year dummies	Yes		
State dummies	Yes		
Constant	2,633.06	108.77	24.21

NOTES: Tobit estimation of welfare model for single female household heads. Dependent variable is welfare per year; observations are 20,281; log likelihood is −111,950; race dummy is black = 1, otherwise = 0; EI is earned income per year; UI is unearned income per year. All dollar values are in constant 1986–87 dollars.

TABLE 2

STATE-LEVEL RACE-BASED DISPARITY: SINGLE FEMALE HOUSEHOLD HEAD

State	G	C	T_y	T_v	Net
AL	$570	$218	.02	.16	
AR	1,288*	28	−.02	.03	$1,344
AZ	−2,309	773	.40	.17	
CA	1,866*	−321	.05	.05	$1,224
CO	2,803	−3,234*	.20	.77*	−$3,665
CT	−1,737	763	−.01	−.01	
DE	729	−741	.23	.52*	
FL	1,481*	80	.00	−.04	$1,641
GA	977	282	−.02	−.01	
IA	−2,286*	1,590*	−.14	.38*	$894
IL	35	391*	−.02	.15*	$817
IN	1,259	205	−.06	−.07	
KS	2,484*	−300	.09	−.26*	$1,884
KY	−418	313	.03	−.14	
LA	2,817*	−203	−.01	.29*	$2,411
MA	−207	−251	.15	.22	
MD	1,715	468	−.19*	−.12	
MI	1,589*	−509*	.00	.27*	$571
MN	−190	693	−.19	−.14	
MO	691	196	.16*	.26*	
MS	2,136*	−358	−.08	.13	$1,420
NC	957	347	−.04	.06	
NE	1,011	20	−.02	.33	
NJ	1,431*	−355	.02	.26*	$721
NM	−2,280	820	−.15	.23	
NY	178	−334*	.19*	.06	−$490
OH	591	235	.01	.03	
OK	252	548	−.12	−.09	
OR	2,079	−107	.01	−3.41	
PA	592	−67	.20*	−.03	
RI	2,724*	−1,255*	.17	.48*	$214
SC	977	760*	−.06	−.07	$2,497
TN	1,490*	262	.00	−.08	$2,014
TX	587	116	−.01	.00	
UT	344	−245	.20*	.11	
VA	−72	1,151*	−.01	.08	$2,950
WA	2,678	−668	.04	−.41	
WI	−2,077*	860*	.06	.61*	−$357
WV	3,990*	−531	−2.05*	−.22	$2,928

NOTES: Tobit estimation of welfare model for single female household heads. G is the extra amount of welfare blacks receive; C is the extra welfare per child blacks receive; T_y and T_v are the additional taxes blacks pay on earned and unearned income, respectively. *Significant at the 95% level.

black families an average of $1,569 more welfare per year than non-black families. Those states were Virginia ($2,950), West Virginia ($2,928), South Carolina ($2,497), Louisiana ($2,411), Tennessee ($2,014), Kansas ($1,884), Florida ($1,641), Mississippi ($1,420), Arkansas ($1,344), California ($1,224), Iowa ($894), Illinois ($817), New Jersey ($721), Michigan ($571), and Rhode Island ($214). Three states gave non-black families an average of $1,504 more welfare per year than similarly situated black families. Those states were Colorado ($3,665), New York ($490), and Wisconsin ($357).

For married couples with children, the national analysis indicated that blacks receive $395 more welfare per year, but $27 less welfare per year per child. Black fathers paid 14 percent less in implicit taxes than their non-black counterparts, and black mothers paid 4 percent less in taxes. Blacks paid 4 percent less taxes on unearned income. Assuming a two-child family with no income, blacks would have received $341 more welfare per year than non-blacks. The results of the national-level analysis are presented in Table 3.

The results for the individual state-level tests for married couples with children are presented in Table 4. Six states awarded a statistically significant greater base amount of welfare to blacks, and two states awarded non-blacks a greater base amount. One additional state awarded more welfare for each child to blacks, and four states (including

TABLE 3

NATIONAL-LEVEL RACE-BASED DISPARITY: MARRIED COUPLES WITH CHILDREN

Variable	Coefficient	Std. Error	*t*
Race dummy	395.19	210.63	1.89
Children	153.27	6.39	24.00
Husband's income	−.408	.007	−62.51
Wife's income	−.413	.013	−32.64
Unearned income	−.231	.012	−19.15
Race dummy × children	−27.31	9.07	−3.01
Race dummy × HI	.139	.015	9.24
Race dummy × WI	.041	.029	1.45
Race dummy × UI	.144	.029	3.76
Year dummies	Yes		
State dummies	Yes		
Constant	2,530.79	159.00	15.92

NOTES: Tobit estimation of welfare model for married couples with children. Dependent variable is welfare per year; observations are 24,340; log likelihood is −67,036; race dummy is black = 1, otherwise = 0; HI is husband's annual income; WI is wife's annual income; UI is unearned income per year. All dollar values are in constant 1986–87 dollars.

TABLE 4

STATE-LEVEL RACE-BASED DISPARITY: MARRIED COUPLES WITH CHILDREN

State	G	C	T_w	T_h	T_v	Net
AL	$256	$68	.04	.06	.25*	
AR	2,872*	−58	−.11	−.11	−.06	$2,756
AZ	7,495*	−187	−.20	−.24	−1.37*	$7,121
CA	1,956	−10	−.11	.05	.05	
DE	1,829	58	−.09	−.03	−.19	
FL	781	−13	−.02	.11*	−.04	
GA	189	−57	−.07	.17*	.23	
IL	4,804*	−17	−.26*	−.29*	−.46*	$4,770
IN	−1,260	−30	.24*	.20*	−.01	
KS	1,594	1,224	—	−.08	.23	
KY	−3,865*	64	.45*	.37*	−.10	−$3,737
LA	3,373*	−6	−.31	.03	−.35*	$3,361
MA	−2,081	−267	−.20	.39	−.53	
MD	−2,577	−0	.17	.27	—	
MI	1,424	−28	−.21	.01	.11	
MO	1,497	194*	−.22	−.06	.09	$1,885
MS	2,551*	−49*	−.12	.00	−.08	$2,453
NC	477	27	−.14*	.13	.03	
NJ	−1,082	35	.24	.37*	.15	
NV	5,311	−1,875	.23	−.18	—	
NY	−1,083	−19	.08	.19*	.24	
OH	−798	−155*	.27*	.18*	.30*	−$1,108
PA	1,971	−12	.23	−.07	−.04	
SC	1,278*	−57*	−.24*	.13*	.03	$1,164
TN	−1,379*	−35	.05	.13*	.66*	−$1,449
TX	−479	−73*	.16*	.05	.14	−$625
VA	717	133	−.19	.02	−.11	
WI	−6,963	−83	−.35	−.53	.01	
WV	−$2,000	$9	.43*	.10	.14	

NOTES: Tobit estimation of welfare model for married couples with children; G is the extra amount of welfare blacks receive; C is the extra welfare per child blacks receive; T_w, T_h, and T_v are the additional taxes blacks pay on the husband's earnings, the wife's earnings, and unearned income, respectively. Net is the additional amount of welfare that a black family with two children receives over a similarly situated non-black family where either G or C was statistically significant. *Indicates significant at the 95% level.

two additional states) gave more welfare to non-blacks for children. Assuming a two-child family with no income, the total disparity from the guarantee level and the child allotment is computed for those states where one or the other of the two factors is statistically significant. That

calculation is presented in the final column of Table 4. Seven states awarded black families an average of $3,359 more welfare per year than similarly situated non-black families. Those states were Arizona ($7,121), Illinois ($4,770), Louisiana ($3,361), Arkansas ($2,756), Mississippi ($2,453), Missouri ($1,885), and South Carolina ($1,164). Four states awarded non-black families an average of $1,730 more welfare per year than similarly situated black families. Those states were Kentucky ($3,737), Tennessee ($1,449), Ohio ($1,108), and Texas ($625).

The national test for disparity across sex had 22,292 observations pooled over the entire 12-year period. Females received $358 per year more than males. Women received more support, but also paid higher taxes. Men lost benefits at a 32 percent rate for earned income and a 20 percent rate for unearned income. Women lost benefits at a 42 percent rate for earned income and a 25 percent rate for unearned income. (See Table 5 for those results.)

The results of the analysis at the state level for sex-based welfare allocation disparity found that 11 states had statistically significant annual welfare allocation disparities between the sexes during the period 1979–1990 at the 95 percent confidence level. Ten states, including the District of Columbia, favored women. They were New Hampshire ($2,606), Iowa ($1,337), Washington, D.C. ($1,330), Massachusetts ($1,309), New Jersey ($1,138), South Carolina ($1,091), New Mexico ($912), Mississippi ($895), Illinois ($810), and Texas ($444). Only one state, Montana ($674), favored men. The ten states

TABLE 5

NATIONAL-LEVEL SEX-BASED DISPARITY

Variable	Coefficient	Std. Error	*t*
Sex dummy	358.25	66.97	5.35
Wage income	−.318	.011	−28.83
Unearned income	−.201	.013	−15.41
Sex dummy × WI	−.100	.015	−6.63
Sex dummy × NI	−.048	.017	−2.78
Year dummies	Yes		
State dummies	Yes		
Constant	−542.95	144.00	−3.75

NOTES: Tobit estimation of welfare model for single men and women. Dependent variable is welfare per year; observations are 22,292; log likelihood is −41,630; sex dummy is female = 1, male = 0; WI is wage income; NI is nonwage income. The positive amount for the sex dummy variable coefficient indicates the additional amount of welfare women receive over similarly situated men. Negative amounts for the coefficient on the sex dummy variable interacted with the income variables indicate the higher level of implicit taxes women pay.

TABLE 6

STATE-LEVEL SEX-BASED DISPARITY

State	G	T_y	T_v	State	G	T_y	T_v
AL	$647	−.12	−.10	AR	$416	.07	.00
AZ	921	−.05	1.59	CA	−286	−.03	−.01
CO	753	−.11	−.13	CT	−1,455	−1.18	−.17
DC	1,330*	−.23	−.10	DE	1,482	−.30*	−.20
FL	607	−.16*	.01	GA	245	.00	.05
IA	1,337*	−.32*	−.10	ID	348	.03	−.05
IL	810*	−.12	.02	IN	−51	.08	.01
KS	557	−.45	−.14	KY	423	.09	−.03
LA	−518	−.07	.04	MA	1,309*	−.04	−.29*
MD	936	.02	−.34	ME	−297	−.03	.05
MI	−426	−.10	.08	MN	212	−.32*	.11
MO	260	−.10	.05	MS	895*	−.10	−.05
MT	674*	.06	−.19*	NC	401	−.11*	−.07
ND	502	−.13	.05	NE	−758	−.20	.31
NH	2,606*	−1.86	−.43	NJ	1,138*	−.23*	−.23
NM	912*	−.11	−.12	NV	1,128	−.07	−.20
NY	410	−.10	−.09	OH	171	−.12	−.06
OK	641	−.06	−.09	OR	−376	.03	.10
PA	7	−.04	.00	RI	606	.05	−.07
SC	1,091*	−.11	−.27	SD	−641	.05	.25*
TN	−409	−.03	.04	TX	444*	−.05	−.04
UT	651	−.24	−.29	VA	−671	−.10	.14
VT	−56	.07	.07	WA	1,060	−.05	.05
WI	734	−.29	−.15	WV	−625	−.08	.03
WY	51	.02	.10				

NOTES: Tobit estimation of welfare disparities between single men and women. G is the amount of additional welfare guarantee level afforded women; T_y is the additional tax rate on earned income paid by women; T_v is the additional tax rate on unearned income paid by women. *Indicates significant at the 95% level.

that favored women gave them an average of $1,187 more welfare per year. The results of the individual state-level tests are presented in Table 6.

Conclusion

At the national level, both the race-based and sex-based analyses for every group examined found that disparities exist in the allocation of welfare. Black single female-headed households received $756 more welfare per year than similarly situated non-black families. For a one-child family, this difference amounted to 16 percent. For a two-child

family, this difference amounted to 13 percent. Black two-parent families received $395 more base welfare per year, but $27 less welfare per year per child, than similarly situated non-black families. That difference amounted to 12 percent for a one-child family and 11 percent for a two-child family. Similarly, significant sex-based disparities existed in the allocation of welfare at the national level. Single women with no children received $358 more welfare per year than similarly situated men.

At the state level for single female-headed households, 15 states gave blacks an average of $1,569 more welfare per year, and three states gave non-blacks an average of $1,504 more welfare per year. At the state level for married couples with children, seven states gave blacks an average of $3,359 more welfare per year, and four states gave non-blacks an average of $1,730 more welfare per year. With respect to sex-based disparities, ten states gave women $1,187 more welfare per year on average, and one state gave men $674 more welfare per year.

The analysis of disparity in the allocation of welfare based on personal characteristics such as race and sex indicates that fundamental problems of equity in either access or assessment persist in the income maintenance system. Although it is not clear why certain groups benefit disproportionately in the welfare system, it is certainly arguable that the method of welfare allocation is a root cause. An alternative system such as a negative income tax program, based solely on income, would be free from possible biases in access, administration, design, targeting, or availability. A federal negative income tax system would also allow uniformity in support levels and implicit tax rates.

The cost of living varies more within states than across states. McMahon and Melton (1978) note that interstate costs of living vary 37 percent, and intrastate costs of living at the average of the county level varies from 21 percent to 37 percent in the four states they examined. Of course, as they admit, "There is heterogeneity within these areas." The intracounty cost of living variation is quite large and must be added to the reported intrastate variation, which is already comparable in magnitude to the total interstate variation. Accordingly, the argument for interstate variation in benefit levels is greatly eviscerated, and the need for local control no longer seems compelling.

However, the purpose of this discussion is not to advocate any particular solution to the problem of disparity (and variability) in welfare allocations. Rather, the purpose is to identify the nature and scope of the inequitable allocation problem itself. The reference to a negative income tax system places the problem in a context that demonstrates that a specific choice of program design may lend itself

to greater or lesser unintended consequences. As things now stand, substantial allocation disparities persist in the administration of the American income-maintenance system.

Appendix: Welfare Benefit Models and Disparity Tests

Welfare Benefit Models

The following models of welfare reflect the different household structures.

For single female household heads:

$$W_i = \alpha + \beta_k K_i + \tau_y Y_i + \tau_v V_i + \epsilon_i. \tag{3}$$

For married couples with children:

$$W_i = \alpha + \beta_k K_i + \tau_h Y_{hi} + \tau_w Y_{wi} + \tau_v V_i + \epsilon_i. \tag{4}$$

For single persons with no children:

$$W_i = \alpha + \tau_y Y_i + \tau_v V_i + \epsilon_i, \tag{5}$$

where W_i is the amount of welfare per year, K_i is the number of children, Y_i is the earned income of a single female household head or single person, Y_{hi} is the earned income of husband, Y_{wi} is the earned income of wife, V_i is the unearned income excluding welfare, and ϵ_i is a mean-zero random error term of the i^{th} family.

In the models given here, α is interpreted as the guarantee amount for the adult (or for both adults), β_k is the additional amount of welfare allowed per child, τ_h is the tax rate on the husband's earnings, τ_w is the tax rate on the wife's earnings, τ_y is the tax rate on earned income for a single female household head or a single person, and τ_v is the tax rate on unearned income.

Disparity Tests

The following models test for race disparities in various household structures:

For single female household heads:

$$W = \alpha + \gamma_r R_i + \beta_k K_i + \gamma_k R_i K_i + \tau_y Y_i + \gamma_y R_i Y_i + \tau_v V_i + \gamma_v R_i V_i + \beta_a A_i + \epsilon_i. \tag{6}$$

For married couples with children:

$$W_i = \alpha + \gamma_r R_i + \beta_k K_i + \gamma_k R_i K_i + \tau_h Y_{hi} + \gamma_h R_i Y_{hi} + \tau_w Y_i + \gamma_w R_i Y_{wi} + \tau_v V_i + \gamma_v R_i V_i + \beta_a A_i + \epsilon_i, \tag{7}$$

where R_i is a race dummy variable (black = 1, non-black = 0), and A_i is a vector of year dummy variables.

The coefficient on the race dummy variable, γ_r, is the magnitude of disparity in base welfare allocations attributable to race. The coefficient on the children variable interacted with the race dummy variable, γ_k, indicates the magnitude of the race-based disparity in welfare allocations per child. The coefficients on the income variables interacted with the disparity dummy variables, γ_y, γ_h, γ_w, and γ_v, indicate the difference in the implicit tax treatment of income between the two races. To analyze racial disparity in welfare allocations at the national level, a vector of state dummy variables is added to the model. The interpretation of the coefficients is the same, but applied to the nation as a whole.

The magnitude of disparity in allocations of welfare by sex can be ascertained by the inclusion of a sex dummy variable, S_i (1 = female, 0 = male), in the model of welfare benefits as developed here. Interactive terms between the sex dummy variable and the income variables identifies differences in implicit tax rates between the sexes. Disparities in the allocation of welfare by sex at the state level can be identified by estimating the expanded welfare model on each state separately. That is done for the single men and women (with no children) group:

$$(8) \qquad W_i = \alpha + \gamma_s S_i + \tau_y Y_i + \gamma_y S_i Y_i + \tau_v V_i + \gamma_v S_i V_i + \beta_a A_i + \epsilon_i.$$

The coefficient on the sex dummy variable, γ_s, is the magnitude of disparity in welfare allocations attributable to sex. As before, the coefficients on the income variables interacted with the sex dummy variables, γ_y and γ_v, indicate the difference in the implicit tax treatment of income between the sexes. To analyze sex disparity in welfare allocations at the national level, a vector of state dummy variables is again added to the model. The interpretation of the coefficients is the same, but summarizes the nation as a whole.

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