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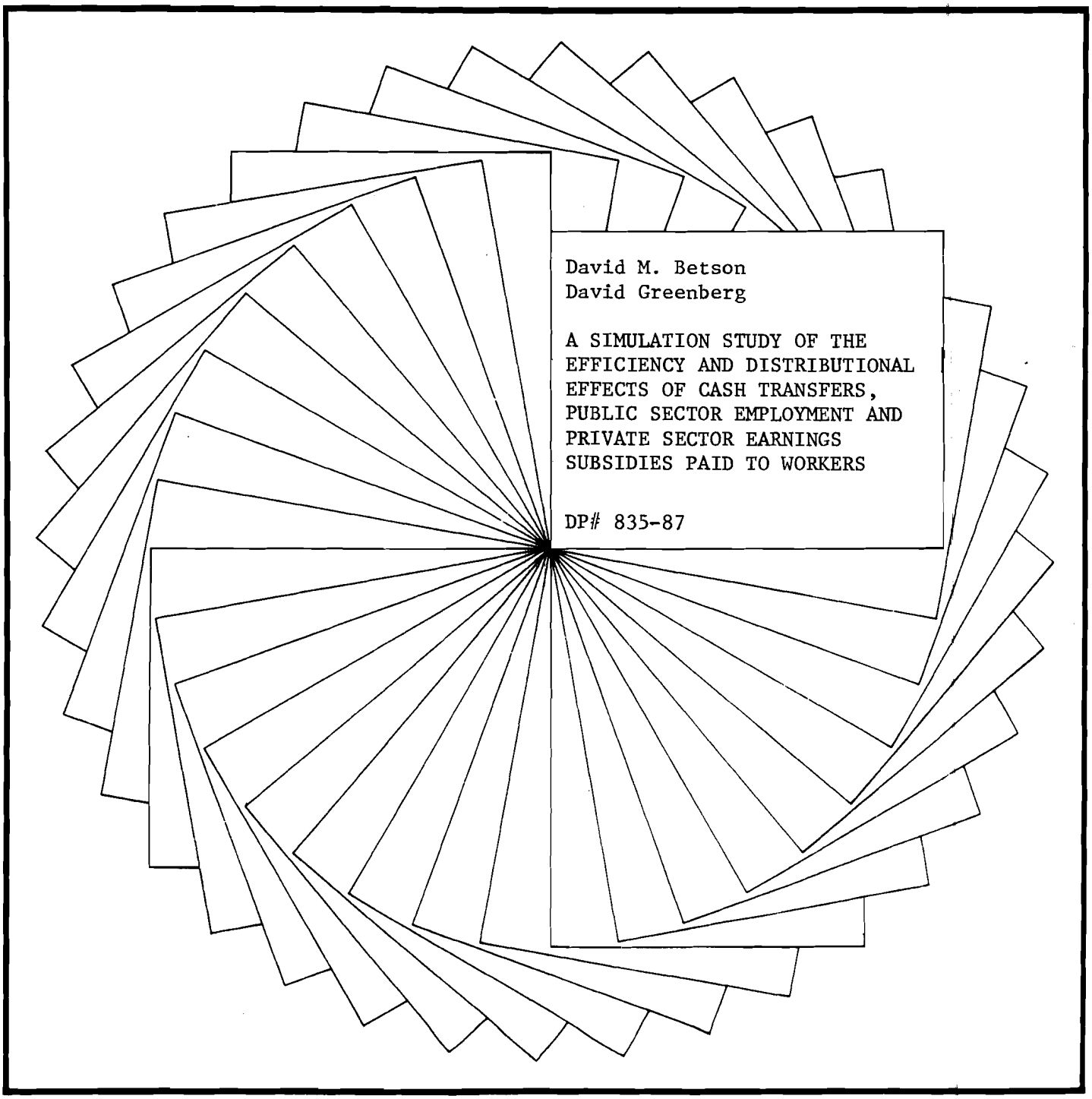

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A Simulation Study of the Efficiency and Distributional Effects of Cash Transfers, Public Sector Employment and Private Sector Earnings Subsidies Paid to Workers

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Abstract

Using microsimulation, this paper compares two alternative strategies for reform of the welfare system in the United States. One alternative is the guaranteed income approach, which provides income to individuals inversely related to their work effort. The other alternative provides a subsidy to workers that is positively related to their private sector work; for those who can't find private sector employment, a publicly provided job is made available. This latter scheme is shown to be an efficient mechanism to increase family income and reduce poverty. However, this scheme is also shown to affect single-parent families adversely, by greatly reducing aid to this group.

I. INTRODUCTION

In the United States , there has been increasing dissatisfaction with the transfer mechanisms used since the 1930s to provide income to poor persons who are thought capable of working. Much of this dissatisfaction results from the perceived work disincentives associated with these mechanisms. For example, both AFDC and Food Stamps -- the two major programs that provide direct transfers to poor persons able to work -- guarantee benefits in the absence of any work. Both economic theory and common sense suggest that this characteristic may cause some recipients to withdraw from the labor force. In addition, those recipients who do work are subjected to implicit tax rates that reduce the reward for market work. Both of these characteristics are thought adversely to affect the number of hours worked.

These effects on hours reduce economic output. More important from a political perspective, they also raise program budgetary cost. In addition, these adverse work incentives frustrate the very purpose of the program: to alleviate poverty. Finally, those persons who are discouraged from working at all are likely to remain dependent on transfer programs for long periods of time.

The 1980s have witnessed a growing consensus that because "pure transfer programs" are inherently subject to these deficiencies, transfer recipients should be required to take part in work or training programs as a condition of receiving benefits unless they are too disabled or have responsibility for the care of very young children [9, 10]. For example, in 1981 Congress allowed the states to impose stronger work requirements on AFDC recipients than ever before. Since 1981, many states have implemented programs that involve some combination of more aggressive search for private sector jobs and "workfare," a requirement that employable recipients who fail to find positions in the private sector work off their grants at jobs provided by government or nonprofit agencies. Evaluations of several of these programs by the Manpower Demonstration Research Corporation suggest that they have been cost-beneficial and have moderately raised the

earnings and work hours and lowered the dependency of those who have participated in them. [5,6, 7].

By themselves, however, these programs provide no more than a very partial solution to the work incentive problem. They usually cover only a small proportion of the recipient population (often only new applicants). They provide a "stick" to urge finding a private sector job, but a very little "carrot". And even those individual who successfully obtain a private sector job often receive wages so low they still cannot escape from poverty.

In this paper, we analyze a program configuration that attempts to overcome these deficiencies, one that couples a public sector work program with a private sector earnings supplement. Under this supplement, the government would make payments to low-wage workers based on their level of earnings: the higher the level of earnings, the higher the payment. As will be seen, this program can potentially increase the incomes of the poor more efficiently than pure transfer programs and, at the same time, enhance work incentives and the attractiveness of private sector jobs. We shall compare this program to a negative income tax -- a pure transfer plan that has often been proposed as a superior alternative to AFDC and Food Stamps, but which has similar work disincentive characteristics. Our comparison is based on preliminary results from a microsimulation model that provides predictions of the relative costs of the two policies and their potential effects on hours of work and on income poverty.

In the following sections, we first describe the specifics of the plans we simulate, then present a brief description of the microsimulation model and the findings of our simulations. Finally, we examine the major implications of our results and suggest directions for future research.

II. THE SIMULATED PROGRAMS

We have simulated two prototype transfer plans: a pure negative income tax program (NIT) and a private sector earnings supplement combined with a public sector jobs program (ES/J). Although these two plans are very different in their specific characteristics and underlying philosophies, comparisons between them are facilitated by the fact that both have been designed to meet the same policy objective: to raise the incomes of households in which the head works full time and year round at a minimum-wage, private sector job to at least the federal government's official poverty line. This objective is consistent with a long-existing U.S. social goal of minimizing the number of persons in poverty and also follows the current policy emphasis on work for the poor. As will be seen, however, the ES/J plan would be expected to engender more work effort on the part of the poor than would the NIT plan.

The two plans are compared in Figure 1 for a hypothetical family of four in which earnings of the household head and income transfers provide the only potential sources of income. In this figure, one set of budget constraints faced by a household are drawn under the assumption that the family head's market wage is $3.35 per hour, the current minimum wage. A second set of budget constraints are drawn under the alternative assumption that the family head receives a market wage of $10 per hour. In the absence of any taxes or transfers, the $3.35 per hour budget constraint is depicted by OJ and the $10 wage by OBJ'. The dark horizontal line, PL, represents the official 1985 poverty line of $10,989 for a family of four and the dark vertical line, FT, represents the 2,080 hours required for a person to work full,time year round (i.e., the product of 40 hours and 52 weeks).

The NIT plan is represented in Figure 1 by the budget line GFN if the head receives the minimum wage and by GF'BJ' if the head receives a wage of $10. The plan is assumed to consolidate most existing federal welfare programs (including AFDC, AFDC-U, Food Stamps, and the Earned Income Tax Credit) into a single negative income tax plan that guarantees a

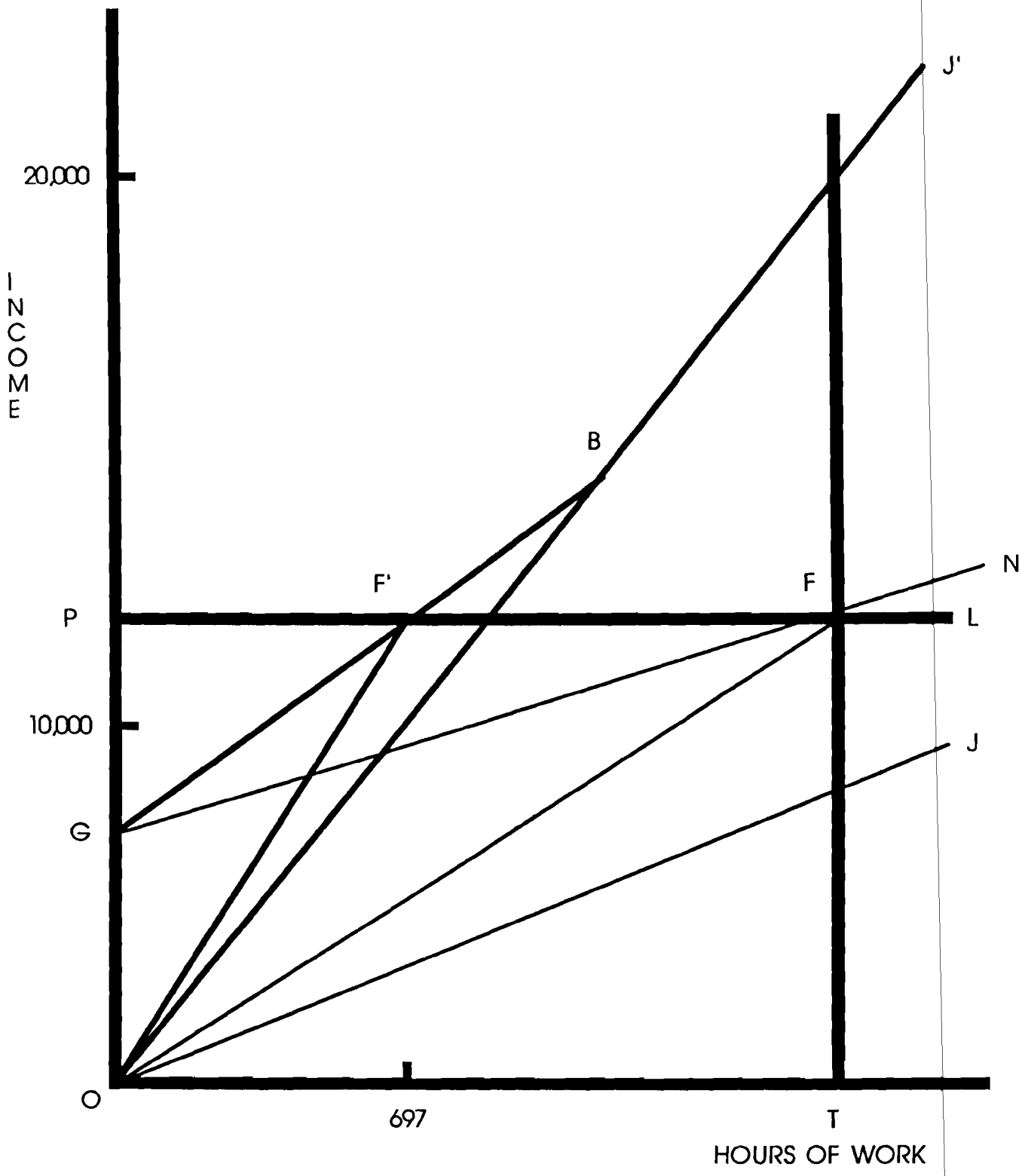

FIGURE 1
COMPARISON OF AN NIT AND THE ES/J

minimum income of 75 percent of the poverty line ($8,242) for a family of four in the absence of any work effort. Under the plan, transfer benefits would be reduced by 61 cents for each dollar of wage or nonwage income the household receives. This 61 percent implicit tax rate was chosen so that the NIT plan would be consistent with the policy objective of raising an individual who works full time at a minimum-wage job to the poverty line. That is, total income will just be sufficient to reach the poverty line if the family is entirely dependent on NIT transfer payments and the head's earnings from a full time, year round minimum wage job (see point F in Figure 1). On the other hand, at a wage of $10, the head needs to work only about 697 hours for family income to reach the poverty line (point F'). Indeed, at a $10 wage rate, if the head worked more than 1,351 hours the family would not qualify for NIT payments, since family income would exceed the program's break-even (point B).

The earnings supplement we simulated is represented in Figure 1 by the budget constraint OFN if the head works at the minimum wage and by OF'BJ' if the head receives a wage of $10. Under this plan, the first $6,968 of the household's private sector earnings -- the amount the head would earn from full time, mimimum wage job -- would be supplemented at a rate of 58 percent, a rate just sufficient to all total family income to reach the poverty line. In other words, the government would pay 58 cents in transfer benefits for each dollar of private sector earnings the household receives until the family income (including the earnings supplement) reached the poverty line. At the minimum wage, the poverty line would be reached if the head worked full-time, year round (See point F). Alternatively, at a $10 wage rate, the head would only need to work 697 hours (point F') for total family income to reach the poverty line. Each dollar of wage or non wage income the household receives in excess of $6,968 (a full time full-year minimum wage job) would be taxed at a rate of 61 percent, the same tax rate as that used in administering the NIT plan.[1] Unlike the NIT, however, it is assumed that the family would receive no transfer income if the head does not work; there is no income guarantee. However, since the head may not be able to find a private sector job during all or part of the year, a public sector job or training slot would be

available at a stipend of $3.35 per hour, the minimum wage. An earnings supplement would not be paid on this stipend and no other family members would be eligible for the job or training positions.[2] The family's income is shown in Figure 1 as the line OJ for the situation in which the head did not obtain a private sector job throughout the year and worked only in a government-provided job (PSE).

A comparison of budget constraints OFN and OJ suggests that, even if the head's market wage is no higher than the legal minimum, a private sector job under the ES/J plan would always be more attractive than would a government-provided one. For example, if the head worked full time and year round, family income would be $10,989 under the private sector component of the ES/J plan and only $6,968 under the public sector component. The reason for this difference is, of course, the 58 percent supplement rate paid on earnings received from a private sector position. If the family head is able to obtain a private sector job that pays above the legal minimum, the divergence between income under the two ES/J components becomes even larger (compare budget constraint OF'BJ', for example, with OJ). Thus, the public sector component is most appropriately viewed as a safety net for low-income families during periods when the heads of these families are unable to obtain private sector work that pays at least the minimum wage. When a family head is able to find such a job, it would almost always be preferred.

The NIT plan and the private sector component of the ES/J plan have been designed so that those segments of their budget constraints above the poverty line are coterminous (for example, FN at a wage of $3.35 and F'BJ at a wage of $10). Thus, for households with incomes above the poverty line , the two plans should have similar effects on work effort. For households below the poverty line, however, the ES/J plan has considerably stronger work incentives. A comparison of budget segments OF and GF (or OF' and GF') suggests that, at a given number of hours of work, income would be lower under the ES/J plan than the NIT plan, but the reward for an additional hour of work would be higher. Consequently, in terms of both income and substitution effects, the ES/J plan provides stronger incentives to work. As compared to the NIT, the ES/J plan

provides a particularly strong incentive to enter the labor force since, in the absence of work, no transfer income can be obtained. In this sense the plan is quite similar to the workfare programs mentioned in the Introduction.

Figure 1 suggests that at relatively low hours, income under the private sector component of the ES/J plan would be much lower than under the NIT plan. Hence the extent to which the relatively stronger work incentives associated with the ES/J plan actually cause people to work more hours is critical to its comparative success in reducing poverty. Also critical is whether the poor are able to find jobs in the private sector. As can be seen from Figure 1, families who are forced to rely mainly on the public sector component of the ES/J plan would receive much lower incomes than they would under the NIT plan.

Figure 1 is also useful for comparing the potential budget costs of the two plans. For example, at any given number of hours, transfer benefits under either the NIT plan or the private sector component of the ES/J plan are measured as the vertical distance between the budget constraint under the plan and the budget constraint in the absence of any plan (that is, OJ at a wage of $3.35 and OBJ' at a wage of $10). As can be seen, at income levels below the poverty line, transfer benefits and hence budget costs are higher under the NIT plan. However, if large amounts of stipends must be paid out under the public sector component of the ES/J plan because participants are unable to find private sector jobs, the cost advantage of the ES/J plan could be substantially reduced and even reversed.

Figure 1 pertains only to a household with four members. Since the poverty line varies with family size, in designing the NIT and ES/J plans we also varied the tax rate and earnings supplement rate with family size. This was necessary so that, regardless of family size, we could meet our objective of providing at least a poverty-line income to households in which the head works full time, year round at a private sector minimum wage job. Parameters for the two plans that are consistent with this policy objective are shown below for families of different sizes:

PARAMETERS OF NIT AND ES/J PROTOTYPES

FAMILY SIZE	POVERTY LINE	NIT		EARNINGS SUPPLEMENT		BREAK-EVEN (% of Poverty Line)
		Guarantee	Tax Rate	Supplement Rate	Tax Rate	
2	$ 7,231	$ 5,423	74%	4%	74%	102%
3	8,573	6,430	69	23	69	109
4	10,989	8,242	61	53	61	123
5	13,007	9,755	53	87	53	142
6	14,696	11,022	47	111	47	160
over 6	16,656	12,492	40	139	40	187

As explained earlier, the tax-rate parameter would be used in operating either the NIT plan or the ES/J plan, while the guarantee is applicable only to the NIT, and the earnings supplement rate only to the ES/J. The guarantee and tax-rate parameters are well within the range of those contained in the many welfare reform proposals seriously considered during the 1970s.[3] The final column of the above table indicates the level of income relative to the poverty line at which benefits under both the NIT and ES/J programs would stop. Given that the current Food Stamp program provides supplementation up to 185 percent of the poverty line for all family sizes, many families whose income before transfers exceed the poverty line would have their transfer reduced were either of simulated plans actually implemented.

As noted in the Introduction, much of the dissatisfaction with the current welfare system is directed at those recipients or target populations who are considered capable of work and hence of self-support. But who should be considered "able" to work? In this paper, we have adopted two demographic criteria for eligibility for both the NIT or ES/J programs: there must a child under the age of 18 residing in the household, and, if there is only one nonaged or nondisabled parent present, the youngest child in the household must be at least 3 years old. It is this group of households that we focus on in this paper. Other groups of households (for example, households which contain no children or in which there is only one nonaged or nondisabled parent present and the youngest child is under 3 years old) are not included in the simulation results reported below.

For our purposes, these excluded groups are of less interest since they are unlikely to be included in the eligible populations of a work program such as the ES/J plan.

The population on which we have focused contains roughly 31 percent of all households in the United States, where there are currently 23.9 million households with two parents present and 5.9 million households with one nonaged or nondisabled parent present. On average, two-parent households have a 10.5 percent incidence of posttransfer posttax income poverty. Single-parent households in which the youngest child is at least 3 years old have 35 percent incidence of income poverty. These two groups contains roughly 28 percent of the poverty population. Single-parent households in which the youngest child is under 3 have an income-poverty incidence of 45 percent income poverty and compose 14 percent of the poverty population. As these numbers indicate, the target population for the simulated program represents a majority of the poverty population with children but excludes the households with the highest rates of poverty.

The exclusion of these households with young children is not meant to downplay the problems that such families face, but to recognize that these households might not be expected to provide for their own support through work. With regard to current government programs that aid households with children, 61 percent of the benefits of these programs are received by the households in our target population,while the remaining 39 percent go to single-parent households in which the youngest child is under 3.

III. SIMULATION MODEL

In the following section, we report simulation results of the two prototype transfer schemes described in the previous section. These results were derived from a large microsimulation model originally designed to analyze President Carter's comprehensive welfare proposal (The Program for Better Jobs and Income, 1977). This model, fully described elsewhere [2], treats various interactions among transfer programs, job programs, and the positive tax system, allowing for labor supply responses to these programs. To conduct the simulations reported in this paper, we have updated the model to represent the target population and tax and transfer programs in 1985. The data base used for the simulation model comprises roughly 15,500 unweighted observations of households drawn from the 1986 Current Population Survey.

Since the major focus of this paper is to investigate the impacts that the NIT and ES/J programs may have upon work effort, we will attempt to provide a brief description of the methodology and assumptions that we have used in the simulation of these responses to changes in the transfer system. For each adult member of the households in our simulation sample, we have information on the individual's wages, hours worked, hours unemployed and sources of income for 1985. Using computer representations of the existing tax programs and the prototype transfer programs, we compute the household's disposable income (YD) and net (after tax/transfer) wage rate (w) for each adult in the household. Assuming that the individual's preferences for income and leisure can be represented by a linear labor supply function and that the individual reacts to a budget constraint linearized at initial desired hours of work (h_0), the hours of work desired by the individual (h) are computed as

$$h = \mu + \pi w + \beta y,$$

where

$$y = YD - w h_0 = \text{"virtual" income}^4,$$

$$\mu = h_0 - \pi w_0 - \beta y_0,$$

and π and β are constant wage and income parameters, w_0 and y_0 are the initial net wage rates and "virtual" income, respectively.

In order to obtain estimates of π and β, we utilized two alternative sets of estimates of uncompensated wage and total income labor supply elasticities for male household heads, wives, and female heads of households. Both sets of elasticities are averages of numerous empirical studies which were compiled by Burtless [4] and are presented below. The first set of elasticities for households represents an average of estimated elasticities from the NIT experiments conducted in the United States from the late 1960s to the late 1970s. We denote this set of estimates the experimental results. The second set of estimates are averages from nonexperimental studies. Since there have been very few nonexperimental studies of the labor supply of female heads, Burtless averaged the studies for all women together. The coefficients in the labor supply functions (π and β) were imputed by assuming that the elasticities presented in the table applied to the "average" individual in the 1986 Current Population Survey in the three various demographic groups. Note that hours and y are measured in thousands.

LABOR SUPPLY ELASTICITIES AND PARAMETERS
(Parameter Coefficients π and β are given in parentheses)

	Experimental Results		Nonexperimental Results	
	Uncompensated Wage (π)	Total Income (β)	Uncompensated Wage (π)	Total Income (β)
Men	.0043 (.0011)	-.0767 (-.0091)	-.1045 (-.0268)	-.3873 (-.0455)
Wives	.1730 (.0573)	-.0696 (-.0148)	1.3553 (.4489)	-.0113 (-.0024)
Female Heads	-.0373 (-.0115)	-.1709 (-.0304)	1.3553 (.4169)	-.0113 (-.0020)

While the simulation of the NIT program is quite straightforward when the above labor supply formulation is used, the simulation of the ES/J is not. To understand the methodology we employed to simulate this program, first consider that an individual in this program has three options available to him (her): the individual can work solely in the private sector, can choose to work only in the public sector (we denoted this as the "pure" strategy), or can choose a "mixed" strategy of work in the private sector and work in the public sector during periods of unemployment. Using the labor supply function above, the model first determines the desired level of work and income under each of these three options or strategies. Then the model determines which option the individual would choose on the basis of the utility function implied in the linear labor supply function.[5]

IV. Simulation Results

Tables 1 and 2 present summary results of our simulations of the prototypes under our two sets of assumptions about labor supply behavior. All dollar amounts are expressed in billions, whereas the change in the number of households in poverty is expressed in millions. Each set of results is displayed by the number of adults present in the household and for the total target population.

The first two rows of each table display budget offsets where negative numbers represent savings. The first row represents the budget offset due to the elimination of the AFDC, AFDC-U, Earned Income Tax Credit (EITC), and Food Stamp programs for the target population. It is interesting to note the current targeting of transfers to single-parent families. Even though, as noted above, there are more two-parent families in poverty, the current system clearly directs the majority of funds toward single-parent families. This reflects the belief that two-parent families should take on a significant role in meeting their household needs. The second row reflects

TABLE 1

SIMULATION RESULTS FOR THE PROTOTYPE NIT AND ES/J PROGRAMS : EXPERIMENTAL LABOR SUPPLY ESTIMATES

	NIT			ES/J		
	1 Parent	2 Parents	Total	1 Parent	2 Parents	Total
Current Tax/Transfer Programs :						
Elimination of Transfer Programs[a]	$-8.96	$-5.46	$-14.42	$-8.96	$-5.46	$-14.42
Changes in Continuing Programs[b]	-.07	-.50	-.57	-.90	-1.85	-2.75
Cost of :						
Public Sector Employment Jobs	---	---	---	3.69	4.77	8.46
Earning Supplements	---	---	---	2.57	8.55	11.12
NIT Payments	12.41	16.17	28.58	---	---	---
Net Cost of Program to Government	3.38	10.21	13.59	-3.60	6.01	2.41
Change in Head's Private Sector Earnings	-.32	-1.80	-2.12	2.69	-.46	2.23
Change in Wife's Private Sector Earnings	---	-.21	-.21	---	.68	.68
Change in Household Disposable Income	3.06	8.20	11.26	-.91	6.23	5.32
Change in Number of Households in Poverty	-.21	-.97	-1.18	-.01	-.98	-.99
Change in Poverty Gap	-3.47	-8.09	-11.56	.82	-4.04	-3.22

Note : Dollar amounts are in billions, for 1985; numbers of households are in millions.

[a] The programs are AFDC, AFDC-UP, the Earned Income Tax Credit, and Food Stamps.

[b] Changes in federal income and payroll taxes and in payments for Unemployment Insurance.

TABLE 2

SIMULATION RESULTS FOR THE PROTOTYPE NIT AND ES/J PROGRAMS : NONEXPERIMENTAL LABOR SUPPLY ESTIMATES

	NIT			ES/J		
	1 Parent	2 Parents	Total	1 Parent	2 Parents	Total
Current Tax/Transfer Programs :						
Elimination of Transfer Programs[a]	$-8.96	$-5.46	$-14.42	$-8.96	$-5.46	$-14.42
Changes in Continuing Programs[b]	.08	.58	.66	-1.31	-1.22	-2.53
Cost of :						
Public Sector Employment Jobs	---	---	---	4.35	4.63	8.98
Earning Supplements	---	---	---	2.43	9.63	12.06
NIT Payments	13.45	18.17	31.62	---	---	---
Net Cost of Program to Government	4.57	13.28	17.85	-3.49	7.57	4.08
Change in Head's Private Sector Earnings	-1.79	-7.15	-8.94	4.17	-4.13	.04
Change in Wife's Private Sector Earnings	---	-.10	-.10	---	2.44	2.44
Change in Household Disposable Income	2.78	6.03	8.81	.68	5.88	6.56
Change in Number of Households in Poverty	-.08	-.73	-.81	-.08	-.97	-1.05
Change in Poverty Gap	-3.21	-7.21	-10.42	.12	-4.56	-4.44

Note : Dollar amounts are in billions, for 1985; numbers of households are in millions.

[a] The programs are AFDC, AFDC-UP, the Earned Income Tax Credit, and Food Stamps.

[b] Changes in federal income and payroll taxes and in payments for Unemployment Insurance.

changes in tax revenues (federal income and payroll taxes) and changes in outlays in Unemployment Insurance. The ES/J program shows significant increases in tax revenues due to increased private sector earnings, and reduced UI outlays due to (1) reduced length of unemployment, and (2) the superiority of public sector employment over UI benefits. These offsets seem to be unaffected by the assumptions made about the labor supply parameters. On the other hand, the offsets in the NIT program are sensitive to the labor supply assumptions. Under the experimental assumptions (Table 1), individuals who were receiving benefits from the current system but no longer do so under the NIT tend to work more. This increased work effort is exerted by individuals with sufficiently high income to be subject to federal income taxes and hence to enlarge tax revenues enough to create an overall savings. However, under the nonexperimental results (Table 2), this increased work effort and the resultant increase in federal income taxes are not enough to offset the significant work reductions on the part of individuals with relative low income and hence are not paying the federal income taxes but are subject to the FICA payroll taxes. On balance, under these assumptions tax revenues fall and the offset is a new cost to the treasury.

The next three rows of these tables present the gross outlays of the NIT and ES/J programs. While the NIT prototypes are similar in concept to the current programs, one quickly sees from the tables that NIT programs would increase outlays to the poor by roughly 100 percent. This significant increase in outlays is the result of three separate effects: (1) increased guaranteed income to the poor in southern states, with currently low benefits; (2) extending benefits to some two parent households not currently eligible for AFDC-U; and (3) the fact that our simulations assume a 100 percent take-up rate. While the first two effects would be a direct consequence of the implementation of an NIT, one would not expect that everyone eligible for the program would indeed participate. This high assumed take-up rate obviously increases program outlays. To give a rough idea of the extent to which this assumption might tend to overstate program outlays, assume that only current welfare (AFDC, AFDC-U, and food stamp) recipients participate. Given this lower assumption, program outlays would be $15.2 billion compared to the $28.6 billion of

payments simulated with 100 percent take-up and an increase of just $.8 billion over current spending. Comparing Tables 1 and 2, we see that the labor supply parameters do make about a 10 percent difference in gross outlays, reflecting a more significant reduction in work effort under the nonexperimental assumptions.

Concerning the gross outlays of the ES/J, our simulations indicate that the combined PSE and Earning Supplement (ES) programs would be roughly two thirds of the gross outlays of the NIT program. Overall, the ES portion of the plan constitutes the major expenditure of funds. The importance of the supplement varies, however, between one- and two-parent families. PSE is more significant for the single- parent family than is the ES portion, which we feel reflects the relatively poor private sector prospects for these households. While the labor supply assumptions do affect the gross outlays of the ES portion of the plan (7 percent higher under the nonexperimental assumptions), they scarecely affect the outlays of the PSE segment.

In comparing the two programs, one interesting results concerns the outlays for one- and two-parent households. Although under both programs the majority of the outlays go to two-parent households, 43 percent of total NIT outlays and only 32 percent of the gross ES/J outlays go to single-parent households. These percentages stand in stark contrast to the current programs, where 62 percent of total outlays are for single-parent families.

The sixth row of both tables present the net cost of each program to the treasury. As would be expected from the preceding discussion, the net cost of the NIT program greatly exceeds that of the ES/J. The only surprising result from this row of numbers concerns the net costs of the ES/J program for single-parent families. Under both sets of labor supply assumptions, this program saves money on this group, owing largely to the small amount of gross outlays to them under the ES/J plan.

The seventh and eighth rows show the impact of the two programs on work effort in terms of changes in private sector earnings. As expected, the NIT as simulated engenders significant overall reductions in work effort. This does not imply that all households would reduce

in their attachment to the labor force. As noted above, households which lose benefits are simulated to increase their work effort, as are those households which experience an increase in their net wage owing to the lower implicit tax rates of the NIT compared to the current tax/transfer system. In the ES/J program, we see that overall work effort increases, as expected. The only major exception concerns the heads of two-parent families, who are predicted to decrease private sector work. The major rationale for this finding is the incentives of the ES portion of the program. Recall that there are two parts of the ES plan: a supplement to initial earnings, and then the "taxing" away of the supplement. The first portion of the ES plan will engender a positive substitution effect but a negative income effect on work effort. The overall result will depend upon the relative strengths of these two effects. The second portion of the ES scheme, however, will engender a negative substitution and income effect and hence will definitely tend to reduce work effort. Under the experimental assumptions, there is an assumed upward-sloping labor supply function; one can hence infer that the first portion of the ES will increase work effort for male heads while the second portion will decrease effort. Overall, the results suggest a slight decline in effort. Under the nonexperimental assumptions, however, males have a backward-sloping labor supply function, and hence both portions of the ES will tend to decrease work effort.

Aggregate changes in household disposable income are presented in the ninth row. Algebraically, the change in disposable income is merely the sum of the net cost of the program and the change in private sector earnings. Thus, programs which engender an increase in work effort will create an increase in household income that exceeds the cost to the government. Under the experimental assumptions, one can see that overall the NIT program raises incomes 83¢ per dollar of cost to the government. On the other hand, the ES/J is a much more efficient mechanism. It raises incomes $2.38 per dollar of net cost to the government. This impressive gain in efficiency is derived primarily from its impact on single-parent households. However, even for two-parent households, incomes are $1.04 per dollar expended. When the nonexperimental assumptions are

utilized, the efficiency of both programs diminishes. The NIT is predicted to increase incomes 49¢ per dollar of cost; efficiency of the ES/J declines but still is an impresive $1.61 per dollar of cost.[6]

While the ES/J is efficient in raising household incomes, how efficient is it in reducing poverty? The tenth and eleventh rows of the tables present the impact on the number of households in poverty and the poverty gap, definced as the difference between the household's poverty line and its disposable income below this line. Even given the smaller net cost of the ES/J, it is surprising that it is as effective as the NIT in reducing the number of households in poverty. The poverty gap figures show that the ES/J is very effective in reducing the gap relative to the net costs of the program. The NIT spends $13.6 billion and reduces the gap by only $11.6 billion, whereas, the ES/J expends $2.4 billion and reduces the gap by $3.2 billion, a result again explained by the large increases in work effort. The only troubling outcome in these simulations is the impact of the ES/J on single-parent families. Under both sets of labor supply assumptions, the ES/J plan is predicted to increase this group's poverty gap. We feel this result stems primarily from the poor employment prospects of female household heads. For this group of individuals, who experience long spells of unemployment, the provision of PSE jobs, which are not subsidized by the ES scheme, are not enough to narrow the gap created by the elimination of current welfare programs, which in many states guarantee fulfillment of a significant proportion of the household's needs.

Before concluding our discussion of the simulations, we present further details on the predictions of participation in the PSE portion of the ES/J program. Table 3 presents the number of participants, number of full-time equivalents (slots), and the average duration in this portion of the program. These figures are broken down by number of parents present and by type of participation, "pure" (does not work in the private sector) and "mixed" (works in the public sector only during times of unemployment). While the labor supply assumptions do affect the results, the most important finding reported in this table is the conclusion that the PSE portion primarily serves as a safety net for the unemployed. Further tabulations of the simulation results indicate that 46

TABLE 3

CHARACTERISTICS OF PARTICIPIANTS IN THE PSE COMPONENT OF ES/J

	Participants (1000's)	Full-Time Equivalent Jobs (1000's)	Average Duration in PSE (Weeks)
Experimental Assumptions:			
1 Parent :			
Pure	330	278	43.7
Mixed	776	252	16.9
2 Parents:			
Pure	98	57	30.4
Mixed	1,808	628	18.1
Total	3,007	1,214	21.0
Nonexperimental Assumptions:			
1 Parent :			
Pure	441	323	38.1
Mixed	746	300	21.0
2 Parents:			
Pure	96	82	43.9
Mixed	1,772	582	17.1
Total	3,056	1,287	21.9

Note : "Pure" means no work in the private sector; "mixed" means work in the public sector only when unemployed in the private sector.

percent of the mixed participants from two-parent families worked in PSE for more than 16 weeks. These individuals had an average duration on PSE of 22 weeks and through their work increased their family incomes by 27 percent. The results for single-parents employing the mixed strategy for at least 16 weeks on PSE are even more stark. These women, by participating on average 32 weeks, increased their household incomes by 47 percent.

A final comment upon participation in PSE pertains to the "pure" participants. As noted above, having a private sector wage that is less than the minimum wage is a neccessary but not sufficient condition for an individual to employ this strategy of PSE. In our simulation sample, 315,000 heads of two-parent families and 594,000 single-parents had wages less than the minimum. Using the experimental assumptions, only 31 percent of the former and 56 percent of the latter are predicted to work solely in the public sector.

V. CONCLUSIONS

The results reported in this paper must be tempered with the warning that they are preliminary estimates and reflect work in progress. In assessing the simulation methodology and techniques used in this paper, we find two significant areas for further work. The first deals with the simulation of labor supply responses to significant nonmarginal changes in individual budget constraints caused by total elimination of the current welfare system. The second concerns the question of a reasonable manner by which to "place" unemployed individuals and those who have never worked into private sector employment. Given the significance of the mixed strategy for the ES/J program, reasonable predictions of the program will hinge directly on how well we can simulate spells of unemployment for these individuals.

However, even with these two major caveates, we are reasonably confident of the overall results for these two programs and their comparison. On these basis of these results, we believe that an ES/J program may potentially be an efficient mechanism to raise individual incomes and reduce poverty. This conclusion is made with two reservations. First, this strategy is predicted not to have a significant effect on poverty among single-parent households, and may in fact increase income poverty for this group. For the ES/J strategy to effectively deal with poverty in this important subgroup of the population, changes in the program design will need to be investigated. Second, while the ES/J scheme reduces the poverty gap by more than the cost to government, the total effect on the gap is quite small. Even under the nonexperimental assumptions, the ES/J reduces the total poverty gap by 25 percent. One must question whether this strategy will continue to be efficient if further reductions in poverty are attempted by this strategy? Or will its effectiveness instead decline, to resemble that of the NIT strategy? These questions concerning modeling, program design, and efficiency form the basis for our future work in this area.

ENDNOTES

1 The formula for the earning supplement can be expressed as :

$$ES = s\ MIN(EARN, \$6968) - t\ MAX(0,\ AGI - \$6968)$$

where

s = the supplement rate,
t = the tax rate of the NIT plan for the same family size,
EARN = the private sector earnings of the unit, and
AGI = the unit's adjusted gross income as defined by the Federal Tax Code.

2 The head of the family is defined as the adult with the highest earnings in the previous year.

3 The Carter Administration's proposal (The Program for Better Jobs and Income) contained benefit-reduction rates that ranged from 50 to 75 percent.

4 See Hausman [8] for a fuller description of virtual income and its use in the empirical labor supply literature.

5 See Betson [1] or Hausman [8] for the derivation of the direct utility function implicit for the linear labor supply function. The direct utility function is

$$U(YD,h) = (\beta h - \pi)\ \exp[\ \beta\ (\mu + \beta YD - h) / (\beta h - \pi)] / \beta^2,$$

where

YD = disposable income of the household.

6 In an earlier study [2], we found that jobs and cash transfer programs were equally efficient in raising family disposable income. On average, we found that either strategy raised incomes 73¢ per dollar of net cost of the program.

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