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Work, Health, and Family at Older Ages in Japan

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Abstract

In this paper, we investigate ways in which the relationship between health and labor force exit at older ages is moderated by family characteristics. Using two waves of data from a national sample of older Japanese men collected 1999 and 2002, we estimate logistic regression models for labor force exit beyond age 63 as a function of health change, family characteristics, and their interactions. We confirm that poor health is strongly associated with labor force exit and find evidence that moderating influences of family context depend upon the level of health. However, results are only partially consistent with hypotheses that the relationship between health and the likelihood of labor force exit should be stronger for (a) those with good health and family incentives to exit the labor force and (b) those with poor health and family incentives to remain in the labor force.

Keywords

Employment; Retirement; Health; Family

Employment beyond typical ages of retirement (i.e., 60–65) is a subject of growing interest to policymakers, employers, and scholars in rapidly aging industrialized societies. Recognizing that older men and women will need to work longer in order to limit the economic impact of changes in population age structure, many countries have begun to implement policy changes designed to encourage continued economic activity at older ages (Clark and Quinn 2002). Other changes in the context of retirement also suggest the possibility of increasing labor force attachment beyond typical retirement ages. In the U.S., for example, changes in the nature of private pension plans, inadequate financial preparation for retirement, and changing attitudes and expectations suggest that more older Americans will continue to work beyond retirement.

Recent studies have documented important changes in retirement behavior, including the slowing or reversal of the long-term trend toward earlier retirement (Friedberg 2007) and increases in both gradual retirement and post-retirement returns to the labor force (Mutchler et al. 1997; Ruhm 1990). Unfortunately, however, we currently know very little about the correlates of work transitions beyond typical retirement ages. The scarcity of relevant research likely reflects the fact that levels of labor force participation at older ages are very low in most industrialized countries. In the U.S., for example, the labor force participation

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rate above age 65 was only 18% for men and 9% for women in 2000. In most western European countries, the corresponding figures are substantially lower (Kinsella and Velkoff 2001).

Japan is an exception to this general pattern. The majority of men remains in the labor force beyond age 60, the age of mandatory retirement for nearly all private company employees. A sizable minority also continues to work beyond age 65, the age of full eligibility for public pension benefits. In 2000, the labor force participation rate of Japanese men was 72% at age 60–64 and 35% at age 65 and above. The corresponding figures for women were also relatively high at 39% and 14%, respectively. In combination with other distinctive social and economic characteristics discussed below, these high rates of labor force participation make Japan a potentially rich source of insight about work behavior beyond typical retirement ages.

In this paper, we focus on the labor force transitions of older Japanese men to further our understanding of the relationship between health and employment at older ages in two important ways. First, we pay attention to the ways in which relationships between health decline and labor force exit beyond age 63 may be moderated by family incentives to either exit or remain in the labor force. Second, we consider whether moderating influences of family circumstances depend upon the level of health. As we discuss below, it may be that older men who remain in good health may have a higher probability of leaving the labor force in response to health decline if they also have family incentives to exit the labor force (e.g., caregiving responsibilities). In contrast, poor health may result in a higher probability of labor force disengagement for those with family incentives to continue working (e.g., financial responsibilities).

Background

The changing context of retirement

Rapid population aging in industrialized countries is projected to result in labor shortages as well as shortfalls in existing public pension and health care systems (e.g., Gruber and Wise 1999, 2001; National Research Council 2001). Long-term trends toward earlier retirement among older men (Kohli et al. 1991) and increasing longevity have magnified concerns about the impact of changes in population age structure. Many countries have begun to address these concerns by shifting away from longstanding policy efforts to encourage earlier retirement in favor of efforts to encourage continued economic activity at older ages (OECD 2006). These policy changes include increasing the age of full eligibility for public pension benefits, lengthening the period of required contributions, reducing benefit levels, and removing tax disincentives to continued employment (Burtless and Quinn 2001; OECD 1998).

At the same time, the increasing prevalence of defined contribution pension plans (Burtless and Quinn 2001; Munnell, Cahill, and Jivan 2003), inadequate financial preparation for complete withdrawal from the labor force (Munnell, Golub-Sass, and Webb 2007), increasing variation in pathways to retirement (Mutchler et al. 1997), and greater interest in working beyond typical retirement ages (AARP 2004) all suggest potential increases in labor force participation among older Americans. These changes underscore the importance of better understanding labor force transitions at older ages. For example, assuming continued improvements in health at older ages (e.g., Manton and Gu 2001), it is important to know for whom and under what circumstances this trend is most likely to contribute to higher levels of labor force participation. Evidence of widespread intentions to work beyond retirement also points to the importance of better understanding the kinds of legislation or workplace policies that might be implemented to facilitate continued attachment to the labor

force. Currently, we know a good deal about pension incentives and other correlates of early and “on-time” retirement (e.g., Leonisio 1996; Quinn and Burkhauser 1994) but very little about the correlates of work at older ages.

The small body of existing research on the correlates of labor force transitions beyond typical retirement age demonstrates the importance on non-institutional factors such as work commitment, family circumstances, and especially health (Haider and Loughran 2001; Hayward, Hardy, and Liu 1994; Maestas 2004; Parnes and Sommers 1994; Williamson and McNamara 2001). The powerful role of health reflects both linkages between health and retirement timing (Deschryvere 2005) and the primary motivations for employment beyond typical retirement age. For example, economic necessity and the desire to remain active and engaged with work presumably provide strong incentives to remain in the labor force until changes in health necessitate exit. These previous studies offer important insights into the roles of health, family, attitudes, and other key correlates of employment beyond retirement age but the selective nature of later-life work in the U.S. and most other countries limits our ability to generalize observed relationships. The relatively high levels of labor force participation of older Japanese men thus provide a valuable opportunity to begin filling this gap in our understanding, thereby facilitating an informed view about future trends in labor force participation at older ages.

Work, health, and family at older ages in Japan

In addition to the relatively high levels of labor force participation, several other distinctive features of work, health, and family circumstances at older ages make Japan a potentially informative setting. First, Japan has the longest life expectancy in the world, implying relatively good health among the young-old and relatively strong financial incentives to continue working beyond retirement (Clark and Ogawa 1997). Among 65–69 year old men surveyed in recent years, 19% reported that a health condition affects their daily life (Ministry of Health, Labour, and Welfare 2004) while 62% reported that they were working primarily for financial reasons (Ministry of Health, Labour, and Welfare 2002). Non-financial motivations to work are also important, with 50% of 60–69 year old men reporting that they want to work as long as physically possible (Economic Planning Agency 1990). This strong desire to continue working is thought to reflect the centrality of work to many older men’s identity in Japan, where many cite *ikigai* or purpose in life as a primary reason for working (Seike and Yamada 2004).

Second, the family structure and family relationships of older Japanese differ in important ways from those of their counterparts in western societies. The most striking difference is the prevalence of coresidence with adult children. Intergenerational coresidence has declined over the past thirty years but remains common, with 49% of those age 65+ living with a child(ren) in 1995 (Raymo and Kaneda 2002). Relationships between living arrangements and employment at older ages presumably depend on the motivations for coresidence and the relative economic circumstances of older parents and their adult children. On the one hand, coresident children are an important source of economic support, thus facilitating parents’ labor force exit at older ages. On the other hand, children are a major economic responsibility, and may thus represent a strong incentive to remain in the labor force. Ogawa (2000) finds evidence for both relationships, with labor force participation of 60–64 year-old men highest among those coresiding with financially dependent children and lowest among those coresiding with financially independent children.

Third, the institutional context of later-life work in Japan differs markedly from that in most other industrialized countries. Unlike in the U.S., phased retirement and post-retirement employment are not new patterns in Japan. For most wage employees, the retirement process typically begins at age 60 with mandatory retirement (*teinen taishoku*) (Seike 1998; Seike

and Yamada 2004). Among 65–69 year-old men surveyed in 2000, 65% had experienced mandatory retirement (Ministry of Health, Labour, and Welfare 2002). At the time of mandatory retirement, almost all private employees receive lump-sum severance payments that are, on average, equivalent to approximately three years of earnings (Clark and Mitchell 2002). Because retirees are not eligible for full public pension benefits until age 65 (Seike 1998), a large proportion of current cohorts of older Japanese have embarked on second careers from which they “re-retire” at a variety of ages (Kimura and Oka 2001). Pathways into these post-retirement jobs depend to a large extent on characteristics of the career job. For those retiring from larger companies with lifetime employment policies and reemployment programs, it is not uncommon to continue working in the same company or to be transferred to an affiliated company (Kimura & Oka, 2001). Others may find employment in different types of work, perhaps in self-employment or perhaps via work agencies (Bass 1996).

Self-employment is very common among older Japanese. Data from the 2000 Population Census of Japan indicate that 44% of male labor force participants age 60 and over were self-employed. Among the self-employed, 65% were working in either primary sector or retail occupations (Raymo et al. 2004). High levels of self-employment reflect the prevalence of self-employment across the life course of current cohorts of older men and women as well as transitions to self-employment subsequent to retirement. Because self-employed workers are eligible only for the relatively limited benefits provided by the basic public pension plan starting at age 65 (Yashiro and Oshio 1999), economic necessity is an important reason for higher levels of labor force attachment among the self-employed. Relatively high levels of self-employment among older Americans (Karoly and Zissimopoulos 2003), growth in “non-standard” employment earlier in the life course (Tilly 1996), and large proportions of pre-retirement Americans whose post retirement plans include self-employment (AARP 2004) suggest the general relevance of the Japanese case.

In sum, distinctive features of work, family, and health circumstances at older ages in Japan provide us with a unique opportunity to extend our understanding of the conditions under which poor health impacts labor force exit beyond typical retirement ages. Existing studies of work and health at older ages in Japan are extremely limited in comparison with research on retirement in the U.S. However, two recent studies based on longitudinal data demonstrate the powerful effect of poor health on labor force exit (Clark et al. 2004; Raymo et al. 2004). A small number of studies have focused on the role of family characteristics (see Nagase 1999; Ogawa 2000; Raymo et al. 2004) but potentially important moderating influences of family characteristics on the relationship between health and labor force participation have yet to be examined.

Health decline, family context, and labor force exit at older ages

It is surprising that existing work has paid little attention to the ways in which the impact of health on labor force exit at older ages may be conditioned by other factors. Studies of early and “on-time” retirement have repeatedly demonstrated that the relationship between poor or declining health and labor force exit depends upon individual characteristics such as age, race, financial circumstances, job characteristics, and family characteristics (Bound, Schoenbaum, and Waidmann 1996; Burr et al. 1996; Hayward, Friedman, and Chen 1998; Hayward and Grady 1990; Hayward et al. 1989; Mutchler et al. 1999). We expect similar relationships to be important for understanding behavior beyond typical retirement ages. Not only are the family circumstances of older men and women more heterogeneous than at younger ages, they are also projected to change significantly in the coming years as cohorts who have experienced dramatic changes in fertility, divorce, and remarriage approach retirement age (Hughes and O’Rand 2004). Increasing longevity of older parents and smaller

sibship size are also expected to result in important changes in family obligations (Pavalko and Henderson 2005).

Past research has identified several ways in which family relations and obligations influence the attractiveness or necessity of continued work relative to full retirement. For example, the retirement-promoting effects of caregiving and provision of other forms of instrumental support are thought to reflect the incompatibility of work and caregiving roles (Dentinger and Clarkberg 2002; Pavalko and Artis 1997). Similarly, the negative association between labor force exit and the presence of economically dependent family members (Szinovacz, De Viney, and Davey 2001) is thought to reflect obligations to provide financial support. Studies of spousal influences on retirement suggest that joint retirement and the positive association between marital quality and labor force exit reflect a desire for shared leisure (Gustman and Steinmeier 2002).

How do these family incentives to remain in or exit the labor force moderate the impact of health decline? In one of the only studies to address this question, Mutchler et al. (1999) concluded that the marginal impact of poor health or health decline on the decision to stop working is strongest for those with incentives “to pursue work attachment as long as health does not become so poor as to intervene” (p. S253). Conversely, the association between poor health and labor force exit was found to be weaker among those with incentives to leave the labor force (e.g., having a non-working spouse). We adopt these findings as our baseline hypothesis.

We also extend this baseline hypothesis by recognizing that the moderating influences of family characteristics may depend upon the level of health. As depicted in Figure 1, we posit that interactive relationships between health change and family characteristics for those who remain in relatively good health may be different than for those in worse health. The 45 degree line is a stylized representation of the well-established positive relationship between poor health (horizontal axis) and the probability of leaving the labor force at older ages (vertical axis). We can think of this line as representing the expected relationship between health and the likelihood of labor force exit for those without family incentives to either exit or remain in employment.

For those with family incentives to exit or remain in employment, we posit a non-linear relationship between health and the likelihood of labor force exit. The thin broken line represents the posited relationship between health and labor force exit for those with family incentives to remain in the labor force. For those in relatively good health, the relationship is expected to be relatively weak, as minor health problems are endured in order to fulfill economic obligations (segment A of Figure 1). This hypothesis would be consistent with a negative coefficient for the interaction between health and family incentives to remain in the labor force for those who remain below some threshold of poor health. However, as demonstrated by Mutchler et al. (1999), the relationship between health and employment may become particularly strong beyond a threshold at which poor health makes it difficult or impossible for those with incentives to continue working to do so. As described by segment B, this hypothesis would be consistent with a positive coefficient for the interaction between health and family incentives to remain in the labor force for those beyond this threshold of poor health.

In contrast, small differences in health may have a large impact on the probability of exit for those with incentives to leave employment, even among those who remain in relatively good health (segment C). This hypothesis would be consistent with a positive coefficient for the interaction between health and family incentives to exit the labor force below some threshold of poor health. Beyond this threshold, however, health may become less important

relative to other factors (e.g., job satisfaction) although the likelihood of exit remains relatively high (segment D). This would be consistent with a process in which older workers most likely to respond to changes in health (among those with family incentives to exit the labor force) are progressively removed from risk of exit, leaving a subgroup of respondents who are less responsive to changes in health. We thus posit that the estimated coefficient for the interaction between health and family incentives to exit the labor force will be negative beyond the threshold of poor health.

It is important to recognize that, if the moderating influences of family characteristics do indeed operate as depicted in Figure 1, previous studies may have failed to identify these relationships. If the exit-dampening (accelerating) effects of incentives to remain in (exit) the labor force for those in relatively good health are offset by contrasting relationships for those in relatively poor health, estimated coefficients for the interaction between health and family (or other non-family) incentives to remain in or exit the labor force may be close to zero. This scenario would be consistent with the relatively limited evidence of moderation found by Mutchler et al. (1999) across a range of posited incentives to remain in or exit the labor force.

Methods

Data

We evaluate the hypothesized interactive relationships between health, family circumstances, and the likelihood of labor force exit using data from the National Survey of Japanese Elderly (NSJE). The NSJE is a longitudinal survey of a nationally representative sample of non-institutionalized men and women age 60 and above conducted at three-year intervals beginning in 1987. Supplementary samples were added in 1990 (60–62 years old), 1996 (60–65 years old), and 1999 (70+ years old). Compared with the data employed in previous studies of later-life labor force participation in Japan, the NSJE data possess three notable strengths. First, its panel design allows us to examine relationships between work status transitions and changes in health. Second, the NSJE also contains a comprehensive array of health measures, whereas most previous analyses have relied exclusively on measures of self-rated health (Ogawa 2000; Oishi and Oshio 2000; Seike and Yamada 2004). Third, available information on family structure and family relationships is richer than in other surveys.

Because questions about family exchanges were not asked in earlier waves, we base our analyses on data from waves 5 (1999) and 6 (2002). Wave 5 respondents include surviving members of the previous survey in 1996 (age 63+ in 1999) and a supplemental sample of respondents age 70 and older. The sample size for this survey was 3,483 and the response rate was 75%. Among these wave 5 respondents, 75% were observed again in 2002, 7% (n=247) died before the wave 6 survey, 11% (n=373) were lost to follow up, and information on another 7% (n=234) was obtained through proxy interviews. Because respondents age 70+ were oversampled in wave 5, we weighted the data to reflect the age distribution of non-institutionalized men age 63 and above in the 2000 census. We base our analyses on the subsample of male respondents who were working at wave 5 (n = 522). The weighted proportion employed at wave 5 (.40) was similar to the corresponding figure for men age 63 and over in the 2000 census (.39).

Measures

The primary variables of interest are labor force exit, health, and family characteristics. Our measure of labor force exit classifies respondents into three categories: those no longer working at wave 6 (i.e., at ages 66+), those remaining in the labor force at wave 6, and those

who died or were lost to follow-up. As shown in the first three rows of Table 1, 58% remained in the labor force, 26% were no longer working, and 17% died or were lost to follow-up between waves.

We measure health as the predicted probability of being in fair or poor health from an ordered logistic regression model of self-rated health (scale of 1 to 5) as a function of several objective measures of health status, including Nagi's (1976) index of functional limitations (ranging from 0–7), the number of serious diseases/conditions (ranging from 0–5), the number of chronic conditions (ranging from 0–15), and a modified version of Pfeffer's (1975) index of cognitive functioning (ranging from 0–9). Results of this model (not shown) indicated that these four objective measures are strongly related self-rated health. Coefficients for each were large in magnitude and statistically significant. The pseudo- R^2 for the model was .12.

This approach to measuring health is a simplified version of the method implemented by Bound et al. (1996, 1999) and is appealing for several reasons. First, it provides a single-value summary of the theoretically relevant information on objective health status available in the survey. Because we are interested in assessing the extent to which family context moderates the relationship between health decline and labor force exit in a relatively small sample, it is essential that we measure health parsimoniously. Second, using predicted values in this way limits potential measurement problems associated with self-rated health. Because we are interested in assessing the differential impact of health across family characteristics that are theoretically linked with normative incentives to remain in or exit the labor force, it is important to reduce the potential bias associated with a tendency to report worse health as a “justification” for not working. Stated differently, we use more objective measures of health to predict self-rated health in order to reduce variation associated with individual differences in the subjective scale on which respondents evaluate their health (Bound 1991). Third, predicted probabilities provide an intuitively meaningful metric with which to measure health status.

Table 1 indicates that the predicted probability of being in one of the two worst categories of self-rated health was 9% at baseline and 12% three years later. This relatively small average increase in the probability of being in fair/poor health reflects the fact that health decline was offset to some extent by improvement in health. One-third of our sample experienced a decline across waves in the predicted probability of being in fair/poor health.

We consider six measures of family structure and family relationships, all of which were measured in 1999. Three dichotomous measures of family exchanges indicate whether or not respondents (a) provided living expenses to a child(ren) in the previous year, (b) provided instrumental support (shopping, domestic work, childcare) to family members on a weekly basis during the past year, or (c) provided physical care to a family member during the past year. Financial support to children is a potentially important incentive to remain in the labor force whereas provision of instrumental support and caregiving both represent potential incentives to exit the labor force. Table 1 shows that the proportion providing financial assistance to children (.17) and caregiving to family members (.10) was relatively low. Provision of instrumental support was much more common, with 46% of older employed men reporting that they provided assistance with childcare, shopping, or housework on a weekly basis during the previous year.

Two dichotomous measures of living arrangements indicate whether or not respondents were coresiding with an unmarried child(ren) or a married child(ren) in 1999. We distinguish between married and unmarried coresident children in an attempt to represent children as both potential recipients of financial support or caregiving and potential sources

of economic, physical, and emotional support for older parents (Ogawa 2000; Raymo et al. 2004). We posit that unmarried children are more likely to represent financial obligations to remain in the labor force to the extent that they are younger, less financially secure, and have yet to receive parental assistance with wedding expenses and the transition to independent living. In contrast, coresidence with married children may provide incentives to exit the labor force to the extent that married children are older, more economically capable of supporting the household, and more likely to need or desire grandparental provision of childcare. Slightly more than one-fourth of the employed men in our sample were coresiding with an unmarried child(ren) and a similar proportion was coresiding with a married child(ren).

Finally, we construct a three-category variable that classifies respondents according to marital status and spouse's employment status in 1999 not married, married and spouse not working, married and spouse working. Only a small minority of the sample (7%) was unmarried and, among those who were married, 54% had a working spouse. Older men's identification with the role of primary provider should provide a strong incentive to continue working as long as one's wife remains in the labor force. We therefore posit that the association between health decline and labor force exit for men with a working wife will be relatively weak for those in relatively good health and/or relatively strong for those in relatively poor health at follow-up.

We control for several characteristics related to work status at older ages, including age, education, employment type, mandatory retirement experience, and economic circumstances, all of which were measured in 1999. Because sample size is not large ($n=522$), we represent these baseline characteristics as parsimoniously as possible. We specify age as a linear spline with a knot at age 77 (i.e., age 80 at follow-up in 2002). The relationship between age and the log-odds of labor force exit is thus assumed to be linear between ages 63 and 77 and linear with a different slope beyond age 77. This specification is based on preliminary, descriptive analyses indicating a relatively steady increase in the probability of labor force exit through age 77 and large fluctuations in exit probabilities for the small number of respondents remaining in the labor force beyond age 77. Educational attainment has three categories: elementary school, middle school/high school, and college. Employment type distinguishes self-employed respondents from employees and a dichotomous indicator of whether the respondent retired from a job between the ages of 50 and 60 is included as a proxy for the experience of mandatory retirement.

We expect that economic need and flexible work will contribute to a lower likelihood of labor force exit among the self-employed whereas higher pension wealth, shorter job tenure, and the relatively low pay and limited job security associated with post-retirement jobs (Kimura and Oka 2001) will result in a higher likelihood of exit among those who have previously retired. We include three measures of economic status – respondents' earnings, per capita household income, and self-stated satisfaction with financial circumstances. The measure of respondents' earnings refers to income from employment and is constructed using the midpoints of categorical income response categories. Per capita income is constructed by dividing the midpoints of the categorical values of total household income by the number of individuals reported on the household roster. For both of these income measures, we assign the mean value to those who did not respond to the question and include dichotomous indicators of missing data. Satisfaction with financial circumstances is measured dichotomously, with those who were not satisfied distinguished from those who were satisfied or neutral. We anticipate that economic need will be reflected in a relatively lower likelihood of labor force exit among those with lower per capita household income as well as those who are dissatisfied with their financial circumstances whereas higher

opportunity costs of retirement will be reflected in a relatively lower likelihood of labor force exit among those with higher earnings.

Models

Because non-random attrition due to either death or non-response may result in biased estimates of the correlates of labor force exit (Hayward et al. 1989), we treat loss to death or follow-up between waves as a competing risk by estimating multinomial logistic regression models. We begin by estimating the following baseline model:

$$\ln[p_{ij2002}/p_{i02002}] = \alpha_j + \beta_{1j}h_{i1999} + \beta_{2j}h_{i2002} + \delta'_jX_{i1999} + \gamma'_jY_{i1999}, \quad (1)$$

where p_{ij2002} is the probability that the i^{th} respondent is in labor force status j (j =out of the labor force, dead/non-response/proxy response) in 2002 and p_{i02002} is the probability that the i^{th} respondent remained in the labor force. To assess the role of health decline in prompting labor force exit, we include both health status in 1999 (h_{i1999}) and health status at follow-up (h_{i2002}). X includes the measures of age, education, self-employment status, retirement experience, and economic circumstances and Y includes the six family characteristics summarized above. This baseline model establishes the average associations of health and family circumstances with the likelihood of labor force exit between waves. The coefficient of primary interest in this baseline model is β_2 , the difference in the log-odds of labor force exit between waves associated with a one percentage point increase in the predicted probability of being in poor health, net of baseline health. We expect this linear relationship between poor health and labor force exit to be positive.

To evaluate the hypothesized moderating influences of family characteristics, we first extend the baseline model to include interactions between health at follow-up and family characteristics:

$$\ln[p_{ij2002}/p_{i02002}] = \alpha_j + \beta_{1j}h_{i1999} + \beta_{2j}h_{i2002} + \delta'_jX_{i1999} + \gamma'_jY_{i1999} + \eta'_j(h_{i2002} * Y_{i1999}). \quad (2)$$

Because sample size is small, we estimate separate models for interactions between health in 2002 and each of the six family characteristics. We evaluate the posited moderating influences of family characteristics by examining the direction, magnitude, and statistical significance of η in the contrast between exiting and remaining in the labor force. Our baseline hypothesis suggests that η should be positive when health is interacted with family incentives to remain in the labor force (e.g., providing financial support) and negative when health is interacted with family incentives to exit the labor force (e.g., caregiving).

Finally, we estimate a series of models in which the interactive relationships between health and family characteristics are allowed to vary by the level of health. Based on the shape of the interactive relationships posited in Figure 1, we specify the predicted probability of being in fair or poor health at follow up (h_{i2002}) as a linear spline with one knot. For each model, this allows us calculate four separate slopes for the relationship between health and labor force exit. “Main effects” represent relationships between health and labor force exit for those without family incentives to remain in or exit the labor force. For this group, we expect slopes to be similar for those in good health and those with higher predicted probabilities of being in fair/poor health. Interaction coefficients indicate the extent to which slopes associated with better and worse health differ depending on family circumstances. We thus expect that η associated with the segment representing better health will be negative for family incentives to remain in the labor force (segment A of Figure 1) and positive for family incentives to exit the labor force (segment C of Figure 1). Similarly, we

expect that η associated with the segment representing worse health will be positive for family incentives to remain in the labor force (segment B of Figure 1) and negative for family incentives to exit the labor force (segment D of Figure 1).

In the results presented below, we place the knot connecting the two segments at a predicted probability of fair/poor health equal to 7%. This somewhat arbitrary threshold splits the sample into two groups of roughly equal size with 53% of those observed in 2002 below this value and 47% above. To facilitate interpretation of the estimated interaction coefficients, we rescale the predicted probability of poor health so that both segments of the spline are of equal length (i.e., by collapsing the 94 values in the 7%–100% range into eight values). Supplemental analyses (not shown) indicate that results are robust to small changes in the placement of the knot.

Results

Table 2 presents estimated coefficients for baseline models in which health in 2002 is specified as a single linear term (columns 1 and 2) and as a two-segment linear spline (columns 3 and 4). Coefficients represent the log-odds of labor force exit or death/loss to follow-up/proxy interview (relative to remaining in the labor force) associated with a one-unit difference in the independent variables. As expected, health decline is strongly correlated with the risk of labor force exit. Net of baseline health, a one percentage point increase in the predicted probability of being in fair/poor health at follow-up is associated with a 6% increase in the odds of leaving the labor force. A one standard deviation in this measure of health status is thus associated with a doubling of the odds of leaving the labor force (i.e., $\exp [.06 \times 15.10] = 2.47$). Poor baseline health is unrelated to men's labor force behavior, in contrast to findings from the U.S. (Bound et al. 1999).

Treating health as a linear spline indicates that the positive relationship between poor health and the likelihood of labor force exit is approximately linear, with no statistical difference between the slopes of the two segments (.43 and .36, respectively). The slopes of these two components of the linear spline are substantially larger than the slope for the linear measure of health in model 1 (i.e., .05) because the scale on which health is measured has been compressed. The slope in the first model indicates change in the log-odds of labor force exit for a one percentage point increase in the predicted probability of being in poor health on a scale of 0–100 whereas slopes in the second model are the differences in log-odds associated with of a one-unit change in health on a scale of 0–16 (i.e., 0%–7% in the first segment and an eight point compression of 7–100% in the second segment).

Family characteristics are largely unrelated, on average, to labor force exit. Exceptions indicate that, consistent with older men's role as family provider, the likelihood of leaving the labor force is significantly lower for those coresiding with unmarried children and those with a working wife. Coefficients for other variables in the model indicate that the likelihood of labor force exit is positively associated with age through age 77 and negatively associated with low education, high education, self-employment, and earnings. The relatively flat slope beyond age 77 (age 80 in 2002) reflects large fluctuations in the age-specific odds of labor force exit among the small number of men observed at these older ages. The likelihood of death/loss to follow up/proxy is higher at older ages and lower among those coresiding with a married child(ren), those with a working spouse, and those with either relatively low or relatively high education.

Table 3 presents results of the interactive models. The estimated coefficients for health in 2002 (in italics) represent change in the log-odds of labor force exit (relative to remaining in the labor force) associated with a one percentage point increase in the predicted probability

of being in fair/poor health for respondents in the reference category of the family variable. The interaction coefficients thus represent the difference in the slope of the relationship between health and the log-odds of labor force exit for a given category of the family variables relative to the reference category. Using a continuous measure of health in 2002, our baseline hypothesis was that these interaction coefficients will be positive for family incentives to remain in the labor force and negative for family incentives to exit the labor force (as summarized in column 1). However, results for these models provided no evidence that family incentives to remain in or exit the labor force moderate the relationship between health decline and labor force exit for men. All of the coefficients for health were positive, statistically significant, and of similar magnitude but none of the interaction coefficients was significantly different from zero.

When health is specified as a linear spline, we expected the interaction coefficients to be consistent with the pattern described in Figure 1: negative for combinations of family incentives to remain in the labor force and good health (segment A) and family incentives to exit the labor force and poor health (segment D) but positive for combinations of family incentives to remain in the labor force and poor health (segment B) and family incentives to exit the labor force and good health (segment C). These expected relationships are summarized in columns 3 and 5. In five of these six models, we found that the slope of the relationship between health and the log-odds of labor force exit does depend upon both family characteristics and the level of health. In some cases, these significant interaction coefficients were consistent with the relationships posited in Figure 1. For example, among those providing instrumental support (a posited incentive to exit the labor force), the association between health and labor force exit was stronger for those in relatively good health (Model 3). Among men with a working spouse (a posited incentive to remain in the labor force) the association between health and labor force exit was weaker for those in relatively good health (Model 6).

At the same time, however, other significant interactive relationships were not consistent with our hypotheses. For example, coresidence with an unmarried child (a posited incentive to continue working) was associated with a stronger relationship between health and exit for those in relatively good health (Model 4). Provision of financial assistance is another posited family incentive to remain in the labor force that, contrary to our expectations, was associated with a stronger relationship between health decline and labor force exit among men in relatively good health (Model 1). Similarly, coresidence with a married child (a posited incentive to exit the labor force) was associated with a stronger relationship between health decline and labor force exit among those in relatively poor health (Model 5).

Overall, our results suggest that family context plays an important role in moderating relationships between health and labor force attachment at older ages. The substantive importance of these relationships is highlighted by the magnitude of the interaction coefficients. The fact that significant interaction coefficients are at least half as large as the coefficients for health indicates that these family incentives to remain in or exit the labor force are associated with more than a 50% decrease or increase in the effect of a given difference in health status on the likelihood of labor force exit. Nonetheless, the nature of these relationships is only partially consistent with our hypotheses, suggesting the need to rethink either our hypotheses or the measurement of family context (or both). We discuss these possibilities in the next section.

Discussion

In this study, we have extended research on work beyond retirement ages by examining the extent to which family circumstances moderate the relationship between health decline and

labor force exit among older Japanese men. Drawing upon previous research on health and retirement in the U.S., we began by evaluating the hypothesis that health decline should be a relatively strong correlate of labor force exit at older ages among those with incentives to remain in the labor force and a relatively weak correlate of exit for those with incentives to stop or reduce employment. We found no support for this hypothesis but our conclusions changed considerably when interactions between health and family circumstances were estimated separately for those in relatively good health and those in relatively poor health. Indeed, we found significant interactions between health and family circumstances in five of the six models we estimated. These results were partially consistent with the posited relationships described in Figure 1. For example, we found that, among those in relatively good health, the relationship between health and the likelihood of labor force exit is relatively strong for those providing instrumental support to family members (a posited incentive to exit the labor force) and relatively weak among those whose wife was also working (a posited incentive to remain in the labor force).

At the same time, however, three of the five interactive relationships that we identified were not consistent with the hypotheses summarized in Figure 1. For example, we found that the relationship between health decline and labor force exit is particularly strong among older men who remain in relatively good health and have provided financial assistance to children or coreside with an unmarried child. It is not difficult to provide interpretations of these results that would be consistent with our hypotheses. For example, it may be that provision of financial assistance to children is less indicative of financial need on the part of children than it is of unmeasured wealth, reciprocation of financial assistance from children, or other financial circumstances that may facilitate labor force exit at older ages. Similarly, it may be that the circumstances of unmarried coresident children are more likely to change between waves than are those of married children. The fact that 21% of men coresiding with an unmarried child in 1999 were not doing so in 2002 suggests that unmarried children's transition to economic independence (e.g., graduating from school, marrying, achieving economic stability and independence) may remove an important incentive for older men to remain in the labor force. While these post-hoc interpretations are potentially informative, it is more important that our inconsistent findings be reevaluated with data that allow for less ambiguous measurement of family incentives to exit or remain in the labor force beyond typical retirement ages.

The limitations of this study leave several important tasks for subsequent research. For example, direct measures of exchanges should be used to reevaluate our findings based on indirect indicators such as coresidence with children and spouse's work status. The direct measures that we do have (provision of physical care, instrumental support, and financial support) refer only to the year before the baseline survey and subsequent studies should consider family transfers measured over a longer period of time as these exchanges may signify longer-term obligations that provide more powerful incentives to remain in or exit the labor force.

It is also important to note that our measures of exchange focused only on the provision of financial support and caregiving although it is possible that family exchanges in the other direction may also moderate relationships between health decline and labor force exit. For example, receipt of financial support from children or other family members may facilitate labor force exit in response to health decline whereas receipt of instrumental support may facilitate continued labor force attachment. An additional data limitation is our inability to precisely date inter-wave changes in labor force participation and health. Information on labor force status and health at two points in time represents a major improvement on the cross-sectional data used in most previous studies but this information alone is not sufficient for conclusions about causal influences of health decline on labor force exit.

Our decision to focus on health decline was motivated by its clear theoretical and established empirical relationships with labor force participation at older ages as well as attitudinal survey data indicating that many older Japanese men hope to work as long as they are physically able (Seike 1998). It is certainly plausible that the strength of other correlates of labor force exit at older ages, such as economic well-being and job satisfaction may also depend upon family incentives to remain in or exit the labor force. Finally, it is important that our results be replicated with a sample large enough to allow for both the simultaneous estimation of interactions between health decline and multiple dimensions of family context and more precise estimation of coefficients for other correlates of labor force transitions. A larger sample would also allow for finer distinctions in the level of health at which family incentives to remain in or exit the labor force are most important. Although we found that our results were relatively insensitive to small shifts in the health threshold at which the nature of moderating relationships was allowed to change, the ability to consider the role of family circumstances at more points in the health distribution (e.g., tertiles, quartiles) may shed further light on the nature of these interactive relationships. It may also be that the threshold at which the nature of moderating relationships changes depends upon type of employment or other characteristics, including space and time. We were not able to consider these higher-order interactions with the available data.

Another important task for subsequent studies is to extend our focus on men to evaluate gender differences in relationships between health, family, and work at older ages. We have chosen to limit our focus to men for purposes of clarity and because Japanese women's labor force participation at older ages is more selective than that of men. Rapid increases in female labor force participation across the life course in most aging societies (including Japan) highlight the importance of understanding of gender differences in relationships between work at older ages and its correlates including, but not limited to, health and family context.

We have chosen to focus on one industrialized country with substantial levels of post-retirement employment, long life expectancy, high levels of self-employment at older ages, and a longstanding policy emphasis on promoting extended labor force attachment in order to provide some initial insights into the complex mechanisms through which family context influences later-life labor force transitions. Our results suggest, for example, that policies encouraging workplace accommodation of changes in older workers' health (e.g., see Daly and Bound 1996) may facilitate continued employment of those who remain an important source of economic support for families. Similarly, our results also suggest that policies facilitating work-family balance (e.g., care leave, improved access to childcare, public provision of daycare for frail family members) may contribute to continued employment among older employees who provide care and instrumental support to other family members (e.g., see Pavalko and Henderson 2006). In addition to assessing the generality of our results by examining data from other countries, subsequent studies should take advantage of variation in exposure to these policies to evaluate the validity of our speculative conclusions.

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Figure 1.
Hypothesized Interactive Influences of Health and Family Context on the Likelihood of Labor Force Exit at Older Ages

Table 1

Sample Characteristics

<i>Variable</i>	<i>Proportion/Mean</i>	<i>s.d.</i>
Labor force transition		
Remain in labor force	0.58	
Exit labor force	0.26	
Lost to death/follow-up/proxy interview	0.17	
Predicted probability of fair/poor health in 1999	9.43	10.93
Predicted probability of fair/poor health in 2002	12.08	15.10
Provided financial assistance		
Yes	0.17	
No	0.83	
Provided caregiving		
Yes	0.10	
No	0.90	
Provided instrumental support		
Yes	0.46	
No	0.54	
Coresidence with unmarried child(ren)		
Yes	0.28	
No	0.72	
Coresidence with married child(ren)		
Yes	0.28	
No	0.72	
Spouse's work status		
Not married	0.07	
Married & spouse not working	0.43	
Married & spouse working	0.50	
Age	68.76	5.27
Education		
Elementary school (0–6 years)	0.05	
Middle School/High School (7–12 years)	0.81	
College (13+ years)	0.14	
Employment Type		
Employee	0.40	
Self-employed	0.60	
Retired between ages 50–60		
Yes	0.32	
No	0.68	
Per capita household income (million yen)	2.59	1.67
Household income missing		
Yes	0.25	

<i>Variable</i>	<i>Proportion/Mean</i>	<i>s.d.</i>
No	0.75	
Earnings (million yen)	2.30	2.75
Earnings missing		
Yes	0.28	
No	0.72	
Financial Satisfaction		
Satisfied	0.90	
Not Satisfied	0.10	
N	522	

Note: The analytic sample described in this table consists of men age 63 and over who were working at the time of the 1999 survey. With the exception of labor force transitions and the predicted probability of fair/poor health in 2002, all variables are measured in 1999.

Table 2

Estimated Coefficients from Baseline Models of Labor Force Exit

<i>Variable</i>	Health in 2002 – linear		Health in 2002 - linear spline	
	LF Exit vs. In LF	Death/NR vs. In LF	LF Exit vs. In LF	Death/NR vs. In LF
Predicted probability of fair/poor health in 1999	–0.03	0.00	–0.02	0.00
Predicted probability of fair/poor health in 2002	0.06**	----		
Predicted probability of fair/poor health in 2002 (0–7%)			0.43**	----
Predicted probability of fair/poor health in 2002 (7–100%)			0.36**	----
Provided financial assistance ^a	0.51	0.48	0.37	0.47
Provided caregiving ^a	–0.71	–0.32	–0.73	–0.35
Provided instrumental support ^a	0.41	–0.18	0.18	–0.20
Coresidence with unmarried child(ren) ^a	–0.61 [#]	–0.06	–0.64 [*]	–0.06
Coresidence with married child(ren) ^a	–0.02	–0.80 [*]	–0.15	–0.79 [*]
Spouse's work status ^b				
Not married	0.55	–0.58	0.57	–0.43
Married & spouse working	–0.64 [*]	–0.63 [#]	–0.77 [*]	–0.61 [#]
Age				
63–77	0.11**	0.06 [#]	0.11**	0.06
77+	0.02	0.22**	0.03	0.22**
Education ^c				
Elementary school	–1.63**	–1.22 [*]	–1.69**	–1.13 [*]
College	–0.59	–0.70 [#]	–0.76 [#]	–0.70 [#]
Employment Type ^d				
Self-employed	–1.09**	–0.13	–1.08**	–0.14
Retirement at age 50–60 ^a	0.30	0.08	0.28	0.07
Per capita household income (million yen)	0.05	0.06	0.08	0.06
Per capita household income missing ^a	–0.03	0.52	0.06	0.54
Earnings (million yen)	–0.33**	–0.03	–0.33**	–0.03
Earnings missing ^a	–0.65 [*]	0.10	–0.58 [#]	0.11
Financial Satisfaction ^e				
Not Satisfied	0.42	0.00	0.37	–0.05
Constant	–7.03**	–5.07 [#]	–9.10**	–4.96 [#]
N	522		522	
Df	39		40	
Pseudo R2	0.16		0.19	

**
p < .01,*
p < .05,

[#]
p < .10

Notes:omitted categories are (a) no, (b) married & spouse not working, (c) middle school/high school, (d) wage employee, (e) satisfied

Table 3

Odds Ratios for Labor Force Exit vs. Remaining in the Labor Force

Model	Health in 2002 = linear		Health in 2002 = linear spline			
			Segment 1: 0–7%		Segment 2: 7–100%	
	Expected	β_2 & η	Expected	β_2 & η	Expected	β_2 & η
Model 1: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.05^{**}	$\beta_2 > 0$	0.38^{**}	$\beta_2 > 0$	0.39^*
Provided financial assistance ^a	$\eta > 0$	0.03	$\eta < 0$	0.73^*	$\eta > 0$	–0.33
Model 2: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.06^{**}	$\beta_2 > 0$	0.41^{**}	$\beta_2 > 0$	0.38^*
Provided caregiving ^a	$\eta < 0$	0.01	$\eta > 0$	0.34	$\eta < 0$	–0.37
Model 3: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.05^{**}	$\beta_2 > 0$	0.34^{**}	$\beta_2 > 0$	0.45^*
Provided instrumental support ^a	$\eta < 0$	0.01	$\eta > 0$	0.22#	$\eta < 0$	–0.24
Model 4: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.05^{**}	$\beta_2 > 0$	0.37^{**}	$\beta_2 > 0$	0.30^*
Coresidence with unmarried child(ren) ^a	$\eta > 0$	0.05	$\eta < 0$	0.54^*	$\eta > 0$	0.29
Model 5: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.05^{**}	$\beta_2 > 0$	0.49^{**}	$\beta_2 > 0$	0.26^*
Coresidence with married child(ren) ^a	$\eta < 0$	0.02	$\eta > 0$	–0.22	$\eta < 0$	$0.39^{\#}$
Model 6: Predicted probability of fair/poor health in 2002	$\beta_2 > 0$	0.08^{**}	$\beta_2 > 0$	0.61^{**}	$\beta_2 > 0$	0.40^*
Not married ^b	?	0.02	?	–0.30	?	0.01
Married & spouse working ^b	$\eta > 0$	–0.04	$\eta < 0$	–0.35 [*]	$\eta > 0$	–0.06

**
p < .01,

*
p < .05,

p < .10

Notes: omitted categories are (a) no, (b) married, spouse not working