

Uses of the American Time Use Survey to Measure Household Services: What Works and Does Not Work

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In 2003, the data from the American Time Use Survey (ATUS) began being published and made available to researchers by the Bureau of Labor Statistics. Data from that survey have been published ever since. Beginning in 2003, ATUS was immediately adopted by Dr. Kurt Krueger as his data source for his annual series Dollar Value of a Day (DVD); the series is published by Expectancy Data. The DVD series was designed to provide data in a manner convenient for use by forensic economists and has been widely cited and used in forensic economic reports for that purpose. This paper looks at problems posed by the ATUS survey itself, by the use of ATUS in DVD, and at a specific criticism leveled at DVD in a paper by Dr. Terrence Clauretie (2010). Clauretie proposes an alternative use of ATUS that he argues is superior. This paper argues that the Clauretie criticism and proposed alternative use of ATUS are without merit and that DVD provides a much more useful basis for valuing loss of household services than the proposed Clauretie method. There are three problems with ATUS and DVD that make that survey and its interpretation in DVD less than perfect instruments for measuring household services of an individual who has been injured or killed. The first problem is that time use in ATUS is based on the age of the youngest child in a family, regardless of the number of children in a household. The second problem is that time use after retirement is not a good proxy for the output of household services by retired persons. The third problem is that DVD shows comprehensive time use for an average person, not just the amount of household services provided by an average person in a demographic category. As such, there may be evidence in the record of a case that shows ways that an individual's time use is not typical of the average that must be accounted for.

This paper looks at the impact of the American Time Use Survey (ATUS) and the two publications that have summarized data from the ATUS in a manner that allows easy use by forensic economists. The two publications are by Krueger of Expectancy Data starting in 2003 with annual revisions through 2010, and a paper by Clauretie in 2010. The paper also looks at three problems that are inherent in using time use

data to measure loss of household services, and inadequacies that remain in the ATUS and therefore in publications using the ATUS to derive time use estimates for specific family circumstances. The first problem is that ATUS reports household services based on the age of the youngest child in a family without regard to the number of children in a family. The second problem is that time use by retired persons is much less reliable as a proxy for the output of household services than time use by persons who are either fully employed in the labor market or have full-time duties as homemakers. The third problem is that ATUS provides data about all of the time use of persons and not just time use for providing household services. If evidence exists indicating that an individual was not using average amounts of time in other time-use categories, available time for providing household services will be impacted in ways that affect valuation of household services.

Leading up to the ATUS

ATUS began releasing time use data in 2003, providing significantly more information about time use in the United States than had been available earlier. Forensic economists, however, had already long since been using time use data to provide valuations of household services. In 1991, four economists published a bibliography of literature relevant to the valuation of household services as of 1991 (Hicks, Ireland, Johnson, Metzen, and Ward, 1991). The list in small print was longer than 13 pages. At that time, one of the most widely used sources was a monograph written by Gauger and Walker in 1980, based partly on time use data collected in and around Syracuse, New York in 1967-68 with a partial update in 1977. It was widely used, in part, because it provided valuation depending on whether or not a wife was employed and with respect to the number of children in a family. A 1992 update with the same title by Bryant, Zick and Kim did not enjoy similar success with forensic economists, because it was much harder to adapt the specific circumstances of families. Since at least the 1970s, loss of household services has been an important element in the development of damage analyses

by forensic economists, but only since 2003 have forensic economists had data with the depth and detail that was provided by the ATUS.

Prior to the ATUS, it was generally understood that time use data in the United States was inferior to that in other nations. The state of time use research in the United States and elsewhere and some of the issues that researchers knew would be confronted by any new national survey in the United States were discussed in a published report prepared by the Time-use Workshop Subcommittee of the Committee on National Statistics, chaired by Julie DaVanzo (Committee on National Statistics, 2000). Regardless of shortcomings discussed in this paper, the availability of the ATUS was a major step forward. The scope of issues relating to time use research is covered in great detail in the report of the DaVanzo Subcommittee. Broad general issues regarding time use research will not be covered in the current paper, but some knowledge of those issues is likely to be useful to forensic economists who are using time-use research as proxy data from which to develop estimates of household services.

Using Time-Use Surveys to Measure Household Services

At least in this author's experience, most valuations made by economic experts of loss of household services are based on placing dollar values on allegedly lost amounts of time that were spent providing household services before an injury or death. In a death case, this is fairly straight forward since death precludes any residual capacity to provide household services. It is more complicated in personal injury cases for the obvious reason that injuries do not inherently mean any loss of time. An injured person has the same 168 hours in a week that a non-injured person has. What has typically changed because of a personal injury is the amount of output of household services that can be produced within a given amount of time. Nevertheless, even in personal injury cases, many economic experts estimate loss of household services based on assumed reductions in the amount of time spent producing household services before an injury. The methodological concept is simple and straight-forward. Loss is estimated as the product of estimated time loss times some assumed wage rate per hour for the time that was lost.

Any method based on this concept is using time-cost as a proxy for measuring the lost dollar value of an individual's household services output. Problems with such an approach were considered by Ireland and Ward (1991). With limited exceptions, economists have no easy way to directly measure the value of the output of household services and typically rely on measuring the value of inputs that are used to produce household services. While homemaker services

have been valued using an opportunity cost approach (valuing household services in terms of the sacrificed earnings a homemaker could have earned by working in the commercial marketplace), most economists use methods that place dollar values on the time that a plaintiff or decedent spent providing household services prior to injury or death. For this purpose, most economists use time-use survey data, but sometimes in combination with having plaintiffs fill out a time-use questionnaire.

Using time-inputs valued by market-based wage rates to measure household outputs creates inherent problems. Time spent by family members at home producing household services is not equal to time spent by persons hired in the commercial marketplace producing similar household services. Family members may be more diligent and energetic in providing household services so that they get more services provided in the same amount of time, but the opposite may also be true. Family members are free to take as many breaks as they like without worrying about being fired. Thus, the intensity of time-use in providing household services is likely to be different from the intensity of time-use by commercial workers, but the direction of the difference is not easy to determine. A second difference is that it can be difficult to distinguish between necessary and recreational time spent on activities described in time use surveys as "household production." A person hired in the commercial marketplace is working at providing household services because that is what the person is being paid to do. A family member who works on elaborate flower gardens and vegetable gardens may be doing so for recreational reasons rather than any need for gardens. As will be discussed in greater detail below, age differences between commercial providers and home owners can also matter for both intensity and recreational differences.

Another problem is the difference in technology between home and commercial environments. Persons who cut their own lawns typically do not have the large self-propelled mowers that private commercial lawn care services use to provide home lawn services. A lawn that might take a person in the household an hour to cut with a typical home owned and self-propelled lawn mower could take a commercial provider less than 15 minutes to cut. In that instance, however, part of what a home owner pays for in hiring a lawn services is a return to the capital represented by the large self-propelled lawn mower that would not be a reasonable purchase for a single homeowner. It would be too large to store and would cost several times as much as a mower appropriate to cutting a single lawn. For all of these reasons, any "replacement cost" analysis based on time-use multiplied by a wage rate is a very imperfect proxy for the value of household services that a family needs to function effectively on a

day to day basis. This is a set of problems that no time-use survey can solve.

The Development of Dollar Value of a Day

DVD did not begin with ATUS. The first annual edition of DVD was published in 1996 and was based on the National Human Activity Survey (NHAPS) of the Environmental Protection Agency (EPA). For its first four years, DVD relied upon time use data from the 1996 NHAPS survey. For a description of the NHAPS survey, see Klepeis et al. (2001). Wage rates based on U.S. Department of Labor surveys that were updated each year were applied to time amounts. During that period, DVD contained 56 tables along with detailed information about the occupational wage data that was used. No issues were produced between 1999 and 2003, when ATUS data became available. Starting with the 2003 edition of DVD, 119 tables were included and many new categories became available, reflecting the increase in information that became available through ATUS. There are 20 categories for married males, 23 categories for married females, 12 categories for single males, 17 categories for single females, 9 tables for all males regardless of marital status, 9 tables for females regardless of marital status. DVD also includes detailed tables that describe each of the time use categories used in the compilation of DVD, a table describing the Standard Occupational Classification used in DVD, and wage adjustments for regional areas that can be used with wage values reported for the occupations. All of this makes DVD a versatile tool for developing forensic economic reports. This amount of detail makes "tailoring" a calculation much more specific to a plaintiff or decedent than was possible prior to ATUS and DVD.

Definitions of household services using DVD. Forensic economists have used DVD with different definitions of household services. The first general category of "Household Production" includes the following subcategories of time use: Inside Housework; Food Cooking & Clean-up; Pets, Home & Vehicles; Household Management; Shopping; Obtaining Services; and Travel for Household Activity. That category is most frequently used, but some economists add part or the entire second general category of "Caring and Helping." This category includes: Household Children; Household Adults; Non-Household Adults; Travel for Household Members; and Travel for Non-Household members. In particular, "caring and helping" for household children constitutes what would normally be thought of as "child care." Helping with "household adults" can also be considered a type of household service, as can "travel for household members." It is an important advantage of DVD that detailed tables are provided that includes descriptions of the specific activities included in each subcategory.

Using data directly from ATUS. Unlike the Clauretje research that will be discussed next, DVD is compiled directly from data tabs in the survey data. In other words, the time use results that are reported in DVD are directly taken from the survey itself, not estimated results.

Cell size limitation. While the number of tables in DVD provides a great deal of versatility on being able to find data for persons comparable to a given plaintiff, as cell sizes based on differences between groups become increasingly smaller the statistical significance of the data becomes increasingly difficult to establish. One of the major problems with DVD, which will be discussed further below, is that the number of children and the ages of all children in the household are not taken into account in any of DVD's tables. Cells could be found for such factors, but those cells would have data for too few persons to have statistical significance.

Terrence Clauretje's Paper in The Rehabilitation Professional

Probably in part because DVD immediately began using ATUS in the first year data from the ATUS was released, no other forensic economic paper addressed possible uses of ATUS to measure household services until a paper by Clauretje in 2010 (Clauretje 2010). Clauretje's paper was published in *The Rehabilitation Professional*, a journal primarily directed at rehabilitation professionals. Other than one key paragraph, Clauretje's paper was an effort by Clauretje to compare results using data from a 1990 paper by Douglass, Kenney, and Miller (DKM 1990) with results he obtained using data from ATUS. Clauretje had been using data from DKM for a number of years in his estimates of household services. The purpose of Clauretje's study was to compare values for household services derived from DKM with values for household services derived from time-use data in the 2006 ATUS survey. Clauretje's 2007 DKM values were inflation adjusted using the Employer Cost Index. Clauretje determined his 2007 ATUS values by multiplying estimates of numbers of hours of household services by an unweighted average wage from six "occupations relating to housework." The six occupations related to housework are: Residential advisors; Cooks, Private Household; Grounds and Maintenance Workers; Child Care Workers, Taxi Drivers; and Personal Care Workers. Hourly earnings rates were taken from Occupational Employment Statistics from the United States Department of Labor for the year 2007. His average wage rate for the six occupations as of 2007 was \$11.51 per hour. After developing his comparison figures, it was Clauretje's conclusion that his updated DKM values and his values derived from ATUS were reasonably similar.

Clauretíe's Table 5 provides annual values for household services based on 2006 ATUS data valued on the basis of a 2007 hourly wage rate for Men Employed, Men Not Employed, Females Employed, and Females Not Employed. His results are reported for each five year cohort starting with ages 20-24 and ending with ages 75-79. Clauretíe's Table 6 also provides 2007 values based on DKM data updated to 2007 for the same five year cohorts. While Clauretíe described the differences he reported in his Table 7 as only implying a "moderate discrepancy," others might have different opinions about the size of the differences. For Employed Males, Clauretíe's smallest cohort difference was 15.70% for any five year cohort. That difference was for employed males between the ages of 65 and 69. Clauretíe's cohort data for average household production by Employed Males was \$10,147 per year for his ATUS calculation and \$8,555 for his updated DKM calculation. That is not a small difference. The next lowest five year cohort difference was 20.39% for employed males between ages 20 and 24. For every age category with Employed Males, ATUS values were higher than DKM values, with differences reaching 34.96% for the 45-49 year old category. For Men Not Employed, Clauretíe found differences for in cohort values as great as 36.93%. For Women Employed, the largest cohort difference was 33.81%, but with some cohorts having higher DKM values than ATUS values. For Women Not Employed, the largest cohort difference was 16.32%, but differences for most cohorts were less than 10%. The differences in Clauretíe's comparison are not small.

Only Table 5 is relevant to an economist using the Clauretíe paper as a basis for projecting household services based on ATUS. No distinction is made between part time and full time work. No distinction is made between whether individuals are married versus not married. No distinction is made between whether the persons have children living in their homes or not. And no distinction is made between persons who have retired from employment or not. All of these differences are considered in the many tables in DVD, but DVD does not provide five year age cohorts. DVD provides limited age differentiation, but not at anything approaching the level of 5 year age cohorts. Since age differentiation is provided in greater detail by Clauretíe, it is relevant to consider what differences exist between his five year age cohorts, starting at his youngest cohort and moving to his oldest cohort in each of his four demographic categories.

For all four of Clauretíe's categories in his Table 5 based on the ATUS, the patterns are similar. Values increase significantly from the age 20-24 cohort to the age 25-29 age cohort and then remain fairly constant for age cohorts from 25-29 through 65-69, but drop significantly for the age 70-74 and 75-79 age cohorts. For Males Employed, Clauretíe shows \$7,374 per year for the 20-24 cohort, \$9,246 per year for ages 25-29, rising

to \$12,825 per year for ages 45-49 and then falling back to \$10,147 per year for ages 70-74. For Men Not Employed in Table 5, Clauretíe shows \$8,851 per year for ages 20-24, \$11,255 per year for ages 25-29, rising to \$16,616 per year for ages 50-54 and falling back to \$14,508 per year for ages 65-69. For Females Employed, Clauretíe shows \$12,968 for ages 20-24, \$15,113 per year for ages 25-29, rising to \$18,162 per year for ages 40-44, and falling back to \$11,957 per year for ages 65-69. For Females Not Employed, Clauretíe shows \$20,069 for ages 20-24, \$23,149 per year for ages 25-29, rising to \$28,350 per year for ages 45-49, and falling back to \$22,163 per year for ages 65-69. In all four cases, the pattern of starting lower and rising to a highest value for a central age and then falling back to a lower value is consistent. (In Clauretíe's Table 6 for inflation adjusted values from DKM, the patterns are similar but not as pronounced.)

The explanations for these patterns probably lies in the distinctions made in DVD that are not considered in Clauretíe's Table 5 that is based on ATUS. By providing five year age cohorts, Clauretíe's table considers age much more extensively than DVD. However, the probability that a person is married, has children, or has retired is, to a significant extent, related to age. What 5-year age cohort data may be showing is an increasing prevalence of marriage and children at different ages in the life cycle. If marriage and children were accounted for, it is possible that household production by age cohort would be even more constant than is shown by his table. If that is the explanation, it is much more useful to have data based on the marital and child age differentiations in DVD than the age-based data provided by Clauretíe.

Regression estimate. Clauretíe describes the regression equation estimates he used in constructing his Table 5 based on ATUS. Instead of using actual values from the underlying data, his regression equation allowed him to make estimates of values for data that he did not extract directly from the survey. This is in comparison with DVD which was produced by extracting all data used directly from the survey database. Use of regression estimates is inherently less accurate than extracting actual results from the database.

Clauretíe's Critique of DVD

Clauretíe's critique of DVD is contained in a single paragraph on the first page of his paper:

Other sources of the value of household services, such as "the Dollar Value of a Day" (Krueger and Ward, updated periodically) provide valuable information only on a cross section of demographics. This source may provide, for example, the value of household services of an employed male with a child under age 18. This snap-shot of information

provides little guidance as to the value of this same person ten, twenty, or more years in the future (Quotation formatted as in original.)

Clauretie's paper reads as if he did his research on ATUS before discovering that DVD existed and had been using data from ATUS to compile measures of household services since 2003. Having learned about DVD after completion of his paper, he appears to have added the paragraph cited above to acknowledge the existence of DVD and to claim that his own research on ATUS was in some manner superior.

If one takes Clairetie's critique at face value, he is effectively arguing that marital status, ages of children, status of working part-time or full-time, and work status of one's spouse could all change over a lifetime. Since all of these factors could change, where the person is now is only a snap-shot of where that person might be in the future. Therefore, it is better to only use values based on age and sex and make no other distinctions when calculating loss of household services. It is, of course, correct that demographic variables can change over time, but many of these variables change in predictable ways. It is reasonable to suppose that if a male is working full time, has a spouse who is working full time, and has youngest a child at age 12, that the youngest child will reach age 14 in two years and that the spouse will still be working two years from now. Surely using data from DVD that is tailored to those predictable changes is more accurate than using data that completely ignores such factors. Clairetie's "snapshot" logic for ignoring such changes would suggest that one should assume when using Clairetie's Table 5 that if a plaintiff fell into the category of "Male Employed" at the time of injury or death, one should ignore the future possibility that the man might retire and thus move into the "Male Not Employed" category. I suspect, however, that Clairetie would assume that the man (or woman) would have retired at some age and that Clairetie would project damages based on the assumption that the man's household production would switch from that of "Male Employed" to "Male Not Employed" at the assumed future age of retirement.

The Youngest Child Problem with DVD

The last part of this paper discusses two problems with using ATUS and DVD to calculate household services. With DVD, one can take into account whether or not an individual was working full time, part time or not at all; whether the individual was married or not married; whether the spouse of the individual was working full time, part time or not at all; and the age of the youngest child in the household if under the age of 18. One cannot, however, further differentiate between families with one child, two children or any other number of children. It is commonly assumed that family size affects the provision of household ser-

vices. Some of the earlier time use surveys, notably Gauger and Walker (1980), provided values for household services based on number of children. DVD did not do so, largely because cell sizes required for doing so are too small to maintain statistical significance. Since more children are likely to imply a greater need for household services, it is an important limitation when using DVD that the number of children in a family cannot be taken into account. In addition, this leads to the "youngest child problem," which will be illustrated with an example from the 2009 Dollar Valuation of DVD.

Assume a household that consists of a mother and father, both employed full time, and two children at ages 10 and 14. If the father was wrongfully killed, the table in DVD that most closely describes the decedent before his death is Table 2 for "Married males that work full-time, wife works, youngest child under age 13." Table 2 indicates that the average amount of time spent by an average father with the decedent's characteristics on household production is 13.32 hours per week. Since the youngest child is at age 10, we can anticipate that the youngest child will reach age 13 in three years, after which the table that would most accurately describe the decedent is Table 5 for "Married males that work full-time, wife works, youngest child ages 13 to 17." That table shows a time value of 14.29 hours per week.

The problem is that the family in question has both a child under 13 and a child between the ages of 13 and 17. Based on the youngest child, the value is smaller when the youngest child is less than 13 years old. However, surely the existence of a younger child does not reduce the time cost for providing for the older child. While it isn't logical or correct, an estimate based on the DVD Tables shown would surely be more reasonable than relying on the very limited table in the Clairetie paper. Using the Clairetie paper, the only considerations to be taken into account were the father's age cohort and whether the father was in the category of "Male Employed" or the category of "Male Not Employed." With DVD, the facts that the decedent was married, that there were children in the home, and that the wife was employed full-time or part-time or a full-time homemaker could all be taken into account.

There is also another factor to consider. "Children younger than 13" presumably require more "child care" than children over the age of 13. That information is provided in DVD. If the decedent was the husband, Table 2 for the youngest child under 13 shows 6.97 hours per week for caring and helping of household children. Table 5 is for "youngest child between 13 and 17." Table 5 shows 1.48 hours per week for "caring and helping of household children." If the decedent was the wife, Table 22 for the youngest child under 13 shows 10.31 hours per week for caring and

helping for household children. Table 25 is for “youngest child between 13 and 17.” Table 25 shows 2.23 hours of caring and helping for household children. Thus even though what is listed as “household production” is smaller when the youngest child is under age 13, the same is not true when “caring and helping” for household children is added to “household production.”

The real message to forensic economists should be that a thorough understanding of the source being used is very important.

The Retirement Problem with Using ATUS to Measure Household Services

The final problem to be discussed relates to retirement. Retirement fundamentally changes a person's lifestyle in a way that has potentially dramatic influences on both the amount of time spent providing household services, the implicit market value of that time, and on the purpose of time recorded as being spent in the process of providing household services. When a person retires, a great deal of time that was previously spent in the workplace becomes available for other uses.

From *DVD: 2009 Dollar Valuation*, an average married male who worked full-time with no children in the home under age 18 (Table 7) spent 44.66 hours per week “working at job” and 4.61 hours per week “commuting to work or school.” That person may also have had up to an additional 5.0 hours per week during lunch periods. Upon retirement, between 50 and 60 hours per week of time is no longer needed for activity related to his employment. DVD also shows that the average married male who worked full-time used 3.80 hours for grooming, 0.57 hours for personal health care and 55.89 hours per week sleeping. Those three categories total 60.26 hours. If 60 hours per week are subtracted from 168 hours in a week, 108 hours remain for other activities. If 54 hours per week are allocated to employment, the time available for all other activities is reduced from 108 to 54. In perspective, retirement approximately doubles time available for all other activities. Retirement means approximately doubling the amount of time available to such a man.

Another effect of retirement is that income available for all types of consumption drops. Most people who retire do not maintain the ability to go back to work at earnings rates they had before retirement. As a result, people may substitute expenditures of time for expenditures of money after retirement. Retired persons may provide household services that they previously hired others to provide for them. More time can be spent shopping to reduce costs. Gardens can provide vegetables that were previously purchased, and so forth. Still another effect is that some retired people downsize living arrangements that they no longer

need as many household services as before retirement.

A person who stays at home for more hours per week may create a greater need for cleaning. However, the increase is not in proportion to the amount of extra time that is now available. Cooking may take longer, but often that is because people choose to spend more time cooking. More time is likely to be spent on gardening and other lawn work, but much of that activity is recreational in nature. More time may be spent shopping to reduce expenses, but shopping also has important recreational elements. More time may be spent caring for pets because pets are being taken for longer walks or otherwise given more attention. All of these changes suggest that hours listed in a time-use survey as being spent on activities identified as household services have become an even more imperfect proxy for the household service output values that we cannot directly measure. If the value of household services continues to be based on hours provided times some measure of commercial market wage rates, the percentage of the values that truly represent needed household services falls significantly after retirement.

Some indication of the problem this poses can be seen by looking at the total amount of household services shown in *DVD: 2009 Dollar Valuation* for a retired husband and wife as compared with the amounts that are shown when the husband and wife were both working full-time. Table 6 is for “Married males that work full-time, wife does not work, youngest child ages 13-17.” The amount of time shown for household production is 12.40 hours per week. Table 17 is for “All married retired males, living only with wife. The amount of time shown for household production is 21.75 hours per week. It makes no sense that a married male who works full time and has a wife who is not employed in the commercial labor market, but who has at least one child in his home between the ages of 13 and 17, provides only 57.01% as many household services as another married male who has retired and lives only with his wife, presumably both of whom are presumably in their 60s.

One might guess that perhaps the answer lies in household services provided by the non-working wife, and a partial explanation may come from this guess. Table 36 is for “Married females that are not in the labor force and not disabled, youngest child ages 13 to 17.” Time shown for household production is 40.03 hours. Table 40 is for all married retired females living only with husband. Time shown for household services is 30.59 hours per week. Taken at face value, this suggests that a working husband and a wife not employed in the commercial marketplace with a teenager in the home require a total expenditure by husband and wife of 12.40 hours from the husband plus 40.03 hours from the wife, for a total of 52.43 hours per week of household production. A retired male plus a retired

female in their 60s with no children in the home require a total time expenditure of 21.75 hours from the husband plus 30.59 hours from the wife, for a total of 52.34 hours. This would suggest that having a teenager in the home requires additional household services of only 0.09 hours or 5 minutes a week of extra household services.

No simple time-use measure is reliable for measuring the household services of retired persons. Looking at the tables provided in the Clauretje paper, this problem might appear to have been surmounted. In Clauretje's Table 5, projected household services decline for all years after age 55, which would be the earliest possible age for normal retirement for all four of his categories. However, in Clauretje's tables, retirement means a shift from his "Men Employed" to "Men Not Employed" categories or from his "Females Employed" to his "Females Not Employed" categories. A shift from "Males Employed" to "Males Not Employed" between ages 55 and 59 results in an increase in his dollar values for household services from \$12,268 per year to \$16,357 per year. The same shift between ages 60 and 64 results in an increase from \$11,403 to \$15,655. The same shift between ages 65 and 69 results in an increase from \$10,147 to \$14,508.

In Clauretje's Table 5, a shift from Females Employed to Females Not Employed in the age cohort 55-59 results in an increase from \$16,132 to \$26,680. For females, a shift from Employed to Not Employed between the ages of 60 and 64 results in an increase from \$14,326 to \$24,777. For females, a shift from employed to not employed between the ages of 65 and 69 results in an increase from \$11,957 to \$22,163. Since Clauretje does not consider marital status, it is useful to consider how one would have to use his Table 5 for a married couple who retire together when the husband is at age 63 and the wife is at age 62. Before they retired, the husband would have been projected to produce \$11,403 in household services and the wife would have been projected to produce \$14,326 per year, for a combined total of \$25,729 per year in household services. After retirement, each would move from "Employed" to "Not Employed." Thus based on the Clauretje paper, the husband would now be producing \$15,655 per year in household services and the wife would now be producing \$24,777, for a combined total of \$40,432 per year of household services. An increase in needed household services of that magnitude does not make much sense.

Accounting for the Rest of a Decedent's or a Plaintiff's Time

Brian Speicher (2008) provided a note about the uses of ATUS by forensic economists that points in a different direction. ATUS and DVD not only provide information about "household production" and "caring and helping," but about 24 hours of the day of an average

person in each demographic category being considered relevant to a decedent or surviving injured plaintiff. Speicher's point was that one cannot simply assume that the plaintiff would have spent whatever amounts of time that appear in ATUS and DVD for that demographic category because there may be important ways in which time use by the decedent or plaintiff differed from average time use of other persons in that demographic category. Speicher's examples were taken from the 2006 ATUS time use report, but the example below will be based on the DVD 2009 *Dollar Valuation*.

In Table 2 for "Married males that work full time, wife works, youngest child under age 13," DVD 2009 *Dollar Valuation* lists 13.32 hours per week as the average time-use for "household production." Assume that in a given case a husband was allegedly wrongfully killed and his widow is suing for wrongful death damages on behalf of herself and her two minor children. The 13.32 hours for household production from Table 2 cannot be used without considering how well the decedent husband fit the 24 hour per day profile indicated for the demographic category in Table 2. Table 2 indicates that an average person included in that table spends 45.82 hours per week on "Work and Education." However, assume that the widow's deposition transcript and other documentation indicate that her former husband had a 40 hour work week, but that he averaged 12 hours per week in overtime. Her deposition also indicates that his travel time to and from work was 30 minutes each way, or one hour per day. If that information is assumed to be correct, her husband worked 52 hours per week, where the average in Table 2 is 41.81 hours per week. In addition, her husband spent 5.0 hours per week commuting to and from work, where the average in Table 2 is 3.72 hours per week.

Thus, where the average person in Table 2 spent 45.53 hours per week working and commuting to and from work, evidence indicates that this decedent was spending 57 hours per week working and commuting to and from work. This is a difference of 11.47 hour per week that must be accounted for. A week has 168 hours. This decedent's extra 11.47 hours per week more than the average for work and commuting to and from work must be offset by a reduction equaling that number of hours from some other time use category. The average person in the category used 30.35 hours per week for leisure, but it is not credible to assume that the extra 11.47 hours per week came from reduced leisure unless there is actually evidence to that effect. Absent specific evidence the most reasonable approach would probably be to make any other relevant adjustments and then reduce other categories proportionately. For example, Table 2 shows 0.29 hours per week being spent on educational activities. If there is no evidence that the decedent was spending any time on educational activities, the 0.29 hours can

be used to reduce the 11.47 of extra work time hours to 11.18 hours. However, it is likely that the remaining 11.18 hours will mean that this decedent's time spent providing household services should be reduced by some amount. If this has not been considered, an expert who has relied upon 13.32 hours per week for this decedent can be put into an awkward position.

Conclusion

The ATUS has added a great deal to the field's understanding of the amounts of time used in the production of household services within households. The development of DVD as a derived data source from the ATUS has been a major improvement over what had existed before ATUS. While the Clauretjie paper is weaker in a number of ways than DVD, it also provides useful information about time use by age category in the production of household services that is not available in DVD. However, any measurement system that measures outputs using imperfect valuation of inputs is much weaker than other data forensic economists rely upon for most of their calculations. Common sense must be applied in how any data is used. That is especially true for time-use data when used as a proxy for measuring the value of the output of lost household services.

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