One Country, Two Systems: Evidence on Retirement Patterns in China*

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February 2015

*Support for research and data used in this paper (the China Health and Retirement Longitudinal Study, CHARLS) came from the Behavioral and Social Research division of the National Institute on Aging (grant numbers 1-R01-AG037031-01, and 3-R01AG037031-03S1); the Natural Science Foundation of China (grant number 71130002); the Knowledge for Change Program (KCP) at the World Bank (RF-P131518-RESE-TF015161); China Medical Board, and Peking University.

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Abstract

This paper documents the patterns and correlates of retirement in China using a nationally representative survey, the China Health and Retirement Longitudinal Study (CHARLS). After documenting stark differences in retirement ages between urban and rural residents, the paper shows that urban Chinese retire earlier than workers in many OECD countries and rural Chinese work until advanced ages. Differences in social security and economic resources explain much of the urban-rural difference in retirement rates. Opportunities for exploiting human capital of older workers, and fending off the fiscal pressures created by population aging, rest with encouraging longer employment among more highly educated and skilled workers living in urban areas. Improving health status, providing childcare and elder care support and creating incentives for women to retire later may facilitate longer working lives for both men and women.

Key words: Retirement; Aging; Pensions; Urban-Rural-Gap; CHARLS

JEL Codes: J26; O15; O17; O53

1. Introduction

With increasing longevity and fertility decline, population aging threatens the prospects for growth in living standards in many countries (NRC 2012). Extending working lives and harnessing the human capital of the older population may ease some burdens of population aging by raising the worker-elderly dependent ratio (Lee 2014, Borsch-Supan et al. 2014). This common prescription runs into a contradiction in rapidly aging middle income countries where one observes two retirement systems: formal retirement with relatively generous benefits enjoyed by civil servants and retirees from formal sector employers, and informal retirement, characterized by family support and depletion of own savings. Unsurprisingly, formal retirees are typically able to exit from work at relatively young ages, while informal retirees may work as long as their health allows. One policy imperative in middle income developing countries involves expanding access to social insurance and pensions for informal retirees, while finding ways to incentivize formal sector workers to extend working lives (Giles et al 2015).

Increases in the average retirement age require consideration of the factors influencing exit from the labor market, both from wage employment and from self-employed activities. In China, farmers are frequently characterized as "endless toilers," who do not retire until forced to by ill health (Benjamin et al., 2003). Anecdotal evidence indicates that informal sector workers in urban areas also exhibit strong labor force attachment. If the majority of Chinese are already retiring late, then there may be little room for extending working lives, and less of an argument for doing so. A first goal of this paper is thus to describe the retirement and labor supply patterns across China's urban and rural areas.

Choosing when to stop working is a critical decision in the life-cycle of an individual and his (or her) family, with impacts on both well-being in old age and accumulation of family resources. Even where faced with mandatory rules for processing administrative retirement, workers in China are not precluded from engaging in new work. Thus retirement is not simply a matter of pension eligibility age; it may be influenced by family wealth and circumstances, and by individual health and preferences as well as policies and institutions. To understand the factors behind the retirement decision, the paper also estimates empirical models of labor supply among the over 45 population. These analyses are a step toward informing on likely labor supply patterns of elderly in the future, and a source of insight into where policy may influence individual retirement decisions.

The Chinese labor market is distinctive in the institutional segregation of urban and rural registered residents, which is further magnified in retirement. Most long-term residents of urban areas must leave long-term formal employers and start drawing on relatively generous pension support at young ages, and thus they tend to cease activity after "processing retirement." Rural residents, by contrast, work on the farm or in other agriculture-related activities until relatively late in their lives and only expect to receive pensions that are a small fraction of those afforded to urban residents (CHARLS Research Team, 2013). Evidence presented in the paper suggests that the advantage in social security and economic resources of the urban elderly contribute significantly to the urban-rural difference in retirement ages, and that the rural elderly's heavy reliance on support from their children leaves them in a more vulnerable position.

Most of the research on the employment behavior in China's labor market has focused on prime age adults in circumstances of restructuring (Appleton et al. 2002, Giles et al. 2006) or married women with caring burdens (Dong 2010, Maurer-Fazio et al. 2011). Relatively little attention has been paid to the timing people enter or exit the labor force. A few papers have examined retirement patterns and decisions (Benjamin 2003, Pang et al. 2004, Giles et al. 2012), but the data sets that were used are not nationally representative and likely fail to reflect all dimensions of the retirement decision from a national perspective. Getting this picture right, as well as important nuances, promises to inform on the types of interventions that might limit the adverse effects of population aging on economic growth and people's well-being.

The paper is organized as follows. In Section 2, we briefly describe the data employed in this study. In Section 3, we describe the patterns of retirement in China. Section 4 lays out factors influencing the retirement decision along with descriptive evidence and a discussion of urban-rural differences in labor supply at older ages. Section 5 develops an analytical model used to estimate the correlates of labor supply in a multivariate framework, and presents these results, and then Section 6 concludes.

2. Data and Measurement

The China Health and Retirement Longitudinal Study (CHARLS) is a nationally representative longitudinal survey of the middle-aged and elderly population (45+) in China along with their spouses, which includes an assessment of the social, economic, and health circumstances of

community-residents.[1] The national baseline survey of CHARLS was conducted between June 2011 and March 2012 and enumerated surveys from 17,708 respondents. To ensure representativeness, the sample was chosen using multi-stage probability sampling. In the first stage, 150 county-level units were randomly chosen with probability proportional to scale (PPS) from a sampling frame including all county-level units of China (excluding only Tibet, Hong Kong and Taiwan) with stratification by region and within each region by urban districts or rural counties. With each county-level unit, 3 villages or urban resident communities were chosen using PPS random sampling. Within each village or resident community, mapping and listing operations were conducted to obtain a sample frame of households. Within each household, one person aged 45 and older was randomly chosen to be the main respondent and the spouse was automatically included. To avoid human manipulation, each stage of the sampling was computerized and all interviews were conducted using face-to-face, computer-aided personal interview (CAPI) technology. Training of interviewers and field procedures followed strict protocols to maximize data quality. As an indicator of the data quality, demographics of the CHARLS respondents closely mimic those of the 2010 national population census (Zhao et al. 2014).

Information on retirement comes from the "work, retirement and pension" modules of the CHARLS questionnaire. Respondents are asked in detail about their current job status, work history, retirement and pension information. Careful distinctions are made between drawing a pension, or *administrative* retirement, and actual *retirement*, which we define as an exit from work.

CHARLS is a comprehensive survey that covers many aspects of the health, earnings and economic well-being of both individuals and their families. For analytical purposes, we draw on the demographic module for individual characteristics, the family module for the size and quality of family support network, specifically number and education of all children whether or not they co-reside in the households, the income/asset module for the availability of economic resources and the health module for information about health status. In addition to current and historical conditions, CHARLS also asks respondents about their expected support in the future, which we bring into our discussion of expectations and retirement decisions.

[1]All co-authors of this paper are members of the CHARLS research team and participated in the design and implementation of the survey. One author of this paper, Yaohui Zhao, is the lead Principal Investigator for the CHARLS project.

3. Retirement Patterns in China

We define retirement as not engaging in any farm and non-farm employment among those who once worked.[2] As farming is seasonal, a respondent is still considered to be employed if he, or she, worked for ten days or more in the past year. All non-farmers were asked about employment activities in the past week, be it wage employment, self-employment or unpaid family business work.[3] Those on temporary leave are considered to be working. We focus on employment as opposed to labor force participation because there are a vanishingly small number of respondents over age 45 who are not employed but report active searches for work. We have no doubt that a search process exists for older workers who wish to work, but it is difficult to capture, and this is particularly true when large shares of older workers are self-employed.

Overall, among those 45 and older the retirement rate is more than twice as high among urban workers (59.5%) as their rural counterparts (26.1%) (Table 1). Not surprisingly women retire sooner than men – in urban areas 67.5% among women versus 52.0% among men, and in rural areas, 32.2% among women versus 19.5% among men. As expected, retirement rises with age, but the age patterns are quite distinct between urban and rural residents. As shown in Figure 1, the retirement rates of all four groups (urban women, urban men, rural women and rural men) were closer at age 45-49, when there was only a 15 percentage point difference between retirement rates of rural men and urban women. Urban women show a sharp jump in retirement when aged 50 to 54, driving a large and growing wedge relative to rural men and women. Urban men's retirement sharply diverges as well with a 5 to 10 year lag, over ages 55 to 59 and 60 to 64. The urban-rural retirement gap starts at 7.0 and 10.6 percentage points for men and women respectively at 45-49. By age 65-69, the urban-rural retirement gap among men peaks at 52.9 percentage points and at 60-65, the gap among women peaks at 56.7 percentage points. By age 75-80, hardly any urban

[2]Only a small fraction of all respondents (2.87 %) reported that they never worked.

[3]One might be concerned that the long recall window for our definition of employment for agricultural workers will lead to over-statement of the labor force participation for farmers. Following the latest resolution from the International Conference of Labor Statisticians (2013, par 57), we adopt the longer recall window to capture the fact that agricultural work may seasonal and some active workers may be excluded. In fact, as we show below, evidence on hours worked conditional on working suggests that workers engaged in household farming tend to work long hours and are fully employed.

residents are still working (only 5% among men and less than 2% among women) but work is still common among rural people (40 percent of men and nearly 25 percent of women).

[Insert Figure 1 here]

[Insert Table 1 here]

One may be concerned that definitional differences yield a higher employment in rural areas: one could conceivably work just 10 days in a year and be counted as working, while an urban worker only needs to have worked an hour during a one week recall period. Alternatively, one could argue that the reason why rural people can work at older ages is because farming is less intensive and can be handled with little effort. To address these concerns, we examine average hours of work per week by *hukou* and gender in Figure 2. The top two graphs show averages across all persons, regardless of work status. As expected from much higher employment among rural people, there is a large gap for the age 65-69 cohort, rural men (women) on average work 21.37 (13.94) hours while urban men (women) only work 5.40 (1.99) hours. Taking the average only among those who work (the bottom two graphs), working hours are quite similar, with rural elderly men working more hours than urban men, though the difference is unlikely to be statistically significant. Thus it is unlikely that the higher labor force participation of rural elderly is due to lower work intensity.

[Insert Figure 2 here]

To give an international perspective on the Chinese retirement rate, Figure 3 highlights differences in retirement rates in China in comparison with seven OECD countries (France, Germany, Italy, Canada, USA, Japan and South Korea) and two large Asian developing countries at a similar stage of economic development (India and Indonesia) as reported in 2008. For each country, we present retirement rates by five-year age cohorts: 45-49, 50-54, 55-59, 60-64 and 65+.[4] The top panel is for men and the bottom is for women. Men in India and Indonesian clearly exit

[4] The data for other countries comes from "An Aging World: 2008," issued by the National Institute of Aging (NIA) of the National Institute of Health (NIH), the US Department of Health and Health Services. Due to data accessibility, the survey year varies by country, with India 2001, France and Indonesia 2005 and all the other countries 2006. The age group also has some difference: For USA, 45–49 is replaced by 45–54; for India, 45–49 is replaced by 40–49, 60–60–64 by 60–69, and 65+ by 70+; for Indonesia, 65+ is replaced by 60+.

employment much later than their richer OECD counterparts. Even within OECD countries large differences exist, especially in the age group near benefit eligibility (55-59 and 60-64), which is a key feature of retirement policy (Gruber and Wise 1998). For women, differences in retirement patterns among younger groups between the OECD and India and Indonesia are less pronounced as a result of differences in gender roles, but the same pattern emerges among older women, i.e., developed countries have higher rates of labor exits and large differences exist within the OECD. The retirement pattern of China's rural workers looks very much like patterns observed in India and Indonesia, but urban people retire at similar rates as in rich OECD countries. Among the 60-64 age group, the retirement rate of urban men far exceeds that in the U.S., Canada, Japan and South Korea, and is on par with that observed in Western European countries. While only 32.8% of Chinese men aged 60-64 are working, 57.5% in the U.S., employment rates are 53.3% in Canada, 70.9% in Japan, and 68.5% in South Korea. Among the 55-59 age group, Chinese women's retirement rate is the highest of all countries, exceeding even Western European welfare states. The younger age cohort of Chinese urban women, 50-54, overtakes European counterparts by an even larger margin. While only 46.7% of Chinese women aged 50-54 are working, employment rates for women are 64.7% in the U.S., 78.1% in Canada, 70.5% in Japan, and 58.5% in South Korea. Even in Italy, where the incentive to work is the lowest in Europe, 54% of women are working, which is 7.3 percentage points higher than among Chinese urban women.

[Insert Figure 3 here]

Another important phenomenon revealed in Figure 1 is that a substantial number of urban people have exited the work force before the official pension eligibility ages, which are set at 60 for men and at 50 and 55 for blue and white collar women, respectively. 40.9% of urban men aged 55-59 have retired and nearly a quarter of urban females have stopped working at 45-49. The presence of such substantial early retirement is further evidence of potential easy exits from work in urban areas, but more importantly, such early retirement is unsustainable in the face of population aging and understanding the institutions and decision process behind this phenomenon is necessary for policy makers.

4. Mechanisms Influencing Retirement in China

In this section, we explore the institutional and policy origins of the significant difference in retirement patterns of urban and rural residents in China.

4.1 Retirement Policy

Retirement policies for formal sector workers in urban China provide much of the explanation for differences in retirement behavior between urban and rural residents. China's retirement system was established in the 1950s to cover government employees and urban workers in state-owned enterprises (SOEs), and later (from 1997 onward) was required of all urban enterprise employees. As is the case with many other forms of social protection, rural China's residents were left to fend for themselves, and have not been included in any substantial government-run retirement system. In the state sector, consisting of government and state-owned enterprises, the retirement age ceiling is strictly enforced. Anyone who reaches retirement age must process retirement and end employment.[5]

Because the government nationalized nearly all private businesses in the 1950s and self-employment was nearly eliminated, the retirement system effectively covered all urban workers before the economic reform period. Thus, any urban worker who started working at least ten years (the minimum number of to qualify for a pension) before the retirement age would receive a pension.

Although management of the pay-as-you-go retirement system has gone through dramatic changes since its inception, program rules governing the retirement age and benefits have remained relatively stable. The program was initially administered by the national government, but few workers became eligible for retirement in its initial years, and so management was simply a matter of personnel record keeping. During the chaotic period of the Cultural Revolution (1966–1976), with the near collapse of central authority, management of enterprise pensions was delegated to individual firms, while government employees continued to have their pensions managed by the central government. Starting in the late 1980s and into the 1990s, the government gradually elevated the pooling of enterprise pensions from individual firms to management by local governments (Feldstein, 1999, Zhao and Xu, 2002). At present, county- or city-level governments administer the pension pools, with a small portion of contributions are in individual accounts.

[5] More detailed description on the Chinese retirement policy and pension system can be found in Du (1997), West (2007), and Song and Chu (2007).

China has some of the world's youngest official retirement ages: age 60 for men, age 50 for blue-collar women, and age 55 for white-collar women, and these ages have not changed since the retirement system's inception in the 1950s. Figure 4 shows that economic retirement, or final exit from work, occurs much more often at the mandatory *administrative* retirement ages. The hazard rate of retirement, defined as percent exiting employment in 2011 among those who worked in the previous year, calculated over the entire sample of respondents, is over 18 (10) percent at age 50 (55) for urban blue (white) collar women, and 15 percent at age 60 for urban men. On the other hand, the retirement hazard for rural men and women does not exhibit sharp jumps, which is consistent with the hypothesis that mandatory administrative retirement policy is a major driving force of behind observed retirement patterns.

[Insert Figure 4 here]

As noted in Section 3, even with China's low official retirement age, substantial retirement occurs even earlier. The Chinese worker's pension policies permits early retirement due to health reasons and hazardous work conditions, but there is evidence that early retirement is granted quite liberally. Another special circumstance leading to early exit from work is known as internal retirement. This was a special practice during the 1990s when many firms experienced financial difficulties. Firms let redundant workers retire before the normal retirement age at the firms' expense, and turned to the Social Insurance Administration to support payment of pensions after workers reached the normal retirement age. Internal retirement enables workers to maintain eligibility for social insurance after retirement.

4.2 Social Security Coverage, Generosity, and Embedded Incentives

The incentive for retirement created by the ability to draw a pension is well documented in the literature, especially with respect to retirement-timing (Stock and Wise, 1990; Coile and Gruber, 2001). In the urban sector, pension programs associated with mandatory retirement policy are well established, and qualified retirees receive a pension of an amount based on certain characteristics of their employment history (Feldstein, 1999). In rural areas, however, the New Rural Pension Program has only been phased in since 2009, and has lower coverage, less generosity and does not require exiting from work (agricultural activities) in order to claim it.

Table 2 describes pension coverage in urban and rural areas. From the bottom line, we see 75.5% of the urban elderly covered by at least one pension, while the fraction is as low as 41% for their

rural counterparts. The urban pension comes mainly from the firm or government institution pension (43.2%), while rural people are covered primarily by the New Rural Pension Program (26.4%), which is much less generous.

[Insert Table 2 here]

Pension coverage and generosity may be a driving force behind the retirement decision, as illustrated in Figure 6. The retirement rate for those covered by a pension is higher than those who are not across all age groups. When further separating by urban-rural classification, the difference only exists in urban areas and is statistically significant across most age ranges, while there is no difference in rural areas, suggesting that rural pension may not be sufficient to support exit from work. To support this claim, top panel of Table 3 presents median pension income of retirees with at least one pension. As expected, we observe a large urban-rural gap: pension income of the urban retirees is much higher than for their rural counterparts (1500 vs. 65 Yuan/month). This difference persists for both men and women of all age groups. Even if one takes into account the differences in cost-of-living between urban and rural areas, this gap is still large.

[Insert Figure 6 here]

[Insert Table 3 here]

4.3 Economic Resources

The importance of economic resources in the decision to retire is well documented in the literature (Poterba et al., 2011). Retired households are dependent on annuitized income streams (pension income) that they have built up during their working careers and on the wealth that they have accumulated in other forms. CHARLS has information on respondents' wealth including assets and home equity, with which we calculated per capita wealth of each household. The bottom panel of Table 3 presents median per capita wealth by *hukou*, gender and age, which shows that wealth of urban people is nearly three times that of the rural people and this urban-rural discrepancy exists for all age groups, and for both men and women. The wealth gap is driven by long-standing income gaps between urban and rural areas, and partly by an urban housing boom that disproportionally benefitted urban residents.

4.4 Expected Types of Support

In addition to pension incomes and accumulated wealth, there may be other sources of support that China's elderly population might count on, and such support may affect retirement decisions. Adult children, for example, are frequently an important source of elderly support (Cai et al., 2006; Zhang and Goza, 2006).

The CHARLS dataset provides insight into "retirement expectations." Specifically, respondents are asked to state their expected source of economic support in old-age when they lose the ability to work, choosing from the following options: from children, from own savings, from pension, and from other sources. Table 4 summarizes the statistics by *hukou* and gender. As is revealed, the majority (73%) of urban respondents expect to rely on pensions, while the comparable figure for rural elderly is very low (9%). This is consistent with less generous pension benefits for rural people. Rural people overwhelmingly expected children to support them (81%) while only one fifth of urban people do so. The fraction expecting to rely on savings is low for both urban and rural people.

[Insert Table 4 here]

Given the paramount importance of children for the rural elderly, we examine what rural children have to offer. In absolute numbers, rural people have more children (2.8 among rural elderly vs. 2.1 among urban elderly). However, if we look at quality reflected in educational attainment, the story is quite different. Table 5 shows average years of education of children. Although adult children's years of education increases for younger cohorts of both urban and rural people, the urban-rural difference remains (12.2 vs. 8.5 on average). Children of rural residents consistently have lower education than their urban counterparts across all age groups. As the returns to a year of schooling are quite high in China, this suggests that the capacity for providing financial support in the future is lower for rural children than their urban counterparts. In other words, child support for rural elderly may not be as generous or as the pensions and wealth drawn on by the urban elderly.

[Insert Table 5 here]

4.5 Other Demands on Time

One obstacle to longer working lives, particularly for women, is the demand for "labor" in household activities other than farming or other self-employed market-oriented work. Although few data sources provide information on time use, summary evidence from the CHARLS data, presented in Table 6, highlight the importance of older women's work in both child-rearing and elder care. The first set of comparisons for men and women examine unconditional averages, and a second set examines average hours per week conditional on providing at least one hour of care. Urban women between 55 and 60 years of age spend a considerable amount of time caring for grandchildren (12 hours per week unconditional, and 43 hours per week conditional on providing care). In rural areas the peak ages for women to provide childcare are also between 55 and 60, for whom there is a conditional average of 48 hours spent providing care. Time spent providing elder care is somewhat lower, but conditional on providing care, urban and rural women aged 55-60 provide 23 and 14 hours per week, respectively. Somewhat surprisingly, both unconditional and conditional rates of care provision for elderly parents are modestly higher for rural men than women.

[Insert Table 6 here]

As age 55 is the retirement age for white-collar women in urban China, it is reasonable to question whether family needs for care provision are responsible for exit from the work force. Upon retiring, women may simply look for ways to help their families. We will examine correlations between potential family needs and labor force participation of women below, but it is possible that eligibility to start drawing a pension (at 50 and 55 for blue and white collar women, respectively) swamps the effect of potential care provision needs. Nonetheless, if one wants to create incentives for longer working lives, policy makers may need to confront expectations that China's relatively young urban retirees (and their children) expect to spend their 50s providing care for family members.

5. The Retirement Decision of Older Adults

5.1 A Model of Labor Supply

We examine the determinants of the labor supply (employment) of older workers, recognizing that important correlates, such as access to pensions, may be systematically related to both the financial ability to retire and unobservable characteristics (e.g., ability). While these models should be viewed as providing descriptive evidence, we choose measures of health status, and proxies for wealth and family characteristics with the aim of minimizing endogeneity biases.

As a framework for analytical explorations into the "retirement" and labor supply decisions of the elderly, we assume that individuals (or households) maximize utility subject to a family budget constraint, which is a function of wealth, labor and non-labor income, available time and health status of household members. From the constrained utility maximization decision, we conceptualize a general model of labor supply:

$$L_i^S = f(W_i^h, I_i^w, I_i^{nw}, H_i, T_i, \mathbf{X}_i, \mathbf{V}_j) \tag{1}$$

where labor supply (or employment) of individual i, L_i^S, is a function of household wealth W_i^h, income from work of all household members I_i^w, income unrelated to current work, I_i^{nw}, health status, H_i, an individual's time endowment, T_i, a vector of individual and household characteristics reflecting preferences, $\mathbf{X}_i$ which include the demographic characteristics of own and household members. Given the likely variation in opportunities and returns to labor across geographic regions (e.g., Jalan and Ravallion, 2002), we control for potential unobserved county-level characteristics affecting labor supply with a vector of county (or city) level indicators, $\mathbf{V}_j$. Identifying effects of each of these variables are complicated by three factors which may introduce bias into our estimates: 1) some are imperfectly observed; 2) inter-relationships among important variables (e.g., health status may affect income through productivity, available time, and available household wealth); 3) and that labor supply of an elderly individual may be simultaneously determined by the labor supply decisions of other family members, especially a spouse. In order

to reduce such bias, we estimate reduced form models with proxies for longer-term determinants of (permanent) income and wealth.

First, we use housing wealth as one proxy for household wealth (W_i^h). Unlike liquid components of wealth, housing wealth will vary less with current shocks to both income and health that simultaneously determine labor supply.[6] Second, current labor income (I_i^w) of a household will also be systematically related to own and family member labor supply decisions. Recognizing that educational attainment of the elderly themselves is likely to be associated with lifetime earnings and accumulated wealth of the household, we include the respondents' own educational attainment as an additional proxy for wealth. In addition, the educational attainment of a spouse acts as a proxy for the value of a spouse's labor.

Health status also affects productivity and ability to earn income through its impact on capacity for work. Elderly who are ill or suffer physical limitations may be unable to work, and so we make use of self-assessments of ability to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs) as proxies for health status. In sum, our complete set of proxies for W_i^h, I_i^w and H_i in the reduced form are categorical educational attainment indicators, age and its square, measures of health status of the respondent (ADL/IADL indices described below), and the educational attainment of a spouse[7] of the household. As some older workers may find that their time is best utilized in provision of care to relatives and that this may influence employment decisions, we also include numbers of grandchildren and living parents, respectively, of the household head and spouse. We estimate the following reduced form labor supply model:

$$L_i^S = \beta_1 E_i + \beta_2 Pen_i + \beta_3 Pen_{-i} + \beta_4 Dis_i + \beta_5 Dis_{-i} + \beta_6 E_{-i} + \boldsymbol{X_i'\gamma} + \boldsymbol{V_j} + u_i \qquad (2)$$

where labor supply, L_i^S, is a binary indicator of whether individual i has worked during the previous year. We expect that higher levels of educational attainment of elderly, E_i, will be

[6]Venti and Wise (2004) show that housing wealth is not treated as a liquid asset in the US.

associated with higher wealth and savings and, as leisure is a normal good, may be negatively related to elderly labor supply.[8] Similarly, we expect that pension receipt, Pen_i, and a spouses pension, Pen_{-i}, will be negatively related to employment.

The health of older workers and elderly are measured using the count number of disabilities, Dis_i.[9] For each of the four data sources, we include the number of ADL and IADL activities that the respondent has difficulty performing (including those he or she cannot perform). Working decisions may be affected by the health status of a spouse, and for this reason, we also include a measure of spouse health status, Dis_{-i}. One may plausibly observe an added worker effect, in which a spouse's health shock leads to increased labor supply so as to insure income against the earnings-loss associated with the health shock (e.g., Coile, 2004), or alternatively find that spouse care needs will require exit from the labor force (e.g., McGeary, 2009).

We expect that declining health will have a negative impact on work activity, particularly for those workers in physically demanding occupations (Bound, 1999). We also control for a vector of individual and household characteristics, $\mathbf{X}_i$, which include age and age-squared that are associated with own productivity, numbers of young household members (age 0-6) and number of elderly household members (age 80 and above) of the head and spouse that are associated with preferences for employment, other indicators of demographic structure of the household and the ln(1+per capita value of the household dwelling), as a proxy for household wealth.

Recent retirement literature in the U.S. has focused on the important roles of spouse employment and spouse health status in labor supply and retirement decisions. Structural models (Blau, 1996; Gustman and Steinmeier, 2004) suggest that labor supply decisions of older couples reflect preferences for shared retirement. With this in mind we also examine correlation between labor supply decisions of husbands and wives. Our final model thus includes an indicator for

[8]Of course, an individual with more education may also be able to earn significantly higher returns, and so the coefficient on education will reflect the net effect of education as well as the effect of accumulated wealth associated with it.

[9]Bound (1991) cautions that general health status questions are likely to be correlated with unobservable individual characteristics, and further, that they may suffer from justification bias. Several studies (e.g. Bound, 1999; Dwyer and Mitchell, 1999) have suggested that proxies constructed from ADLs do not suffer from such serious bias. Bound et al (2010) cautions that financial wealth may affect ADL outcomes, and that even proxies developed from ADLs may lead us to underestimate the negative effects of poor health on labor supply. As we do not yet have appropriate panel data for the three countries in this study, we are not able to control for dynamic relationships between health and wealth.

employment status of a spouse, L_{-i}^{S}, as well as an indicator for whether or not the respondent has a spouse. The final model estimated is thus:

$$L_i^S = \beta_1 E_i + \beta_2 Pen_i + \beta_3 Pen_{-i} + \beta_4 Dis_i + \beta_5 Dis_{-i} + \beta_6 E_{-i} + \beta_7 L_{-i}^S + \boldsymbol{X_i'} + \boldsymbol{V_j} + u_i \quad (3)$$

As the labor supply decisions of husbands and wives are likely to be jointly determined and have a dynamic relationship with health and shocks to health and employment, we view these models as purely descriptive but informative of the extent to which joint labor supply decisions may affect the timing of retirement. As the HRS-type surveys mature into full panel studies, it will be easier to control for unobservables and to unlock directions of causality among these variables.[10]

Descriptive statistics for our full set of regressors are shown in Table 7, below. As men and women in urban and rural areas likely faced different educational opportunities in their youth, labor market conditions in working age and the prospect of different retirement systems, we estimate models separately by gender and residence.

[Insert Table 7 here]

5.2 Determinants of "Retirement" in China

***Employment and Pension Availability*.** In Table 8 below, we show results from estimating the labor supply model presented in specification (3) above.[11] The results are suggestive of the role that pension income plays in decisions to exit from the labor force. After controlling for age, education, health status of the respondent and spouse, proxies for wealth and family demographic characteristics, receiving a pension is associated with 24 and 15 percentage point reductions in

[10] In estimating (2) and (3), it should be noted that there are subsamples of the population for which there is no spouse or for which spouse information is not available, and this may lead us to concern about biases introduced by selection into marriage. In the models presented in this paper, we have handled this problem by including indicator variables for marital status and for absence of spouse information, and use the demographic and socio-economic status of the respondents to predict the characteristics of the missing spouses. We have also estimated these models on the subset of the data for which we have information on both spouses. We take comfort in the fact that there is no appreciable difference in the coefficients of interest across models using the full sample and the one estimated on married couples with spouse information.

[11] We present linear probability models by gender and residence location (urban and rural). While magnitudes differ somewhat, marginal effects using probit models do not lead to significant qualitative differences in results.

employment for men and women, respectively, in urban China (Table 8), and given that 56 and 40 percent of urban men and women over 45 are employed (Table 7), this corresponds to 43 and 38 percent reductions in the probability that men and women are working.

[Insert Table 8 here]

In urban China, mandatory retirement provisions limit scope for employment in larger formal sector workplaces beyond age 60 for men, and 50 and 55 for blue and white collar women, respectively. While there are no explicit provisions or biases against working beyond the retirement age in urban China, the relative generosity of the urban employee pension combined with mandatory retirement makes it less likely.

A respondent's educational attainment may be related to accumulated wealth (and ability to retire) but also with potential current returns available in the labor market, and thus we have no *a priori* prediction of how retirement will vary with education (and presumably skill) after controlling for pension receipt. Interestingly, we find that urban women with high school education or above are significantly more likely to be employed than those with lower education (9.9 percent). In urban areas, this may partially reflect the fact that educated white collar women are eligible for pension at 55, as opposed to 50 for blue collar women. As the education effect is apparent after controlling for pension receipt, however, it reflects the fact that more educated women are more likely to return to work even after processing retirement, suggesting that skills matter in promoting later exit from work.

***Work and Health Status*.** Lower health status, as measured through the count index of difficulty performing ADLs and IADLs, is strongly associated with reductions in employment. The coefficients on ADL-IADL difficulties, shown in Tables 8 reflect the percentage point change in probability of employment associated with an increase of one disability. Given employment rates less than 100 percent, the percentage change in the probability of employment with disability will be higher. An increase in one disability is associated with 2.4 and 1.7 percentage decreases in employment, but given that 46 and 28 percent of men and women are employed in urban areas, this amounts to 5.2 and 6 percent in probability of exit from workforce for the currently employed men and women, respectively. In rural areas, coefficient estimates are somewhat larger, but a larger share of the population is working. Thus coefficients on the ADL/IADL index of 3.1 and 2.3 for men and women in rural areas, where 73 and 60 percent work, respectively, amounts to 4.2 and

3.8 percent reductions in the probability of working for each additional disability. As most work in rural areas is more physically demanding, the stronger negative effect of health on probability of working in urban areas is particularly striking and underscores the difficulty of retiring for China's rural residents.

Employment and Spouse Health Status. Examining the relationship between employment and spouse health status, also calculated using an index of spouse ADLs and IADLs, in Table 8, we find evidence of a significant and relatively small added worker effect of poor spouse health status. The magnitudes are not large: coefficient estimates of 0.009 and 0.006 for men and women in urban China and 0.005 and 0.005 in rural areas correspond to 2 and 2.1 percent increases in probability of employment for men and women in urban areas, respectively, with an increase in spouse disability, and 0.7 and 0.8 percent increases in rural areas. In research using the US Health and Retirement Survey (Coile, 2004) the small positive effect in the US is interpreted as evidence of an inability to smooth income loss associated with health shocks. Another perspective, however, might be that there are some differences across countries in the financial effect of health shocks. In China, the fact that older workers are more likely to work when a spouse is ill may reflect a greater need to smooth income.

Family Care Provision and Employment. Requirements of families for the care of children or elderly may also influence decisions to retire. As co-residence, care and retirement decisions may be made jointly, we should take care in assigning a causal relationship between exit from work and presence of children or elderly. Still, a range of studies show that provision of family care is associated with fewer working hours and a higher probability of retirement and exit from the workforce (Jacobs et al, 2014; Meng, 2011; Van Houtven, 2013). Finding a negative relationship between presence of children or elderly in the household and employment would suggest public support for care through pre-school or elderly community centers might influence labor supply decisions of older women, particularly if the opportunity cost of forgone earnings in the labor market is significant (e.g. Bolin et al, 2008). For China, information on time allocation, available in CHARLS, suggests that women in their 50s contribute significant amounts of time to provision of childcare and eldercare, the contribution to childcare is also underscored in the labor supply models estimate in Table 8. Presence of an additional child under age six in the household is

associated with 4.9 and 2.0 percentage point reductions, or alternatively, 17.6 and 3 percent reductions in the probability of employment for working urban and rural women, respectively.

***Interdependence of Spouse Retirement Decisions*.** Strong correlation between the employment of husbands and wives suggests that spouses make joint labor supply decisions and may have a preference for retiring together. While not causal relationships, the correlations between own and spouse labor supply are economically and statistically significant. In urban China, employment of a spouse is associated with 18 and 16 percent increases in probability that men and women are working, respectively. In rural China, coefficient estimates suggest that a working spouse leads to 17 and 20 percent increases in probabilities the men and women are working, respectively. Joint labor supply, or retirement, decisions of spouses are of considerable policy relevance when considering incentives to increase the working ages of men and women. In China, where women have a lower retirement age than men, a gradual increase in the mandatory retirement age for women would likely lead to increases in the labor supply of both men and women.

Apart from strong correlations in work status of spouses, other research exploiting natural experiments suggest that an increase in women's retirement age will lead to increases in probability that men will work as well. Cribb et al (2013) exploit institutional variation introduced in 1995 legislation in the UK mandating an increase in women's minimum age of state pension eligibility from 60 to 65 between April 2010 and March 2020, and find that women's employment rates at age 60 increased by 7.3 percentage points when the state pension age was increased from 60 to 61, and the employment rates of their male partners also increased by 4.2 percentage points. The authors argue that the increase can be explained as the result of preferences for joint retirement more than the effects of either credit constraints or a response to financial incentives to work. Looking strictly at labor force participation, Schirle (2008) finds that an increase in wives' participation in the labor force can explain one-fourth, one-half and one-third of the increase in older married men's labor force participation in the United States, Canada and the United Kingdom, respectively.

5.3 Is There Evidence of Gradual Retirement?

In developed countries, retirement is often a gradual process: workers may reduce working hours at present employers, move to work arrangements requiring fewer hours per week or even

transition in and out of retirement.[12] Using the US Health and Retirement Study (HRS), Gustman and Steinmeier (2000) find that twenty-two percent of the population reported being partially retired at some point, and that a fifth of the population had partially retired by age 65. Exits from employment, or the labor force, are also not always permanent: Gustman and Steinmeier's study finds that over four waves, 17 percent of the sample experienced a reversal in which they moved from less-intensive work to more work.

In urban China, one might expect that low unemployment rates and shortages of skilled labor will offer opportunities for older skilled workers to re-enter the workforce. Their willingness to do so may depend in part on the ability to continue working later in life but for fewer hours. In China, hours of work conditional on working for both urban and rural residents remain quite high. Hours of work for those still working in urban areas (primarily the self-employed) tend to decline little and then drop off sharply around age 70.

Rural workers tend to work much longer hours, and given physical requirements of farmers, those in poor health simply cannot work. Men and women working in agriculture still put in long hours at relatively old ages, suggesting that the absence of migrant adult children might contribute to a scarcity of labor and higher labor input of rural elderly in China. We next estimate models similar to earlier employment regressions and examine the effects of pensions, education, health status, spouse health and spouse employment status on hours of work for those who are still employed. Results are presented in Table 9. Of particular note:

- *Pensions*. Conditional on working, pension receipt does not have a significant impact on hours of work.
- *Education*. Urban women in China tend to work fewer hours if they have a high skill education or above.
- *Health Status*. An increase in the ADL-IADL index is associated with reduced hours of work for both men and women in rural China. Poor health status of a spouse leads to an added worker effect in hours for both men and women in rural China.

[12]Gustman and Steinmeier (1984) find that self-reports of partial retirement among US men aged 58 to 69 was quite common, particularly partial retirement into a job different than the one held at age 55. Blau (1994) emphasize that older workers transition in and out the labor force ("retirement") with considerable frequency and that these transitions are often not picked up in annual data.

- *Spouse Employment Status*. A working spouse is associated with more hours of work among rural men and women.

[Insert Table 9 here]

6. Conclusions

At lower levels of economic development and with a significant share of the elderly population vulnerable to falling into poverty, China is also experiencing an unprecedented aging process. In order to provide insight into the types of policy that might promote longer working lives, and ease some strain from rising old age dependency rations, we describe the patterns of labor force participation in rural and urban China and the institutions that shape these patterns.

In examining employment patterns of older workers in a multivariate framework, the paper highlights the roles of pension receipt, spouse work status, family care requirements and health status. In urban China, where mandatory retirement is paired with relatively generous pensions, we observe a strong relationship between pension receipt and exit from work. This results calls attention to the importance of developing and unifying the Chinese old-age support system. To reduce the urban-rural discrepancy in retirement while also easing the burden of population aging, it is reasonable to encourage delays in the retirement age in urban sectors, and at the same time redesign the rural pension system so as to increase incentives to participate in plans with the higher levels of accumulation and expected future benefits to facilitate a secure retirement for the rural elderly.

Raising the retirement age is often politically unpopular, and this partially reflects opposition to increases in the age of eligibility for a pension. Some proponents of increasing the retirement age have received considerable publicity, but also heavy critique through social media.[13] Concerns include fears that raising the retirement age will make it more difficult for young adults to find work, a lack of fairness for enterprise employees relative to civil servants, and a belief that older workers (of the Cultural Revolution generation) are unproductive and lack skills (NETEAST, 2012). These types of concerns are not uncommon in other countries, but from the experiences of

[13]Yang (2014) proposes that women's retirement age be raised first and then both men and women's retirement ages progressively to age 65.

OECD, one suspects that these fallacies and misperceptions are likely to change with increasing scarcity of labor. Much of the Cultural Revolution generation has already retired, and the education levels of workers in their late middle ages will continue to rise, which will likely facilitate the training and employment at older ages.

Research conducted in the US and Europe suggests that one might provide incentives within the pension system to encourage retirement later in life (Coile and Gruber, 2007; Gustman and Steinmeier, 2009; Vere, 2011; Robalino et al, 2009).[14] Moreover, correlations in retirement of spouses, reflecting coordination of retirement planning, raises the prospect that incentivizing women to remain in the labor force after 50, or 55, may encourage delayed retirement of their husbands as well.

The role played by women in providing care within family, implies that removing barriers to work at older ages, such as mandatory retirement, will not be sufficient to raise the employment rates for women. In the absence of both markets for care providers and public provision of care, older women may need to devote time to providing care for children or elderly. Finding ways of to support care for both young children and the elderly may make it feasible for women to extend their working lives.

Feasible extension of working lives also requires that older workers are physically and mentally capable of working, and poor health status is associated with exit from work. To the extent that younger generations are healthier than their older parents, as a result of better nutrition in their youth, and are more often engaged in white-collar occupations, low health status may not pose a significant obstacle to extending working lives.

[14]Coile and Gruber (2007) find that changes in expected social security benefits in the US have an impact on retirement planning well ahead of retirement. Gustman and Steinmeier (2009) and Vere (2011) find that changes in social security rules or benefits help to increase the labor force participation of older workers, and may even lead to increases in hours worked "after retirement" in one's 70s. Robalino et al (2009) suggest that changes to social insurance policies in Brazil could have an important impact on the labor supply and retirement decisions of older workers.

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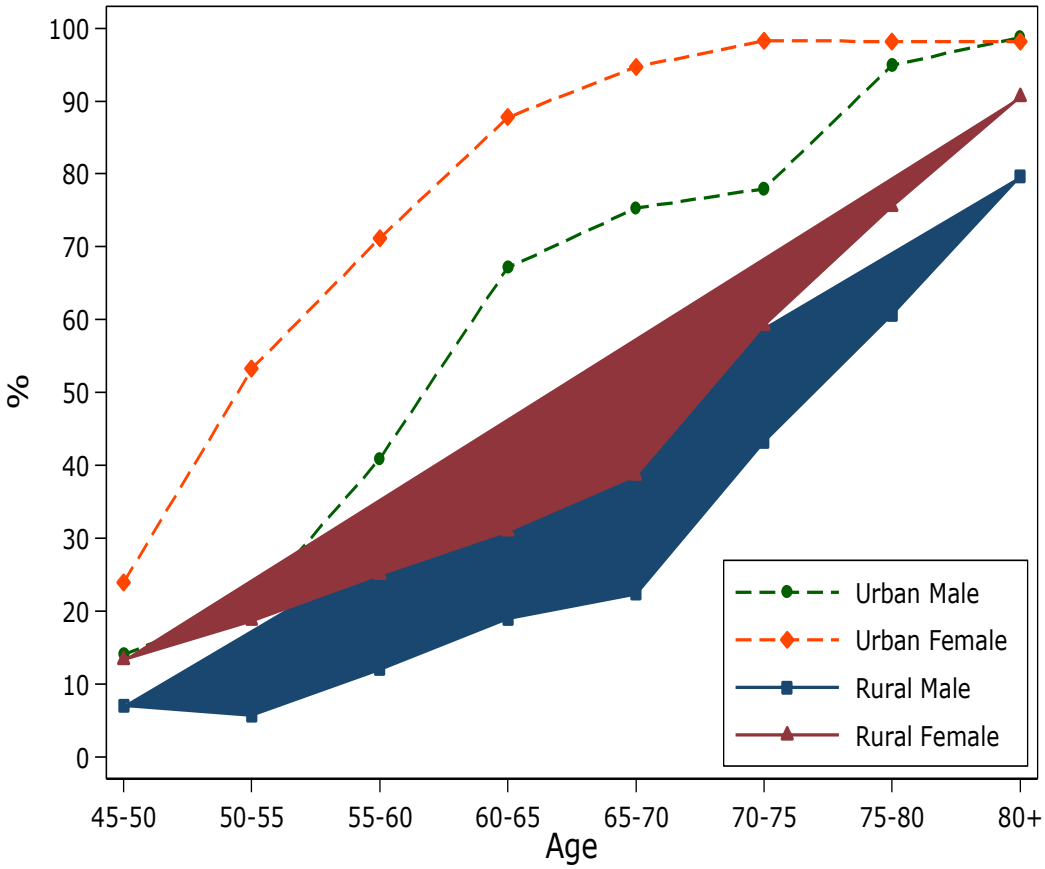
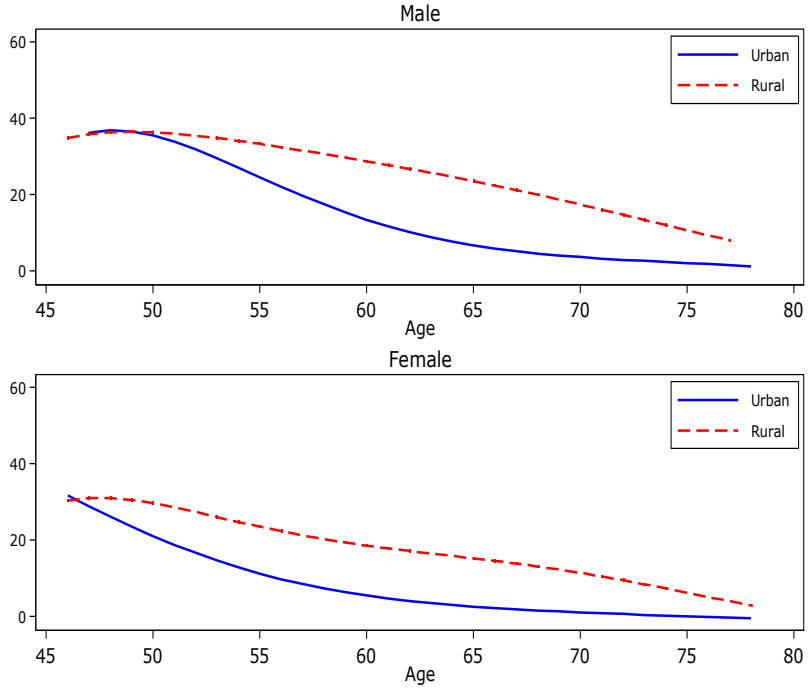
Figure 1
Retirement Rate by Age, *Hukou* and Gender



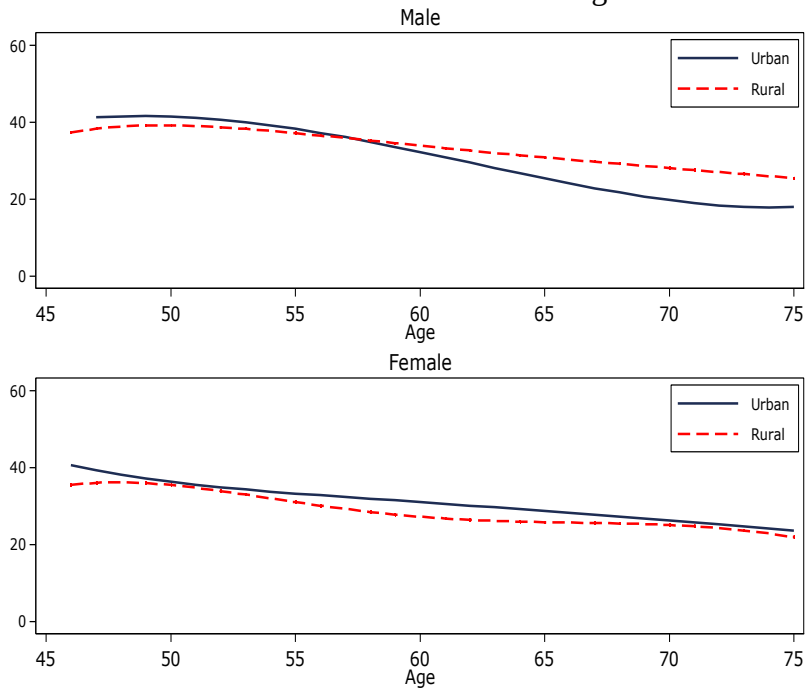
Sourece: CHARLS (2011), National Baseline Survey.

Figure 2
Average Hours of Work Per Week

Panel A. Unconditional

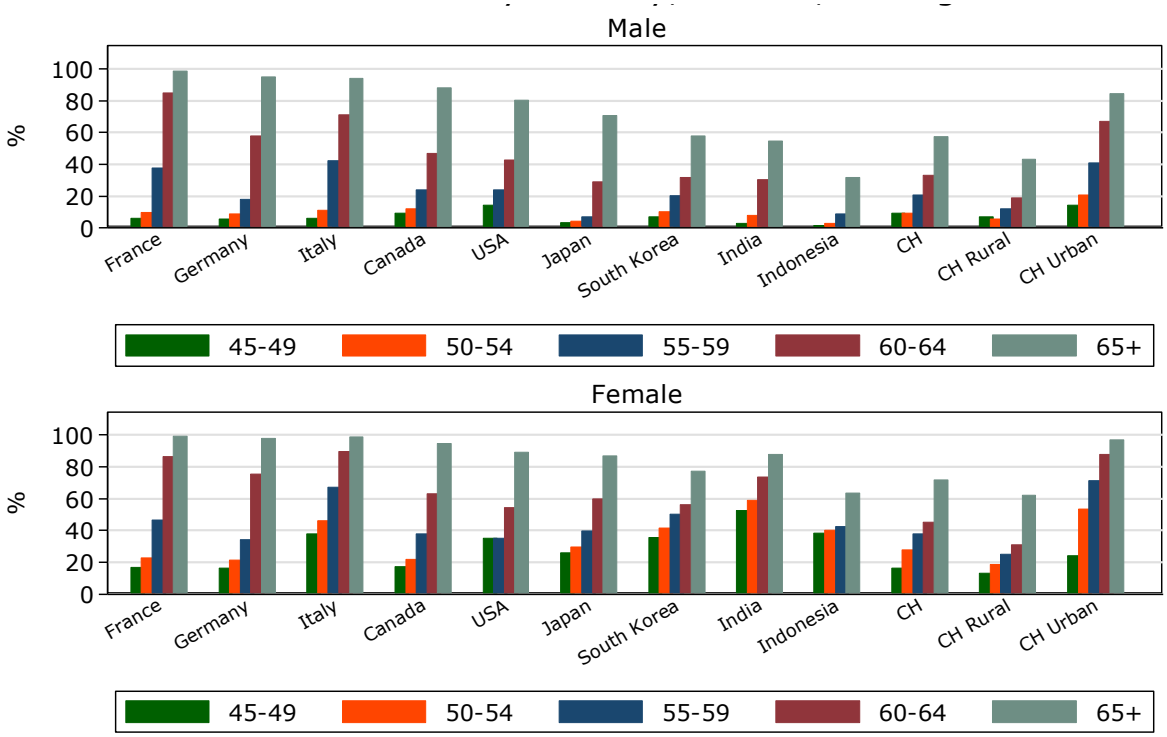


Panel B. Conditional on Working



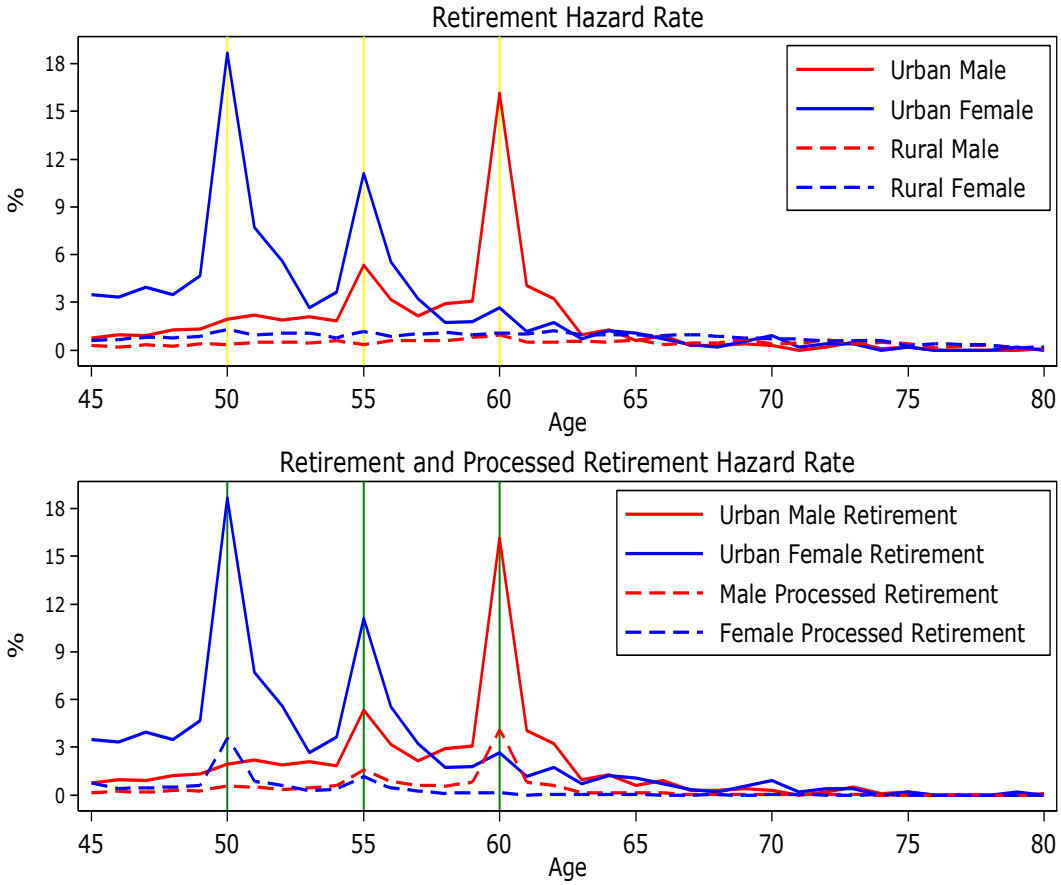
Source: CHARLS (2011), National Baseline Survey.

Figure 3
China's Retirement Rate in International Perspective
Retirement Rates by Country, Gender and Age



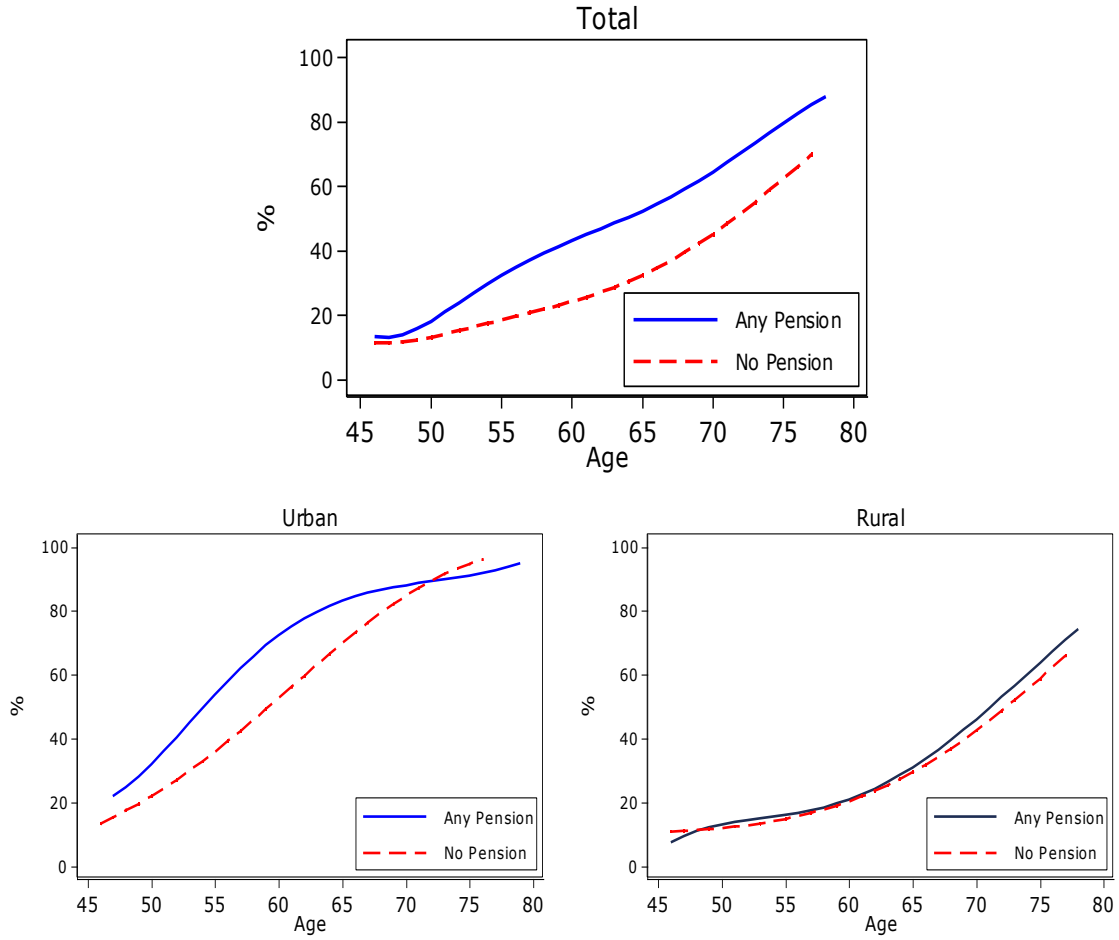
Data for China comes from CHARLS (Weighted), data for other countries come from 'An Aging World: 2008,' issued by NIA of NIH, U.S. Department of Health and Health Services

Figure 4
Unconditional Retirement Hazard Rates



Source: CHARLS (2011) National Baseline Survey

Figure 5
Retirement Rates by Pension Coverage



Source: CHARLS (2011) National Baseline Survey

Table 1: Retirement Rate by *Hukou*, Gender and Age (%)

	Total		Male		Female	
Age_Group	Urban	Rural	Urban	Rural	Urban	Rural
45_49	19.2	10.5	14.1	7.1	24.0	13.4
50_54	38.5	12.4	20.8	5.7	53.3	18.7
55_59	55.7	18.7	40.9	12.1	71.2	25.1
60_64	76.6	25.1	67.2	19.0	87.8	31.1
65_69	84.6	30.2	75.3	22.4	94.7	38.7
70_74	86.5	51.2	78.0	43.3	98.2	59.2
75_79	96.2	68.5	94.9	60.7	98.2	75.6
80+	98.5	86.5	98.7	79.7	98.2	90.6
Total	59.5	26.1	52.0	19.5	67.5	32.2
OBS	3,607	12,963	1,922	6,277	1,685	6,686

Data source: CHARLS baseline survey, 2011-12. All numbers are weighted.

Table 2: Pension Type and Coverage (%)

Pension Type	Urban	Rural	Total
Worker's Pension	**43.2**	3.1	14.6
Firm's Pension	**20.6**	1.0	6.6
Government or Institutions' Pension	**23.4**	2.2	8.3
Other Pension	20.3	38.3	33.1
Pension Subsidy to the Oldest Old	0.5	1.6	1.3
New Rural Pension Program	1.1	**26.4**	19.1
Urban Residents' Pension	10.0	0.4	3.2
Residents' Pension	2.4	0.9	1.3
Rural Pension	0.7	10.3	7.6
Conmmercial Pension	1.4	0.8	1.0
Other Pension	4.5	1.0	2.0
Any Pension	75.5	40.8	50.7

Data source: CHARLS baseline survey, 2011-12. All numbers are weighted.

Table 3: Pension Income and Wealth

	Total		Male		Female	
Age Group	Urban	Rural	Urban	Rural	Urban	Rural
Median Pension Income (unit: yuan/month)						
45_49	1,300	0	7,000	0	1,100	0
50_54	1,260	329	1,240	0	1,260	329
55_59	1,300	400	1,300	200	1,300	480
60_64	1,600	60	1,900	70	1,300	60
65_69	1,600	60	1,800	100	1,400	60
70_74	1,600	70	1,800	120	1,400	60
75_79	1,700	60	1,780	90	1,382	60
80+	2,000	70	2,300	120	1,300	60
Total	1,500	65	1,800	90	1,300	60
OBS	1,717	1,310	820	477	897	833
Median Per Capita Wealth (unit: 1,000 yuan)						
45_49	74.3	22.9	71.4	22.4	76.9	24.0
50_54	75.3	25.9	61.9	25.9	80.1	25.9
55_59	92.1	23.4	91.9	24.8	94.7	21.7
60_64	60.6	18.5	61.0	18.4	59.0	18.5
65_69	66.4	14.8	58.5	14.4	81.7	15.0
70_74	52.4	14.5	48.6	14.1	56.9	15.0
75_79	59.1	17.3	62.4	13.8	59.1	19.1
80+	68.2	14.8	75.3	13.7	61.8	15.0
Total	69.7	20.0	67.6	19.9	71.8	20.1
OBS	3,607	12,963	1,922	6,277	1,685	6,686

Data source: CHARLS baseline survey, 2011-12. All numbers are weighted.

Note: *Median Pension Income* is calculated conditional on pension receipt.

Table 4: Expected Economic Support Type (%)

	Total		Male		Female	
Type	Urban	Rural	Urban	Rural	Urban	Rural
Children	20.1	80.8	16.8	77.3	23.6	84.0
Savings	4.0	4.4	3.9	5.4	4.2	3.6
Pension	73.0	9.1	77.0	11.0	68.6	7.3
Other	2.9	5.7	2.3	6.3	3.6	5.1
OBS	3,560	12,624	1,899	6,180	1,661	6,516

Data source: CHARLS baseline survey, 2011-12. All numbers are weighted.

Table 5: Education of Children

	Years of Education	
Age_Group	Urban	Rural
45_49	12.5	9.9
50_54	13.0	9.7
55_59	13.0	9.0
60_64	12.3	7.9
65_69	11.6	7.1
70_74	11.4	7.0
75_79	10.8	6.4
80+	10.8	6.3
Total	12.2	8.5
OBS	3,535	12,703

The sample is restricted to respondents with at least one child.

Data source: CHARLS baseline survey, 2011-12. All numbers are weighted.

Table 6. Time Spent Providing Care to Children and Parents

			Unconditional					Conditional on Hours>0			
			Women		Men			Women		Men	
	Age	All	Urban	Rural	Urban	Rural	All	Urban	Rural	Urban	Rural
Average Hours Spent Providing Care for Parents/Parents in-law	45-49	1.98	2.84	1.91	1.45	1.88	16.90	16.44	15.63	14.40	20.00
	50-54	1.60	2.03	1.56	1.19	1.62	15.10	12.36	14.53	11.71	18.64
	55-59	1.12	2.15	0.76	1.52	1.07	16.74	22.71	13.94	20.74	15.28
	60-64	0.90	0.92	0.56	0.89	1.24	22.85	19.76	19.60	16.88	27.89
	65+	0.31	0.16	0.18	0.10	0.55	20.93	8.29	18.01	5.87	30.84
Hours Spent Providing Care for Children	45-49	3.67	3.64	5.94	0.79	1.90	45.40	56.21	51.94	41.64	28.38
	50-54	7.33	9.31	9.61	2.68	5.61	44.72	51.78	45.97	44.63	39.83
	55-59	9.41	12.46	11.51	4.53	7.69	44.26	42.76	47.58	36.12	42.05
	60-64	8.23	8.48	7.74	8.28	8.63	43.35	42.75	45.15	39.43	43.23
	65-69	6.38	3.74	5.50	5.80	8.06	41.44	27.96	41.05	30.90	47.56
	70+	2.19	1.08	2.15	2.87	2.39	36.22	18.55	38.70	45.72	36.62

Source: CHARLS 2011.

Table 7. Summary Statistics for Labor Supply Models

Categories	Variables	Urban		Rural	
		Men	Women	Men	Women
Independent variables	Age	59.566	59.282	59.873	59.285
		(9.806)	(10.257)	(9.617)	(9.983)
	Married	0.929	0.825	0.892	0.843
		(0.256)	(0.380)	(0.311)	(0.364)
	Agricultural hukou	0.479	0.511	0.943	0.986
		(0.500)	(0.500)	(0.232)	(0.116)
	Number of HH members				
	Age 0-5	0.191	0.196	0.267	0.277
		(0.455)	(0.466)	(0.570)	(0.581)
	Age 6-11	0.14	0.147	0.199	0.209
		(0.387)	(0.394)	(0.502)	(0.510)
	Age 12-17	0.127	0.12	0.169	0.179
		(0.381)	(0.367)	(0.459)	(0.475)
	Age 18-59	1.233	1.259	1.334	1.378
		(1.007)	(1.042)	(1.163)	(1.192)
	Age 60-79	0.395	0.384	0.39	0.385
		(0.733)	(0.712)	(0.722)	(0.720)
	Age 80+	0.06	0.063	0.06	0.063
		(0.267)	(0.266)	(0.271)	(0.274)
	Number of ADL and IADL disabilities	1.56	2.226	1.996	2.976
		(3.071)	(3.416)	(3.275)	(3.706)
	Education				
	Primary school and below	0.443	0.605	0.653	0.862
		(0.497)	(0.489)	(0.476)	(0.345)
	Middle school	0.289	0.213	0.246	0.11
		(0.453)	(0.410)	(0.430)	(0.313)
	High school and above	0.266	0.18	0.1	0.027
		(0.442)	(0.384)	(0.300)	(0.163)
	Old age pension eligible	0.334	0.343	0.122	0.082
		(0.472)	(0.475)	(0.327)	(0.274)
	Log household wealth	2.056	2.111	1.265	1.317
		(2.002)	(2.098)	(1.682)	(1.759)
	Spouse characteristics				
	Age	56.781	59.548	56.788	59.55
		(9.216)	(9.450)	(8.970)	(9.065)
	Working	0.447	0.575	0.668	0.763
		(0.497)	(0.494)	(0.471)	(0.425)
	Agricultural hukou	0.531	0.487	0.986	0.939
		(0.499)	(0.500)	(0.118)	(0.239)
	Number of ADL and IADL disabilities	1.946	1.475	2.619	1.921
		(3.097)	(2.943)	(3.382)	(3.213)
	Spouse education				

	Primary school and below	0.513	0.34	0.74	0.529
		(0.500)	(0.474)	(0.439)	(0.499)
	Middle school	0.234	0.294	0.127	0.253
		(0.424)	(0.456)	(0.333)	(0.435)
	High school and above	0.183	0.265	0.028	0.108
		(0.387)	(0.441)	(0.166)	(0.310)
	Old age pension eligible	0.312	0.335	0.07	0.125
		(0.463)	(0.472)	(0.256)	(0.331)
Dependent variables and sample size	Working	0.562	0.392	0.74	0.614
		(0.496)	(0.488)	(0.439)	(0.487)
	N	3280	3620	5078	5170
	Hours Working	55.127	50.296	56.942	49.396
		(26.128)	(25.723)	(28.585)	(26.275)
	N	1845	1420	3757	3175

Source: CHARLS 2011.

Table 8
Effects of Pension Eligibility and Health Status on Employment of China's Older Residents

	Urban		Rural	
Regressors	Male	Female	Male	Female
Age	-0.033*	-0.045***	0.020	0.017
	(0.019)	(0.014)	(0.013)	(0.012)
Age square/100	0.021	0.027**	-0.021**	-0.020**
	(0.016)	(0.011)	(0.011)	(0.009)
Married	0.115	0.027	0.121	-0.019
	(0.082)	(0.061)	(0.076)	(0.085)
Number of HH members under 6	-0.001	-0.049**	0.021	-0.020**
	(0.023)	(0.022)	(0.013)	(0.010)
Number of HH members between 6 and 12	-0.020	-0.081*	0.009	0.005
	(0.037)	(0.047)	(0.019)	(0.014)
Number of HH members between 60 and 80	0.003	0.007	-0.004	0.025*
	(0.015)	(0.017)	(0.012)	(0.012)
Number of HH members above 80	-0.028	0.005	-0.003	-0.012
	(0.033)	(0.029)	(0.024)	(0.021)
Health (Number of ADL & IADL Disabilities)	-0.024***	-0.017***	-0.031***	-0.023***
	(0.004)	(0.002)	(0.002)	(0.002)
Education: High school and Above	-0.039	0.099*	-0.001	0.001
	(0.057)	(0.057)	(0.020)	(0.036)
Receiving a Pension	-0.239***	-0.148***	-0.016	-0.002
	(0.029)	(0.030)	(0.028)	(0.027)
Spouse working	0.184***	0.161***	0.169***	0.198***
	(0.031)	(0.028)	(0.018)	(0.026)
Spouse Number of ADL and IADL	0.009**	0.006*	0.005**	0.005**
	(0.004)	(0.003)	(0.002)	(0.002)
County fixed effects	Yes	Yes	Yes	Yes
Observations	3,275	3,620	5,071	5,170
R-square	0.387	0.351	0.270	0.274

Source: CHARLS 2011. Other regressors (not shown) include: an agricultural hukou indicator, number of HH members between 12 and 18, number of hh members between 18 and 60, an indicator for middle school completion, ln (housing wealth+1), spouse age, spouse age square/100, spouse has agricultural *hukou*, spouse completed middle school, spouse competed high school, spouse pension eligible and county fixed effects.

Table 9
Determinants of Hours Worked Conditional on Working: China

	Urban		Rural	
Variables	Male	Female	Male	Female
Age	2.984	-0.577	1.433*	0.407
	(1.888)	(2.403)	(0.836)	(1.012)
Age square/100	-2.973*	0.560	-1.667**	-0.781
	(1.625)	(2.140)	(0.677)	(0.808)
Married	-2.221	12.620	4.878	-11.408**
	(5.841)	(9.322)	(5.355)	(5.699)
Number of HH members under 6	1.827	-1.380	0.475	-1.346*
	(1.587)	(1.227)	(0.892)	(0.780)
Number of HH members between 6 and 12	0.852	2.638	-0.498	-1.065
	(1.913)	(3.462)	(0.880)	(0.957)
Number of HH members between 60 and 80	1.071	3.318*	-0.767	-0.762
	(1.463)	(1.886)	(0.950)	(0.841)
Number of HH members above 80	5.943*	0.291	-1.162	2.530
	(3.037)	(4.514)	(2.400)	(2.302)
Health (Number of ADL & IADL Disabilities)	-0.021	-0.735	-1.214***	-0.555***
	(0.442)	(0.520)	(0.218)	(0.208)
High School Education or Above	-3.485	-8.440**	-0.786	4.006
	(2.279)	(3.770)	(1.634)	(2.978)
Receiving a Pension	-0.271	1.896	-3.314	-2.143
	(2.454)	(2.645)	(2.112)	(2.213)
Spouse working	0.652	1.242	3.832***	2.796*
	(1.747)	(2.985)	(1.006)	(1.599)
Spouse Number of ADL and IADL Disabilities	0.246	0.214	0.287*	0.292*
	(0.291)	(0.493)	(0.170)	(0.167)
County fixed effects	Yes	Yes	Yes	Yes
Observations	1,842	1,420	3,751	3,175
R-square	0.160	0.172	0.183	0.165

Source: CHARLS 2011. Other regressors (not shown) include: number of HH members between 12 and 18, number of hh members between 18 and 60, an indicator for middle school completion, ln (housing wealth+1), spouse age, spouse age square/100, spouse completed middle school, spouse competed high school, spouse pension eligible and county fixed effects.

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1