

# What can we learn from time-use data?

*Data on the ways in which people allocate their time among daily activities can be used to answer questions on a broad range of economic and sociological issues*

Mary Joyce  
and  
Jay Stewart

The study of economics often is concerned with optimal decisionmaking in the face of some sort of constraint. Economist Thomas Juster has argued that the ultimate constraint on human activity is time.<sup>1</sup> We are each given 24 hours per day to devote to competing uses, and how we use that time has important implications for our financial security, health, emotional well-being, and general level of happiness. Time-use surveys attempt to measure the numerous and diverse ways in which people use those precious 24 hours.

Time-use data could contribute to research and policy analysis in a number of areas. One area that has recently received considerable attention is the prospect of measuring and valuing unpaid but productive activities (that is, nonmarket work) with the ultimate goal of including the value of these activities in a satellite account of the National Income and Product Accounts. Although the valuation of nonmarket work has been the primary political impetus behind the collection of time-use data, it is by no means the only use of these data. In this article, we discuss some of the many research applications of time-use data.

## National estimates

Perhaps the most fundamental application of time-use data would be to provide nationally representative estimates of the amount of time that Americans spend in various activities. The types of activities that could be captured include: pro-

ductive nonmarket activities such as housework; home maintenance and repairs; child care and care of elderly and disabled persons; leisure activities such as watching television, reading books or magazines, pursuing hobbies, and socializing with friends; and nonproductive, nonleisure activities, such as waiting in line and commuting.<sup>2</sup>

If time-use data were combined with demographic information, such as that available from the Bureau of Labor Statistics Current Population Survey (CPS), it would be possible to compare time use across different groups. For example, analysts could compare time spent in housework and child care between men and women; time spent on educational activities between students and nonstudents, or between students at different grade levels; time spent on leisure activities between single and married parents; time spent watching television between persons in families of differing earnings and income levels; and time spent cooking and cleaning between persons with differing levels of market work. Conducting a time-use survey on an ongoing basis would allow researchers to study how the time spend in various activities changes over time.

The availability of national time-use data would also facilitate comparisons of time-use patterns in the United States with patterns in other countries. In addition to comparing measures of material well-being such as GDP, analysts could also study how Americans fare on such nonmaterial dimensions as hours of free time.

Mary Joyce and Jay Stewart are economists in the Office of Employment Research and Program Development, Bureau of Labor Statistics.

## Valuing nonmarket work

A long-standing criticism of the U.S. National Income and Product Accounts is that they count only productive activities that take place in the market economy and ignore productive activities that take place outside the market, particularly those done in the home. In recent years, there has been renewed interest, particularly among women's groups, in placing a monetary value on nonmarket work. The 1995 United Nations Fourth World Conference on Women stated in its Platform for Action (item 206) that "national, regional and international statistical agencies should measure, in quantitative terms, unremunerated work that is outside national accounts and work to improve methods to assess and accurately reflect its value in satellite or other official accounts that are separate from but consistent with core national accounts."<sup>3</sup>

Aside from putting a dollar figure on household work, accounting for the value of nonmarket production would provide a more comprehensive picture of aggregate output, income, and productivity in the United States. For example, the increase in women's labor force participation has resulted in a shift from nonmarket work to market work. This increase in market work caused measured gross national product and per capita income to rise, resulting in a somewhat distorted picture of the trends in aggregate production and income because the accompanying decrease in nonmarket work was never accounted for.

Valuing the time spent in nonmarket activities will undoubtedly be challenging and controversial. A key conceptual issue in measuring nonmarket work is deciding on exactly what should be measured. In order to distinguish between productive and personal activities, the "third person criterion" often is used. Under this criterion, an activity is deemed productive if it could be delegated to someone else while achieving the desired result. For example, preparing a meal would be considered nonmarket work, but eating it would not be.<sup>4</sup>

After deciding which activities are productive, the next step is to place a value on these activities. This valuation can be done a number of ways. One approach, known as the output approach, involves identifying the outputs (that is, goods or services) that result from these productive activities and then assigning a price to those outputs. Although this approach is conceptually closer to the way market goods are treated in the National Income and Product Accounts, data availability issues make it difficult to implement in practice.<sup>5</sup> A second approach, known as the input approach, requires an estimate of the amount of time spent in productive activities that is then multiplied by a wage rate. The time spent in nonmarket work can be readily obtained from a time-use survey, and the wage rate can be imputed in a number of ways.

To illustrate, consider the simple example of building a deck for a house. Three possible wage rates could be used to

value this activity: (1) an individual's wage rate at his or her job, (2) a "specialist" wage rate (that is, the average wage for carpenters), or (3) the "generalist" wage (the average wage for handymen). Although there are advantages and disadvantages to each, most analysts use the "generalist" wage.<sup>6</sup>

There are three drawbacks to the input approach. First, as with market work, the time spent in an activity may not be a good indicator of the value of the output produced. For example, someone who has never built a deck would take longer than someone with more experience to build a deck of similar quality. Second, the choice of wage rates used to value various activities is somewhat arbitrary. Finally, many types of nonmarket activities are performed simultaneously with other activities (for example, providing child care and watching television) and researchers have not yet reached a consensus on how to value the time spent doing simultaneous activities.

## Verifying and interpreting existing series

Time-use data can also aid analysts in verifying data that currently are collected in a number of surveys. Data on hours worked provide an example. It has been noted by researchers that, over the past 20 years or so, average weekly hours as measured by the Current Employment Statistics survey (CES), a BLS establishment survey, have declined, while average weekly hours in the CPS, a BLS household survey, have remained fairly constant.<sup>7</sup> This discrepancy has called into question the accuracy of hours worked data reported in household surveys such as the CPS.

John Robinson and Ann Bostrom compared hours worked measures obtained from time-diary data with those obtained from a CPS-like question.<sup>8</sup> They found that respondents tended to report more hours worked in the CPS-like question than in time diaries, that people who worked more hours tended to overreport by a larger amount, and that overreporting increased between 1965 and 1985. However, Jerry A. Jacobs, using data from the 1992 National Survey of the Changing Workforce, found that the CPS-style measures of the workweek correlate well with a new measure of work time derived from questions that ask for departure and return times to and from work (less commuting time).<sup>9</sup> Jacobs also argued that the discrepancy between the time-use diaries and CPS estimates of the length of the workweek may be a statistical artifact resulting from random measurement error in both measures. Conducting a time-use survey would be a useful way of studying whether respondents tend to overreport hours worked in the CPS survey.<sup>10</sup>

Similarly, existing information on the time spent commuting could also be verified with time-use data. National data on hours spent commuting typically come from a standard survey question that asks, "How many minutes does it usually take you to get to work?" This question was asked in the 1990 Journey to Work Survey conducted by the Census Bureau as

part of the decennial Census. These data could be compared to those obtained from a time-use survey that collects information on start and stop times for all activities, including traveling to work.

Time-use data could also be helpful in interpreting price index data. It has been argued that part of the reason that inflation has been so low is that consumers have to wait more for some services and that they shop around more for bargains. For example, health maintenance organizations typically charge less than fee-for-service health plans, but their patients also typically wait longer to see a health-care provider. This reasoning implies that people are increasingly substituting time for money.

A time-use survey that is linked to an expenditure survey, such as the Consumer Expenditure Survey, would make it possible to attach a “time cost” to specific goods and arrive at an alternative price index. In the absence of this linkage, time-use data collected over multiple periods could shed light on trends in these types of time expenditures. For example, a stable inflation rate of, say, 3 percent per year may indicate inflationary pressures if consumers are, in actuality, spending increasing amounts of time waiting or shopping for bargains.

## Measuring real income and well-being

Typically, analysts use quantifiable measures, such as real income or earnings, to assess changes in the quality of life over time. Collecting information on time use would permit a more complete assessment of changes in quality of life. For example, stories in the popular press report that some individuals have quit high salary jobs that require long working hours to take lower paying jobs with fewer hours. While these people consider themselves “better off,” any objective measure of income or earnings would indicate that these individuals are “worse off.” Data from a time-use survey that is linked to a household survey, such as the CPS, would permit analysts to account for the increase in nonmarket production and leisure time when assessing changes in quality of life.

A broader income measure also would improve analysis on earnings and income inequality, both of which have increased in recent years. However, analyses that ignore home production and leisure may be misleading. This point also applies to the measurement of poverty. With time-use data, it is possible to measure a family’s command over a broader set of resources.

## Education and training

One important form of investment for any society is the amount of time and resources spent by both children and adults in learning activities. Many learning activities, particularly among young children, take place at home rather than in formal educational institutions. A time-use survey, particularly one that collects diaries from or about children, can provide information on the amount

of time that preschoolers spend reading or interacting with parents and the amount of time that school-age children spend doing homework. Comparisons, both over time and across countries at a point in time, of the time spent in these learning activities would be informative.

## Policy and business cycle changes

At present, we know a great deal about how policy changes affect individuals’ labor market behavior. For example, higher income taxes tend to reduce labor supply. But little is known about how government policies affect the way individuals spend their nonworking time. Do they engage in more nonmarket production or do they consume more leisure? Time-use data can shed light on this issue.

If time-use data are collected on a continuous basis, as are CPS data, analysts could examine how time-use patterns change over the business cycle. For example, during recessions, do people shift from take-out meals to home-cooked meals, or from purchased laundry services to doing their own laundry? Time-use data could also be used to study how unemployed persons use their time—how much time is spent on job search, retraining and education activities, nonmarket production, and leisure? Time-use among the nonemployed could also help refine our definitions of a “discouraged” worker.

## Business and legal applications

Marketing is one area of business that would likely be interested in time-use data. Marketers could use this information to determine how time spent in various activities (for example, television viewing, radio listening, shopping, eating out) differs by demographic characteristics, earnings, and income.

Time-use data also have legal applications. For example, these data might be useful to those estimating the economic damages in personal injury and wrongful death cases. Typically, economic damages primarily include lost earnings. The value of home production either is omitted from the valuation, is based on old survey data, or is created from the survivors’ estimates of nonmarket production. Time-use data on a nationally representative sample would provide a more complete picture from which to estimate the economic loss associated with an injury or wrongful death.

## Timing of activities

In addition to providing information on the duration of time spent in various activities, a time-use survey also captures what time of day and in what sequence these activities take place. Such information could be used in a variety of research applications. For example, data on when and how much people sleep could be used by researchers interested in studying sleep patterns. Data on when people work could be used to deter-

mine the wage premium required to compensate workers for working at undesirable times. Psychologists also could use time-use data to study the degree and nature of multitasking. What types of people typically do more than one thing at a time? What types of tasks usually get grouped together?

BECAUSE TIME-USE SURVEYS COLLECT information on all the activities that individuals engage in during a 24-hour period, time-

use data are remarkably wide in scope. Availability of such information would allow researchers to answer a host of questions that have long been neglected for lack of data to address them. In this article, we have listed some of the potential applications of time-use data. Undoubtedly, we have only scraped the surface. As Rebecca Blank, an economist at the Council of Economic Advisors, stated it at a recent National Academy of Sciences conference: "After having time-use data, researchers will wonder how they ever did research without it." □

## Notes

<sup>1</sup> See F. Thomas Juster, "Time Use Data: Analytic Framework, Descriptive Findings, and Measurement Issues," Paper prepared for the Workshop on Measurement of and Research on Time Use, National Academy of Sciences, Washington, May 1999.

<sup>2</sup> See the article by Linda Stinson elsewhere in this issue for a detailed description of various activity classification systems that have been used to capture the ways in which people spend their time.

<sup>3</sup> See United Nations, *Platform for Action, Report from the Fourth World Conference on Women* (Beijing, United Nations, September 1995), also on the Internet at [www.undp.org/fwcw/dawoff.htm](http://www.undp.org/fwcw/dawoff.htm)

<sup>4</sup> The third person criterion is the most general criterion used to distinguish unpaid work from personal activities. However, Statistics Canada and International Research and Training Institute for the Advancement of Women have developed other criteria that are used to qualify the third person criterion. See Statistics Canada, "Household Unpaid Work: Measurement and Valuation," Catalogue No. 13-603E, No 3 occasional (Ottawa, Statistics Canada, 1995); and International Research and Training Institute for the Advancement of Women, "Measurement and Valuation of Unpaid Contribution: Accounting through Time and Output" (Santo Domingo, Dominican Republic, 1995)

<sup>5</sup> Duncan Ironmonger argues for the construction of national household accounts that would be completely separate but analogous to the national income and product accounts (which he would believe should be renamed the national market accounts). These accounts would not only measure outputs from household production but also households use of labor, capital, and intermediate materials. In order to construct such accounts, he argues, three types of household surveys are essential: household time-use surveys, household expenditure surveys, and household output surveys. According to Ironmonger, the latter has not been done by any national statistical office. See Duncan Ironmonger, "National Accounts of Household Productive Activities," Paper prepared for the Conference on Time Use, Non-Market

Work, and Family Well-Being, Bureau of Labor Statistics and the MacArthur Foundation, Washington, November 1997.

<sup>6</sup> See Luisella Goldschmidt-Clermont, "Monetary Valuation of Non-Market Productive Time: Methodological Considerations," *Review of Income and Wealth*, series 39, no. 4, pp. 419-434; Chris Jackson, "The Valuation of Unpaid Work—A Canadian Perspective," Paper prepared for the Conference on Time Use, Non-Market Work, and Family Well-Being, November 1997; and Steven Landefeld and Stephanie Howell, "Accounting for Nonmarketed Household Production within a National Accounts Framework," mimeo. April 1999.

<sup>7</sup> See Katharine Abraham, James Spletzer, and Jay Stewart, "Divergent Trends in Alternative Wage Series," in John Haltiwanger, Marilyn Manser, and Robert Topel, eds., *Labor Statistics Measurement Issues* (Chicago, University of Chicago Press 1998); and John Robinson and Geoffrey Godbey, *Time for Life: The Surprising Ways Americans Use Their Time* (University Park, PA, Pennsylvania State University Press, 1997). Note that the levels of the two measures are expected to differ because they measure different concepts (hours worked in the CPS and hours paid in CES). However, this should not affect the trends.

<sup>8</sup> See John Robinson and Ann Bostrom, "The overestimated workweek? What time diary measures suggest," *Monthly Labor Review*, August 1994, pp. 11-23.

<sup>9</sup> See Jerry A. Jacobs, "Measuring time at work: are self-reports accurate?" *Monthly Labor Review*, December 1998, pp. 42-53.

<sup>10</sup> There are two drawbacks to using time-use data to verify CPS hours, however. First, time use is measured during one 24-hour period, so that comparisons would only be made possible by constructing synthetic workweeks. Second, the effect of proxy reporting in the CPS, which may account for some of differences between household labor force information and time diary data, could not be determined.