Abstract

This study includes the marginal cost of redistribution (MCR) in analyzing the adjusted tax price faced by the median voter. The adjusted tax price is then used to analyze the degree to which efficiency costs change the level of income redistribution provided through the Aid to Families with Dependent Children (AFDC) program. The results of this article suggest that efficiency costs, on average, raise the cost of AFDC transfers by approximately 28% and reduces the level of AFDC redistribution by about 14.6%.

EFFICIENCY COSTS AND THE DEMAND FOR INCOME REDISTRIBUTION

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I. INTRODUCTION

In analyzing the cost of income redistribution in public choice models, researchers have not included the efficiency costs. This article extends the literature on the demand for income redistribution by incorporating the role of efficiency costs. Essentially, this approach treats efficiency costs as part of the "full price" on redistributing income. In this article, efficiency costs are caused by the labor supply distortions associated with the collection of the tax revenue used to finance income redistribution.

This study includes the marginal cost of redistribution (MCR) in determining an adjusted tax price faced by the median voter. The adjusted tax price is then used to analyze the degree to which efficiency costs reduce the level of income redistribution provided through the Aid to Families with Dependent Children (AFDC) program. The

PUBLIC FINANCE REVIEW, Vol. 26 No. 3, May 1998 214-230

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results of this article suggest that efficiency costs, on average, raise the cost of AFDC transfers by approximately 28%. Furthermore, the analysis allows for the calculation of the extra redistribution that could occur, without additional tax revenue, if the income redistribution program were financed with nondistortionary taxation.

This article is organized as follows: Section II discusses the demand for income redistribution and the variables that affect the marginal cost of transferring income via the AFDC program. Section III discusses the empirical model and the calculation of the MCR. Section IV presents the econometric results. Finally, Section V summarizes the findings of this article and discusses policy implications.

II. DEMAND FOR INCOME REDISTRIBUTION

Assume that the amount of income states provide to AFDC recipients is determined by a demand function for income redistribution. Orr (1976) was the first to examine income transfer programs as the result of a demand for income redistribution. Orr explains the level of income redistribution in terms of the median voter's tax price for an additional dollar of redistribution and other economic variables. The tax price is an estimate of the median voter's marginal cost of a dollar increase in the AFDC transfer. The basic tax price is the ratio of the number of income transfer recipients divided by the number of donors.

We adjust the basic tax price for three effects. First, tax exporting—a measure of the ability to shift tax burdens to residents in other jurisdictions (states)—is incorporated by multiplying by 1 minus the tax exporting rate. Tax exporting lowers the marginal cost of all publicly provided services. Second, an adjustment is made for the federal government matching funds by multiplying by 1 minus the AFDC or Medicaid matching grant. States choose whether to receive the AFDC or Medicaid matching grant, both of which give a larger subsidy to states with relatively low per-capita incomes. The adjustment for tax exporting and matching grants has previously been incorporated into demand models for income redistribution (see, e.g., Colburn 1992). Third, we adjust the tax price to include the MCR—the ratio of the income transfer donors' losses in real income divided by the transfer recipients' gains in real income. The MCR includes the efficiency costs associated with income redistribution.

As mentioned above, the MCR is the ratio of the donors' losses in real income divided by the recipients' gains in real income. The cost to the state of redistributing one dollar to each AFDC recipient is one dollar if there are zero efficiency costs. In other words, if the marginal welfare cost (MWC) is equal to 0, the MCR equals 1. As the size of the MWC increases, the cost to the state to redistribute income also rises. The MCR may be written as

$$\text{MCR} = \frac{\text{Tax } \textit{Increase} + \text{MWC}}{\text{Recipient } \textit{Transfers}}. \quad (1)$$

Efficiency costs increase the median voter's tax price (TP_i). The modified tax price (TP_i^*), which includes efficiency costs, is calculated as

$$TP_i^* = TP_i * \text{MCR}. \quad (2)$$

The effect of including the MCR on the demand for AFDC is shown in Figure 1. D_A represents the demand for income redistribution through the AFDC program and describes the marginal benefit from an extra dollar of income redistribution. The tax price, measured along the vertical axis, is the median voter's marginal cost of a dollar of income redistribution. Without distortionary taxation, the TP_i equals TP_1. The corresponding level of AFDC transferred to each recipient is A_1.

Including the MCR increases the price of redistribution; hence, the quantity of redistribution demanded is reduced. TP_2 corresponds to the TP_i^*, which equals TP_1 * MCR. The median voter provides A_2 to each AFDC recipient. The shaded region illustrates the additional cost to the median voter of redistributing income. The area is equal to TP_1 * (MCR – 1) * A_2. (MCR – 1) may be interpreted as the efficiency costs per dollar of income redistribution. Hence, we calculate TP^* in this article as TP + (MCR – 1) TP.

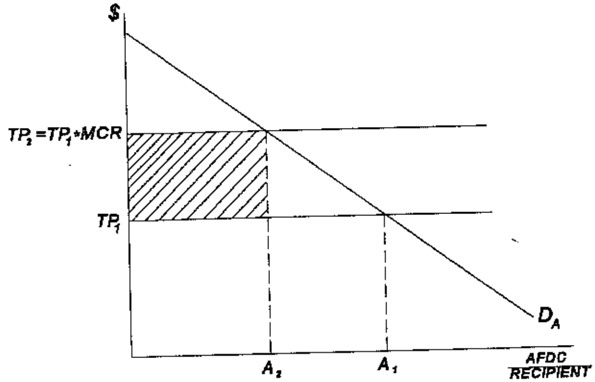

Figure 1: The Effect of Including Efficiency Costs

III. EMPIRICAL MODEL

This section develops the econometric model that tests the effect of including the MCR in the tax price. There is particular emphasis on the methodology employed to calculate the MCR.

As earnings are reduced because of the increase in the marginal tax rate, taxes paid from the original tax are also reduced. This reduction in taxes paid is calculated as the original marginal wage tax rate times the reduction in earnings. The reduction in earnings is ve(ΔMTR/(1 – MTR)) $*\varepsilon_u * W * H$, where MTR is the original marginal wage tax rate, ΔMTR is the percentage increase in the MTR necessary to redistribute $1 to each AFDC recipient, W is the wage rate, H is the labor supply before the increase in the MTR, ε_u is the uncompensated labor supply elasticity, and $\frac{\Delta \text{MTR}}{(1 - \text{MTR})}$ is the percentage change in the net wage, assuming there is no change in the market wage in response to ΔMTR. The additional taxes paid are then calculated as the $\Delta \text{MTR} * W * H$ minus the reduction in tax revenue from the original MTR for each household.

Following Browning (1987), we calculate the MWC as

$$\text{MWC} = (.5\Delta\text{MTR} + \text{MTR})\frac{WH_2\varepsilon_c}{(1-\text{MTR})}\Delta\text{MTR}, \tag{3}$$

where ε_c is the compensated labor supply elasticity. The MWC will be larger if the MTR is higher or ε_c is more elastic.[1]

The MWC calculated in this article only includes labor supply distortions. The MCR does not include administrative or compliance costs or the effects of increases in the wage tax on either the choice of occupation or savings. Furthermore, we do not adjust the MCR due to changes in the lifetime distribution of income that make the income distribution more equal.[2] The MCR would be larger if these effects were included.

The distribution of labor income affects the MCR. To calculate the distribution of labor income, 100 households are assumed to make up each state's annual income and earnings distribution. The annual income distributions have the same degree of inequality as the annual income distributions found in the 1980 Census Population Survey. The 1980 Panel Study of Income Dynamics allowed for the determination of the difference between income and earnings in each state. Some states were eliminated from the data set because of a lack of required observations to generate an earnings distribution.[3]

Considering only labor supply effects, Browning and Johnson (1984) and Horowitz (1990, 1993) demonstrate that the size of the MCR is affected by (a) the MTR, (b) ε_c, (c) the distribution of labor income, and (d) features of the tax transfer system. The MCR will be larger if (a) the MTR is higher and (b) ε_c is higher.

Lack of data on labor supply elasticities by state required assumptions to be made about the magnitude of the elasticities. An ε_c of 0.2 and an uncompensated labor supply elasticity (ε_u) of 0.35 are central case estimates. Subsequent sensitivity analysis (presented in the following empirical section) using a more inelastic set of elasticities ($\varepsilon_c = 0.25$ and $\varepsilon_u = 0.1$) and a more elastic set of elasticities ($\varepsilon_c = 0.45$ and $\varepsilon_u = 0.3$) led to no appreciable change in parameter estimates. Estimates for the marginal tax rate in each state are from

Mutti and Morgan (1983). Computer simulations were used to calculate the MCR in each state. The average is approximately \$1.28.

The \$1.28 MCR suggests that the extra burden imposed from the redistribution of a dollar of income, with the given income distribution and tax transfer system, is about 28 cents. Appendix A presents information on the components of the tax price for a dollar increase in the income transfer for each state for the year 1980, Appendix B presents a detailed discussion and provides an example of the computation of the tax price over time.

This calculation of the MCR is significantly less than other similar measures. For example, Browning and Johnson (1984) calculate the MCR to be \$3.49. Horowitz (1990) calculates the cost to be \$2.52. Horowitz (1993) calculates the cost to be \$2.90. We suggest two reasons for the differences. The first is "tagging" of the AFDC recipient population. Akerlof (1978) defines a group of persons as tagged when they are identified by some characteristic, such as employment, age, and so on. The characteristic used in this study is AFDC recipients. This yields a smaller recipient population than the bottom quintile employed by Browning and Johnson, Horowitz, and others. Akerlof demonstrates that the cost of reducing income inequality is lower with a smaller recipient population. Second, because we do not allow for labor supply distortion by income transfer recipients, the MCR is somewhat downward biased.

The argument presented above suggests that TP_i^* will increase if (a) the number of welfare recipients increases, (b) the number of taxpayers decreases, (c) the matching grant provided by the federal government decreases, (d) the degree of tax exporting decreases, (e) the ε_c of donors rises, and (f) the MTR in the state increases.

Theoretical models on the demand for income redistribution (e.g., Colburn 1990) suggest that, besides the tax price, donor income and federal taxes paid by the donor should be included as factors that affect the demand for income redistribution. Other variables that may affect the level of income redistribution include the tax price of an alternative redistribution program, such as Medicaid, and the percentage of non-White AFDC recipients. The percentage of non-White AFDC recipients variable accounts for discrimination in the level of income transfers by race. Equation (4) is the specification of the AFDC equation. Variables are measured in logarithms so coefficients may be interpreted as elasticities.

$$\ln A = \beta_0 + \beta_1 \ln TP^* + \beta_2 \ln (I - T) + \beta_3 \ln MP^* + \beta_4 \ln FS_g + \beta_5 \ln NWH + \overrightarrow{\beta_6 D_r} \quad (4)$$

where

$\ln A$ = log of the real average AFDC payments, per recipient, per month;
$\ln TP^*$ = log of the tax price, the marginal cost of a dollar of income redistribution, including efficiency cost;
$\ln (I - T)$ = log of the real average per capita after federal tax (T) income (proxy for median voter income);
$\ln MP^*$ = log of the tax price of a unit of Medicaid redistribution, including efficiency cost;
$\ln NWH$ = log of the percentage of the AFDC recipient population that is non-White;
$\ln FS_g$ = log of the real food stamp guarantee;
$\overrightarrow{D_r}$ = vector of state dummy variables.

Each dollar-denominated variable was adjusted with a state-specific price index.[4] The TP^* for income transfers is defined above. The Medicaid tax price was developed by Granneman (1979) and is similar to the tax price for AFDC transfers. The difference between MP^* and TP^* is that MP^* always uses the Medicaid matching grant and is adjusted to account for changes in the cost of providing covered services by state. We further adjust the Medicaid tax price to include the efficiency cost because Medicaid transfers are also provided with public tax dollars.

The expected signs of the parameter coefficients are negative for the T, and positive for after federal tax income $(I - T)$ (presuming income redistribution is a normal good). The other coefficients may be either positive or negative. Empirical results from other studies suggest that the expected sign on the NWH is negative (see, e.g., Orr 1976; Gramlich 1982). The effect of changes in the MP^* is not predicted a priori. Medicaid transfers may be either a complement to or a substitute for AFDC transfers. The coefficient on FS_g measures the degree that federally provided food stamps have altered the demand for income redistribution by states. It is appropriate to include the food stamp guarantee instead of the food stamp transfer itself because the size of the food stamp transfer is a function of recipient income, including AFDC income. Hence, the magnitude of the food stamp transfer is a function of the AFDC transfer. The degree that donors perceive that the federal government provided food stamp transfer is a substitute for the state-determined AFDC transfer may be investigated from consideration of the coefficient on the food stamp guarantee.[5]

IV. ECONOMETRIC RESULTS

Parameter estimates of equation (4) are presented in Table 1 with their t statistics. For comparison purposes, we also provide an estimate of equation (4) without the marginal cost of income distribution included so that the effect of incorporating the marginal cost of income redistribution on the demand for income transfers may be illustrated. Recall that $TP^* = TP + TP(\text{MCR} - 1)$ which allows for variation over time and across states in the modified tax price.[6]

Equation (4) is estimated with a panel data set for the states included for the years 1970 through 1983. We chose a panel data set because of the associated increase in degrees of freedom and efficiency as well as a reduction in colinearity between variables. To account for variation in income redistribution associated with unaccounted for fixed effects, we estimated equation (4) with a least squares dummy variable (LSDV) specification by including a dummy variable for each state. Wisconsin is arbitrarily chosen as the base state. LSDV is appropriate when there exists variation across states that is not relevant to the economic question being asked. To determine the appropriateness of using the LSDV estimator, we performed the Hausman error specification test and concluded that the generalized least squares error was correlated with the fixed effects, which suggests that the LSDV is the appropriate estimator.[7] Dummy variable coefficients, associated with the LSDV estimator of the model with the MCR included, are presented in Appendix C.

A comparison of the results of the two models suggests that the tax price with the MCR included is slightly more elastic than the specification without the MCR included and that the tax price of Medicaid

TABLE 1: Econometric Results

Variable	*Parameter Estimate With MCR Included*	*Parameter Estimate Without MCR Included*
Intercept	−1.9862*	−2.1457*
	(−2.382)	(−2.668)
ln *TP**	−0.5244*	−0.3023*
	(−6.802)	(−7.349)
ln *MP**	0.4217*	0.2802*
	(11.982)	(13.032)
ln (*I* − *T*)	0.4545*	0.5558*
	(3.968)	(4.884)
ln FS_g	0.5947*	0.4678*
	(7.326)	(5.635)
ln *NWH*	−0.0022	−0.0059
	(−0.050)	(−0.138)
R^2	.9447	.9471
F	197.299	206.430

NOTE: *t* statistics in parentheses. Dependent variable = log of AFDC per recipient. MCR = marginal cost of redistribution.
* Significant at 1% risk

transfers is also higher. The other parameter estimates are of approximately the same magnitude.

All variables except the percentage of AFDC recipients who are non-White are statistically significant, and the signs on the variables are very much as expected. The coefficient on the *TP** is negative and its size suggests a relatively inelastic demand. A positive *TP** would not have been entirely surprising, as some authors have argued that a positive relationship between the number of AFDC recipients (part of the tax price measure) and the size of the AFDC transfer indicates an interest group effect in the delivery of income transfers. These results suggest that the price effect dominates the interest group effect.[8] Because of the importance of the tax price coefficient for our analysis, we also estimated the model with the more elastic and more inelastic assumptions of the variables that are incorporated in the MCR and different assumptions about the marginal tax rate. We found no appreciable changes in the coefficients or their levels of significance.[9]

The only change in the two models presented above is the inclusion of the MCR. Because the models are estimated in logs, the models are nested. A comparison of the *F* statistics suggests that the effect of including the log of the MCR is not equal to zero. Using a simple *F* test, we conclude that we cannot reject the null hypothesis that the effect of including the MCR is equal to zero.[10]

The income redistribution tax price elasticity calculated in this study equals –0.52. The impact on the level of redistribution of including the MCR in the AFDC tax price can be estimated with the above results. The 28% average increase in efficiency costs raises the *TP** by 28% and reduces the level of AFDC redistribution by 14.6% (0.28 * 0.52).[11]

The sign on the *MP** is positive. This positive sign suggests that, from the donors' perspectives, redistributing income via the AFDC program is a substitute for the provision of medical transfers to the poor via Medicaid. The sign of the food stamp guarantee coefficient is positive. This is supportive of the finding of Moffitt (1990) that food stamp transfers did not crowd out AFDC transfers. The sign on after federal tax income ($I - T$) is also positive and suggests that income redistribution is a normal good. The positive and lack of significance on the *NWH* is somewhat surprising, as other studies have found a negative coefficient on this variable (see, e.g., Orr 1976). The *t* statistics on the state dummy variables, presented in Appendix C, suggest that there is some state-specific variation not explained by the independent variables and supports the use of the LSDV specification. Recall that the Hausman error specification test presented above suggested the selection of the LSDV specification.

Appendix D provides estimates of the per recipient and the total decline in AFDC transfers for each state in the sample when efficiency costs are included in the tax price for 1980. As expected, the reduction in transfers is greater in high-benefit, high-recipient population states such as California and New York than in low-benefit states such as Mississippi and Arkansas. This result is expected because the high-benefit states often have higher marginal costs of redistribution and smaller subsidies from the federal government. Both of these effects increase the tax price and yield a relatively larger reduction in AFDC transfers than in other states. For example, two of the high-benefit states, New York and California, have the largest declines in AFDC transfers due to both their levels or redistribution and their tax prices.

V. SUMMARY AND CONCLUSIONS

This article includes the MCR in analyzing the tax price faced by the median voter. The effect of including the MCR into the tax price is estimated with a model that incorporates characteristics of the actual tax transfer system in 35 states.

The average MCR calculated in this study is approximately $1.28. This figure is lower than the estimates of Browning and Johnson (1984), Horowitz (1990, 1993), and others because in this study, transfers are given only to AFDC recipients (tagging), and the recipients are assumed to have no labor supply distortions.

The empirical results reported above show the impact of the MCR on the level of AFDC redistribution. The income redistribution tax price elasticity calculated in this study equals –0.52. Including the $1.28 MCR into the tax price increases the tax price by 28% and reduces the level of AFDC redistribution by about 14.6%. In 1980, there were approximately 11 million AFDC recipients; total payments, for the year, were approximately $12.5 billion (U.S. Bureau of the Census 1982). The empirical findings suggest that the level of AFDC transfers would have been $14.32 (12.5 * 1.146) billion had transfers been provided without the distortions discussed above.

This study shows the value of including the MCR along with the tax price in analyzing AFDC transfers. We find that the financing of government income redistribution programs via distortionary taxation, which create associated efficiency cost, did reduce the amount of income redistribution accomplished in the AFDC program. Including the MCR in the tax price when analyzing other current and proposed transfer programs should also provide more insight into those programs.

APPENDIX A
Tax Price Components

State	AFDC Per Poor	Poor	Nonpoor	Federal Grant	Tax Export	Tax Rate	MCR	TP*
AL	13.78	179,723	3,715,277	.7131	.186	.354	1.2218	.01378
AR	17.96	84,886	2,214,114	.7287	.169	.363	1.2218	.01056
AZ	19.63	53,589	2,677,411	.6147	.200	.400	1.2692	.00783
CA	41.39	1,420,037	22,350,963	.5000	.233	.435	1.3262	.03231
CO	28.16	78,448	2,824,552	.5316	.222	.406	1.2804	.01260
CT	39.61	140,018	2,973,982	.5000	.247	.408	1.2809	.02270
FL	22.53	264,085	9,609,915	.5894	.212	.365	1.2329	.01096
GA	18.07	225,748	5,256,252	.6676	.191	.383	1.2429	.01435
IL	28.82	678,274	10,754,726	.5000	.226	.405	1.2825	.03130
IN	23.46	161,597	5,327,403	.5728	.199	.372	1.2329	.01280
IA	37.28	107,345	2,805,655	.5657	.201	.384	1.2566	.01668
KS	22.28	169,839	3,492,161	.6807	.186	.377	1.2402	.01568
LA	16.67	214,959	4,007,041	.6882	.217	.394	1.2692	.01662
MA	37.32	349,529	5,393,471	.5175	.206	.419	1.2934	.03211
MD	25.19	214,837	4,010,163	.5000	.227	.422	1.2964	.02684
MI	40.99	711,277	8,543,723	.5000	.219	.421	1.2955	.04211
MN	40.82	138,894	3,944,106	.5564	.210	.401	1.2684	.01565
MS	10.58	174,147	2,348,853	.7755	.176	.380	1.2445	.01701
MO	26.58	205,038	4,718,962	.6036	.199	.351	1.2445	.01717
NC	22.93	200,015	5,687,985	.6764	.184	.354	1.2329	.01145
NE	32.69	36,058	1,535,942	.5762	.200	.380	1.2389	.00986
NJ	32.12	462,940	6,914,060	.5000	.229	.405	1.2774	.03300
NY	40.11	1,102,390	16,472,610	.5000	.227	.451	1.3424	.03472
OH	28.96	532,980	10,267,020	.5510	.195	.371	1.2319	.02311
OK	29.96	90,356	2,947,644	.6364	.217	.383	1.2445	.01086
OR	35.68	101,949	2,536,051	.5566	.199	.383	1.2445	.01777
PA	33.05	632,339	11,247,661	.5514	.196	.384	1.2566	.02548
SC	13.89	154,405	2,972,595	.7097	.167	.362	1.2218	.01534
SD	26.71	19,969	670,031	.3122	.174	.354	1.2187	.00769
TN	15.21	165,563	4,429,437	.6943	.182	.358	1.2218	.01142
TX	12.35	311,987	14,009,013	.5835	.230	.373	1.2329	.00881
UT	32.85	39,853	1,432,147	.6807	.194	.413	1.2816	.00918
VA	24.83	168,771	5,193,229	.5654	.210	.384	1.2566	.01402
WA	38.33	161,084	3,986,916	.5000	.219	.388	1.2564	.01982
WI	43.99	218,571	4,509,429	.5795	.193	.404	1.2762	.02099

NOTE: MCR = marginal cost of redistribution. AFDC = Aid to Families with Dependent Children.

APPENDIX B
Tax Price Example

Year	TP	TP*
1970	.03201	.04245
1971	.03106	.04120
1972	.02921	.03874
1973	.02639	.03500
1974	.02640	.03501
1975	.02772	.03676
1976	.02732	.03623
1977	.02628	.03483
1978	.02518	.03339
1979	.02360	.03130
1980	.02437	.03232
1981	.02600	.03449
1982	.02515	.03336
1983	.02595	.03442

NOTE: This appendix uses California data to demonstrate how *TP*, MWC (marginal welfare cost), and *TP** are calculated. The basic tax price, shown in column 2, is found by multiplying the poor to nonpoor ratio by (1 – tax export rate) and by (1 – matching grant rate). As shown in Appendix A, in 1980, there were 1,420,037 poor (AFDC recipients), 22,350,963 nonpoor, the tax export rate was .233, and the matching grate rate was .5. This gives a *TP* in 1980 of .02437. The *TP* varies from 1970 to 1983 because the tax export rate, the matching grant rate, and the number of poor and nonpoor vary from year to year. Because of data limitations, the marginal cost of redistribution (MCR) is only calculated for 1980. As shown in Appendix A, the MCR in California is 1.3262. In other words, it cost $1.3262 to redistribute $1 to the poor. As discussed in the text, we calculate *TP** as equal to *TP* + (MCR – 1) *TP*.

APPENDIX C
State Dummy Variables

State	*Parameter Estimate*	*t Value*
AL	–1.1171	–17.210
AR	–0.8414	–13.385
AZ	–0.9085	–15.642
CA	–0.2399	–4.396
CO	–0.4901	–11.147
CT	–0.2316	–5.260
FL	–0.9783	–16.102
GA	–0.9321	–15.577
IL	–0.3747	–6.038
IN	–0.6758	–13.908
IA	–0.2362	–4.015
KS	–0.5813	–12.983
LA	–0.9929	–15.468
MA	–0.0571	–1.190
MD	–0.5649	–9.644
MI	–0.1307	–2.153
MN	–0.0810	–1.625
MS	–1.3815	–17.465
MO	–0.7428	–15.385
NC	–0.6527	–9.772
NE	–0.4621	–8.437
NJ	–0.2523	–4.354
NY	–0.0558	–0.949
OH	–0.5083	–11.532
OK	–0.5692	–10.591
OR	–0.3163	–5.119
PA	–0.2366	–5.209
SC	–0.4452	–16.599
SD	–1.0787	–15.976
TN	–0.9677	–16.590
TX	–1.2139	–20.089
UT	–0.2802	–3.114
VA	–0.5133	–8.918
WA	–0.2007	–4.455
WI	omit	omit

APPENDIX D
Income Transfer Changes, 1980

State	*Per Recipient Decline*	*Total Decline*
AL	1.65266	296,949
AR	1.94509	165,111
AZ	1.98768	106,518
CA	5.70652	8,103,465
CO	3.15368	247,400
CT	5.03874	705,514
FL	2.45505	648,341
GA	2.08261	470,146
IL	3.97485	2,696,038
IN	2.64140	426,843
IA	4.43224	475,779
KS	2.61893	444,796
LA	1.19549	256,981
MA	5.17134	1,807,534
MD	3.32956	715,312
MI	6.11477	4,349,297
MN	4.77336	662,991
MS	1.40947	245,455
MO	3.18716	653,489
NC	2.52148	504,333
NE	3.48092	125,515
NJ	4.49670	2,081,701
NY	5.61859	6,193,878
OH	3.73598	1,991,202
OK	3.25142	293,785
OR	4.31283	439,688
PA	4.34609	2,748,203
SC	1.70206	262,806
SD	2.82528	56,418
TN	1.72378	285,395
TX	1.31469	410,165
UT	3.42484	136,490
VA	2.83934	479,199
WA	4.74139	763,761
WI	5.49682	1,201,445

NOTES

1. Equation (9) in Browning (1987) measures the marginal welfare cost (MWC) per dollar of tax revenue. It divides the MWC (shown above in equation (3)) by the change in tax revenue. However, it is not appropriate when calculating the marginal cost of transferring income. Browning and Johnson's (1984) marginal cost of redistribution (MCR) should be used. The MCR is shown in our equation (1).

2. Because lifetime labor earnings are more equally distributed than annual earnings, the MCR and thus the tax price from a lifetime earnings perspective will be higher than from the annual earnings perspective. In this study, only the annual earnings are included. See Horowitz (1990, 1993) for more on the lifetime marginal cost of redistribution.

3. The excluded states are Alaska, Delaware, District of Columbia, Hawaii, Idaho, Kansas, Maine, Montana, Nevada, New Hampshire, New Mexico, North Dakota, Rhode Island, Vermont, West Virginia, and Wyoming, yielding a sample size of 35 states.

4. We thank Steven Craig for the state-specific price index.

5. For a more detailed consideration of the role of food stamps in determining the demand for income redistribution, see Colburn (1990).

6. We also estimated the model with data for the year 1980 exclusively but found insignificant estimates for the tax prices that were not consistent with previous literature. See Plotnick and Winters (1985) and Orr (1976), for example.

7. See Hausman (1978). The error components estimator chosen was developed by Wallace and Hussain (1969).

8. For further consideration of interest group effects in income redistribution, see Sander and Giertz (1986).

9. To determine the sensitivity of the results to the parameter estimates, the MTR was increased and decreased by 5 percentage points. Also, more inelastic labor supply elasticities ($\varepsilon_c = 0.25$ and $\varepsilon_u = 0.1$) and more elastic labor supply elasticities ($\varepsilon_c = 0.40$ and $\varepsilon_u = 0.3$) were used. In each case, the tax price elasticity was approximately –.52. More details on the sensitivity analysis are available on request.

10. We performed this test as a simple F test. The computed F statistic comparing the R^2s was 1.140, which suggests that we cannot reject the null hypothesis that ln (MCR) = 0. We would like to thank an anonymous referee for this comment and suggestion.

11. This calculation holds constant the tax price on Medicaid transfers.

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