The effects of a wife’s retirement on her husband’s mental health among older adults in China

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ABSTRACT
Previous studies indicate that the spillover effects of retirement on spousal health-related outcomes are likely to vary significantly by gender and social context. Using data from China Health and Retirement Longitudinal Study (CHARLS) and adopting a regression discontinuity design, we examine the causal effects of a wife’s retirement on her husband’s mental health in urban China. In contrast to findings in Europe and Japan, we provide evidence showing improvements in husbands’ mental health after wives’ retirement. These results, along with previous studies, highlight the different roles retirement can play in spouses’ health in different cultural and institutional settings and call for studies of such effects on a case-by-case basis.

I. Introduction
With the ageing of the world’s population, the effects of retirement on health have been extensively studied. In recent years, a small but growing literature has been focusing on the cross-spousal effects of retirement on health. In Japan, Bertoni and Brunello (2017) find that a husband’s retirement negatively affects his wife’s mental health while the husband’s mental health is not affected by his wife’s retirement. In Europe, Müller and Shaikh (2018) find that one’s retirement increases the alcohol intake and reduces the physical activities of the partner, and the retirement of the husband negatively affects the wife’s subjective health status while the wife’s retirement has no impact on her husband’s same outcome. In contrast, Zang (2020) studies the spillover effects of a man’s retirement on his wife’s health in urban China and finds that a husband’s retirement improves his wife’s physical health and mental well-being.

These studies indicate that the spillover effects of retirement on spousal health-related outcomes is likely to vary significantly by gender and social context and warrant a case-by-case study.

In this paper, we extend this literature and examine the impact of a wife’s retirement on the mental health and health behaviours of her husband in urban China. Different from studies in developed countries, this study provides important evidence showing that a wife’s retirement improves her husband’s mental health in urban China.

II. Data
Our sample comes from 2011, 2013, and 2015 China Health and Retirement Longitudinal Study (CHARLS). We pool all three waves of CHARLS together and use the interview year and the household identification number to link husbands and wives. By doing so, we are able to link a husband’s mental health, as well as other outcomes and control variables, with his wife’s retirement status, age, and education.

In urban China, statutory retirement ages are 60 for males and 50 for females (for female civil servants, who only constitute a small portion of the population, the statutory retirement age is 55). Therefore, we normalize the retirement age by...
subtracting 50 for females. Since the statutory retirement age does not apply to rural China, we only include husbands whose wives are urban residents. This is defined by a woman’s household registration status (or Hukou) is urban. Following previous studies (Zhang, Salm, and van Soest 2018), we restrict the sample to residents aged between 40 and 75 and exclude husbands with wives who neither work nor report ‘processed retirement’. Finally, individuals with missing variables of interest are dropped from the analysis.

We use the following variables to measure mental health and subjective health: 1) the Center for Epidemiological Studies Depression Scale (CES-D) depression score, which ranges from 0 to 30 with a higher score signifying more severe depression; 2) the number of happy days in the past week; 3) the number of depressed days in the past week; 4) the number of lonely days in the past week; 5) the number of restless sleep days in the past week; and 6) a constructed variable, ‘self-reported health is good’, which equals one if self-reported health status is good or above and equals zero otherwise. In addition, we test two health behaviour outcomes including smoking (one if currently smoking, zero otherwise), and alcohol drinking (one if consumed alcohol in the past year, zero otherwise).

III. Methodology

We adopt a fuzzy regression discontinuity design (RDD) and exploit the discontinuity of women’s probability of retirement around the statutory retirement age as an exogenous variation to uncover the causal effect of a wife’s retirement on her husband’s health. To do so, we perform a local linear regression discontinuity estimation with robust bias-corrected confidence intervals (Calonico et al. 2017, 2019; Calonico, Cattaneo, and Titiunik 2014a, b). Bandwidths (common on both sides of the threshold) are selected based on the MSE-optimal bandwidth selector proposed by Calonico, Cattaneo, and Titiunik (2014b) and Cattaneo, Idrrobo, and Titiunik (2019). Additional covariates are included to eliminate small sample imbalances in observed variables and to improve estimation precision and inference (Imbens and Lemieux 2008; Lee and Lemieux 2010; Zang 2020). These covariates include the husband’s age and age squared; the wife’s age, age squared, and age cubic; whether the husband is older than 60; the husband’s middle school completion status, the husband’s childhood health, and year dummies.

The validity of an RDD requires no manipulation of running variables (i.e. wives’ normalized age) around the threshold. We assess the validity of our design both visually using a histogram of the continuous running variable and formally using a density discontinuity test of the running variable developed by Cattaneo, Jansson, and Ma (2018, 2020). Furthermore, the validity of an RDD requires there are no other changes in values of confounding factors that both correlate with the threshold and the outcomes. As such, we test whether there are systematic differences in individual characteristics that are correlated with the threshold (Imbens and Lemieux 2008; Lee, Moretti, and Butler 2004) by plotting husbands’ characteristics (i.e. age, middle school completion, and childhood health) against their wives’ normalized age. We also use an RDD to estimate the impact of wives’ retirement on their husbands’ middle school completion status and childhood health.

The visual assessment (shown in Figure S1) shows no evidence of substantial bunching around the threshold. The formal manipulation test of the running variable yields a test statistic of 1.1176 with an associated p-value of 0.2638, suggesting that the continuity of the normalized spousal age cannot be rejected. These assessments suggest that there is no manipulation of the running variable. Second, we do not observe discontinuity in husbands’ characteristics around the threshold (Figure S2) and find that wives’ retirement has no significant effect on husbands’ middle school completion status and childhood health (Table S1), further supporting that our RDD is valid.

IV. Results

Summary characteristics

Table 1 presents the characteristics of the full sample and that stratified by the wife’s retirement status. The average CES-D depression score is lower among husbands with retired wives, suggesting fewer depression symptoms.
In addition, although husbands with retired wives tend to report a lower level of self-rated health, they experience more happy days, fewer depressed days, fewer lonely days, and fewer restless sleep days in the past week. For health behaviours, those with retired wives are slightly less likely to be current smokers but more likely to have consumed alcohol in the past year.

**Discontinuity in the probability of retirement**

Figure 1 shows the probability of retirement for wives versus their normalized age (i.e. actual age minus the statutory retirement age of 50), and the probability of retirement for husbands versus their wives’ normalized age. We observe a clear jump in the probability of retirement for wives at the statutory retirement age threshold but no such pattern for husbands, suggesting that age 50 is a good discontinuity threshold for wives’ retirement status, and this discontinuity is not contaminated by changes in husbands’ retirement status (i.e. any changes in husbands’ health outcomes are solely due to their wives’ change in retirement status).

**Causal effect estimates**

Table 2 presents the effects of a wife’s retirement on the husband’s subjective health, mental health, and health behaviours (see Figure S3 for RDD plots). We find no evidence that a wife’s retirement status affects her husband’s self-reported health status. However, we observe a 3.4–6.2-point decline in the husband’s CES-D depression score and a statistically significant drop of 2.7–3.8 depressed days. We also find an increase of 2.2–3.2 happy days and a decline of 0.9–1.8 lonely days. Though the estimates of the effects on lonely days are not statistically significant, their magnitudes are overall large. In general, these results indicate an improvement in a husband’s mental health status caused by his wife’s retirement, especially through reducing his number of depressed days.

The point estimates for the drinking and smoking behaviours are also negative, which indicates that a husband’s health behaviours might have also improved after his wife’s retirement (we are less confident about this since the estimates are not statistically significant at conventional levels). As for the restless sleep days, the results suggest a wife’s retirement may lead to more restless sleep days for her
husband (the point estimates are positive, and the conventional estimate is statistically significant).

**Robustness checks**

We perform the following robustness tests. First, we use different bandwidths that are constructed by rescaling the optimal point estimation bandwidth by 50%, 75%, 125%, and 150%. The results (shown in Table S2) are similar to our main findings. Second, we perform a so-called ‘donut-hole’ estimation to investigate if our results are sensitive to observations close to the threshold by excluding observations around the threshold (Barreca, Lindo, and Waddell 2016; Cattaneo, Idrobo, and Titiunik 2019; Shigeoka 2014). Specifically, we perform three sensitivity analyses in which we exclude one month, two months, and three months of

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**Figure 1.** Probability of retirement by wife's normalized age, for wives and husbands. Note: RDD plots of the probability of retirement by wife's normalized age, for (a) wives and (b) husbands, respectively, with 95% confident intervals and a polynomial fit of order 4. We use a uniform kernel, apply individual sampling weight, and set the number of bins as 20 to the left and 25 to the right.
Table 2. Impact of a wife’s retirement on her husband’s self-reported health, mental health, and health behaviours.

|                          | Self-reported health is good | CES-D depression score | Depressed days in the past week | Happy days in the past week |
|--------------------------|------------------------------|------------------------|---------------------------------|-----------------------------|
| Conventional             | 0.178                        | −6.179*                | −3.813***                       | 3.180**                     |
|                          | (0.303)                      | (3.599)                | (1.427)                         | (1.619)                     |
| Robust                   | 0.147                        | −3.358                 | −2.773*                         | 2.192                       |
|                          | (0.356)                      | (4.015)                | (1.534)                         | (1.868)                     |
| Bandwidth                | 2.484                        | 2.713                  | 2.717                           | 2.500                       |
| N                        | 2,543                        | 2,320                  | 2,366                           | 2,358                       |
| Conventional             |                             |                        |                                 |                             |
|                          | −1.799                       | 2.687*                 | −0.422                          | −0.428                      |
|                          | (1.148)                      | (1.387)                | (0.357)                         | (0.305)                     |
| Robust                   | −0.897                       | 1.511                  | −0.315                          | −0.400                      |
|                          | (1.405)                      | (1.681)                | (0.427)                         | (0.370)                     |
| Bandwidth                | 2.804                        | 2.839                  | 2.597                           | 3.127                       |
| N                        | 2,368                        | 2,368                  | 2,570                           | 2,124                       |

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1. The sample is from 2011–2015 CHARLS. Covariate-adjusted local linear fuzzy RD estimation with (robust) and without (conventional) bias-adjustment of point estimation and inference (Calonico, Cattaneo, and Titiunik 2014a, 2014b; Calonico et al. 2019). All standard errors (in parentheses) are clustered with plug-in residuals at the individual level.
observations from both sides around the threshold, respectively. The results (Table S3) are also largely consistent with our main results.

V. Conclusion

Using 2011–2015 CHARLS, this study shows that a wife’s retirement improves her husband’s mental health in urban China. Our results complement Zang’s (2020) findings, suggesting retirement of spouses of both sexes is beneficial to their partners in urban China, at least in the short run. This study is also important for being the first that examines the cross-spouse spillover effects of female retirement on men’s mental health in any developing country. These results, along with previous studies (Bertoni and Brunello 2017; Müller and Shaikh 2018), highlight the different roles retirement can play in spouses’ health in different cultural and institutional settings and calls for studies of such effects on a case-by-case basis.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Alexander von Humboldt Foundation; Bill & Melinda Gates Foundation [Project INV-006261]; Chinesisch-Deutsche Zentrum für Wissenschaftsförderung [Project C-0048]; National Science Foundation of China [72004007, 72033001].

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