

Estimating Hours of Lost Household Production Using Time Use Data: A Caution

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Introduction

In compensation for wrongful death or injury, the valuation of household production plays an increasingly important role. Full-time homemakers are recognized as providing services of economic value to their spouse and children. Even men and women who are engaged in market work still perform significant amounts of home production. While market earnings must be adjusted for the probability of unemployment in any one year, and for eventual retirement, nonmarket production is likely to increase in the event of unemployment or of lessened labor force participation. The economic value of this work is greater than a comparable hour of market work because it is not subject to taxation.

The Latest Time Use Study from Cornell

Since it is difficult to estimate reliably the time any one individual spent or will spend in household production, many forensic economists use data from nationally recognized time use surveys to provide proxy estimates. The most recent of the "Cornell studies" uses data from the *Time Use Longitudinal Panel Study* collected by the Survey Research Center at the University of Michigan (Juster, et al., 1988). Family members kept diaries of time use over twenty-four hours on four separate occasions during 1975 which varied as to day of the week and season of the year. A subsample of husband-wife families were reinterviewed in 1981. No more recent studies of detailed time use are available, although the studies published by Cornell attempt to update the dollar values associated with these hours.

The economic theory of the household posits that paid market work and unpaid (but still productive) household work compete for the time of the housewife, or other household member. The greater the share of time allocated to paid work, the less will be spent in unpaid work, *ceteris paribus*. In keeping with the theory, when results for any of these studies are presented in tabular form, average hours worked in the household by women are always separated for women employed outside the home and those not so employed. (Often, there are intermediate categories for levels of part-time employment.)

The tabular results reported in the most recent edition of the Cornell studies are consistent with past studies in showing more housework when children are present and less housework when more hours are worked outside the home. Median minutes per week of household work is reported for married males and married females, by age of child, number of children, and number of hours employed per week.¹ However, when the analysis is extended by reporting multiple regression equations economic theory seems to be forgotten. The *concept* of reporting coefficients estimated on variables such as age, education, and number and age of children is excellent. Changes in the hours of household production for an individual over their lifetime as these variables change could be predicted in a continuous fashion, within some margin of error, by such an equation.

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¹ Bryant, Zick, and Kim, pp. 3-5

Problems with the 1993 Cornell Results for Women

However, while the concept is good its implementation falls short. The most glaring deficiency is that the reported equation for married women's household production contains no variable measuring time spent in the labor force! The economic theory of the household tells us that hours worked in the labor market is a critical determinant of hours spent in household production, along with number and age of children. Its omission calls the accuracy of all other coefficients into serious question, not to mention the predictive power of the equation. Interestingly enough, the wage earned in the labor market is part of the model used to predict married men's household work, although hours worked is not.

There are numerous other problems with the value and sign of the estimated coefficients. As can be seen below, in the equation estimated by Bryant, Zick, and Kim from the University of Michigan data,² the large positive coefficient on the age-squared variable (offset in the early years by a negative coefficient on age) implies that the older a woman gets the more housework she will do. This does not seem plausible. It may be a result of the fact that the sample did not include women over sixty-five, or of the omitted variable problem. With life expectancies increasing into the early eighties for many women, a reliable method of estimating the household production of older women would be very helpful to forensic economists, who must now make arbitrary assumptions about the hours of work performed by these individuals.

$$\begin{aligned}
 (1) \text{ TIMEF} = & 3770.59 + 8676 \text{ UNEARN} + 521.69 \text{ UND3} - 94.2772 \text{ AGEF} + 1.23 \text{ AGEFSQ} \\
 & (911.55) \quad (5.26) \quad (98.17) \quad (42.56) \quad (0.48) \\
 & - 46.93 \text{ EDF} + 199.83 \text{ FAMGT3} - 235.87 \text{ OWN} - 7.22 \text{ URBAN} - 651.78 \text{ BLACK} \\
 & (20.29) \quad (40.94) \quad (187.82) \quad (99.76) \quad (265.06)
 \end{aligned}$$

where standard errors are listed in parentheses and the variables are

TIMEF =	estimated minutes per week spent by married woman on household work
UNEARN =	after tax annual nonwage (or nonsalary) income of family in thousands of dollars
UND3 =	number of children age three or younger in the family
AGEF =	age in years of the married woman
AGEFSQ =	AGEF squared
EDF =	years of education completed by the married woman
FAMGT3 =	number of family members older than three in the family
OWN =	dummy variable equalling 1 if family owns home
URBAN =	dummy variable equalling 1 if in a city of 50,000 or more population
BLACK =	dummy variable equalling 1 if married woman is black

The regression for all married women has an adjusted R-square value of .18 and a standard error of estimate of 801.69. Only home ownership, nonwage income, and urban/rural status are not significant at the .05 level. However, given the omitted variable problem, the validity of all the coefficients should be seriously questioned.

² Bryant, Zick, and Kim, p. 6-7

Problems with Estimates Based on Racial Background

The dummy variable for being black has a statistically significant negative coefficient, leading to a lower estimate of lost household production for a black woman with the same years of education, number of young children, etc. However, forensic economists should avoid using the lower estimates of housework done by black housewives as the basis of an estimate for a black plaintiff for several reasons.

First, there were a very small number of blacks in the sample -- only 14 in 1981). Second, the use of a readily identifiable characteristic which has no theoretical basis is always highly questionable. For example, if tall housewives were found to perform fewer hours of housework on average than were short housewives, an economist would hesitate to use the height of an injured party as a partial determinant of their economic loss. Lack of theoretical justification suggest that there is either an omitted variable which explains the difference, or that the difference is due to sampling error. Given the flaws in this study either could be true but no theoretical reason for accepting the lower estimate based on race alone has been given, and it is difficult to imagine one.

Conclusion

Time-use diaries and the resulting estimates of household production are a valuable resource to economists. However, given the problems with the estimating equations used in the most recent Cornell publication, use of the medians seems the only prudent solution and racial breakouts are inappropriate and invalid. There is a need for more studies which incorporate the effect of women's labor market activity on their household work and which deal with the household work of the older woman.

References

- Juster, F. Thomas, Martha S. Hill, Frank P. Stafford, and Jacquelynne Eccles Parsons. *Time Use Longitudinal Panel Study, 1975-81*. Ann Arbor, Michigan: Survey Research Center, University of Michigan, 1988.
- Bryant, W. Keith, Cathleen D. Zick, and Hyoshin Kim. *The Dollar Value of Household Work*, revised edition. Ithaca: New York State College of Human Ecology, Cornell University, 1993.