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Occupational Differences in Estimates of Time at Work

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OCCUPATIONAL DIFFERENCES IN ESTIMATES OF TIME AT WORK

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ABSTRACT

National time-use studies prior to 2003 have paid little attention to respondent occupation as a predictor of daily activity, mainly because minimal research effort had been expended to ask and code occupation questions. In the ATUS data collection starting in 2003 by the Bureau of Labor Statistics (BLS), on the other hand, occupation is of central concern. In this article, occupations are identified an important determinant of paid work time. Respondents classified as in managerial and farm occupations estimated they spent most time at work (45+ weekly hours), while those in food, health and other service jobs reported the least (under 38 hours). This article examines the ATUS diary hours reported at paid work and confirms that these same occupations also report most time at work in their time diaries.

At the same time, these diary work hours are slightly lower than their work hour estimates, and these disparities between diary- and estimate-based figures are also significantly related to occupation. While the disparities are decreased after multivariate adjustment for respondent age, income and other demographic predictors of hours at work, they still remain significant. Middle-income, middle-aged and married respondents reported higher disparities. Disparities within more specific occupations are also identified, with police officers, school teachers and lawyers showing greater disparities. Overall, occupation differences seem as important as income in predicting hours at work.

1 INTRODUCTION

In the American Time-Use Survey (ATUS), a national cross-section sample of the US public provides a complete accounting of what they do on a particular day. This represents a great step forward in social science understanding. Its strict respondent selection standards, large sample size, continuous monitoring, elaborate coding scheme, replicated field procedures and wide availability are among its notable methodological strengths.

One as of yet unexploited ATUS features is its detailed and elaborate breakouts by respondent occupation. In previous US time-use studies, little or no attention has been paid to reporting of respondent occupation, and almost no effort was expended to ensure that when occupation questions were asked, they were asked and coded in a detailed and comparable manner. In the ATUS, on the other hand, occupation is of central concern to its sponsor, the Bureau of Labor Statistics, which pays extremely close attention to this background variable and has decades of experience in ensuring its careful and detailed capture in the ATUS data files.

This also presents a new research opportunity to learn more about a possible predictor of how much time is spent at work in time-use analysis and for public policy concerns. Much attention has been paid to, and explanatory power received from, the other two measures of a respondent's social status, namely education and income. For example, in his depiction of "Veblen in reverse", Gershuny (2009) found a widening gap between college- and less-educated workers in several countries, much as Aguiar and Hurst (2009) have found in the U.S.**.1/** There is also an important connection of work hours with income, in that one obvious way to increase one's income is to work more hours. This has become relevant in the context of the many authors who have expressed concerns about *Overworked Americans*. (Schor 1991), *Busy Bodies* (Burns 1993), *Fighting for Time* (Epstein and Kalleberg 2004), *Work to Live*(Robinson 2003), *Take Back Your Time* (de Graff 2003), *Busier Than Ever* (Darrah et al. 2007) in their shorthand titles connoting increasing work or time pressure in American society. **2/**

A distinct reason for interest in this topic is the concern about workers who genuinely have relatively long standard hours, as identified by traditional workhour estimate questions in government and other surveys. These concerns emerged quite early in the analysis of time-diary survey analysis (e.g., Hoffman, 1981, Niemi, 1983, Robinson and Bostrom, 1994). **3/** They were then countered by authors who tried to explain such disparities simply in terms of the "regression to the mean" phenomenon (Jacobs, 1998; Jacobs and Gerson 2004; Frazis and Stewart, 2004) **4/**, a puzzling argument insofar as the questionnaire and diary estimates in this case are virtually simultaneous and not in any panel or predictive context in which such regression takes place. While there remains the possibility that specific groups properly claiming long hours of paid work may nevertheless overestimate their hours at work. However, since the selection of diaries as the method of choice in other fields (such as nutrition and money expenditure) to overcome parallel problems/issues of social desirability and of other biased responses makes the relative neglect of diary evidence for this purpose appear more questionable.

We might, in particular, expect variations in working arrangements (especially in the regularity of work starting and stopping times, and in the degree of employer supervision

of these hours). Moreover, the work-time arrangement for payment, either by employers or customers -- are likely to have implications for respondent knowledge of their own work hours, and hence their ability to answer estimate questions items accurately. These work-time arrangements, as well as their honorific, stigmatizing and social desirability connotations, are thus likely to vary systematically between different types of occupation.

The ATUS time-diary data:

This article addresses many of these concerns by applying the detailed BLS occupation codes available in the ATUS questions about hours at work. Its central measure of interest is the hours of paid work that ATUS respondents both estimate and report in their retrospective diary accounts of what they did across the 24 hours of the previous day. These diaries are open-ended accounts of all of a worker's daily activities, and their beginning and ending times, in sequential order across that day. In that way, the diary preserves the important "zero-sum" feature of time, that is, if aggregate time on one activity (like TV) increases, it must be "zeroed out" by decreases in work, sleep or other activities..

These open-end diary accounts, consisting of about 20 activities respondents report across the previous day, are then coded into one of 450 categories of time use, which are the recoded into broader categories like paid work, child care, personal hygiene or TV viewing. As noted above, central interest in this article is on diary time reported and coded as paid work, although previous articles based on ATUS data have tended to focus on differences in details of family care (particularly child care), meal times and travel during the day. Further information on procedures for and availability of data in the ATUS can be found at *atus/bls.gov* and in Abraham et al. (2006). **5/**

These time expenditures can then be analyzed as a function of the rich set of potential predictors of time available both from the ATUS interview itself, and from the 8-wave panel of Current Population (CPS) surveys that preceded it. These had collected details of respondent employment and unemployment situations, including the two types of "work estimate" questions that BLS regularly and historically has employed to measure hours at work, one asking about "usual" hours at work, the other about "actual" hours worked in the previous week. In the ATUS survey, that usual hours question was repeated for respondents who had changed their work schedules since the final (eighth) CPS interview (usually conducted about 3 months prior to the ATUS interview). The CPS and ATUS also collected other details about respondent personal background (like gender, age and income), family situation (like household size and presence of children) and location (like region, type of household dwelling). Adjustments for five of the more important of these predictor variables are included in the following analyses.

2. RESULTS

The main focus and structure of this article is summarized by Tables 1 and 2. Table 1 (as throughout this paper, reported by respondents aged 20-59) provides basic descriptive statistics for hours of work in each of 22 broad occupational categories. Columns 1-3 show average hours and standard errors of questionnaire-derived estimates of paid work per week for each of the three estimate questions: the ATUS "Usual" hours in column 1 (WK1), CPS "Usual" hours in column 2 (WK2) and CPS "Actual" hours in column 3 (WK3).

Column 4 then shows the average diary hours of *weekly* work for all people in that same occupation (plus their standard errors), as extrapolated from the ATUS daily diaries (i.e.; weighted so that each day of the week is equally represented and multiplied by 7). The result of this procedure is that the mean should be identical to a hypothetical equivalent calculated from a 7-day diary, but with a much higher variability, since there will be underestimated week equivalents from short-work or non-work days and overestimated week-equivalents from normal or long workdays. (It should be noted that these extrapolated estimates were verified by close matches with figures from the BLS annual press release tables on diary hours at work).

The three "estimate" columns in the left side of Table 1 are slightly different in their averages, with the ATUS usual hours being highest at 42.4 hours and the CPS actual hours being lowest at 40.0 hours. Nonetheless the three questions all agree that managers and executives and farm workers (as distinct from farm managers and owners in general who are under the manager category in this table) estimate the longest work hours at, or approaching, 45 hours per week, while food, maintenance and personal service workers are lowest at 36-37 hours per week.

Between these extremes, one also finds consistently higher work hours among those in engineering, construction and in other manual jobs, with lower than average work hours for those in maintenance and office workers. For other occupations, the picture is more mixed, with workers in legal and protective occupations estimating above average work hours, but below average hours in their diaries. Those in education also report lower diary work hours in relation to their estimated hours. For example, the estimated work hours for these three groups average about 5 more weekly hours (in column 3) than in the diary (column 4), groups that are of particular interest in the following analyses. Nonetheless, Table 1 generally confirms the view that workers in these same occupations also report most time at work in their time diaries. It also reinforces the important role of occupation in predicting hours at work.

Disparities between estimate and diary figures:

The first three panels of Table 2 show the occupation-specific mean disparities between estimate and diary hours in Table 1, together with their standard errors. They are the disparities between each of the estimates in columns 1 to 3 of Table 1 and the time reported in the diaries in column 4 (for these same occupations). The CPS "actual" estimate in column 3 is the most conservative (generally the lowest) and may be the most appropriate comparison figure to the diary, since

it refers to a specific period of time or reference point. (Positive numbers mean that the estimated hours were higher and negative numbers mean that the diary hours were higher).

The final three panels in Table 2 show equivalent multivariate regression coefficients taking other predictors (shown in Table 3) into account. The dependent variable in these three equations is in each case the difference between the questionnaire estimate and the diary paid work time estimates whose means are in panels 1 to 3. We use standard OLS (SPSS version 16) OLS dummy variable (0/1) regression. Panels 4 to 6 thus give the coefficients associated with the 22 occupational categories, adjusted for the five non-occupational demographic predictors of work hours (whose effects are then next analyzed in Table 3 below). Note that the occupational regression coefficients in these columns are all expressed relative to the reference or default occupational category "Sales and related" occupations, a group selected because its CPS actual estimate has a mean unadjusted gap close to zero hours. As a result, the regression coefficients in this latter group of three panels provide intuitively straightforward comparison groups for the simple mean occupational gaps, in the form of estimators of the gap adjusted for the non-occupational predictors.

In general, the Table 2 multivariate results confirm what stood out in Table 1, namely that the greatest disparities between estimated hours and diary hours are found for those in protective, legal and education fields. Moreover, in each case these suggest are significant *overestimates* in hours worked. Significantly higher estimates are also consistently found for other occupations, like personal care and office workers, but these are only about half as large as the overestimates for protective, legal and education fields.

There are some occupations in Table 2 that show the opposite pattern, namely estimates that are lower than reported in diaries, like those in primary health care and artistic occupations, but these are inconsistent or irregular, and only sporadically significant. The predominant pattern is for work hour overestimates, particularly clustered in a few occupations. This is to be verified in the more detailed occupations within these professions in Table 4, but we first review the major demographic predictors underlying the disparities found in Table 2.

Other demographic predictors

Table 3 shows that, while many of the non-occupational categories have significant effects, few have a particularly strong association with the occupational disparities in estimated vs. diary work hours. More specifically, the average disparities across occupational categories seen in Table 2 are slightly higher for women than for men, as reflected in the reduction in the "woman" effect once occupational controls are introduced. The disparities for age are similar with and without controls, but Table 3 shows an inverted-U relation with age; people in mid-age overestimating work hours by about 1 hour/week, where both the very youngest workers (less than 25 years) and the very old (57-60) underestimate to a somewhat smaller extent. There is a substantial difference for education coefficients, once occupation is added, indicating that much of the difference between panels 3 and 6 in Table 2 is to be explained by educational differences associated with occupations. But the income effect in Table 3 appears to be pretty much unchanged by the introduction of occupational categories, indicating

that this is not a major source of the changes between the simple mean occupational gaps and the regression estimates of occupational gaps in Table 2.

More detailed occupation groupings

The ATUS has a more detailed elaboration of categories nested within the 22 categories in Table 1. Several of these have relatively larger numbers of respondents (here over about 200 respondents) from which to make estimates for more fine-grained analyses. Some 63 of these are listed in Table 4, along with their sample sizes, estimated work hours, diary work hours, and the disparities between estimate and diary averages. In general, these disparities remain after regression adjustment for the same five demographic predictors in Table 3 for these factors -- much as in the display and procedures employed in connection with Table 2.

It will be remembered that the largest questionnaire/diary disparities in Table 2 were found for workers in the legal, education and protective occupations. In Table 4, it becomes possible, for example, to separate lawyers from paralegals and other support staff. Table 4 shows that, after adjustment for the non-occupational determinants, the major disparity is found among lawyers themselves (+7.2 hours) and not their supporting staff (-0.4 hours). In the case of workers in education, on the other hand, a notable disparity is found across virtually all groups of teachers, ranging from +8.1 hours for those teaching in elementary school vs. college teachers with their +2.0 hour discrepancy. In the case of protective workers, only police officers and security guards have sufficient samples to compare, and here it is the police who show the greater disparity (+10.3 vs. +6.3 hours per week).

Some of the occupations with the largest disparities in Table 4 are found within the first category of managers in Table 1. For example, chief executives and medical managers are above average (at +3.3 and +5.4 hours) in their estimates vs. diary disparities, while managers at food and construction facilities actually report more work in their diaries than they estimated. Within the arts category, designers estimate 3 hours more than in their diaries. Within the lowest overall discrepancy category of food workers, waiters underestimate their work hours as lower than in their diaries and all groups of sales workers report below average disparities. Hairdressers are also above average in reporting 5-hour higher estimates than diary work hours (though when other non-occupational factors are accounted for, this becomes a similar-sized under-estimate).

While farm laborers (along with managers) report high unadjusted diary work hours, their disparities in estimates with the diary are negative once non-occupational variation is added to the regressions equation.

A note on the work hours of lawyers, doctors and other workaholics

No analysis of occupational work hours would be complete without some examination of the work hours of lawyers, doctors and other high-paid workers. A legend has emerged

around the 80+ workweeks of lawyers in particular, with perhaps even longer work hours for doctors on 24-hour call. Such high estimates may be what they report to friends, neighbors or other colleagues, but that is not what they report to Census Bureau interviewers. Less than 2% of lawyers report they worked more than 80 hours in the preceding week, and only about 15% reported 60 hours or more. On the other hand, more than 10% of doctors report more than 80 hours (topped only by farmers, not farm laborers, at 12%), another 28% of doctors said they put in more than 60 hours.

As noted the diary figure in Table 4, the doctors' claimed hours are the highest in the table -- but still they are only 1.3 hours above the hours in their diary records. By contrast, lawyers claimed 44 work hours for the preceding week, or more than 7 hours greater than their diary reports, which were hardly changed after adjustment for other predictors, and which are about five times higher than the disparity for doctors. There are occupations with larger disparities (10 hours for police officers), but the lawyer overestimates are among the largest in Table 4. The even higher questionnaire estimates for farmers are much more consistent with what they report in their diaries.

In brief, then, fewer lawyers match their estimated work hours with what they report in diaries, and their 37 diary hours of work remain about average. As one colleague suggested, perhaps the 80-hour estimate would hold for junior law partners in the Washington-New York centers of power, but (perhaps fortunately) even the detailed occupation codes in the ATUS do not allow us to identify them.

3. SUMMARY AND CONCLUSIONS

Although few analysts have taken advantage of the detailed occupation codes in the ATUS, or of occupation as a predictor of time on various activities, there are significant occupational differences in both estimates of work hours and the differences in time at work reported in the ATUS time diaries. Managers and farm workers estimate up to 10 hours more work hours than those in food, maintenance and service occupations, and this holds in the work hours they report in their diaries. Moreover, these disparities generally still hold after other demographic predictors of work hours (like income and age) are taken into account. In general, then, the diary data confirm the conclusions from time estimates about occupations having longer and shorter work weeks.

There are also important occupational disparities between estimated and diary work hours, with workers in legal, education and protective occupations reporting diary work hours that are up to 6 hours lower than in their workweek estimates. Examination of more detailed occupation distinctions within the broader 22-occupation BLS categories reveals that within the legal category, lawyers report higher disparities than reported by their legal support staff. Within the protective occupations, police officers report higher disparities than security guards. In contrast, teachers at all levels of education report higher disparities, with elementary school teachers giving workweek estimates that are 8 hours greater than those reported in their diaries.

There were notable differences in groups with lower disparities as well. Food workers actually reported slightly lower estimates than that reported in diaries, and this was

particularly true for stock-clerk supervisors. That was true as well for managers in the food and construction vs. other fields. Within the arts, designers reported almost 4 hours more weekly work in their diaries than in their questionnaires.

Among five demographic predictors of these hours and discrepancies, income was found to have an effect on work hours independently of occupation. Significant occupation differences in paid work time are maintained alongside the other social-status predictor of education, with those of higher education reporting progressively higher overestimates.

The important role that occupation plays in explaining differences in work hours suggests that it may be as important in predicting other aspects of daily life covered in the ATUS. The ATUS data provide an opportunity to examine whether occupation predicts other aspects of time use, especially free time. How much activities at work "spill over" into free-time choices seems a particularly apt topic to explore with these data, as well as discriminating between occupations in all aspects of their lives after work. Do cooks spend more time preparing home-cooked meals, social workers more time helping others, health workers more time working out, mechanics fixing up their own cars and the like? The answers may lie not far beneath the surface within the rich ATUS data files.

FOOTNOTES

1/Gershuny, Jonathan (2009) "Veblen in Reverse: Evidence from the Multinational Time-Use Archive" *Social Indicators Research* (2009) 93:37-45
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2/ Burns, Lee (1993) *"Busy Bodies: Why Our Time Obsessed Society Keeps Us Running in Place*, New York: W.W. Norton.
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3/ Bonke, Jens. (2005) "Paid Work and Unpaid Work: Diary Information Versus Questionnaire Information" *Social Indicators Research* 70: 349-368.
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4/ Jacobs, Jerry A. (1998) "Measuring Time at Work: Are Self-Reports Accurate?" *Monthly Labor Review* December 8: 42-53.
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5/ Abraham, K., K. Maitland and S. Bianchi. (2006). "Nonresponse in the American Time-Use Survey." *Public Opinion Quarterly* 70(5): 676-703

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