Thomas MaCurdy

Commentary

In their paper, Philip Robins and Charles Michalopoulos project the impacts of an earnings-supplement program modeled after Canada's Self-Sufficiency Project (SSP).[1] The distinguishing characteristic of this program involves a benefit structure designed to encourage welfare recipients to work full-time. This commentary addresses the following questions:

- What are the key features of the proposed program?
- How does the authors' study evaluate the program?
- How reliable is this evaluation?

Description of the Proposed Earnings-Supplement Program

The critical element of SSP is that it pays benefits based on the number of hours per week an individual works. The benefits schedule offers nothing until a person reaches thirty hours per week, then it pays a large amount exactly at thirty hours. This amount is inversely related to a person's wage rate. As a person increases hours of work beyond thirty hours, benefits are reduced much in the same way as they are in other welfare programs. Although an hours-limitation feature is an uncommon feature of U.S. welfare programs, many programs in Europe have such elements. In Great Britain, for example, the Family Credit program gives a bonus to families when they reach sixteen hours per week, and another bonus for thirty hours.

To gauge the size of SSP payments for the most generous version of the program considered by Robins and Michalopoulos, Chart 1 compares the benefits paid by the federal earned income tax credit (EITC) with those paid by the SSP program with a target annual earnings level of $30,000. When an individual works more than thirty hours per week, he is eligible to receive ½*($30,000 - actual earnings) in addition to his actual earnings. The chart depicts the supplement for three cases, differentiated by the wage of the worker: a worker who earns $6 per hour, a second who earns $9, and a third who receives $12. The $6-per-hour worker begins to receive the supplement when his monthly earnings are $780, the amount he would earn if he worked exactly thirty hours per week. The initial supplement of $860 for this hypothetical worker more than doubles his earnings. For each additional dollar he earns, his supplement is reduced by fifty cents. The chart shows that individuals receiving hourly wages of $9 and $12 become eligible for the SSP benefit at higher levels of monthly earnings, $1,170 and $1,560, respectively. It also highlights the different incentives attached to the EITC, which does not base benefits on hours worked, as compared with the SSP. Under the EITC, each additional hour of work is rewarded with a positive transfer up until monthly earnings reach $780. In contrast, when total weekly hours are less than thirty, an additional hour of work does not result in any supplement according to the SSP program.

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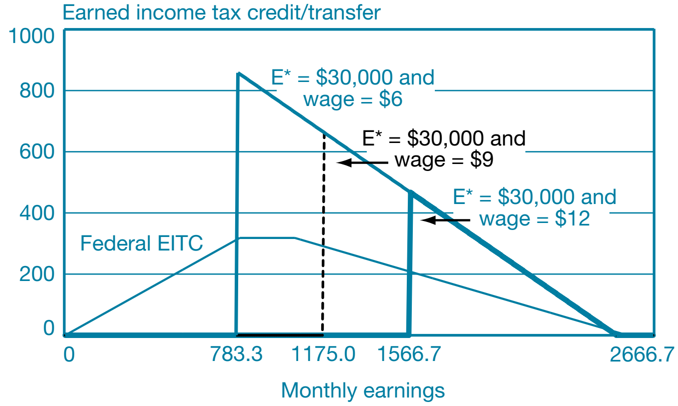
Chart 1

Monthly Benefits Paid by Federal EITC and SSP Programs for Different Earnings and Hourly Wages

Dollars



To illustrate further the implications of the SSP program on work incentives, Chart 2 shows changes in monthly disposable income as a family's earnings increase in conjunction with benefits paid from the federal EITC, the Temporary Assistance for Needy Families (TANF) program, and the SSP program. The chart shows how disposable income changes for an additional $100 in monthly earnings under two scenarios: one in which a family receives TANF and EITC benefits (termed a TANF family) and a second in which the family also qualifies for the SSP program (designated an SSP family). In addition to an adjustment for benefit changes, all computations account for the payment of Social Security and income taxes. The changes displayed in the chart are based on the TANF benefit schedule for California, which pays benefits that are about 15 percent higher than the most generous level paid by the states considered by Robins and Michalopoulos. According to the chart, disposable income rises approximately $110 for the first $100 earned by either a TANF or an SSP family. The three large spikes in the chart depict the large increase in disposable income occurring when the SSP program first goes into effect at thirty work hours per week for eligible recipients. The locations of these spikes reflect the different monthly earning thresholds at which workers with different hourly wages initially receive the SSP benefit.

To highlight the impact of the SSP program on work incentives, Chart 3 duplicates Chart 2, except that 1) the vertical scale is reduced to magnify changes in disposable income ranging from -$25 to $125 and 2) the chart isolates changes only for a family that makes $9 per hour. The chart shows that changes in disposable income across monthly earnings are identical for TANF and SSP families when monthly earnings range from $0 to $1,100, the point at which the SSP benefit is first given. When earnings increase from $1,100 to $1,200, the TANF family sees a decrease in disposable income of $2.80 while the SSP family witnesses a one-time increase of approximately $390. However, the increase in disposable income for SSP families for the next $100 in additional earnings—from $1,200 to $1,300—is only $6. When earnings increase from $1,500 to $1,600, the

Chart 2

Change in Monthly Disposable Income from Additional $100 in Earnings for TANF and SSP Families for Different Hourly Wages

Dollars

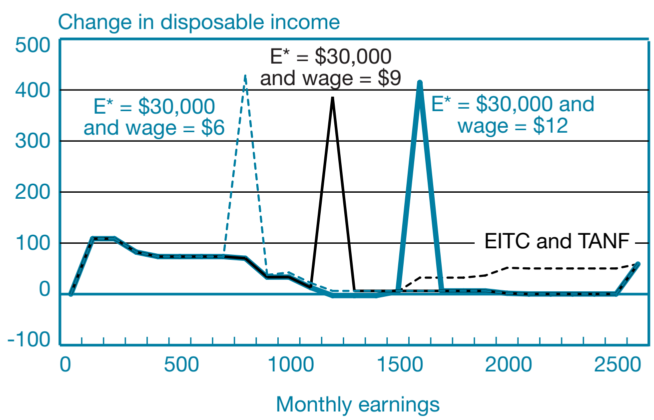
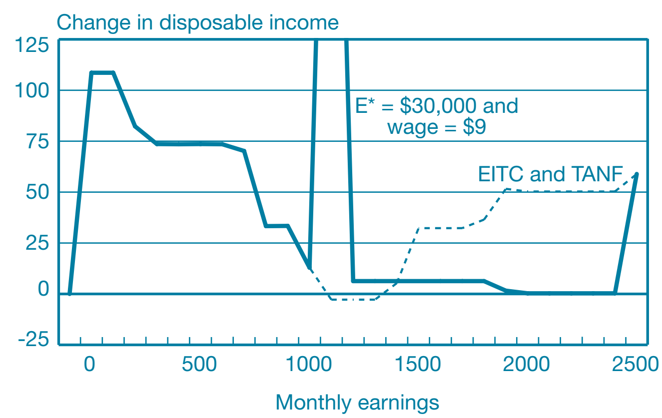


Chart 3

Change in Monthly Disposable Income from Additional $100 in Earnings for TANF and SSP Families

Dollars



relationship between the two programs is reversed; this increase in earnings causes about a $30 increase in disposable income for TANF families and only a $6 increase for SSP families. Changes in disposable income occurring to families under TANF remain higher than those under SSP until monthly earnings reach $2,600, when these programs are no longer relevant.

Thus, the work incentive created by the SSP program varies according to the level of weekly hours worked. For incremental changes at low hours, TANF and SSP families face the same work incentives, since the SSP program pays nothing. The SSP program offers a large incentive for a family to increase hours up to thirty. After thirty hours, work incentives are generally worse for the SSP family. So, if the objective is to induce workers to raise hours from thirty to forty, a typical definition of full-time work, SSP works against achieving this goal.

Approach for Predicting Impacts of the Earnings-Supplement Program

To predict the impact of introducing an SSP program, Robins and Michalopoulos posit a specific utility optimization framework and presume that families in the target population select hours of work according to this model. In essence, they implement a "simulation" approach to solve this optimization problem and to forecast responses.

Specifications Selected by the Robins-Michalopoulos Study

The functional forms for preferences assumed by Robins and Michalopoulos in conducting their analysis come from Moffitt (1983), a well-known empirical study analyzing the effects of Aid to Families with Dependent Children (AFDC) benefits on welfare participation and hours of work. The maintained labor supply equation takes the form:

1) $$H_1 = \alpha + \beta W(1 - \gamma t) + \delta(N + \gamma G)$$

for a person who receives welfare, and

2) $$H_0 = \alpha + \beta W + \delta N$$

for nonwelfare participants. An individual participates in welfare when

3) $$P^* > 0 \qquad P^* = \gamma\delta Wt + ln\left(\frac{\beta - \delta H_0}{\beta - \delta H_1}\right) - \varphi .$$

The variable H represents weekly hours of work, W is the gross hourly wage rate, N is nonwage income excluding welfare, t reflects the benefit reduction rate associated with the welfare program, and G is welfare benefits at zero hours of work. A person does not work when $H_1 < 0$ and $P^* > 0$ or when $H_0 < 0$ and $P^* \leq 0$. The coefficient α is an intercept dependent on a linear function of age, race, education, unemployment, and family composition; β measures the substitution effect; δ determines the income response; and the parameters γ and φ allow for the presence of welfare stigma.

Robins and Michalopoulos assume coefficient values and distributions broadly consistent with Moffitt's econometric model. For coefficients, they select values estimated by Moffitt. Also, as in Moffitt, the authors interpret the intercept of the labor supply function, α, and welfare sigma, φ, as being randomly distributed across families; α and φ equal normally distributed error terms added to fitted values estimated by Moffitt. Robins and Michalopoulos estimate a predicted value for wages using a simple linear regression equation, and they add a normally distributed error to this value to assign wages for nonworkers.

Overview of the Robins-Michalopoulos Simulation Procedure

To achieve their underlying goal of imputing distributions for wages, φ, and α, Robins and Michalopoulos simulate hours worked and welfare participation for each low-income family in their sample, given the AFDC benefit schedules actually faced by the family. To construct these distributions, Robins and Michalopoulos first draw one random variable, an error determining the value of φ, for each member of the sample who works. Using data on an averaged hourly wage, they then evaluate hours from equations 1 and 2 depending on whether the family participates in welfare. This hours calculation implicitly determines a value for the coefficient α (the intercept of the labor supply equation). Using the value drawn for φ and the constructed values of wages and hours, equation 3 determines whether the family receives welfare. If the resulting outcomes agree with the observed hours of work and welfare status of the sample member—and are consistent with highest utility—these imputed values of wage, φ, and α are assigned to this family. If, however, the outcomes disagree with the observed data, then the procedure is repeated with new random draws for φ until agreement is achieved. The process then moves on to assignments for the next sample member.

For sample members who do not work, Robins and Michalopoulos modify the above procedure by drawing two additional random components: an error for wages and a disturbance determining the value of α. Computing wages as the sum of a fitted value and the drawn error, they calculate hours and welfare participation from equations 1-3 using this value of the wage and the drawn realizations of φ and α. If the simulation reveals outcomes inconsistent with observed behavior, the process is repeated with new random draws. Once agreement with observed data is found, the constructed values of wage, φ, and α are assigned to the sample member.

At the end of this procedure, each family has been assigned values for the random variables of the model, which are then fixed for conducting counterfactual exercises. To forecast impacts of the SSP program, Robins and Michalopoulos alter benefit schedules to reflect the addition of the SSP benefits and then calculate changes in hours of work implied by their behavioral model. They then use these new hours to calculate changes in disposable income and program costs.

Concerns about the Reliability of Predicted Impacts

Carrying out a counterfactual analysis of the type performed by Robins and Michalopoulos always involves making compromises subject to criticism. This discussion briefly notes three categories of potential shortcomings: 1) problematic features of the underlying economic/empirical model, 2) incompatibilities between the simulation model and its estimated variant, and 3) modifications needed to conduct the simulation exercise.

Conceptual Features of the Economic Model

A major shortcoming concerns the presumption by Robins and Michalopoulos that all adjustments in annual hours of work come in the form of changes in weekly hours instead of shifts in the number of weeks worked per year. Even a casual examination of data on annual hours worked reveals that exactly the opposite is true; most adjustments occur in changes in the number of weeks worked per year. Moreover, the estimated empirical model used by the authors to calibrate their model merely measures the impact of changes in wages and income on a person's weekly hours, but it offers minimal capacity to assess effects on number of weeks worked over any extended period. Unless participation is determined independently across weeks for the given family, or is perfectly correlated, knowledge of the probabilities of working in a random survey week cannot be used to infer a family's annual, quarterly, or monthly hours. Furthermore, one cannot assess the degree to which benefit programs encourage more hours worked per week at the expense of fewer weeks worked. Robins and Michalopoulos focus on hours per week because this is the target variable of the SSP program, even though they consider payments from this program in an annual context analogous to the way in which the EITC program operates. The reasoning underlying the authors' linkage between hours per week and hours per year is questionable.

Predictions rely critically on the applicability of the labor supply function maintained in the simulation exercise, and the static linear specification assumed here is difficult to justify. The most fundamental shortcoming is that the labor supply function must apply globally for all ranges of wages and income observed in the data. This is a challenge not attained by most empirical specifications with only one source of randomness in tastes. Moreover, this same specification determines labor force participation, meaning that its parameters govern whether or not a person works. Unfortunately, such specifications have been found to be grossly incompatible with the data whenever tested. The static character of the assumed specification also gives rise to some concern, for it presumes that individuals ignore impacts of current work experience on future choices and opportunities, thus ruling out trade-offs between hours across periods. Moreover, such static specifications ignore responses motivated to avoid sanctions and time limits, which have become critical elements of states' welfare systems.

Selected Calibration of the Simulation Model

In addition to questions about the applicability of the behavioral underpinnings of the Robins-Michalopoulos simulation model, the authors' selection of parameter values and distributional assumptions raises concerns about the accuracy of hours projections. To be accurate, the model must be calibrated using values associated with the circumstances relevant for the simulation. There are two shortcomings in this regard.

First, the treatment of missing wages in this analysis creates problems with predictive accuracy. Robins and Michalopoulos simply impute wages using fitted values from conventional regression estimation, ignoring potential sample selection that will alter predictions for particular disadvantaged groups. In contrast, Moffitt (1983) accounts for sample selection in his estimation of missing wages. This adjustment leads to systematic and significant differences between the expected value and other moments of the wage distribution used in the simulated and the estimated versions of the model.

Second, whereas Robins and Michalopoulos use their model to predict the behavioral responses of a highly dependent population of welfare recipients, their choice of coefficient values and evaluation points for parameters specifying distributions comes from Moffitt, who estimates his model on a nationally representative sample of single-female households. Only 10 percent of the Robins-Michalopoulos sample worked at the baseline, and 80 percent received AFDC and food stamps for at least eleven months in the previous year. These numbers far exceed those for the representative population of female-headed families; Moffitt reports that only 35 percent of his sample received welfare benefits. The resulting parameters presented in Moffitt are unlikely to be applicable to the Robins-Michalopoulos population. Consequently, even if all the functional forms of distributions correctly describe outcomes for welfare populations, the values at which the authors evaluate parameters yield distributions that do not fit their data in the baseline simulation.

Conceptual Problem with the Simulation Approach

When random variables enter specifications nonlinearly, simulation methods dictate that many draws must be assigned to each sample observation to calculate distributions. For example, if a researcher wishes to infer the distribution of the quantity $g_i(x)$, and x follows a density $f(x)$, then constructing a histogram of the values $g_i(x_k)$, $k = 1, \ldots, N$, with each x_k representing an independent draw from $f(x)$, computes this distribution. A single draw and the resulting value $g_i(x_k)$ do not estimate this distribution. Instead, one requires a sufficient number of simulated values to obtain consistent estimates of the statistic of interest.

As interpreted above, Robins and Michalopoulos conduct their simulation with only a single draw assigned to each sample member. This might be appropriate to compute statistics if the g_i's are linear in their random components, or if many welfare families are observationally equivalent possessing identical g_i's—identical abstracting from the value of x_k. However, neither of these conditions holds in the authors' analysis. Nonlinear budget constraints and nonconvexities alone rule out linearity of the g_i analogues. The existence of families residing in different states and with differing economic endowments implies that g_i's vary across observations. Thus, a proper analysis should include many assigned simulated draws for each sample member.

Conclusion

The paper by Robins and Michalopoulos is an enlightening contribution to a topic that is central to the debate on welfare reform. The above commentary suggests that researchers should consider three modifications in future applications. First, to evaluate features of earnings-supplement programs aimed at influencing weekly hours, the underlying empirical/economic model should not only incorporate hours per week, but also weeks worked per year or some other relevant period allowing for trade-offs between weekly hours and weeks worked. Moreover, to describe the behavior of any population with a substantial segment that does not work, the model must allow for factors to impact interior solutions for hours of work different from labor force participation decisions. Second, one needs to calibrate the model to fit the sample used in simulation. This requires adjusting coefficient values and/or distributions to account for how a simulation sample differs from the data used in estimating parameters of the model. Estimating parameters of the model using the simulation sample offers one method for accomplishing this task, but less onerous options are available. Lastly, the simulation implementation must assign enough random draws for each sample observation to compute distributions and statistics reliably.

Endnotes

1. Portions of this commentary pertain to an unpublished technical appendix to the Robins-Michalopoulos paper.

References

Moffitt, Robert. 1983. "An Economic Model of Welfare Stigma." American Economic Review 73, no. 5 (December).