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CHANGES IN AFDC TAX RATES, 1967-1971

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Abstract

This paper presents new measures of the implicit marginal tax rate on earnings in the Aid to Families with Dependent Children (AFDC) program. The tax rate is frequently central to welfare reform debates since high tax rates may cause work disincentives. Estimation techniques are introduced that significantly reduce biases present in previous work on the subject.

Previous estimates of implicit marginal tax rates (essentially the rate at which AFDC payments decline as earnings increase) suffer from two types of bias. First, they do not adequately control for nonlinear relationships between AFDC payments and earnings. Second, they are estimated in "truncated" samples. These two factors lead to downwardly biased estimates. Through explicit consideration of the AFDC payment formula, methods are devised in this paper for eliminating both types of bias from tax rate estimates.

The new methods are then used to estimate AFDC tax rates in 1967 and 1971. Between these years the federal government implemented legislation designed to reduce implicit marginal tax rates on earnings. The measurements thus permit assessment of state efforts to mitigate the impact of the federal initiative. The evidence reveals that while tax rates declined in most states, some states counteracted the federal initiative by altering AFDC program parameters.

CHANGES IN AFDC TAX RATES, 1967-1971

Work disincentives are a critical concern in discussions of the American system of cash transfers. Part of this concern focuses on the tax rates confronting recipients of these transfers. If for each dollar of earnings payments to a recipient decline by one dollar, the recipient confronts a 100 percent "implicit marginal tax rate on earnings." One may reasonably hypothesize that such a system will discourage recipients from working.

Two empirical questions are raised in consideration of this work disincentive: What are the implicit marginal tax rates in existing systems and to what extent do these tax rates affect labor supply? This paper is aimed at answering the first question within the context of the Aid to Families with Dependent Children (AFDC) program. The second question has been explored through cross-sectional analyses and social experiments [Cain and Watts, 1973; and Watts and Rees, 1973: parts A and B].

For some time both policymakers and social scientists have been concerned with work disincentives implicit in the AFDC program. At least three factors appear to have contributed to this concern. First, one of the program's explicit goals is to encourage recipient adults to "attain or retain a capability of self-support" [U.S. Congress Subcommittee on Fiscal Policy of the Joint Economic Committee, 1974: 140]. Second, since most AFDC recipients are female heads with children, changing values regarding working mothers affects public attitudes toward the program. The growing presence of married women in the labor

force raises problems in justifying public support of mothers who do not work. Finally, the program's size (it is the nation's largest public assistance program, with 11 million recipients and 7.9 billion dollars expended in 1974) makes it a natural focal point for debates on welfare reform. During the 1960s, the program was frequently attacked for discouraging work through high tax rates on earnings. Congress responded to this criticism by enacting the 1967 Amendments to the Social Security Act, which embodied a federal initiative, often termed the $30 and 1/3 disregard, aimed at lowering this tax rate.

The AFDC program is not, however, controlled solely by the federal government. Though much of the financing comes from federal coffers, states wield great power in determining AFDC benefit levels. As is subsequently demonstrated, states had the power to counteract the federally mandated reduction in tax rates. One of the objectives of this paper is, then, to measure AFDC implicit marginal tax rates before and after implementation of the 1967 Amendments in order to ascertain the extent to which states accommodated the federal initiative.

Another reason for deriving accurate measures of the implicit AFDC marginal tax rate on earnings is to permit comparisons of the magnitude and variability of tax rates across states, fundamental to an understanding of horizontal and vertical equity within the AFDC program. Indeed, if the existing system is perceived as inequitable, then a knowledge of existing tax rates is requisite in assessing proposals to set a uniform national marginal tax rate.

Accurate measures of implicit marginal tax rates are needed in such analyses, but are not easily obtained. Other authors have measured

the AFDC implicit marginal tax rate on earnings, but their results suffer estimation biases [Lurie, 1974; Barr and Hall, 1975; Rowlatt, 1972; Heffernan, 1973; and Hausman, 1972].[1] In order to lay the groundwork for a discussion of these biases and a proposal for their solution, the first section of this paper defines the implicit AFDC marginal tax rate within the context of the AFDC payment formula. Included in this section is a discussion of the federally mandated $30 and 1/3 disregard. The second section analyzes biases in two previous studies; the third section proposes solutions. The final section presents new tax rate estimates and analyzes the extent to which biases existed in the previous studies. In addition, this section assesses changes in tax rates between 1967 and 1971.

I. Determinants of the AFDC Implicit Marginal Tax Rate on Earnings

Since several definitions of the term "marginal tax rate" are possible, it is necessary at the outset to clarify the object of analysis.[2] This paper focuses on the "implicit AFDC gross earnings tax rate"--the percentage difference between a worker's gross earnings in the market and her dollar gain after AFDC payment reductions. Reductions in payments from other transfer programs (such as the food stamp program) and reductions in earnings from taxes are thus ignored.

The determinants of the implicit AFDC gross earnings tax rate may be ascertained through consideration of the AFDC payment formula. Two concepts are at the core of the formula--financial requirements and countable income. The financial requirement is the amount of funds

that the state believes the family "needs", while countable income is the amount of family resources that can be used in meeting these needs. In some states, payments fill the gap between financial requirements and countable income; that is,

$$\text{Payment} = \text{Financial Requirement} - \text{Countable Income} \tag{1}$$

Other states limit payments by establishing maximum payment levels, by using percentage reductions of financial requirements, and by applying percentages to the difference between requirements and countable income. Bringing these into the formula, one may adapt Barbara Boland's work [1973] and write,

$$\text{Payment} = \min\{r[p(\text{F.F.}) - \text{C.I.}], M\}, \tag{2}$$

where p is a percentage reduction applied to the financial requirement (F.R.); r is the "ratable reduction," a percentage reduction applied to the difference between p(F.R.) and countable income (C.I.); M is the maximum level of payments; and min(A,B) means if $A > B$, $\min(A,B) = B$, if $A \leq B$, $\min(A,B) = A$.

It is important to note that not all income is countable. Prior to the 1967 Amendments to the Social Security Act, countable income essentially included all earned and unearned income less deductions for work-related expenses, child care while parent works, and other special expenses. Countable income was, then,

$$Yu + \max(0, Ye - D), \tag{3}$$

where Yu is unearned income (for example, alimony or child care payments), Ye is gross (before tax) earnings, and D is allowable AFDC deductions. The 1967 amendments introduced a requirement to disregard part of

earnings in calculating payments. Specifically, the first $30 of earnings and 1/3 of the remainder were disregarded. As a result,

$$\begin{aligned} \text{Countable Income} &= Yu + \max[0,\ Ye - \$30 - (1/3)(Ye-\$30) - D] \\ &= Yu + \max[0,(2/3)Ye - \$20 - D]. \end{aligned} \tag{4}$$

The complete payment formula may then be written,

$$\begin{aligned} \text{Payment} &= \min\{r[p(F.R.) - C.I.],\ M\} \\ &= \min\{r[p(F.R.) - Yu - \max(0,\ KYe - T - D)],\ M\}, \end{aligned} \tag{5}$$

where $K = 1$ and $T = 0$ prior to implementation of the 1967 amendments and $K = 2/3$ and $T = 20$ after implementation of the amendments.

The implicit AFDC gross earnings tax rate equals $-\partial \text{Payment}/\partial Ye$. Thus, to derive the tax rate one must differentiate the payment formula with respect to earned income. In keeping with the focus on the AFDC tax rate, assume Yu is not a function of earned income.[3] Of the remaining variables, only D should be a function of earnings. It may then be shown that

$$-\partial \text{Payment}/\partial Ye = 0, \tag{6}$$

when either

$$r\{p(F.R.) - C.I.\} \geq M, \text{ or } (KYe - T - D) < 0; \text{ and}$$
$$-\partial \text{Payment}/\partial Ye = r(K - \partial D/\partial Ye), \tag{7}$$

when both $r\{p(F.R.) - C.I.\} < M$ and $(KYe - T - D) \neq 0$.

Equation (6) essentially indicates that at low levels of earnings, payments are not affected by increased earnings. For example, a family receiving the maximum payment (M) will not have payments reduced until $r[p(F.R.) - C.I.] < M$.

Equation (7) indicates that at higher levels of earnings, the tax rate depends on $\partial D/\partial Ye$ (the partial derivative of allowable deductions

with respect to gross earnings, henceforth termed the "deductions-earnings partial"), r (the ratable reduction), and K (a constant determined by the federal government). The 1967 amendments reduced K from 1 to 2/3 thereby lowering marginal tax rates. States can, however, alter tax rates by changing the ratable reduction and the deductions-earnings partial. They could have used this power to counteract the 1967 amendments.

Diagram 1 depicts one possible relationship between payments and earnings for a specific family in a state with a maximum. The point A is a level of earnings such that, for all earnings less than A, $r\{p(F,R,) - C,I,\} \geq M$. The tax rate on earnings less than A is then zero and benefits are unaffected by additional earnings. For earnings greater than A, payments are reduced by $r(K - \partial D/\partial Ye)$ for each dollar of earnings.

II. Estimation Biases in Previous Studies

The goal of estimation is to measure the nonzero tax rate for earnings greater than A in Diagram 1. Previous efforts at estimating this tax rate have been biased toward zero for two reasons: (1) they do not adequately control for zero tax rates over the lower range of earnings; and (2) they utilize a truncated sample.

The first bias may be illustrated through consideration of two recent works--one by N.A. Barr and R.E. Hall [1975] and the other by Irene Lurie [1974]. Barr and Hall use SMSA data to estimate a model of the form,

$$\text{Payment} = \sum_{k=1}^{12} b_k X_{ik} - \sum_{j=1}^{10} t_j Y_{ij},$$

Diagram 1

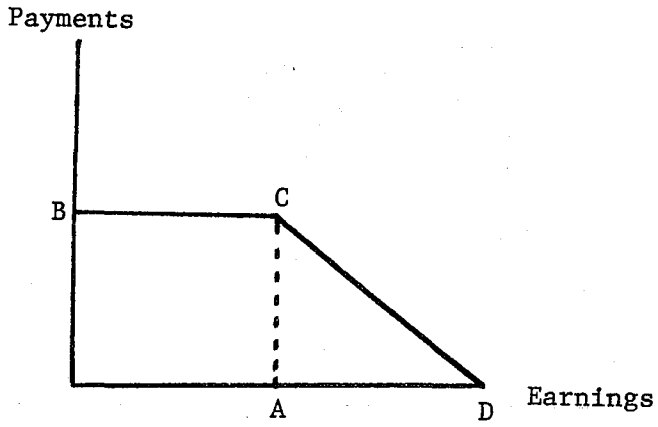
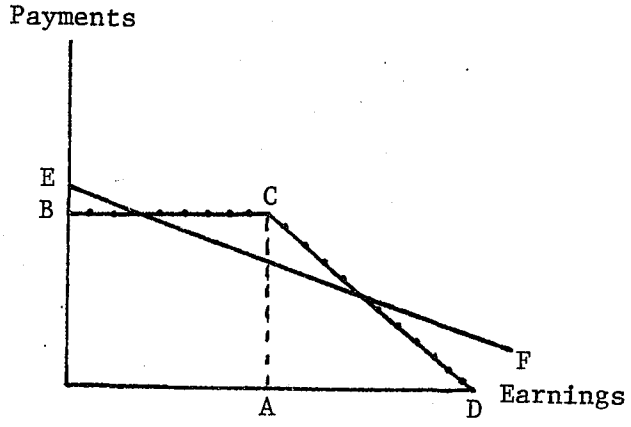


Diagram 2



where the X variables measure nonincome characteristics of the ith family, the Y variables measure incomes from various sources (including earnings) of the ith family, and the b's and t's are parameters. This amounts to fitting a linear relationship to the nonlinear payments-earnings relationship depicted above.[4] As Barr and Hall recognize, this imparts a bias to the tax rate estimate.

To illustrate, consider the estimates that would result from applying the model to a sample of families with identical payments-earnings relationships. Assume that all observations lie on a line BCD in Diagram 2. Also assume the data are similar to those used by Barr and Hall with most families having no earnings and thus located at point B on the diagram. Estimation of the model fits a line EF through the observations. The slope of EF is a biased estimate of the slope of CD.[5] Given observations along a line BC, the direction of bias is toward zero.

Lurie partially corrects for this problem by estimating a model of the form,

Payment = g(financial requirement) - (ceXe + t_o^eYe) - (cuXu + t_o^uYu);

where g, ce, cu, t_o^e, and t_o^u are estimated coefficients; Ye is earned income; Yu is unearned income; Xe = -1 if the family has earnings and zero otherwise; and Xu = -1 if the family has unearned income and zero otherwise.

Again, consider the simple case depicted in Diagram 2 where all families have identical payments-earnings relationships. In Lurie's model, EF is estimated from data on families with earnings. Its Y-intercept is g(Financial Requirement) + ce and its slope is t_o^e. As

Lurie recognizes, it too will yield a biased estimate of the slope of CD. If there are observations on BC, the slope of EF is biased toward zero.

As Barr and Hall, and Lurie recognize, truncation of the sample data is the second source of bias in their studies. Both works are based on surveys of AFDC recipients and therefore only include families with positive payment levels. The sample is thus truncated, because it does not include families receiving zero payments. As earnings increase, the sample becomes increasingly restricted to families with characteristics that yield relatively high payments, ceteris paribus. Families without these characteristics receive zero payments and leave the sample. This phenomenon imparts a spurious positive correlation between payments and earnings that would not exist were the sample not truncated. Truncation then alters the measured partial derivative of payments with respect to earnings.

III. The Estimation Technique

The estimation technique introduced in this section corrects for both sources of bias in the previous works and shows that truncation biases tax rate estimates toward zero. To control for zero tax rates over the lower range of earnings, one can attempt to measure the nonzero tax rate, $r(K - \partial D/\partial Ye)$ in Equation 7. Since there exists published data on r [U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Service, 1967 and 1971] and K, this implies estimation of $\partial D/\partial Ye$ (the deductions-earnings partial). The 1967 and 1971 AFDC surveys may be used for this purpose.

The AFDC surveys delineate five types of allowable deductions from earnings: costs attributable to employment; income assigned to support of other dependents; costs of care of children while parent works; other expenses not included in the assistance budget; and amount of income set aside for future identifiable needs of children. Sixty percent of total 1971 deductions in all states were attributable to costs of employment. Costs of child care constituted twenty-two percent of this total.

The definition and treatment of the above deductions varies between states. Writes Lurie, "Pennsylvania and Illinois permit a telephone to be included as a work expense; New York, Illinois, Texas, California, and Missouri count lunches as a work expense; and Missouri includes something called 'personal expenses' which are in addition to extra clothing. [Lurie, 1974: 106]." Most states treat federal, state and local payroll income taxes as work related expenses. Some states, however, credit them as paid, others use a formula to calculate the deduction, while still others place a maximum on the amount of taxes that may be treated as deductions.

One would therefore expect the deductions-earnings partial to vary across states and even across individual AFDC recipients. In addition, since income taxes are generally a nonlinear function of earnings, the relationship between earnings and allowable deductions is probably nonlinear. It would be extremely difficult to thoroughly cope with these complexities in the empirical analysis. So for simplicity a linear approximation of the deductions-earnings partial will be estimated in each state.

The 1967 and 1971 AFDC surveys contain data on earnings and allowable deductions for a sample of assistance units. This analysis restricts the sample to female heads with children and positive earnings.[6] The following model was estimated in each of twenty states:

AFDC Allowable Deductions = $B_0 + B_1 E_F + \sum_{i=2}^{7} B_i X_i + \varepsilon$, where $B_0 . . . B_7$ are coefficients, E_F is earnings of female head, ε is an error term, and $X_2 . . . X_7$ is a set of binary variables indicating age of youngest child (0-6; 7-13), number of children (3 or 4; 5 or 6; 7+), and residence in an SMSA. These variables act as controls.

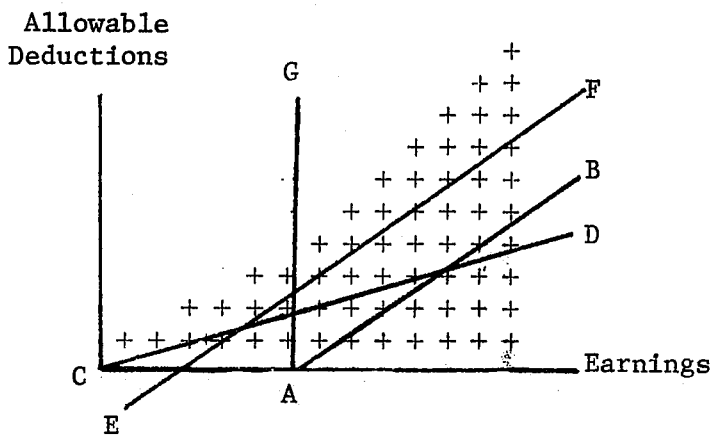
If this model were estimated without further restrictions on the data, B_1 (the deductions-earnings partial) would suffer the truncation bias plaguing previous studies. (See Diagram 3.) Suppose AFDC allowable deductions were calculated in a sample of female heads. One may then observe a scatter of points (denoted by plus signs) like that shown in the diagram.

Some of these workers have a combination of earnings and allowable deductions such that they receive zero AFDC payments; a survey of AFDC recipients will not observe these households. In Diagram 3, families receiving zero payments (and thus not observed in the AFDC survey) are represented by the points in the shaded area to the right of the line of truncation, AB. It can be shown that at point A

$$\text{Earnings} = [p(\text{F.R.}) - Yu + T]/K. \qquad (8)$$

This is simply the breakeven income level when deductions equal zero. It can also be shown that the slope of AB equals K. Thus, the slope was 1 before implementation of the 1967 amendments, and 2/3 thereafter.[7]

Diagram 3



Let CD represent the true relationship between allowable deductions and earned income. Estimation in the truncated sample (implying exclusion of points to the right of AB) yields the relationship represented by EF. Since the slope of EF exceeds that of CD, the deductions-earnings partial in the truncated sample will be positively biased. This will bias tax rate estimates calculated from $r(K - \partial D/\partial Ye)$ toward zero.

One solution to the problem is to truncate the sample on AG, i.e., exclude all families that would have zero payments if their allowable deductions were zero. The remaining observations have levels of earnings below A and cannot possibly have a combination of earnings and allowable deductions such that they must leave the AFDC system. Estimation of the deductions-earnings partial in this altered sample should then eliminate the bias generated by the original truncation.[8]

To implement this technique, the level of earnings at point A was calculated for each family from Equation (8). Family financial requirements (F.R.) and unearned income (Yu) were obtained from the AFDC surveys, while p was obtained from published data. [U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Service, 1967 and 1971].

IV. Results

Table 1 presents estimates of the implicit AFDC gross earnings tax rate in 1967 and 1971 for twenty states.[9] Seventy-nine percent of the families receiving AFDC in 1971 lived in these twenty states. The third pair of columns presents tax rate estimates calculated from the formula, $r(K - \partial D/\partial Ye)$. Data on r, the ratable reduction, is presented in the

first pair of columns. The second pair of columns gives estimates of the deductions-earnings partial based on the estimation technique outlined above. Three points should be noted: (1) the average 1967 tax rate in the twenty states was 64.6 percent, and thus not even close to the frequently cited 100 percent level; (2) with the exception of Alabama tax rates declined between 1967 and 1971, the average tax rate in 1971 for the twenty states being 36.8 percent; and (3) there was wide variation in tax rates across states, ranging from a low of 16.6 percent in California to a high of 58.3 percent in Michigan.

The tax rate estimates presented here are based on data for families with incomes substantially below breakeven income levels and are most valid in this range. There is reason to believe that tax rates increase as earnings become large.[10] On the other hand, as noted by Barr and Hall [1975], if recipients tend to underreport earnings, true effective tax rates may be lower than estimated here [Barr and Hall, 1975: 382].

A major point of interest is whether these estimates differ substantially from earlier tax rate estimates. The argument in preceding sections suggests that previous estimates were biased toward zero. If this is so, the results in Table 1 should then be larger than those in earlier works. This is definitely the case for the Barr and Hall 1967 estimates, even though comparison is hampered by the fact that they present estimates for cities rather than states. It is also the case for fourteen of seventeen states in Lurie's 1971 estimates.

What is the cause of bias? Two sources affecting earlier works have already been noted: (1) use of the truncated AFDC survey data without adjusting for truncation; and (2) inadequate control for zero

Table 1

1967 and 1971 Values of r, ∂D/∂Ye, and AFDC Gross Earnings Tax Rates in Twenty States

State	r		∂D/∂Ye		Estimated Tax Rate		Percentage Deviation from .33 X $r_{(1967)}$**
	1967	1971	1967	1971	1967	1971	
Alabama	0.50	1.00	.246 (.023)*	.221 (.046)	.377	.446	1.41
California	1.00	1.00	.425 (.034)	.501 (.024)	.575	.166	-0.23
Florida	1.00	0.60	.264 (.014)	.320 (.030)	.736	.208	-0.58
Georgia	1.00	0.73	.543 (.046)	.290 (.027)	.457	.275	0.45
Illinois	1.00	1.00	.134 (.050)	.241 (.030)	.866	.426	-0.32
Kentucky	0.87	1.00	.205 (.053)	.232 (.094)	.629	.435	0.11
Louisiana	1.00	1.00	.269 (.031)	.315 (.078)	.731	.352	-0.14
Maryland	1.00	1.00	.432 (.056)	.336 (.145)	.568	.331	0.29
Massachusetts	1.00	1.00	.296 (.055)	.148 (.049)	.704	.519	0.45
Michigan	1.00	1.00	.335 (.046)	.084 (.083)	.665	.583	0.75
Missippi	0.27	0.40	.177 (.032)	.189 (.036)	.222	.191	0.66
Missouri	1.00	1.00	.315 (.028)	.220 (.119)	.685	.447	0.29
New Jersey	1.00	1.00	.216 (.037)	.308 (.058)	.784	.359	-0.27
New York	1.00	1.00	.255 (.038)	.410 (.042)	.745	.257	-0.46
North Carolina	1.00	1.00	.235 (.027)	.221 (.074)	.765	.446	0.04

Table 1--Continued

State	r		∂D/∂Ye		Estimated Tax Rate		Percentage Deviation from $.33r_{(1967)}$
	1967	1971	1967	1971	1967	1971	
Ohio	1.00	1.00	.428 (.056)	.374 (.075)	.572	.293	0.16
Pennsylvania	1.00	1.00	.423 (.059)	.344 (.049)	.577	.323	0.24
Tennessee	1.00	1.00	.280 (.029)	.235 (.071)	.720	.432	0.14
Texas	1.00	1.00	.371 (.020)	210 (.038)	.629	.457	0.48
Washington	1.00	1.00	.157 (.076)	.259 (.100)	.843	.408	-0.30
Unweighted averages			.300	.273	.646	.368	0.16

Note: Numbers in parentheses are standard deviations of parameter. The percentage deviations from $0.33r_{(1967)}$ are calculated as

$$1 - \left(\frac{\text{Actual 1967-1971 tax change}}{.33r_{(1967)}}\right)$$

Table 2

Comparison between Lurie's 1971 Tax Rate Estimates and the New 1971 Tax Rate Estimates

	Average of Lurie Estimates	Average of New Estimates Before Adjustment for Truncation	Average of New Estimates After Adjustment for Truncation
All 17 states	.271	.319	.364
10 states without maximums	.363	.348	.377
7 states with maximums	.139	.278	.342

tax rates over the lower range of earnings. In determining the importance of these two factors in generating bias, Lurie's work has been chosen for the comparison since Lurie measured tax rates within states using AFDC survey data.[11] As shown in Table 2, Lurie's tax rate estimates in these seventeen states average 0.271, while the new estimates after adjustment for truncation average 0.364. What generates the difference?

Consider the first source of bias--use of the AFDC survey without adjustment for truncation. To determine the importance of this factor, the deductions-earnings partials were reestimated in full samples, i.e., samples that were not truncated along AG in Diagram 3. When the tax rates were calculated from these biased estimates of the deductions-earnings partial, the resultant seventeen state average tax rate was 0.319. Failure to adjust for truncation of the sample thus explains about one-half the difference between the new and previous seventeen state averages.[12]

Can the remaining difference be reasonably attributed to the second bias source--inadequate control for zero tax rates over the lower range of earnings? Strong evidence in support of this hypothesis is found

through a comparison between states with and without maximums. Since the range of earnings over which tax rates are zero is relatively large in states with maximums, one would expect the earlier estimates to be severely biased in these states.

Table 2 indicates that this is indeed the case. In the seven states with maximums, the Lurie avearge is 0.139 while the new average, without adjustment for truncation, is 0.278. In the ten states without maximums, the average Lurie estimate is actually slightly larger than the new estimate. It then appears that inadequate control for zero tax rates over the lower range of earnings significantly biases tax rate estimates for states with maximums.

A final point of interest is whether states counteracted federal efforts to reduce tax rates. The 1967 amendments altered tax rates by changing K from 1 to 2/3. States could reduce the impact of this change by increasing the ratable reduction (r) or decreasing the deductions-earnings partials ($\partial D/\partial Ye$). Since few states had a ratable reduction of less than one in 1967, few states could increase this parameter in response to the amendments. All states could decrease the deductions-earnings partial.

The final column of Table 1 presents data on state reactions to the 1967 amendments. If neither the deductions-earnings partial nor the ratable reduction were changed during this period, the 1967 amendments would have altered tax rates by $.33r_{(1967)}$. The last column gives the percentage of deviation from $0.33r_{(1967)}$. It equals 1 - (Actual 1967-1971 Tax Rate Change/$.33r_{(1967)}$). If the deductions-earnings partial and the ratable reduction were measured with complete accuracy, one could claim that positive values of this index indicate

state efforts at counteracting the federal tax rate initiative. However, the deductions-earnings partial is a sample statistic and published data on the ratable reduction may contain errors. One may then cautiously interpret the evidence as indicating that Alabama, Kentucky, and Mississippi reduced the impact of the 1967 amendments by increasing the value of the ratable reduction. Other states such as Georgia, Michigan, and Texas appear to have reacted by reducing the deductions-earnings partial (though Georgia reduced r and $\partial D/\partial Ye$ at the same time).[13] Clearly, there was not a uniform pattern of response to the amendments. States like California, New York, and Florida appear to have introduced parameter changes, which enhanced the work incentives implicit in the 1967 amendments.

V. Conclusion

This paper presents new estimates of implicit AFDC marginal tax rates on earnings that correct for biases in previous estimates. These estimates are used to analyze changes in tax rates between 1967 and 1971. The evidence indicates that in response to a federal initiative aimed at lowering tax rates, tax rates fell in nineteen of twenty states. Some states, however, appear to have behaved in a manner that partially counteracted the federal initiative.

Though previous estimates of the AFDC tax rate were biased toward zero, the essential conclusions from these earlier works remain valid. Consider, for example, Lurie's contention that "many welfare reform plans might increase the tax rate on earnings, not lower them [Lurie, 1974: 106]." These data indicate that only one of the twenty states had an estimated 1971 tax rate above the fifty percent level frequently en-

visioned in reform proposals. Again, it is important to emphasize that these tax rates pertain to the AFDC program. Cumulative tax rates, which are derived from income and payroll tax rates as well as tax rates in other transfer systems, could be higher than fifty percent.

Finally, this analysis demonstrates the wide variation in implicit marginal tax rates among states. Tax rate estimates ranged from 16.6 percent in California to 58.3 percent in Michigan. This is perhaps not surprising in a transfer system that emphasizes state control over payment levels. Yet, how does one justify this apparent[14] horizontal inequity? If in fact families in equal economic circumstances confront substantially different tax rates on earnings, why <u>should</u> this be allowed to continue? It would be possible to correct the problem through standardization of the ratable reduction, the deductions-earnings partial, and the range of earnings over which tax rates equal zero.

Notes

[1]Both Lurie [1974] and Barr and Hall [1975] employ household level data in analyses of AFDC tax rates. Lurie's paper has had a major impact on this work. Rowlatt [1972] analyzes tax rates in an Alberta, Canada transfer program. Heffernan [1973] focuses on tax rates in Vermont's AFDC program, while Hausman uses aggregate data to estimate implicit average tax rates in nine states.

[2]It is possible to delineate at least three other definitions of the marginal tax rate. The first may be termed the cumulative gross earnings tax rate. This is the percentage difference between what a worker earns in the market for an additional hour of work and what she gains from that hour in additional money for purchases of desired goods and services. Federal, state and local income and payroll taxes, actual work related expenses, and changes in AFDC and other transfer payments contribute to this percentage difference. The second may be termed "the AFDC net earnings tax rate." This is the percentage difference between what the worker would gain (in money to purchase desired goods and services) from an additional hour of work were she not an AFDC recipient and what she gains as an AFDC recipient. Both concepts are discussed in Hutchens [1976: Appendix A]. Barr and Hall [1975: 375] discuss a third tax rate, the AFDC tax rate on AFDC earnings. This is the incremental reduction in benefits per dollar increase in AFDC earnings, where AFDC earnings are defined as gross earnings minus allowable work related expenses under the program.

[3]This implies that Yu does not include OASDI, or unemployment insurance.

[4]Since T equaled zero in 1967, states without maximums should in fact have a linear payments-earnings relationship. The Barr and Hall [1975] model is appropriate in these cases.

[5]If, however, families with zero earnings tend to have higher "financial requirements" than those with positive earnings due to unobserved variables, the bias will be reduced.

[6]Households containing nonrecipients were also excluded.

[7]The line of truncation may be found by setting payments to zero in Equation 5 and solving for D. Thus, $D = KYe + Yu - T - p(F.R.)$. The slope of the line of truncation is clearly K. The intercept on the earnings axis (where $D = 0$) is

$$Ye = \frac{1}{K} [p(F.R.) - Yu + T].$$

[8]This is admittedly an inefficient way of dealing with the truncation problem since it excludes many observations with information about the relationship being analyzed. If, in addition, the true relationship is curvilinear, then linear approximations derived from a sample truncated at earnings level A could be biased.

[9]In most of the other states the number of observations are insufficient for accurate analysis of the deductions-earnings partial.

[10]Lurie notes that "some states will not make payments that are below some minimum amount [Lurie, 1973:75]." States also have both the right and the capacity to adjust the degree to which deductible work related expenses vary with earnings as earnings increase. If $\partial D/\partial Ye$ declines as earnings rise, then tax rates rise with earnings.

[11]Comparison between the estimates was possible in seventeen states. Lurie did not estimate tax rates in Maryland, North Carolina, or Washington.

[12]Specifically, it is $\frac{.364 - .319}{.364 - .271} = \frac{.045}{.093} = .484$.

[13]In an effort to ascertain policy changes associated with the decline in the deductions-earnings partial, letters were sent to state welfare agencies in Georgia, Texas, and Michigan. The clearest indication of a policy change came from Michigan. In September 1970 Michigan implemented a flat employment expense allowance of forty dollars per month, which was applied regardless of actual expenses. Given that prior policy was to deduct actual work related expenses, this should have effectively reduced the deductions-earnings partial. The policy was found to be out of compliance with federal regulations, and in July 1971 it was replaced by a policy quite similar to that in existence before September 1970.

[14]Since this paper has not explicitly proved that families in equal economic circumstances confront different tax rates, one must refer to apparent horizontal inequities.

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