Double Shift, Double Balance: Housework in the Presence of Children in the United States

Deborah S. DeGraff and Rebecca M. Centanni

1 Introduction

With the monumental changes in women's roles in the late twentieth century, the twenty-first century has witnessed a renewed interest in issues related to work-family balance. This is a large and complex topic, many aspects of which have been well studied in a developed country context. This paper focuses on a relatively unexplored dimension of the topic, the extent to which women combine household chores or housework with minding children. Given that housework can be done along with child care, but presumably at a cost, this characteristic of home production time constitutes another margin in women's lives where the balancing act of their many roles plays out. To explore this topic using data for the United States, we take advantage of an unusual and heretofore under-utilized aspect of the American Time Use Survey (ATUS), its questions on "the

D.S. DeGraff (✉)
Department of Economics, Bowdoin College, Brunswick, ME, USA
e-mail: ddegraff@bowdoin.edu

R.M. Centanni
Analysis Group, Boston, MA, USA
e-mail: centannirm@gmail.com

R. Connelly, E. Kongar (eds.), *Gender and Time Use in a Global Context*, DOI 10.1057/978-1-137-56837-3_13

presence of others". We seek to understand what underlies the large differences we observe in the data with respect to how home production is accomplished vis-à-vis children and, especially, to evaluate whether women who are more heavily engaged in employment are systematically different in this respect. Even though the trend in home production time for women in the United States has been decreasing, several studies suggest that women feel considerable time pressure and fare worse than men according to a variety of subjective measures of well-being related to time use (Bittman and Wajcman 2000; Connelly and Kimmel 2013, 2015; Hamermesh and Lee 2007; Krueger 2007; Pew Research Center 2006; Sevilla et al. 2012; Stevenson and Wolfers 2009; Wang 2013). A closer look at the nature of time spent in home production can shed further light on how women with children seek to find balance in their lives.

First rising to widespread recognition among the populace following the coining of the term "the second shift" in Arlie Hochschild's (1989) influential book, more recent publicity on work-family issues has centered on highly educated women choosing to "opt out of" or "lean into" their careers (Belkin 2003, 2013; Sandberg 2013). A recurring theme of these national conversations has been the stresses women face in balancing the demands of employment with the needs of family, personal, and home life, given the historical precedent for household chores and child care to rest largely with women. A growing recognition of the importance of these issues is also evident in the policy arena, as exemplified by the White House Summit on Working Families held in June 2014. The White House briefing paper for the Summit stated: "A growing number of working Americans – both men and women – struggle to balance the needs of their families with the responsibilities of their jobs" and argued that these issues are important not only for the well-being of individuals and families but also for the health of the American economy (White House 2014).

In the shadow of the publicity, researchers have focused considerable attention on these issues. Through this body of research, we have gained a more comprehensive understanding of trends from the 1960s onward regarding how adults use their time, key factors that influence time use, and the nature of stresses experienced by individuals and families in balancing the various dimensions of their lives. Much of the more recent work on these topics in the United States has been informed by the ATUS, which has made available large-sample, nationally representative and detailed time use data beginning in 2003. Our study contributes to this literature by using the ATUS to explore a related but largely unexamined

set of questions. Specifically, given the time that women allot to household chores, how do they spend this time vis-à-vis the presence of children? Do women tend to engage in these tasks without children present, perhaps allowing them to complete household chores more quickly? Or do they instead tend to use their home production time to multi-task, by also being with their children while they do chores?

To facilitate exposition, we introduce the term "intensity" of home production. As defined here, home production time is considered more intensive if children are present while one is engaged in household chores, and less intensive if chores are done alone. We model this behavior to identify what characteristics of women and their households influence them to shift toward one end of the home production intensity spectrum versus the other, while also taking into account the endogeneity of time allocation decisions. Within this broad question, we are especially interested in establishing whether women who spend more time in employment are systematically different with respect to this dimension of how they do housework. Do longer labor market hours motivate women to use their household chore time in the most productive way with regard to completing such tasks (i.e., without children present), or do longer work hours motivate them to make up for lost time with children by keeping them close while engaged in household chores? We find the former to be the case. Controlling for covariates, greater employment time encourages women to choose the less intensive form of home production.[1]

2 Background and Conceptual Framework

Recent decades have seen a growing research focus in the United States and other industrialized countries on women's labor supply and time allocation to non-market activities, and the division of child care and household chores between women and men. Numerous studies have examined trends in these behaviors.[2] The increase in women's labor supply in the United States since the 1960s is well documented, in terms of both participation and average hours in employment. These trends have been accompanied by other changes in time use. For example, a number of studies document decreases in total time that households devote to housework and especially in the time women spend on housework. Recently, there has been an increase in men's time devoted to housework and child care in the United States, but no corresponding decrease in women's time spent caring for children. Combining all work activities (labor market,

home production, and child care), women still devote more time to work on average than do men (Aguiar and Hurst 2007; Bianchi 2000; Connelly and Kimmel 2010; Fox et al. 2013; Sayer 2005; Sayer et al. 2004).

These patterns give rise to concern about the time pressures faced by families, and by women in particular. While these trends were associated with an increase in average leisure time between the 1960s and 1980s for both sexes, the increase for women was less pronounced and has reversed in recent decades (Aguiar and Hurst 2007, 2009; Ramey and Francis 2009). In view of these trends, numerous studies have focused on the stresses of the double shift (i.e., work in both the labor market and at home) faced by employed women (see, e.g., Hochschild 1989; Hamermesh and Lee 2007; Milkie et al. 2009; Ruppanner and Pixley 2012; Sayer et al. 2009). A substantial literature examining the determinants of women's (and sometimes men's) time allocation to employment, non-market work, and leisure has developed, supported by the increasing availability of detailed time use surveys. This body of work advances the earlier research on women's labor supply in a variety of ways. Of greatest relevance to our analysis, some studies incorporate a detailed focus on parental child care, distinguishing between care, that is, primary versus secondary, or active versus passive, as well as discussing the measurement of time devoted to child care. Some studies additionally incorporate a focus on home production time, making distinctions between primary and secondary activities (Bryant and Zick 1996; Folbre et al. 2005; Folbre and Yoon 2007; Kalenkoski et al. 2005, 2009; Milkie et al. 2009; Moro-Egido 2012; Sayer and Fine 2011; Sayer et al. 2009). Time use diaries allow the parsing of home production time in ways that further the understanding of this complex set of activities. However, little attention has been given to the focus of this chapter, that is, the qualitative nature of home production time with respect to the presence of children.[3] We seek to better understand, given women's allocation of time across alternative uses, how they utilize the time they allot to housework in terms of being with children. In other words, given the time that a woman devotes to household chores, does she tend to do these tasks alone or with children present?

Following many of the previous studies, we assume that the first layer of decision-making is choosing the allocation of time to employment, non-market work, and leisure. We add to this a second layer of decision-making in which, given the initial time allocation decision, women decide how to divide their housework time between time

alone and time with others present, especially children. We assume that most household chores can be completed more efficiently without children present (e.g., try washing the floor or balancing the checkbook accompanied by children). In a given amount of time, more or higher quality household production can generally be accomplished without children present, thereby increasing household utility.[4] In addition, depending on preferences, to the extent that there is any process benefit of housework, that is, one might receive pleasure from the act of washing the floor and not just from the end result of a clean floor (Hallberg and Klevmarken 2003; Juster et al. 1985), it might be greater if the task is done alone. These forces would motivate women to "specialize" their time, focusing on chores during household production time and using leisure and primary childcare time to be with children.

However, spending time with one's children (or other individuals) is also likely to be beneficial, at least up to a point. Moreover, children's presence while doing household chores can also include an investment component, in teaching them how to do such work, further contributing to household utility (Keith and Zick 1996). These opposing effects create a tradeoff, suggesting that it is not appropriate to view women's time inputs into home production as homogenous, but rather, being of two forms, solitary and non-solitary.

Some literature speaks to this argument while neither focusing on our question nor pursuing our empirical modeling. For example, the discussion of active versus passive child care in Folbre et al. (2005) is generally consistent with the idea of home production time being more efficient without children present and, conversely, more intensive with children present due to the multi-tasking nature of the work. Floro and Miles (2003: 882) speak of the "intensification" of work when one engages simultaneously in primary and secondary activities (though, in contrast to our analysis, they focus on non-market work as a secondary activity) and, using data from Australia, estimate models of the amount of time spent in non-market work overlapped with any type of primary activity. In addition, Hamermesh and Lee (2007), noting the 24-hour day as the most binding of constraints, argue that anything which increases the efficiency of household chores is equivalent to an increase in "effective" time and thereby a source of reduced stress. Foster and Kalenkoski (2015) provide empirical evidence regarding the increased efficiency of doing housework without children present. These arguments create an

incentive to engage in housework on a solitary basis, but this comes at the cost of spending less time with one's children.

With this tradeoff in mind, we seek to determine what characteristics of women and their households systematically shift the division of home production time toward or away from solitary time or, conversely, toward or away from having children present when engaged in housework. Such analysis contributes to a better understanding of the nature of the stresses that women face in trying to fulfill their multiple roles. We are especially interested in whether women who spend more time in employment are systematically more or less likely to choose home production time that is solitary in nature. The a priori theoretical arguments are ambiguous. On the one hand, women who spend more time in employment may feel it is better to have a larger proportion of solitary housework time because their absence from home while doing labor force work places a premium on the greater efficiencies of solitary home production. Conversely, such women may place a greater value on spending housework time with children to compensate for time away from home.

3 Data and Sample

The primary data source for this analysis is the ATUS for 2003 through 2011, and the corresponding linked Current Population Survey (CPS) data. Each year during this time period, a cross-sectional random sample of households was drawn from the outgoing CPS sample for administration of a detailed time use survey. The respondents were individuals aged 16 and older, with only one individual interviewed per household. We use a sample of women who are either the head or spouse of the head of the household. We further narrow the sample to exclude women younger than 24 or older than 60, and also the small number who are self-employed or unpaid family workers. The age-based exclusions remove most women whose primary activity is still educational (at the younger ages), and who have already retired (at the older ages). We exclude the two employment categories because the distinction between employment time and home production time is likely much less clear for these women. The sample size after these exclusions is 43,419.[5] The analysis sample for the primary model is further limited, as discussed in the later text, to women with children less than 18 years old. Each respondent was asked to complete a time use diary based on recall for the 24-hour period ending at 4:00 a.m. for the day prior to the interview. Diaries were completed through an

interview process with prompting in order to enhance recall accuracy and detail. In addition to the ATUS data, we make use of a variety of annual indicators of local labor market conditions available from the Bureau of Labor Statistics.

The ATUS is characterized by highly detailed time use designations that we use to determine the amount of time allocated to non-market work, employment, and leisure as primary activities, as identified by the respondent. Non-market work as primary activity encompasses two categories: household chores and child care, each as primary activity. Household chores includes activities such as food shopping and meal preparation, laundry and household cleaning, financial management, home maintenance, and travel related to household activities.[6] Childcare time includes caring for and helping household children, activities related to household children's education and health, travel and waiting related to such activities and to the use of childcare services.

An important feature of the ATUS for our purposes is that it asks respondents to indicate who was present when engaged in each primary activity, except employment, sleep, and personal care. It is this information that allows us to determine whether housework time was spent alone, with children aged 17 or younger present, or with other individuals present. A shortcoming of the ATUS is that it asks only about primary activities. As a result, if an individual is simultaneously performing tasks from multiple time use categories, only the task self-identified as primary is recorded. However, given the information on who was present during each primary activity, the data largely capture the form of multi-tasking which is the focus of this analysis, where keeping an eye on children takes place while doing household chores as the primary activity.[7]

Given this information, we are able to construct measures of the proportions of housework time spent alone (without anyone else present) and spent with children present. Table 1 shows that for our sample of women with children younger than 18, approximately 31% of women's housework time is spent alone (implying 69% with someone else present), and 57% with children present (implying 43% without children present). We also see evidence of variation in this behavior in that, as expected, the percentage of home production time spent alone tends to be greater for unmarried than for married women. In addition, not controlling for other characteristics, women engaged in employment activity during the diary day spend a higher percentage of their home production time alone and a lower percentage with children than do women with no employment

Table 1 Division of home production time by key characteristics, women ages 24–60 with children younger than 18 (n = 24,670)

	% of Home production time alone | not alone	*% of Home production time without | with children <18*
Full sample	31 | 69	43 | 57
Married	29 | 71	42 | 58
Not married	35 | 65	46 | 54
Employment time = 0	29 | 71	42 | 58
Employment time > 0	34 | 66	46 | 54

activity. The same pattern holds when using a conventional measure of employment status (not shown), which differs from zero versus positive employment minutes captured in the ATUS, due to the narrow time frame of the 24-hour diary period that might coincide with an employed woman's off-day.

4 Estimation Strategy

4.1 Structure of Model

Our primary goal is to better understand what factors influence the division of women's housework time between a solitary state and having others present, and between having children present or not. Within that over-arching objective, we are especially interested in whether women with greater time in employment are more, less or equally inclined in these choices about housework time. Accordingly, the dependent variable of our main estimated model is the proportion of housework time spent alone/not alone (or, alternatively defined, with/without children present), expressed as a function of the amount of time in labor market work, in non-market work and in leisure, controlling for a set of individual, household, and local characteristics argued to influence preferences, opportunities, and constraints related to the division of housework time (the control variables are discussed in the later text).

A number of econometric issues must be addressed in the estimation of this model. First, while we believe that the home production division

decision is distinct from decisions regarding the amount of time allocated to employment, non-market work, and leisure activities, the latter are likely to be related to the former. For example, unobservables pertaining to work ethic or beliefs about child rearing could influence time allocation decisions as well as decisions about with whom to do housework. To address this, we use an instrumental variables approach in which estimates of the time allocated to employment, non-market work, and leisure are derived in a first-stage model. The structure of the model is summarized as follows:

Home production division (main model):

$$\Omega_i = \beta_0 + \beta_{1j}\tau^*_{ij} + \beta_2 X^{\Omega}{}_i + \upsilon_i \tag{1}$$

Time allocation (first-stage model):

$$\tau_{ij} = \alpha_{0j} + \alpha_{1j}\hat{w}_i + \alpha_{2j} X^{\tau}{}_i + \varepsilon_{ij} \tag{2}$$

where j indicates employment, non-market work, or leisure, $\hat{w}$ is the selection corrected estimated ln(wage), X^{τ} is the vector of exogenous explanatory variables used in each of the time allocation equations, $\tau^*{}_j$ are the three estimated time use values derived from Eq. (2), X^{Ω} is the vector of exogenous explanatory variables used in the home production division equation, and ε_j and υ are the disturbance terms.

The dependent variable, Ω_i, in Eq. (1) can be alternatively defined to allow for multiple possible divisions of housework time. We focus on two versions: one measuring the proportion of housework time spent alone in contrast to not being alone and the other contrasting housework time with children present to no children present. Given that the dependent variables in Eq. (1) are proportions, we use a version of a Generalized Linear Model (GLM) with options that limit the estimated values of the dependent variable to the [0, 1] range (0–100%).[8] The dependent variables for the three equations represented by Eq. (2) are in terms of the number of minutes, which raises the possibility of censoring at zero. For both non-market work and leisure, the percentage of respondents with zero minutes is small enough that a linear functional form can be assumed; these equations are estimated using Ordinary Least Squares (OLS). In contrast, a sizeable percentage of respondents have a value of zero minutes for time in employment during the diary period. Accordingly, this equation is estimated using a Tobit specification.[9] The same explanatory

variables are used for each of the three equations in Eq. (2), and are discussed in the later text; these equations are estimated using the full sample defined earlier in order to benefit from as much information as possible. The main equations in Eq. (1) are estimated using a more narrowly defined sample including only those women with children younger than 18. The logic here is that the results for the intensity of housework time might be skewed simply by the presence/absence of children in the household. We also re-estimate Eq. (1) using the full sample to check for sensitivity of results to the large and possibly non-random reduction in sample size.[10]

Any model of this structure must be attentive to the necessary exclusion restrictions for statistical identification. The three time-allocation equations in (2) include the following variables that are argued to affect overall time-use decisions, but have no direct effect on the division of home production time into solitary time or time with children present: a time dummy distinguishing before versus after the onset of the financial crisis in 2008, estimated log wage, the interaction of these two variables, and a set of interactions between education and ethnicity variables. The time dummy captures the argument that, as presented in Aguiar et al. (2013) and Berik and Kongar (2013), time allocation decisions were systematically different during the Great Recession. The second two variables capture the opportunity cost of women's time itself and juxtaposed with the economic downturn. All of these factors should influence her overall time allocation decisions, but not how she uses her allotted housework time. The interactive terms between the respondent's ethnicity and educational attainment are indicative of how the labor market values education differently according to ethnicity. As these variables reflect labor market valuation of certain characteristics, they will affect how the respondent divides her time between market and non-market work and leisure, but not how she then chooses to use her housework time. The pattern of statistical significance of these variables, as discussed in the later text, satisfies the conditions for statistical identification of the model as a whole.[11]

Finally, as mentioned previously, we include married (or partnered) and unmarried women in our sample.[12] Given that the presence of a spouse may fundamentally alter the decisions modeled in Eqs. (1) and (2) (Connelly and Kimmel 2009), we recognize this possibility using two alternative approaches. First, we estimate Eqs. (1) and (2) for the combined sample including interactions between spouse present and key explanatory variables. Second, we estimate Eqs. (1) and (2) separately by

sub-sample based on marital status. The results of these two approaches are highly consistent. For brevity, we present results for the combined sample and briefly mention results from the sub-sample estimation where they provide additional insight.[13]

4.2 Control Variables

In addition to the three estimated time use values from Eq. (2), the estimation of Eq. (1) controls for a large set of individual, household, and local characteristics thought to influence the division of housework time between solitary and non-solitary forms, given the total amount of non-market work time chosen. Descriptive statistics for explanatory variables used in the estimation of Eq. (1) are given in Appendix Table A.1. At the individual level, we include respondent's age, years of education, and ethnic/cultural background. Such characteristics may influence preferences or expectations regarding women's roles. Women's estimated wage, while included in the overall time allocation model represented by Eq. (2), is not included in the estimation of Eq. (1). The estimated wage represents the opportunity cost of non-labor time, and therefore is an integral part of the choice between paid and unpaid time. However, the decision represented by Eq. (1) is not between labor force and non-labor force time; it is about dividing housework time between solitary and non-solitary forms. The opportunity cost of spending time outside of employment is irrelevant to this decision.

At the household level, we use a detailed set of demographic structure variables which, in part, capture individuals who need watching. Given that the need for supervision decreases as children age, we include the number of children in each of five age groups ranging from 0 to 17 years. We also include the number of other adults, as well as a spouse/partner, who could share in the housework with the respondent (as might some children), or simply be present as company. Such individuals could also influence the nature of the housework to be done. In addition, we include the partner's average weekly hours of employment, as this may influence the importance women place on being efficient in household chores. Finally, we control for exogenous income (i.e., income other than labor earnings of the respondent) because women from higher income households are less constrained in purchasing market substitutes for home produced goods, promoting a higher proportion of housework time with children present.[14]

In addition to individual and household characteristics, we also include geographic region, residence in an urban area, and interactions between these variables. Finally, we control for whether the time diary period was during the week versus on the weekend.

4.3 Time Allocation Estimation

The explanatory variables included in Eq. (2) are similar to those found in recent literature on women's labor supply and time use, and are intended to capture preferences or norms regarding women's roles, income, relevant prices, and factors that reflect opportunities and constraints related to time use. This set of variables overlaps substantially with those used in the estimation of the proportional division of housework time in Eq. (1), with some exceptions. As previously noted, women's estimated wage is included in the estimation of Eq. (2) but not Eq. (1), as are the variables used for statistical identification discussed earlier. Conversely, while each estimated time use value derived in Eq. (2) is included in the estimation of Eq. (1), it is not included as an explanator in the other two time-use equations in Eq. (2). The rationale is that these values are assumed to be joint outcomes of a single time allocation process. Finally, world region of origin variables are included in the estimation of Eq. (1) but not Eq. (2), as these variables are argued to influence women's choices regarding only the division of home production time with respect to the presence of children and others as they are intended to allow for differing cultural norms about how housework is done.

5 Results

5.1 First-Stage Time Allocation Results

We very briefly review results for the three time allocation equations to establish validity in support of our use of the predicted values from Eq. (2) in the estimation of Eq. (1). Results for time in employment, non-market work, and leisure are presented in Appendix Table A.2. The time allocation equations have significant explanatory power, with a Probability > F value of approximately zero in each case ($F = 385.33$, $F = 249.59$, and $F = 211.62$ for employment, non-market work, and leisure, respectively). Also, as mentioned earlier, the pattern of statistical significance of the variables intended to identify the model meets the necessary conditions

for identification. Specifically, in each of the three estimated time allocation equations, the set of potential identifier variables considered as a whole is jointly significant (at ≤ 0.1%), with sufficient explanatory power to support the instrumental variables approach as indicated by the corresponding test statistics (Bound et al. 1995; Stock and Yogo 2005).[15] Furthermore, in each equation at least three of the identifier variables are individually statistically significant (at ≤ 5%), with the pattern of significance differing across equations.

Turning to specifics, we highlight a few results to illustrate that overall, the time allocation model is consistent with expectations and previous literature. First note the standard finding that the estimated wage has a positive effect on women's time in employment and a negative effect on leisure time. Controlling for own wage, women's education is positively associated with employment and leisure time, and negatively associated with non-market work. In addition, the results show the usual effects of the presence of a spouse: a substantial decrease in women's time in employment, accompanied by increases in non-market work and leisure.

The results also exhibit the standard negative effect of exogenous income on women's time in employment, and the corresponding positive effect on leisure. The effect on non-market work time is positive as well, suggesting that normal good income effects for women's primary child care and home produced goods (e.g., bigger houses, higher standards of housekeeping, more time-intensive foods) outweigh any effects of income that might decrease total non-market work, such as purchasing market replacements (e.g., hired housekeepers, market child care, or prepared meals). Finally, the demographic composition variables also display the expected results. The number of children has a negative effect on time in employment and leisure, and a positive effect on time in non-market work, with the magnitude of effects decreasing with children's age. Conversely, the number of adults in the household, that is, individuals who might help out in the home, promotes women allocating more time to labor market work and less time to non-market work.

5.2 The Division of Home Production Time

The division of home production time, as explained earlier, can be sliced many ways with respect to who was present or not present while the respondent was engaged in these chores. For each version, we

identify a category and its mutually exclusive and all-inclusive converse, so that the dependent variable measures the proportion of home production time spent in the designated category. Results for two versions of the dependent variable – solitary (versus non-solitary), and children younger than 18 present (versus children not present) – using the sample of women with children less than age 18, are included in Appendix Tables A.3 and A.4. Table 2 extracts from the Appendix the results for the estimated time-use variables for this sample, and also presents these results for the larger sample including women without children younger than 18.[16] For each time-use variable, two sets of results are presented in Table 2, the main results which apply to all sample women, and interacted with marital status to allow these effects to differ according to the presence of a spouse/partner. We are principally interested in the results for women's time in employment, but include all three time-use variables for completeness.

Table 2 Estimated results – marginal effects for time-use variables on proportional division of home production time, women ages 24–60

	Proportional division of home production time			
	Women with children <18		**All women ages 24–60**	
	(n = 24,670)		(n = 43,419)	
	(a)	(b)	(c)	(d)
Explanatory variable:	**Proportion alone**	**Proportion with children <18**	**Proportion alone**	**Proportion with children <18**
1. Time in employment	0.00032*	−0.00034*	0.00048*	−0.00051*
(1) x Married	−0.00026*	0.00016	−0.00046*	0.00023*
2. Time in non-market work	0.00085*	−0.00060*	0.00144*	−0.00086*
(2) x Married	0.00010	−0.00008	0.00030*	−0.00069*
3. Time in leisure	0.00172*	−0.00190*	0.00235*	−0.00348*
(3) x Married	−0.00043*	0.00023	−0.00097*	0.00057*

* indicates statistically significant at a 5% level or lower. Full model results are presented in Appendix Tables A.3 and Tables A.4 for the sample of women with children younger than 18.

Focusing first on the main effect for time spent in employment, we see a clear pattern that women with greater labor market attachment are more likely to do household chores alone, and are less likely to have children present during home production time, ceteris paribus. Recall that the a priori theoretical arguments regarding time in employment are ambiguous. Greater labor force time may encourage use of housework time in the most efficient way with respect to the completion of chores (i.e., do them alone), while at the same time motivating women to make up for lost time with children by keeping them close during housework time (i.e., intensive home production). Our results suggest that the first of these influences is stronger. Furthermore, we also see evidence of these overall effects being less pronounced for married women relative to women without a partner present. The point estimates for the interaction between employment time and marital status are of opposite sign from the main effects and of smaller magnitude, and are mostly statistically significant. The separate regressions by marital status sub-samples are consistent with this pattern. Thus, the tendency for longer employment time to place a premium on production efficiency in home production time, while present for all women, is stronger for unmarried women. To gauge the magnitude of these effects, we conducted a series of simulations comparing a doubling of employment time (starting from the mean of about 2½ hours) to various other changes.[17] The simulations show that while the predicted effect on home production intensity of doubling employment time is much smaller than for adding a very young child to the household, it is of similar magnitude as the predicted effect of increasing exogenous income by 50%.

The pattern of results for time allocated to leisure is similar to that for time in employment, but with relatively less difference in estimates by marital status. This could be indicative of a certain type of specialization among women who choose more leisure time, in which housework time is geared toward production efficiency with leisure activity (and also primary childcare time) being where time with children tends to take place. Women who allocate more time to non-market work also tend to choose a greater proportion of solitary housework time and less in the company of children. Women who choose to allocate more time to non-market work likely feel that overall, there is more work to be done in this realm. This same feeling may then translate into a

greater emphasis on production efficiency in deciding how best to use housework time. Also, given that non-market work in the first-stage time allocation equation is total time, that is, home production as primary activity plus primary child care, larger non-market work minutes may reflect a larger allocation of time to child care as a primary activity, resulting in less importance being attached to having children present during housework time.

Results for selected additional explanatory variables are also worthy of mention (see Appendix Tables A.3 and A.4). Exogenous income has a negative effect on the proportion of housework time spent alone and a positive effect on the proportion spent with children. Greater financial resources represent the ability to more easily acquire technologies that render home production time more efficient, thereby offsetting the need to choose the more efficient solitary form of housework. The findings for women's education are also interesting. Higher education is likely associated with greater out-of-office demands from employment, which would encourage prioritizing efficiency in home production. At the same time, more highly educated women might make secondary child care a priority, as argued by Hill and Stafford (1985). Our results suggest that these influences tend to offset one another, resulting in non-significant effects of education.

The results also suggest systematic differences in the division of home production time across ethnic groups, with African American and Hispanic women being more likely than other ethnic groups to engage in housework alone and less likely to have children present, ceteris paribus. Additionally, the pattern of results for numbers of children by age is as hypothesized. Finally, weekend diary days, as expected, have a negative effect on the proportion of housework time spent alone and a positive effect on the proportion spent with children. The generally more relaxed time constraints of weekends in many households may motivate women to choose a balance of housework time that emphasizes time with children and others, in addition to the higher likelihood that household members are at home.

6 Conclusion

Substantial research has been conducted to better understand the allocation of women's time in the United States and elsewhere, and the balancing act that women face with respect to the many roles they play. This study adds

another dimension to that balancing act by exploring under what conditions women are more likely to engage in home production alone or with children present, based on a model that accounts for endogeneity of time allocation decisions. The results indicate systematic differences in this behavior according to a number of characteristics of women and their households. Of particular interest, women with greater labor force attachment, as measured by minutes in employment, are more likely to engage in household chores alone and are less likely to have children present while doing housework. This suggests that the dominant influence of employment with respect to the nature of home production time is to motivate women to use this time efficiently vis-à-vis the completion of chores (i.e., without children present), rather than to use this time intensively to "make up" for time away from family. This result holds for both married and unmarried women and, in some cases, is stronger for women without a partner.

According to the ongoing initiative of the Organization for Economic Co-operation and Development (OECD) to better understand what contributes to quality of life, the United States ranks lower for work-life balance than for any other areas of life quality considered, and ranks lower in this topic area than most OECD countries. OECD (2014) The focus of policy leaders in the United States on this issue, therefore, is timely. Using the unusual and not yet fully exploited data in the ATUS on the presence of others, this analysis contributes to the discussion by highlighting an additional margin where women try to find balance in their lives, one that is qualitatively distinct from well-studied time allocation choices. Further research to more fully examine what occurs inside the "black box" of home production would enhance knowledge regarding the sources and nature of stresses that detract from the quality of life in the United States. A related topic which we do not address in detail, but that is worthy of attention, is the impact of children's presence on the efficiency of doing household chores.

Appendix

Table A.1 Descriptive statistics for explanatory variables used in primary models

Explanatory variables	*Mean*	*Standard deviation*
Estimated time use variables:		
Employment time	138.392	112.491
Partner × employment time	94.666	109.246
Non-market work time	329.481	81.174
Partner × non-market time	255.256	169.082
Leisure time	351.445	77.500
Partner × leisure time	253.142	168.641
Partner present	0.727	0.446
Employed hours of partner	28.457	23.421
Exogenous annual income	39595	36846
Education, years	14.001	2.908
Age	37.777	7.500
Age × partner	27.517	17.978
No. own children 0–2	0.280	0.515
No. own children 3–5	0.331	0.548
No. own children 6–9	0.482	0.657
No. own children 10–12	0.351	0.558
No. own children 13–17	0.440	0.652
No. other children 0–17	0.030	0.206
No. other adults	0.065	0.246
Other children × other adults	0.011	0.137
African American	0.104	0.305
Asian American	0.040	0.196
Hispanic	0.146	0.353
Other ethnicity	0.029	0.167
Weekend	0.516	0.500

Note: Models also include dummy variables representing location of residence, world region of origin, and home ownership status.

Table A.2 Summary of regression results for minutes in employment, non-market work, and leisure

Explanatory variables	*Employment*	*Non-market work*	*Leisure*
ln estimated wage	51.07*	89.97*	–102.02*
Partner present	–151.65*	61.88*	76.89*
Partner × ln wage	35.91*	–24.67*	–8.72
Employed hours of partner	0.3969*	0.2673*	–0.2876*
Exogenous annual income	–0.0014*	0.0007*	0.0006*
Education, years	3.3463*	–8.67*	5.72*
Age	–2.3547*	0.9795*	2.70*
Age × partner	0.8249*	0.3420	–1.26*
No. own children 0–2	–56.31*	122.99*	–41.70*
No. own children 3–5	–25.25*	66.01*	–27.99*
No. own children 6–9	–17.78*	48.77*	–17.00*
No. own children 10–12	–10.91*	40.17*	–18.80*
No. own children 13–17	–2.21	29.46*	–17.40*
No. other children 0–17	–6.01	39.81*	–17.40*
No. other adults	12.43*	–10.50*	–2.55
Other children × other adults	8.23	–34.70*	14.26*
African American	–44.12*	–81.57*	71.41*
Asian American	–16.87	4.56	3.67
Hispanic	0.3640	26.36*	–47.16*
Other ethnicity	–13.42	–2.37	–38.23
African American × educ	3.25*	2.77*	–4.63*
Asian American × educ	1.08	–0.1066	–1.55
Hispanic × educ	–0.1790	–1.41	1.50
Other × educ	–0.1416	0.5654	2.57
Interview pre-2008	38.26*	36.98*	–46.30*
Pre-2008 × ln wage	–13.12*	–4.90	11.65
Weekend	–197.06*	37.13*	136.90*
Constant	25.07	–1.68	443.85*
R^2	0.0433	0.1853	0.01581
n	39,273	39,273	39,723

Note: Regressions also control for region of residence, urban location and home ownership status.
*Significance at the 0.05 level or less.

Table A.3 Regression results for proportion of home production time spent alone

Explanatory variables	*Coefficient*	*Standard error*	*t-Statistic*	*Marginal effect*
Estimated time use variables:				
Employment time	0.0016*	0.0006	2.57	0.0003
Partner × employment time	−0.0013*	0.0006	−2.02	−0.0003
Non-market work time	0.0042*	0.0012	3.43	0.0009
Partner × non-market time	−0.0005	0.0007	−0.71	−0.0001
Leisure time	0.0085*	0.0015	5.62	0.0017
Partner × leisure time	−0.0021*	0.0009	−2.40	−0.0004
Partner present	0.4622	0.5393	0.86	0.0935
Employed hours of partner	0.0005	0.0007	0.76	0.0001
Exogenous annual income	−5.36E−06*	1.41E−06	−3.79	−1.08E−06
Education, years	0.0127	0.0082	1.55	0.0026
Age	0.0018	0.0048	0.37	0.0004
Age × partner	0.0105*	0.0036	2.90	0.0021
No. own children 0–2	−0.7502*	0.1224	−6.13	−0.1518
No. own children 3–5	−0.3454*	0.0666	−5.19	−0.0699
No. own children 6–9	−0.1983*	0.0501	−3.96	−0.0401
No. own children 10–12	−0.1195*	0.0425	−2.81	−0.0242
No. own children 13–17	0.0590	0.0330	1.79	0.0119
No. other children 0–17	−0.3277*	0.0831	−3.94	−0.0663
No. other adults	−0.1095*	0.0455	−2.41	−0.0222
Other children × other adults	0.4522*	0.1137	3.98	0.0915
African American	0.2028*	0.0615	3.30	0.0410
Asian American	0.0622	0.0957	0.65	0.0126
Hispanic	0.1585*	0.0499	3.17	0.0321
Other ethnicity	−0.0573	0.0612	−0.94	−0.0116
Weekend	−1.2070*	0.2098	−5.75	−0.2443
Constant	−4.5147*	0.6992	−6.46	
log pseudolikelihood	−10567.83			
n	22,501			

Note: Regression also controls for location of residence, world region of origin, and home ownership status.
*Significance at the 0.05 level or less; marginal effects for dummy variables represent a discrete change from 0 to 1.

Table A.4 Regression results for proportion of home production time with children present

Explanatory variables	*Coefficient*	*Standard error*	*t-Statistic*	*Marginal effect*
Estimated time use variables:				
Employment time	−0.0015*	0.0006	−2.47	−0.0003
Partner × employment time	0.0007	0.0006	1.12	0.0002
Non-market work time	−0.0026*	0.0012	−2.19	−0.0006
Partner × non-market time	−0.0004	0.0007	−0.56	−0.0001
Leisure time	−0.0084*	0.0014	−5.79	−0.0019
Partner × leisure time	0.0010	0.0009	1.21	0.0002
Partner present	0.0959	0.5281	0.18	0.0218
Employed hours of partner	0.0010	0.0007	1.40	0.0002
Exogenous annual income	5.12E−06*	1.36E−06	3.76	1.16E−06
Education, years	−0.0066	0.0080	−0.83	−0.0015
Age	0.0003	0.0047	0.06	0.0001
Age × partner	−0.0148*	0.0036	−4.14	−0.0034
No. own children 0–2	0.7664*	0.1197	6.40	0.1738
No. own children 3–5	0.3749*	0.0647	5.80	0.0850
No. own children 6–9	0.2450*	0.0492	4.98	0.0556
No. own children 10–12	0.1645*	0.0417	3.95	0.0373
No. own children 13–17	−0.1002*	0.0325	−3.08	−0.0227
No. other children 0–17	−0.1415	0.0722	−1.96	−0.0321
No. other adults	−0.1506*	0.0430	−3.50	−0.0342
Other children × other adults	−0.0134	0.0984	−0.14	−0.0030
African American	−0.2479*	0.0606	−4.09	−0.0562
Asian American	−0.0843	0.0924	−0.91	−0.0191
Hispanic	−0.2432*	0.0475	−5.12	−0.0552
Other ethnicity	0.0459	0.0594	0.77	0.0104
Weekend	0.9704*	0.2013	4.82	0.2201
Constant	3.5235*	0.6758	5.21	
log pseudolikelihood	−11552.98			
N	22,501			

Note: Regression also controls for location of residence, world region of origin, and home ownership status.
*Significance at the 0.05 level or less; marginal effects for dummy variables represent a discrete change from 0 to 1.

Notes

1. We use the terms "home production" and "housework" interchangeably to refer to doing household chores; it does not refer to child care. The term non-market work encompasses both home production and the care of children.
2. See Connelly and Kimmel (2013) for a detailed summary of the literature on these trends in the United States.
3. An exception is Foster and Kalenkoski (2015) who, using experimental data, examine the effects of multi-tasking on productivity in the context of doing *either* a household chore or childcare activity only, versus engaging in both activities simultaneously.
4. We do not attempt to establish empirical evidence to support this assumption, however, see Foster and Kalenkoski (2015) for experimental evidence on the negative effect of children's presence on efficiency in home production.
5. It is widely recognized that the response rate for the ATUS, while higher than for most time use diary surveys, is lower than ideal (approximately 54–58%). Abraham et al. (2006) analyze the pattern of non-response and conclude that it is largely due to failure to contact respondents (as opposed to refusal) which appears to be relatively randomly distributed across the pool of possible respondents. Therefore, meaningful bias due to sample selection is unlikely to be present.
6. The detailed listing of time use designations of the ATUS can be found at the Bureau of Labor Statistics website (www.bls.gov/tus/lexicons.htm).
7. As argued by Folbre et al. (2005) and Folbre and Yoon (2007), the data may underestimate the extent of child care as a secondary activity if, for example, young children who are asleep or playing in another room are *not* considered to be in the presence of the respondent.
8. We use Stata for all estimations.
9. Because of the complexities of differing functional forms in Eq. (2), we do not allow for the possibility of correlated error terms across time use categories as in, for example, Kalenkoski et al. (2005) and Kimmel and Connelly (2007). If such correlation is present, which is reasonable to assume, not accounting for it reduces the statistical efficiency of Eq. (2), resulting in larger standard errors for the estimated coefficients. However, the estimates maintain the property of unbiasedness. Given that our primary purpose in estimating (2) is to derive unbiased instruments to use in the estimation of (1) rather than to test hypotheses within (2), the loss of efficiency is not a cause for concern.

10. Breusch-Pagan tests indicated the presence of heteroscedasticity in Eqs. (1) and (2), thus, we estimate using the robust option to adjust estimated standard errors.
11. Wages are estimated using the Heckman sample selection model. The wage equation includes the following variables that are not included in Eq. (2): age-squared and education-squared, the state unemployment rate, the unemployment rate interacted with the pre-2008 dummy, and an indicator of whether the state minimum wage is higher than the federally mandated minimum wage.
12. As is common in this literature, we treat women's marital status as exogenous. See Blau and Kahn (2007) for one study that controls statistically for the possible endogeneity of marriage in a model of women's labor supply and finds that results are generally not sensitive to selection into marriage.
13. Full results for the sub-samples are available upon request.
14. Approximately 10% of observations are missing information on income and, therefore, are dropped. An alternative to dropping these observations would be to use spouse's earnings to proxy for exogenous income. Because we include unmarried women in the sample, this measure seems more problematic due to the systematic nature of the missing information, and the much larger portion of the sample affected. Nonetheless, we check for sensitivity to this alternative specification. Also, the time gap between household income data (from the CPS), and the data used to calculate women's labor market earnings (from the ATUS collected several months later), results in the latter being larger than the former for a small percentage of observations. We therefore also estimate two versions of the model, one setting negative values to zero and one treating them as missing. Results are not sensitive to these alternatives; reported results set negative values to zero.
15. The F values for joint significance in the non-market work and leisure equations are 16.39 and 13.35, respectively, and the corresponding chi-squared value for the employment equation is 69.24.
16. We also estimated Eq. (1) using a more limited sample, based on women with children younger than age 13. The results are generally highly consistent across samples, especially with respect to the explanatory variables of greatest interest to us.
17. Simulations are conducted for prototypes based on marital status and education level, and using the modal or mean value within each prototype group for other explanatory variables. Detailed simulation results are available upon request.

References

Abraham, Katherine G., Aaron Maitland, and Suzanne M. Bianchi (2006). Nonresponse in the American Time Use Survey: Who Is Missing from the Data and How Much Does It Matter? *Public Opinion Quarterly*, 70(5), 676–703.

Aguiar, Mark, and Erik Hurst (2007). Measuring Trends in Leisure: The Allocation of Time over Five Decades. *The Quarterly Journal of Economics*, 122(3), 969–1006.

Aguiar, Mark, and Erik Hurst (2009). A summary of trends in American time allocation: 1965-2005. *Social Indicators Research*, 93, 57–64.

Aguiar, Mark, Erik Hurst, and Loukas Karabarbounis (2013). Time Use During the Great Recession. *American Economic Review*, 103(5), 1664–1696.

Belkin, Lisa (2003). The Opt-out Revolution. *New York Times Magazine* (October 26).

Belkin, Lisa (2013). The Retro Wife Opts Out: What Has Changed and What Still Needs To. *The Huffington Post* (March 19).

Berik, Günseli, and Ebru Kongar (2013). Time Allocation of Married Mothers and Fathers in Hard Times: The 2007–2009 US Recession. *Feminist Economics*, 19(3), 208–237.

Bianchi, Suzanne (2000). Maternal Employment and Time with Children: Dramatic Change or Surprising Continuity? *Demography*, 37(4), 401–414.

Bittman, Michael, and Judy Wajcman (2000). The Rush Hour: The Character of Leisure Time and Gender Equity. *Social Forces*, 79(1), 165–189.

Blau, Francine D., and Lawrence M. Kahn (2007). Changes in the Labor Supply Behavior of Married Women: 1980–2000. *Journal of Labor Economics*, 25(3), 393–438.

Bound, John, David A. Jaegar, and Regina M. Baker (1995). Problems with Instrumental Variables Estimation When the Correlation between the Instruments and the Endogeneous Explanatory Variable is Weak. *Journal of the American Statistical Association*, 90(430), 443–450.

Connelly, Rachel, and Jean Kimmel (2009). Spousal Influences on Parents' Non-market Time Choices. *Review of Economics of the Household*, 7, 361–394

Connelly, Rachel, and Jean Kimmel (2010). *The Time Use of Mothers in the United States at the Beginning of the 21st Century*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Connelly, Rachel, and Jean Kimmel (2013). Gender Differences in Unpaid Time Use by Family Structure. In Esther Redmount (ed.), *Family Economics: How Households Impact Markets and Economic Growth*. Santa Barbara, CA: ABC-CLIO.

Connelly, Rachel, and Jean Kimmel (2015). If You're Happy and You Know It: How Do Mothers and Fathers in the U.S. Really Feel about Caring for Their Children? *Feminist Economics*, 21(1), 1–34.

Floro, Maria Sagrario, and Marjorie Miles (2003). Time Use, Work and Overlapping Activities: Evidence from Australia. *Cambridge Journal of Economics*, 27, 881–904.

Folbre, Nancy, and Jayoung Yoon (2007). What Is Child Care? Lessons from Time-use Surveys of Major English-speaking Countries. *Review of Economics of the Household*, 5, 223–248.

Folbre, Nancy, Jayoung Yoon, Kade Finnoff, and Allison Sidle Fuligni (2005). By What Measure? Family Time Devoted to Children in the United States. *Demography*, 42(2), 373–390.

Foster, Gigi, and Charlene Kalenkoski (2015). Measuring the Relative Productivity of Multitasking to Sole-Tasking in Household Production: Experimental Evidence. *Applied Economics*, 47(16–18), 1847–1862.

Fox, Liana, Wen-Jui Han, Christopher Rulm, and Jane Waldfogel (2013). Time for Children: Trends in the Employment Patterns of Parents, 1967-2009. *Demography*, 50(1), 25–49.

Hallberg, Daniel, and Anders Klevmarken (2003). Time for Children: A Study of Parent's Time Allocation. *Journal of Population Economics*, 16, 205–226.

Hamermesh, Daniel S., and Jungmin Lee (2007). Stressed Out on Four Continents: Time Crunch or Yuppie Kvetch? *The Review of Economics and Statistics*, 89(2), 374–383.

Hill, Russell C., and Frank P. Stafford (1985). Parental Care of Children: Time Diary Estimates Of Quantity, Predictability, and Variety. In F. Thomas Juster and Frank P. Stafford (eds.), *Time, Goods, and Well-Being* (pp. 415–437). Ann Arbor, MI: The University of Michigan.

Hochschild, Arlie Russell (1989). *The Second Shift: Working Parents and the Revolution at Home*. New York: Viking Penguin.

Kalenkoski, Charlene M., David C. Ribar, and Leslie S. Stratton (2005). Parental Child Care in Single-parent, Cohabiting and Married-couple Families: Time Diary Evidence from the United Kingdom. *AEA Papers and Proceedings*, 95(2), 194–198.

Kalenkoski, Charlene M., David C. Ribar, and Leslie S. Stratton (2009). The Influence of Wages on Parents' Allocation of Time to Child Care and Market Work in the United Kingdom. *Journal of Population Economics*, 22, 399–419.

Keith, Bryant, W., and Cathleen D. Zick (1996). An Examination of Parent-Child Shared Time. *Journal of Marriage and the Family*, 58(1), 227–237.

Kimmel, Jean, and Rachel Connelly (2007). Mothers' Time Choices: Caregiving, Leisure, Home Production, and Paid Work. *The Journal of Human Resources*, 42(3), 643–681.

Krueger, Alan (2007). Are We Having More Fun Yet? Categorizing and Evaluating Changes in Time Allocation. *Brookings Papers on Economic Activity*, 2, 193–215.

Milkie, Melissa A., Sara B. Raley, and Suzanne M. Bianchi (2009). Taking on the Second Shift: Time Allocations and Time Pressures of U.S. Parents with Preschoolers. *Social Forces*, 88(2), 487–518.

Moro-Egido, Ana I. (2012). Changing Trends of Mothers' Active and Passive Childcare Times. *Journal of Family and Economic Issues*, 33, 11–23.

OECD (2014) Better Life Index. http://www.oecdbetterlifeindex.org/ (accessed August 2014).

Pew Research Center (2006). Who's Feeling Rushed? (Hint: Ask a Working Mom). *Social Trends Report* (February 28).

Ramey, Valerie, and Neville Francis (2009). A Century of Work and Leisure. *American Economic Journal: Macroeconomics*, 1(2), 189–224.

Ruppanner, Leah, and Joy E. Pixley (2012). Work-to-Family and Family-to-Work Spillover: The Implications of Childcare Policy and Maximum Work-Hour Legislation. *Journal of Family and Economic Issues*, 33, 283–297.

Sandberg, Sheryl (2013). *Lean In: Women, Work and the Will to Lead*. New York NY: Knopf Publishing.

Sayer, Liana C. (2005). Gender, Time and Inequality: Trends in Women's and Men's Paid Work, Unpaid Work and Free Time. *Social Forces*, 84(1), 285–303.

Sayer, Liana C., and Leigh Fine (2011). Racial-Ethnic Differences in U.S. Married Women's and Men's Housework. *Social Indicators Research*, 101, 259–265.

Sayer, Liana C., Suzanne M. Bianchi, and John P. Robinson (2004). Are Parents Investing Less in Children? Trends in Mothers' and Fathers' Time with Children. *American Journal of Sociology*, 110(1), 1–43.

Sayer, Liana C., Paula England, Michael Bittman, and Suzanne M. Bianchi (2009). How Long Is the Second (Plus First) Shift? Gender Differences in Paid, Unpaid and Total Work Time in Australia and the United States. *Journal of Comparative Family Studies*, 40(4), 523–545.

Sevilla, Almudena, Jose I. Gimenez-Nadal, and Jonathan Gershuny (2012). Leisure Inequality in the United States: 1965–2003. *Demography*, 49(3), 939–964.

Stevenson, Betsy, and Justin Wolfers (2009). The Paradox of Declining Female Happiness. *American Economic Journal: Economic Policy*, 1(2), 190–225.

Stock, James H., and Motohiro Yogo (2005). Testing for Weak Instruments in Linear IV Regression. In D.W.K. Andrews (ed.), *Identification and Inference for Econometric Models* (pp. 80–108). New York, NY: Cambridge University Press.

Thomas, Juster, F., Paul N. Courant, and Greg K. Dow (1985). A Conceptual Framework for the Analysis of Time Allocation Data. In F. Thomas Juster and Frank P. Stafford (eds.), *Time, Goods, and Well-Being* (pp. 113–131). Ann Arbor, MI: The University of Michigan.

Wang, Wendy (2013). Parents' Time with Kids More Rewarding than Paid Work – And More Exhausting. Pew Research Center (October).

White House (2014) *Summit on Working Families*, http://workingfamiliessummit.org/ (accessed July 2014).

Deborah S. DeGraff is Professor of Economics at Bowdoin College. She holds a Ph.D. in Economics from the University of Michigan. Her research focuses on household decisions and outcomes, primarily in developing countries, regarding children's work and schooling, women's labor force participation and time use, and the economic well-being of older persons.

Rebecca M. Centanni is Senior Analyst at Analysis Group, Boston. She is a 2013 Magna Cum Laude graduate of Bowdoin College with High Honors in Economics. She was also co-recipient of the 2013 Noyes Political Economy Prize awarded by the Department of Economics, Bowdoin College, for her thesis studying women's "double burden."