Adjusting to Loss: Widow Time

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ABSTRACT

By age 77 a plurality of American women are widows. Comparing older (ages 70+) married women to widows in the American Time Use Survey 2003-18 and linking the data to the Current Population Survey allow inferring the short- and longer-term effects of an arguably exogenous shock—husband's death—and measuring the paths of adjustment to it. Widows differ from otherwise similar married women, and especially from married women with working husbands, by cutting back on home production, especially food preparation and housework, mostly by engaging in less of it each day, not doing it less frequently. British, French, German and Italian widows behave similarly. Widows are alone during most of the time they had spent with their spouses, with only a small increase in time with friends and relatives (except shortly after becoming widowed). They feel less time pressure than married women but are less satisfied with their lives. Most of the adjustment of time use in response to widowhood occurs within one year of the husband's death.

I.   Introduction and the Problem

Seven percent of Americans ages 25+ were widows/widowers in 2006-17. But this group consists mainly of widows: Only three percent of men in this age group were widowers, while eleven percent of women were. If we restrict the sample to Americans ages 70+, 47 percent of women were widows, but only 16 percent of men were widowers. Widowhood is the fate of the majority of women who reach their 70s— it is a central fact among the demographic characteristics of women.[1]

Despite the importance of this demographic group in the U.S. (and in other wealthy countries' populations), remarkably little research has examined the economic circumstances of this major fraction of the population of older Americans. Ethnographers and psychologists have studied widows' psychological conditions in various countries (e.g., Chenube and Omumu, 2011; articles in Jenkins, 2003; Hawkley *et al*., 2019). Some studies have examined widows' remarriage prospects and the incentives to remarry (Brien *et al*., 2004; Baker *et al*., 2004; Carr, 2004); their living arrangements (Bethencourt and Rios-Rull, 2009) and their incomes (Burkhauser *et al*., 2005). Only one small-scale study has examined how widows use their time (Hahn *et al*., 2011); and none has examined the adjustment process by which a recently-widowed woman alters her time use or spending in response to her husband's death—the dynamics of adjustment to a particular demographic shock.[2]

In this study I examine how the time use of this major demographic group—older widows—differs from that of otherwise similar married women, inferring both the size and hebdomadal distributions of the differences. With data that distinguish between newly widowed and longer-term widows, I can also study the dynamics of women's adjustment of their time use in response to the shock of becoming widowed. An immense literature in sociology and economics has considered demographic differences in spending time (summarized in Hamermesh, 2019). No study for any group, however, has examined the path of adjustment

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[1]These calculations are from the American Community Survey for those years. Even among the oldest old (ages 85+), men are less than half as likely as women to be widows/widowers. The sex difference in the incidence of widowhood pervades the entire adult life cycle (Goldman and Lord, 1983).

[2]Throughout I refer to the widow's previous partner as her husband—a male. This implicitly ignores the roughly 1.5 percent of older married women who were part of lesbian couples in the ACS 2013-17.

of time use to an exogenous demographic shock; and doing so is crucial to understanding how such shocks affect well-being beyond simply comparing welfare in two different equilibria.

With these goals in mind, Section II describes patterns of widowhood among older Americans and details demographic differences among older women who differ by marital status. Section III describes the American Time Use Survey (ATUS) data, including patterns of time use among longer-term and recent older widows and married older women. Section IV studies how and whether time use differs among these groups whose demographic characteristics differ, and it also examines whether this American behavior is observed elsewhere by comparing older married women and widows in time-use samples from France, the U.K., Germany and Italy. Section V disaggregates the largest differences into sub-categories, looks at how widowhood affects the timing of activities and uses these results to infer the structure of household production functions. In Section VI I examine how recent and longer-term older widows change the people with whom they spend their time compared to married women, while Section VII studies how widows' feelings—about being pressed for time, or about their life satisfaction—differ from those of married women. In Section VIII I infer the time path of the adjustment of time use to widowhood.

II.   The Demographics of Older American Women

Throughout this study I divide women into four groups: Widowed; married with spouse present; divorced; and other (which includes those who never married or who list themselves as single, those who are married but whose spouse is absent, and those who are married but separated).[3] I base the initial look at the demographics of older women (ages 70+) and of widows in particular on the American Community Survey (ACS) 2006-17. During these years this survey provided a sample of about 2.5 million women in this age range, more than enough to note statistically significant and often economically important differences among groups that differ by marital status.

Figure 1 presents the percentage distributions of women classified by marital status at each age over 69. At age 70 widows account for less than half as much of this population as married women. Seven

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[3]In this sample the never married/single account for 2/3 of this miscellaneous group. All the calculations using the ACS are based on the sampling weights in the public-use data sets.

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years later, widows are the plurality; and by age 80 widows represent the majority of surviving women.[4] Older American widows are less likely than older married women to have been educated beyond high school; they are less likely to be white non-Hispanics than married older women with spouses present and they are more likely to be African-American. Since we know that age and race/ethnicity are related to differences in how people use time, comparing widows' time use to others' and examining how it adjusts to recent widowhood require accounting for detailed demographic characteristics.

III.   Time Use Among Older American Women

The basic data used in what follows come from the ATUS 2003-18, provided by Hofferth *et al*. (2018). (Hamermesh *et al*., 2005, describes these data in detail.) Because the ATUS is based on diaries kept by respondents who had been included in the eighth-month outgoing rotation groups of the Current Population Survey (CPS), we can link women's marital status in the ATUS to their marital status in their fourth month in the CPS, somewhere between 14 and 17 months before the date for which they completed the time diary as part of the ATUS.[5] Linking these data allows classifying widows into two groups: Longer-term widows, those who stated in both their 4th CPS month and in the ATUS that their marital status was widowed; and new widows, those who listed themselves as married with spouse present in their 4th CPS month but as widowed in the ATUS. Throughout I compare the behavior of members of these groups to that of women who listed themselves as married with spouse present in both the 4th CPS month and in the ATUS. Older women in the divorced, never married or "other married" groups are excluded from the analysis to concentrate on the process of involuntarily leaving or having left a marriage.[6]

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[4]A graph like Figure 1 for men 70+ looks totally different. Only at age 92 does the population of widowers exceed that of married men with spouse present; and even at ages 95+ widowers barely exceed 50 percent of the sample.

[5]In the sample of older married women 18 percent of the diaries were completed 2 months after the woman's final CPS interview, 73 percent after 3 months, nearly 9 percent after 4 months and fewer than 0.5 percent after 5 months.

[6]Because the transition to divorce is hardly exogenous to the woman's decisions, I do not include divorcees in the analysis. In Appendix A, however, I include comparisons of older divorcees to widows and married older women along the dimensions analyzed in the text.

There are 16,817 women ages 70+ in the ATUS samples from 2003-18 whom I designate as belonging to Sample 1 (married spouse present or widow in the ATUS). The difficulty is that not all these women have information on their marital status at the 4th CPS month. For those who do, we can examine the transition probabilities across marital statuses over the year between that and the 8th CPS month. The transition matrix is shown in Table 1. Slightly fewer than 5 percent of married women with spouse present in this age group became newly widowed over the year preceding their selection for inclusion in the ATUS. Small fractions (of the much smaller groups) of divorced and other married women also list themselves as transitioning into widowhood, and we exclude these from further analyses.

The central feature of the transition matrix is the stability of older women's marital status over the twelve-month periods. In each classification at least 94 percent of these older women do not change marital status during the year. Most important for our purposes, 99 percent of older women who are widows remain as widows over the twelve months between CPS months 4 and 8. Almost none say that they re-married during this period. This stability of marital status is consistent with demographic evidence that a woman who is widowed can expect a long period of widowhood—12 years in the data used by Compton and Pollak (2019).

In order to argue that becoming widowed has causal effects on time use, we also need to be sure that becoming widowed is an exogenous event—one that was not expected within the year before we observe widows' time use—when the woman was still married. We cannot infer this from the cross-section data of the ATUS. Information from U.S. estate filings (Kopczuk, 2007, Table II) suggests, however, that the majority of final illnesses of men ages 70+ (who comprise the overwhelming majority, 86 percent, of spouses of women ages 70+) last less than several months. GAIN (2010, Figure 9) suggests too that the final illnesses of over 80 percent of all deaths in Northern Ireland were of 6 months or shorter duration. We can be fairly confident that the time use of married women is not altered by pre-adjustments to impending widowhood. Widowhood among older American women is the result of an unanticipated event; and as Table 1 showed, it is an absorbing state.

The absence of information on marital status at CPS month 4 reduces the usable sample to the 78 percent included in what I designate as Sample 2. Other factors reduce the usable sample still further from the 16,817 women included in Sample 1. Because some older women report being in none of the three categories—married spouse present in both CPS interviews, longer-term widowed or newly widowed—upon which we concentrate—Sample 3 is reduced to 62 percent of Sample 1. Because a few respondents list large fractions of their diary time as being included in "other activities," to avoid prorating much of a woman's time across identifiable aggregates of time use, I restrict the sample still further to construct Sample 4, excluding those women whose diary contains more than 3 hours of time in "other activities," which reduces the sample to 49 percent of Sample 1. Also, while relatively few older women work for pay, to maintain the homogeneity of the respondents, Sample 5 excludes an additional 4 percent of Sample 1 respondents who worked for pay (either reported doing paid work on the diary day, or reported having positive usual weekly workhours), reducing the usable sample to 45 percent of the original sample. Finally, Sample 6 excludes another 5 percent, those women who were item non-respondents on their family income.[7]

We know (Abraham *et al.*, 2006) that those included in the ATUS are not observationally different from those who were asked to complete a diary (were in their 8th CPS month). It is also true that there is no more sample attrition among older widows between months 4 and 8 in the CPS than among women generally: Taking outgoing rotation groups from the CPS for 2003-18, at both waves the fraction widows among women 70+ was 0.462. Widows are no less likely to persist in the CPS, and thus be eligible for inclusion in the ATUS, than other older women.

Our samples, however, may not be random from among those included in the ATUS (those women in Sample 1). To consider the role of sample selectivity across Samples 2-6, Appendix Table B1 presents estimates of probits describing the probability that an observation is included in Sample k conditional on its inclusion in Sample k-1, k=2,..., 6. Also presented is a probit describing the probability of inclusion in

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[7]Slight less than ½ percent of the widows in Sample 5 list themselves as co-habiting with another person in the 8th CPS month. Removing these women alters only minutely the results reported here.

Sample 5, the data used most in this study, conditional on being included in Sample 2. The general conclusion from this examination is that there is some non-randomness in the inclusion of observations as the sample size is restricted, but that there is no obvious pattern of relationships to objective characteristics with successive restrictions. It is true that moving from Sample 2, on which information on changes in marital status is available, to Sample 5 is not random. Rather, continued inclusion is more common for less educated respondents, for minority respondents and for women in their early 70s rather than older women. Even with the use of sampling weights throughout this study, selection into the sub-samples may affect our inferences, although the use of large vectors of covariates should remove any potential problems.

The average respondent reports time spent in only 5 percent of the more than 400 ATUS categories on a typical diary day. This level of disaggregation is not interpretable or easily usable. I therefore aggregate the categories into six major divisions: Market work; home production; sleep; other personal care; TV-watching, and other leisure activities.[8] Among respondents in Samples 3 and 4, there are five independent aggregates, but, because average time spent in market work is minute in this population, I aggregate other leisure and market work and concentrate on home production, sleep, other personal care and TV-watching. For respondents in Sample 5, to whom I pay the most attention, market work is zero on the diary day, and they report a usual workweek of zero paid hours. For them the fixed 1440 minutes per day mean that there are only four independent aggregates of time use.

The top panel of Table 2 presents for Sample 5 the means and their standard errors of time spent in various activities by new widows, longer-term widows and married women with spouse present.[9] Sleep constitutes by far the largest component of these women's time, with longer-term widows sleeping roughly one hour more per week than married older women. They watch four hours more of television per week

than other older married women and engage in two more weekly hours of other leisure activities. The two groups differ little in the time spent in other personal activities. Widows make up for the excess time spent in most of these aggregates by spending nearly seven hours per week less time in home production activities. All of these differences are highly significant statistically.

The main difference between new and longer-term widows in their average use of time is in home production, which is roughly halfway between the much larger amount spent by married women and the reduced amount spent by longer-term widows. Their time watching TV is much closer to that of married women than of longer-term widows. They sleep more than women in both other groups but spend much less time in other personal care (grooming and other personal activities).

IV.   Older Women's Time Use

The differences in the average time spent in different activities among older women classified by marital status are suggestive, but they fail to account for the demographic differences among women classified by marital status based on the ACS that were discussed above. To make these adjustments I use the ATUS data to estimate:

(1) $T_{ij} = \alpha_{j0} + \alpha_{jN} I\{\text{New Widow}\} + \alpha_{jL}I\{\text{Longer-term Widow}\} + F(X_i) , j = 1,\ldots 4,$

where i is an observation; the T_j are the time-use categories (leaving off other leisure activities, o, since for it each estimated $\alpha_{oN} = - \Sigma\alpha_{jN}$ for new widows (similarly for α_{oL} for longer-term widows) in Sample 5; the I{·} are zero-one indicators of marital status, with women married with spouse present being the excluded group; X is a vector of demographic characteristics, and the α are parameters to be estimated.

A.   General Estimates for the U.S.

The estimates of the parameters in Equation (1) using Sample 5 are listed in Table 3.[10] The vector of controls X includes indicators of five-year age ranges in this group; racial/ethnic identity, metropolitan status, and major Census region; immigrant status, day of the week, month of the year and year when the

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[10]The parameters are estimated using the STATA command *sureg* to provide estimates of the cross-equation correlation matrix of the residuals and allow testing of the cross-equation restrictions.

time diary was completed.[11] Mainly because widows are on average older than married women in this sample, the implications of the estimates of α_{jN} and α_{jL} are somewhat different from those of the means shown in Table 2. Compared to women who are currently married and had been married for at least a year before they completed their ATUS diaries, longer-term widows spend less time in home production activities and more time watching television and engaging in other leisure activities. They differ little from married women in time spent sleeping or in other personal care activities. In percentage terms the reduction in home production time represents by far the largest difference from married women's time use.

New widows also differ from currently married women. They too spend less time in home production, but they spend more time sleeping, more time in other leisure activities and less time in other personal care. The differences among the three groups in how time is spent do not arise from the restriction of our main sample to non-workers and those who spend relatively little time in "other activities:" The results are robust to the choice of samples, given that the samples are all necessarily restricted to women whose marital histories were traceable to their appearance in their 4th CPS month.[12]

While I have included long vectors of available covariates, unobservable measures might, if they could be included, alter the estimated impacts of widow status on time use. To examine this possibility, I estimate how highly correlated a set of excluded variables would have to be with the variables of interest (status as a new or longer-term widow) to vitiate the inferences about their effects on time use (thus measuring the δ in Oster, 2019). Except for those parameters that have very low t-statistics (on TV-watching among new widows, on sleep and other personal care among longer-term widows), these calculations suggest that unobservables would need to be far more highly correlated with the indicators of marital status than are the observable covariates to render the estimated impacts of marital status statistically insignificant.

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[11]Detailed geographic information, including state of residence, is also available, but including indicators for each state would, given the relative paucity of new widows in the sample, eliminate much of the sampling variation. Because the ATUS classifies respondents between ages 80 and 84 as age 80, and those ages 85+ as age 85, we cannot control for age at any greater level of detail.

[12]The cross-equation correlations of the estimated residuals in this model are statistically significant although not huge, ranging from -0.10 to -.0.28.

Employing the estimates in Table 3, I test whether the use of time within each of the three pairs of groups classified by marital status is the same. This means testing: 1) $\alpha_{jN} = \alpha_{jL}$, $j = 1, \ldots, 5$; 2) $\alpha_{jN} = 0$, $j = 1, \ldots, 5$; and 3) $\alpha_{jL} = 0$, $j = 1, \ldots, 5$. All three joint hypotheses are strongly rejected. Especially interesting are the differences between new widows and longer-term widows, the first joint hypothesis, and between new widows and married women with spouse present, the second. Despite the relative paucity of observations on newly widowed older women, they differ sufficiently in their use of time from members of the other two groups to allow strong statements about the statistical significance of these differences.

In the ACS the household incomes of widows ages 70+ averaged only 65 percent of those of married women with spouse present. Given the complementarity of income and time in household production, it makes sense to re-estimate the models in (1) using the slightly reduced Sample 6 of the ATUS. Other things equal, higher household incomes do significantly raise the amount of time spent on other personal activities and other leisure activities, and reduce time spent watching television. Their inclusion in the model, however, hardly alters the parameter estimates describing the differences in how older married women, new widows and longer-term widows spend their time.

Eighteen percent of the widows in Sample 5 (including 13 percent of new widows and 19 percent of longer-term widows) list themselves as having someone else (not a spouse) in the household. While their inclusion in the estimates in Table 3 provides the proper focus on widows generally, it also means that decision-making and household production may be more like that of married women than that of other widows. To examine this possibility, I re-estimate the equations for the five aggregates of time use excluding these widows. The point estimates of the coefficients on new and longer-term widows in these re-specifications are: Household production, -11.49 and -52.32; sleep, 6.89 and -3.47; other personal activities, -11.72 and -4.93; television-watching, 0.31 and 30.71; and other leisure, 28.23 and 21.64. While there are some differences from the estimates in Table 3, especially for the relatively sparse sample of new widows, overall the estimates are quite similar. This is especially the case for the biggest changes from the

time use of married older women, the drops in time spent in household production and the greater time spent watching television and in other leisure activities.[13]

None of the women in Sample 5 works for pay, but 10 percent of the married women have working husbands. The theory of household bargaining assumes power in a married couple is based partly on earnings (ability). Also, evidence on spending behavior (Lundberg *et al*., 2003) shows a discrete change in spending in older couples when the husband retires. Taken together, the theory and empirical work suggest that that the time use of women with working husbands will differ more from that of widows than will that of wives with non-working husbands.

To examine these implications in this context, I add an indicator of whether a husband works to the estimates of equation system (1). The estimates support the predictions of the theory—the indicators are jointly statistically significant (p=0.05). The largest difference across groups is that women with working husbands spend more time in home production than those whose husbands do not work for pay, who in turn, as in Table 3, spend more time in home production than new widows, and still more than longer-term widows. They make up for this by watching less television than other married women, and much less than widows.

In nine of sixteen years in the ATUS samples the respondents rated their overall health on a five-point scale (excellent through poor). In Sample 5 28 percent of longer-term widows rate their health as fair or poor (the two lowest categories), while 33 percent of new widows and married women rate it this low. Since ill-health leads otherwise identical individuals to sleep more and watch more television (Hamermesh, 2019, Ch. 7), including a vector of indicators of self-rated health might alter our inferences about the effect of marital status on the allocation of time. Re-specifications of the model in (1) do show that TV-watching and sleep both increase monotonically as an older woman's self-rated health decreases. These effects,

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[13]These equations were re-specified to include interactions of the indicators of widow status with the vector of indicators of educational attainment. These vectors of interactions were not jointly statistically significant. The same vectors of interactions were added to the equations estimated of the ATUS described in Sections VI and VII. In those cases too these additions were not statistically significantly nonzero.

however, hardly alter the estimated α_{jN} and α_{jL}. The differences that we observe in how older women in the three groups spend their time are not produced by differences in their (self-rated) health.

More educated older women might adjust their time differently from their less educated peers, perhaps because they are more efficient in home production (since we know that education alters household technologies (Michael, 1972)). To examine this possibility, I create in indicator equaling 1 for the roughly 1/3 of older women who have attained more than a secondary-school diploma and interact it with the two indicators for widow status. Taken as a group, these interactions are not statistically significantly nonzero when added to the equations described in Table 3; and only one of the ten interactions was individually statistically nonzero.[14]

B. Replication for France, the U.K., Germany and Italy

As a check on the generality of responses of time use to widowhood, we can estimate models like (1) using data from France, the U.K., Germany and Italy, the four largest economies in Europe and ones for which enough time diaries were completed in recent surveys to allow meaningful comparisons of time use by marital status among women ages 70+. For France I use the 2009-10 *Enquête Emploi du Temps*; the estimates for the U.K. are based upon the 2014-15 United Kingdom Time Use Survey; those for Germany use the *Zeitverwendungserhebung*, 2012-13, while those for Italy use the 2002 *Indagine Multiscopo sulle Famiglie*: *Uso del Tempo*. Italy is an especially interesting example, since Italian women engage in much more home production than women in other rich countries (Burda *et al.*, 2008).

Because these surveys have many fewer respondents than the ATUS, and because their respondents were not in some prior survey, we cannot distinguish new from longer-term widows. Also, it is crucial to note that the methods of collecting time diaries and the categorizations of activities differ among these four surveys and from those in the ATUS. Any estimates are thus not strictly comparable across countries; rather,

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[14]With the relative paucity of newly-widowed women in the sample, I re-estimated the equations combining newly- and previously-widowed women, and added the interactions with educational attainment. The conclusion of no significant differences in adjustment of time use with education was unchanged.

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they are presented to see whether the same general patterns demonstrated by the results in Table 3 are discernable in other rich countries.

For all four countries I estimate models based on Equation (1) describing home production, sleep, other personal activities, TV-watching and other leisure activities, restricting the samples to women ages 70+ who do no paid work and who are either widows or married with spouse present and have no children present in their households. Also included in the models are indicators of age (each quinquennium from age 70-84 for France, the U.K. and Italy, only 70-74 for Germany, since the highest age listed is 75); of educational attainment; of immigrant status (except for the U.K. and Italy, for which the information is unavailable); and indicators of day of the week, month of the year (quarter in Germany), and year. Because the French and British surveys obtain two daily diaries for each respondent, and the German survey obtains three, standard errors of the parameters are clustered on the respondents in those countries; and sampling weights are used throughout. The estimates are thus designed to be as closely comparable to those in Table 3 as the inherent differences among the surveys allow.

Table 4 provides the results of estimating these models (only the parameter estimates on the indicator for widows) and lists the mean time spent in each activity by married women. The samples are much smaller than the ATUS sample. Nonetheless, in all four countries widows spend less time than married older women engaged in home production. This shortfall is made up by widows spending more time engaged in other leisure activities (but not in television-watching). In all four there are only relatively small percentage differences in time spent sleeping between older widows and older married women. The most noticeable similarity to the American results is the lesser time spent in home production, with these results being quantitatively quite consistent with those for the U.S. The decline in time spent in home production in widowhood ranges from 7.3 percent in the U.K. to an 18.9 percent drop in Italy, slightly more than in the U.S.

V. Disaggregating the Impact of Widowhood on Home Production

Due to the relatively small samples of widows in the other countries, only in the U.S. can we decompose the drop in home production upon widowhood into its components. The results in Table 3

showed that the largest adjustment of time use by widows is in home production: The absolute decline is over ¾ hours per day (47 minutes), which represents a decrease of 18 percent. No other change in time use is nearly so large absolutely or relatively.

A. *Quantitative Disaggregation*

We can disaggregate home production activities in the ATUS as consisting of the broad categories of caring for others in the household; household activities, which include many diverse sub-categories; and purchasing activities. To decompose the overall drop in home production once the adjustment to widowhood is complete, I concentrate on four activities: The two broad categories of caring for others in the household and purchasing goods, and the sub-categories food preparation and cleanup, and housework. Activities included in the former sub-category are clear; the latter includes interior house-cleaning, laundry, sewing/repairing and miscellaneous indoor activities.

Table 5 lists regression results which include the same covariates and indicators of marital status as in Table 3, for these four home production activities separately. The declines in time spent by longer-term widows in these four activities total 52.5 minutes—more than the total drop in all home production activities—with the excess accounted for by small changes in all the other miscellaneous activities included in the category household activities. Over half of the decline in home production time is in food preparation/cleanup, a drop of almost 40 percent compared to otherwise identical married women with spouse present. The decline in time spent in housework accounts for most of the remainder of the decrease in home production. Not surprisingly, without a spouse present time spent caring for others in the household drops to nearly zero.[15]

The bottom row of Table 5 shows the average time spent by husbands of older women in these same four activities for which results in the upper part of the table are presented. Time spent by these husbands in food prep/cleanup and housework totals 34 minutes per day, compared to 150 minutes daily

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[15]Excluding those widows not living alone, the estimates change only slightly. Since they are alone in their household, by definition they spend no time caring for others in the household, so the estimates in the first column are slightly larger in absolute value. The other estimates differ little from those in Table 4.

by their wives.[16] Among married older couples men perform very little of these two activities. We can then infer that time spent in these two activities after adjustment to widowhood, a decrease of 42 minutes (28 percent), represents a proportionate decline in production.

B. Temporal Disaggregation

All these activities except caring for others in the household are performed both by married women and those without a spouse present. Essentially each entails a fixed cost of engaging in the activity, for examples, setting up to cook or to clean dishes; doing laundry or mopping floors; and food-shopping. With a sufficiently large decline in the demand for the home-produced commodity by a widow, she has an incentive to cut the fixed costs of home production by engaging in the activity on fewer days. This suggests examining the incidence of each activity—what fraction of women engage in it on a representative (diary) day—and its intensity, the conditional mean time spent by those engaging in it on a given day. If, for example, the incidence of an activity declines with widowhood while its intensity remains the same or even increases, we can conclude that the loss of a husband leads widows to economize on the fixed costs of the activity. Obversely, if the incidence declines only slightly while its intensity declines a lot, we can infer that the fixed costs of engaging in the activity are less important than the variable costs.

To infer the comparisons between the fixed and variable costs of these household activities, Table 6 presents estimates of the differences among new widows, longer-term widows and married women in the incidence and intensity of time spent in these four activities, adjusting for large vectors of covariates. The estimates for care of others are not surprising: Without a husband only a small fraction of older women list caring for others as an activity during their diary day. The estimates describing its intensity are meaningless, since so few widows engage in this activity.[17]

The interesting comparisons are for the other three categories of home production activities. The incidence of time spent on food preparation/cleanup is about 13 percent (0.106/0.805) lower among longer-

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[16]The husbands are not spouses of the women in our samples, as the ATUS obtains diaries for only one household member. Rather, they are ATUS respondents who are married with spouse present and whose wives are 70+.

[17]Only 4 newly widowed women could be included in this conditional regression.

term widows than among married older women, but its intensity is 29 percent (26.88/92.12) lower. Similar behavior occurs for housework: The decline in incidence is only 5 percent (0.031/0.618), but the drop in intensity is 14 percent (16.73/123.47). Implicitly, the reduction in the scale of the household upon widowhood leads women to economize more on the variable than on the fixed costs of time use. The same is not true for purchasing: The small overall decline in time spent purchasing among longer-term widows results entirely from a 6 percent drop in its incidence; time spent when shopping actually increases slightly.

These results imply that a major mechanism by which widows adjust their time use to the loss of their husbands is by spending less time while engaged in those activities that are stereotypical "women's work." They cut time spent in these activities by performing them only slightly less often; the larger cuts are in the amount of time spent when doing them. Implicitly the loss of one's husband leads widows to economize on the variable costs of major home production activities more than on their fixed costs.

C. *Implications for the Structure of Household Production*

We can use the difference in time use to examine one aspect of home production—the nature of economies of scale—and thus get at the nature of equivalence scales in time use to match the myriad estimates of those of goods expenditures.[18] I concentrate on the intermediate production item—food for consumption at home, not including time spent eating, in order to avoid the difficulties of inferring scale economies in production from time spent in both production and consumption (thus defining the commodity more narrowly than Lecocq (2001), Hamermesh (2008), Couprie and Ferrant (2015), and Gardes and Starzec (2018)).[19] Also, by comparing widows' behavior to that of married women without children, this comparison is clearly of units that are twice the size of those to which they are being compared.

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[18]Couprie and Ferrant (2015) and Gardes and Starzec (2018) examine food spending and time comparing singles and couples (and couples with children). Each defines the commodity eating fairly broadly, including time spent consuming the food that is produced by monetary expenditures and time spent in shopping, food preparation and clean-up.

[19]Part of the time spent eating—consuming the home-produced commodity food—consists of socializing, since in the sub-sample used in this sub-section married older women spend 80.3 minutes/day eating, while widows spent slightly but nearly statistically significantly less time, 76.8 minutes.

In this sub-section I use women in Sample 6 for whom information on food spending is obtainable and in which married women's husbands do no paid work. I assume that the commodity "food eaten at home" is produced by time spent in preparation and clean-up (Column (2) of Table 5) and by time spent shopping for groceries (estimates shown in Column (5) of Table 5). Wives without working husbands spend 77.38 minutes (s.e.= 3.66) in food production. Taking husbands in the ATUS who have wives ages 70+; and imputing their time in these activities based on the age and education of husbands of wives in the ATUS sub-sample, I obtain total time in food production in older couples averaging 108.58 minutes (s.e.=3.66). Widows in Sample 6 spend 52.10 minutes (s.e.=1.88) in food production, i.e., 0.48 as much time producing this commodity as do married older couples.

To estimate monetary expenditures on food consumed at home, I link ATUS respondents who kept diaries in February-May to the December CPS Food Security Supplements. This linkage allows obtaining information on the food spending of about 1/3 of ATUS respondents. These restrictions yielded a sample of 474 married older women and 1,138 widows. The Supplements provide information on the household's actual weekly food expenditures, with widows spending 0.69 as much money on food each week as couples with a married older woman.[20] Finally, I need to assume how much food is produced for consumption by widows and married older women—i.e., what happens to food output upon widowhood. Given differences in caloric needs by age and gender, assuming that output falls by at least half upon widowhood suggests that 0.5 is an upper bound on the ratio of the food consumption by widows to that in married older two-person households.[21]

Taken together, the implied household production function is depicted in Figure 2. There appear to be diseconomies of scale in food spending, and constant returns to scale in food time. The restriction of this sub-sample to non-working older women who, if married, have non-working husbands, means that in

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[20]The Supplements also report usual weekly food expenditures. The analysis is hardly altered if these are used to measure differences in spending between older couples and widows.

[21]Taking the caloric needs of moderately active older American adults (https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/appendix-2/) gives a ratio of 0.45.

neither group is there a market alternative for their time. The Figure suggests that this household production function is not homothetic. Food production is only one of many commodities that households produce (with goods expenditure accounting for only 12.4 percent of pre-tax income among widows in this sub-sample (12.0 percent in married older households) and only 6 percent of non-sleep time. The comparison between widows and married older women suggests, however, that published equivalence scales based on expenditures understate the full cost of expanding from a 1- to a 2-person household.[22]

These calculations clearly rest on assumptions that may be wrong, particularly about the change in output when a woman is widowed. They also implicitly assume that women enjoy no process utility from time spent preparing food, which may vary depending on the presence of a spouse. Nonetheless, they are among the first to: 1) Consider equivalence scales in time inputs, and the only ones to focus on time spent in home production rather than in the production and consumption of home-produced commodities; and 2) To compare time spent between groups whose value of time is independent of market wage rates.

VI.   Togetherness in Widowhood

One of the major purposes of the institution of marriage is to allow individuals to spend time together, taking advantage of both the specialization in home production that togetherness allows and the complementarities in the utility derived from the consumption of leisure and other time (Becker, 1973).[23] Clearly, spouses do spend more time together than randomly-matched pairs of opposite-sex adults (Hamermesh, 2002). When one spouse (a husband) is no longer present, the older widow has to reallocate her time to activities with other people who might provide some jointness in production or consumption of the time, or simply spend it alone.

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[22]The currently used OECD scale assumes that utility is equalized between single- and two-adult households when the latter's spending is 1.5 that of the former http://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf .

[23]This original statement of the theory made it clear that positive and negative assortative mating will both arise, with the latter being a prediction about matching only in household production. Regrettably, the richness of these predictions has been largely ignored, with most attention given only to sorting/matching along lines of efficiency in production.

The ATUS asks people to list who they were with during each particular activity on the diary day, although the information is not requested for activities that account for much of the day (particularly sleep and other personal activities). The information is collected in over 20 categories, ranging from spouse through more distant relatives, various types of other people, co-workers standing in various relationships to the respondent and being alone. I collapse this information into 5 categories: Other people; friends; other (non-spouse) relatives; spouse; and being alone. In the data new widows ages 70+ report whom they were with for 771 minutes on a representative day, longer-term widows for 769 minutes, and married women for 758 minutes.

Figure 3 graphs the distributions of time in the 5 aggregated categories for each of the 3 groups of older women in our data (Sample 5). What stands out unsurprisingly is the shift upon widowhood from time spent with one's spouse, with the majority of the time shifted to being alone.[24] Beyond that shift, the biggest increase is in time spent with other relatives.

As with the amount of time spent in various activities, we should expect that the identities of the individuals with whom time is spent will depend on demographic and economic characteristics. For example, culture and location in immigrant enclaves may lead immigrants to spend less time alone and more time with friends and relatives. Also, declining mobility with age may limit older women's ability to leave their residence and engage in activities with friends. Finally, with the total amounts of time reported as being with others or alone differing by marital/widow status, adjusting for these totals will also alter inferences about the identity of people with whom new and longer-term widows choose to spend their time.

Table 7 lists the estimates of the impact of being a new or longer-term widow on choices about with whom time is spent compared to those of married women. Included in these regressions are all the covariates underlying the estimates in Tables 3 and 4, and the total amount of time that the respondent lists as being with someone else or alone. The estimates of the effects of the other covariates show that as a

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[24]17 of the 5114 longer-term widows in the sample report spending time with their spouse, averaging 8 daily hours, which generates the little blip in time with spouse in this group. No recent widow reports time with spouse. We cannot be sure whether this anomaly is a coding error, a reporting error, or these few women are holding séances.

woman ages beyond 70 she spends less time with friends, less time with other relatives and more time with other people. Increasing age *per se* is unrelated to the amount of time spent alone. Immigrant women spend less time alone and more time with other relatives. White non-Hispanics spend more time alone and less time with other relatives.

The estimates of the impacts of widow status on the identity of who the time is spent with generally corroborate the statistics depicted in Figure 3.[25] About 2/3 of the time no longer spent with (the deceased) spouse is spent alone, both among new and longer-term widows. Indeed, in only one category does the reallocation of time change nearly statistically significantly as the duration of widowhood increases: Newly widowed women spend substantially more time than married women with other (non-spouse) relatives, a difference that is smaller among longer-term widows.[26]

VII. Feelings in Widowhood

A. *Time Stress*

The ATUS provides no information on how respondents feel about the availability of time—about the constraint that the limitation of daily hours imposes upon them. We know (Hamermesh, 2019, Ch. 11), however, that the time constraint seems more binding as incomes are higher, consistent with the notion that spending (increasingly abundant) money requires using time (that does not increase with income). Widows' incomes are lower than those of married women, but so too is their spending. It is thus unclear whether widowhood makes otherwise identical women feel more or less pressured for time.

The ATUS offers no help with this question—feelings of time pressure are not elicited—so that we cannot distinguish between new and longer-term widows. The French, U.K. and German time-use data, however, all provide information on the degree of time stress that respondents feel, with all three data sets offering this information for all days on which the respondents kept time diaries. Because the U.K. data set

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[25]Estimating these equations jointly with the equations describing the amounts of time spent in each activity hardly alters the results reported here.

[26]As with the distribution of time use by widows, so too the distribution of the types of people with whom they spend time does not differ by widows' level of education.

only offers information on whether the respondent felt rushed or not, we collapse the scales in the other two data sets into indicator variables, with unity in the French data if the woman says she feels any stress about time, and unity in the German data if she does not disagree with the feeling of being under some time pressure.[27]

The upper panel in Table 8 reports the estimates of the impacts of being a widow on a woman's stating that she feels rushed for time. The same covariates are included that underlay the estimates reported in Table 5. In all three countries, otherwise identical widows feel less pressed for time than do married women. The point estimates imply that, compared to otherwise identical married women, widows are 20, 18 and 28 percent less likely to feel stressed in France, the U.K. and Germany respectively. None of the estimated impacts is highly statistically significant, although two reach standard levels of significance. Taken together they suggest that no longer having a spouse present reduces feelings of being pressured for time among older women.

Why the reduction in feeling stressed for time occurs may be due to widows having more time to themselves—choosing how to spend their time on their own rather than making decisions jointly with a husband. Since the estimates in the upper panel of Table 8 hardly change when we include as covariates the amounts of time spent in different activities, it cannot be that widows undertake activities that are less inherently stressful than those undertaken if a husband were present. Rather, it may be that being able to control their time themselves gives them a feeling of being under less time stress.

B. Life Satisfaction—the Unmerry Widow

While the German data do not offer information on the respondents' feelings of life satisfaction or on their happiness, the ATUS, French and U.K. data sets do provide this information. We can thus compare the determinants of life satisfaction to those of time stress in two of the three data sets, and we can examine

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[27]The French question asks whether the individual feels pressed for time (*l'individu se sent pressé par le temps*) on a five-point scale. The indicator variable equals 1 for those responding 5 on this question. The German question asks whether the respondent is frequently under time pressure (*häufig unter Zeitdruck*). I use "agree completely" (*stimme voll und ganz zu*), "sort of agree" (*stimme eher zu*) or "indifferent" (*teils/teils*) as the stressed category.

the former in the ATUS. In the ATUS, respondents in the 2012 and 2013 waves rated their life satisfaction on a 10 (best possible life) to 0 (worst possible life) scale. I rescale this variable into an indicator equaling 1 if the person gives a rating of 7 or higher, dividing the entire ATUS sample into roughly equal-size groups. The French data employed the same 11-point scale, so that I define the indicator of life satisfaction exactly as in the U.S. data. The U.K. time-use data set asked respondents to rate their life satisfaction on a 7 to 1 scale, which I aggregate into an indicator equaling 1 if the respondent answers "6" or "7" on this question, 0 if not.

The estimates of the impact of widowhood (distinguishing new from longer-term widows in the U.S. data) in regressions describing this indicator of life satisfaction are shown in the bottom panel of Table 8. For all three countries the same vectors of covariates as used throughout are included, which is crucial given the evidence (Blanchflower and Oswald, 2017) of changes in average reported happiness as people age through their 70s and 80s. In all three data sets the impact of having been a widow (for at least one year in the U.S. data) is negative and statistically significant, with widowhood reducing expressed life satisfaction by this measure by 12, 41 and 37 percent in the U.S., France and the U.K. respectively. The effects of widowed status are even more significant statistically in ordered probits describing the entire range of responses to the questions about life satisfaction.[28]

Even the U.S. sample is relatively small here, with only 44 new widows included in the sub-sample over which this equation is estimated. For that reason, the estimated impact on life satisfaction of being newly widowed is not statistically significant. The point estimate is, however, larger than that of being a longer-term widow, although the estimated impacts are not statistically different from one another. The effect of widowhood on life satisfaction is hardly altered if we account for the kinds of activities on which these women spend time. Both estimates, however, shrink to near zero if we add information on the distribution of women's time across individuals who are present with them (the information we analyzed in the previous Section). The differences in life satisfaction by widowhood status are thus entirely due to

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[28]While self-reported measures of health status are highly correlated with expressed life satisfaction when included in these estimates, adding them hardly alters the estimated impact of widowhood on this outcome.

its correlation with the identities of the people with whom that time is spent. Widows who spend more time with friends are no less satisfied with life than otherwise identical married women; and those widows who spend more time alone are nearly significantly less satisfied with their lives than married women.

VIII. The Dynamics of Time Use

New widows' time use reflects the cost of adjusting to the absence of a spouse, both the cost of changing the technology of how commodities are produced (becoming a sole producer—providing the only input of time) and the cost of adjusting to the elimination of the need to account for the spouse's preferences in choosing what to produce. Also, since becoming widowed typically leads to a reduction in household income, a widow's time-demand functions must also adjust to the changed opportunities that the cut induces. Together these generate an adjustment of:

(2) $\Delta T_j = \lambda_j[T_{jw1} - T_{jw0}]$, j = 1,…,M.

where j is a commodity. Each λ_j is the fraction of the adjustment that occurs between the time the woman is widowed and the time when she completes her time diary (no more than 17 months in this sample). Some of the λ_j may exceed one; but we expect the average adjustment to be less than one—that on average new widows complete only part of the change in their time use from what it was when married and what it will be once they reach the equilibrium pattern of time use of longer-term widows.

In calculating the λ_j we are estimating a specific example of the time path of adjustment of household production to a demographic shock. Unlike the examinations of how goods or time consumption adjust to other demographic changes (a birth, Buddelmeyer *et al.*, 2018; retirement, Lundberg *et al*., 2003, and Lührmann, 2010), the shock examined here is arguably exogenous. Longer-term widows' eventual equilibrium and the adjustment path toward it result from responses to an external shock that the woman has faced, not from something that chose herself and that she could have planned for over an extended period of time.

As is clear from examining the parameter estimates in Table 3, some of the components of time use—sleep and other personal care—"over-adjust" along the path from married to being widowed for over a year—being a longer-term widow. Others—home production, TV-watching and other leisure activities—

adjust only part-way. There is no unique way to aggregate the λ_j—to obtain a summary measure of the amount of adjustment observed among new widows. Instead I present two calculations. The first measures the absolute distance between the use of time in a particular category by new compared to longer-term widows:

$$(3a)\ D_1 = \exp\left\{ -\Sigma \mid T_{jN} - T_{j1} \mid /1440 \right\},$$

with the summation over all five aggregated categories of time use. The minimum of this measure, indicating complete adjustment, is 1. The second measure is based on relative deviations:

$$(3b)\ D_2 = \exp\left\{ -\Sigma w_j \mid T_{jN} - T_{j1} \mid /T_{j1} \right\}.$$

where the weight $w_j = T_{j0}/1440$, with the summation exponentiated so it lies between 1 (complete adjustment) and 0:

The upper panel of Table 9 shows the estimates of D_1 and D_2 based on the parameter estimates shown in Table 3 (and for Sample 6 too), with the baseline values of the T_{i0} (among married women) adjusted for the demographic controls used in the estimation. The estimates vary little between the samples, nor do they differ depending on whether the average or the relative percentage differences are used. The results imply that the overwhelming majority of the gap between the time use of older married women and longer-term widows is made up by the average new widow in the sample.

Assume that the distribution of the deaths of the new widows' husbands over the 12 months between their 4th and 8th CPS interview is uniform; and remember that the mean lag between the latter interview and the completion of the time diary is three months. These considerations suggest that the average newly widowed older American woman in the ATUS sample was widowed 9 months before she completed her time diary. If her adjustment process was described by (2) along this time path, these assumptions and the calculations in Table 9 imply that the half-life of the adjustment was less than 4 months. The calculations also imply that her adjustment to the demographic shock of her husband's death is essentially complete within a year.

Replacing 1440 in (2a) and (2b) by the sum of time spent alone, with spouse, with friends, with other people and with relatives by longer-term married women, we can make similar calculations describing the path of widows' adjusting their time use with others using the estimates in Table 7. These are shown in the bottom row in Table 9. Like the time path describing widows' adjustment of the quantities of time used, that describing changes in their choices about whom to spend their time with also leads very rapidly quickly to their equilibrium.

IX.   Conclusions and Implications

Widows comprise a large fraction of the population of rich countries; among women ages 70 and over they constitute a near majority. How they spend their time compared to married older women is of interest *per se*, even ignoring what it tells us about the cost of activities like home production or about the micro-dynamics of adjustment to a demographic shock. Evidence from American time diaries shows that the biggest adjustment made by widows to the loss of a husband is a sharp decline in time spent in home production activities. Similar responses to widowhood are observed in France, the U.K., Germany and Italy. This drop leads widows to spend more time watching television and more time in other leisure activities.

The behavior of widows allows inferring the structure of the cost of some home production activities. In particular, it suggests that food preparation/cleanup and housework (totaling slightly more than 2 hours per day), which account for over half of older married women's home production, have relatively low fixed costs compared to their variable costs. With one less person (a husband) in the household women cut back on these activities mainly by doing much less of them each day, not by doing them much less frequently. Their spending of time in food production decreases more than their spending on food. This suggests that equivalence scales based solely on comparisons of goods spending across households of different sizes will incorrectly measure differences in the full cost of household production (in this case, understating the costs facing a larger household).

Considering how women adjust to widowhood allows inferring the general nature of the costs of adjusting time use to a demographic shock. With the evidence that new widows—those widowed sometime within 17 months of providing information on their time use—engage in behavior that resembles that of

longer-term widows much more closely than that of married women, we can infer that the adjustment process (clearly, only of their use of time) is fairly rapid.

Clearly, the example we have used—older widows—is unique, with the induced changes being more likely than some others to have resulted from what is truly an exogenous shock. The example allows easier inferences about behavior than other shocks might, since the people examined are unlikely to alter their marital status again and are typically not choosing to work for pay. Nonetheless, using this approach to consider how demographic shocks might change other groups' spending of time and money seems an extremely useful next step in the examination of household behavior.

REFERENCES

Katharine Abraham, Aaron Maitland and Suzanne Bianchi, "Non-response in the American Time Use Survey," *Public Opinion Quarterly*, 70 (2006): 676-703

Michael Baker, Emily Hanna and Jasmin Kantarevic, "The Married Widow: Marriage Penalties Matter," *Journal of the European Economic Association*, 2 (June 2004): 634-64.

Gary Becker, "A Theory of Marriage: Part I," *Journal of Political Economy*, 81 (July/Aug. 1973): 813-46.

Carlos Bethencourt and José-Victor Rios-Rull, "On the Living Arrangements of Elderly Widows," *International Economic Review*, 50 (August 2009): 773-801.

David Blanchflower and Andrew Oswald, "Do Humans Suffer a Psychological Low in Midlife? Two Approaches (With and Without Controls) in Seven Data Sets," NBER Working Paper No. 23724, Aug. 2017.

Michael Brien, Stacy Dickert-Conlin and David Weaver, "Widow Waiting to Wed? (Re)Marriage and Economic Incentives in Social Security Widow Benefits," *Journal of Human Resources*, 39 (Summer 2004): 585-623.

Hielke Buddelmeyer, Daniel Hamermesh and Mark Wooden, "The Stress Cost of Children on Moms and Dads," *European Economic Review*, 109 (2018): 148-161.

Michael Burda, Daniel Hamermesh and Philippe Weil, "The Distribution of Total Work in the EU and USA," in Tito Boeri *et al.*, *Working Hours and Job Sharing in the EU and USA: Are Europeans Lazy? Or Americans Crazy?* Oxford University Press, 2008.

Richard Burkhauser, Philip Giles, Dean Lillard and Johannes Schwarze "Until Death Do Us Part: An Analysis of the Economic Well-Being of Widows in Four Countries," *Journal of Gerontology: SOCIAL SCIENCES*, 60B (2005): S238-46.

Deborah Carr, "The Desire to Date and Remarry among Older Widows and Widowers," *Journal of Marriage and the Family*, 66 (Nov. 2004): 1051-68.

Olufunke Chenube and Florence Omumu, "The Influence of Socio-Economic Status and Education in Grief Experienced and Coping Strategies Employed among Widows," *Gender and Behaviour*, 9 (2011): 3612-23.

Janice Compton and Robert Pollak, "The Life Expectancy of Older Couples and Surviving Spouses," IZA Discussion Paper No. 12571, August 2019.

Hélène Couprie and Gaëlle Ferrant, "Welfare Comparisons, Economies of Scale and Equivalence Scale in Time Use," *Annals of Economics and Statistics*, 117/118 (Jan/June 2015): 1-26.

GAIN, *Northern Ireland Audit: Dying, Death and Bereavement*. Belfast: GAIN, October 2010. www.gain-ni.org

François Gardes and Christophe Starzec, "A Restatement of Equivalence Scales Using Time and Monetary Expenditures Combined with Individual Prices," *Review of Income and Wealth*, 64 (Dec. 2018): 961-79.

Noreen Goldman and Graham Lord, "Sex Differences in Life Cycle Measures of Widowhood," *Demography,* 20 (May 1983): 177-95.

Elizabeth Hahn, Kelly Cichy, David Almeida and William Haley, "Time Use and Well-being in Older Widows: Adaptation and Resilience," *Journal of Women and Aging,* 23 (2011): 149-59.

Daniel Hamermesh, "Timing, Togetherness and Time Windfalls," *Journal of Population Economics*, 15 (2002): 601-23.

----------------------, "Direct Estimates of Household Production," *Economics Letters*, 98 (2008): 31-34.

----------------------, *Spending Time*. New York: Oxford University Press, 2019.

Daniel Hamermesh, Harley Frazis and Jay Stewart, "Data Watch: The American Time Use Survey," *Journal of Economic Perspectives*, 19 (Winter 2005): 221-32.

Louise Hawkley, Kristen Wroblewski, Till Kaiser, Maike Luhmann and L. Philip Schum, "Are U.S. Older Adults Getting Lonelier? Age, Period and Cohort Differences," *Psychology and Aging*, 34 (Dec. 2019): 1144-57.

Sandra Hofferth, Sarah Flood and Matthew Sobek. *American Time Use Survey Data Extract Builder: Version 2.7* [dataset]. College Park, MD: University of Maryland and Minneapolis, MN: IPUMS, 2018.

Carol Jenkins, ed., *Widows and Divorcees in Later Life*: On Their Own Again. Philadelphia: Haworth Press, 2003.

Wojciech Kopczuk, "Bequests and Tax Planning: Evidence from Estate Tax Returns," *Quarterly Journal of Economics*,122 (Nov. 2007): 1801-54.

Sébastien Lecocq, "The Allocation of Time and Goods in Household Activities: A Test of Separability," *Journal of Population Economics*, 14 (2001): 585-97.

Melanie Lührmann, "Consumer Expenditures and Home Production at Retirement—New Evidence from Germany," *German Economic Review*, 11 (May 2010): 225-45.

Shelly Lundberg, Richard Startz and Steven Stillman, "The Retirement-Consumption Puzzle: A Marital Bargaining Approach," *Journal of Public Economics*, 87 (May 2003): 1199-1218.

Robert Michael. *The Effect of Education on Efficiency in Consumption*. New York: Columbia University Press. 1972.

Emily Oster, "Unobservable Selection and Coefficient Stability: Theory and Evidence," *Journal of Business and Economic Statistics*, 37 (April 2019): 187-204.

Table 1. Transition Matrix across Marital Statuses, CPS Months 4 to 8, ATUS 2003-18, Women Ages 70+ (percent distributions)

	Widow	Married Spouse Present	Divorced	Other*
Widow	99.3	0.1	0.0	0.6
Married Spouse Present	4.4	94.5	0.1	1.0
Divorced	1.4	0.0	97.9	0.7
Other	4.4	0.6	0.7	94.3

*Other includes never married, married spouse absent, separated.

Table 2. Descriptive Statistics, Time Use Categories, Women 70+ by Marital Status, Representative Day in the ATUS 2003-18 (minutes/day)*

	N =	Home production	Sleep	Other personal	TV-watching	Other leisure
Group:						
New widows	230	231.91	581.10	123.65	237.15	266.20
		(11.24)	(9.35)	(5.72)	(12.15)	(14.01)
Longer-term widows	5,114	199.76	561.95	141.18	269.51	267.60
		(2.36)	(1.96)	(1.53)	(2.86)	(2.82)
Married spouse present	2,298	258.29	551.17	144.16	231.80	254.59
		(3.69)	(2.44)	(2.16)	(3.59)	(3.99)

*Standard errors in parentheses below means.

Table 3. Estimates of the Effects of Differences in Marital Status on Time Use, and Tests of Hypotheses, Representative Day, ATUS 2003-18 (minutes/day), N=7,642*

Ind. var.:	Home production	Sleep	Other personal	TV-watching	Other leisure
New widow	-22.67	25.53	-20.30	-0.25	17.69
	(13.32)	(10.20)	(8.42)	(14.89)	(15.41)
Longer-term widow	-46.78	0.28	-2.96	29.11	20.34
	(4.14)	(3.17)	(2.62)	(4.63)	(4.79)
R²	0.094	0.039	0.020	0.047	0.050

Hypotheses:	p-value			p-value	
New widow = married on all 5	0.008		**New widow = longer-term widow on all 5**	0.003	
Longer-term widow = married on all 5	<0.001				

*Additional covariates are vectors of age ranges, of educational attainment, racial/ethnic identity, metropolitan status, region, day of week, month of year, and year, and an indicator of immigrant status. The four equations are estimated jointly, with married women the excluded category. Standard errors in parentheses.

Table 4. Estimates of the Effects of Differences in Marital Status on Time Use, Non-working Women Ages 70+, France 2009-10, U.K. 2014-15, Germany 2012-13, Italy 2002 (minutes/day)*

	Home production	Sleep	Other personal	TV-watching	Other leisure
Ind. Var.:			**FRANCE**		
Widow	-33.94	-0.10	-24.27	16.96	41.35
	(10.11)	(8.90)	(7.00)	(9.37)	(9.67)
R²	0.167	0.106	0.083	0.080	0.137
Mean Married	257.64	537.17	219.18	216.46	189.84
N Diaries Married/Widow	1,048	952			
			U.K.		
Widow	-20.96	-14.67	-15.08	-1.55	52.23
	(13.57)	(11.22)	(9.39)	(14.96)	(12.74)
R²	0.155	0.121	0.086	0.137	0.129
Mean Married	286.65	529.36	199.08	197.51	209.65
N Diaries Married/Widow	447	492			
			GERMANY		
Widow	-20.89	7.13	-9.74	10.49	13.01
	(14.30)	(9.85)	(7.74)	(13.33)	(14.93)
R²	0.108	0.049	0.041	0.052	0.057
Mean Married	278.16	533.32	191.56	157.03	278.54
N Diaries Married/Widow	541	253			

ITALY

Widow	-69.74	20.22	8.53	17.24	23.75
	(6.25)	(5.03)	(4.16)	(4.78)	(5.40)
R²	0.215	0.148	0.051	0.038	0.071
Mean Married	368.24	556.62	116.67	130.94	267.53
N Diaries Married/Widow	967	2,003			

*Based on the *Enquête Emploi du Temps*, 2009-10, the United Kingdom Time Use Survey, 2014-15, the *Zeitverwendungserhebung*, 2012-13 and *Indagine Multiscopo Uso del Tempo*, 2002. Each equation includes indicators for five-year age intervals over age 69 up through 84 (85+ is the excluded category); educational attainment, immigrant status (France and Germany) and indicators of the day of the week, month of the year, and year (except Italy). Married women are the excluded category. All estimates are based on sampling weights, and standard errors are clustered on individuals (except Italy).

Table 5. Estimates of the Impact of Marital Status on Home Production, Women Ages 70+, ATUS 2003-18 (minutes/day)*

Dep. Var.:	Care of others in household	Food prep/ cleanup	Housework	Purchasing	Purchasing groceries
Ind. Var.:					
New widow	-10.21	-27.62	-4.84	3.07	-0.24
	(3.37)	(5.77)	(8.11)	(6.69)	(1.89)
Longer-term widow	-7.88	-29.07	-13.44	-2.12	1.26
	(1.05)	(1.79)	(2.52)	(2.08)	(0.59)
R²	0.017	0.051	0.039	0.048	0.027
Means (S.E.) **Married women** **(adjusted)**	10.87	74.22	76.31	54.42	8.25
	(1.03)	(1.69)	(2.19)	(1.85)	(0.47)
Husbands of women 70+	7.12	22.34	11.89	47.13	7.36
	(0.77)	(0.94)	(0.80)	(1.59)	(0.42)

*Estimates are from equations including all covariates used in the equations in Table 3. Standard errors in parentheses.

Table 6. Sources of Changes in Home Production, ATUS Women Ages 70+, 2003-18*

Dep. Var.:	Care of others in household	Food prep/ cleanup	Housework	Purchasing
	Incidence			
New widow	-0.081	-0.064	0.031	0.024
	(0.019)	(0.034)	(0.038)	(0.038)
Longer-term widow	-0.081	-0.106	-0.031	-0.024
	(0.006)	(0.011)	(0.012)	(0.012)
R²	0.041	0.027	0.046	0.066
Mean married	0.111	0.805	0.618	0.426
	Intensity			
New widow	-20.34	-29.34	-15.09	-0.224
	(37.23)	(6.80)	(11.78)	(12.34)
Longer-term widow	20.16	-26.88	-16.73	3.32
	(26.32)	(3.02)	(4.71)	(4.51)
R²	0.185	0.057	0.042	0.045
N with activity	334	5,492	4,282	2,708
Conditional mean married	97.84	92.12	123.47	127.75

*Estimates are from equations including all covariates used in the equations in Table 3. Standard errors in parentheses.

Table 7. Effects of Marital Status on Choice of Whom Time is Spent With, Representative Day, ATUS 2003-18, (minutes/day), N=7,642*

	WHO WITH				
	Alone	**Other relatives**	**Other people**	**Friends**	**Spouse**
Ind. var.:					
New widow	270.55	83.93	10.63	24.31	-389.43
	(17.10)	(11.52)	(6.17)	(7.41)	(13.53)
Longer-term widow	278.14	63.69	14.05	32.00	-387.89
	(5.33)	(3.59)	(1.92)	(2.31)	(4.21)
R²	0.469	0.067	0.025	0.045	0.574
Hypotheses: **New widow = longer-term widow (p-value)**	0.66	0.08	0.58	0.30	0.91
Mean married	312.46	29.06	12.73	19.34	384.64

*Additional covariates are vectors of age ranges, racial/ethnic identity, metropolitan status, region, day of week, month of year, and year, and an indicator of immigrant status. Also included is the total amount of time the woman lists as being alone or with someone else. Married women are the excluded category. Standard errors in parentheses.

Table 8. Feelings and Widowhood, ATUS 2012-13, France 2009-10, U.K. 2014-15, Germany 2012-13*

	U.S.*	France**	U.K.**	Germany**
Dep. Var.			**Rushed*****	
Widow		-0.071	-0.022	-0.126
		(-0.036)	(0.024)	(0.065)
R²		0.120	0.121	0.097
N =		2,029	867	772
Mean married		0.363	0.120	0.442

Dep. Var.		**Upper-2/3 of Life Satisfaction*****		
New widow	-0.130	-------	-------	
	(0.115)			
Longer-term widow (or all widows)	-0.088	-0.271	-0.310	
	(0.034)	(0.081)	(0.053)	
R²	0.049	0.316	0.218	
N =	888	195	395	
Mean married	0.728	0.665	0.827	

*Additional covariates are vectors of age ranges, racial/ethnic identity, metropolitan status, region, day of week, month of year, and year, and an indicator of immigrant status. Married women are the excluded category.

**Based on the *Enquête Emploi du Temps*, 2009-10, the United Kingdom Time Use Survey, 2014-15, and the *Zeitverwendungserhebung*, 2012-13. Each equation includes indicators for five-year age intervals over age 69, educational attainment, immigrant status (except U.K.), and indicators of the day of the week, month of the year, and year. Married women are the excluded category.

***All estimates are based on sampling weights. Each equation includes indicators for five-year age intervals over age 69, educational attainment, immigrant status (except U.K.), and indicators of the month of the year. Married women are the excluded category.

Table 9. Adjustment Paths to Longer-term Widowhood*

Sample	Absolute Difference D_1	Relative Absolute Difference D_2
	Time Use	
5	0.932	0.933
6	0.923	0.924
	Who With	
5	0.961	0.901

*The estimates for time use are based on the coefficients in Table 3 and unpublished regressions. Those for "who with" are based on the coefficients in Table 7.

Figure 1. Distribution of the Population by Marital Status, Women 70+, ACS 2006-17.
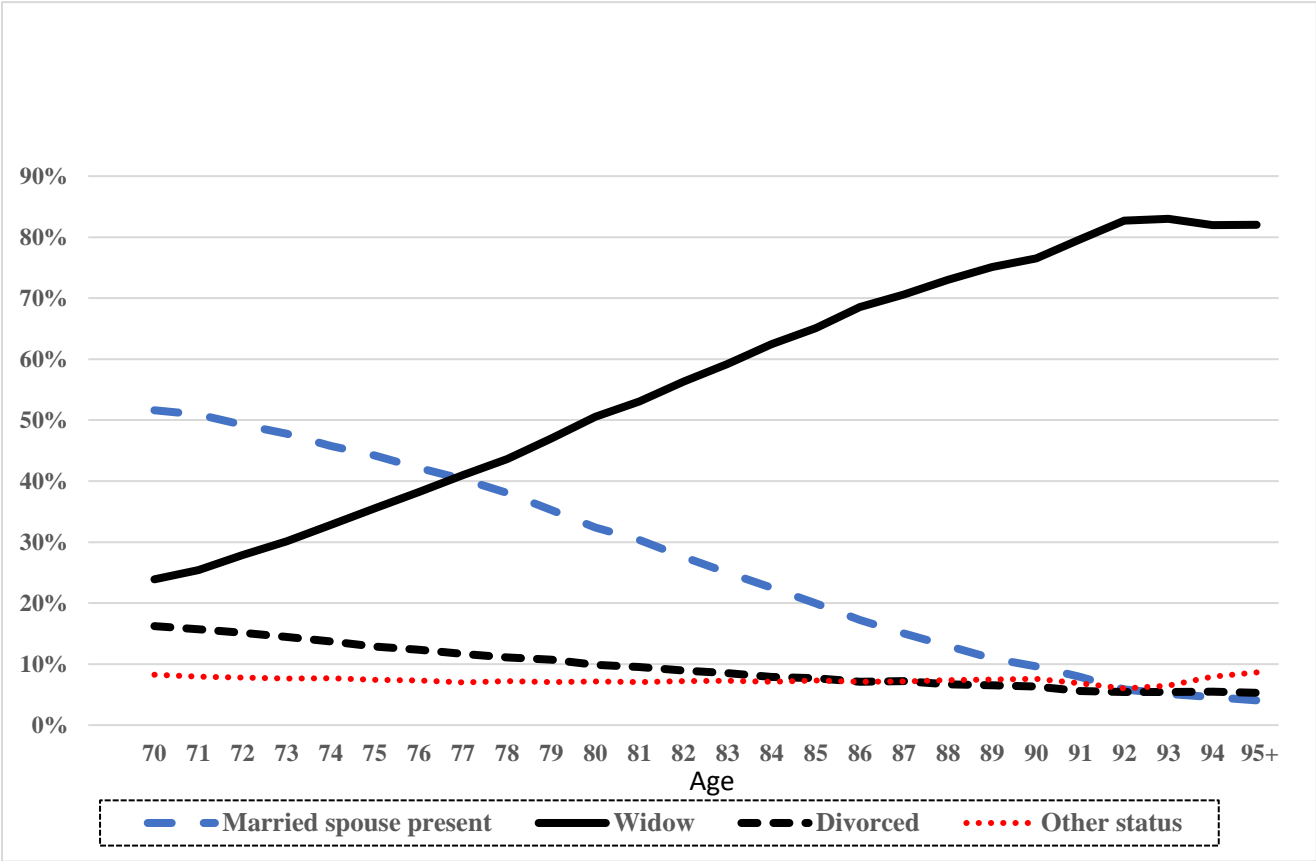
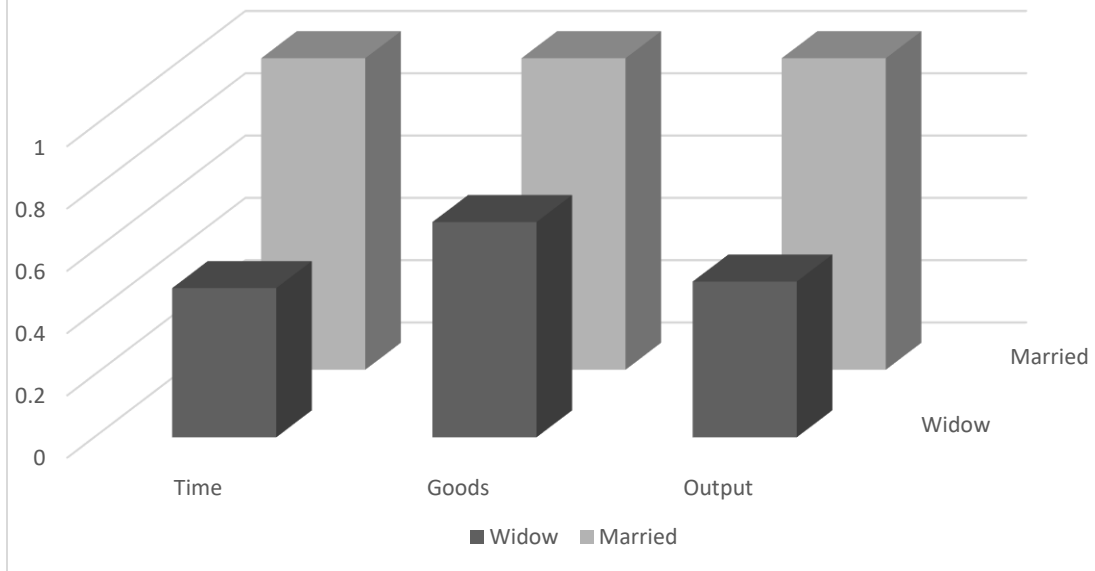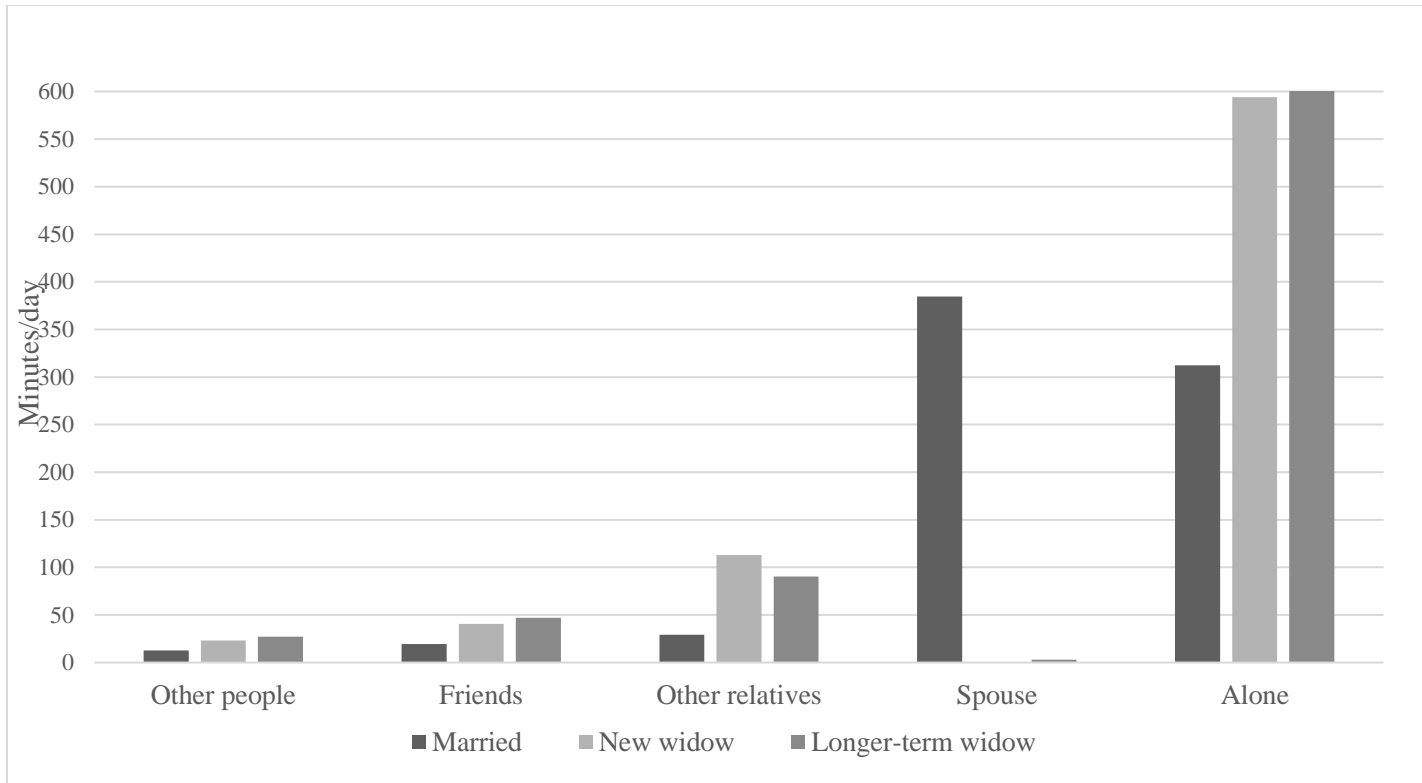Figure 2. Goods and Time Spending on Food at Home

Figure 3. Time Alone or with Various Others, Married, New Widows and Longer-term Widows, ATUS 2003-18.

Appendix A. The Time Use, "Who With" and Life Satisfaction of Divorcees

While divorcees are only half as many as married women in the samples of women ages 70+ (and only 1/5 as many as widows), the samples are sufficiently large to make a comparison of their behavior to that of widows and married older women worthwhile. In what follows I therefore compare their time use, who they spend their time with, their time stress and their happiness to those of women in the two groups analyzed in the text.

I initially re-estimate the models described in Equation (1), add divorced older women to Sample 5 and adding a variable indicating the woman is a divorcee.[29] Older divorcees' time use does not differ significantly from that of older widows except in one respect: Divorcees watch significantly more television than observationally otherwise identical widows, 23 minutes more per day, and spend commensurately less time in other leisure activities. Taken together, the differences in time use between divorcees and widows are almost statistically significant; and, like widows, divorcees' time use differs sharply from that of married older women.

Expanding the samples used to generate the results in Table 7 by adding older divorcees and including an indicator for them demonstrates that the identity of people with whom they spend time differs significantly from that of older widows. Divorcees spend significantly more less time with friends than do widows, about 8 fewer minutes per day, and also significantly less time with other relatives (15 minutes per day). They make up for this deficit by spending 24 minutes per day with other people than do widows. Although like widows divorced older women spend much more time alone than married older women, the difference between divorcees and widows is tiny and not statistically significant.

While the results in Table 8 show that longer-term widows are 10 percentage points less likely than otherwise identical married older women to respond that they are happy (life satisfaction at least 8 on a 10-to-0 scale), divorcees are 20 percentage points less likely than married older women to state that they are happy. Moreover, the differences in happiness between widows and divorcees is statistically significant.

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[29]The results are nearly identical if we use the slightly larger Sample 3 in these estimates and in those reported below.

Appendix Table B1. Probit Derivatives Describing Sample Selection, ATUS 2003-18*

Ind. Var.	Pr{Sample 2| Sample 1}	Pr{Sample3| Sample 2}	Pr{Sample 4| Sample 3}	Pr{Sample 5| Sample 4}	Pr{Sample 6| Sample 5}	Pr{Sample 5| Sample 2}
High school	0.024	-0.017	-0.086	-0.013	0.013	-0.082
	(0.011)	(0.011)	(0.016)	(0.012)	(0.010)	(0.016)
Some college	0.043	-0.040	-0.146	-0.028	0.020	-0.146
	(0.012)	(0.013)	(0.021)	(0.015)	(0.012)	(0.019)
College	0.028	-0.071	-0.190	-0.014	0.038	-0.182
	(0.015)	(0.018)	(0.027)	(0.018)	(0.012)	(0.023)
Masters	0.043	-0.137	-0.199	-0.047	0.051	-0.241
	(0.015)	(0.020)	(0.028)	(0.023)	(0.012)	(0.023)
Doctorate	0.066	-0.180	-0.133	-0.132	-0.042	-0.271
	(0.029)	(0.046)	(0.028)	(0.061)	(0.052)	(0.048)
African-American	0.011	-0.109	0.102	0.041	0.024	0.026
	(0.012)	(0.014)	(0.013)	(0.008)	(0.010)	(0.048)
Non-black Hispanic	0.017	-0.085	0.108	0.034	0.061	0.044
	(0.016)	(0.019)	(0.017)	(0.011)	(0.010)	(0.023)
Asian-American	-0.051	0.058	0.144	0.005	0.081	0.176
	(0.039)	(0.023)	(0.023)	(0.024)	(0.008)	(0.038)
Other race	-0.094	-0.056	0.091	-0.082	0.061	-0.024
	(0.048)	(0.044)	(0.045)	(0.085)	(0.026)	(0.070)
Age 75-79	-0.002	0.029	-0.002	0.045	-0.011	0.065
	(0.010)	(0.008)	(0.014)	(0.008)	(0.011)	(0.014)
Age 80-84	0.016	0.056	-0.015	0.078	-0.011	0.102
	(0.011)	(0.008)	(0.014)	(0.007)	(0.011)	(0.014)
Age 85+	-0.083	0.075	-0.005	0.080	0.022	0.137
	(0.013)	(0.010)	(0.016)	(0.006)	(0.012)	(0.016)
Pseudo-R^2	0.007	0.029	0.030	0.066	0.016	0.026
Mean dep. var.	0.783	0.798	0.792	0.917	0.894	0.580

*Standard errors in parentheses.