

Time Use and The Significance of Overlapping Activities

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ABSTRACT

The overlapping of activities is an important dimension of time use that has previously received little attention in economic analysis. Most time use studies have looked only at *primary* activities, ignoring the fact that individuals often perform two or more activities simultaneously. This seriously underestimates the time spent on several economic activities such as childcare and housework which are also performed as *secondary* activities. Existing standard of living measurements and household economic models often do not take into account this important dimension. This paper will argue as well that overlapping activities have important welfare implications particularly on individual well-being.

Using a two-adult household sample drawn from the 1992 National Australian Time Use Survey, this paper examines the incidence and determinants of overlapping activities among 3,966 male and female household members. It first shows that inclusion of overlapping activities in time use measurements provides a better estimation of the economic contribution of individuals especially in non-market production and that its incidence is non-trivial. Tobit models are estimated to examine the effects of economic as well as social factors on the incidence of *overlapped* work activity. The findings, which are found to be robust, showed that gender, household lifecycle and composition, education, cultural norms, employment status and level of income earnings influence the extent to which individuals, particularly women, perform secondary work activities. Conclusions are drawn in the final section of the paper.

I. Introduction

The analysis of overlapping activities—secondary and tertiary activities are performed simultaneously with primary ones—is an important dimension of time use that is now gaining attention in economic, social and policy analyses. This paper explores those factors that influence our decision to overlap activities, particularly the performance of secondary work activities, as well as the importance of the measurement and inclusion of these activities in time use research. A plethora of studies have acknowledged that overlapping activities is neither an isolated phenomenon nor a trivial issue.¹ Studies also show that there are welfare, measurement and policy consequences of overlapping activities which make their study an urgent research agenda.

First, measuring the extent to which people overlap activities can convey information about their quality of life, or lack thereof, that standard economic indicators do not (Floro 1995, Folbre 1997). Quality of life issues are currently receiving greater attention from researchers and policy makers worldwide, leading to a growing recognition that time use data may be as important as income and consumption data for informing public policy (Nussbaum and Sen (1993), UNDP 1995, Smeeding 1997). The question of well-being is not predicated solely on a person's access to goods and services. Engagement in work- whether production for own consumption, for the community at large or for the market - constitutes an essential element of life so that the length and the manner in which a person performs such activities is an important determinant of well-being. The tendency to overlap activities, for example, can imply potential benefits in terms of increased pleasantness to an individual, or it can represent the intensification of work and the lack of discretionary or “pure” leisure time (as in the case of overlap between work and leisure activities). Long hours of work coupled with prolonged periods of high work intensity negatively affect a person's health and well-being (Baruch, Beiner and Barnett 1987, and Pittman, Solheim and Blanchard 1996).

Second, the inclusion of *overlapped activities* (e.g. secondary and tertiary activities) in present time use surveys can provide a more accurate estimate of an individual's economic contribution, especially in the area of non-market production of goods and services (Bittman

1995, Benería 1996, Folbre 1997).² The significance of the non-market sector of the economy to human development and social reproduction is gaining considerable interest and concern. There is growing recognition that the unpaid labour of non-market production, particularly the care of people, underpins the functioning of the market economy as well. Unfortunately, some methods of collecting time use data tend to omit certain activities—especially when, by their nature and specific locational context, they are likely to be combined with another. This inaccurate measurement results from the typical imposition of a rigid construct of time use, namely that a person performs only one activity at a given time.³ The total set of daily activities measured must, therefore, be equal to a twenty-four hour constraint.

Third, a better understanding of how individuals and families organize their daily life can provide a better assessment of the impact of economic changes on living standards and work burden (Humphries 1999, Floro 1995a). Individuals' and households' responses to cyclical fluctuations, particularly during periods of economic downturns, involve coping mechanisms that affect labour force participation, household division of labour and time use. This may include increased search for additional sources of income, the substitution of home-produced goods and services for market purchases, and so forth. Changes in the structure of the economy influence the well-being of the household and its members not only by influencing their access to market goods and services but also on their time spend in production for their own use and consumption. This significant fact is overlooked however in conventional policy formulation and appraisals as well as in standard macroeconomic models which makes their evaluation of the economy seriously inadequate. Such coping strategies affect not only the length of working hours but also the intensity of an individual's time use. Instead of choosing between two activities that need to be done, people may perform both simultaneously rather than singularly. Policy and academic debates on time allocation are insufficiently informed when they merely focus on the time use trade-off among primary activities, while ignoring production accomplished as overlapped activities.

Building on the works of Apps and Rees (1997), Bittman and Matheson (1996), Floro (1995), Ironmonger (1989, 1994) and Juster and Stafford (1985, 1991), this paper critically examines the incidence and nature of overlapping activities. An analytical model is developed to

help predict an individual's inclination to perform overlapped economic (work) activities.⁴ It takes into account the fact that a person's decision to do work—whether productive or reproductive (household)—involves not only the length of time but also the organization of time.

The empirical study that we undertake in this paper differs from previous time allocation studies in two respects. First, it attempts to re-estimate the actual time spent in economic activities by taking into account overlapping activities. Secondly, it focuses its analysis on the amount of time spent in doing work as a secondary activity. Using a subsample from the 1992 National Australian Time Use Survey, Tobit tests are conducted to examine the various factors that are likely to affect the incidence of such activities by individuals. The significance of this approach will be justified in the body of the paper.

The paper is organized as follows: Section 2 reviews the literature, discusses the data used in our empirical analysis, and briefly describes the effect of the inclusion of overlapped work activity in time use measurement. Section 3 examines the interplay of economic and social factors—such as gender and social norms, household structure, education and income—that can influence an individual's time use decision with regards to overlapping activities. An individual decision-making model and Tobit test results on the determinants of overlapped work activities are given in Section 4. A summary of the main points and policy considerations concludes the paper.

II THE NOTION OF OVERLAPPING ACTIVITIES AND DATA SETTING

The concept of overlapping activities remains underexplored in economic research, although a growing number of studies are beginning to address its significance. Studies on the informal sector in both developed and developing countries show the prevalence of women's tendency to overlap (Roldan 1985, Benton 1989, Lozano 1989, Szebo and Cebatorev 1990, Moser 1993). Home-workers and other self-employed women frequently combine income-earning activities with domestic chores such as cleaning, cooking and childcare. Using 1992 Australian time use survey data, Ironmonger (1994), Bittman and Matheson (1996) and Ironmonger (1996) show that omitting overlapped activities in time use studies results in the

inaccurate measurement of the labour time spent caring for children. As a result, the extent of gender asymmetry in the household division of labour is also underestimated (Bittman and Matheson 1996). Cognizant of this problem, Apps and Rees (1997) and Apps, Killingsworth and Rees (1996) included overlapped activities in their study of Australian intra-family income distribution and labour supply responses to economic policy.

Consumer research and marketing studies have called into question the assumption underlying standard time allocation models that activities are undertaken “one at a time” or monochronically, with a rigid 24-hour constraint (Lane, et. al. 1989, and Kaufman, Lane, and Lindquist 1991). Their findings show that people will often overlap activities—using time polychronically—to “stretch” their time budgets.⁵

It is important to note that overlapping activities can take on multiple combinations, some of which can be pleasant and enjoyable. For example, performing a secondary activity such as listening to the radio while cooking (primary activity) breaks the monotony of the primary task involved. On the other hand, overlapping activities may lead to increased stress or diminished quality of the output or experience which may adversely affect the person’s well-being. Studies have shown that persons who are “time squeezed” are likely to cope with time pressure by performing secondary work activities in conjunction with another (primary) activity such as childminding and cooking, or childcare and market work (Roldan 1985, Baruch, Beiner and Barnett 1987, Benton 1989, Sichtermann 1988). Likewise, the “pure” satisfaction derived from a primary leisure activity or the attention given to personal care may diminish when necessity dictates its combination with a secondary work activity. For example, the pleasure derived from watching sports on TV with undivided attention may be lessened when the person is also minding a young child whose interruptions are not necessarily timed during commercial breaks.

While there are several facets of overlapping activities that present opportunity for more exploration, we focus our analysis to the individual’s decision to perform work as a secondary or overlapped activity. An implicit assumption is that this behavior demonstrates the existence of “time-constraint”. Whether the primary activity it is overlapping with is a work activity, personal care, socializing or leisure activity, the performance of a secondary work activity indicates the need of the individual to complete some tasks simultaneously with these other primary activities.

The presence of overlapped work activities highlights the insufficiency of monochronically conceived time to satisfy the demands placed by his/her different roles.

There are several reasons why this is an important issue that needs more study. Firstly, an overlapped or secondary work activity performed simultaneously with another is more likely to increase the intensity of work when the primary activity also involves attention and/or effort. Active child minding combined with housecleaning leads to intensification of labour. Secondly, the overlapped work activity can reduce the level of discretion if the primary activity is of a non-work nature--such as leisure or personal care. This can alter the amount of satisfaction an individual receives from the primary activity. Finally, the performance of unpaid work as an overlapped activity implies that the length of time spent in unpaid work is considerably longer than what standard time use measurement indicates.

The sub-sample used in this paper involves 3966 adult respondents—either married or defacto—taken from 1983 households. It is part of the 1992 Australian National Time Use Survey of approximately 3,000 households, administered by the Australian Bureau of Statistics (ABS)⁶. Tables 1, 2, and 3 present relevant household and individual characteristics of the sample data, including household type, geographic location (57% metropolitan, 32.9% urban, and 10.9% rural), weekly household income, age, education levels, primary language spoken in the home, country of birth, employment status, main source of income, and weekly individual income. Note that nearly sixty percent of our sample households have dependents and in almost a quarter of them, both spouses work full-time (Table 1).

[Table 1 about here]

Information for the national time use survey was obtained through both personal interview and self-completion diaries (for two days). Respondents—members of each survey household over 15 years of age—were asked to keep "time journals" for two randomly chosen 24-hour periods.⁷ They were instructed to record their main activity, any other activities undertaken simultaneously, where they were, and who was with them. This encouraged respondents to record all their activities, promoting better reporting of simultaneous or overlapping activities.⁸ Each activity is indicated as "primary", "secondary" or "tertiary" when reporting joint activities.⁹ For purposes of our analysis, activities are classified in the following

categories: a) work or economic activities, including labour market work, domestic activity, childcare, shopping and volunteer work; b) leisure activities, including active leisure and passive leisure; and c) other activities, including sleep and personal hygiene, shopping and education.

It can be noted that the household sample reflects the “broad middle class” structure of Australian society sample—as seen in the average "Weekly Household Income" distribution. (see Table 1). There are two reasons for this. Firstly, Australia has a strong tradition of organized labour (Bell and Head, 1994) so that by the early 1990s – at the time the time use survey was undertaken - approximately eighty percent of all workers were covered by national award wages and standardized work terms and conditions. This history has enabled Australian workers power to bargain bonuses such as increased holiday leave, shorter work weeks, and higher compensation for overtime hours worked (OECD, 1994). Secondly, Australia had wide coverage of social welfare programs until the mid-1990s.¹⁰

[Table 2 about here.]

As Table 2 shows, over 11% of the respondents in our sample spoke a language other than English in their home with 26% of women and almost 29% of men born in a country other than Australia. One important reason is that in the 1970s, more immigrants were admitted to the country. By 1992, more than one in five of the population was born overseas, with one in six coming from a non-English speaking country (Bertone, 1992).

[Table 3 about here.]

The men in the subsample are two and half times more likely to hold full-time jobs than the women (see Table 3).¹¹ Over 26% of the female respondents hold part-time jobs while only 5% of men do. Both men and women in this subsample reported significantly lower unemployment rates than the national average, with female respondents at 4.6% and male respondents at 6.2% compared to national averages of 10.4% and 11.3%, respectively (OECD 1994). Of those employed, the majority reported their main source of income accrued from wages and salaries (39.4% for women and 54.5% for men). Table 3 also shows that respondents drawing government pensions (19.6% of women and 19% of men) comprised the second largest group.

There are some limitations to the subsample data that need to be acknowledged. Actual wage earnings were not reported in the survey. Instead respondents were asked to report gross weekly income (from all sources). To further complicate matters, this information is provided only in terms of income range categories. For analytical purposes, we make use of the latter as a proxy for wage earnings.

[Table 4 about here.]

Table 4 presents the participation rates and daily time spent by women and men in both primary and secondary (overlapped) economic or work activities. It shows participating women engage in labour market activities to a lesser extent than men, both in terms of participation rate and average time spent. Participating men on average, spend 515 minutes per day doing market work compared to participating women's average of 377 minutes. The majority of both men (81.8%) and women (98%) perform some domestic chores as a primary activity.¹² It is interesting to note, however, that nearly twice the number of women (30%) compared to men (18%) perform additional domestic chores as an overlapped or secondary activity.

Table 4 also shows that childcare is another activity that reveals gender differences. Whether as a primary or overlapped activity, women have a higher participation rate (42%) and spend more time caring for children than men. Women and men, who performed at least 5 minutes of primary childcare activity, reported an average of 157 and 75 minutes per day respectively. But the amount of time they each spent on secondary childcare activity is substantially greater, on average of 478 minutes for women and 302 minutes for men.

Tabulation results for the entire sample of the national survey indicate that at least a third of every activity episode recorded by the diary method involves at least one other simultaneous activity (ABS 1994, p. 4). Secondary work activities tend to contribute an additional 25% of total working time of individuals, with the amount done by women (158 minutes per day on average) more than double that done by men (67 minutes per day on average). The differences in our subsample are more striking. Overlapped work activities performed by the household head and spouse respondents in the subsample households contribute, on average, 31.6% of total working time of individuals. Women's total time increases by an average of 218 minutes daily or nearly 44%, while men's time increases by an average of 100 minutes or 20%.

Table 5 presents an overview of time use, in terms of primary and overlapped activities for all men and women in our sub-sample. Taking into account the time allocated to primary activities alone, the results show a pattern consistent with other time use studies. Men spend the largest part of their waking hours in labour market work, while women's time is spent largely on domestic work, childcare and shopping. With respect to primary leisure, women and men in the sub-sample seem to allocate roughly the same proportion of their time to these activities.

[Table 5 about here.]

But when time use data takes into account overlapped work activities, a different picture emerges. Table 6 shows the change in the average time spent and the percent distribution of time use when secondary activities are included. Two alternative methods, based on different assumptions, are used in accounting for secondary activities namely: a) primary and overlapped work activities are given equal weight (assumption 1); and b) overlapped work activities are given half the weight of the main activity (assumption 2). Table 6 also shows that childcare is a household activity that is often combined with other activities. Taking both primary and secondary childcare activities into account, the average time of 64.7 minutes spent by women in childcare increases to 264.8 minutes (assumption 1) or to 164.7 minutes (assumption 2), an increase of 310% and 150% respectively. Men's average total childcare time increases by 440% from 20.3 minutes to 110.4 minutes (assumption 1) or by 220% to 65.3 minutes (assumption 2). By performing overlapped work activities, women increased their economic activities by 15% (assumption 1) or 8% (assumption 2). Men, meanwhile, "stretched" their time by 7% (assumption 1) or 3% (assumption 2).

[Table 6 about here.]

Table 7 shows the average (mean) time spent per day by an individual on a particular type of primary activity that is overlapped with a secondary work activity. About 124 minutes or 47.1% of the total secondary work activity time is spent by an individual while doing personal care as primary activity. Another 31.3 % of the total secondary work activity time or 82 minutes is spent with another work (primary) activity, whether it be domestic work, childcare, purchases of goods and services, etc. Performance of a leisure (primary) activity with overlapped work activity comprises 21.4% or an average of 56 minutes per person per day.

[Table 7 about here.]

The above results suggest that overlapped work activities, especially for women, are not trivial. There is also underestimation of the amount of unpaid labour used in the non-market production of goods and services if they are omitted. In the section that follows, we explore the varied factors that may influence individuals' decision to overlap activities.

III. DETERMINANTS OF OVERLAPPED WORK ACTIVITIES

The extent to which a person performs work as an overlapped activity depends on a variety of economic, demographic and social factors. These include social norms, household lifecycle and composition, individual's educational attainment, sex, income and employment status.

Prevailing social and gender norms—"men take out the garbage", "women are responsible for the children", etc—influence the household division of labour. Although the labour force participation of women has increased significantly worldwide—including Australia—over the last three decades, market work is still perceived to be the primary role of men and that of household maintenance and childcare to be women's principal work domain. These distinct social constructs have a number of implications. First, they influence the sexual division of labour within the household creating time pressure for many women as they are confronted with a multiplicity of roles (Horna 1989, Bittman 1996, Creighton 1999). Second, they affect the individual members' perception of time itself. Some consumer research studies argue that men—especially from western cultures—"have been trained to focus on doing one thing at a time or processing time monochronically" (Lane, et. al. 1989, p. 123).¹³ Not all individuals, however, organize activities in "linear, separable time". Women, in particular, have been acculturated into, compelled to, and/or have consciously developed the ability to perform multiple activities simultaneously. In striving to meet their varied roles, many become adept at extending time through polychronic use. For these reasons, women are more likely to overlap activities than men are.

Demographic factors also influence the length and intensity of overlapped work activities. Persons in the ascendant phase of the household life cycle tend to experience increased time pressure, given the demands of their jobs and/or young children. As one moves into a later stage (e.g. older children, retirement, etc), time pressure is expected to decline. Household composition, particularly the presence of children, also plays an important role in overlapping activities. Given the intensive nature of childcare, demands on parents' time are high, increasing the likelihood to overlap.¹⁴ The age of children in the household also sets the parameters by which parents can perform other tasks. Pre-school aged children place a higher demand on adults' primary time than do older children, increasing the probability of parents overlapping work activities more frequently when young children are present in the household.

Educational attainment is yet another factor that influences an individual's tendency to overlap activities. Those with more education may have higher expectations of themselves and their use of time. They place greater importance on the quality of the output or on the self-fulfilling elements of the tasks. This could manifest itself as higher standards of cleanliness, better care for the sick or elderly, more nutritious meals, or more involvement in their children's activities. Even with time pressure, persons may decide to cope with multiple demands on their time not by purchasing market substitutes such as fast food or nannies, but rather by overlapping their activities or multi-tasking (Zick, McCullough and Smith 1996).¹⁵

The importance of cultural norms in both the allocation and organization of time needs to be taken into account. Some cultures maintain stronger social and kinship ties than others, creating a tendency for work sharing and extended family networks that provide assistance to a household. The absence or weakening of such ties in more individual-oriented cultures suggests a greater compulsion for those households to either rely on their own members' labour or on purchased labour to perform certain tasks. To the extent that recent immigrants in Australia may still maintain more kinship-oriented aspects of their cultural identity, one can observe differences between these households and non-immigrant households in their organization of time use.

Individual earnings also influence the incidence of overlapping via the income effect and the intra-household bargaining effect. As an individual's income increases, household income also increases. Through the income effect, a person has increased access to capital goods that

could potentially decrease (e.g. laundry equipment, microwaves, etc.) or increase (more expensive and care intensive furnishings, etc.) the incidence of overlapping.¹⁶

At the same time, an individual's personal income may influence her/his relative bargaining position in the household—particularly in those areas that are subject to negotiation (Fleck 1998, Agarwal 1994, Roldan 1988). The division of household labour may be an area more open to negotiation than decisions such as the choice of residence, etc. When an individual contributes a larger share of income to the household, he/she potentially wields greater influence on the manner in which household work is distributed. In this case, there may be less pressure for that individual to perform overlapped work activities.

An individual's employment status and job characteristics may also affect that person's time demand. The extent to which a person is engaged in market work full-time or part-time, is seeking a job, or not in the labour force can increase or decrease time pressure. One would expect that a fully employed person is likely to be more time-constrained than a part-time, unemployed, or non-working person (Probert 1993). A person's employment status, to the extent that it contributes income to the household, can also affect the person's bargaining position within the household. Job location and the number of jobs held also can influence the person's organization of time. A person with multiple jobs is more likely to be experiencing "time-squeeze" than a person with one or no job at all. Home-based employment enables the person to perform more overlapping activities. The effect of all these factors on the level of overlapped work activities performed by an individual is examined empirically with the use of the Tobit method in the next section.

IV. EMPIRICAL ANALYSIS

The presence of overlap activities implies that time allocation decisions of individuals are more complicated than normally assumed in the existing models.¹⁷ Individuals decide not only how to allocate their time among various activities, but also whether to perform these activities separately or simultaneously. Assuming the person has prior knowledge about the nature of the task involved (i.e. the required physical energy, concentration and attention), then the manner of

performing that work –whether market or non-market—involves two types of *simultaneous* time use decisions. These are: a) the choice of whether to perform it singularly or in combination with another activity;¹⁸ and b) the length of time spent on the activity.¹⁹ For example, when a person allocates time to wash dishes and mind a child, he or she must determine both the amount of time to devote to these activities and whether to perform them individually or simultaneously. More concretely, we specify the following reduced form equation for the time spent by individual i in household j on overlapped work activities:

$$OL_{ij}^* = X_{ij}\beta + Z_j\gamma + \varepsilon_{ij} \quad (2)$$

where:

$$OL_{ij} = \begin{cases} OL_{ij}^* & \text{if } OL_{ij}^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (3)$$

The observed dependent variable, OL_{ij} , is the actual time spent by individual i on overlapped work activities. X_{ij} and Z_j are vectors of observable characteristics at the individual and household levels respectively, which influence the decisions involving overlap of activities. Both β and γ are unknown parameters to be estimated. The random error term, ε_{ij} , has two components:

$$\varepsilon_{ij} = \eta_j + \mu_{ij} \quad (4)$$

where η_j is the unobserved household-specific effect, and μ_{ij} a random individual term uncorrelated with the household error component. Since our data contains both husbands and wives, the error terms are not independent across individuals leading to biased standard errors

for the coefficient estimates. Consequently, we obtain unbiased estimates of variance by calculating robust (Huber/White) standard errors.

It should be noted that the above Tobit model imposes the same economic structure on both the decision to overlap and the length of time to spend on the secondary work activity; hence it uses the same regressors and parameters. Thus, for estimation purposes, the equation that determines the time spent by individual i in household j on overlapped work activities becomes a function of the same set of exogenous household and individual characteristics that determine whether or not that person will overlap.

Several Tobit models are estimated, each differing in the independent variables included. First we estimate a basic model (Model 1) to examine several individual and household-level factors that may influence the dependent variable, OL_{ij} which is measured in minutes per person per day (see Appendix A). If the individual decides to overlap, then OL_{ij} is positive; if he/she decides not to, then OL_{ij} is zero. The individual-level independent variables, X_{ij} , in the basic model are the following: a) gender (SEX), b) lifecycle stage, represented by the age of the individual (AGE), c) educational attainment represented by the education dummy variables (EDUC1 and EDUC2), and d) individual income (WINC1 to WINC7).²⁰ Due to data limitations, we make use of income dummy variables to take into account both the income effect as well as the effect of individual bargaining power (via the influence of earnings) on the person's performance of overlapped work activities (Appendix A). The household-specific variables, Z_j include: a) household composition, particularly the number of pre-school (0-4 years) (NCHIL14) and schoolage (5-14) children (NKIDS14), and b) social and cultural norms prevailing in the household represented by the dummy variable (OTLAN). The latter variable refers to whether the household member's primary language is not English and serves as a proxy for cultural norms that may influence work sharing patterns and labour allocation within the household.

The basic model is expressed as:

MODEL 1

$$OL_{ij} = [\text{Sex}_{ij} + \text{Age}_{ij} + \text{Educ1}_{ij} + \text{Educ2}_{ij} + \text{Winc1}_{ij} + \dots + \text{Winc7}_{ij}] + [\text{Nchild14}_j + \text{Nkids14}_j + \text{Otlan}_j] + \varepsilon_{ij}.$$

Several extensions (Models 2-4) are made to the basic model by adding exogenous variables sequentially into Model 1 to test the robustness of the regression results. These variables, namely WRKHOM, KIDHLTH, and MULJOB, attempt to capture the specific circumstances that additionally motivate or enable the individual to perform overlapped work activities. Employment that is carried out at the residence allows more flexibility to perform overlapping activities. Persons caring for a chronically ill child or those with multiple jobs are more likely to experience “time squeeze” and cope by performing overlapped work activities.

In model 2, we add a job location dummy variable (WRKHOM) to the basic equation. This dummy variable indicates whether the person is doing market work at home or not.

MODEL 2:

$$OL_{ij} = [\text{Sex}_{ij} + \text{Age}_{ij} + \text{Educ1}_{ij} + \text{Educ2}_{ij} + \text{Winc1}_{ij} + \dots + \text{Winc7}_{ij}] + [\text{Nchild14}_j + \text{Nkids14}_j + \text{Otlan}_j] + \text{Wrkhom}_{ij} + \varepsilon_{ij}.$$

Model 3 also takes into account the health condition of children in the household (KIDHLTH), hence we have:

MODEL 3:

$$OL_{ij} = [\text{Sex}_{ij} + \text{Age}_{ij} + \text{Educ1}_{ij} + \text{Educ2}_{ij} + \text{Winc1}_{ij} + \dots + \text{Winc7}_{ij}] + [\text{Nchild14}_j + \text{Nkids14}_j + \text{Otlan}_j] + \text{Wrkhom}_{ij} + \text{Kidhlth}_j + \varepsilon_{ij}.$$

Model 4 includes the dummy variable (MULJOB) that indicates whether the individual holds multiple jobs or not. This is expressed as:

MODEL 4:

$$OL_{ij} = [\text{Sex}_{ij} + \text{Age}_{ij} + \text{Educ1}_{ij} + \text{Educ2}_{ij} + \text{Winc1}_{ij} + \dots + \text{Winc7}_{ij}] + [\text{Nchild14}_j + \text{Nkids14}_j + \text{Otlan}_j] + \text{Wrkhom}_{ij} + \text{Kidhlth}_j + \text{Muljob}_{ij} + \varepsilon_{ij}.$$

Finally, a variant of the basic model is estimated in Model 5 to examine whether employment status has a role in the determination of the incidence of overlapped work activity. Employment status not only affects the time constraint of the person but also his/her bargaining power in the household division of labour. A fully employed person is likely to contribute more to household income and is more able to negotiate work sharing among household members than one who is either working part-time or not at all. We therefore substitute the employment status dummy variables (EMPST) in place of the weekly individual income dummy variables (Appendix A).²¹

MODEL 5:

$$OL_{ij} = [\text{Sex}_{ij} + \text{Age}_{ij} + \text{Educ1}_{ij} + \text{Educ2}_{ij}] + [\text{Nchild14}_j + \text{Nkids14}_j + \text{Otlan}_j] + \text{Wrkhom}_{ij} + \text{Kidhlth}_{ij} + \text{Muljob}_{ij} + \text{Empst1}_{ij} + \text{Empst2}_{ij} + \text{Empst3}_{ij} + \varepsilon_{ij}.$$

The regression results for Models 1-5 are given in Tables 8a and 8b. As expected, the gender coefficients in all the models show that the length of overlapped work activities increases significantly if the individual is female. This is consistent with the findings of other studies that show the prevalence of this coping strategy among women since they take on multiple roles that compete for both their time and effort.

[Tables 8a and 8b about here.]

We now turn to the variables that reflect demographic factors. Age is measured in the equations by the logarithm of its value; the coefficient then represents the elasticity of overlapped work activities with respect to age. The strong negative sign shows that as the age of the individual increases (progressing through the more intensive work stages of the life cycle), the dependent variable decreases significantly. Household composition, particularly the presence of children, are shown to have strong positive effect on the extent of overlapped work

activities. Comparing the size of the coefficients, the presence of younger, pre-school children in the household tends to have a larger impact than that of older, school-age children. These results are consistent with our earlier finding that the time spent on performing childcare increases dramatically if secondary activities are taken into account in time allocation (Tables 5 and 6). They reflect the intensive nature of this reproductive activity which demands such long hours that it is often performed in combination with other activities (Ironmonger 1989, Bittman and Matheson 1996).

The language dummy variable serves as a proxy for social/cultural norms that may influence work sharing patterns and labour allocation within the household. The coefficients show that a person is less likely to perform overlapped work activity if the individual speaks a language other than English at home. The significance of this variable may be explained by the fact that recent or first-generation immigrants to Australia – from neighboring Asian countries, e.g. Vietnam, Philippines and Malaysia, and from eastern Europe, e.g. Hungary, – tend to maintain more kinship oriented aspects of their culture. Extended family networks and work sharing practices provide assistance to these households and reduce the incidence of overlapped work activities.

The education dummy coefficients in all the models' estimation yield interesting results. A person who holds an undergraduate or higher degree is more likely to perform overlapped work activity than a person with less (formal) education. If a person has a trade degree or a certificate, the time spent on overlapped work activities increases significantly, although not as much as a person with an undergraduate degree. The results suggest that educational attainment has an effect on individuals' expectations of themselves and their use of time which are manifested in higher standards of cleanliness, better manicured lawns, carefully prepared meals, or simply, in wanting to have a more 'productive' day. Individuals with more schooling spend more time working, commuting to work and shopping. These tend to increase their time demand, which they attempt to meet by performing overlapped work activities.

The individual income dummy variables in Models 1-4 serve as proxies for both the income and bargaining power effects on the amount of overlapped work activities performed by an individual. The negative sign suggests that as income initially increases (up to the third

weekly income range A\$ 155-230), the extent to which the person performs overlapped work activity diminishes but not significantly. But as the person's income increases further, particularly to the middle and upper income level ranges (over A\$230), the decline in the incidence of overlap becomes significant. These coefficients suggest that the individual's gross weekly earnings negatively affects the amount of overlapped work activities he/she performs, particularly above some critical threshold level (A\$230 weekly). The higher individual earnings, the higher is the household income and the greater is the access to market purchased substitutes such as babysitters, cooked meals, and "time-saving" durables such as microwave ovens. An increase in an individual's earnings also affects her/his influence in household decision making; the person is better able to negotiate the division of tasks within the household in his/her favor. As a result, there is less pressure for that individual to overlap work activities.

The variables added to Models 2-5 represent specific circumstances affecting a person's decision to overlap and provide additional insight into our analysis. The impact of job location is found to be significant at the 5 and 10% levels (see Models 2-5, Tables 8a and 8b). Although a small proportion of our subsample, individuals who have home-based employment are likely to increase the amount of time in overlapped work activities. This is consistent with the findings of studies on homeworking or the practice of "subcontracting" that enable workers (in most cases, married women with children) to combine paid work and domestic activities. The strong positive effect of kids' health condition on the dependent variable shows that a child with an adverse, chronic health condition (longer than six months) increases significantly the time demand on the (adult) individuals in those households (see Models 3-5). There is greater need for caregiving, increasing the incidence of overlapped work activities. As shown in Table 8b, Models 4 and 5, individuals holding multiple jobs are more likely to experience "time squeeze" than those who hold only one job and hence they perform more overlapping activities.

The effects of the individual's employment status are shown in Model 5. Some findings stand out when the employment dummy variables are used: the strong positive sign of the coefficients suggest that a person who is either a part-time worker, unemployed or not in the labour force spends more time doing overlapped work activities than a fully-employed individual.

This result seems to be somewhat surprising since one would expect the opposite. Full-time workers are expected to be more time constrained than part-time or non-workers. A number of alternative forms of the model were calculated that include interactions between employment status and sex dummy variables, employment status and number of young children, and the like. Such experimentation is justified as long as the results are viewed as part of sensitivity analysis. The findings regarding the relation of employment status and gender suggest that when the person is female, the effect of employment status is significant only for part-time employment; the difference on time spent in overlapped work activities between female non-worker (one who is either unemployed or not in the labour force) and one who is fully employed is found to be weak. Presence of children, both young and school age, also weakens the significance of the effect of the employment dummy variables. Furthermore, it should be mentioned that the coefficient estimates and significance levels of the other variables remain essentially unchanged.

We also re-estimated many of the models with days of the week dummy variables added. The coefficient estimates of the variables listed in Tables 8a and 8b are qualitatively and quantitatively identical.

V. Concluding Remarks

In this paper, we examined the work dimension of overlapping activities, an important dimension of time use that has received little attention in economic analysis. Using a sub-sample of 3966 individuals from the 1992 National Australian Time Use Survey, we showed that the effects of overlapping activities on the pattern of time use among men and women and on the level of effort required in some activities are non-trivial. Omission of overlapping activities leads to serious underestimation of economic contributions of individuals especially in non-market production. This confirms the observation made in previous studies of their importance, particularly with respect to a more accurate measurement of women's and men's use of time and their economic activities. To the extent that overlapping activities can intensify work and affect the person's level of stress and discretionary time including personal care and leisure, their omission leads to an inaccurate assessment of the individual's well-being.

This study also examined the influence that pertinent economic, social and demographic

factors may have on a person's decision to do work as secondary or overlapped activity. Regression tests were performed using the Tobit method. The findings, which are found to be robust, showed the significant influence of gender, household lifecycle and composition, education, cultural norms, individual income as well as employment characteristics on the extent to which an individual performs overlapped work activities.

The importance of these results lies in the fact that time use data are now receiving greater attention among policymakers and researchers world-wide concerned with measurement and analysis of policy impacts as well as with formulation of economic and social policies. The inclusion of overlapping activities in time use provides a more accurate picture of individual's economic contribution and coping strategies. A more informed understanding of how individuals organize their daily life can provide a better assessment of the effects of economic and social policies on labour market, consumption patterns and individual well-being. Individuals' and households' responses to economic fluctuations for example, particularly during periods of stagnant or declining real incomes and economic downturns, involve coping mechanisms that affect not only labour force participation, but also men and women's time use. Increased time spent in earning additional income accompanied by the substitution of home production for market goods and services that have become less affordable affect not only the length of working hours but also the intensity of one's work time. A better understanding of this important issue requires, however, intertemporal comparisons of time use that are beyond the scope of this study.

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Endnotes:

¹ It is also termed “multi-tasking”, “polychronic time use” (Lane, Kaufman and Lindquist, 1989), “concurrent activities” (Hendrix, Kinnear and Taylor 1979, Hill 1985, Juster and Stafford 1985, 1991), and “joint production” (Peskin 1982).

² These include care giving, subsistence farming, food preparation, volunteer work, housecleaning, etc.

³ Interviews are often constructed to account for only one activity at a time, which precludes the possibility that some activities can actually be performed simultaneously.

⁴ For our study purposes, overlapped activities refer to secondary and tertiary activities performed in combination with a primary or main activity.

⁵ See Hornik 1984; Lane, et al. 1989; McGrath and Kelly 1986; Kaufman, et al. 1991; Reilly, 1982; and Zick, et al. 1996. Lane, et al. (1989) observed that working parents (particularly mothers) deal with increased time pressure not only by reducing leisure and sleep but also by overlapping activities.

⁶ This is the country’s first time use survey undertaken on a national scale--following a 1987 pilot survey conducted in Sydney. It covered urban and rural areas across all States and Territories of Australia and was collected in a manner to ensure that all days of the week were surveyed in equal proportions.

⁷ The choice to use time journals or diaries, in which people record their activities by time of day for two specified days was based on considerable previous research, testing and evaluation in Canada, Europe and Australia (ABS 1993, p 30). See also Juster and Stafford 1985 and 1991 for discussion of various time use data methods.

⁸ Up to three simultaneous activities were captured by the time use diary. The main coding principle was to remain as close to the respondent’s reporting as possible. This meant that the respondent’s decision about whether an activity was primary or secondary was accepted. For a more detailed discussion of the time use survey design, see ABS 1993.

⁹ An activity episode consists of a starting time, a finishing time, a main activity and possibly other activities, location, and a social context. A change in any of these constitutes the beginning of a new episode (ABS 1994, p.1).

¹⁰ These include (with the year of inception in parentheses): Age Pension (1901), Disability Support Pension (1991), Rehabilitation Allowance (1983), Sickness Allowance (1991), Child Disability Allowance (1987), Job Search Allowance (1991), New start Allowance (1991), Double Orphan Pension (1973), Sole Parent Pension (1989), Special Benefit (1945).

¹¹ The female labour force participation rate in 1992 was 51.9%, while that of males was 74.3% (OECD 1994, p. 140). When the 1992 Time Use survey was taken, Australia was beginning to recover from a two-year recession.

¹² Another study which examines the 1992 National Time Use Survey of Australia shows that “men provide practically 80% of the time devoted to home maintenance and car care” (Bittman 1996, p. 9). That’s roughly 50 minutes per day or 49% of the total men’s time in domestic activities (101 minutes per day). Women’s domestic activities largely include cleaning, cooking, laundry and other indoor activities. Shopping, gardening and playing with children are the activities where women and men spent equal amount of time (p. 12).

¹³ In fact, the language and social norms of many Western cultures appear to be tied to the monochronic

time view so that it is treated as though it were the only natural and logical way of organizing activities.“ This is particularly true for those involved in the business world and in those work activities where (monochronic) time is money” (Hall 1983, p. 43).

¹⁴For example, when childcare as a secondary activity is taken into account, Ironmonger (1989) estimates that the care and nurture of children in Australia involves some 200 million hours per week based on the 1992 time use survey. This is in addition to what schools provide - about 60 million hours per week of formal and about 20 million hours per week of informal care.

¹⁵Schor (1992) shows that over time, households in industrialized countries like the United States have spent more time in housework because of increasingly higher standards for cleanliness, childcare and other household activities. Presumably, this is partly due to overall higher levels of education.

¹⁶Studies by Strober and Weinberg (1980) and Nickols and Fox (1983) show that income is a significant determinant of ownership of household “time-saving” durables.

¹⁷Several time allocation studies have examined the observed allocated time units to specific activities including market work, non-market work (at home) and leisure from the input side (Mueller 1984, Skoufias 1993, Khandker 1988). That is, the estimated equations consist of demand functions for time inputs in these non-overlapping activities

¹⁸This preempts the choice of which activities to overlap.

¹⁹In a simple model of overlapped activities, an individual will (mentally) weigh the costs and benefits of engaging in overlapping activities. The benefits (B_{ij}) typically refer to higher level of output produced per unit of time, such as having both clean clothes and clean house, or to simply getting the necessary tasks done within a given period, such as providing care to young children, preparing meals, etc. Costs (C_{ij}), on the other hand, may include greater amount of stress, lower concentration and attention, or lower quality of the output (good or service) produced. The net benefit to the individual i in household j can be written as:

$$NB_{ij} = B_{ij} - C_{ij}. \quad (1)$$

The individual will engage in overlapped activities if NB_{ij} is greater than zero and the greater the net benefits, the more time the individual will spend in an overlapped or secondary work activity.

²⁰Ideally, one would prefer to use individual income as a proportion of total household income as a proxy for bargaining power. Due to data constraints, however, we are unable to create such a variable and instead, rely on the income level categories provided by the survey data.

²¹The individual employment status is correlated to some extent with the weekly individual earnings.