Family-related Determinants of Bridge Employment Decisions in China

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Abstract

This paper seeks to estimate the effects of family-related factors on bridge employment decisions in China and build a general analysis framework of family-related factors in bridge employment. I used longitudinal data from the China Health and Nutrition Survey (CHNS) to examine the effects of family-related variables using probit models with random effects and correlated random effects respectively. It has been found that overall, four variables out of the 5-category analysis framework are significantly related to people's decisions of bridge employment: spouse's employment status, marital status of adult children, time spent on childcare and time spent on household chores. Differences in bridge employment patterns between males and females, rural residents and urban residents are also highlighted in this study.

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1 Introduction

China's population is aging rapidly. According to the national statistics in 2018, about 166.58 million people were aged 65 and over, accounting for 11.9% of the total population, and the old dependency ratio, the ratio of the elderly population to the working-age population, was 16.8, which has increased by 48.67% compared to 10 years ago (National Bureau of Statistics of China, 2019). This trend of population aging is expected to continue for years to come.

One direct implication of the aging population is the increase in retirees. In China, the retirement patterns and behaviors have significant differences between urban and rural areas. Urban residents are more likely to have had formal wage employment, retire at a relatively young age and receive financial support from pensions. While in rural areas, the income of the old generation is still relatively low despite the new rural pension scheme,[1] and the departure of the young population leads to the elderly being left behind and picking up some of the agricultural work abandoned by their adult children (Giles, Wang, & Cai, 2011; Connelly, Maurer-Fazio, & Zhang, 2014). Moreover, the difference between genders is also significant: females generally have younger retirement age than males.

In order to address the potential economic and social problems caused by the aging

[1] The new rural pension scheme was initiated by the Chinese government in 2009 and reached universal coverage by the end of 2012. This new pension scheme is more generous and has a significant positive impact on the lives of the elderly in terms of income, expenditure, labor supply, health, and mortality (Huang & Zhang, 2021).

population, many policy makers are suggesting increases in the official retirement age. However, the retirement decision is related to other factors apart from policies, such as individual preferences and family conditions, and moreover, nowadays retirement is no longer a permanent decision, and more retirees choose to reenter or stay in the work force and maintain certain levels of work engagement. This type of employment is defined as bridge employment: paid work undertaken after retirement, or more formally, labor force participation exhibited by older workers as they leave their career jobs and move toward complete labor force withdrawal (Shultz, 2003).

There has been a notable absence of studies pertaining to what drives retirees to stay in or reenter the workforce in China. Related existing literature has examined some determinants of retirement and labor force participation of the elderly in the context of China, such as pension eligibility, health status, spouse work status (Giles, Wang, & Cai, 2011; Giles, Lei, Wang, & Zhao, 2015). Nevertheless, related research is scattered and only estimates the causal effect of some certain individual and family-level factors on individual's retirement decisions without developing a general analysis framework and evaluating how family-related economic and demographic characteristics jointly determine a retirees' decision on bridge employment.

In this paper, I seek to estimate the effects of family-related factors on bridge employment decisions and build a general analysis framework of bridge employment determinants. The empirical analysis uses China Health and Nutrition Survey (CHNS) data. Respondents were asked whether they were retired but rehired in 9 waves across 1991-2015. By applying a probit model with random effects and correlated random effects respectively, I provide estimates of family-

related factors affecting bridge employment in China. I focus here on the young elders who were between the ages of 50 and 74. They were likely to be out of the labor force because of reaching the retirement age and demand for family care provision or stay in the labor force due to increases in labor demand or family circumstances. And in this study, family refers to a three-generation (four in some cases) family that extends from the nuclear family of the respondent, which includes the respondent, their spouse, adult children, grandchildren and their parents (if any). In East Asian countries such as China where collectivism dominates the value system, the influence of extended family on people may be significant, especially for people of retirement age who may be the eldest of the family and tend to assume more responsibilities. So when analyzing family-related factors, it is important to take this cultural and social background into account. In addition, I highlight the different bridge employment patterns between males and females, rural residents and urban residents because of the huge difference in people's retirement behaviors between genders and residence as is stated before.

The remainder of the article is organized as follows. After reviewing the previous literature on bridge employment in general and retirement patterns in China, I introduce the theoretical model that analyzes how family-related factors affects labor force participation of prospective retirees. I next lay out the empirical model to examine the family-related factors and review the data source and data manipulation process. After presenting the results, I discuss their implications and offer concluding remarks.

2 Literature Review

The topic of retirement has been studied by several disciplinary fields of research such as economics, gerontology, management, psychology, and each looks at retirement from a somewhat different perspective. However, with regard to bridge employment, none of the disciplines dominates in the specific topic of bridge employment, which is a somewhat new and still seldom-studied issue in retirement theory, research, and application (Beehr & Bennett, 2015).

Most research regarding bridge employment has focused on its predictors. From an individual level, age, wealth and health status have been shown to be predictors of bridge employment (e.g., Kim & Feldman, 2000): people who are older, wealthier or of poorer health tend to retire fully and not to engage in bridge employment. However, the relationships between age, wealth, health and bridge employment are not absolute, and opposite theories have been proposed by researchers. For example, the study conducted by Wang et al. (2008) failed to show the negative effect of total wealth in predicting the odds for retirees to take bridge employment. And Beehr and Bennett (2015) indicated that for those with enough retirement income, bridge jobs tend to be entered into more voluntarily and age shows less effect on people's bridge employment choice; while for those living close to the poverty line, the bridge job may not be so voluntary, and different factors may be significant. In addition, education is another factor that could influence people's decision making on bridge employment: people with college degrees are more inclined to take bridge jobs (e.g., Kim & DeVaney, 2005), considering that the jobs available to well-educated people are more likely to be less physically demanding and more enriching, which would

further encourage bridge employment (Beehr & Bennett, 2015).

Family-related factors have also been studied by scholars, but research in this area is sparse. Kim and Feldman (2000) found that marital status did not have a significant effect on bridge employment, while having a working spouse and number of dependents were positively related to accepting bridge employment, i.e., if retirees had spouses who were still in the workforce or had children to support, they were significantly more likely to engage in bridge employment. Wang et al. (2008) did not find family-related variables (marital status and marital quality in this case) significant in differentiating full retirement and general bridge employment. They offered two possible explanations: one that the effects of the particular predictors may be moderated by other aspects of family-related life, and the other that the predictive effects of family-related variables, which are relatively distal in influencing people's bridge employment decisions, may be overshadowed by other more proximal predictors. However, Beehr and Bennett (2015) pointed out that more research regarding family-related variables is needed before solid conclusions can be drawn, and it would be helpful to look at family-related variables beyond simple demographics. In addition, little research in this area has examined how factors beyond the nuclear family, such as extended family structure and intergenerational relationships, would affect people's decision to accept a bridge job.

Nonetheless, most research pertaining to bridge employment has been focusing on what drives people of retirement age to stay in or reenter the workforce in the context of Western countries, and very little research has been conducted in the context of China. But given that the

bridge employment literature is fairly young, theories and empirical studies about bridge employment in China may be adapted from the study of retirement in general, which has a richer theoretical and empirical foundation. In Giles, Wang and Cai's (2011) study, Chinese workers who were eligible for a pension were found to be more likely to exit the workforce at a relatively young age, and a strong relationship between health status and labor supply in rural areas was also observed, indicating that better access to health care may extend working lives and also providing proof for a common perception that older rural residents tend to work as long as they are physically capable. Nevertheless, their study failed to show the hypothesized relationship between some family-related variables and labor supply of older workers, such as average education of spouse and adult children, number of living parents and number of grandchildren, except that having a working spouse was positively related to bridge employment at a significance level of 0.01. Consistent with the above study, Giles, Lei, Wang and Zhao (2015) also highlighted the roles of pension receipt, spouse work status, family care requirements and health status in examining retirement patterns of older workers in a multivariate framework. Feng and Zhang's analysis (2018) showed a significant increase of 29 percentage points in provision of grandchild care after retirement in females and a 21 percentage points increase in males, which implies the positive relationship between retirement and grandchild care. Connelly, Maurer-Fazio and Zhang (2014) studied the role of coresidency with adult children in the labor force participation decisions of older men and women in China, and discovered that coresiding with adult children significantly reduces the likelihood of rural elders being in the labor force, possibly due to the high rate of

substitutability of workers within agriculture and the heavy physical demands of farming, while for urban elders, coresidence with adult children had no discernable effect on their labor force participation.

When considering retirement and bridge employment in China, it is necessary to take into account its unique cultural and social background. In China, extended families dominate Chinese society, and the patriarchal and patrilocal tradition have a notable influence on Chinese family and kinship ties. The younger generations are expected to provide care and show obedience to the senior generation, which has been reinforced by the Confucian ethnics and evolved into filial piety; consequently, there will be stigma costs if adult children shirk their duty of supporting their parents (Zhang, 2019). Additionally, due to the patrilineal family structure and patrilocal residence, sons are expected to support their aging parents, and old parents have a high probability of coresiding with a married son (Zhang, 2019). So when examining the family-related factors in bridge employment of the elderly, we should also allow for the possible effects of the second generation, such as the gender, income and marital status of adult children.

Furthermore, people who have retired may become grandparents for the majority of families in China, and in rapidly developing countries such as China, grandparents are characterized as “family maximizers,” allowing adult children to take advantage of expanding labor markets and seize more lucrative opportunities from which all family members can benefit (Baker and Silverstein, 2012). Research has shown that grandparents serve as important alternative childcare providers in contemporary China and the involvement of grandparents as custodial

caregivers is likely to remain robust during the first several decades of the twenty-first century (e.g., Silverstein & Cong, 2013; Chen, Liu, & Mair, 2011). Moreover, one noteworthy characteristic of patriarchal family structure in China is son preference, which implies that grandparents can derive higher utility from grandsons than granddaughters. And research has proved the existence of son preference: the probability of a family coresiding with paternal grandmother was higher if the firstborn was a boy, though the impact of the child's sex was not significant if the mother was well-educated (Sun, Zhang, & Hu, 2019). This implicitly indicates that the gender of grandchildren may be linked with the amount of care provided by coresidential grandparents, thus exerting influence on the elder's decision on bridge employment, so the gender of grandchildren might be a variable of interest in the analysis of determinants of bridge employment.

In the context of China, another aspect in the analysis of bridge employment that should be noted is the stark contrast between genders and regions. Dong and An (2015) revealed that women bear primary responsibility for housework and care activities and thus encounter more rigid tradeoffs between paid work and unpaid care work. The gender disparity in time allocation suggests that holding constant individual and regional effects, women are less likely to prolong work life and devote their time to paid work outside of the household, and some household and family-related variables in bridge employment may be more significant for women. The urban-rural difference is also remarkable in retirement patterns in China. Urban Chinese retire at a relatively young age, and their mandatory retirement in urban areas is paired with relatively

generous pensions, while most rural Chinese work until advanced ages (Giles, Lei, Wang, & Zhao, 2015). The transformation of China's economy creates new non-farm work opportunities for rural residents, but there are still many non-migrant people, mostly elders, who are left behind in rural areas; and rural women were found to do more farm work than would have otherwise been the case, while the migration of the younger generation did not have a significant impact on left-behind men (Mu & Van de Walle, 2011). So it is necessary to look at each specific subsample divided by gender and urban-rural classification in the analysis of bridge employment.

Taking these above factors into account, this paper contributes to the literature by providing a general analysis framework that allows the evaluation of the causal relationship between family-related economic and demographic characteristics and a retirees' decision on bridge employment. An important feature of this framework is that it highlights the three-generation family that extends from the nuclear family in light of the unique cultural and social background of China and emphasizes how individual and household demographic and economic characteristics can potentially serve as economic incentives for bridge employment.

3 Theoretical Model

The theoretical approach I take is a neoclassical economic model as is proposed by Stock and Wise (1990), which is a life-cycle model of retirement based on the option value of continuing to work. The life-cycle model has often been used in the economics literature concerning retirement to capture the economic tradeoff between allocating more time to paid work and

allocating more time to non-paid-work activity, and more studies have factored in nonpecuniary determinants such as health and caring responsibilities (Lumsdaine & Vermeer, 2015). Although the original model developed by Stock and Wise (1990) was built to estimate the effects on retirement of firm pension plan provisions, it can be modified to show how nonpecuniary individual and family-related factors can determine an individual's decision on bridge employment, i.e., to retire or to continue to work.

I use the model of retirement decision based on Stock and Wise (1990):

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} U_W(Y_s) + \sum_{s=r}^{S} \beta^{s-t} U_r[B_s(r)]$$

where an individual maximizes the utility received over the remainder of their life at time t given retirement at age r, $V_t(r)$, which depends on the retirement age r and is the sum of the indirect utility of future wage income, $U_W(Y_s)$, and the indirect utility of retirement benefit including non-wage activity, $U_r[B_s(r)]$.[2] β is the discount factor and S is the expected age of death. The individual must choose either to work during year t, so that $r > t$, or to retire, so that $r = t$. Specifically,

$$U_W(Y_s) = Y_s^{\gamma} + \omega_s$$

[2] In the original model, $U_r[B_s(r)]$ refers to utility from pension benefits received while retired, so it is associated with r since these benefits depend on the person's age and years of service at retirement, and on their earnings history (Stock & Wise, 1990). In this paper, $B_s(r)$ includes not only pension benefits but also non-wage activities.

$$U_r[B_s(r)] = (kB_s(r))^\gamma + \xi_s$$

where the utility is derived indirectly from wage income Y_s and the retirement benefit $B_s(r)$ in year s and takes a constant relative risk aversion form. γ is the coefficient of risk aversion, and ω_s and ξ_s are individual-specific random effects. k may be parameterized to account for nonpecuniary individual and family-related factors (Lumsdaine & Vermeer, 2015): for example, if we assume that the individual derives utility from the well-being of their grandchildren, k can be modeled as $k = k_0 + k_G N_G$ to capture the additional utility from caring, where N_G represents the number of grandchildren. To simplify the analysis, it is assumed that: (1) the elders in this study are all altruistic caregivers who derive utility from their own consumption of both market goods and leisure, as well as their family's well-being, (2) other decisions in the family such as the adult children's marriage and fertility decisions are independent of their bridge employment decisions, and (3) the utility of wage income in bridge employment and the utility of retirement benefit are not simultaneous, for instance, if the individual is engaged in bridge employment, they cannot allocate time to caring for their grandchildren. Assumption 3 is a very strong assumption, since it rules out the possibility of part-time bridge employment, but it is consistent within this study given the data that is used in the study, where people were only asked about whether they were in full-time employment or full retirement.

Given the option value $V_t(r)$, the expected gain at time t from bridge employment until age r is then given by

$$G_t(r) = E_t[V_t(r)] - E_t[V_t(t)]$$

where $E_t(\cdot)$ denotes the individual's expectation about future circumstances. Let r^* be the retirement age with the highest expected value, so the individual retires if $G_t(r^*) = E_t[V_t(r^*)] - E_t[V_t(t)] < 0$, i.e., there is no expected gain from bridge employment. Otherwise they postpone retirement. Following Lumsdaine and Vermeer (2015), the bridge employment decision can be described in terms of $Pr[G_t(r^*) > 0]$, which is related to the parameterization of $V_t(r)$. $G_t(r^*)$ can be calculated using an assumed valuation of income and the parameters determined by maximum likelihood estimation. Assuming that the bridge employment decision depends on other unobserved determinants, a standard specification of the bridge employment decision would be $Pr[\delta_0 + \delta_1 G_t(r^*) + \varepsilon > 0]$, which leads to the probit model if one assumes that ε follows a standard normal distribution. The probit estimation results can be found in the following sections.

4 Empirical Strategy and Data

4.1 Empirical Strategy

This paper uses logistic regression analysis to examine the determinants of an individual's bridge employment decisions. Specifically, I adopt two different empirical strategies: a probit model for panel data and a probit model with correlated random effects (CRE) for panel data. The panel-data probit model is used due to the theoretical model introduced above and the nature of the data: the dependent variable is binary and there exist several waves of data. The panel-data probit model with correlated random effects (CRE) is popular with empirical researchers. It allows unobserved heterogeneity to be correlated with observed covariates and assumes that the time

invariant error is a function of the time average of the covariates. The specification is

$$P(y_{it} = 1|\boldsymbol{x}_{it}, \boldsymbol{z}_i, \alpha_i) = \Phi(\boldsymbol{x}_{it}\boldsymbol{\beta} + \boldsymbol{z}_i\boldsymbol{\delta} + \alpha_i)$$

where y_{it} is a dummy variable of bridge employment; $\boldsymbol{x}_{it}$ is a vector of time-varying variables of the individual i at year t; $\boldsymbol{z}_i$ is a vector of time-invariant variables of the individual i; $\boldsymbol{\beta}$ and $\boldsymbol{\delta}$ are vectors of parameters; α_i is time invariant individual unobserved heterogeneity. In the CRE approach, we assume that α_i is a function of the time averages of explanatory variables: $\alpha_i = \bar{\boldsymbol{x}}_i\boldsymbol{\lambda} + \eta_i$, where $\bar{\boldsymbol{x}}_i$ **is** the time average of $\boldsymbol{x}_{it}$. Adding the average values of the covariates as a set of controls for unobserved heterogeneity that is correlated with the time varying variables, the CRE approach estimates the effect of changing covariates but hold the time average fixed, and average marginal effects are identified under nonparametric restrictions on the distribution of heterogeneity; while the traditional fixed effects methods treat the heterogeneity as parameters to be estimated and suffer from the incidental parameters problem (Wooldridge, 2002). Therefore, I use the CRE approaches to examine whether there exists unobserved heterogeneity and estimate the model if the unobservable factors exist. In addition, since the data set in this study is an unbalanced panel data set, it is implicitly assumed that observing a data point in any time period cannot be systematically related to the idiosyncratic errors, i.e., $E(\mu_{it}|\boldsymbol{x}_i, \alpha_i, \boldsymbol{s}_i) = 0$, where $\boldsymbol{s}_i$ is a series of selection indicators that equal to 1 if time period t for individual i is used in the data set (Wooldridge, 2019).

4.2 Data Descriptions

The analyses use data from the China Health and Nutrition Survey (CHNS). The survey

took place in 15 provinces and municipal cities that are substantially different in geography, economic development and public resources; it used a multistage, random cluster process to draw a sample of about 7,200 households with over 30,000 individuals over a 7-day period.[3] There are 10 waves of data in total from 1989 to 2015, but data in 1989 were not used since the key variables in 1989 are unavailable.

Respondents were asked whether they were retired but rehired in the survey, so it can be implied that those who responded "yes" in this question were involved in certain types of bridge employment. However, due to the large number of missing values in this variable, those who responded "retired" in the question "reason not working" were also included since they certainly did not engage in bridge employment. The dataset ultimately builds to 9,995 observations after setting the age limit between 50 and 74. These individuals were not only asked about their demographics and economic conditions but also intergenerational linkages, which allows us to explore the effects of three-generation family that extends from the nuclear family.

4.3 Key Variables

In this section, I describe the key variables of interest in the analysis. Apart from the dependent variable, key variables of interest are divided into six categories: spouse, adult children, grandchildren, living parents, time spent on chores and control variables, and thus it develops into an analysis framework which emphasizes the role of family in the individual's decision on bridge

[3] More details of the dataset are available at http://www.cpc.unc.edu/projects/china.

employment. On account of the large number of missing values in some variables, multiple imputation is used to handle missing data. In the statistical literature, multivariate imputation by chained equations (MICE), also known as "fully conditional specification" or "sequential regression multiple imputation", has emerged as the principal method of handling missing data. This method is flexible and accounts for the statistical uncertainty in the imputations and can handle different types of variables (e.g., continuous or binary) as well as complexities such as bounds or survey skip patterns (Azur, Stuart, Frangakis, & Leaf, 2011). Summary statistics for key variables used in the analysis can be found in Table 1.

Spouse. For simplicity, marital status of the individual is categorized into "married" and "unmarried" as a dichotomous variable, and the effects of spouse demographic and economic characteristics are included as interaction terms with marital status, i.e., these variables take a value of zero if the respondent is unmarried. Specifically, variables relating to spouse characteristics include age, age squared, employment, pension, education and health status. The *Age* variable is continuous, as is *Age Squared*, and indicates the age of the respondent in years. The *Employment* variable is dichotomous and equals to one if the respondent's spouse is presently working and zero otherwise. *Pension* is reported in nominal Chinese yuan and transformed by logs since it is highly skewed. *Education* is defined as the "highest level of education" the respondent attained, and it is divided into three dichotomous categories: *Primary School* (equals to one if the respondent only graduated primary school or is illiterate), *Middle School* (equals to one if the respondent had a lower or upper middle school degree), *Higher Education* (equals to one if the respondent had a

technical, university or college degree or higher). *Health Status* is constructed using principal component analysis with the variables used in its construction being BMI, whether the respondent has hypertension, and diabetes, because the self-reported health status has incomplete observations in the survey. A higher score in *Health Status* indicates poorer physical conditions. Multiple imputation is used in spouse's employment, pension, education and health status.

Adult Children. Except the number of adult children (*#Adult Children*), I also consider other characteristics of adult children, specifically the effects of their gender (*#Female Adult Children*), marital status (*#Married Adult Children*), employment (*#Working Adult Children*), and average income (*Ave Adult Children Income*). Average income is transformed by logs. For those respondents that do not have children, these variables take a value of zero.

Grandchildren. Given the availability of data, I include the number of grandchildren (*#Grandchildren*) and the number of female grandchildren (*#Female Grandchildren*) in the analysis to account for the possible son preference in China. For those respondents that do not have grandchildren, these variables take a value of zero. Additionally, I also consider the time devoted to childcare (*Childcare Time*), which includes physical labor devoted to feeding, washing, and supervising children.

Living Parents. Assuming that a couple shares the responsibility of caring for both parents, i.e., the respondent provides care to their own parents and in-laws, the number of living parents (*#Living Parents*) takes a value of 0 to 4.

Time Spent on Chores. Household chores include preparing and cooking food, washing

and ironing clothes, and housecleaning. Time spent on household chores (*Chores Time*) is described as the sum of the average time (minutes) spent on these activities per day. For those who responded "yes" in whether they do the chores but do not have a valid response to how much time they spend on chores (6.58% of the sample), this variable is assumed to take the mean of the rest of the sample.

Control Variables. Control variables include individual characteristics such as urban/rural status (0 = rural; 1 = urban), gender (0 = male; 1 = female), age, age squared, household income, pension, health status, education and province and calendar year fixed effects. The respondent's individual income is excluded from household income since their individual income is inextricably linked to whether or not they are engaged in bridge employment. Household income and pension are reported in nominal Chinese yuan and transformed by logs. Health status and education are constructed in the same way as spouse variables.

5 Results

To examine family-related factors on an individual's bridge employment decision, I performed a series of probit regression analyses for the full sample and the urban, rural, male, female subsamples respectively. The results of the probit regression models for the full sample are presented in Table 2 in Appendix.

From the analyses of the full sample in which the respondent has a valid response in bridge employment and is aged between 50 and 74, columns 1 and 2 of Table 2 report the coefficients and

marginal effects of family-related variables in China respectively using probit regression with random effects. Compared with the results in columns 1 and 2, the probit model with CRE does not produce significant results which are presented in columns 3 and 4, since the robust Hausman test indicates that all of the regressors are exogenous and random-effects probit is sufficient (p = 0.310). Overall, spouse being in the workforce leads to a 6.01 percentage point increase in the likelihood of engaging in bridge employment, and people who devoted one more minute to childcare and household chores are 0.13 and 0.01 percent less likely to be in bridge employment respectively ($p < 0.01$). Adult children's marital status also has a significant effect ($p < 0.05$) on bridge employment decisions: one more married adult child makes the elders 1.57 percent less likely to take some type of bridge jobs. Grandchildren are also found to be associated with bridge employment status, but the effect is only significant at a 10% level.

Table 3 in Appendix shows the results of probit regression analysis on the male subsample. The p-value (0.100) of the robust Hausman test indicates that the probit model with CRE is not necessary to obtain consistent parameter estimates at a standard 5% significance level. The results of probit model with random effects are similar to those of the full sample. Spouse's employment (marginal effect = 6.32%, $p < 0.01$), the number of married adult children (marginal effect = -1.88%, $p < 0.05$), childcare time (marginal effect = -0.11%, $p < 0.05$) and chores time (marginal effect = -0.01%, $p < 0.05$) are found to be significant in people's decision on bridge employment. The differences are that the effects of childcare time and chores time are only significant at a 5% level, while in the full sample they are significant at a 1% level; and the number of grandchildren

does not have a significant effect on bridge employment decisions in the male subsample.

The results of regression analysis on the female subsample are presented in Table 4 in Appendix. Different from the full sample and the male subsample, the probit model with CRE indicates that some of the regressors are correlated with the unobserved heterogeneity at a 5% significance level. Similar to the full sample, spouse's employment status is also positively related to bridge employment decisions ($p < 0.01$), but the marginal effect (3.69%) of this variable is smaller compared to its counterparts. Apart from whether the spouse is working, the adult children's employment status also has a significantly positive effect on female elder's bridge employment decisions, with its marginal effect being 4.62%. Average income of adult children (marginal effect = -0.39%, $p < 0.05$), and time spent on childcare (marginal effect = -0.09%, $p < 0.10$) and household chores (marginal effect = -0.01%, $p < 0.05$) are negatively related to bridge employment, while the number of grandchildren (marginal effect = 2.01%, $p < 0.05$) is positively associated with whether one takes a bridge job.

Table 5 in Appendix presents the results of analyses on the rural subsample. The results of probit model with random effects are used in the following analysis because the Hausman test for CRE shows that its results are not significant. Rural residents show a different pattern in their decisions of bridge employment. In terms of spouse, one's marital status (marginal effect = 34.92%%, $p < 0.05$), spouse's age (marginal effect = -1.24%, $p < 0.05$) and age squared (marginal effect = 0.01%%, $p < 0.05$), employment status (marginal effect = 6.22%%, $p < 0.01$) and education level (middle school, marginal effect = 1.88%%, $p < 0.10$) are all found to be significantly

associated with one's bridge employment decisions. Except spouse related variables, only the time spent on childcare is significantly related to bridge employment at a 1% level, with its marginal effect being -0.11%.

The probit regression results of the urban subsample are shown in Table 6 in Appendix. The probit model with CRE is not needed to obtain consistent parameter estimates given the *p*-value (0.225) of the robust Hausman test. Overall, only three factors have significant effects on people's decisions of bridge employment at a 5% level: whether the spouse is working, and time spent on childcare and household chores, and the marginal effects are 4.81%, -0.13% and -0.01% respectively.

6 Discussion

6.1 Overall Effects

In this study, I use five categories of variables (i.e., spouse, adult children, grandchildren, living parents and time spent on household chores) to build an analysis framework of how family-related factors affect an individual's decision on bridge employment. From the analysis of the full sample, I found that (1) a spouse being employed leads to a 6.01 percentage point increase in the likelihood of engaging in bridge employment; (2) people who spend more time on household chores are less likely to be in bridge employment; (3) people who spend more time on childcare are less likely to take a bridge job, but the number of grandchildren is positively related to bridge employment, though the effect is only significant at a 10% level; (4) one more married adult child

makes the elders 1.57 percent less likely to be employed after they rehired.

In general, these findings do not support the predictive effects of the majority of the family factors, which is consistent with Wang et al.'s (2008) study which also failed to find predictive effects of family-related variables in differentiating full retirement and general bridge employment. They proposed several explanations for this pattern which are also applicable in this study: one is that other aspects of family life may moderate the effects of these particular predictors, and the other that the predictive effects of family-related variables are relatively distal in influencing people's bridge employment decisions, and thus may be overshadowed by other more proximal predictors, such as personal pension.

Nevertheless, there are still some interesting findings from which we can deepen our understanding of bridge employment and retirement decisions. First, it is consistent with previous studies (e.g., Kim & Feldman, 2000; Szinovacz, 1989; Giles et al., 2015) that a spouse's employment status is strongly related to one's decision on bridge employment. A possible explanation is that retirees will not have the companionship of their spouses to replace their interactions with coworkers if they have spouses who are still working outside the home (Erdner & Guy, 1990). Second, it is trivially true that aged people who spend more time on household chores and childcare prefer to be out of the workforce when employment is not a requirement at this stage of their lives. However, the number of grandchildren is found to be positively related to bridge employment, which is inconsistent with common sense and the above finding. But this positive effect is only significant at a 10% level (p-value = 0.080) which is inconclusive, and this

positive relationship may not suggest that there exists a positive causal effect. The effect of time spent on childcare is consistent with previous studies (e.g., Feng & Zhang, 2018). Third, in the category of adult children variables, only the marital status of adult children has a significant effect on bridge employment decisions. Adult children being married means the start of their new family and implies the reduction of dependents for the aged parents, which in turn reduces the probability of the retirees engaging in bridge employment. It is also worth noting that adult children's coresidency with the elders, which has been studied before (e.g., Connelly et al., 2014) and found to be negatively related to bridge employment, and their marital status are different: it is highly likely that retirees and their married adult children live under the same roof in China. And regarding why the employment status and income of adult children fail to be significant, one possible explanation is that some young people who just enter the workforce still rely on their parents while others can be financially independent, and the logarithm transformation on income in the estimation weakens its effect.

6.2 Male vs. Female

First, whether the spouse is working has a significant effect on bridge employment for both males and females, but the difference is that its marginal effect for females is smaller by 2.63% compared to males. One potential reason is that women have a younger retirement age than men in China, and therefore when the husband takes some type of bridge job after retirement, the wife may have spent years after her full retirement age and thus have a lower propensity to stay in the workforce. Another explanation is that men are more likely to be unwilling to retire by himself,

which is in line with Szinovacz's (1989) study that women may be under considerably more pressure to retire jointly with or soon after their spouse.

Second, on the adult children level, while males' bridge employment decisions are only significantly affected by the marital status of adult children, their employment status and income have significant effects on females' decisions on whether to take a bridge job. For women, adult children's employment status has a positive effect on bridge employment, which seems against common sense, but this causal relationship is plausible considering the emphasis of Chinese women on family. As is stated above, retirees will not have the companionship of their family members to replace their interactions with coworkers if they have family members who are working outside the home. So, for females with employed adult children, they might be unwilling to retire and stay at home, especially when their husband is also working outside, and therefore they have a higher propensity of engaging in bridge employment. In addition, the income of adult children is negatively associated with female's bridge employment decisions but not males, indicating that female elders may benefit more from the potential financial transfer than males.

6.3 Rural vs. Urban

The bridge employment patterns are remarkably different for rural residents. First, except time for childcare, only the spouse-related variables have significant influence on bridge employment decisions. This can be explained by the fact that many elders are left behind in rural areas and the supportive ties between adult children and their parents have been threatened by demographic changes over the years, such as birth control and increasing geographical mobility

among the young generation (Dewit, Wister, & Burch, 1988). So, factors regarding adult children and grandchildren may seem irrelevant in people's decisions of bridge employment. Second, in such context of rural areas where an elder's life outside of work revolves around a two-person household, the effects of spouse-related factors are magnified. Marital status is strongly positively related to bridge employment for rural elders, which is the opposite of the results and hypotheses proposed by Kim and Feldman (2000) and Wang et al. (2008). They hypothesized that married retirees will be more likely to become fully retired given that one of the possible intrinsic motivations for retirement is to spend more time with one's family. But in the case of rural China where the income of old people is relatively low, being married implies the necessity to support a family of two for whether males or females and consequently the higher likelihood of engaging in bridge employment. Spouse's age has a negative effect on bridge employment, and this effect is stronger as people get older. This is potentially due to the heavy physical demands of farming and the fact that a couple in a two-person household in rural areas has to take on the responsibility of caring for each other and exit the workforce as they get older and physically uncapable of working. The effect of spouse's employment is consistent with the full sample. Moreover, whether the spouse has obtained a middle school degree is shown to be related to one's bridge employment decisions, but this effect is only significant at a 10% level, which is inconclusive.

For the urban population, the overall effects of family-related factors on bridge employment are not very significant, and only three specific variables are relevant in people's decisions of bridge employment. The first one is spouse's employment status, which is consistent

with the full sample and the rural subsample. But its effect is smaller compared with rural residents, possibly because urban elders rely less on their spouse than rural elders and have less propensity to retire jointly with their spouse. The other two significant variables are time spent on childcare and household chores, which are negatively related to bridge employment as expected. It is noticeable that time spent on household chores is significant for urban residents but insignificant for rural elders. Household chores can be viewed as both necessities and luxuries, i.e., part of the household chores is necessary such as cooking and basic cleaning, but if people want to spend more time on cooking and cleaning houses etc., then household chores can be luxuries which only people who have the time and energy can afford. For example, people who do not have a high income or spare time tend to spend the minimum amount of time on chores, while richer people with a more flexible schedule can spend more time cooking meals or cleaning houses. In this case, rural elders are likely to do the basic household chores merely and are unable to afford more time on them, so time spent on household chores does not have a significant effect on their employment decisions. In contrast, urban retirees have the time and energy to devote more time to chores, and for those who are willing to spend more time on them, bridge employment seems to be an unattractive option.

6.4 Estimation Bias

The correlated random effects model is a useful extension to the standard random-effects and fixed-effects approaches. It is expected that there exists unobserved heterogeneity that is correlated with the observed covariates in the estimation of bridge employment determinants in

China, and the CRE approach will be a valid method of estimation. Nonetheless, most of the probit regression analyses with CRE suggests that the observed covariates are not correlated with the unobservables and random effects probit is sufficient, except that the female subsample does observe unaccounted heterogeneity. One conceivable reason is that there are many time-constant control variables and calendar year and province fixed effects added in the probit regression model, which lessens the effects of unobserved factors and makes the random-effects assumption true that covariates and the time-constant error are uncorrelated. For the female subsample, it is likely that there exists unobserved characteristics of women that makes the standard random-effects approach inconsistent.

There might also be other estimation biases. For example, the CRE approach does not account for a possible correlation of an explanatory variable and the time-varying error. In this case, a potential solution is to use instrumental variables method which accounts for the endogeneity. Furthermore, the nature of the data set in this study causes inevitable biases. For example, the multiple imputation method is used given the number of missing values in the data set. Although it is useful in handling missing values, the imputed values are certainly less accurate and effective than the data from respondents' original answers.

7 Conclusions

Using a longitudinal data set, this study examines the effects of family-related factors on bridge employment decisions in China using probit models with random effects and correlated

random effects respectively and builds a general analysis framework of bridge employment determinants. I find that in general, four explanatory variables out of the 5-category analysis framework of family-related factors are significantly related to people's decisions of bridge employment: spouse's employment status, marital status of adult children, time spent on childcare and time spent on household chores. The results show that this framework of family-related factors in bridge employment is robust: factors in each level of the three-generation family has a significant influence on people's decisions of bridge employment. From the comparison between males and females, it can be concluded that female elders put more emphasis on their family (including the spouse and adult children) than their career and benefit more from the intergenerational ties. The comparison between rural and urban areas leads to the conclusion that rural elders rely heavily on their spouse in a two-person household, as most of them are left behind in rural areas to pick up the physically demanding agricultural work abandoned by their adult children. And it also suggests that the rural elders may face worse financial situations and living conditions compared with urban retirees.

The findings have two important policy implications. First, given that women retirees value their family more than their career and benefit more from the intergenerational ties, they have stronger incentives to exit the workforce, so policies such as raising the official retirement age might not be a desirable choice. However, if the markets for childcare and elder care are mature, older women can devote less time in caring in the household and gain more independence at the age of their retirement. In this way, they are less likely to quit the labor force and become limited

to the domestic realm. Hence, a better system of provision of care for both children and senior citizens may contribute to the extension of women's working lives.

Second, rural elders may voluntarily prolong their working lives due to their financial conditions and continue the agricultural or industrial work as long as they are physically capable. But most rural elders are left behind and strongly rely on their spouse, so more elder care services, especially the public provision of elder care, may lead to a prolonged working life for the elderly in rural areas. Moreover, the work they have been doing is physically demanding, and most of them are forced to exit the workforce when they are still willing to take up some work to get additional income. Therefore, more job opportunities and options in rural areas that are less physically demanding can help old rural residents stay in the labor force.

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Appendix

Table 1 Summary Statistics for Key Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Spouse					
Marital Status	9995	0.87	0.33	0	1
Age	9995	54.19	21.63	0	94
Age Squared	9995	3404.16	1522.93	0	8836
Employment	9995	0.17	0.37	0	1
Pension	9995	5.23	3.21	0	10.48
Health Status	9995	0.77	1.56	-3.71	7.74
Education:					
Primary School	9995	0.48	0.50	0	1
Middle School	9995	0.33	0.47	0	1
Higher Education	9995	0.19	0.39	0	1
Adult Children					
#Adult Children	9995	1.08	1.04	0	7
#Female Adult Children	9995	0.44	0.70	0	4
#Married Adult Children	9995	0.25	0.48	0	4
#Working Adult Children	9995	0.38	0.60	0	5
Ave Adult Children Income	9995	2.78	4.17	0	13.04
Grandchildren					
#Grandchildren	9995	0.57	0.85	0	6
#Female Grandchildren	9995	0.28	0.56	0	5
Childcare Time	9995	2.08	10.04	0	210
Living Parents					
#Living Parents	9995	0.03	0.20	0	4
Time Spent on Household Chores					
Chores Time	9995	112.64	114.84	0	1301
Control Variables					
Urban	9995	0.66	0.47	0	1
Gender	9995	0.53	0.50	0	1
Age	9995	62.55	6.32	50	74
Age Squared	9995	3951.96	789.28	2500	5476
Household income	9995	8.84	2.84	0	14.73
Pension	9995	6.40	2.19	0	9.21
Health Status	9995	0.86	1.67	-3.83	19.39
Education:					
Primary School	9995	0.39	0.49	0	1
Middle School	9995	0.41	0.49	0	1
Higher Education	9995	0.20	0.40	0	1

Table 2 Family-related Determinants of Bridge Employment in China

Probit model with panel data, dependent variable: whether retired but rehired (0 = no; 1 = yes)

	Random Effects		Correlated Random Effects (Hausman test: p = 0.310)	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Spouse				
Marital Status	3.035	23.42%	6.774*	51.61%*
	(2.157)	(0.166)	(3.561)	(0.270)
Age	-0.104	-0.80%	-0.195	-1.49%
	(0.071)	(0.005)	(0.121)	(0.009)
Age Squared	0.001	0.00%	0.001	0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Employment	0.778***	6.01%***	0.643***	4.90%***
	(0.102)	(0.008)	(0.153)	(0.012)
Pension	0.005	0.04%	0.006	0.05%
	(0.015)	(0.001)	(0.021)	(0.002)
Health Status	-0.007	-0.06%	0.071*	0.55%*
	(0.024)	(0.002)	(0.042)	(0.003)
Education: (Base Case: Primary School)				
Middle School	0.095	0.74%	0.119	0.91%
	(0.099)	(0.008)	(0.101)	(0.008)
Higher Education	-0.013	-0.10%	0.000	0.00%
	(0.126)	(0.010)	(0.129)	(0.010)
Adult Children				
#Adult Children	-0.016	-0.12%	-0.014	-0.11%
	(0.062)	(0.005)	(0.065)	(0.005)
#Female Adult Children	0.049	0.38%	0.055	0.42%
	(0.074)	(0.006)	(0.075)	(0.008)
#Married Adult Children	-0.203**	-1.57%**	-0.130	-0.99%
	(0.100)	(0.008)	(0.134)	(0.010)
#Working Adult Children	-0.011	-0.08%	0.097	0.74%
	(0.112)	(0.009)	(0.163)	(0.012)
Ave Adult Children Income	0.023	0.17%	0.002	0.01%
	(0.015)	(0.001)	(0.022)	(0.002)
Grandchildren				
#Grandchildren	0.144*	1.11%*	0.173**	1.31%**
	(0.083)	(0.006)	(0.086)	(0.007)
#Female grandchildren	0.043	0.33%	0.026	0.20%
	(0.102)	(0.008)	(0.103)	(0.008)
Childcare time	-0.017***	-0.13%***	-0.015**	-0.11%***
	(0.006)	(0.000)	(0.006)	(0.000)
Living Parents				
#Living Parents	0.020	0.15%	-0.209	-1.59%
	(0.157)	(0.012)	(0.348)	(0.026)
Time Spent on Chores				

Chores time	-0.002***	-0.01%***	-0.001**	-0.01%**
	(0.001)	(0.000)	(0.001)	(0.000)
Control Variables	X	X	X	X
N	8,771	8,771	8,771	8,771
rho	0.561		0.568	
	(0.041)		(0.041)	

Notes: Standard errors (SE's of the coefficients are clustered at the individual level and SE's of the marginal effects are calculated using the delta method) are in parentheses. Regressions also include a constant term, calendar-year fixed effects and provincial fixed effects.

Source: China Health and Nutrition Survey (CHNS) data.

*$p < .10$; **$p < .05$; ***$p < .01$

Table 3 Family-related Determinants of Bridge Employment in China: Male Subsample

Probit model with panel data, dependent variable: whether retired but rehired (0 = no; 1 = yes)

	Random Effects		Correlated Random Effects (Hausman test: p = 0.100)	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Spouse				
Marital Status	2.234	18.08%	4.596	37.03%
	(2.959)	(0.239)	(5.121)	(0.414)
Age	-0.070	-0.56%	-0.116	-0.93%
	(0.100)	(0.008)	(0.165)	(0.013)
Age Squared	0.000	0.00%	0.001	0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Employment	0.781***	6.32%***	0.787***	6.34%***
	(0.135)	(0.011)	(0.216)	(0.017)
Pension	-0.003	-0.03%	-0.004	-0.03%
	(0.018)	(0.001)	(0.024)	(0.002)
Health Status	0.031	0.25%	0.097*	0.78%*
	(0.030)	(0.002)	(0.053)	(0.004)
Education: (Base Case: Primary School)				
Middle School	0.151	1.22%	0.157	1.27%
	(0.117)	(0.009)	(0.117)	(0.009)
Higher Education	0.026	0.21%	0.042	0.34%
	(0.165)	(0.013)	(0.166)	(0.013)
Adult Children				
#Adult Children	-0.012	-0.10%	-0.012	-0.10%
	(0.072)	(0.006)	(0.073)	(0.006)
#Female Adult Children	0.061	0.50%	0.065	0.52%
	(0.087)	(0.007)	(0.088)	(0.007)
#Married Adult Children	-0.232**	-1.88%**	-0.044	-0.35%
	(0.118)	(0.010)	(0.161)	(0.013)
#Working Adult Children	-0.012	-0.01%	-0.077	-0.62%
	(0.134)	(0.011)	(0.181)	(0.015)
Ave Adult Children Income	0.026	0.21%	-0.001	-0.01%
	(0.019)	(0.001)	(0.027)	(0.002)
Grandchildren				
#Grandchildren	0.048	0.39%	0.063	0.51%
	(0.090)	(0.007)	(0.090)	(0.007)
#Female grandchildren	0.127	1.03%	0.123	0.99%
	(0.112)	(0.009)	(0.113)	(0.009)
Childcare time	-0.014*	-0.11%**	-0.021**	-0.17%**
	(0.007)	(0.001)	(0.010)	(0.001)
Living Parents				
#Living Parents	-0.228	-1.85%	-0.884***	-7.12%***
	(0.246)	(0.020)	(0.340)	(0.027)
Time Spent on Chores				

Chores time	-0.002**	-0.01%**	-0.001	-0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Control Variables	X	X	X	X
N	5,041	5,041	5,041	5,041
rho	0.490		0.482	
	(0.053)		(0.051)	

Notes: Standard errors (SE's of the coefficients are clustered at the individual level and SE's of the marginal effects are calculated using the delta method) are in parentheses. Regressions also include a constant term, calendar-year fixed effects and provincial fixed effects.

Source: China Health and Nutrition Survey (CHNS) data.

*$p < .10$; **$p < .05$; ***$p < .01$

Table 4 Family-related Determinants of Bridge Employment in China: Female Subsample

Probit model with panel data, dependent variable: whether retired but rehired (0 = no; 1 = yes)

	Random Effects		Correlated Random Effects (Hausman test: p = 0.020)	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Spouse				
Marital Status	0.392	2.36%	4.826	27.76%
	(3.425)	(0.206)	(4.474)	(0.257)
Age	-0.020	-0.12%	-0.168	-0.96%
	(0.107)	(0.006)	(0.139)	(0.008)
Age Squared	0.000	0.00%	0.001	0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Employment	0.783***	4.70%***	0.641***	3.69%***
	(0.035)	(0.009)	(0.209)	(0.012)
Pension	0.024	0.14%	0.039	0.23%
	(0.022)	(0.001)	(0.029)	(0.002)
Health Status	-0.038	-0.23%	0.040	0.23%
	(0.035)	(0.002)	(0.054)	(0.003)
Education: (Base Case: Primary School)				
Middle School	0.011	0.07%	0.157	0.17%
	(0.160)	(0.010)	(0.117)	(0.010)
Higher Education	-0.070	-0.42%	-0.073	-0.42%
	(0.186)	(0.011)	(0.200)	(0.011)
Adult Children				
#Adult Children	-0.054	-0.36%	-0.033	-0.19%
	(0.103)	(0.006)	(0.114)	(0.007)
#Female Adult Children	-0.005	-0.03%	-0.004	-0.02%
	(0.120)	(0.007)	(0.126)	(0.007)
#Married Adult Children	-0.160	-0.96%	-0.050	-0.29%
	(0.160)	(0.010)	(0.210)	(0.012)
#Working Adult Children	0.104	0.63%	0.804***	4.62%***
	(0.181)	(0.011)	(0.238)	(0.014)
Ave Adult Children Income	0.002	0.01%	-0.069**	-0.39%**
	(0.022)	(0.001)	(0.031)	(0.002)
Grandchildren				
#Grandchildren	0.269*	1.62%*	0.349**	2.01%**
	(0.149)	(0.009)	(0.164)	(0.009)
#Female grandchildren	-0.161	-0.96%	-0.201	-1.16%
	(0.184)	(0.011)	(0.192)	(0.011)
Childcare time	-0.021**	-0.13%**	-0.015*	-0.09%*
	(0.008)	(0.001)	(0.009)	(0.000)
Living Parents				
#Living Parents	0.232	1.39%	0.295	1.69%
	(0.192)	(0.011)	(0.422)	(0.024)
Time Spent on Chores				

Chores time	-0.002***	-0.01%***	-0.002**	-0.01%**
	(0.001)	(0.000)	(0.001)	(0.000)
Control Variables	X	X	X	X
N	5,537	5,537	5,537	5,537
rho	0.627		0.650	
	(0.056)		(0.056)	

Notes: Standard errors (SE's of the coefficients are clustered at the individual level and SE's of the marginal effects are calculated using the delta method) are in parentheses. Regressions also include a constant term, calendar-year fixed effects and provincial fixed effects.

Source: China Health and Nutrition Survey (CHNS) data.

*$p < .10$; **$p < .05$; ***$p < .01$

Table 5 Family-related Determinants of Bridge Employment in China: Rural Subsample

Probit model with panel data, dependent variable: whether retired but rehired (0 = no; 1 = yes)

	Random Effects		Correlated Random Effects (Hausman test: p = 0.415)	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Spouse				
Marital Status	4.413**	34.92%**	11.29***	87.39%***
	(2.147)	(0.168)	(4.222)	(0.320)
Age	-0.157**	-1.24%**	-0.360**	-2.78%***
	(0.071)	(0.006)	(0.136)	(0.010)
Age Squared	0.001**	0.01%**	0.003	0.02%**
	(0.001)	(0.000)	(0.001)	(0.000)
Employment	0.786***	6.22%***	0.390*	3.02%*
	(0.147)	(0.012)	(0.231)	(0.018)
Pension	0.013	0.10%	0.019	0.15%
	(0.020)	(0.002)	(0.027)	(0.002)
Health Status	-0.026	-0.21%	-0.007	-0.06%
	(0.035)	(0.003)	(0.064)	(0.005)
Education: (Base Case: Primary School)				
Middle School	0.238*	1.88%*	0.284*	2.20%*
	(0.141)	(0.011)	(0.147)	(0.011)
Higher Education	-0.039	-0.31%	0.009	0.07%
	(0.201)	(0.016)	(0.205)	(0.016)
Adult Children				
#Adult Children	-0.036	-0.28%	-0.045	-0.35%
	(0.086)	(0.007)	(0.089)	(0.007)
#Female Adult Children	0.091	0.72%	0.113	0.87%
	(0.100)	(0.008)	(0.104)	(0.008)
#Married Adult Children	-0.099	-0.79%	-0.129	-1.00%
	(0.141)	(0.011)	(0.202)	(0.016)
#Working Adult Children	-0.186	-1.47%	-0.019	-0.15%
	(0.158)	(0.012)	(0.250)	(0.019)
Ave Adult Children Income	0.023	0.18%	-0.002	-0.01%
	(0.022)	(0.002)	(0.035)	(0.003)
Grandchildren				
#Grandchildren	0.111	0.88%	0.120	0.93%
	(0.101)	(0.008)	(0.105)	(0.008)
#Female grandchildren	0.197	1.56%	0.184	1.42%
	(0.128)	(0.010)	(0.129)	(0.010)
Childcare time	-0.014*	-0.11%*	-0.004	-0.03%
	(0.008)	(0.001)	(0.010)	(0.001)
Living Parents				
#Living Parents	0.082	0.65%	-0.325	-2.51%
	(0.232)	(0.018)	(0.527)	(0.041)
Time Spent on Chores				

Chores time	-0.001	-0.01%	-0.001	-0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Control Variables	X	X	X	X
N	3,433	3,433	3,433	3,433
rho	0.444		0.650	
	(0.080)		(0.056)	

Notes: Standard errors (SE's of the coefficients are clustered at the individual level and SE's of the marginal effects are calculated using the delta method) are in parentheses. Regressions also include a constant term, calendar-year fixed effects and provincial fixed effects.

Source: China Health and Nutrition Survey (CHNS) data.

*$p < .10$; **$p < .05$; ***$p < .01$

Table 6 Family-related Determinants of Bridge Employment in China: Urban Subsample

Probit model with panel data, dependent variable: whether retired but rehired (0 = no; 1 = yes)

	Random Effects		Correlated Random Effects (Hausman test: p = 0.225)	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Spouse				
Marital Status	-4.092	-26.60%	-2.441	-15.64%
	(3.562)	(0.232)	(4.893)	(0.314)
Age	0.138	0.90%	0.106	0.68%
	(0.117)	(0.008)	(0.154)	(0.010)
Age Squared	-0.001	-0.01%	-0.001	-0.01%
	(0.001)	(0.000)	(0.001)	(0.000)
Employment	0.740***	4.81%***	0.810***	5.19%***
	(0.130)	(0.008)	(0.180)	(0.011)
Pension	-0.004	-0.02%	0.002	0.01%
	(0.020)	(0.001)	(0.025)	(0.002)
Health Status	0.014	0.09%	0.109**	0.70%**
	(0.030)	(0.002)	(0.047)	(0.003)
Education: (Base Case: Primary School)				
Middle School	-0.060	-0.39%	-0.062	-0.40%
	(0.124)	(0.008)	(0.127)	(0.008)
Higher Education	-0.140	-0.91%	-0.149	-0.95%
	(0.152)	(0.010)	(0.156)	(0.010)
Adult Children				
#Adult Children	-0.061	-0.39%	-0.052	-0.33%
	(0.084)	(0.005)	(0.091)	(0.006)
#Female Adult Children	0.027	0.17%	0.025	0.16%
	(0.097)	(0.006)	(0.099)	(0.006)
#Married Adult Children	-0.144	-0.94%	-0.009	-0.06%
	(0.126)	(0.008)	(0.168)	(0.011)
#Working Adult Children	0.235	1.53%	0.396**	2.54%**
	(0.145)	(0.009)	(0.191)	(0.012)
Ave Adult Children Income	-0.003	-0.02%	-0.041	-0.26%
	(0.018)	(0.001)	(0.025)	(0.002)
Grandchildren				
#Grandchildren	0.039	0.26%	0.104	0.66%
	(0.124)	(0.008)	(0.131)	(0.008)
#Female grandchildren	-0.182	-1.18%	-0.191	-1.22%
	(0.154)	(0.010)	(0.157)	(0.010)
Childcare time	-0.020***	-0.13%***	-0.022***	-0.14%***
	(0.008)	(0.000)	(0.008)	(0.001)
Living Parents				
#Living Parents	-0.060	-0.39%	-0.182	-1.16%
	(0.192)	(0.013)	(0.408)	(0.026)
Time Spent on Chores				

Chores time	-0.002***	-0.01%***	-0.002***	-0.01%***
	(0.001)	(0.000)	(0.001)	(0.001)
Control Variables	X	X	X	X
N	7,145	7,145	7,145	7,145
rho	0.598		0.602	
	(0.046)		(0.045)	

Notes: Standard errors (SE's of the coefficients are clustered at the individual level and SE's of the marginal effects are calculated using the delta method) are in parentheses. Regressions also include a constant term, calendar-year fixed effects and provincial fixed effects.

Source: China Health and Nutrition Survey (CHNS) data.

*$p < .10$; **$p < .05$; ***$p < .01$