**Market versus Non-Market Time Allocation in a Family Setting**

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The newly available American Time Use Survey (ATUS) has facilitated a wave of new research examining the manner in which mothers and fathers of children make their time use decisions, particularly with regard to work hours, active leisure, unpaid home work and caregiving. (Kalenkoski, Ribar, and Stratton 2005; Kimmel and Connelly, 2006) For married mothers and fathers, however, there has been a missing link, namely, the role their spouses play in these choices. Because the ATUS provides time use detail for only one adult per household, it is not possible to model joint choices directly, despite the sense that these choices are made in a family context. For this paper, we implement an alternative approach of matching husbands with wives across households (but both with his/her own reported time diary) to form synthetic couples. Using this matching methodology, we can examine time use decisions of parents in a family context.

Our focus in this paper is on how market and non-market time use decisions are related within the household. Using the ATUS time diary reports of detailed activities, we aggregate time use into four general categories: paid employment, household production, active leisure and caregiving. According to Gronau (1977), different time use activities can only be combined into composite measures if each responds similarly to various socioeconomic factors, and Kimmel and Connelly (2006) show this criteria makes necessary the modeling of four uses of time. Specifically, caregiving time responds in a unique way to various regressors, thus must be modeled as distinct from household production. Given this finding for individual mothers, we choose to model spousal time use using the same four time use specification. We use the matched spouse=s information to construct total measures of household production and caregiving time for each "husband" and "wife." However, for our analysis in this paper, we will focus not on the number of hours devoted to various time uses, but rather on the proportion of the total couple's time devoted to each activity. For example, if the mother spends two hours a day on home production and the matched "father" spends 1 hour a day, then the mother performs 2/3 of the couple=s home production. By using these relative time measures as dependent variables, we achieve the goal of incorporating spouse's time use, but also control for family-specific differences in time choices, such as differences in productivity across households, difference in standards of household maintenance, and the availability of help from other household members. (Presser 2003, p. 115;)

Using the above described relative measures of time use, we will estimate a four equation simultaneous tobit model of active leisure time, home production time, child caregiving time, and employment time. The tobit specification allows us to "handle" both the lower limit of zero and the upper limit of one in terms of the proportion of the couples' time devoted to each of the four time uses. Characteristics to be included in the analysis will include demographic characteristics of the time diary respondent, household characteristics, and imputed wages and child care prices. Wages and child care prices will be imputed as was done in Kimmel and

Connelly (2006). We plan to incorporate three distinct wage measures in each time use equation: own wage, spouse's wage, and the relative wage (own wage/spouse wage). This third relative wage measure permits us to answer questions such as ADoes the proportion of home production the mother performs decrease when her earnings relative to her husband=s earnings increase?@ This provides insight into the power structure within the marriage along the lines of Apps (2003), for example. The model will also account for competition in time available for leisure, home production, child caregiving and work hours by allowing for correlation across the errors of the four equations. We plan to estimate the time use system of equations separately for mothers and fathers.

The reliability of our regression estimates lean heavily on the proper implementation of the matching process. The ATUS/ CPS information about the time diary respondent=s spouse will be matched based on known household characteristics to another married time diary respondent of the opposite sex. Matching characteristics will include education of both spouses, weekly employment hours of both spouses, the diary day, diary season, number of children of various ages and the presence of other adults in the household. Propensity score matching allows us to "match" on a large number of dimensions which increases the precision of the exercise. (Dehejia and Wahba 2002) Once we have calculated a propensity score, we will use the nearest neighbor criterion to "marry" two time diary respondents. The nearest neighbor criterion links each time diary respondent to the time diary respondent of the opposite sex with the closest propensity score. It is a one-to-one matching strategy with replacement such that one husband record may be linked to more than one wife record if his propensity score is closer to each wife than any other potential husband's score. The specification of the propensity score equation will be checked for preservation of means of the matching variables and the preservation of the covariance between the matching variables and the imputed variables using techniques described in Dehejia and Wahba (2002). With proper attention to variables used to match versus regression variables, we can product regression estimates that will provide useful insight into parental time choices. (See, for example, Bollinger and Hirsch (2006) and Ridder and Moffitt (2006)).

The goal of this Atime proportion@ estimation is to examine the role that spouses= time use, gender wage gaps, number of children, child care prices, as well as demographic factors, play in influencing gender differences in fundamental time allocation decisions between market and non-market time. We hope to learn more about how these spouses jointly make their time choices, and discern the relative importance of economic incentives on market versus non-market time use. The latter results should help inform policy formation.

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