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## ABSTRACT

In this paper, the amount of time that a welfare client spends receiving welfare payments is analyzed within the framework of a model on the optimal allocation of time. The model allows for factors such as the stigma associated with receiving welfare, and the model suggests the possible influence of wage rates and welfare rates on the amount of time an individual will spend on welfare. The conclusions suggested by the model are tested with data from approximately 550 welfare clients from four states. As was anticipated by the model, weekly earnings of the client were negatively related to the number of weeks per year spent on welfare, and monthly welfare payments were positively related to the number of weeks spent on welfare. Other factors such as the number of applications for welfare also had a strong positive influence on the number of weeks spent on welfare. In general, the empirical results suggest that the model is not inconsistent with observed behavior, and the analytical framework seems much better suited to analyzing the behavior of welfare clients than the more traditional work-leisure model.

## TIME AND THE ECONOMICS OF WELFARE

A. G. Holtmann

Under current state welfare programs, there are usually periods during which potential welfare recipients are not receiving welfare payments. Some clients, after an initial period of receiving welfare payments, may never again participate in a welfare program. Conversely, other individuals may be on and off the welfare rolls for years. Still other individuals may legally qualify for some form of welfare aid, but never apply for payments. These different modes of behavior and the growing magnitude of total welfare payments in the United States have stimulated interest among economists. In general, three substantive points emerge in the literature. First, the choice to accept welfare can be analyzed within the traditional theoretical framework concerning the choice of work and leisure.<sup>1</sup> Second, although the work-leisure type model may provide some useful insights into the problem, the fact that the conditions under which welfare may be received are controlled by the state agencies limits the value of the pure work-leisure model.<sup>2</sup> Third, the cost of enduring a stigma from receiving welfare may be a deterrent to many who qualify for a welfare program.<sup>3</sup>

In this paper, a model is developed which incorporates the above mentioned factors related to the behavior of welfare clients. Also, empirical evidence based on a sample of approximately 550 welfare clients will be introduced to test the hypotheses suggested by the model.<sup>4</sup> To determine the behavior of welfare recipients, we reformulate Gary Becker's model on the allocation of time.<sup>5</sup>

We assume that individuals combine the time they are on welfare and commodities to produce consumption goods that contribute to their satisfaction. During the time individuals are not receiving welfare, they combine time and commodities to produce consumption goods that enter their utility functions. However, the marginal utility of using time for consumption has a different value when an individual is receiving welfare than when an individual is not receiving welfare. That is, at the margin the individual simply gets less satisfaction from consumption during the time he is on welfare. We might call this the stigma effect. Finally, the time the individual uses working produces a good that enters his utility function. In this case, we assume that this good enters the individual's utility function in a negative manner.

Since we assume individuals cannot work during the time they are receiving welfare, the total amount of time available is divided between work, consumption while on welfare, and consumption while not working or on welfare. The total amount of time might be a year, which is allocated among these three pursuits. In the model, we assume that the individual is paid a welfare rate per unit of time on welfare and we assume that he is paid a wage for time spent working. In addition, we assume these rates are constant and that they have been transformed into rates for comparable units of time. This theoretical scheme can be formally described in the following model.

#### I. THE MODEL

The utility function, the production functions, and the constraints are:

$$U = U(C_1, C_2, W) \quad (1)$$

$$C_1 = f_1(t_1, x) \quad (2)$$

$$C_2 = f_2(t_2, x)$$

$$W = f_3(t_3)$$

$$t_1 + t_2 + t_3 = T \quad (3)$$

$$px = at_1 + bt_3 + B$$

where  $C_1$  is the consumption good produced from using time to consume while receiving welfare;  $C_2$  is the consumption good produced from using time to consume while not receiving welfare;  $W$  is the good produced from using time for work;  $t_1$  is time used to consume while on welfare;  $t_2$  is time used to consume while not on welfare;  $t_3$  is time used for work;  $T$  is the total period of time available;  $x$  is the commodity used in consumption;  $a$  is the welfare rate;  $b$  is the wage rate;  $p$  is the price of the commodity used in consumption; and  $B$  is other income. While we assume only three goods, this is only to make the analysis more transparent.

If we substitute  $T-t_1-t_3$  for  $t_2$  in  $C_2$ , we can write the Lagrangian

$$L = U(C_1, C_2, W) - \lambda[px - (at_1 + bt_3 + B)] \quad (4)$$

and maximize it with respect to the choice variables to obtain the maximum of (1) subject to (3). This results in the first order conditions for a maximum of

$$\frac{\partial L}{\partial t_1} = \frac{\partial U}{\partial C_1} \frac{\partial f_1}{\partial t_1} + \frac{\partial U}{\partial C_2} \frac{\partial f_2}{\partial t_2} \frac{\partial t_2}{\partial t_1} + \lambda a = 0 \quad (5)$$

$$\frac{\partial L}{\partial t_3} = \frac{\partial U}{\partial W} \frac{\partial f_3}{\partial t_3} + \frac{\partial U}{\partial C_2} \frac{\partial f_2}{\partial t_2} \frac{\partial t_2}{\partial t_3} + \lambda b = 0$$

$$\frac{\partial L}{\partial X} = \frac{\partial U}{\partial C_1} \frac{\partial f_1}{\partial X} + \frac{\partial U}{\partial C_2} \frac{\partial f_2}{\partial X} - \lambda p = 0$$

$$\frac{\partial L}{\partial \lambda} = at_1 + bt_3 + B - px = 0$$

From the first equation in (5), we see that the positive welfare rate is equal to the difference in the marginal utility of using time to consume while on welfare and the marginal utility of using that time to consume while not on welfare. Surely there are alternative ways of introducing the importance of the stigma effect, but this method has the merit of showing that the consumption time used while a person is on welfare does not have negative utility.<sup>6</sup> The model simply implies that the marginal utility of time used in consumption while on welfare must be less than the marginal utility of consumption time used while not receiving welfare.

The second equation in (5) suggests that the positive wage is equal to the marginal disutility of work and the marginal consumption time foregone while working. While we have assumed that working time has negative marginal utility, the model does not necessarily suggest that the marginal utility of work time be negative. In addition, it is worth noting that relationships in (5) show that the time used in consumption while the individual is on welfare is related to the utility function by way of a production function. This production function relationship may be influenced by the actions of the welfare agencies. For example, in a food stamp program, one uses stamps to purchase the food made available. Such methods may change the marginal utility associated with consuming food. In any case, it is important to note that how one uses his time in consumption may be rather important.

If we subtract the first equation in (5) from the second, we obtain

$$\lambda(b - a) = \frac{\partial U}{\partial C_1} \frac{\partial f_1}{\partial t_1} - \frac{\partial U}{\partial W} \frac{\partial f_3}{\partial t_3} \quad (6)$$

This suggests that the difference between the marginal disutility of time spent working and the marginal utility that one obtains through consuming while receiving welfare is attributable to the difference between the wage rate and the welfare rate.

Of course, the effect of a change in the welfare rate is not perfectly clear. As the welfare rate increases, there is a substitution effect and an income effect. These influences can be seen by taking the total derivative of (5) with respect to "a." Taking the total derivative and rearranging equations results in the following system of equations

$$\begin{bmatrix} 0 & b & -p & a \\ b & U_{33} & U_{3x} & U_{31} \\ -p & U_{x3} & U_{xx} & U_{x1} \\ a & U_{13} & U_{1x} & U_{11} \end{bmatrix} \begin{bmatrix} \partial \lambda / \partial a \\ \partial t_3 / \partial a \\ \partial x / \partial a \\ \partial t_1 / \partial a \end{bmatrix} = \begin{bmatrix} -t_1 \\ 0 \\ 0 \\ -\lambda \end{bmatrix} \quad (7)$$

where the U's represent the second partial derivatives with respect to  $t_1$ ,  $t_3$ , and  $x$ .

Writing the determinant of the matrix of coefficients as  $|\bar{H}|$  and solving for  $\partial t_1 / \partial a$ , we have

$$\frac{\partial t_1}{\partial a} = -\lambda \frac{\begin{vmatrix} 0 & b & -p \\ b & U_{33} & U_{3x} \\ -p & U_{x3} & U_{xx} \end{vmatrix}}{|\bar{H}|} + t_1 \frac{\begin{vmatrix} b & U_{33} & U_{3x} \\ -p & U_{x3} & U_{xx} \\ a & U_{13} & U_{1x} \end{vmatrix}}{|\bar{H}|} \quad (8)$$



From the second order condition for a maximum of (5), we know that the principal minor of the determinant of coefficients in the denominator of the first factor in (8) and the principal minor of that determinant in the numerator of the first factor in (8) have opposite signs. Therefore, we know the substitution effect is positive. Unfortunately, we do not know the sign of the second factor. However, as we have suggested, the fraction in the second factor is equal to the change in the time devoted to being on welfare associated with a change in income,  $B$ . If, as seems plausible, we assume this effect to be negative, the sign of  $\partial t_1 / \partial a$  will depend on the relative size of the income and substitution effects connected with the change in the welfare rate. At low incomes, however, we might guess that the substitution effect would dominate, and an increase in the welfare rate would lead to an increase in time devoted to welfare.

## II. SOME EMPIRICAL EVIDENCE

Without developing all the comparative statics of the model, we can proceed to a discussion of the available data. Generally, data to determine the type of relationships implied by the above model are not available. Economists have often had to rely on state average wage rates and average welfare rates in their studies of the behavior of welfare recipients. Aggregate data of this type are of limited help in determining the influence of factors at a microeconomic level. Fortunately, some data do exist that shed light on the behavior of individual welfare clients. As is often the case, these data are not completely satisfactory for testing the importance of the theoretical model described earlier, but they may be the best available.

During 1969, a study was undertaken of welfare clients who had participated in a vocational rehabilitation program during the early 1960s. While all

clients had participated in the program, some were judged to have been rehabilitated after the program and others were classified as not rehabilitated. A classification of rehabilitated meant that at the time of release from the rehabilitation program the individual was able to function satisfactorily in his previous activities. These included such activities as working, maintaining a home, and going to school. The clients participating in the 1969 follow-up study were from Florida, New Jersey, West Virginia, and Arkansas. From among some 861 clients who were interviewed, data concerning welfare were available for some 554 clients.

It was not possible to obtain information on the amount of welfare that each client had been receiving since he left the rehabilitation program. However, it was possible to determine the average annual number of weeks that each client had been receiving welfare since leaving the rehabilitation program. We used this average number of weeks on welfare as the dependent variable in a regression analysis. It was hoped that the determinants of the average annual number of weeks on welfare and the direction of the influence of these determinants could be predicted from the earlier theoretical model. For example, we would expect that, other things being the same, the higher the welfare rate the more time the individual would spend on welfare during a year. To test this, the client's average monthly welfare payment at the time he left the rehabilitation program was entered into the regression equation as an independent variable. This variable was a proxy for the potential welfare rate available to the individual. On the basis of our earlier analysis concerning the influence of the welfare rate on the amount of time spent on welfare, we expected a positive relationship between this variable and the dependent variable. An estimate of the current welfare rate available to the client could not be obtained.

As can be seen from equation (6), the wage rate is important in determining the amount of time spent on welfare. While the influence of a change in the wage rate cannot be stated unequivocally, again we would expect the substitution effect to dominate, resulting in more working time and less time on welfare and consumption. Therefore, we would predict a negative relationship between the individual's wage rate and the average annual number of weeks on welfare since closure from the rehabilitation program. As with the welfare rate, we have information on the average weekly earnings of the client at closure from the vocational rehabilitation program. This was taken as a proxy for potential rewards in the labor market.

According to the model, we would anticipate that an increase in other income, B, would lead to a decrease in the amount of time spent receiving welfare. In this case, we are assuming that there is a negative income effect associated with the time spent on the welfare rolls. Two variables for which we have data are associated with the client's potential other income, B. The monthly welfare payments to other members of the family, and the weekly earnings of the client's spouse at the time the client's case was opened with the vocational rehabilitation service are part of other income, B, available to the client.

The model developed earlier also suggests that some clients might have a greater taste for spending time on welfare than others. While determining the factors that would suggest a positive or negative taste for welfare payments may be somewhat subjective, these factors are likely to be important, and the data available concerning the welfare clients are related to these factors. Ceteris paribus, we would expect that clients who apply more often for welfare

are likely to spend more weeks on welfare per year. In this case, the average number of applications for welfare since the client's vocational rehabilitation was entered in the regression equation as an independent variable. This variable not only reflects a taste for welfare payments but may reflect a return to effort and endurance. Of course, if clients remain on welfare for an extended length of time, this may lead to a negative association between the average number of applications for welfare and the average number of weeks on the welfare rolls.

We might expect that women would have a greater taste for welfare than men, when all other factors are held constant because the stigma for not being attached to the labor market is not likely to be as great for women as for men in our culture. In any case, being male was entered in the regression analysis with a value of one, and being female was entered with a value of zero. If the above logic is correct, we would expect a negative value for the regression coefficient associated with this dummy variable.

We might suspect that blacks have a greater propensity to be on welfare than whites. Such a hypothesis might be related to the higher unemployment rates among blacks, rather than to a cultural difference between the races. Another dummy variable was used with blacks forming the basis group. If blacks do have a greater tendency to be on welfare, we should expect a negative sign to be associated with the regression coefficient of this variable.

Among the other variables that entered the regression that might be associated with a need for welfare or a taste for welfare were the following. The age of the client was entered as a continuous independent variable. In this case, we would expect that the older poor clients would have a greater

need for welfare payments. To the extent that welfare recipients are likely to be part of a "poverty culture," we might expect those who had parents who received welfare to spend more time per year on the welfare rolls themselves. Again, this factor was related to the dependent variable through a dummy variable. If a client was classified as closed-rehabilitated, this was entered as a dummy factor with the category closed-not-rehabilitated forming the basis of comparison. We would expect that those classified as rehabilitated would spend fewer weeks per year on the welfare rolls. There are two sets of dummy variables that reflect the client's degree of disability. In the first case, the classification of "not a severe disability" is compared with "no disability," a "somewhat severe disability," and a "severe disability." Of course, we would expect the most severe disability category to have the greatest positive association with the average yearly number of weeks the client spent on welfare. Lastly, a set of dummy variables was entered into the regression to reflect the jobs lost due to any disability. Having lost one job or less due to a disability was used as the basis for comparison for those who had lost several jobs and those who had lost many jobs.

Another factor that might be considered a taste factor is the number of years since the client left the vocational rehabilitation program. If there is any deterioration in the effects of the vocational rehabilitation services, we would expect those who were closed from the program earlier to have spent more weeks per year since closure on the welfare rolls. Also, the state where welfare was received is entered into the regression. Arkansas forms the basis of comparison for this set of variables.

## III. THE REGRESSION RESULTS

As can be seen from Table 1, the variables included in the regression equation accounted for approximately 18 percent of the variation in the average annual number of weeks spent on the welfare rolls. When the number of factors that determine a client's participation in a welfare program are considered, the  $R^2$  is not particularly discouraging. Studies of micro-economic behavior based on cross section data are often plagued by a low coefficient of determination. In any case, we are mainly concerned with the regression coefficients. If we consider the regression coefficient associated with the client's average monthly welfare payment after vocational rehabilitation, we see that there is a meaningful positive relationship between the welfare rate and the time spent on the welfare rolls. In this case, a ten dollar increase in monthly welfare payments would bring about an increase in time spent receiving welfare of almost one week. This is, of course, consistent with our earlier prediction.

The results in Table 1 also confirm the hypothesis that wage rates are negatively related to time spent on welfare. In this case, a ten-dollar increase in the client's weekly wage when leaving the vocational rehabilitation program is associated with a decrease of one-half week on the welfare rolls per year. In addition, the number of applications for welfare per year is positively related to the propensity to be on the welfare rolls. For each application, a client was able to increase the annual number of weeks he spent on welfare by about seven weeks. The other two significant independent variables are sex and the number of years since closure from the vocational rehabilitation program. As anticipated, being male was negatively associated with the annual

TABLE 1

## Determinants of Average Annual Weeks on Welfare Rolls for Welfare Clients

Variable	Regression Coefficients	Standard Error
Weekly earnings at closure	- .057	.024***
Monthly welfare payments at closure	.082	.014***
Average number of welfare applications	7.921	3.243**
Weekly earnings of spouse	- .066	.041
Age	- .055	.074
Monthly welfare payments to others in family at closure	.039	.029
Number of years since closure	1.926	.871**
<b>Sex:</b>		
Male	-4.219	1.912***
Female	0	0
<b>Race:</b>		
White	-2.163	1.969
Black	0	0
<b>Rehabilitation status:</b>		
Rehabilitated	-1.740	2.18294
Not rehabilitated	0	0
<b>Parents received nonfinancial welfare aid:*</b>		
Yes	-3.507	3.375
No	0	0

TABLE 1 (cont.)

Variable	Regression Coefficients	Standard Error
Unemployment from disability:		
Lost several jobs	3.561	1.995
Lost many jobs	4.014	2.514
Lost one job or less	0	0
Disability:		
Very severe	1.5702	4.095
Somewhat severe	- .8716	4.277
Not severe	0	0
No disability	4.536	5.0367
State:		
Arkansas	0	--
Florida	1.6307	2.5269
New Jersey	5.6485	3.0666
West Virginia	4.9854	2.5776

$$R^2 = .1789$$

$$F = 6.123$$

## Notes:

\* The variable concerning those who indicated their parents had received welfare would not enter the stepwise regression because of its low F.

\*\* Significant at the .05 probability level or higher.

\*\*\* Significant at the .01 probability level or higher.



number of weeks that an individual spends on the welfare rolls. A reduction of about four weeks on the welfare rolls is associated with being male. A deterioration in the benefits from vocational rehabilitation is implied by the positive relationship between years since closure and the number of weeks per year the client receives welfare. In this case an additional year since receiving vocational services is associated with an increase of about two weeks on the welfare rolls.

There are at least two variables found to be insignificant in the analysis that deserve some discussion. First, there was no significant relationship between race and the average number of weeks a client received welfare per year. Examination of the entire regression analysis suggests that perhaps there is actually no relationship between race and the average number of weeks on the welfare rolls. There is a very small negative zero-order correlation between being white and the jobs lost due to disability. However, when the factors associated with disability and employment are excluded from the analysis, the racial variable remains insignificant. There was a small positive correlation between being white and the weekly wage at closure. Nevertheless, entering the racial variable into the equation did not change the regression coefficient associated with the wage rate. There are always some problems of multicollinearity in an analysis of this type, but such problems do not seem to account for the insignificance of this variable.

Finally, although the relationship between being classified as rehabilitated and the average number of weeks on welfare was negative, the coefficient was not significantly different from zero. One explanation for this is that there is a quality dimension associated with vocational rehabilitation. Since

those clients classified as rehabilitated vary greatly in their ability to function in the labor market, the simple dichotomous variable does not adequately reflect the benefits from rehabilitation. The wage rate at the completion of the rehabilitation program may reflect the quality of the vocational service provided and may therefore be reflected in the negative relationship between weekly wages at closure from vocational rehabilitation and the number of weeks the client is on the welfare rolls.

#### IV. SUMMARY

The data reported here were taken from interviews with the welfare clients, welfare records, and vocational service records. Therefore, the analysis is not based on sets of data collected for the specific purpose of testing the theoretical model presented earlier. Nevertheless, the results are quite consistent with the logic of the analytical framework developed to explain the amount of time an individual spends on welfare. While many of the results would be consistent with other theoretical constructs of behavior, the model based on the allocation of time seems most appropriate for analyzing the behavior of welfare clients. First, the theory emphasizes the importance of the consumer's production function in using time while receiving welfare payments. This is important because this production can be influenced by the way welfare is given. Second, the theory provides an explanation for the possibility that a stigma effect exists even when the welfare client derives positive utility from consumption. Third, conceiving time on welfare as part of the entire allocation of a person's time does not carry the same connotation as considering such time as leisure. Surely, little of the time spent on welfare

is likely to be used in consuming goods remotely related to activities associated with pure leisure. While a definition of leisure that consists of all time away from work is analytically sound, it does not go far enough in describing behavior.<sup>7</sup> The formulation of the problem in this paper seems to take us further in describing the behavior of welfare clients without sacrificing analytical rigor.

## Footnotes

<sup>1</sup>See C. T. Brem and T. R. Saving, "The Demand for General Assistance Payments," American Economic Review 54 (December 1964): 1002-18, for an analysis of one type of public assistance program and its influence on work incentives.

<sup>2</sup>See B. Stein and P. Albin, "The Demand for General Assistance Payments: Comment," American Economic Review 57 (June 1967): 575-585, for a general attack on the leisure model for predicting behavior of welfare clients.

<sup>3</sup>See B. A. Weisbrod, "On the Stigma Effect and the Demand for Welfare Programs: A Theoretical Note" (Madison: Institute for Research on Poverty, 1970) Discussion Paper 82, for an imaginative cost-benefit approach to the demand for welfare aid. While Weisbrod does not use the theoretical apparatus developed here and he does not discuss any empirical evidence, his paper stimulated the thinking in the present paper.

<sup>4</sup>The welfare clients in this sample may have received several different types of welfare payments. See C. Grigg, A. Holtmann, and P. Martin, Vocational Rehabilitation for the Disadvantaged (Lexington, Mass.: Heath Lexington Books, 1970) for a description of all clients during the vocational rehabilitation program.

<sup>5</sup>This model is a reformulation of Becker's model of occupational choice. See Gary S. Becker, Economic Theory (New York: Knopf Books, 1971), pp. 165-170.

<sup>6</sup>At least one other plausible approach can be developed by introducing time spent on welfare directly into the individual's utility function. Then, one might conceive of the individual choosing the time spent on welfare and off of welfare. Further, time consuming and working while not on welfare may be assumed to be in fixed proportions. The first order conditions associated with this model are similar to those developed in the text. The model is formally sketched below.

Assume utility is a function of consumption, work, and time receiving welfare. Using the notation developed earlier, the utility function is

$$U = U(C, W, t_1) \quad (1')$$

The production functions are

$$C = C(t_1, at_2, x) \quad (2')$$

$$W = W[(1-a) t_2]$$

where C is consumption; W is work;  $t_1$  is time on welfare;  $t_2$  is time off welfare; a is the proportion of  $t_2$  used in consumption;  $(1-a)$  is the proportion of  $t_2$  used in work; and x is the commodity used in consumption.

Letting z equal the welfare rate, g equal the wage rate, B equal other income, and T equal total time available, we have the following two constructs:

$$T = t_1 + t_2 \quad (3')$$

$$px = zt_1 + g(1-a)t_2 + B$$

where p is the price of commodities.

Substituting the first constraint in (3') into the second, we form the Lagrangian expression

$$L = U(C, W, t_1) - \lambda \{ px - [zt_1 + g(1-a)(T-t_1) + B] \}$$

Taking the partial of this expression with respect to  $t_1$  gives the following as part of the first order conditions for a maximum:

$$\frac{\partial U}{\partial t_1} + a \frac{\partial U}{\partial C} \frac{\partial C}{\partial t_2} \frac{\partial t_2}{\partial t_1} + \frac{\partial U}{\partial C} \frac{\partial C}{\partial t_1} + \frac{\partial U}{\partial W} \frac{\partial W}{\partial t_2} \frac{\partial t_2}{\partial t_1} (1-a) +$$

$$\lambda z - \lambda(1-a)g = 0 \quad (4')$$

This suggests that the individual adjusts his time on welfare until the marginal utility of time spent consuming while on welfare,  $\frac{\partial U}{\partial C} \frac{\partial C}{\partial t_1}$ ,

disutility of time spent on welfare,  $\frac{\partial U}{\partial t_1}$ , plus the value of the welfare rate,

$\lambda z$ , is equal to the marginal utility of time consuming while not on welfare,

$a \frac{\partial U}{\partial C} \frac{\partial C}{\partial t_2}$ , plus the marginal disutility of time spent working,  $(1-a) \frac{\partial W}{\partial t_2}$ ,

plus the value of the wage rate  $\lambda(1-a)g$ . While the results are similar to those obtained in the text, the disutility associated with being on welfare does not enter the results in the same manner.

<sup>7</sup> See A.G. Holtmann, "A Note on Lump-Sum Subsidies: How to Have Your Work and Utility Too," National Tax Journal 23 (December 1970): 469-72. The work-leisure model is also deficient in explaining reactions to negative taxes.