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Getting old in a changing world

Sons, pension, and the wellbeing of the elderly in contemporary China

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Getting Old in a Changing World

Sons, Pensions, and the Wellbeing of the Elderly in Contemporary China

ZEYUAN CHEN

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Getting Old in a Changing World

Sons, Pensions, and the Wellbeing of the Elderly in
Contemporary China

Zeyuan Chen



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DOCTORAL DISSERTATION

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Abstract		
<p>The Chinese population is rapidly aging, which has brought challenges for the elderly support system. Until very recently, only urban employees were eligible to receive a pension, while the rural elderly were forced to rely on income from their own labor and support from their family. In these circumstances, it is unsurprising that the rural elderly were most likely to fall into poverty. The recent introduction of the New Rural Social Pension represents a fundamental change, as it offer a comprehensive pension to rural Chinese for the first time in its history. The initiative may reduce the need for family support. Son preference is well-established in China as, traditionally, sons are expected to be mainly responsible for taking care of their elderly parents. As the new pension relieves the elderly's economic dependency on their children, it becomes relevant to ask whether it has mediated the implications of son preference, notably whether having a son still results in a better later life.</p> <p>This dissertation explores how changes in intergenerational support have affected the elderly's wellbeing. The results show that the new pension has made it possible for the rural elderly to retire and improved their relative bargaining power within the household – allowing them to spend more on healthcare. The treatment effect of the pension is remarkably strong given the small amount of benefit (9 USD per month). This indicates that the rural elderly had been living in very poor conditions, and suggests that the family support system cannot adequately provide for them. It appears that better public support is required.</p> <p>Another finding concerns the situation within the family. My results show that having a son does not improve either material support or subjective wellbeing. It therefore appears that young parents' son preference does not turn out to be a rational choice in later life. Moreover, the expansion of social welfare has weakened the economic rational of favoring sons, and increased the importance of daughters, as parents' needs shift from day-to-day care to emotional support. Once basic material needs are met, daughters' have the advantage of providing emotional support, and they become essential to their parents.</p>		
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Zeyuan Chen



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To my mom

献给妈妈

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终于，我要毕业啦！

Lund, 30 September 2018

Zeyuan

List of papers

- I Chen, Zeyuan, Tommy Bengtsson and Jonas Helgertz. Labor Supply Responses to New Rural Social Pension in China: A Regression Discontinuity Approach. *Unpublished manuscript.*
- II Chen, Zeyuan and Albert Park. Rural Pensions, Intra-household Bargaining, and Elderly Medical Expenditure in China. *Unpublished manuscript.*
- III Chen, Zeyuan. Revisiting Son Preference: The Effects of the Sex of the Firstborn Child on Intergenerational Support in China. *Unpublished manuscript.*
- IV Chen, Zeyuan. Does Having a Son Make You Happier? –Evidence from China. *Unpublished manuscript.*

Introduction

Motivation and aim

Birth, ageing, illness and death are facts of life. Although the current population will live longer than any other generation in history, decline and death remain inevitable. Our physical abilities decline as age advances and, as people are elderly for longer, they have higher probability of relying on others. The younger generations are expected to provide both economic support and physical help. The question of how to provide comprehensive support to the elderly has become a common challenge for many countries with an ageing population.

China is one example of population ageing. In 2016, the elderly (people aged over 60) made up 20% of the total population, and this is expected to increase in the future (National Bureau of Statistic 2018). Around them, the world is changing. On the one hand, economic growth, modernization and urbanization in the past few decades has raised living standards and significantly reduced poverty (Deaton 2013). On the other hand, economic development is unevenly distributed, notably in an urban–rural divide and an age dependent income gradient. While educated, prime age rural residents migrate to urban areas seeking better jobs and a higher income, the elderly have been left behind. Today, 70% of elderly Chinese live in rural areas (National Bureau of Statistic 2018) and are most likely to be poor (Park et al. 2011). This is the natural result of the decline in their capacity to work and underlies their need for intergenerational transfers from the prime age population (Lee and Mason 2011). This can be provided by the state in the form of a pension (public transfers), or can take the form of private transfers from children to parents. While most urban elderly are able to support themselves from their pension, the rural elderly mainly depend on income from their own labor and support from their family (Giles, Wang and Cai 2011; Giles, Wang and Zhao 2010).

There have been recent changes in the family support system, particularly the roles of sons and daughters. Traditional culture emphasizes filial piety; this encourages adult children to respect their parents and pay back their investment. Within the family, the expectations of sons and daughters differ. Sons are mainly responsible for taking care of their natal parents, whilst daughters' obligations cease at marriage. Moreover, only sons can carry on the family name. There is therefore both an economic rationale and a culture incentive for parents to invest more in their sons,

as this is expected to result in a higher pay off in the long term. However, recent studies show that sons do not necessarily provide more help than daughters (Xie and Zhu 2009). This finding suggests that the economic rationale for son preference has weakened, and raises the question of whether it remains a sensible choice. Although traditional values are slow to change, the daughter's role has become more important in the family support system. Parents see daughters as "little quilted vests to warm parents' hearts", rather than "spilt water" (Shi 2009).

In recent years, China has expanded its social welfare program. The New Rural Social Pension (NRSP) scheme was implemented between 2009 and 2012. With the aim of poverty reduction, the NRSP offers rural Chinese a comprehensive pension for the first time in the country's history. Benefits represent about 10% of average *per capita* income in rural areas. Among the elderly in general, this figure is higher (20%) as their income is below average; and it is even higher among the poorest of this group. Although the amount is small and insufficient to live on, it represents a fundamental change for the rural Chinese.

The elderly population is facing major changes. On the one hand, institutional support is increasing. As their income increases, the elderly person's economic status within the family changes, which may, in turn, affect their wellbeing. On the other hand, the family support system is also changing as daughters play an increasingly important role in supporting their parents. These developments raise the question of whether young parents' son preference is actually a rational choice in later life.

At the same time, the expansion of public welfare may be influencing private transfers. How the elderly and their family are adapting is unclear. Some previous studies document the elderly support system but they are more in descriptive nature (Lei et al. 2012a; Park et al. 2011). Therefore, more accurate, quantitative studies are required. This dissertation explores how the elderly's wellbeing has been affected by changes in intergenerational support. It addresses the following research questions:

- i) How has the recently-introduced NRSP affected the elderly's wellbeing?
- ii) Does having sons have the expected effect of improving the elderly's wellbeing?
- iii) How has the expansion of social welfare mediated son preference?

The first two papers address the first research question. The NRSP is one of the most significant attempts to improve the rural elderly's wellbeing. These papers examine its impact on the elderly, and their family's behaviors. As eligibility is determined by age, the pension benefit represents an exogenous change in income relative bargaining position. Those who are aged 60 and above when they enroll are entitled to pension benefits even if they have not contributed to the scheme. The first paper analyses whether the new rural pension system has improved the rural elderly's

welfare. This population used to work until they dropped, a situation that has been attributed to poverty (Benjamin, Brandt and Fan 2003). The study asks how their retirement decisions have changed as their income has increased.

The pension not only increases income, it also changes the elderly person's relative economic status within the family. Their increased bargaining power may, in turn, influence resource allocation. The literature predicts that those who have greater relative earning power are more likely to obtain their desired outcomes (Lundberg and Pollak 1996). An interesting finding is that in China, health expenditure decreases as people age, which is inconsistent with the fact that an elderly person is more likely to fall ill than a younger person (Park and Xia 2014) and suggests that the elderly are not the priority in household resource allocation. Consequently, my second paper examines whether household resource allocation has been changed by the windfall income from the NRSP, which helps to understand whether the pension has had impacts beyond the target population.

This dissertation also looks at the family support system. The last two chapters focus on the longstanding practice of son preference, and address the second research question. Chinese couples favor sons, as they expect to receive higher returns from them when they get old. But this expectation might be mistaken. These papers investigate how the elderly's wellbeing is affected by the sex of their children. They document potential changes in the family support system, particularly the roles of sons and daughters. The third paper takes as its starting point a random event, the sex of the firstborn child (which is often used as an instrument for the number of children). The study compares intergenerational support between those who have a firstborn son and those who have a firstborn daughter. Furthermore, I look into the potential mechanism linking the firstborn son and intergenerational support and show how son preference manifests in fertility decisions and investment in children and, ultimately, affects the elderly's welfare. The final paper examines whether having a son makes the elderly happier. I compare satisfaction with life among the elderly who have children with different sex compositions to examine whether, in practice, son preference translates into parental happiness.

The extension of social security has reduced the elderly's reliance on their children, which may, in turn, weaken the economic rationale for son preference. An individual fixed effects model is applied to study whether the role of the firstborn son(s) has changed as a result of the introduction of the NRSP. The aim is to examine how the new pension has affected family support, and the implications of son preference.

This dissertation makes several contributions to the literature. Firstly, it deepens our knowledge of the wellbeing of the elderly in China. Secondly, it helps to evaluate the effects of the new pension. Thirdly, it records changes in the family support system, especially the roles of sons and daughters. It also contributes to the son preference literature by extending the study group to the elderly who have

completed their family, and reveals whether son preference turns out to be a rational choice in practice. Finally, it documents how the family support system has reacted to institutional changes and, in turn, influenced the wellbeing of the elderly.

List of contributions: co-authored papers

Paper I was co-authored with Tommy Bengtsson and Jonas Helgertz. The author of this dissertation was the main author at all stages, and of all components.

Paper II was co-authored with Albert Park. Both authors contributed to the study concept, research design, theoretical framework and interpretation of findings. The author of this dissertation acquired the data, conducted the statistical analysis and drafted the manuscript.

Elderly's wellbeing in China

Retirement

In China, urban and rural elderly have different retirement patterns. In general, urban residents retire at a relatively younger age, and receive a substantial pension. The mandatory retirement age is 60 for men, 55 for female managers, and 50 for female workers. While most studies only give descriptive information, Giles et al. (2011) provide a more detailed picture, and highlight the interdependence of spouses' retirement decisions. Men tend to continue to work while their spouses still work, and this effect is more pronounced among women. Spouse health status has no effect on retirement decisions. An interesting phenomenon is the lack of female participation in the labor force for those aged over 40 in cities, which may be due to the restructuring of state-owned enterprise in the 1990s. However, if this is the case, the trend should have already ended. Gender differences in the mandatory retirement age may be another reason. Since women retire at a younger age, they are more likely to face age discrimination in the job market. Female reemployment is also related to family circumstances, as those who have college-age children have a greater incentive to work (Giles, Park and Cai 2006). At the same time, taking care of grandchildren is not a reason to remain unemployed (Giles et al. 2011).

Rural residents tend to work until they are unable to continue, a situation that has been described as "ceaseless toil" (Pang, De Brauw and Rozelle 2004). Although health status is considered as an important factor driving retirement in rural China, poor health only explains less than 50% of the reduction in men's working hours (Benjamin et al. 2003). Poor health also affects women, but to a lesser extent. The latter study also finds that women work more when their husbands' health fails.

Household wealth also plays a role. Men in a richer family retire early. For richer women, their spouse's health status has less influence. While the lack of a stable income might be one reason for the rural elderly's late retirement, the magnitude of its impact is unknown. The newly-introduced NRSP created an income shock, and I use it to examine the casual effect of income on the labor supply. I hypothesize that the expansion of pension coverage enables the rural elderly to retire earlier.

Healthcare

Healthcare represents an important element in wellbeing. The lack of health insurance means that rural Chinese still mainly rely on out-of-pocket payments to finance health expenditure (Li et al. 2012). Such expenditure is a heavy burden for rural households, and it is one of the principal factors that push them into poverty (Tang et al. 2008). Low-income families suffer most. Public health insurance is available to better-off groups, especially those who work in urban areas, while rural residents are covered by the New Cooperative Medical Scheme, which has a relatively low reimbursement rate (Yip et al. 2012). Moreover, disproportionate health insurance coverage means that the poor run a higher risk of incurring catastrophic medical expenses (Van Doorslaer et al. 2007). As a consequence, low-income households are less likely to seek healthcare when diagnosed (Zhang et al. 2007).

Typically, demand for healthcare increases as age advances. However, (Park and Xia 2014) found that in rural China, health care expenditure decreases as age increases after the age of 65. This contrasts with the pattern seen in the developed world (Yang, Norton and Stearns 2003) and indicates that health services are under-used by the elderly. Their relatively low income could be one explanation for this. Although previous studies have documented that better-off families tend to spend more on health services (You and Kobayashi 2011), how health service use responds to a change in income is unclear. Therefore, I use the income shock created by the NRSP to test the relation as a lack of money is one of the reasons that people forgo healthcare when they fall ill. I hypothesize that health expenditure increases as the elderly person's income increases.

Intrahousehold bargaining power

Resource allocation within the household has been a subject of interest for academics and policymakers, as decisions made within family may affect the impact of policy (e.g., giving child benefit to the mother rather than the father in the United Kingdom (Lundberg, Pollak and Wales 1997). Considering family as an economic unit, family members put different types of resources into it and decide their usage (e.g., how to divide expenses, leisure time, and household work on each family member). Several economic models have been developed. The traditional model

(Becker 1991) considers the family as a single unit. Members share preferences, pool resources, and allocate them to maximize the utility of the whole family. This model has been consistently challenged, mainly due to unrealistic assumptions regarding shared preferences and resource pooling. Alternative models propose that family members have individual preferences, but pool incomes and use (non)cooperative bargaining tactics to make decisions (Lundberg and Pollak 1996). Bargaining power is often measured by individual characteristics such as income, assets, or potential earning ability. Collective models avoid making any assumptions about the intra-family decision-making process, and only assume that household allocations are Pareto efficient.

Most empirical studies focus on the allocation of money and time between couples and children (e.g., Datta Gupta and Stratton 2008; Hotchkiss 2005). Household decision-making may be affected by gender norms. Using data from 25 countries, Fuwa (2004) shows that the effects of increased earning ability on bargaining power are mediated by the macro environment. Another experiment in China found that although joint decisions taken by couples reflected both their preferences, the husband's preference dominated in the final decision (Carlsson et al. 2012). Using the dowry as a measure of bargaining power, Brown (2009) showed that the welfare of women in China was improved by having assets under their control. Therefore, although husbands dominate in decision-making, wives with greater bargaining power will be better off. Only a few articles focus on extended families (Case and Deaton 1998; Duflo 2003). The latter two papers investigated whether pension reform in South Africa affected household resource allocation and found that grandchildren are better taken care of when the elderly have a pension. Moreover, living arrangements changed. These findings support the idea that an increase in income for some family members can affect other members of the household.

There are two, common challenges in empirical studies. First, change in bargaining power is hard to observe, as an exogenous shock to individual income is rare. Most changes are endogenous, as the labor supply itself may be the consequence of intrahousehold bargaining. Second, preferences cannot be observed. Theory predicts that those who have higher bargaining power are more likely to achieve their preferred outcome in resource allocation. Given that preferences cannot be directly observed, researchers assume that they are gender-based (e.g., men favor alcohol consumption and women prefer to spend more on children). Furthermore, most household surveys only record aggregated data and not individual consumption. Thus, it is hard to assign any changes in consumption to individual preferences. However, if data on individual expenditure is available, it would be unsurprising to see that those who have a higher income spend more on themselves.

In this dissertation, I used data from the China Health and Retirement Longitudinal Study (CHARLS). This survey contains rich data on individual expenditure, particularly healthcare expenses. Since health is an essential function of human wellbeing, it is safe to assume that healthcare spending reflects a personal preference.

At the same time, the NRSP was an exogenous income shock to the elderly aged over 60. Together, these factors help to address the two problems mentioned above and made it possible to identify the casual effect of changes in intrahousehold bargaining power on household allocation.

Intergenerational transfers

Given the incomplete social security system, it is unsurprising that the family has been, and still is, the main care provider and source of financial support for the elderly in China. Unlike western countries, where downward transfers dominate, upward transfers from children to elderly parents predominate (Lei et al. 2012a). The successful family planning policy and greater labor mobility have challenged the family support system, casting doubt on the value of filial piety. With respect to research, most of the literature on intergenerational transfers in China is descriptive. Only a few papers have explored the motives for private transfers and the crowding-out effect of public transfers (Cai, Giles and Meng 2006; Wu and Li 2013). These studies concern how children respond to a reduction in their parents' income.

Generally speaking, there are two main motives for intergenerational transfers: altruism and reciprocity. The former refers to the feeling of obligation to help another person, and emphasizes the well-being of the receiver. Reciprocity considers transfers as part of an exchange of services or future returns. Private transfers are consistent with parental income that is below the poverty line, but not above it (Cai et al. 2012); this result is consistent with altruistic motives. Another study (Giles et al. 2010) found that while private transfers are partially crowded out by a pension, a pension improves the living standard of the elderly. The same study documents that variance in predicted transfers is larger for the elderly with migrant children.

The studies listed above suffer from data limitations, in that transfers are recorded at aggregated, household level; consequently, they fail to differentiate between inter- and intragenerational transfers. The CHARLS dataset provides an opportunity to distinguish between these two types of transfers. Wu and Li (2013) confirm the altruism motive for intergenerational transfers based on CHARLS data. The latter study also identifies other motives; for example, reciprocity is only found among sons, while sons and daughters respond differently to a reduction in their parents' pre-transfer income. Lei et al. (2012a) describe other factors associated with transfers, notably the number of children. Furthermore, transfers are not only affected by parents' pre-transfer income, but also by the socioeconomic status of their children. Specifically, well-educated children transfer more money to their parents. The impact of household wealth is rarely studied, with one exception (Porter and Park 2010). The latter authors use housing windfalls as a proxy of permanent household wealth to examine exogenous changes in household wealth.

They find that an increase in household wealth is associated with a decline in transfers from children, thus confirming the altruistic motive.

Within the family, intergenerational contracts are different between sons and daughters. Traditionally, sons, especially the oldest son, are expected to live with their elderly natal parents and take care of them (Lee and Wang 2001). Moreover, only sons can carry on the family name. These practices provide the basis for son preference, which persists in modern society, evidenced by the abnormal sex ratio at birth. Son preference does not only mean that parents prefer sons to daughters, it also indicates that they treat them differently. In general, parents invest more in sons (Knight, Li and Deng 2010) and households with sons behave differently compared to households with daughters. They save more and are more active in financial activities (Ding and Zhang 2014; Wei and Zhang 2011a, 2011b).

Traditional filial piety may have been eroded as urbanization has increased and the economy has grown. Filial piety developed in an agricultural society with little mobility. Changes in the social and economic system mean that values and practices must also adjust. Nowadays, at least half of the elderly do not live with their children, although most still have children living nearby (Lei et al. 2012b). Moreover, both sons and daughters provide similar support to their parents, particularly in urban areas (Xie and Zhu 2009). The son's relative important role may be reinforced by the living arrangement. Living with a married son is more common than living with a married daughter. Controlling for living arrangement, the principal difference between sons and daughters was that sons provided financial support, and this difference only existed in rural areas (Xu 2015). These studies suggest that family support systems are changing and that better-educated women are better able to support their elderly parents. Furthermore, the recent decline in fertility means that the elderly have fewer children to rely on. Here again, daughters emerge as an important alternative. Nevertheless, although daughters provide help to their parents, their role is still seen as complementary (Tang, Ma and Shi 2009). It seems that the cultural influence on son preference does not fade away easily.

In practice, it is unclear whether those who have sons are actually better off as a result of their decision. Similarly, son preference may no longer be a rational choice, as the role of the son may have changed. Most previous studies treat the sex of children as a given, and ignore the fact that the sex of children itself reflects parents' preferences. It is therefore interesting to document how son preference manifests in fertility decisions and investment in children and, ultimately, affects the elderly's welfare. To investigate this, I use the gender of the firstborn child, which is a random event, to study the effect of the gender of their children on the elderly's wellbeing. While previous studies only focus on one aspect of support from children, I study all dimensions of intergenerational support: co-residence, contact, financial transfers, and practical help. In doing so, I am able to draw some general conclusions. Moreover, the CHARLS dataset makes it possible to explore both the frequency and strength of support. This is unlike most of the existing literature, which only studies

the frequency of support. Finally, I also examine subjective wellbeing, which has received too little attention from researchers.

Happiness

Intergenerational transfers improve the elderly's living standards, but are only one aspect of their welfare. Besides material wellbeing, subjective wellbeing is another important element. According to the CHARLS dataset, 40% of the elderly population are depressed, and the poor are more vulnerable. Subjective wellbeing (happiness) has been the subject of very few studies although living with grandchildren, social participation, and having a pension have been found to increase the elderly's happiness (Chyi and Mao 2012; Ding 2017; Zhang and Zhang 2015).

The happiness literature has grown since it first emerged in the 1990s (Clark et al. 2008). One of the most studied research questions is whether a higher income increases happiness, and it seems that the relationship between income and happiness is non-linear. Rather, it has a reverse U-shape. Easterlin (2004) proposes an explanation for why happiness does not increase with absolute income. He argues that it is the result of a comparison of the objective situation with a subjective living standard. Individuals' needs increase with economic growth, while preferences are shaped by economic growth. Therefore, happiness does not increase with absolute income, as people's expectations change.

There are only a few studies of happiness in China, and most focus on the effect of income on the prime age population. Among the urban Chinese, subjective wellbeing is sensitive to inequality (Jiang, Lu and Sato 2012). In rural China, Knight, Lina and Gunatilaka (2009) find that relative income, past income and expected income have more influence than current absolute income. Rural Chinese are not unhappier than urban Chinese, despite being poorer. The reason for this might be that their reference group is neighbors or people in the village. Knight and Gunatilaka (2010) investigate why rural-to-urban migrants are less happy than either rural or urban residents. They argue that migrant workers' aspirations increase as they switch their reference group from the rural village to the urban community. Although their income increases, it still does not match their rosy expectations. Therefore, they remain unhappy. This finding is consistent with Easterlin (2004)'s hypothesis, which suggests that people will not be happier so long as increased income does not exceed expectations.

As one of the most important life events, fertility should have an impact on parents' subjective wellbeing. However, the happiness effect of birth has been found to only last for several years, after which levels return to baseline (Clark et al. 2008). The connection between parenthood and happiness is sensitive to age and context (Myrskylä and Margolis 2014). Although young parents are less happy after giving

birth, the elderly are happier if they have children. This reflects the fact that parents may enjoy returns from their children as they age. The relationship between children's sex composition and parental happiness has been less studied. In Germany, Margolis and Myrskylä (2016) find no relationship, although couples prefer to have children of both sexes.

Given son preference and the traditional emphasis on having children, the effect of fertility should have a stronger impact on parents' subjective wellbeing in China than in western countries. Mu and Xie (2014) document a positive relationship between the number of children and parental happiness in rural China. However, their study targets prime age parents. To the best of my knowledge, there are no studies that examine the link between the sex composition of children and the elderly's happiness. Although there are studies of the roles of sons and daughters in supporting parents, intergenerational transfers do not necessarily translate into parental happiness. Even if daughters and sons provide similar support to their parents, traditional parents might be still happier with sons. The final effect of the sex of children reflects a comparison between cultural incentives and economic returns.

The setting: contemporary China

This section provides some facts about China. I start with a map, and illustrate regional differences. Today's elderly have experienced huge social and economic changes, and several difficult periods in the country's history. To understand this context, I provide a brief summary of the economic growth and demographic changes in recent decades. The section ends with an overview of the social welfare system.

The People's Republic of China (PRC) was established in 1949. It consists of over 22 provinces, five subdivisions that are officially termed *autonomous regions* (each corresponding to a minority group), and four municipalities under direct control. These administrative divisions are shown in Figure 1. The distribution of natural resource and development are uneven across regions, which has resulted in large variations in social policy and living standards. Depending on their geographic location and economic development, provinces can be grouped into the East region, the Northeast region, the Middle region, and the West region. The East region includes Hebei, Beijing, Tianjin, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, and Hainan, which are the most developed areas in China. The remainders are often called less-developed regions and correspond to the Middle and West areas.

Administrative Divisions of the People's Republic of China (PRC)



Figure 1: Provincial administrative divisions of China

Economic development

China used to be the world's largest economy. In 1820, it contributed one third of the world's GDP (Figure 2). However, when western countries modernized following the industrial revolution, China was left behind. Moreover, subsequent wars and conflicts have blocked progress. When the PRC was established in 1949, China's share of global GDP was about 5%. In the first few years after 1949, the country was transformed into a socialist, state-owned economy. In the next thirty years, China transformed from an agricultural to an industrial society. The share of GDP due to agriculture declined from 57.7% to 32.8% between 1952 and 1989. Meanwhile, industry's contribution increased from 19.5% to 49.4% (Lin, Cai and Li 2003) (Table 4.2)¹. Although it seems that industry dominates the economy, most investments were made in heavy industry, while light industry was neglected. The development of heavy industry, such as the military industry, created few job

¹ This section is based on Lin, Cai and Li (2003).

opportunities in cities. As a result, in 1978, over 70% of the labor force still worked in agriculture. Under the planned economy, peasants worked collectively. Products were passed to the collective and redistributed by it. Peasants had little motivation to work harder, which led to low productivity.

To support heavy industry, the government redistributed wealth from the agricultural sector. The price of agricultural products was kept low and urban residents were prioritized in resource allocation. To entrench the situation, a social registration (*hukou*) system was established in 1958 to prevent migration from rural to urban areas. Ever since, urban and rural *hukou* have been segregated. *Hukou* status is determined at birth and children are given their parents' status. Changing from rural *hukou* to urban *hukou* is seen as a sign of upward social mobility, and it usually happens following higher education or marriage (Wu and Treiman 2007). Social benefits are largely a function of *hukou* status. For example, historically, only urban residents could receive social security, giving them an economic and social advantage.

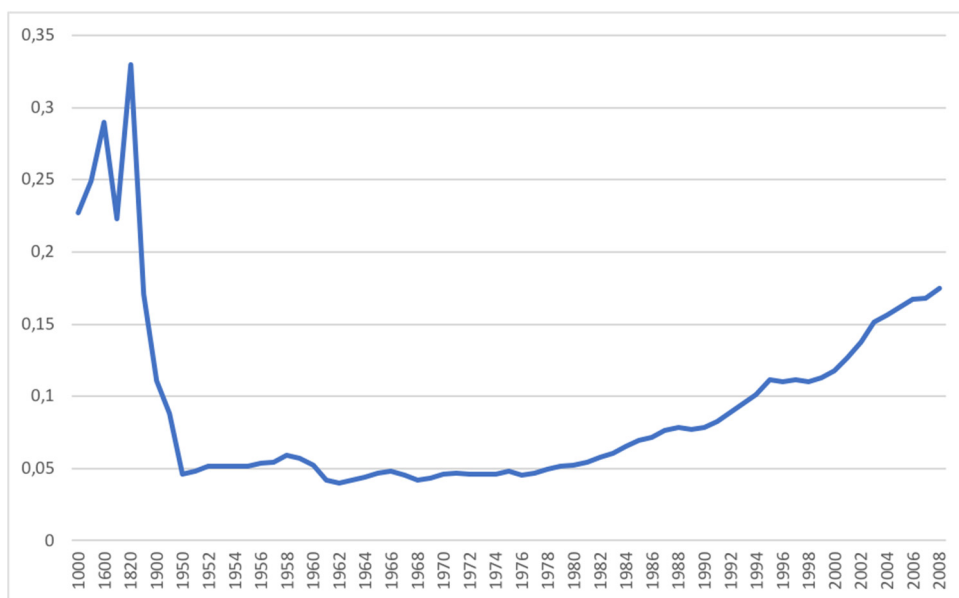


Figure 2: Contribution of China to the global GDP 1000-2008 (source: Maddison (2010)).

The economy stagnated during the Cultural Revolution between 1966 and 1976. In 1978, the central government decided to implement reform, notably opening the country to foreign investment and restructuring the economy. A 'household responsibility system' was introduced in rural areas in 1978. This made a household responsible for their losses and profits from agricultural work. It provided an

incentive to work, and thus improved productivity. The state also allowed entrepreneurs to set up businesses. Although state-owned companies still monopolized some key sectors, the share of the private sector had increased to about 70% of GDP in 2005.

Economic reform brought drastic changes. With a 9.5% average annual growth rate, GDP increased tenfold between 1979 and 2012 (National Bureau of Statistic 2018). It has been seen as an economic miracle, and significantly increased living standards. The poverty rate has fallen from 88% (in 1981) to 6.5% (in 2012), which accounts for two thirds of the poverty reduction worldwide (Deaton 2013). Figure 3 shows the share of the three main economic sectors in the past few decades. Industry has stabilized at about 40–50% since the late 1970s. Agriculture decreased from around 30% to below 10% between 1979 and 2015. In contrast, over the past 30 years, the service sector has gone from the smallest share to the largest (more than 50%). These changes in the contribution of sectors are reflected in the labor market. With the decline in the agricultural sector, a large part of the working population migrated from rural China to urban areas, facilitated by the expansion of education. The illiteracy rate dropped from 34% to 5% between 1982 and 2002. Currently, over 60% of the population is educated to at least secondary school level (National Bureau of Statistic 2011). Better education has provided reserves of labor for the industrial and service sectors.

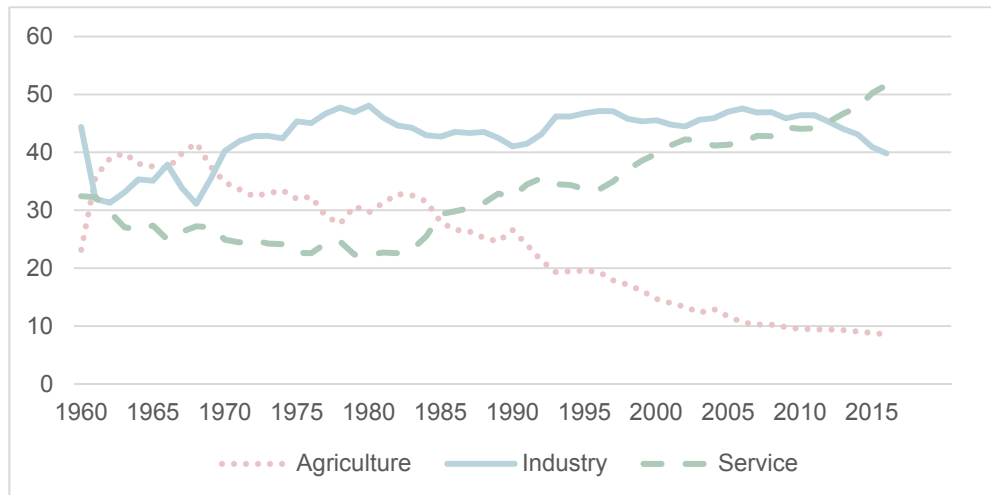


Figure 3: Contribution of agriculture, industry, and services to GDP (%) (World Bank 2018)

The urban population has increased over time. When the PRC was established, over 90% of the population lived in rural areas and the agrarian sector dominated the economy. As industrialization expanded, beginning in the 1950s, the urban

population has grown. Many rural residents moved to the city and the proportion of urban residents in the total population has increased (12.84%, 17.58%, 20.43%, 25.84%, 35.39% and 49.68% in 1953, 1964, 1982, 1990, 2000, and 2010 respectively) (National Bureau of Statistic 2011). In 2011, the urban population exceeded the rural population for the first time. It is worth noting that many of those who migrate from rural to urban areas do not change their *hukou* status. Over 70% of Chinese still had rural *hukou* status in 2010 (*ibid*). This internal migration has important implications for support for the elderly as migrant workers are mainly prime age adults, while the elderly population has been left behind. The migration of adult children reduces the likelihood of co-residence and practical help available to the elderly, which challenges the family support system.

Demographics

Thanks to the improved public health system, life expectancy at birth increased from 45 in the 1960s, to over 75 in 2010. This increase is largely due to a huge fall in infant mortality, which decreased from 80 to less than 10 per 1,000 live births between 1970 and 2010. Meanwhile, fertility has declined significantly in the past few decades. Figure 4 shows that the overall fertility rate fell from a peak of 6.4 to 1.5 in the late 1990s. This can be partly attributed to the birth control policy that was introduced in the early 1970s. Alarmed by the high fertility in the 1960s, the government introduced a birth control policy called “later, longer, fewer”, which encouraged people to start having children later, leave longer intervals between births, and have fewer children. It encouraged urban families to have at most two children. As a result, the overall fertility rate declined drastically in the 1970s.

Fertility was further restricted by the one-child policy, which was introduced in 1979. Although its implementation varied in different regions, in general it allowed those who had urban *hukou* status to have only one child. Those who had rural *hukou* status were allowed to have a second child if the first was a girl. As a result, overall fertility declined to below two in the early 1990s. Meanwhile, son preference persisted. People had fewer children, but they still preferred to have at least one son. When pre-birth ultrasound technology and sex selection abortion became widely accessible in the late 1980s, it became possible to select a child’s sex (Zhu, Lu and Hesketh 2009) and the sex ratio at birth started to increase in the 1990s. It reached 120 boys per 100 girls in 2000, which is far above the normal range (106:100). The sex imbalance has had a series of social consequences, notably a highly competitive marriage market.

Although the one child policy has been blamed for low fertility rates, Figure 4 shows that fertility began to decline much earlier. Therefore, the effect of the policy should not be overstated (Wang et al. 2018) – the low fertility rate after the 1990s may be related to economic growth. Improved living standards may have reduced the need for many children to provide support in old age. The one child policy was abolished

in early 2016. However, the fertility rate did not rebound as the central government expected (National Bureau of Statistic 2018), which suggests that low fertility might have become the norm for Chinese society.

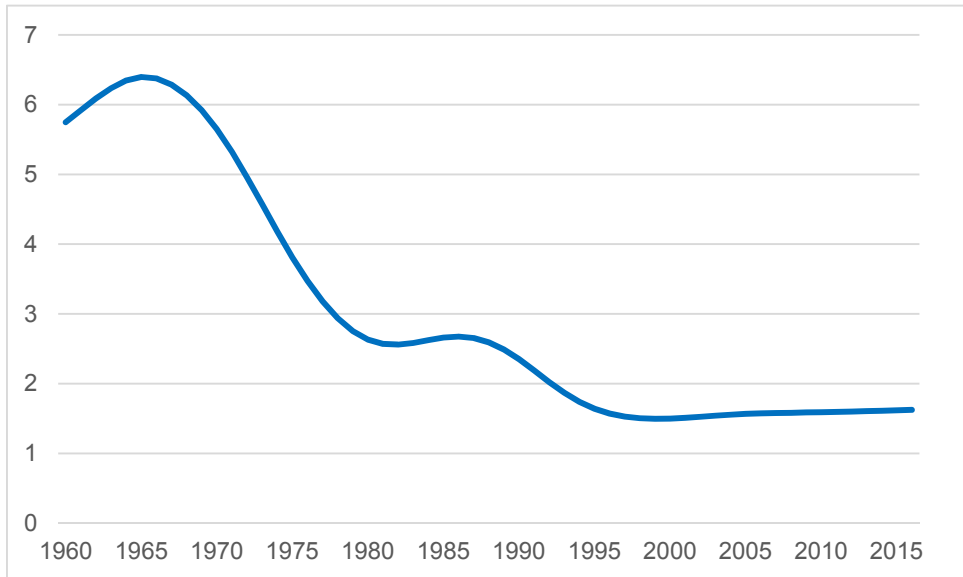


Figure 4: Overall fertility rate/ births in China 1960-2015 (World Bank 2018)

Reduced mortality and fertility both lead to population aging. Figure 5 shows the aging process in China since 1962. Over time the share of the youth (aged 0–14) has decreased, while the share of the elderly (65+) has increased. In 2016, people aged over 65 made up 10.8% of the population, and this is expected to increase. The extent of aging varies among regions. Low fertility and out-migration has made the Northeast region the most aged area in China today. It is also the area that presents the biggest challenge to the pension system (National Bureau of Statistic 2018).

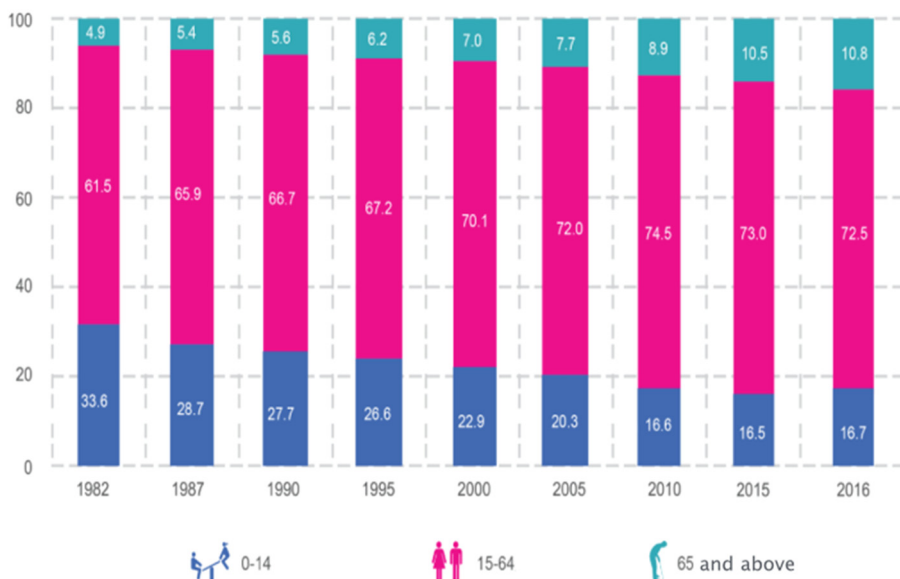


Figure 5: Distribution of age groups in China 1982–2016 (National Bureau of Statistic 2018)

Pension schemes in urban China

In urban China, a pension system was initiated in 1950. It initially only benefited employees of state-owned firms, and was gradually extended to other types of ownership between the 1980s and 2005². The pension scheme for civil servants/institutional staff was distinguished from that for workers in private companies in 1978. The pension system only covered urban employees until 2009 when the New Rural Social Pension (NRSP) was introduced. These reforms mean that rural residents without formal employment are entitled to a pension, although benefits are much lower compared to the pension received by urban employees.

The urban employee pension was established in 1950. Initially all employees were covered regardless of ownership type. Since almost all firms were state-owned, insurance actually only covered public sector employees. Designed to supplement low wages, employees were insured from the cradle to the grave. Companies worked for the state and the state took full responsibility for providing a pension. People who had worked for at least five years in the same company were eligible for payments of 50–70% of their wage as a pension (Chen and Wang 2010). A program for civil servants and institutional staff was introduced in 1955. Employees with a

² This overview of the social welfare system draws upon Chen and Wang (2010).

certain number of working years were eligible for pensions of up to 50–80% of their wage. Pension programs for companies and institutions were unified in 1958.

During the Cultural Revolution (1966–1976) the urban social insurance system almost stopped. The economic reforms of 1978 gave state-owned firms more autonomy, and the non-state economy started to emerge. The pension program for civil servants, institutional staff and employees of state-owned firms resumed in 1978. Pension benefits increased to 60–90% of final wages. Differences continued to exist between programs for staff working in government and institutions and company employees. The division continues today.

Coverage gradually extended from state-owned companies to other types of firms. In 1984, a pension scheme for staff working for collectively-owned firms was established, benefitting around 20 million workers. A pension for contract workers was introduced in 1986, benefitting six million workers. In 1991, the programs for state-owned and collectively-owned companies were unified into the Urban Employee Pension Program. These were unified nationwide in 1997, when regulations were introduced to limit the contribution of firms and the source of individual accounts, amongst others. Firms currently contribute 20% of wages to an employee's pension, while individuals pay 8% of their salary. Companies' contributions follow the pay-as-you-go (PAYG) pooling system and are used to pay pensions to the retired population. Individual contributions could be considered as a compulsory individual savings plan or partial accumulation. When people retire, their pensions come from both the PAYG system and their individual accounts. The target replacement rate is 58.5%, while contributions from PAYG and individual accounts are 20% and 38.5%, respectively. The number of employees enrolled in a pension program increased from 566 million in 1991, to 867 million in 1997. Retirees increased from 109 million to 253 million in the same period.

In 2005, the Urban Employee Pension Program was expanded to private firms and foreign-owned firms. In 2008, 54% of urban employees, and 59% of the population aged over 55 participated in the program, which covered most formal employees. However, flexible workers, migrant workers and peasants without land were still largely ignored. The target replacement rate changed to 59.2% (replacement rates of PAYG and individual accounts were 35% and 24.2%, respectively). The actual replacement rate in 2011 was 50.3%. The difference can be partly attributed to the calculation of the replacement rate, which is computed based on wages, and normally excludes bonuses.

All of the pension schemes discussed above cater for employees. The residents' pension was introduced in 2011 as a complement to the Urban Employees' program and covers urban residents who do not benefit from the latter program. By the end of 2012, this pension covered the whole of China, and 483 million people were enrolled. The basic benefit is 55 *yuan* per month, but individual payouts depend on insurance fees and years of contribution. At the end of 2013, the average pension

benefit was 81 *yuan* per month. Considering that the average annual income is 29,547 *yuan* and 8,896 *yuan* for urban and rural residents, respectively (Statistics Bureau), this is low. The urban residents' pension and the NRSP were combined in February 2014. Beginning in July 2014, beneficiaries of the resident's pension could switch to the urban employee program.

Health insurance in urban China

Since the early 1950s, civil servants and institutional workers have been entitled to medical insurance provided by the government (*gong-fei*), while company staff are covered by urban employee medical insurance (*yi-bao*). The government scheme pays almost all medical expenses. The urban employee scheme covers the same population as the Urban Employee Pension Program and medical expenses are largely financed by companies or insurers. Relatives of employees also enjoy partial medical insurance. This system largely ended during the Cultural Revolution.

Both schemes resumed in 1978. New schemes were piloted between 1993 and 1997. In 1998, a new urban employee scheme was implemented. Pooled at prefectural level, it covered employees from all of the institutes and companies in urban China and combined social pooling and individual accounts. Individual accounts were financed by both individuals and firms, while social pooling accounts relied on firms' contributions. Over time, the percentage paid by individuals for inpatient and outpatient care has risen.

Flexible and migrant workers were included in 2003. Enrolment rates for urban employees and retirees were 40% and 98% in 2008, respectively. In 2007, urban resident medical insurance was introduced. This provides cover for unemployed urban residents for inpatient care and outpatient visits in the case of a critical illness. This was the first time that health insurance was decoupled from employment. Between 2008 and 2012 the number of participants increased from 42 million to 272 million.

Social security in rural China

The social security system in rural China was largely neglected until the 2000s. Between 1950 and 1978 (under the planned economy), rural residents only had two, very basic types of insurance: the Five-guarantees Subsistence plan was aimed at those who were unable to work and had nobody to help them; and cooperative medical insurance. Along with the decline in the collective economy that began in 1978, the cooperative medical insurance fund shrank. Various pilot schemes were tested in the 1980s and 1990s, but proved ineffective. The Five-guarantees Subsistence plan ended in the 1990s. In the early 2000s, the government expanded health insurance and pensions to rural areas. The New Cooperative Medical

Insurance plan (*he-zuo-yi-liao*) was introduced between 2003 and 2008, while the new NRSP was introduced in 2008, and expanded nationwide in 2012.

In 1955, the agrarian sector was collectivized and managed by the local commune. Agricultural products were allocated first to the state, then to the commune, and finally to individuals. Households had little ability to protect themselves against risks, and peasants had to rely on the collective economy. The government encouraged local collectives to provide aid to members who could no longer work and who had no-one to help them. Against this background, the Five Guarantees subsistence plan was initiated in 1956. It provided five guarantees: food, clothing, cooking, education, and burial expenses. A total of 4.1 million households (5.2 million people) were eligible for assistance. A cooperative medical insurance was implemented in 1955, which covered 90% of rural residents and gave peasants access to basic medical care. As funding was exclusively provided by the commune, payouts largely depended on its development. The Cultural Revolution brought both the Five Guarantees and cooperative medical insurance almost to an end.

After 1978, a household responsibility system replaced collective agriculture in rural China. The Five Guarantees were funded at town, rather than village level. Cooperative medical insurance almost ended as collective agriculture declined—the percentage of villages offering it dropped from 90% to 5% between 1979 and 1985. At the same time, assistance provided by the state to rural areas decreased.

Various experimental rural pension programs were launched in the 1990s. However, as funds were pooled at the county level, poorer areas were unable to provide sufficient finance. Moreover, high inflation made it difficult to maintain the value of funds. The central government ended the rural pension plan in 1999 and the issue was not revisited until 20 years later when the NRSP was introduced. The new scheme consists of a pooling-based pension and individual accounts. Contributions to the pooled, basic pension are paid by government, while individual accounts are financed by both individual pension contributions and government assistance. Unlike the older rural pension program, which relied solely on individual payments, the NRSP is financed by individuals, the collective, and the government. Rural residents who are aged over 16, and who are not enrolled in an urban employee pension program are eligible. Contributions range from 100 to 500 *yuan* per month and participants can choose how much they pay (those who pay more receive higher benefits). Participants aged 60 and above are entitled to a pension. For eligible participants, the central government pays 100% basic pension in less developed areas and 50% in wealthier provinces. Local government is another contributor. Introduced in 2009, 10% of counties participated in the pilot program, which proved successful. The scheme then expanded quickly. By the end of 2010, 24% of counties (14.3 million people) were covered. National coverage was achieved in 2012.

The New Cooperative Medical Insurance plan was launched in 2003. It is funded by individuals, communes, and the government. Like its urban counterpart, it covers

inpatient care and outpatient visits for critical illnesses. In 2003, each province selected 2–3 counties to participate in the pilot program. From 2004 to 2008, participation increased from 80 million to 815 million people. All counties were covered by 2008. In 2011, 96% of rural residents were enrolled.

Data and Methods

This dissertation applied quantitative methods to a micro-level survey, the China Health and Retirement Longitudinal Study (CHARLS). CHARLS itself is based on the Health and Retirement Survey (HRS) and is comparable with other datasets in the HRS family, such as the Survey of Health, Ageing and Retirement in Europe (SHARE) and the English Longitudinal Study of Ageing (ELSA). The pilot CHARLS survey was conducted in 2008 in two provinces (Zhejiang and Gansu). The follow-up analysis confirmed the quality of the dataset. The national baseline survey was performed in 2011, and respondents are followed up every two years. The baseline survey interviewed 17,708 individuals from 10,257 households in 150 counties in 28 provinces. The first three waves (2011, 2013, 2015), and the life history survey (conducted in 2014) are available to the public. As the third wave (2015) and the life history survey were not available when this dissertation was written, the 2011 and 2013 waves are used.

CHARLS was initiated by the National School of Development and the Institute of Social Science Survey at Peking University. It aims to collect a high-quality, nationally-representative sample of the Chinese population aged ≥ 45 to support scientific research on the elderly. There are only a few micro-level datasets in China and most of were established in recent years. The other large-scale national survey focused on the elderly in China is the Chinese Longitudinal Healthy Longevity Survey (CLHLS) that focuses on the oldest (≥ 80) group, and a comparison group aged 65–79. Other micro datasets have been established for specific purposes. The China Health and Nutrition Survey (CHNS) focuses on the health of children and the family. In parallel with CHARLS, Peking University also conducts the China Family Panel Studies (CFPS), which aims to record information about individuals, the family, and the community. The CFPS focuses on prime age households, and the elderly only make up a small proportion of the sample. Other datasets are either not nationally representative or not publicly available.

CHARLS applies multi-stage (county–community/ village–household) stratified sampling proportional to the size of the population. As migration affects the distribution of households, CHARLS invented the CHARLS-GIS system to determine the boundaries of communities and villages. Selected households were sent information about the survey. Those who agreed to be interviewed were asked whether there were any household members aged above 45. If yes, this person and

their spouse were interviewed. The response rate of the baseline wave was 80.5%, with a higher rate in rural (94%) than urban (67%) areas. This rate is higher than the first wave of HRS, SHARE, and ELSA surveys (CHARLS 2013). The mean age of respondents in the baseline survey was 58. Females made up 52.4% of the sample, and 28.7% had urban *hukou* status. Descriptive statistics are given in Table 1.

Table 1: Descriptive statistics for the CHARLS 2011 wave (%)

Age group	percentage	Sex		Hukou status		Residence	
		men	women	urban	rural	urban	rural
<50	23.3	21.1	25.2	21.8	23.9	24.6	21.9
50–59	14.5	14.5	14.5	12.8	15.1	14.5	14.5
55–59	19.2	19.9	18.6	19.3	19.1	19.2	19.2
60–64	15.0	15.6	14.4	14.3	15.2	14.2	15.8
65–69	9.7	10.5	9.0	9.9	9.7	8.7	10.7
70–74	7.9	8.5	7.3	9.9	7.1	8.1	7.6
75–79	5.5	5.6	5.3	6.7	4.9	5.6	5.3
≥80	5.1	4.4	5.8	5.3	5.0	5.0	5.2
All	100.0	47.6	52.4	28.7	71.3	50.1	49.9

CHARLS collects individual, household, and community information. The individual modules include demographics, family (children, parents, and interactions), health, use of healthcare, individual income and assets, consumption, and work and retirement. Household information concerns household income and assets. Data for the community survey is provided by the community/ village administrator. It includes population, labor force, migration, wages, health services, social policy, prices, and epidemiology. This data is used to help to understand and analyze the elderly’s behavior in the local context.

CHARLS illustrates some key facts about the elderly. For example, they are poorly educated – only 44.7% aged over 60 have completed primary education. Many have health problems – 32% report their health as bad or very bad, 38% report difficulty in performing daily activities, and 54% have hypertension. Moreover, health status deteriorates rapidly with age – 25% of people in their 70s need help with daily life, and this increases to 50% for those who are aged over 80. There is a positive relationship between health and wealth. The poorer elderly are more likely to have health problems. Besides physical health, psychological health also merits attention – 40% of the sample suffer from depression. Elderly females are more vulnerable to both physical and psychological health problems.

The CHARLS dataset shows that 23% of the elderly live under the poverty line in terms of consumption, which is much higher than the younger cohort aged 45–59

(CHARLS 2013). Median income is 4,440 and 16,320 *yuan* for rural and urban *hukou*, respectively. The rural elderly are more likely to fall into poverty, and require more transfers from others, particularly children, while consumption decreases with advancing age. Although traditionally children are expected to live with their elderly parents and take care of them, nowadays only 37.8% of the elderly live with at least one child. This figure suggests that living with parents might not be the principal way to provide support to the elderly anymore. Instead, the data suggests that children tend to live near their elderly parents. For those elderly who do not live with their children, only 6.1% do not have any children living in the same county. At the same time, many elderly take care of their grandchildren when their children and in-laws are away.

In the preceding year, around 50% of the elderly had received a financial transfer from non-resident children, while only 19% of them had made a financial transfer to their children. This is consistent with the belief that intergenerational transfers follow an upward trend in China. Rapid economic growth has benefited the younger generation more than the elderly, and the younger cohort have relatively higher incomes. Nevertheless, around half of the elderly had not received any financial support from their non-resident children, which suggests that public transfers are needed to ensure their living standards. In 2011, pension coverage was 83% and 43% for urban and rural *hukou*, respectively.

As noted above, the CHARLS dataset reveals that a considerable proportion of the elderly have health problems and live under the poverty line. Although public health insurance and the pension system have been expanded to cover a broader population, family support still plays an important role. This opens up opportunities to explore how the elderly's wellbeing has been affected by changes to their support system.

The advantage of using survey data is that it records in-depth information about respondents and allows researchers to examine different aspects of the elderly person's life. However, there are potential drawbacks. The record of life events relies on the respondent's memory. The further back in time an event occurred, the greater the likelihood of errors. To overcome this potential problem, CHARLS compares key social events to individual stories; the result is that, in general, they are consistent. In this dissertation, the main explanatory variables I am interested are the rural pension reform and the sex of children. The former is a recent development. As children, and contact with children, are important aspects of life, it is unlikely that the elderly misreport the gender of their children. Most of the other variables used in my study concern the current situation, such as educational attainment and health status, rather than when events occurred. Thus, the potential problem of poor memory is not expected to bias the results. Another potential problem is selection bias. Those who passed away before being interviewed are not part of the sample. In other words, only survivors are sampled. Nevertheless, this dissertation focuses on the current situation of the elderly, notably how recent changes in public transfers and family support have affected their wellbeing. As I

do not seek to trace the long-term relationship between earlier events and today's consequences, selection bias should not threaten my analysis.

The first two papers presented in this dissertation applied a regression discontinuity design (RDD). RDD was initially used in economics in the 1990s, and has become a widely-applied method in the social sciences. The general framework is based on that treatment variable is determined by whether a running variable passed a certain exogenous threshold (discontinuity cutoff). Since those who are just above and just below the threshold are, in theory, identical, any difference in the outcome variable is considered as the treatment effect. One of the most cited RDD papers studied the effect of class size on educational performance (Angrist and Lavy 1999). In Israel, if the class size exceeds 40 pupils, a new class must be formed. As parents cannot determine how many pupils have enrolled in a particular school, the number of classes is determined by whether number of children (the continuous variable) exceeds 40 (the threshold). This is used to study the casual effect of class size.

The first two papers both examine the effects of the NRSP on the wellbeing of the elderly. Under the scheme, elderly people aged 60 and above can claim pension benefits even if they have not contributed to the scheme. Therefore, whether the person receives a pension or not is determined by their age (over or under 60). This offers an opportunity to identify the casual effect of income shock on the elderly.

The third paper examines the causal effect of the sex of the firstborn child. Although the sex ratio at birth is abnormally high in China, the sex of the firstborn child is random. The paper uses this fact to investigate the effect of the sex of the firstborn child on intergenerational support. The fourth paper uses the ordinary least squares method to study the association between the sex of children and the elderly's happiness. Although the sex composition of children is not random, it offers some insight into its effect on the elderly's wellbeing. These last two papers also apply an individual fixed effects model. At the time of the first CHARLS wave, 40% of rural villages were not covered by the NRSP. At the time of the second wave all rural villages were covered. I therefore selected villages where the NRSP was introduced between these two waves. One advantage of the individual fixed effects model is that it excludes individual characteristics that are invariant over time. Therefore, it is the preferred method, as it controls for unobserved factors that may confound the main result.

Results: summary of each paper

Paper I: Labor supply responses to new rural social pension in China: A regression discontinuity approach

The transition into retirement is relevant to many crucial issues, such as poverty reduction and social welfare. But the determinants of the retirement decision are understudied in many developing countries; notably, most previous studies in China are descriptive. As the pension provided by the government is insufficient, the rural elderly largely rely on income from their own labor and support from their family. They normally work until they are unable to continue; consequently, the main factor affecting their retirement decision is their health status rather than public policy. Internal migration of the prime age population increased the proportion of the working elderly between the 1990s and 2000s. The rural elderly are most vulnerable to falling into poverty and it seems they have not benefitted much from the country's rapid economic growth.

The recently-introduced New Rural Social Pension scheme (NRSP) represents a fundamental change for this group. Using the CHARLS 2011 dataset, this paper applies a regression discontinuity design (RDD) to explore how the elderly's retirement decisions have responded to this exogenous increase in income. The study makes several contributions to literature. Firstly, the introduction of the NRSP allows us to untangle the causal effect of income on the labor supply. Unlike western countries, where governments are trying to reduce pensions to ease pressure on public expenditure, developing countries such as China are in the process of increasing pension provision to the elderly. One important aim of the NRSP is to allow them to retire. Studies from developing countries have found that although the elderly labor supply is affected by a new pension program, the size effect is sensitive to pension benefits and context. This study provides another important insight into how the elderly's wellbeing is affected by a pension program. Secondly, the receipt of pension benefits generates an income effect. An increase in income mainly results in either an income or substitution effect. The former refers to the decreased incentive to work as income increases, while the latter is seen when people are encouraged to retire if the pension system is linked to some form of income tax. This is particularly true when people are required to leave the labor market in order to receive pension benefits, or when income has to be below a threshold to receive benefits. As the NRSP is not linked to any form of income tax, its influence on the labor supply should be mainly driven by an income effect.

The paper analyzes the 2011/ 2012 CHARLS dataset. The sample consisted of elderly people living in rural villages where the NRSP had been implemented for at least one year before the time of the survey. As there is a discontinuity at the age of 60, I further restricted the sample to elderly people aged between 50 and 70 (a total of 2,316 individuals). Fuzzy RD was used; receipt of pension benefit was instrumented by whether the respondent had reached the age of 60. This found that the percentages of those working were 84% and 73% for those aged under 60 and those aged above 60, respectively.

The main RD model used the linear spline function to interpret age. The first stage regressed receipt of pension benefit on whether the individual had passed the age of

60. The second stage regressed the labor supply on the instrumented receipt of pension benefit. This showed that pension benefit caused a 15% decline in the labor supply. A series of robustness checks were conducted to test whether the result was sensitive to the RD model specification, including different bandwidths and different polynomial orders. Although the magnitude varied, the direction and significance of the effect were consistent. I also ran the same model on areas where the NRSP had not been introduced. In this case, the labor supply is insensitive to whether the individual has passed the age of 60. Therefore, the decrease in the labor supply in rural areas where the NRSP is available is caused by the introduction of pension benefits.

Estimates show that the negative effect on the labor supply is sizable. Although the sums that are paid are small, a non-negligible percentage of the elderly choose to stop working. The new scheme does indeed improve the elderly's wellbeing by making it possible for them to retire. This suggests that the long working life of the rural elderly is mainly driven by their poor economic status. This study therefore suggests that the government's anti-poverty social welfare scheme also needs to take the effect on the labor supply into account.

Paper II: Rural pensions, intrahousehold bargaining, and elderly medical expenditure in China

This paper investigates how cash transfers from a newly-introduced social pension program (the NRSP) influence intrahousehold resource allocation with respect to the elderly in rural China. Understanding the intrahousehold decision-making process is essential for policymakers, as the family mediates many policy effects. Earlier literature predicts that those who have greater intrahousehold bargaining power are more likely to achieve their preferred resource allocation. In other words, intrahousehold resource allocation reflects the economic contribution of different household members. The introduction of the NRSP provides a window into how household decision-making impacts the elderly's wellbeing. Firstly it represents an exogenous shock to an individual's income and bargaining power for those above age 60. Secondly, the CHARLS dataset records details of individual health expenditure. Since health is an important dimension of wellbeing, it is safe to assume that greater healthcare use and health expenditure is an individual preference. Therefore, both bargaining power and preference can be measured, which solve the two common challenges in empirical studies of intrahousehold resource allocation.

Previous research mainly focuses on gender differences in consumption. Studies on bargaining power based on age and the family are rare. A common finding is that the elderly are disadvantaged in intrahousehold resource allocation. This paper helps to address the question of whether resource allocation is mainly determined by age or relative earning capacity. In particular, household consumption *per capita* is

controlled for, which isolates the effect of increased bargaining power from the income effect. This paper also contributes to previous work on healthcare utilization in the developing world. Studies in China have focused on evaluating the policy effects of medical insurance. Since providing comprehensive health services is one of the main goals of policymakers in many developing countries, it is essential to understand the social factors that affect their utilization.

This paper seeks to find an explanation for the downward trend in health expenditure with age. Earlier work reveals that in rural China, the relation between health expenditure and age has an inverse U-shape. In particular, health expenditure decreases after the age of 65, which is inconsistent with the fact that people are more likely to fall sick as they age, and suggests that they lack adequate healthcare. Although insufficient health insurance and poverty clearly play a part, this situation raises the question of what prevents the rural elderly from spending on healthcare. One possible explanation is that the elderly are altruistic and prefer to spend limited household resources on other family members. On the other hand, other household members, such as cohabiting children, may decide not to spend money on healthcare for the elderly. Therefore, we compared treatment effects for elderly people who have control over their spending (no extended family), and those who need to “bargain” with other family members (extended family).

The CHARLS national baseline wave (2011/ 2012) and the follow-up survey (2013) were used. For the 2011 wave, we restricted the sample to areas where the NRSP had been introduced before the start date of the observation window. In 2013 (when the follow-up survey was conducted), the NRSP had achieved national coverage, and the dataset included all rural villages. The two waves were pooled to obtain a larger sample of those aged between 50 and 70 (8,415 individuals). A fuzzy regression discontinuity design was applied. The main explanatory variable was receipt of pension benefit instrumented by whether the individual was over 60. Dependent variables were utilization of healthcare services and out-of-pocket expenditure. Both outpatient and inpatient care were included.

The results showed that receiving pension benefits increased both utilization of outpatient care and healthcare expenditure. The NRSP has enabled elderly people to seek medical help. These findings remain robust when *per capita* household consumption is controlled for. Therefore, the treatment effect is not driven by an increase in household income.

To explore the reasons for declining healthcare expenditure with age in more detail, we divided the sample according to whom the elderly person lived with. This found that the pension improved healthcare for those who were co-resident with their children or grandchildren, but not for those who only lived with a spouse. The finding supports intrahousehold bargaining power theory. The pension benefit increases the elderly’s person bargaining power within the household, enabling them to spend more on themselves. Therefore, it is not the case that elderly people

are altruistic and choose to not to spend money on their own healthcare. Cohabiting children appear to decide to spend less on their elderly parent's healthcare; in other words, the elderly are disadvantaged in intrahousehold resource allocation. This raises a question of whether family support for the elderly is sufficient.

Paper III: Revisiting son preference: The effects of the sex of the firstborn child on intergenerational support in China

Son preference is a longstanding cultural norm in China, and continues to persist to the present day. The most cited evidence is an abnormally high sex ratio at birth over the past two decades. Sons are favored because they are expected to bring higher returns for their parents. Moreover, they are expected to be mainly responsible for taking care of their elderly parents. Modernization and urbanization have challenged traditional values, and the gender division of intergenerational support is also changing. Nowadays daughters provide increasing support to their natal parents, and have become an important alternative source of help. This raises the question of whether parents with a son are still better off than those with a daughter. This paper takes the sex of the firstborn child as the starting point to investigate how son preference affects both subsequent births and post-birth resource allocation between sons and daughters. In doing so, it helps to answer the question of whether favoring a son does, in practice, improve the situation of parents in later life.

Although the overall sex ratio at birth is abnormally high in China, the sex ratio of the first child is in the normal range. Thus, the sex of the firstborn child can be seen as a random event. However, son preference means that the sex of the firstborn child is expected to affect the parity progression ratio. Those who have a firstborn daughter are more likely than those with a firstborn son to have more children. Consequently, previous studies have used the sex of the firstborn child as an instrument for the number of children to study the impact on various outcomes. One potential threat of this method is that although the sex of the firstborn child is random, subsequent fertility is endogenous. In addition to affecting the number of children, the sex of the firstborn child may have an independent impact on many other family outcomes. Treating it as an instrument may be problematic if its impact is not fully understood. This study intends to fill this gap.

The findings also contribute to the son preference literature. Existing studies mainly focus on explaining the consequences of the abnormally high sex ratio, and most target the prime age population. On the other hand, research on the elderly emphasizes the "exchange" contract between the two generations and tries to identify whether there is gender division between sons and daughters. However, both fertility and children's sex composition are endogenous to many family outcomes. Although having a firstborn son is not equivalent to having a son, it

ensures that the family has a male heir and relieves the pressure to have a son later. By studying a random event, the sex of the firstborn child, this paper provides some insight into the causal influence of the gender of children.

The study draws upon the CHARLS 2013 dataset to explore the influence of the firstborn son on four dimensions of intergenerational support: living arrangements, contact, financial transfers, and practical help. The sample contains elderly aged 45-84. First, I regress having a firstborn son on intergenerational support and, second, I decompose the effects of the firstborn son and investigate mechanisms. In addition to potential independent impacts (direct effect), the sex of the firstborn child can affect the quality and quantity of children (indirect effect), which, in turn, impacts intergenerational support. Furthermore, the paper examines how social welfare expansion has mediated son preference, by comparing the effect of the firstborn son before and after the introduction of a national pension scheme (the NRSP).

The results show that having a firstborn son increases the probability of seeing children weekly, but decreases the probability of receiving positive financial transfers from children. The former may be explained by the fact that sons are more likely to live near to their natal parents. Although the results are mixed, having a firstborn son does not seem to improve later life. The decomposition of the effects shows that although it affects intergenerational support via the number of children and their education, independent influences are more important. Therefore, further studies should be more careful when using the firstborn son as an instrument for the number of children.

Lastly, the introduction of the national pension scheme has indeed affected the role of sons. The effects of the NRSP are larger among those who have a firstborn son. In particular, those aged over 60, who are already receiving a pension income, are more affected than those who are younger. This suggests that firstborn sons are more sensitive to their elderly parents' income. The implications of son preference have been affected by the expansion of social welfare and, particularly, the associated increase in income. Therefore, although parents prefer to have sons, the final outcome of their choice may not be what they expected. It appears that the practice of son preference might indeed be outdated.

Paper IV: Does having a son make you happier? –Evidence from China

Demographers are interested in parents' preferences regarding the gender of their children as it influences fertility, parents' behaviors, and family outcomes. Sex preference is also a public policy issue, as it may lead to an abnormal sex ratio and increase competition in the marriage market, especially in East Asian countries where son preference is prevalent. Although son preference has been widely discussed, whether it translates into increased parental happiness however is unknown. This paper links children's sex composition to the elderly's happiness.

As one of the most important life events, fertility is expected to influence parental happiness. Earlier literature has mainly focused on whether parents are happier than childless couples. This shows that, in general, people are better off without children. Moreover, although fertility affects happiness, its impacts are transitory. Less attention has been paid to the sex composition of children. While parents from western countries treat boys and girls more equally, the gender of their children has substantial impacts on family outcomes, which may ultimately affect parental happiness. One study from Germany shows that although parents prefer a mix of sexes for their children, this does not affect their happiness, suggesting that sex preference does not necessarily translate into happiness. This finding hints that reality does not live up to parents' expectations.

Traditionally, sons in China are expected to carry the family name and are mainly responsible for taking care of parents as they age. However, nowadays sons do not necessarily provide better support than daughters. Partly due to the abnormally high sex ratio, parents with sons need to save and invest more in their child. Such factors have eroded the economic rationale for son preference. However, cultural incentives do not fade away easily. It seems sons are still irreplaceable and support from daughters is seen as complementary. Consequently, I hypothesize that elderly people with only daughters are less happy than those with only sons. At the same time, the elderly's filial expectations are shifting from day-to-day care and material support to emotional support. In this context, daughters tend to be better at meeting their parents' needs. Therefore, those who have children of both sexes should be happier than those who have only sons. Moreover, I expect the sex composition of children to have a larger effect among rural parents who are more economically dependent on their children. Finally, this paper also investigates how the expansion of social welfare has affected the relationship between sex composition and parental happiness in order to determine to what extent son preference is affected by an economic rationale.

Using the CHARLS 2013 dataset, this paper tests whether the gender composition of children affects the elderly's happiness. I limit the sample to those who have at least one child and are above 60. The main outcome variable is satisfaction with life. An ordinary least squares regression is applied to examine whether those who have only daughters or who have children of both sexes are significantly happier than those who have only sons. An individual fixed effects model is used to identify whether the impact of the sex composition of children changed due to the introduction of the national pension scheme (the NRSP).

The results show that those who have only daughters are no less happy than those who have only sons, while those with children of both sexes are significantly happier than those who have only sons. The results remain the same after controlling for intergenerational interactions, and the socioeconomic status of the elderly and their children. This finding contradicts son preference, since not having a son does not lead to an unhappy later life. Conditional on having a son, having a daughter

increases the elderly's life satisfaction. Moreover, the analysis of urban–rural differences shows that having children of both sexes is particularly important for the rural elderly. It is likely that they have less access to social welfare than the urban elderly, and support from their children is therefore more valuable. The analysis of the effect of the NRSP found that the positive effect of having children of both genders increased when the rural elderly were provided with a pension. It seems that when their income increases, having daughters becomes more important. This result clearly shows that son preference does not translate into parental happiness.

Conclusion

This dissertation aimed to explore how the elderly's wellbeing is affected by recent changes in intergenerational support. Along with economic growth, the Chinese population is rapidly aging, which has brought challenges for the elderly support system. Although economic development has improved living standards and significantly reduced poverty the elderly, and particularly the rural elderly, are still most likely to fall into poverty. The current elderly population experienced significant hardship, then witnessed an economic miracle, but have been forgotten as they have aged. As their capacity to work declines, they require intergenerational transfers from the prime age population. While most of the urban elderly are able to live on their pension benefits (public transfers), the rural elderly mainly rely on income from their own labor, or private transfers from their children. Without a stable income, they tend to work as long as their health allows. Meanwhile, increased mobility and a decline in fertility have weakened the family support system. With fewer children or fewer children living nearby, the elderly need more public support.

Seeking to reduce poverty, the Chinese government expanded social welfare to the rural population in the early 2000s. For the first time in the country's history, the New Rural Social Pension offers a comprehensive pension to rural Chinese, and it represents a fundamental change in the support system for the elderly. Consequently, public transfers are expected to play a larger role. At the same time, although sons are expected to be mainly responsibility for taking care of their elderly parents, nowadays daughters provide increasing support. This raises the question of whether gender-based intergenerational support within the family persists, and how it affects the elderly's wellbeing. In addition, the expansion of social welfare has increased the rural elderly's income and thus reduced their economic dependency on adult children, which may mediate the implications of son preference.

The results show that the new rural pension has drastically changed the elderly's life, as 15% stopped working once they were offered the pension. Moreover, they

spend more on healthcare. The pension not only increases the elderly's income and facilitates their retirement, but it also increases their relative bargaining power within the household and allows them to spend more on themselves. Previous work has highlighted decreasing health expenditure with age among the rural elderly. While some may say that elderly people are altruistic and prefer to save money to give to other household members, my result clearly shows that this is not the case. In particular, the positive effect of the pension on medical expenditure is only present among the elderly who live with their extended family (and who need to bargain with other generations), but not among those who only live with their spouse (and who already had control over spending before they received the pension). Therefore, it appears that altruism may not be the reason for decreasing health expenditure with age. The underutilization of healthcare does not reflect the elderly's preference, but other family members' preferences. This result is consistent with intrahousehold bargaining power theory, which predicts that those who earn more are favored in intrahousehold resource allocation. On the other hand, it reveals the sad fact that the elderly were disadvantaged by their family prior to the introduction of the pension.

As the pension income represents windfall income for those who are aged >60 , and a quasi-experimental method is applied, the findings can be considered as causal effects. The treatment effect of the pension is remarkable given the small sums of money involved (9 USD per month). The pension rescues many rural elderly from a situation where they must work until the end of their life, and are unable to access healthcare if they fall sick. The strength of the impact suggests that many rural elderly had been living in very poor conditions. Benefits account for 20% of income among the elderly. For many who do not have any individual income, their pension is the only stable source of finance. At the same time, poverty forces them to continue working and restrict their consumption. It appears unlikely that the family support system can meet all of the elderly's needs.

The dissertation also looks into gender-based intergenerational support within the family, and examines whether the elderly with sons are better off. First, I explore the causal influence of the firstborn son on intergenerational support. Son preference has led to the widespread practice of 'at least one son' and prioritizing sons after birth. Thus, the sex of the firstborn child is expected to alter parents' fertility decisions, and resource allocation among children after birth. I find that having a firstborn son increases the probability of seeing children weekly, but decreases the probability of receiving positive financial transfers from children. It therefore seems that having a firstborn son does not lead to better care in later life. Moreover, by decomposing the effects, I find that the independent effect of the firstborn son dominates, and affects intergeneration interactions via the number of children and their education attainment. The sex of the firstborn child may affect support for the elderly via other channels, as it may change the parents' life trajectory.

These results, on the one hand, confirm that son preference has non-negligible effects; on the other hand, it shows that son preference does not bring the material gains parents expect. Furthermore, the last chapter reveals that having sons does not improve psychological wellbeing. By comparing life satisfaction among parents with children of different gender compositions, I find that having only daughters does not make the elderly less happy. Moreover, having children of both sexes significantly increases happiness. Therefore, having daughters also benefits parents. This is consistent with the current shift in needs from day-to-day care to emotional support, and with the fact that daughters are usually better at meeting their parents' non-financial needs. Although the results from these two papers are somewhat mixed, the message is clear: having a son does not have the expected benefits in later life.

My findings also show that the expansion of social welfare mediates the implications of son preference in rural China. The rural elderly are heavily reliant on support from their children, especially sons. Therefore, the sex of their children is expected to have a larger influence on them than the urban elderly. While this is found to be true (see paper IV), the expansion of the pension scheme has relieved their economic dependency on their children, and altered the roles of sons and daughters. In particular, my results show that sons are more sensitive to changes in their parent's income, and the elderly with a firstborn son have been more affected by the NRSP. Moreover, the NRSP has enhanced the benefits of having children of both sexes. Taking together, the role of sons in supporting their elderly parents has been diminished by the rural pension. Before the introduction of the NRSP, the principal difference between sons and daughters was that sons provided financial support, and this difference only existed in rural areas (Xu 2015). Now that the elderly have access to a pension, the importance of economic support from sons has lessened, which has weakened the economic rationale for son preference. On the other hand, once basic material needs are met, daughters have the advantage that they can provide emotional support, and they become essential for parents. Before the introduction of the NRSP, parents' views of their daughters had changed from "spilt water" to "little quilted vests to warm parents' hearts" (Shi 2009). However, earlier studies suggest that help from daughter considers to be considered as complementary to support from sons (Tang et al. 2009). My results show that daughters are not simply complementary to their brothers; they bring real benefits and increase their parents' happiness. This does not mean that sons have become unimportant. Rather, it hints that when the economic rationale for son preference is weakened, parents tend to increase the value they give to their daughters.

To conclude, the expansion of institutional support has improved the elderly's wellbeing. The significant changes in their behavior brought about by the new rural pension scheme raises concerns about the family support system. At the same time, within the family, the role of sons in supporting their parents is weakening, while the role of daughters is becoming increasingly important. Although young parents

may prefer sons, their expectations are inconsistent with the real situation in later life. Moreover, the expansion of the pension scheme has accelerated this transformation within the family. Receiving a pension has weakened the economic rationale underlying son preference, which may destabilize the practice even more. Finally, the system of private intergenerational transfers seems to fail to provide adequate support to the elderly. As, in the future, the elderly will have fewer children to rely on (given falling fertility rates), there is a need for further improvements to the system of public transfers.

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Getting Old in a Changing World

The Chinese population is rapidly aging, which has brought challenges for the elderly support system. Until very recently, only urban employees were eligible to receive a pension, while the rural elderly were forced to rely on income from their own labor and support from their family. In these circumstances, it is unsurprising that the rural elderly were most likely to fall into poverty. The recent introduction of the New Rural Social Pension represents a fundamental change, as it offers a comprehensive pension to rural Chinese for the first time in its history. The initiative may reduce the need for family support. Son preference is well-established in China as, traditionally, sons are expected to be mainly responsible for taking care of their elderly parents. As the new pension relieves the elderly's economic dependency on their children, it becomes relevant to ask whether it has mediated the implications of son preference, notably whether having a son still results in a better later life.

This dissertation explores how changes in intergenerational support have affected the elderly's wellbeing. The results show that the new pension has made it possible for the rural elderly to retire and improved their relative bargaining power within the household – allowing them to spend more on healthcare. The treatment effect of the pension is remarkably strong given the small amount of benefit (9 USD per month). This indicates that the rural elderly had been living in very poor conditions, and suggests that the family support system cannot adequately provide for them. It appears that better public support is required.

Another finding concerns the situation within the family. My results show that having a son does not improve either material support or subjective wellbeing. It therefore appears that young parents' son preference does not turn out to be a rational choice in later life. Moreover, the expansion of social welfare has weakened the economic rationale of favoring sons, and increased the importance of daughters, as parents' needs shift from day-to-day care to emotional support. Once basic material needs are met, daughters have the advantage of providing emotional support, and they become essential to their parents.



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