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# "Time to Do the Chores?" Factoring Home-Production Needs into Measures of Poverty

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**Abstract**

Currently, income is the only resource that the government takes into account when measuring poverty. But in order for a family to maintain an adequate standard of living, its members must not only have money, but the time to do certain kinds of work in the home: child care, food shopping, meal preparation, laundry, housecleaning, and the like. With this in mind, the author recalculates poverty rates using a method developed by Vickery (1977) in which time is factored in as a resource. She finds that poverty rates increase dramatically when time is factored in as a resource, because working parents, especially single parents, often do not have enough time to perform essential tasks. Data are from the 1985 American Time Use survey.

**"Time to Do the Chores?" Factoring Home-Production Needs into Measures of Poverty**

In 1977 Clair Vickery challenged the basis on which the federal government establishes its poverty lines and calculates adjusted poverty rates. In creating national poverty lines, the government considers the amount of income needed to buy basic food items sufficient to feed families of different sizes. In measuring poverty rates, it considers the incomes of families and the number of people in them. In neither case does the government recognize that households need more than just money to function efficiently; as Vickery points out, maintaining a household requires not only money, but the time necessary to engage in subsistence levels of household production—caring for children, shopping for necessities, cooking meals and doing the dishes, washing clothes.

Thus, when the government established the 1992 poverty threshold of $14,463 for four-person families, it assumed that the members of those families had sufficient time available for minimal household-production requirements. Such an assumption may not always be correct, however, according to Vickery. In some families, members may have to work so many hours outside the home in order to earn enough money to make ends meet that they have little time left over for household production. The situation is particularly difficult for single parents who can neither specialize in household production nor accept shift work so as to split child care with another adult family member.

The implication from a policy perspective is that two families of the same size with incomes at minimum poverty levels may not share the same standard of living. Vickery demonstrated that poor families with identical incomes may have different standards of living if they have dissimilar home-production needs and different amounts of time available for meeting those needs. For example, consider two families of four. Members of the first family are not employed but receive $14,463 in unearned income each year.[1] Members of the second family are employed for fifty-eight hours a week at $5 per hour and net the same amount of money as the first family. Although both families have the same income and are officially poor, the first family, it can be argued, enjoys a greater standard of

living.[2] Because they do not work outside the home, its members have enough time available for household production and have more income at their disposal, since they do not have to spend some of their money on child care and transportation to and from a job. Further, if the second family is headed by a single parent, it is unlikely that its basic household operation needs are being met.

Throughout its history, the U.S. government has neglected to explicitly recognize that families have basic personal time needs and that such time has value. Despite much political talk about the importance of family values and especially the need for parents to spend more quality time with their children, we neither attempt to estimate the value of such time in terms of gross domestic product nor account for it when establishing poverty guidelines. We continue to base measures of economic growth and living standards on fiscal indicators only. This paper questions the suitability of income-based measures of poverty and living standards as it revisits Vickery's earlier work. It also estimates the incidence of "time poverty"—a situation in which a household's standard of living is subpar because not enough time is available for subsistence levels of home production. Data are from the 1985 American Time Use survey. The paper will conclude with a further discussion of conceptual and policy implications regarding establishing time-adjusted poverty thresholds.

## USDA POVERTY THRESHOLD MEASUREMENT

The federal government began measuring poverty in the early 1960s. The first poverty lines were based on data indicating that families in the 1960s spent about one-third of their income on food. The U.S. Department of Agriculture was then directed to calculate the lowest cost means for families of differing types to purchase "nutritionally adequate" diets. These estimates were multiplied by three to determine the dollar poverty thresholds for families of different compositions. Annual poverty thresholds continue to be based on what is now known as the "Thrifty Food Plan"; however, they are updated by applying changes in the Consumer Price Index to the previous year's values, rather than

repricing the Thrifty Food Plan and multiplying by three. Poverty rates are calculated by the Census Bureau using the official poverty thresholds.

Numerous criticisms have been leveled against the current methods used for establishing thresholds and counting the poor, so much so that Congress has asked the National Research Council to study statistical and conceptual issues involved with our understanding and measurement of poverty. It is beyond the scope of this paper to review all the criticisms of the current poverty guidelines (see Ruggles 1990). Instead, the focus will be on the conceptual need for time as a resource to be considered in such measures and the policy implications of such an action.

## VICKERY TIME POVERTY AND MONEY POVERTY STANDARDS

To visually demonstrate the effects of incorporating time scarcity into conventional consumption-based poverty measures, Vickery (1977) plotted time and money inputs available to families and mapped out poverty thresholds. Figure 1 is taken from that article. It establishes that minimum money inputs ($M_o$) and minimum time inputs ($T_0$) are needed for basic subsistence, and represents needs for which resources may not be substituted one for the other. $M_0$ thus represents the USDA's current consumption-based poverty threshold for a particular family. $T_0$ is assumed to equal two hours per day, that is, households require a minimum of two hours per day of household-production time, which includes the time spent searching for and purchasing goods and services. Thus, any household with inputs below these minimums as represented by points B and A would be considered poor. Because time is a fixed resource, $T_m$ represents the finite time constraint. Its daily value per adult in the household as measured by Vickery is 24 hours less 11.5 hours for sleep and personal care.

Figure 1 here

Point C represents a family with the poverty threshold income level and full time available for household production (no time spent in market work). As long as the household has $T_1$ hours of time available for household production, subsistence income, $M_0$, is sufficient. However, if adults in the household are employed for more than $T_m$ minus $T_1$ hours of market work, they will need to substitute market-purchased goods and services for those marginal units of household production to enjoy the same standard of living. For instance, if the adults had one hour fewer than $T_1$ hours of time available for household production, then they would have to buy an hour's worth of child care, or pay somebody to clean their house for an hour. Vickery calculated the mean amount of time spent by full-time homemakers and their full-time employed spouses in household production by the number of children present and used these figures as the basis for establishing $T_1$. One exception was that rather than use time spent house cleaning by married full-time homemakers, the average time spent by married women employed full time was used in calculating $T_1$. A similar convention was followed in this analysis.

Point B represents the family that (1) has allocated its maximum time available to market work, (2) enjoys just enough income to be able to sustain $M_0$ consumption levels plus income equal to the value of foregone necessary household production, and (3) only spends subsistence amounts of time (two hours per day) in household production (cooking, cleaning, laundry, child care, etc.).

The slope of the poverty threshold between points B and A depends on the rate at which families are able to trade money for home-produced goods and services. Although household-production theory indicates that the inframarginal rate of technical substitution between market-purchased and home-produced goods and services exceeds the marginal rate of technical substitution, for convenience one may, as we have, assume a constant rate of substitution, thus implying a linear poverty threshold.

## MEASUREMENT OF POVERTY THRESHOLDS ADJUSTED FOR TIME

To derive estimates of time-adjusted poverty thresholds, one must have data on family time use for establishing minimum levels of the household-production needs of families of differing compositions. Vickery's work used Walker and Woods's (1976) 1967 time diary data for two-parent families. The last nationwide U.S. time budget survey was conducted in 1985 by John Robinson at the University of Maryland. Those data have recently been released (February 1993) for public use to the Inter-university Consortium for Political and Social Research and are employed in this analysis. Respondents to the survey were asked to record, in a single day, time diaries of each activity they engaged in over a twenty-four-hour period. The time diary data were gathered through three different data collection methods: mail-back, telephone, and personal interviews. Respondents were instructed to describe in the diaries when certain activities began, the time the activities ended, where they occurred, and who was present when they took place. Demographic variables include household type, respondent's sex, marital status, age, educational level, occupation, work hours, number of children in the household under five and eighteen years of age, and household income. Other variables pertain to total work time, total time traveling to and from work, time spent on meal preparation and cleanup, house cleaning, outdoor chores, laundry, ironing, clothes care, home repair, baby care, child care, shopping for food, and traveling to and from shopping.

The main survey was administered by mail and included a sample of Americans who were first contacted by telephone using a random digit dial design. All household members aged twelve and over were sent mail-back diaries. A total of 2,921 mail-back diaries were completed and returned by adults aged eighteen and over. These survey data were used for the married couples' time use analysis in this paper. The survey responses of husbands and wives were matched to create household records of adult time use. In addition, data were collected by telephone (n=1,210) and in-home interviews (n=808). To maximize the sample size, the single-parent records used in this paper were

selected from all three survey method types.

Table 1 presents government poverty dollar thresholds ($M_0$), household production time poverty thresholds ($T_1$), and revised dollar poverty thresholds accounting for time scarcity, that is, adjusted poverty thresholds compensating for the marginal units of foregone household production if all available discretionary time were devoted to market work at a constant rate ($M_1$). $M_1$ was calculated at the minimum wage ($3.35 an hour in 1984) and at a slightly higher wage ($5 per hour) to provide upper- and lower-bound estimates of the value of the marginal units of household-production time. The calculations were made as proposed by Vickery. It is interesting to note the consistency in the value of $T_1$ over time. Vickery found using 1967 data that time thresholds for two-parent families with 1, 2 to 3, 4 to 5, and 6 or more children present were 62, 66, 68, and 74 hours per week, respectively. The 1985 Time Use data estimates are very similar.

Table 2 presents data on the incidence of poverty, using the 1985 American Time Use diary data. Sample statistics are provided for women by marital and employment status on consumption-based poverty rates, time poverty rates, and Vickery's combined time and money poverty rates. The consumption-based poverty rates are low compared to national averages. This is attributable to two factors. First, low-income households were underrepresented in the Robinson data. To remedy that, data from the Census Bureau on the distribution of income among female-headed households (U.S. Department of Commerce, 1991) were used to calculate survey weights and were used in all analyses. Second, Robinson collected only categorical income data, with <$15,000 being the lowest category. In 1985 the poverty threshold for a three-person family was $8,277. Thus, even if the income interval midpoint ($7,500) was assigned, two-child single-parent households in the lowest income bracket would not be classified as poor. Although household incomes were imputed, ensuring that imputed values fell within the original categorical range,[3] that

**TABLE 1**

**Parameters of Poverty Threshold (Weekly Values)**

| Household Type | $M_0$[a] | $T_1$ (Hours) | $M_1$ | |
|---|---|---|---|---|
| | | | $3.35 | $5 |
| 1 adult[b] with: | | | | |
| 1 child | $134 | 46.9 | $244 | $299 |
| 2 children | $159 | 43.3 | $257 | $306 |
| 3 children | $204 | 46.2 | $312 | $365 |
| 4 children | $242 | 53.0 | $373 | $437 |
| 2 adults with: | | | | |
| 1 child | $159 | 65.0 | $283 | $344 |
| 2 children | $204 | 59.5 | $311 | $364 |
| 3 children | $242 | 65.9 | $369 | $432 |
| 4 children | $273 | 72.5 | $424 | $498 |
| 5 children | $310 | 91.1 | $521 | $625 |

**Source:** Author's calculations based on the 1985 American Time Use survey.

[a] The $M_0$ figures are 1984 poverty cutoff points.

[b] Although actual single-parent time use data were available to calculate threshold time poverty values, when broken down by number of children, the cell sizes were small ($n < 15$ in all but one cell). Therefore, married women's time (excluding husbands' contributions) was used for single parents.

**TABLE 2**

**Poverty Rates for Families with Children**

| | Married Mothers | | Single Mothers | |
|---|---|---|---|---|
| | Employed (n=136) | Not Employed (n=124) | Employed (n=210) | Not Employed (n=160) |
| Poverty rates by official government income standards | 6% | 9% | 11% | 18% |
| Poverty rates including only time measure | 91% | 78% | 90% | 77% |
| Poverty rates including time and income | 24% | 14% | 53% | 56% |

**Source:** Author's calculations based on the 1985 American Time Use survey.

process resulted in few households falling below the government's poverty thresholds. That is, one can assume that the present analysis underestimates the consumption-based poverty rates.

Analysis of household time poverty reveals that 90 percent of the single parents employed full time and 77 percent of the full-time homemakers did not spend what Vickery defined as the threshold amount of time in household work. By calculating the time-adjusted poverty threshold using the $3.35 per hour replacement wage, we see that adjusted poverty rates are similar for employed single mothers and full-time-homemaker single mothers. That is, although employment reduces consumption-based measures of poverty among single mothers, once the scarcity of their time resource is considered, their circumstances are very similar to those of their full-time-homemaker counterparts.

However, of central importance from a policy perspective is whether time poverty is "voluntary" or not. That is, do families who do not spend threshold amounts of time in household production have the discretion to do so? Table 3 presents several measures of the time constraint facing families. Vickery stated that families who spent fewer than two hours per day in household production were poor, per se. Thirty-seven percent of single mothers employed full-time spent less than two hours per day in household work on a workday. That compares to only 11 percent on non-workdays. Vickery also suggested that adults required 11.5 hours per day for sleep and personal care. However, again we see that on workdays 41 percent of employed single women were unable to spend even eight hours per day on sleep and personal care. Given Vickery's suggestion for personal care time needs, single-parent families face a time constraint of 12.5 hours per day (25 hours in the case of two-parent families) for allocation to all work (paid and unpaid) activities. The last line of Table 3 shows that on workdays, 21 percent of employed single mothers spent more than 12.5 hours per day in all work and further analysis indicates that 81 percent of those mothers spent fewer than eight hours per day on sleep and personal care.

**TABLE 3**

**Absolute Time Poverty Rates, by Employment Status**

| | Married Mothers | | | Single Mothers | | |
|---|---|---|---|---|---|---|
| | Employed | | Unemployed | Full-Time Employed | | Unemployed |
| (n=90 ) | Workday (n=46 ) | Non-workday (n=124) | (n=48) | Workday (n=26) | Non-workday (n=73) | |
| < 2 hours/day for household maintenance | 21% | 12% | 4% | 37% | 11% | 19% |
| < 8 hours/day available for personal care including sleep | 33% | 9% | 21% | 41% | 12% | 31% |
| Neither adequate household maintenance nor personal care time (< 8 hours/day) | 5% | 0% | 0% | 15% | 0% | 7% |
| Binding time constraint (home & market work >12.5 hours/day) | 23% | 4% | 5% | 21% | 0% | 0% |

**Source:** Author's calculations based on the 1985 American Time Use survey.

Finally Vickery proposed an analysis of the "critical wage" to determine whether households are involuntarily poor. The critical wage ($W_c$) is defined as the net wage rate that household member(s) must earn in order to reach the adjusted poverty threshold and is calculated as:

$$W_c = (M_0 + \Sigma_i p_i h_i)/[(T_m - T_1) + \Sigma_i h_i], \text{ for } p_i \leq W_c < p_i \neq 1,$$

where $p_i$ equals the replacement wage cost and $h_i$ equals the number of household-production hours to be replaced.

Table 4 presents estimates of critical wages for households of varying compositions, assuming the adults are employed full time. $T_w$ equals employment hours including travel time; $T_s$ is the number of hours available after market work and essential nonmarket work is complete (the number of essential hours to be bought off, if negative); and $M_c$ equals the time-adjusted poverty threshold income. To provide upper- and lower-bound estimates of $W_c$, replacement wages of $3.35 and $5 per hour were used in the calculations. Several points are demonstrated by this table. First, if single-parent households work full time they will not have sufficient time available for threshold amounts of household production. Thus, they would need to be compensated for five to fifteen weekly hours of household production. Compensating wages range from $2.60 to $4.79 and enable a one-child single parent who earns the minimum wage to attain the minimum poverty threshold income. Larger family sizes would require a larger compensating wage.

Only two-parent households with five or more children would require compensation for unpaid work; thus the time-adjusted poverty thresholds ($M_c$) for families with one to four children equal the USDA's consumption-based poverty lines ($M_0$). But if the adults in a five-child family were able to secure minimum wage ($3.35) employment, they would earn enough to replace their nonmarket work since the compensating wage rate for five children would be $3.25.

Vickery further defined involuntary time poverty as a situation in which a family's time constraint is binding and their market wage is less than the critical wage. That is, they do not

**TABLE 4**

**Critical Wages with Weekly Income and Hours of Work**

| | Work Hours | | Replacement Cost of Nonmarket Time | | | |
|---|---|---|---|---|---|---|
| | | | $3.35 per hour | | $5 per hour | |
| | $T_w$ | $T_s$ | $W_c$ | $M_c$ | Wc | $M_c$ |
| Household type | | | | | | |
| 1 adult with: | | | | | | |
| 1 child | 49 | -8.9 | $2.60 | $164 | $2.24 | $178 |
| 2 children | 49 | -5.3 | $3.53 | $177 | $3.31 | $186 |
| 3 children | 49 | -8.2 | $4.41 | $231 | $4.08 | $245 |
| 4 children | 49 | -15.0 | $4.79 | $292 | $4.18 | $317 |
| 2 adults with: | | | | | | |
| 1 child | 98 | 11.0 | $2.45 | $159 | $2.68 | $159 |
| 2 children | 98 | 16.0 | $3.22 | $204 | $3.55 | $204 |
| 3 children | 98 | 10.1 | $3.45 | $242 | $3.66 | $242 |
| 4 children | 98 | 3.0 | $3.54 | $273 | $3.60 | $273 |
| 5 children | 98 | -15.0 | $3.25 | $360 | $2.94 | $385 |

**Source:** Author's calculations based on the 1985 American Time Use survey.

command a wage that would allow them to earn sufficient income to bring them up to the time-adjusted poverty levels given their threshold household-production needs. Using the Robinson time use data I find that among all employed (both full and part time) single parents who face a binding time constraint, 10 percent, 26 percent, and 69 percent of those with one, two, and three or more children, respectively, have market wages that fall below the critical wage, assuming a constant market replacement cost of $3.35 per hour.

Finally, Vickery discussed choices regarding family composition that influence poverty levels. To some extent, single parents do "choose" their living arrangements and number of children. For example, they choose to live alone with their children rather than combine families with another single parent. And they choose whether or not to conceive, give birth to, or adopt a child. Clearly, single mothers reduce the probabilities that they will live in poverty by combining time and money resources with another adult, or by reducing the number of children they have. However, neither of these "choices" can be made freely. For example, there is not a large market for single mothers looking to share living accommodations with another single-parent family. Further, welfare program participation rules often discourage, through lowering benefit levels, combining households to extend family resources. And although parents may surrender children to foster care if they are unable to provide for them, it is usually considered an undesirable way to reduce household responsibilities. While family size certainly can be limited, most divorced single parents made fertility choices while living in a two-adult household, assuming the availability of those combined resources.

## POLICY IMPLICATIONS OF TIME-ADJUSTED POVERTY THRESHOLDS

From a policy perspective, it is essential to recognize the conceptual relationship between resources and needs. Current poverty guidelines are tied, albeit poorly, to family consumption needs that are in turn inextricably tied to household composition. When household size is reduced,

consumption needs are diminished. These needs are considered when determining what subsistence resources should be provided through the social welfare system.

However, what we neglect to recognize is that families also have subsistence household-production needs that include child care and nurturing, food preparation, shopping, and household maintenance. These needs are also related to family composition, particularly the number of children and the age of the youngest child. While young children require fewer market-purchased goods than their teenage counterparts, they require a lot of parental time, and that opportunity cost represents as much as 40 percent of total childrearing costs.

Since the time use of single parents is vastly understudied, the relationship between household-production needs and the number and gender of adults in the household is not well understood. The absence of a spouse, however, does not necessarily mean that a mother's household-production time will be reduced. Although a woman's spouse does benefit through her specialization in household production, it is arguable that his contributions to non-child-care-related housework just offset the marginal demands that his presence places on his wife's time. That is, the mother may have spent a certain amount of time every week doing things that only her husband benefited from, such as washing and ironing his clothes; however, perhaps her husband spent the same amount of time doing other kinds of non-child-care-related work. Thus, although when the husband is gone, the need to wash and iron his clothes disappears, the time that used to be spent doing that will now have to be spent doing the other household work that he used to do. On average, the amount of work the mother has to do stays the same; she may no longer have to do his laundry, but she will now have to do his other chores.

However, with respect to child care, the absence of a second adult may increase the subsistence household-production needs of custodial mothers. That is, given that (1) children's needs for custodial parental time may increase without the regular attention of a second parent and (2) since

unlike other household work that can be ignored or conducted at virtually any hour of the day, child care needs are pressing and cannot usually be delayed until an hour when one has greater discretionary time or energy, single mothers' subsistence home-production needs may be at least as great, if not greater, than those of their two-parent counterparts.

Since social assistance program eligibility is tied to consumption-based poverty guidelines, we explicitly assume and implicitly convey to program participants that we will only provide for their consumption needs. Thus, when poor single parents seek paid employment, the welfare system ignores employment's effect of reducing the time available for meeting subsistence household-production needs. If a policy goal is to encourage single parents' full-time employment, then poverty guidelines on which we base social assistance must be adjusted to reflect the fact that employment decreases the amount of time available for housework. That is, if social assistance policies are to provide a paid work incentive, policymakers must ensure that families realize a net economic benefit for doing so by considering their paid and unpaid labor.

This analysis demonstrates that all parents, particularly single parents employed full time, face a time resource deficit. Without using a time-adjusted consumption-based poverty standard when assessing program eligibility, social assistance programs will provide even greater work disincentives to single parents than to their two-parent counterparts. Stated in the contrapositive, if programs are to provide employment incentives, official poverty levels for employed mothers, on which public assistance program eligibility benefits are based, should be increased vis-à-vis their unemployed counterparts.

**TABLE A-1**

**Mean Hours per Week Spent Doing Housework**

| Type of Household | Child Care | House Care | Other Housework | Total Housework |
|---|---|---|---|---|
| 1 adult with: | | | | |
| 1 child | 12.5 | 3.3 | 31.1 | 46.9 |
| 2 children | 12.0 | 3.9 | 27.4 | 43.3 |
| 3 children | 16.8 | 5.5 | 23.9 | 46.2 |
| 4 children | 20.3 | 6.7 | 26.0 | 53.0 |
| 2 adults[a] with: | | | | |
| 1 child | 14.3 | 4.0 | 46.6 | 65.0 |
| 2 children | 15.0 | 5.1 | 39.4 | 60.0 |
| 3 children | 19.2 | 6.9 | 27.3 | 65.9 |
| 4 children | 24.0 | 7.6 | 40.9 | 73.0 |
| 5 children | 14.7 | 7.5 | 68.9 | 91.1 |

**Note:** Mean hours for "child care" and "other housework" are based on a sample of adults in households in which the mothers were full-time homemakers; mean hours for "house care" are based on a sample of full-time employed married women with children under age 18.

[a] Times include husbands' and wives' contributions.

## Endnotes

[1]Unearned income can consist of AFDC benefits, food stamps, housing subsidies, and Medicaid benefits, among others.

[2]It can also be argued that employed households have lower living standards (as measured by a consumption-based standard) since they do not have the time available to seek out the most favorable market prices.

[3]To impute income, each observation was assigned an income equal to the midpoint of their categorical income range. Then multiple regression analysis was conducted running income for each of the single- and two-parent households (separately) on a number of demographic variables. Those parameter estimates were then used to predict household income. Predicted values were then checked against the original categorical specifications. If income estimates were low (high), respondents were assigned the lower (upper) bound of the income category as their income. Complete details of the imputation process are available from the author upon request.

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