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# Does Public Employment Affect Household Saving Rates? Evidence from Chinese Household Data

## Abstract

This paper investigates the impact of public employment on household saving rates in China using representative household-level data. After controlling for a series of variables such as income, risk attitude, financial literacy, and demographic factors, we show that households headed by public employees have higher saving rates than other households. This positive association holds after controlling for self-selection bias. Public employees are more likely to save for their children and they have a higher saving capacity than non-public employees due to better social security. Our results contribute to a better understanding of Chinese household saving rates, which is of great importance given their extremely high level in international comparison.

JEL-Codes: D140, E240, H310, G510.

Keywords: public employment, household saving rates, Chinese economy.

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# 1 INTRODUCTION

A sizeable literature analyzes the drivers of Chinese households' saving rates, indicating that multiple factors have contributed to China's high household saving rates, such as its economic transition, demographic changes, and cultural reasons (Baker et al., 2022; Chen et al., 2019; Curtis et al., 2017; Horioka and Wan, 2007; Lugauer et al., 2019; Wei and Zhang, 2011). Our paper contributes to this literature by studying Chinese households' saving rates using an extensive longitudinal household survey. We extend the empirical literature by highlighting the role of employment type: Households working for the public sector save more than households working in the private sector. Depending on the method and sample we use, the increase in household saving rates caused by public employment is between 3 and 8 percentage points, after controlling for a series of variables such as income, risk attitude, and demographic factors. This finding is in contrast to the results for other countries, where public employment is generally found to reduce household saving rates because of relatively lower uncertainty and higher compensation (Bettoni and Santos, 2021).

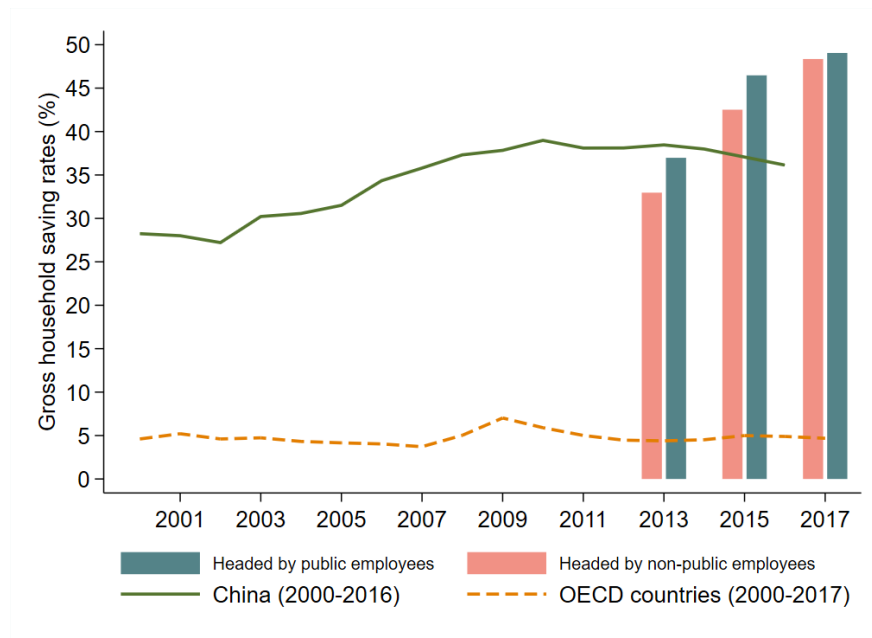
Our work is motivated by some stylized facts about household saving rates and type of employment, which are visualised in Figures 1 and 2. Figure 1 shows that gross household saving rates are considerably higher in China than in OECD countries. In fact, the average gross saving rate of Chinese households in the period under consideration was around 35% whereas that of households in OECD countries amounted to only 5%. This figure also shows that Chinese public employees have higher saving rates than non-public employees in all years considered. Figure 2 shows the relationship between the share of public employment across provinces and the unexplained part of China's household saving rates after controlling for standard determinants. The upward fitted regression line suggests a positive relationship between household saving rates and public employment. That is, provinces with a higher portion of employees working in the public sector tend to have higher household saving rates. Overall, these figures highlight the positive effect of public employment on Chinese households' saving rates. Nevertheless, so far, there is little theoretical or empirical evidence focusing on whether and why employment type impacts households' saving decisions, especially in the context of China. Our paper aims to fill this gap in the literature.

Understanding the effect of public employment on Chinese household saving rates is important for several reasons. First, household savings play a crucial role in a country's investment and long-run sustainable economic growth. Moreover, in the short run, their cyclicity might dampen or amplify crises and affect the speed of recovery (Adema and Pozzi, 2015). Therefore, it is important for policymakers and economists to understand the determinants of household saving rates. This is especially true for the Chinese economy where - despite a large body of literature - the high household saving rates are still a puzzle.

Second, besides these domestic effects, household savings in China affect the global economy. According to the savings glut hypothesis there has been a significant increase in the supply of global savings with China being a major player. These savings have financed global imbalances and the US current account deficit. Global imbalances, in turn, are considered to be a potential source of global instabilities (Bernanke, 2005).

The implication of public employment on household saving rates has been neglected so far. However, identifying a causal effect faces two key obstacles. First, third factors might affect both employment choice and household saving rates. As explained in the next section, public employment is associated with other characteristics that may also affect household saving rates, such as better education, higher risk aversion, higher financial literacy, and better social security. Failing to control for these factors might distort estimates of the impact of public employment on household saving rates. Second, selection into a public job is not a random decision. In particular, job seekers apply for a position in the public or private sector predominantly based on their preferences, and each sector has particular criteria for offering work opportunities. In other words, we have to deal carefully with potential selection bias when investigating the causal effect of public employment on household saving rates.

Using micro-level longitudinal data from a representative household survey in China, we investigate whether the



**Figure 1.** Gross household saving rates

*Notes:* The green and (dashed) orange lines display gross household saving rates of China and OECD countries, respectively. The gross household saving rate is defined as aggregate savings of all households divided by aggregate disposable income of all households. Data are collected from the OECD database. The red and blue bars represent gross saving rates of urban Chinese households headed by public and non-public employees, respectively (note that households are excluded whose heads are unemployed or retired). Data are collected from the China Household Finance Survey.

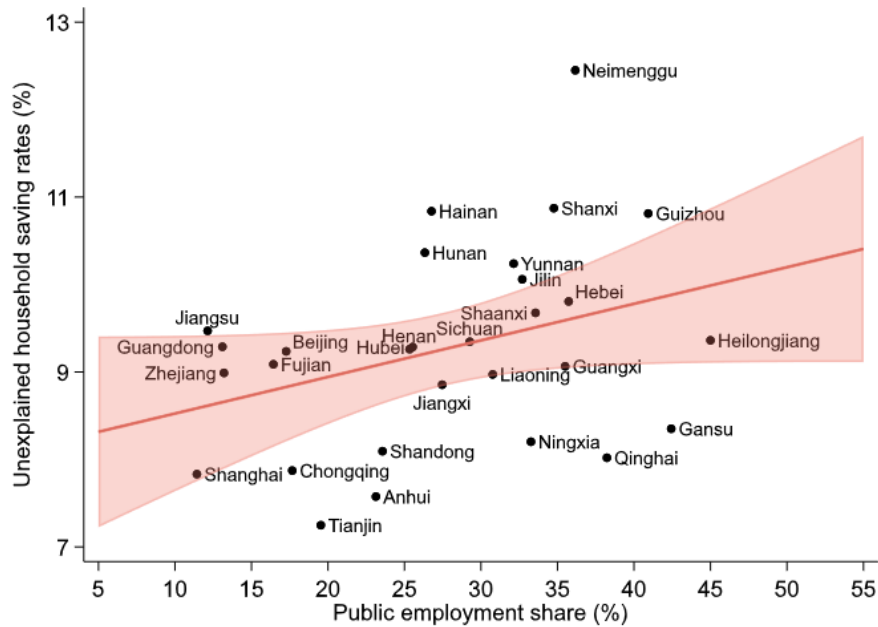
household saving rate depends on the type of employment of the household. To identify the genuine effect of public employment on household saving rates, we use a series of approaches. First, we use simple panel regressions with a rich array of control variables to get an intuitive idea of the association between public employment and household saving rates. As a robustness check, we use instrumental variable estimation to alleviate the possible endogeneity problem. Second, we use Propensity Score Matching and the Heckman two-step approach to mitigate the self-selection bias. Third, we consider the sub-sample of households whose heads changed from non-public employment to public employment in order to investigate the effect of an employment change on saving rates. Fourth, we consider the life-cycle effect of public employment on household saving rates. Finally, we formulate some possible explanations for our empirical findings.

The structure of this paper is as follows. Section 2 presents a review of the literature on public employment and household saving rates in China. Section 3 presents the data we use. Section 4 introduces our empirical strategy and the corresponding results. Section 5 reports the results from the robustness checks. Section 6 provides a brief discussion of our results, and Section 7 concludes.

## 2 BACKGROUND: HOUSEHOLD SAVING RATES AND PUBLIC EMPLOYMENT IN CHINA

### 2.1 Household saving rates

Studies examining cross-country differences in household saving behavior indicate that Chinese households save a larger portion of their income and have a different hierarchy of saving motives compared with households from other



**Figure 2.** Unexplained household saving rates and public employment share

*Notes:* The figure plots the median of the unexplained part of household saving rates against the public employment share in 2013 and 2015 across provinces in China. Unexplained household saving rates are defined as residuals from a regression of household saving rates on household-level variables such as income, assets, and size, and variables concerning household head such as gender, age, age squared, educational background, marital status, number of dependent kids, risk attitudes, and financial literacy. Data are taken from the China Household Finance Survey. The public employment share is defined as the ratio of public employment to total employment. Employment data are collected from the China Statistical Yearbook. The red line represents the fitted OLS regression line of unexplained household saving rates on the public employment share (slope = 0.105, p-value = 0.06). Shaded areas represent the 95% confidence interval.

countries. For example, Curtis et al. (2017) compare the household saving rates in China, India, and Japan, and conclude that the distinctive demographic structure such as smaller household size and higher sex ratio accounts for the disparate saving behavior between Chinese households and their foreign counterparts. Ang (2009) finds that pension reform has opposite effects on household saving rates in China and India and he attributes this to different importance of saving motives such as the early-retirement and bequest motive in the two countries. Choi et al. (2017) show that both household income growth and income risk are higher in China than in the United States, therefore contributing to a higher household saving rate in the former. They also show that the precautionary motive drives most of household savings in China and nearly all household savings in the United States. Taken together, these studies highlight the special feature of Chinese households' saving rates and suggest that explanations of households' saving rates common in other countries may not be valid for China.

There is an evolving literature that provides unique explanations for the high household saving rates in China. For example, a strand of literature associates the high saving rates of Chinese households with the country's economic transition and the income growth of households. In particular, Horioka and Wan (2007) and Modigliani and Cao (2004) suggest that income growth in China brought by economic reform could explain the rising household saving rates. Chamon and Prasad (2010) find that the rising burden of housing, education, and healthcare encourages Chinese households to save more. Another strand of literature argues that the income structure and related uncertainty could affect household saving rates. Chamon et al. (2013) find that rising income uncertainty explains much of the rise in saving rates among urban households in China. Moreover, a number of studies highlight the role of demographic

characteristics in determining household saving rates in China. For example, Lugauer et al. (2019) document a negative relationship between the number of dependent children and household saving rates, implying that the one-child policy has contributed to the increase in household saving rates via reducing household size. Curtis et al. (2015) and Ge et al. (2018) also emphasize that China's population control policies induced demographic structural changes and promoted household saving rates. Interestingly, Wei and Zhang (2011) highlight that Chinese parents with a son tend to save more to gain an advantage for their son in the marriage market.

To date, the literature on Chinese households' saving rates particularly pays attention to economic and demographic conditions, yet little is known about the role of political factors. Some studies emphasize the role of households' political background, which is usually associated with household members' occupations, in shaping Chinese households' financial decisions. For example, He et al. (2018) use China's SOE reform in the late 1990s as a natural experiment to estimate precautionary savings of Chinese households. Their findings confirm the existence of precautionary savings stemming from the sudden increase in unemployment risk for SOE employees compared to that for government employees who were not affected by the reform. Ge et al. (2021) find that the political background has a significant impact on households' financial behavior via encouraging financial market participation, reducing credit constraints, and promoting investments. A common characteristic of these studies is that they take into account the occupational background when studying household financial decisions.

## **2.2 Public employment and its influences on household saving rates**

Between 1949 and 1978, virtually all Chinese employees were either self-employed or employed by the government and its affiliated institutions, the state-owned or collective enterprises (Meng, 2012). There were no private employees in that era because there were no private enterprises. A central plan assigned the labor force to industries and regions according to their family background, educational experiences, and residency. Those who obtained a job offer were not allowed to quit or switch jobs. Officially, there was no unemployment, and employees were less likely to be laid off than nowadays, even with poor work performance. Therefore, this occupation with guaranteed job security is referred to as "iron rice bowl". However, after a series of economic reforms in the 1990s, which aimed to break the centrally planned economy and build a market-based one, many State-Owned-Enterprise (SOE) employees became redundant and lost their jobs. Private sector employment expanded rapidly. This reform showed that SOEs could go bankrupt, and unemployment could become a reality.

The reform transformed SOEs into profit-oriented enterprises. At the same time, SOEs are still deeply involved in Chinese politics, which makes the classification of public and non-public employment in China controversial. Some studies (Cui et al., 2019; Démurger et al., 2012) classify the SOE workforce as public employees, while another strand of literature (Feng et al., 2011; You and Zhang, 2016) regards this kind of employment as non-public. We follow the second strand and classify employees in SOEs as non-public employees as the SOE reform has made SOEs less resemble a public sector actor but rather a market player. This reform has dramatically reduced the similarity between SOE employees and other public employees concerning unemployment risk (He et al., 2018). To be more specific, public employees, based on our definition, are composed of two subgroups. The first group refers to employees who work directly for the government, either for the central government or local government. Our data shows that these government employees account for around 20 percent of all public employees. The second group consists of employees who work in public institutions and state organs that are mainly financed by fiscal spending (also known as *Shiyedanwei*), such as the education, health, and research sectors. Similar to public employees in any other country, Chinese employees in these two sectors have relatively lower unemployment risk and higher compensation when compared to non-public employees, even though reform is on the way aiming to reduce work-related benefits of public employees.

It is worth pointing out that working in the public sector differs in many aspects from working in the non-public sector, which may have important implications on households' saving behavior. First, it is recognised that in most

countries public employment is associated with lower unemployment uncertainty, which generates less precautionary household savings. For example, Bettoni and Santos (2021) develop a theoretical model to investigate the effect of public employment on household saving rates. Having calibrated the model using micro data from Brazil, they conclude that public employment implies lower uncertainty and more stable income, therefore reducing the necessity of precautionary savings.

Second, public employees in most countries are compensated with relatively better social security. In the case of China, public employees are not only covered by a sounder social security system but have extra benefits compared with other employees. An example is that Chinese public employees usually have extra hidden work-related benefits, such as comprehensive welfare benefits and subsidies, longer and guaranteed maternity leave, and various kinds of in-kind festival benefits (Chan and Ma, 2011; Gao et al., 2015). Note that the impact of social security or aforementioned work-related benefits on household saving rates is theoretically ambiguous. On the one hand, public employees may save less because more comprehensive social security obviates the need for precautionary savings. On the other hand, better social security may increase the saving rates of public employees because it reduces expenditures and increases freely disposable income. For example, households with better medical insurance may save for housing or a car that would not happen without insurance because these additional savings would have to be used for medical reasons. Better social security increase saving rate by increasing the awareness of households about the importance of saving for the older age and inducing early retirement (Feldstein, 1974). Overall, the way of how social security affects household saving rates is more complicated in practice (see Wroński (2021) for a brief review).

Third, besides lower unemployment risk and better social security, Chinese public employees may be different from non-public employees due to their relatively higher social status. Traditional Confucianism regards scholar-officials as the top social class in society, therefore encouraging Chinese people to enter the public sector. Working in the public sector usually implies cultural superiority and pride for the family (Chen et al., 2018). Social status could impact households' saving rates because of status seeking as a saving motive (Weiss and Ferschtman, 1998). The role of social status in affecting household saving rates could be special for East Asian societies like China due to the historical influence of Confucian values. In particular, their perceived social status encourages public employees to save more in order to invest in their children so that their descendants could achieve the same or better social status.

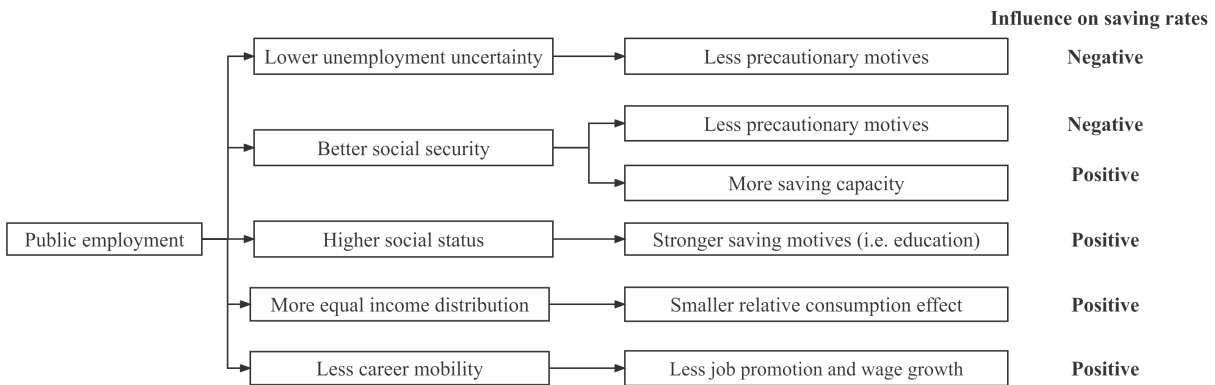
Forth, public employment influences household saving rates because of a more equal income distribution within the sector, which lowers public employees' consumption due to income differences with peers (relative consumption hypothesis) and promotes saving rates. An example is Drechsel-Grau and Schmid (2014) who use German household data and find that the so-called "upward-looking interpersonal comparison", which depicts that households compare their consumption levels to those of richer households and develop higher consumption needs and lower saving rates, is less pronounced among public employees. In China the income differential within public sectors is smaller than that within private sectors (Démurger et al., 2012; Su et al., 2019). Accordingly, the smaller relative consumption effect implied by a more equal income distribution in public sectors is expected to have a positive effect on household saving rates in China.

Finally, public employees face less career mobility than private employees due to a less free and competitive working environment. This could stimulate saving rates because they have weaker prospects of promotion and related wage growth. Wisman (2009) attribute the low saving rate of U.S. households to their strong belief of vertical mobility. They have less saving motives because they believe that individuals' success depends upon their willingness to study and work hard. In our context, the assessment and promotion of public employees are generally slower and less sensitive to employees' personal efforts. As a result, career mobility in the public sector is relatively small compared to that in other sectors (Chen and Xu, 2020), which encourages public employees to save more for their future because they cannot assume higher future income. This explanation is consistent with Horioka and Wan (2007) who find that the lower



income volatility is one of primary predictors of China’s high household saving rates.

Figure 3 summarizes key implications of public employment and their relationships with household saving rates. As seen in this section, Chinese public employees are different from non-public employees in many dimensions, which has complex theoretical impacts on household saving rates. In particular, the implied negative association between public employment and household saving rates is limited to precautionary saving motives, which is not representative of the entire household saving motives. Other features of public employment could also play a role in affecting households’ saving decisions, which makes the nexus more complicated. Therefore, we turn to the empirical question of whether and how households’ saving rates are affected by employment in the public sector. To examine the causal relationship, we employ various approaches to quantify the impact of public employment on household saving rates using representative Chinese household survey data that we describe in the next section.



**Figure 3.** Public employment-saving-rates nexus

### 3 DATA

The data used in this paper are obtained from the China Household Financial Survey (CHFS),<sup>1</sup> a nationally representative household survey covering 29 provinces and municipalities across mainland China.<sup>2</sup> Every second year since 2011, CHFS collects information on Chinese households’ financial status such as household assets and liabilities, income and expenditures, investment attitudes, together with family members’ demographic characteristics and employment status. The survey is conducted using a stratified three-stage probability proportion to size random sample design that allows the data to be both nationally and provincially representative (Gan et al., 2016). We use the data of the three most recent waves (2013, 2015, and 2017) in this paper,<sup>3</sup> and restrict our analysis to urban households because labor markets in rural and urban China are very different. Public employees in rural China are recruited through a totally different system and mostly work part-time (Zhang et al., 2012). Our sample is further restricted to households in which the respondent is the household head aged between 16 and 60 because the household head in this age group is generally the primary source of income and the most knowledgeable member regarding household finances.<sup>4</sup> Second, with respect to

<sup>1</sup> For more details, see Gan et al. (2012). The CHFS database is provided by the Survey and Research Center of China Household Finance at Southwestern University of Finance and Economics, and has been widely used for research on Chinese household finance; cf. Chen et al. (2019), Feng et al. (2019), and Yang and Gan (2020).

<sup>2</sup> The CHFS excludes Tibet, Xinjiang, and Inner Mongolia.

<sup>3</sup> We do not use data from the 2011 survey because it does not have a sufficient number of repeated observations with the subsequent surveys.

<sup>4</sup> Household head is a special term in China, often appearing with *Hukou*, a unique household registration system used in mainland China. Under the *Hukou* scheme, every Chinese citizen must register within a household at the municipality. The system collects information that officially identifies a person as a permanent resident of an area and includes information such as name, parents, spouse, and date of birth. Each family has a household head, who is the primary provider of household income but traditionally connoting a senior male.

the control group of households headed by self-employees or other employees we restrict our sample to those having an above-one-year labor contract with their employers. Our final sample comprises 5539, 5785, and 4545 observations in each wave, respectively.

One concern in this study is the measurement of household savings. The conceptual approach defines annual savings as changes in net wealth, including changes in cash holdings and durable goods, such as housing that provide a flow of future services. This conceptual approach focuses on asset accumulation, while most empirical studies measure saving as a residual. We thus follow the empirical approach of Lugauer et al. (2019) and Kong and Dickinson (2016) to define the household saving rate as the ratio of the amount of savings (income minus consumption) to total income. However, a disadvantage of this measurement is that it is highly sensitive to the income level as household saving rates are measured relative to income. For example, a household that reports very low or zero income would have a deeply negative saving rate, therefore producing some extreme values. To address this problem, we restrict our sample to households that have saving rates higher than -200%.<sup>5</sup>

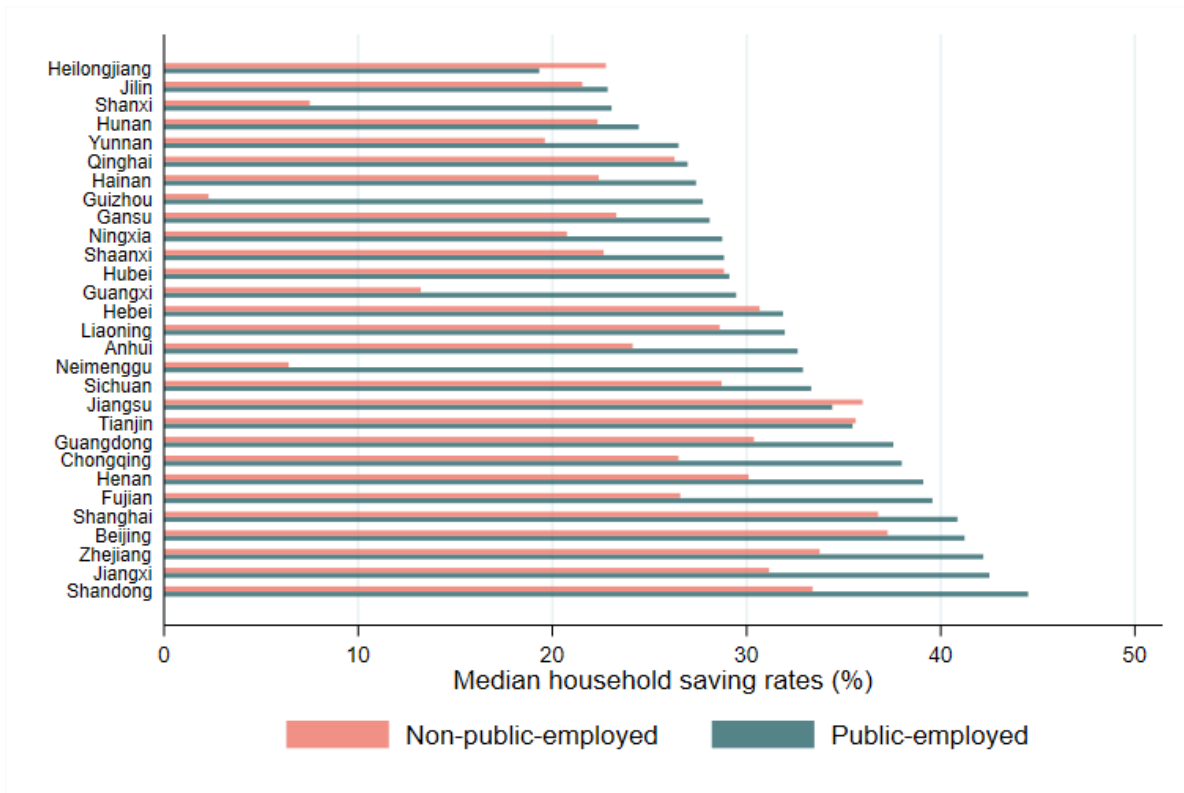
Table 1 provides descriptive statistics on crucial household characteristics, separating public-employed from non-public-employed households. The public-employed households refer to those households whose head is currently employed by the public sector in the survey year. Likewise, non-public-employed households refer to households of which the household head is currently self-employed or employed by the non-public sector in the survey year. Out of 15,869 observations, 25.18% of households are public-employed. In terms of financial status, we may note that public-employed households in general have more assets than non-public-employed households. However, the former group has relatively lower average income and consumption than the latter group. Chan and Ma (2011) reveal that in China the basic pay of public employees is lower than that of non-public employees, while total compensation that includes fringe benefits and subsidies is not. Chinese public employees are in general compensated with decent welfare or subsidies (such as subsidies for transportation, in-kind daily necessities like rice and eggs, electricity and gas, festival allowances, free health check, etc), which in many cases do not appear on the pay slip but reduce the necessity of private consumption. The saving rate of public-employed households is higher than that of non-public-employed households. The mean and median values of household saving rates in the former group are 23.16% and 33.89%, which are 5.6 and 4.8 percentage points higher than those in the latter group, respectively. Table 1 also provides *p*-values from the two-sample *t* tests. It shows that households' assets and consumption are not significantly different between the two groups, while income and saving rate differ significantly across public-employed and non-public-employed households. Specifically, public-employed households have lower income, but their saving rates are higher than those of non-public-employed households.

Besides household-level information, Table 1 also provides demographic and other socioeconomic information on household heads. It is shown that around 60-70% of household heads are male, either of public-employed or non-public-employed households. Public-employed household heads are slightly elder and better educated than non-public-employed household heads. The share of members of the Communist Party of China (CPC) is higher in the public-employed sample. In terms of household composition, we find that public-employed households are smaller and their heads have fewer dependent children. This is probably due to the fact that the one-child policy is enforced more strictly for public employees (Lugauer et al., 2019). Additionally, we see that public-employed household heads do not significantly differ from non-public-employed household heads in terms of risk attitudes, but the former usually have higher financial literacy.

The relatively higher saving rates of the public-employed households can also be seen in Figure 4, which plots the median saving rates of both public-employed and non-public-employed households across provinces. There has been enormous variation between public-and non-public-employed households in their saving rates, with the saving rate of

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<sup>5</sup> We also tested other thresholds, such as -300% and -100%. The results are similar. We discuss this issue in more detail in Section 5.



**Figure 4.** Median household saving rates by provinces

public-employed households ranging between 20% and 45%, and that of non-public-employed households ranging between 3% and 35%. In 26 out of 29 provinces, the saving rate of public-employed households is higher than that of non-public-employed households.

Overall, the statistical comparison shows that public-employed households have higher saving rates than non-public-employed households. However, before we can conclude that there is a positive causal effect of public employment on household saving rates, a careful econometric analysis controlling for confounding factors as well as selection bias is needed. Thus, in the next section, we conduct different analyses to identify causality.

**Table 1.** Descriptive statistics 2013-2017

Variable	All households			Public-employed households			Non-public-employed households			<i>p</i> -values in diff.
	Variable	SD	Median	Variable	SD	Median	Variable	SD	Median	
<i>Information on households</i>										
Assets	1634.615	2741.705	742.061	1663.360	2423.795	863.182	1624.941	2840.740	700.600	0.44
Income	147.736	268.404	85.470	140.239	197.715	96.000	150.260	288.286	82.000	0.04
Consumption	82.566	90.165	58.810	82.211	80.046	61.980	82.685	93.327	57.794	0.77
Saving rate (%)	18.968	46.989	30.247	23.157	44.241	33.892	17.558	47.798	29.078	0.00
No. of public employed	0.438	0.697	0.000	1.427	0.549	1.000	0.105	0.329	0.000	0.00
Household size	3.115	1.272	3.000	3.049	1.063	3.000	3.138	1.335	3.000	0.00
<i>Information on household heads</i>										
Gender	0.705	0.456	1.000	0.644	0.479	1.000	0.726	0.446	1.000	0.00
Age	41.191	9.830	42.000	42.639	9.186	43.000	40.703	9.990	41.000	0.00
Married	0.829	0.377	1.000	0.863	0.344	1.000	0.817	0.387	1.000	0.00
High school education	0.701	0.458	1.000	0.899	0.302	1.000	0.634	0.482	1.000	0.00
University education	0.450	0.498	0.000	0.718	0.450	1.000	0.360	0.480	0.000	0.00
Political affiliation	0.161	0.368	0.000	0.328	0.470	0.000	0.105	0.307	0.000	0.00
Dependent children	0.605	0.686	0.000	0.556	0.593	1.000	0.622	0.714	0.000	0.00
Risk loving	0.180	0.384	0.000	0.177	0.382	0.000	0.180	0.385	0.000	0.65
Risk averse	0.487	0.500	0.000	0.473	0.499	0.000	0.491	0.500	0.000	0.04
Financial literacy	0.790	0.807	1.000	0.834	0.829	1.000	0.775	0.799	1.000	0.00
Observations	15869			3996			11873			

*Notes:* *Asset*, *Income*, and *Consumption* are measured in units of 1,000 RMB (155 US dollars, approximately). *Saving rate* is defined as ((Income-Consumption)/Income)\*100%. Public-employed households refer to households headed by a public employee who has a long-term (above one year) labor contract with the government or public institutions. Likewise, non-public-employed households include households headed by self-employees and other employees who have long-term (above one year) labor contracts with their employers. *Dependent children* is the sum of kids aged below 16 of the household head.

## 4 METHODOLOGY AND RESULTS

To identify the impact of public employment on household saving rates, we employ different estimation techniques and specifications, paying careful attention to potential biases induced by self-selection. First, we use random effects and IV estimators to examine the association between public employment and household saving rates. Second, we use the Propensity Score Matching strategy to identify the treatment effect of public employment on household saving rates. Further, we use the Heckman two-step approach to eliminate possible self-selection biases. Forth, we examine the effect of public employment on household saving rates within households by considering changes in employment type for a given household. Finally, we explore the life-cycle effect of public employment on household saving rates.

### 4.1 Random effects model

#### 4.1.1 Method

We start by using basic panel estimators and regressing household saving rates on public employment and other control variables. Given that our sample is characterized by many cross-sectional units and few time periods, we treat unit-specific heterogeneity as outcomes of random variables rather than fixed effects to estimate. Moreover, the variation of employment type within households across the three survey waves is negligible. Therefore, we favor the random effects over the fixed effects model because the former pays more attention to the differences between households.

In the random effects model, the individual-specific effect is expected to be a random variable that is uncorrelated with the explanatory variables. To relax this assumption, we employ the Correlated Random Effects (CRE) model that allows possible correlations between the explanatory variables and the unobserved individual effects (Mundlak, 1978).<sup>6</sup> Specifically, the following empirical specification of the household saving rates model incorporating control variables is used:

$$Saving\ rates_{it} = \omega_i + \alpha_1 Public_{it} + \beta X_{it} + \gamma \bar{X}_i + u_{it}, \quad (1)$$

where  $Public_{it}$  is an indicator variable that equals 1 if the head of household  $i$  works in the public sector in year  $t$ , and 0 if the household head is self-employed or employed in the non-public sector. It is worth noting that the impact of public employment could also be found in households whose head is not a public employee but has public-employed household members. In this regard, we take into account the employment type of all household members. In particular, instead of the dummy that only considers the employment type of the household head, we use the number of public-employed household members (NPEHM) as an alternative measurement of public employment.  $\omega_i$  captures the unobserved individual effect assumed to be uncorrelated with explanatory variables.  $X_{it}$  includes a series of control variables that could affect  $Saving\ rates_{it}$ .  $\bar{X}_i$  is the vector of time averages of time-varying variables.<sup>7</sup>  $u_{it}$  is the error term. We also include year-fixed effects to control for the year-specific effects on household saving rates and provincial-fixed effects to capture the heterogeneity of household saving rates across provinces.

The richness of our data enables us to control for household heterogeneity. Specifically, we add three sets of control variables that could affect the household saving rate. The first group consists of household income and wealth. As shown in the descriptive statistics, public-employed households have a lower income level than non-public-employed households, and the difference between them is statistically significant. There is a possibility that public-employed households have different saving rates than non-public-employed households because their income levels are different. However, given that household saving rates are measured relative to household income, using household income as an

<sup>6</sup> There are some singleton observations in our sample. However, the random effects model allows singletons and provides a sample-wide view of the relationship between dependent and independent variables. We also run regressions without singletons, and the results (available on request) are robust.

<sup>7</sup> We include time-demeaned income and assets in this specification. The public employment and other demographic variables are excluded from  $\bar{X}_i$  because they display little time variation.

explanatory variable may cause reverse causality problems as household income is on both sides of the saving equation. Instead, we therefore use the income percentile for each wave to capture income effects. Besides income, we include household assets to capture the effect of household wealth on the saving rates.

The second set of control variables consists of demographic characteristics of household heads. Multiple studies document a U-shaped age-saving profile of Chinese households (e.g. Chamon and Prasad, 2010; Ge et al., 2018; Lugauer et al., 2019). To account for this non-linear life-cycle effect, we include the age and its squared term.<sup>8</sup> We also control for gender and educational background of household heads.

The third set of variables controls for the household composition. In particular, we include household size and the marital status of the household head. Taking into account the role of the one-child policy, we follow Lugauer et al. (2019) and also include the number of dependent children as an explanatory variable.

The fourth set of controls captures personal characteristics like risk attitude and financial literacy of household heads. The CHFS asks all respondents questions to measure their risk attitude and familiarity with financial markets. Based on the answers, we construct variables containing the information of household heads' risk attitude and financial literacy. The inclusion of these variables in this study is essential because of the possible link between risk attitude and public employment. As an example, a risk-averse individual may have a higher tendency to work in the public sector as that provides a higher level of security.

The description of the control variables is given in Table 12 of the appendix. To check for multicollinearity, we provide a correlation matrix in Table 13 of the appendix. Multicollinearity seems not to be a problem because most correlation coefficients between the independent variables are small.

Although our control variables account for various differences between public- and non-public-employed households, our results could be biased if public employment is endogenous with regard to household saving rates. For example, omitted variables or reverse causality could cause endogeneity and distort our results. In particular, households with an inherently stronger saving desire might prefer a particular type of employment. Different effects are possible: Households with a higher propensity to save might choose employment outside the public sector where wages are on average higher. Alternatively, households preferring high saving rates might opt for public-sector employment that offers them a more stable income stream, which has a positive effect on their average saving. Therefore, to check the robustness of our OLS results, we employ a two-stage regression approach. We use as an instrument the political affiliation of the household head, which equals one if the household head is a member of the CPC. Political affiliation could be an ideal instrument because it likely satisfies the two validity conditions. First, CPC membership is expected to increase the possibility of a Chinese being accepted to work in the public sector. In other words, political affiliation and public employment are positively correlated, implying that the first-stage regression is robust. According to our estimates, around three of ten public employees are members of the CPC, whereas this only holds for one of ten private employees. Second, there is no evidence of a direct relationship between political affiliation and household saving rates. Given that many college students join the CPC before their graduation and many CPC members work in different private sectors, CPC membership should have little influence on households' saving decisions. Whether political affiliation satisfies the third validity condition of being uncorrelated with the error term cannot be tested because the number of instruments does not exceed the number of endogenous variables.

#### **4.1.2 Results**

Table 2 presents results from standard CRE and IV-CRE models by estimating the household saving rate equation as specified in Equation (1). Note that we use two different proxies for public employment: a dummy that only considers the household head and a discrete variable defined as the number of household members working in the public sector.

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<sup>8</sup> Our dataset contains only employed household heads such that it does not cover the period after retirement when the saving behavior is expected to be different.

**Table 2.** Baseline regression results

Variable	CRE (1)	IV-CRE (2)	CRE (3)	IV-CRE (4)
Public employment	3.589*** (0.963)	8.094* (4.907)	2.028*** (0.592)	4.878* (2.569)
Assets	-2.806*** (1.072)	-2.760*** (1.029)	-2.824*** (1.072)	-2.831*** (1.051)
2nd income percentile	51.247*** (3.174)	51.680*** (2.750)	51.200*** (3.176)	51.108*** (2.804)
3rd income percentile	78.802*** (3.224)	79.113*** (2.952)	78.603*** (3.227)	78.390*** (3.020)
4th income percentile	114.310*** (3.653)	114.544*** (3.287)	114.091*** (3.657)	113.786*** (3.368)
Gender	3.760*** (0.931)	3.960*** (0.980)	3.780*** (0.933)	4.053*** (0.971)
Age	-1.382*** (0.381)	-1.412*** (0.381)	-1.370*** (0.381)	-1.436*** (0.373)
Age squared	0.020*** (0.005)	0.020*** (0.005)	0.020*** (0.005)	0.021*** (0.004)
High school education	-5.528*** (1.175)	-5.956*** (1.263)	-5.504*** (1.176)	-5.871*** (1.220)
University education	-1.166 (1.086)	-2.283 (1.726)	-1.016 (1.084)	-2.154 (1.500)
Household size	-1.971*** (0.426)	-2.005*** (0.413)	-2.049*** (0.427)	-2.134*** (0.417)
Married	-2.412* (1.413)	-2.314* (1.345)	-2.558* (1.416)	-2.698** (1.369)
Dependent kids	-1.976** (0.819)	-2.022** (0.789)	-1.895** (0.820)	-1.808** (0.787)
Risk loving	-1.424 (1.156)	-1.344 (1.190)	-1.452 (1.157)	-1.550 (1.178)
Risk averse	2.222** (0.941)	2.155** (0.940)	2.226** (0.942)	2.116** (0.932)
Financial literacy	-0.779 (0.506)	-0.673 (0.512)	-0.783 (0.506)	-0.647 (0.510)
Constant	59.235*** (8.632)	49.575*** (8.282)	59.302*** (8.640)	50.334*** (8.149)
Observations	15,869	15,775	15,869	15,775
R squared	0.297	0.297	0.297	0.296
First-stage F-statistic		38.65***		49.68***

*Notes:* The dependent variable is the household saving rate. All estimations include province-level fixed effects, time fixed-effects, and correlated random effects. In columns 1 and 2, *Public employment* is an indicator variable that equals 1 if the household head works for the public sector. In columns 3 and 4, *Public employment* is defined as the number of household members who work for the public sector. *Asset* is log transformed in order to reduce the weight of outliers. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

Columns 1 and 2 report the results of using the public employment dummy as the key explanatory variable, and columns 3 and 4 present results using the number of public-employed household members as the key explanatory variable. The first two rows displays the estimates of  $\alpha$  that capture the impact of being a public-employed household on the saving rate, compared with all other non-public-employed households. In columns 1 and 3, the results of standard CRE models reveal a positive and statistically significant effect of public employment on household saving rates. The coefficients 3.589 and 2.028 indicate that the saving rate of households headed by a public employee is on average 3.589 percentage points higher than that of other households, and an additional public-employed household member could increase the saving rate by 2.028 percentage points, after controlling for other differences across households except endogeneity. Columns 2 and 4 report the two-stage instrumental variable regression results based on a CRE model. To check the validity of the instrument, we compute the first-stage  $F$  statistic that tests the significance of the instrumental variable. The significant  $F$  statistics indicate that political affiliation is a relevant instrumental variable. We find that the IV

estimator delivers similar results as the standard CRE model. Returning to the main results, columns 2 and 4 show that the coefficients of public employment are again positive, although only at the 10% significance level. These results confirm a positive and significant association between public employment and household saving rates in China.

The control variables in Table 2 are reasonably signed and consistent with previous literature. The coefficients of household assets are significantly negative, suggesting that a high level of household wealth reduces the saving rate. This negative association is consistent with the findings of Modigliani and Cao (2004) and Chen et al. (2019). The coefficients of the three income percentile dummies are all significantly positive; and the magnitude of the coefficients increase when moving up to higher percentiles. This indicates that household income has a significant positive effect on saving rates, with high-income households having higher saving rates. When looking at the demographic variables, we find that households headed by a male have higher saving rates. We find a U-shaped relationship between the age of the household head and household saving rates. Saving rates are higher for households with relatively young or old heads and lower for households with middle-aged heads. Some research has also documented this U-shaped relationship in China, rather than the hump-shaped relation reported for other countries (Curtis et al., 2015; Lugauer et al., 2019). The two dummies of the education level suggest that having a high school education reduces the saving rate while the effect of having a university education is not significant. In addition, the coefficients of household size, marital status, and the number of dependent kids are significantly negative, implying that larger household size, being married, and having children reduce the saving rate. Finally, we consider the effect of risk attitudes and financial literacy on household saving rates. Our results show that the coefficients of the risk loving dummy and financial literacy are insignificant, while the dummy for risk aversion has a significant and positive coefficient. This implies that a household headed by a risk-averse individual has a higher saving rate on average.

Overall, our results suggest that there exists a significant positive association between public employment and household saving rates. This effect is robust to the inclusion of many control variables such as household income, demographic variables, and risk attitudes, and to potential endogeneity.

## **4.2 Propensity score matching**

### **4.2.1 Method**

As argued in the previous sections, there may exist systematic differences between public-employed households and non-public-employed households. Meanwhile, there are potential confounding factors that affect both public employment and household saving rates. By way of example, individuals' risk attitude might affect both their savings decisions and job preferences. To address these concerns, we apply the Propensity Score Matching (PSM) approach to identify the treatment effect of public employment on household saving rates. The main idea of PSM is to build a counterfactual control group of which a household head is non-public-employed but shares considerable similarities with the public-employed household head. Compared to conventional regression methods, PSM attaches more weight in estimation to those non-public-employed households that share similar demographic and socioeconomic characteristics with public-employed ones.

The detailed procedure of this approach is as follows. First, a logit regression is used to obtain the propensity score that measures for each household the probability that a household with given characteristics is headed by a public employee. In this regard, we use the same control variables as used in the baseline regression to make the two groups more comparable. Apart from these variables, we include additional covariates that might help predict the probability of public employment: the household head's political affiliation, and the household head's parents' educational background and political affiliation. The reason for adding these additional variables is explained in the following subsection. Second, we use matching strategies based on computed propensity scores to match a public-employed household (i.e., treated group) to a similar household but headed by a non-public employee (i.e., control group) that exhibits no observable differences. Third, we compute the average treatment effect (ATE), which shows the impact of public



employment on household saving rates.

We first conduct PSM on each wave's cross-sectional data by following the above procedures. More specifically, we use four matching strategies to examine the robustness of our result: One-to-one matching, K-nearest neighbor matching, Radius matching, and Kernel matching. However, even with matching on the observable variables, we admit that there still may be unobserved factors that differ between public employees and other employees. Therefore, in order to further exploit our panel data, we estimate a panel model based on matched households using the one-to-one matching strategy. In this regard, every public-employed household is matched to a non-public-employed household sharing very similar characteristics. We pool the treatment group and control group and estimate a CRE model. In particular, based on observed characteristics in each wave, we generate a dummy indicating whether the matched household is in the treatment or control group. Then, we use this dummy instead of the previous indicator  $Public_{it}$  in estimating the CRE model. Compared with the baseline model, this PSM-CRE model excludes non-public-employed households that have a relatively lower probability of being employed by the public sector. Moreover, the matched groups (the treatment and control groups) are more similar in terms of observed socioeconomic factors. The inclusion of controls could further mitigate the influence on household saving rates due to factors besides public employment.

#### 4.2.2 Results

Table 3 reports the computed ATEs based on cross-sectional data from each wave. As the ATEs are significantly positive in most cases, we confirm our finding that the effect of public employment on household saving rates is positive. According to the estimates from the PSM on the cross-sectional data, the saving rate of a household headed by a public employee is around 5 to 8 percentage points higher compared to a household with large similarities but not headed by a public employee.

**Table 3.** PSM results on cross-sectional data

<i>Panel A. Year 2013</i>				
Matching strategy	ATE	S.E.	Obs. of Treatment	Obs. of Control
One-to-one matching	8.047***	1.731	1559	1559
K-nearest neighbor ( $\sigma = 0.01$ ; $k=4$ )	7.264***	1.839	1559	3963
Radius matching ( $\sigma = 0.01$ )	9.223***	2.152	1559	3963
Kernel matching ( $bw=0.01$ )	8.427***	1.725	1559	3963
<i>Panel B. Year 2015</i>				
Matching strategy	ATE	S.E.	Obs. of Treatment	Obs. of Control
One-to-one matching	7.264***	1.839	1383	1383
K-nearest neighbor ( $\sigma = 0.01$ ; $k=4$ )	7.788***	2.298	1383	4294
Radius matching ( $\sigma = 0.01$ )	7.516***	2.395	1383	4394
Kernel matching ( $bw=0.01$ )	8.782***	2.077	1383	4394
<i>Panel C. Year 2017</i>				
Matching strategy	ATE	S.E.	Obs. of Treatment	Obs. of Control
One-to-one matching	8.031***	2.095	1014	1014
K-nearest neighbor ( $\sigma = 0.01$ ; $k=4$ )	5.028*	2.724	1014	3418
Radius matching ( $\sigma = 0.01$ )	1.962	2.778	1014	3418
Kernel matching ( $bw=0.01$ )	5.036**	2.309	1014	3418

*Notes:* ATE represents the average treatment effects. Off-support observations are dropped. The standard errors and p-values are obtained through 200 bootstrap repetitions. \*, \*\*, \*\*\* denote statistically significant effects at the 10%, 5% and 1% level, respectively. The propensity score is estimated as a function of household income, assets, household size, and household head's gender, age, educational background, marital status, number of dependent kids, risk attitude, and financial literacy, as well as the household head's political affiliation, and the educational background and political affiliation of the parents of the household head.

Table 4 reports results from the CRE model using the same controls as the baseline regression but after the PSM is conducted. We find that *Public employment* again has a significant positive sign in the saving rate equation. This reveals that the treatment group (public employees) has significantly higher saving rates than the control group. On average, the saving rate of public-employed households is 3.9 percent points higher than that of non-public-employed households that share considerable similarities.

**Table 4.** Correlated random effects model after PSM

Variable	Coefficient	Variable	Coefficient
Public employment	3.928** (1.856)	High school education	-3.157* (1.726)
Assets	-2.110 (1.859)	University education	-2.828 (1.784)
2nd income percentile	51.585*** (4.898)	Household size	-2.090*** (0.570)
3rd income percentile	77.222*** (4.977)	Married	-3.034 (1.972)
4th income percentile	108.619*** (5.448)	Dependent kids	-2.274** (1.105)
Gender	3.918*** (1.346)	Risk loving	-0.155 (1.635)
Age	-1.610*** (0.511)	Risk averse	1.221 (1.296)
Age squared	0.023*** (0.006)	Financial literacy	-1.495** (0.709)
Constant	76.135*** (11.937)		
Observations		7930	
R squared		0.287	

*Notes:* The dependent variable is the household saving rate. *Public employment* is an indicator variable that equals 1 if the household is in the treatment group and 0 if the household is in the control group. Each group consists of 3965 observations. *Assets* is log transformed. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

Overall, the results based on the PSM approach confirm that public employment has a positive and sizable effect on household saving rates even if we shift focus to comparing similar households.

### 4.3 Heckmann two-step model

#### 4.3.1 Method

An important issue related to estimating the effect of public employment on household saving rates is self-selection. This bias arises when the decision of a household head to work in the public sector is not random but depends on characteristics not controlled for. Failing to deal with self-selection may cause endogeneity and lead to biased results. It is worth noting that applying the IV estimator or PSM approach in the preceding sections could, to some extent, solve the self-selection problem. However, given that the primary explanatory variable of our interest is a dummy variable, we are able to use another efficient method to eliminate the self-selection bias in a different way and examine the validity of our results: a variation of the Heckman (1979) two-step approach: the treatment effects model.

In the first step, we use a panel Probit model to estimate the household head's decision to work in the public sector. In this Probit equation we first include the household head's political affiliation and educational background. Typically, a member of the Communist Party of China with good education is more likely to be employed by the public sector. We also consider the risk attitude of the household head because we expect that a risk-averse individual could show more interest in working in the public sector. Moreover, Gao et al. (2019) and Jia et al. (2021) provide evidence for the case of China that parental background plays an essential role in one's career choice. Therefore, we include the educational background and political affiliation of the parents of the household head as an explanatory variable. Finally, we take

into account household assets to capture the effect of wealth on the employment type. Using the results derived from the Probit model, we compute the inverse Mills ratio (IMR), which is then included in the CRE model as a control variable together with an indicator variable characterizing public employment and our prior controls from Equation (1). The IMR is supposed to pick up expected values of the error in the saving rates equation conditional on public employment.

**Table 5.** Treatment effects using Heckman two-step approach

<i>Panel A. Second-stage regression</i> (Dependent variable: Household saving rate)			
Variable	Coefficient	Variable	Coefficient
Public employment	3.557*** (0.978)	High school education	-5.946*** (1.619)
Assets	-2.760** (1.074)	University education	-1.518 (2.079)
2nd income percentile	51.482*** (3.193)	Household size	-2.055*** (0.428)
3rd income percentile	78.988*** (3.233)	Married	-2.206 (1.424)
4th income percentile	114.480*** (3.663)	Dependent kids	-2.033** (0.827)
Gender	3.833*** (1.084)	Risk loving	-1.107 (1.176)
Age	-1.433*** (0.389)	Risk averse	2.227*** (0.949)
Age squared	0.021*** (0.005)	Financial literacy	-0.795 (0.508)
Constant	61.097*** (10.630)	IMR	-0.270 (1.121)
Observations		15693	
R squared		0.301	
<i>Panel B. First-stage probit regression</i> (Dependent variable: Public employment)			
Variable	Coefficient	Variable	Coefficient
Gender	-0.652*** (0.070)	Risk averse	0.230*** (0.065)
Age	0.068*** (0.004)	Assets	0.035* (0.021)
High school education	0.932*** (0.096)	Father's educational background	-0.080 (0.075)
University education	1.449*** (0.101)	Father's political affiliation	-0.272 (0.202)
Political affiliation	1.358*** (0.088)	Mother's educational background	0.128* (0.075)
Risk loving	-0.330*** (0.085)	Mother's political affiliation	0.349*** (0.113)
Constant	-3.788*** (0.312)		
Observations		15693	

Notes: Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

#### 4.3.2 Results

The main results of the Heckmann two-step model are presented in Panel A of Table 5. It shows that the IMR is insignificant, and the coefficient on *Public* is again significantly positive, suggesting that public employment has a positive effect on the household saving rate even after controlling for potential self-selection. It is worth noting that panel B of Table 5 presents the first-step probit regression results. As expected, we find that variables indicating educational background and political affiliation are significantly positive, implying that the household head with higher education and/or CPC membership is more likely to be employed in the public sector. Further, *Risk loving* has a

significant negative coefficient whereas *Risk averse* has a significant positive coefficient, implying that public employees are more likely to be risk-averse. Interestingly, we find that the employment choice of household heads is significantly influenced by their mothers' rather than fathers' educational background and political affiliation. To be more specific, households whose head's mother has good education and/or membership in CPC are more likely to be employed in the public sector.

#### 4.4 Estimation in differences: employment transitions

##### 4.4.1 Method

The use of PSM and CRE models allows us to study the differences between households, while the differences within households in terms of the effect of employment type on saving rates are still not known. To address this concern, we exploit a smaller sample that includes households whose heads have experienced a transition from non-public to public employment. For comparison, we include another group of non-public-employed households that have not experienced a transition. Specifically, we estimate the following equation:

$$\Delta Saving\ rates_i = \alpha D_i + \beta \Delta Income_i + \gamma \Delta Asset_i + \omega + \mu_i, \quad (2)$$

where  $\Delta Saving\ rates_i$  is the difference in saving rates of household  $i$  from  $t = 1$  to  $t = 2$ .  $D_i$  is the indicator variable that equals 1 if the household  $i$  transitions from non-public-employed in  $t = 1$  to public-employed in  $t = 2$ , and 0 if the household  $i$  is non-public-employed in both periods.  $\omega$  is the constant and  $\mu_i$  is the error term. We also include province-level fixed-effects to capture the regional difference. The parameter  $\alpha$  captures the effect of a change from non-public employment to public employment on household saving rates. A positive  $\alpha$  implies an increase in household saving rates when a non-public-employed household head becomes employed in the public sector.

##### 4.4.2 Results

Table 6 presents the results based on Equation (2). The estimated coefficient of public employment is 14.25, suggesting that the change in saving rates of households that experience a transition from non-public to public employment is 14.25 percentage points higher than that of households working in the non-public sector and without transition in the employment type. This result provides additional evidence for higher saving rates among public-sector employees: Independent of household characteristics, a household increases its saving rate when it becomes employed in the public sector.

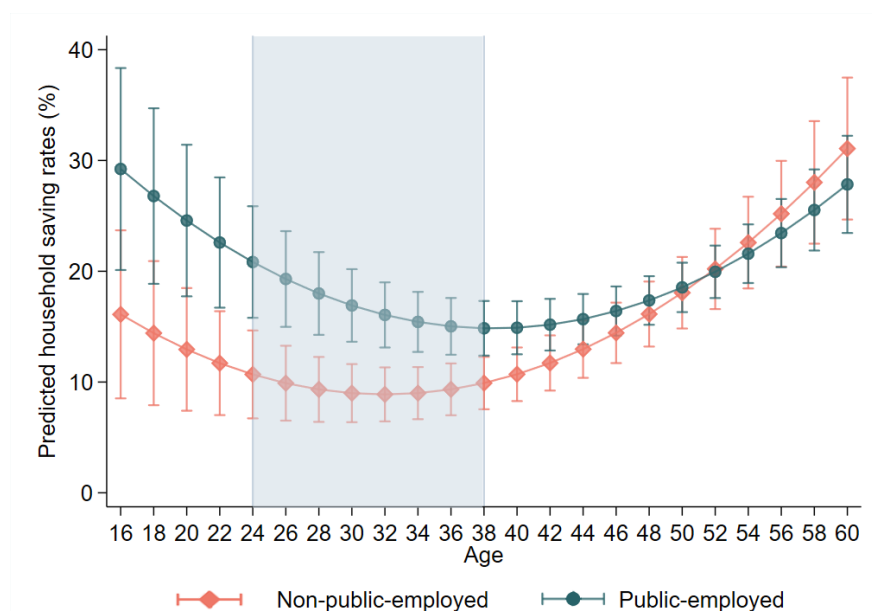
**Table 6.** Effects of entering public employment on saving rates

Variable	Coefficient
D	14.245** (6.372)
$\Delta$ Income	47.991*** (3.156)
$\Delta$ Assets	-1.997 (2.470)
Constant	10.406* (5.782)
Observations	1966
R-squared	0.343

*Notes:* The dependent variable is  $\Delta$ Saving rate $_i$ .  $D$  equals 1 if a household has changed from non-public to public employment between periods and 0 otherwise. The sample includes 135 households that experience a transition from non-public to public employment and 1831 households that are non-public-employed in both periods. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

#### 4.5 Exploring life-cycle effects

It is essential to understand how the effect of public employment on household saving rates varies along the life cycle because households at different ages could have different saving needs and capacities. The Life-cycle theory predicts that the decisions of households about consumption and saving are based on their lifetime income, implying that household saving rates differ across different stages of the life-cycle. In line with this theory, Yao et al. (2015) show that Chinese households save for different reasons at different life-cycle stages. For example, middle-aged households are more likely to save for retirement than other age groups, and younger households are more likely to save for purchasing a home or car. Given the different saving motives across ages, the effect of public employment on household saving rates could be different.



**Figure 5.** Predicted saving rates of public- and non-public-employed households over ages

*Notes:* The figure plots the predicted household saving rates from an regression of household saving rates on variables used in Table 2 and on interactions between public employment and other variables. The shaded area represents the range in which the predicted saving rate of public-employed households is significantly higher than that of non-public-employed households.

In order to explore the life-cycle effect, we conduct an extended analysis by interacting public employment with age in regressing household saving rates. We find that the interaction term between public employment and age is significantly negative. To better illustrate the interaction effect, we derive the predicted values for the dependent variable (household saving rates) for different values of age and according to employment type. Figure 5 visualizes the result, where the y-axis represents the predicted household saving rates, and the x-axis represents age. The diamonds give the results for non-public employees, and the circles represent public employees. Figure 5 shows a U-shaped relationship between the age of the household head and household saving rates, independently of whether public- or non-public-employed households are considered. Household saving rates first decrease as age increases until it reaches around 35-40 and increase thereafter till the retirement age around 60. This result is in line with Chamon and Prasad (2010), Chamon et al. (2013), Curtis et al. (2015) and Wei and Zhang (2011) who also find a significant U-shaped effect of age on household saving rates. Shaded areas in Figure 5 indicate the age range in which the predicted saving rate of public-employed households is significantly higher than that of non-public-employed households. The areas range

between 24 to 38, suggesting that the positive impact of public employment on household saving rates is the strongest for middle-aged households. In addition, another notable difference between these two types of households is that the turning point of the age effect is comparatively higher and comes later for public-employed households. This implies that a public-employed household at a young age saves more than non-public-employed households of similar age. However, as household heads get older, the saving gap reduces between public-employed and non-public-employed households.

Our results show that the saving rate gap between public- and non-public-employed households is most evident at the age between 20 to 40. This finding supports our results in Section 6 that public employees save more in order to prepare and invest for the education of their children as this saving motive implies that they have to save more while they are young parents. Another possible explanation is that the growth of income and hence saving capacity during work life is lower for public-employed households than non-public-employed households. This limits the growth of saving capacity of public-employed households in the later stage of their life. The saving capacity of non-public-employed households, in turn, increases, which explains the narrowing differences of saving rates between two types of households.

## 5 ROBUSTNESS ANALYSIS

### 5.1 Alternative measurement

A disadvantage of the conventional measurement of household saving rates is that it is highly sensitive to the level of household income. That is, a low level of household income could cause a negative saving rate of unreasonable size, and there could be undefined saving rates for households that report zero income. Omission of these observations would lead to sample selection problems. To keep as many observations as possible and avoid being affected by extreme values, in the preceding analyzes we restrict our sample to households with savings relative to income larger than -200%. In the following, we present two alternative strategies to deal with very low saving rates.

First, instead of dropping observations with saving rates lower than -200%, we winsorize the data at the bottom 1%. Results show that the positive link between public employment and household saving rates still holds using winsorized data.<sup>9</sup> Second, we consider an alternative definition of the saving rate that uses the difference between the logarithm of income ( $\ln Y$ ) and the logarithm of consumption ( $\ln C$ ).<sup>10</sup> This allows us to define household saving rates as savings relative to either income or consumption.

Results are reported in Table 7. The estimated coefficients on *Public employment* are significantly positive in all specifications, suggesting that public employment increases household saving rates. While columns 1 and 3 use the dummy variable to measure the effect of public employment, column 2 uses the number of public-employed household members and show that an additional public-employed household member increases household saving rates.

### 5.2 Scope of public sector

As noted in Section 2, the definition of the public sector is not unambiguous in the existing literature. To examine the sensitivity of our results to this definition, we compare the results using different scopes of the public sector. First, we consider only those employees in the government and *Shiyedanwei* sector as public employees if they hold *Bianzhi*. According to Brødsgaard (2002), *Bianzhi* refers to the authorized number of personnel or established posts in the government and its affiliated institutions. By controlling *Bianzhi*, the Chinese government is able to control the administrative apparatus, from government officials to university lecturers. Public employees holding *Bianzhi* are in general fully fiscally dependent, meaning that their employment and wage income are guaranteed by the government.

<sup>9</sup> The results may be obtained from the authors upon request.

<sup>10</sup> Note that this definition can be converted to the ratio of savings to consumption because  $\ln(Y) - \ln(C) = \ln\left(\frac{Y}{C}\right) = \ln\left(\frac{Y-C+C}{C}\right) = \ln\left(\frac{Y-C}{C} + 1\right) = \ln\left(\frac{S}{C} + 1\right)$ . Moreover, the difference between the logarithm of income ( $\ln Y$ ) and the logarithm of consumption ( $\ln C$ ) is actually an approximation of the saving rate in case of lower level of saving. Chen et al. (2007) provide a detailed explanation.

**Table 7.** Robustness checks: alternative measures

	CRE		PSM-CRE
	(1)	(2)	(3)
Public employment	0.043*** (0.016)	0.018* (0.009)	0.243*** (0.037)
Observations	17690	17690	8374
R squared	0.444	0.443	0.454

*Notes:* The dependent variable is the household saving rate relative to consumption. Public employment in column 1 is an indicator that equals 1 if the household head is a public employee, and 0 otherwise. Public employment in column 2 is the number of public-employed household members. Public employment in column 3 is an indicator that equals 1 if the household is in the treatment group, and 0 if the household is in the control group. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

They therefore have a higher level of employment security as well as better compensation than other public employees in the government or *shiyedanwei* do. Therefore, we expect that the effect of public employment on saving rates is more pronounced for this subgroup of public employees. Second, we expand the definition of the public sector to include employees from SOEs.

**Table 8.** Robustness checks: different scopes of the public sector

	<i>Bianzhi</i> (1)	SOEs (2)
Public employment	8.536** (4.258)	4.475*** (1.581)
Observations	4318	12764
R squared	0.310	0.306

*Notes:* The dependent variable is the household saving rate, defined relative to income. Public employment in column 1 equals 1 if the household head has *Bianzhi*, and 0 otherwise. Public employment in column 2 equals 1 if the household head works in the government or its affiliated institutions, or SOEs, and 0 otherwise. The results are estimated based on a PSM-CRE model with the same control variables as in Table 2. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

The results are reported in Table 8. It shows that the saving rate of households headed by public employees with *Bianzhi* is 8.5 percentage points higher than that of households headed by other employees. If we use the broader definition including employees from SOEs, the saving rate is 4.5 percentage points higher if a public employee heads the household.

## 6 DISCUSSION: WHY DO PUBLIC EMPLOYEES SAVE MORE?

Our theoretical interpretation in Section 2 indicates that public employment has complicated impacts on household saving rates. And our empirical results confirm a significant positive effect of public employment on the household saving rate in China after controlling for socioeconomic factors such as educational background, risk attitudes, and income. This positive association is consistent with indirect evidence from studies on household saving rates in China, such as Lugauer et al. (2019) and Chen et al. (2019), but in contrast to findings for other countries such as Bettoni and Santos (2021). According to Bettoni and Santos (2021), public employees are supposed to be exposed to a lower level of uncertainty in terms of both employment and wages, which reduces their savings for precautionary motives. Though we acknowledge that public employees in China also enjoy lower uncertainty concerning employment and wages, the association between public employment and household saving rates is found to be positive. In the following sections, we try to explain this finding by referring to the specific conditions in China.

## 6.1 Saving motives

It is worth noting that the household saving rate is jointly determined by both the motive and capacity of the household to save. Therefore, the higher saving rate of public-employed households may be explained by either stronger motives to save and/or by a greater capacity to save. Concerning the saving motives of Chinese households, the literature reveals that education, health expenditure, marriage, retirement, and the purchase of housing are important reasons to save. In particular, Chamon and Prasad (2010) point out that the rising burden of expenditures on education, health, and housing plays a significant role in driving high saving rates of Chinese households. These expenditures account for a large share of consumption expenditures, therefore constituting important motives for households to save.

Unfortunately, it is infeasible to observe all saving motives of households and their contribution to saving rates precisely. As an approximation, we use the information on households' bank deposits gathered in the CHFS of 2013, where respondents were asked to indicate the purpose(s) of their bank deposits. Based on the answers, we summarize the importance of different saving motives of both public-employed and non-public-employed households in Table 9. The two most frequently reported saving motives for both public- and non-public-employed households are interest income and wealth security. To be specific, around 36% of households in each group report that they have bank deposits for the purposes of wealth safety or gaining interest income. However, when the importance to save for education differs: Around 25% of public-employed households indicate that they save for education or training. In contrast, for non-public-employed households, this share amounts to 19% only. This suggests that it is more likely that an average public-employed household saves for education than an average non-public-employed households. Additional evidence that public-employed households attach greater importance to education can be derived from the CHFS waves of 2013 and 2015, which provide information on whether household heads plan to send their children to study abroad. According to the survey, approximately 16.2% of public-employed households have this plan, while this proportion is only 12.9% for non-public-employed households. Both pieces of evidence support a higher preference of public employees to save for their children's education. Another notable difference between public- and non-public-employed households is the inheritance motive. About 16% of public-employed households report that they save to leave an inheritance for their children, while only 11.4% of non-public-employed households report the same motive. With respect to savings for health reasons, the share of saving for medical expenses is 10.25% for public employees and 8.49% for non-public employees, implying that public employees are more likely to save for health reasons. Finally, the share of saving for purchasing/refurbishing housing is 15% for public employees, which is higher than the 13.78% for non-public employees. To summarize, Table 9 indicates that the saving for education, health, and housing is more prevalent among public-employed households than non-public employed households.<sup>11</sup>

Even though it is difficult to quantify the effect of public employment on specific saving motives, it is possible to investigate the effect of public employment on different consumption categories. In this regard, we regress different components of consumption (e.g., food, energy, housing) on public employment. In addition, to control for the growth effect of rising income on household consumption, we interact public employment and household income to investigate whether public employment has an impact on the effect of income on consumption. Table 10 presents the estimation results. It shows that most interactions are insignificant, indicating that the effect of income on most consumption categories is independent of the type of employment. Interestingly, there are two findings worth mentioning. First, the interaction between public employment and income is found to be significantly negative in estimating food expenditure, implying that the increase in food expenditures due to income growth is less pronounced in public-employed households than in non-public employed households. A possible explanation is that public-employed households have a higher standard of living and a smaller Engel coefficient, which reduces the proportion of basic expenditures such as food.

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<sup>11</sup> As a robustness check, we regress each saving motive dummy on public employment and other controls to avoid being misled by simply comparing means. The regression results are in accordance with results from statistical comparisons.



**Table 9.** Saving motives of public and non-public employees

Public-employed households (400 obs.)			Non-public-employed households (813 obs.)		
Rank	Motives	Share	Rank	Motives	Share
1	Wealth security	36.25%	1	Interest income	38.50%
2	Interest income	36.00%	2	Wealth security	36.90%
3	Education or training	25.00%	3	Education or training	18.82%
4	Retirement	19.50%	4	Retirement	17.10%
5	Inheritance to children	16.00%	5	Purchase/refurbish housing	13.78%
6	Purchase/refurbish housing	15.00%	6	No other use temporarily	11.56%
7	No other use temporarily	11.00%	7	Inheritance to children	11.44%
8	Medical expenses	10.25%	8	Medical expenses	8.49%
9	Travel or holiday	8.00%	9	Travel or holiday	4.55%
10	No other investment opportunities	5.00%	10	Weddings or funerals	4.31%
11	Weddings or funerals	4.50%	11	Financial investment	4.18%
12	Financial investment	3.75%	12	No other investment opportunities	3.81%
13	Purchase vehicle	3.00%	13	Purchase vehicle	2.95%
14	Purchase furniture or other durable	1.75%	14	Purchase furniture or other durable	2.34%
15	Dept repayment	1.75%	15	Initial funds for start-up business	1.48%
16	Initial funds for start-up business	0.00%	16	Dept repayment	1.11%
17	Others	1.50%	17	Others	2.71%

*Notes:* This table provides the share of respondents who answered “yes” to the respective option of the multiple-choice question: “What is the purpose of the family’s time deposit?” in the 2013 CHFS wave. Unfortunately, the 2015 and 2017 waves did not include this question.

Another possible explanation is that public employees in China receive food subsidies, which reduces their out-of-pocket expenditures on food. The second relevant finding is that the interaction between public employment and household income is significantly positive for expenditures on education and training, travel, luxury goods, and children’s education. This finding could also be explained by the fact that public employees have a higher standard of living. In other words, this table shows that public-employed households spend a smaller portion of their income on basic expenditures such as food, but a larger portion of income on education.

As described in Table 9, public-employed households might save relatively more to cover the future education costs of their children or to leave an inheritance for their children. To check the validity of these hypotheses, we perform heterogeneity analyses that are based on samples splitting our observations in two groups: we compare one-son with one-daughter households and households with relatively high shares of education expenditures (relative to total expenditures) with households with low shares of education expenditures. We hypothesize that the positive savings effect of public employment is more pronounced among households that pay more attention to children. To test this hypothesis, we first consider the gender of the only child in the household. According to the findings of Wei and Zhang (2011), households with a son save more because they want to improve their son’s competitiveness in the marriage market. This may be relevant given the high male ratio in China. We, therefore, restrict our sample to households with only one child aged below 16 and divide it into two sub-samples according to the gender of the only child.<sup>12</sup>

Results are reported in columns 1, 2, and 3 of Table 11. In column 1, we add an interaction term between public employment and the gender of the only child. Results show that the interaction is significantly positive, implying that the one-son household has a higher saving rate if it is public-employed. However, the saving behavior of one-daughter households, which form the reference group, does not depend on the type of employment. The second and third columns report the impact of public employment on saving rates of households with one daughter or one son, respectively. The coefficient of public employment is significantly positive in the sample of one-son households while insignificant in the one-daughter sample. Therefore, we may conclude that the positive effect of public employment on household saving rates, that we report in our main analysis of Section 4, primarily stems from households with one son, implying that

<sup>12</sup> We do not discuss the situation of households with more than one child because the effect of dependent children is more obvious among one-child households (Lugauer et al., 2019), and one-child households account for 80.53% of the households with children.

**Table 10.** Interactions of public employment and income on consumption

	Food (1)	Energy (2)	Daily necessities (3)	Durables (4)	Service (5)	Transport (6)	Communication (7)	Cultural (8)
ln(Income)	0.227*** (0.008)	0.157*** (0.011)	0.217*** (0.012)	0.296*** (0.029)	0.281*** (0.069)	0.397*** (0.016)	0.246*** (0.009)	0.244*** (0.018)
Public employment	0.281* (0.151)	0.205 (0.210)	-0.227 (0.240)	0.216 (0.530)	-0.208 (1.204)	-0.154 (0.302)	0.133 (0.173)	-0.321 (0.338)
(Public employment ×ln(Income))	-0.027** (0.013)	-0.013 (0.018)	0.021 (0.021)	-0.019 (0.046)	0.039 (0.101)	0.012 (0.026)	-0.018 (0.015)	0.021 (0.029)
Observations	15,819	11,833	15,519	3,498	1,500	13,527	15,791	10,160
R squared	0.311	0.249	0.228	0.202	0.204	0.317	0.317	0.223

	Clothing (9)	House maintenance (10)	Education and training (11)	Travel (12)	Healthcare (13)	Luxury goods (14)	Vehicle (15)	Children's education (16)
ln(Income)	0.358*** (0.012)	0.667*** (0.126)	0.216*** (0.026)	0.413*** (0.024)	0.232*** (0.025)	0.350*** (0.106)	0.624*** (0.075)	0.218*** (0.032)
Public employment	-0.070 (0.259)	-0.109 (2.232)	-1.347*** (0.473)	-0.875** (0.427)	-0.304 (0.521)	-6.173* (3.500)	-2.531 (1.881)	-1.702*** (0.551)
(Public employment ×ln(Income))	0.006 (0.023)	0.003 (0.191)	0.108*** (0.041)	0.070* (0.036)	0.029 (0.045)	0.499* (0.298)	0.207 (0.161)	0.137*** (0.048)
Observations	15,380	1,498	8,225	7,184	8,966	525	1,702	5,347
R squared	0.324	0.178	0.147	0.310	0.134	0.222	0.163	0.145

*Notes:* The dependent variable is the logarithm of household expenditure in the category listed in the column headings. All regressions include province-level fixed effects and year fixed effects. Other control variables in the regression include household assets, gender, age, age squared, educational background, marital status, household size, the number of dependent children, risk attitude, and financial literacy. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

public employment may enable households with a son to comply with their higher saving propensity. The “competitive saving motive” that has been documented before (e.g. Wei and Zhang (2011)) is primarily a characteristic of households employed in the public sector.

Following the same strategy, we conduct the second heterogeneity analysis that focuses on the share of education expenses in total household expenditure. We hypothesize that public-employed households have higher saving rates because they are more willing to prepare for human capital investment in their children. To examine this hypothesis, we first include an interaction term between public employment and the share of education expenses. Then, we divide all households into two samples according to the median of the share of educational expenses relative to total expenses. The results in column 4 in Table 11 show that the interaction term is positive and significant, suggesting that public employment increases the positive effect of the share of educational costs on household saving rates. Similarly, the results in columns 5 and 6 indicate that public employment has a more substantial impact on saving rates in households that spend a larger portion for the education of their children.

## 6.2 Saving capacity

Another dimension of household saving behavior is the capacity to save. Gan et al. (2012) find that a vast majority of Chinese savings is held by rich households. They also point out that the savings of about half of the Chinese households are negligible simply because they do not receive a decent income and hence miss the capacity to save. Therefore, the saving capacity could be another important dimension of household saving rates. An essential factor that may determine the saving capacity is social security that may somewhat reduce the consumption needs and provide more room for savings.

As described in previous sections, public employees in China are compensated with better social security as well as

**Table 11. Heterogeneity regarding children**

	One-child households			Share of educational costs for children (Median = 9.84%)		
	Full sample	A daughter	A son	Full sample	Below median	Above median
	(1)	(2)	(3)	(4)	(5)	(6)
Public employment	-0.117 (2.136)	-2.158 (2.431)	6.067*** (1.844)	-3.833 (2.514)	4.471* (2.463)	7.536*** (2.177)
X	0.454 (1.438)			-0.348*** (0.080)		
(Public employment × X)	5.872** (2.619)			0.267** (0.130)		
Observations	6381	2732	3649	5650	2825	2825
R squared	0.392	0.369	0.411	0.218	0.380	0.496

*Notes:* This table reports the estimation results based on the sample divided according to the variables stated in the column headings. The share of educational costs on children is defined as the ratio of the educational costs on children (such as tuition fees, out-of-school club fees, etc) to total expenses of the household per year. X refers to the gender of the only child in column 1, and the share of educational costs for children in column 4. All regressions include correlated random effects, province-level fixed effects and time effects. Owing to the availability of data, we exclude the observations from the 2017 wave in columns 4, 5, and 6. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1%, respectively.

more welfare or subsidies in comparison with non-public employees. Numerous studies have estimated the effect of social security on private savings, but the results are inconclusive. This is because social security participation reduces the necessity for precautionary savings but increases their capability. We, therefore, extend the empirical literature by examining whether social security participation affects the impact of public employment on household saving rates. One possibility is that public employment reduces the positive effect of social security on saving rates because public employment inherently implies better benefits and protection against incidents such as injuries, maternity, and retirement. To do so, we first add an interaction of public employment with different types of social security (pension, medical insurance, work-related injury insurance, unemployment insurance, maternity insurance, and housing fund). Next, we divide the entire sample into two sub-samples based on the participation in each type of social security and compare the coefficients of public employment between the sub-samples. To save space, results are given in Table 14 in the appendix, which presents a wide range of interaction analyses of specifications for different types of social security participation in China. The results of all panels that include different kinds of social security participation are similar in terms of signs and significance of the interaction term as well as in terms of the difference of the coefficients of public employment in the sub-samples. The negative interaction terms between public employment and social security participation imply that the effect of public employment on household saving rates is dampened by the participation in a social security plan. In addition, it is shown that the coefficients of public employment are generally smaller in the sample with social security than in the sample without social security. This comparison suggests that public-employed households are able to save more because of their higher coverage of social security. In other words, access to social security could promote the capacity to save for public-employed households.

## 7 CONCLUSION

This paper investigates the impact of public employment on household saving rates in China. Using micro-level data from a representative household survey, we find that the saving rate of households headed by a public employee is between 3 and 8 percentage points higher than that of households headed by a non-public employee, depending on the sample and model specification. The positive effect of public employment on household saving rates is still valid even if we control for self-selection bias. We also find that the positive effect of public employment on household saving rates is conditioned on the age of the household head. This effect is more obvious for middle-aged households. Besides the

positive impact of public employment, we find that households with higher assets, lower income, and married middle-aged household heads with only one child have relatively lower saving rates. Further, our results shed light on possible reasons why saving rates of public-employed households are higher. We find that public-employed households have stronger saving motives for education and leaving an inheritance to children. Moreover, public-employed households are characterised by a higher saving capacity because better social security reduces their expenditure needs.

The main contributions of our findings are twofold: First, as a general result, we highlight that the often assumed negative relationship between public employment and the saving rate is not universally valid. Depending on cultural and country-specific factors, the lower unemployment risk and the better social security coverage enjoyed by public employees might be outdone by other factors that induce higher saving rates. Second, our results contribute to a better understanding of Chinese saving rates, which is of great importance given their high level in international comparison.

Our results have important implications for policymakers seeking to influence public employment and household saving rates. First, they have to be aware that public employment has a substantial impact on households' saving decisions. Any adjustment in the share of public in total employment is expected to affect aggregate savings in the household sector. Second, our paper reveals that different types of occupation go hand in hand with substantial differences in household saving rates. Policymakers may wish to reduce the disparity in benefits and guarantees between public and non-public jobs to alleviate the high saving rates of public-employed households.

We have to admit that there are limitations to the findings of this paper. First, the fact that we use Chinese data and consider Chinese-specific institutional settings limits the validity of our results to other countries, especially given that we argue that Chinese-specific cultural and social characteristics are important drivers of our results. However, we believe that the characteristics of public employees identified in this paper may also apply to other East Asian countries where the cultural values are similar to those in China. Second, the public sector in China has been experiencing reforms in past decades. Many benefits of Chinese public employees are increasingly being reduced by the public administration. Accordingly, the saving behavior of Chinese public employees should change as well. This may affect the adaptability of our results in the future as some differences between public employees and non-public employees might vanish. Future work might examine how these reforms affect the saving behavior of Chinese households.

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# Appendices

## A.1 TABLES

**Table 12.** Variable definition

Variable	Definition
<i>Household-level variables</i>	
Assets	includes non-financial assets and financial assets. Non-financial assets include agricultural operating assets, industrial and commercial operating assets, land assets, real estate, vehicle assets, and other non-financial assets. Financial assets include social security account balances, cash, deposits, stocks, funds, bonds, derivatives, wealth management, foreign currency assets, gold, other financial assets, and lending.
Income	is the total annual income of a household that includes wage income, agricultural operating income, industrial and commercial operating income, transfer income, and investment income. Based on household income in each wave, we construct three percentile dummies, with the first income percentile as a reference group and therefore excluded from the estimation. For example, the 2nd income percentile dummy equals 1 if the household income is between the 25th to 50th percentile. The 3rd income percentile dummy equals 1 if the household income is between the 50th to 75th percentile.
Consumption	is the total annual expenditure of a household that includes expenditure on food, clothing, housing, living goods and services, education and entertainment, transportation and communication, medical care and others.
Saving rate	$= (1 - \text{Consumption}/\text{Income}) * 100\%$
Household size	number of household members
<i>Individual-level variables</i>	
Gender	= 0 female; = 1 male
Age	= survey year - the year of birth
Married	= 0 No; = 1 Yes
High school education	= 1 if the household head has high school education
University education	= 1 if the household head has university or higher education
Good health	= 1 if the household head has a good health
Bad health	= 1 if the household head has a bad health
Dependent kids	number of kids younger than 16
Risk loving & Risk averse	The respondent was asked to scale their risk attitude between 1 to 5 from high risk with high profit to low risk with low profit. The reference group is the risk neutral. Risk loving equals 1 if the answer ranges between 1 and 2. Risk averse equals 1 if the answer ranges between 4 and 5.
Financial literacy	number of three correctly answered questions regarding financial calculations, such as annual interest payments and inflation rates see details in Lyons et al. (2019) and Feng et al. (2011).
Political affiliation	= 1 if the household head is a member of the Communist Party of China (CPC)

*Notes:* China's social security is composed of five types of social insurance (pension, medical insurance, unemployment insurance, work-related injury insurance and maternity insurance) and the housing fund. CHFS in 2013 and 2015 collected information on all types of social insurance and the housing fund, but in 2017 it only collected information on pension, health insurance, unemployment insurance and housing fund.



**Table 13.** Correlation table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	1.000																			
(2)	0.091	1.000																		
(3)	0.533	0.129	1.000																	
(4)	0.173	0.131	0.598	1.000																
(5)	0.048	-0.075	0.052	0.072	1.000															
(6)	0.011	0.098	-0.097	0.064	0.115	1.000														
(7)	0.014	0.090	-0.107	0.046	0.119	0.992	1.000													
(8)	0.099	0.253	0.294	0.245	-0.039	-0.230	-0.228	1.000												
(9)	0.124	0.309	0.327	0.240	-0.073	-0.315	-0.317	0.591	1.000											
(10)	0.011	0.047	0.120	0.143	0.118	0.165	0.138	-0.175	-0.165	1.000										
(11)	0.045	0.118	0.140	0.219	0.154	0.320	0.277	-0.086	-0.104	0.447	1.000									
(12)	-0.010	-0.028	0.118	0.113	0.063	-0.126	-0.174	-0.042	-0.031	0.485	0.305	1.000								
(13)	0.033	0.006	0.155	0.112	0.077	-0.158	-0.156	0.135	0.149	-0.058	-0.073	0.003	1.000							
(14)	-0.044	-0.023	-0.195	-0.130	-0.046	0.259	0.258	-0.208	-0.225	0.077	0.089	-0.032	-0.456	1.000						
(15)	0.043	0.040	0.140	0.107	0.061	-0.122	-0.124	0.146	0.150	-0.036	-0.026	0.015	0.183	-0.180	1.000					
(16)	0.049	0.253	0.110	0.110	0.033	0.019	0.019	0.212	0.260	-0.034	0.048	-0.030	0.055	-0.069	0.036	1.000				
(17)	0.040	0.049	0.161	0.113	-0.090	-0.238	-0.234	0.251	0.279	-0.196	-0.108	-0.030	0.102	-0.147	0.032	0.137	1.000			
(18)	0.012	0.057	0.077	0.081	-0.032	0.023	0.020	0.105	0.111	-0.072	-0.001	-0.020	0.035	-0.042	-0.013	0.122	0.405	1.000		
(19)	0.014	0.078	0.104	0.080	-0.093	-0.221	-0.217	0.237	0.249	-0.181	-0.106	-0.060	0.085	-0.117	0.058	0.120	0.597	0.228	1.000	
(20)	-0.013	0.106	0.008	0.036	-0.045	0.035	0.030	0.108	0.090	-0.059	0.003	-0.057	0.014	-0.015	0.027	0.134	0.178	0.212	0.343	1.000

*Notes:* This table presents a correlation matrix among key variables used in this paper. The variables in this table are: (1) Household saving rates; (2) Public employment; (3) Income; (4) Assets; (5) Gender; (6) Age; (7) Age squared; (8) High school education; (9) University education; (10) Household size; (11) marital status; (12) Dependent children; (13) Risk loving; (14) Risk averse; (15) Financial literacy; (16) Political affiliation; (17) Father's education; (18) Father's political affiliation; (19) Mother's education; (20) Mother's political affiliation.

**Table 14.** Interactions with social security participation

<i>Panel A. Pension</i>			
	Full sample	With social security	Without social security
Public employment	9.177*** (3.394)	3.300*** (0.995)	7.464* (3.816)
Pension	2.492** (1.269)		
(Public employment × Pension)	-6.149* (3.443)		
Observations	15,869	12,973	2,896
R squared	0.301	0.306	0.277
<i>Panel B. Health insurance</i>			
	Full sample	With social security	Without social security
Public employment	5.471 (3.964)	3.442*** (0.985)	3.650 (4.509)
Health insurance	1.549 (1.556)		
(Public employment × Health insurance )	-2.049 (4.015)		
Observations	15,869	14,274	1,595
R squared	0.301	0.311	0.288
<i>Panel C. Unemployment insurance</i>			
	Full sample	With social security	Without social security
Public employment	5.611*** (1.528)	2.478** (1.202)	4.960*** (1.644)
Unemployment insurance	4.934*** (1.058)		
(Public employment × Unemployment insurance)	-3.797** (1.849)		
Observations	15,869	7,495	8,374
R squared	0.302	0.287	0.290
<i>Panel D. Work-related injury insurance</i>			
	Full sample	With social security	Without social security
Public employment	4.976*** (1.752)	3.339** (1.450)	4.160** (1.879)
Work-related injury insurance	3.145** (1.259)		
(Public employment × Work-related injury insurance)	-2.272 (2.142)		
Observations	11,324	5,067	6,257
R squared	0.300	0.304	0.280
<i>Panel E. Maternity insurance</i>			
	Full sample	With social security	Without social security
Public employment	5.064*** (1.637)	2.840* (1.665)	4.274** (1.727)
Maternity insurance	2.590** (1.307)		
(Public employment × Maternity insurance)	-3.309 (2.144)		
Observations	11,324	3,922	7,402
R squared	0.299	0.304	0.285

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(Continued)  
 Panel F. Housing fund

	Full sample	With social security	Without social security
Public employment	6.808*** (1.823)	2.226* (1.197)	6.397*** (1.850)
Housing fund	3.156*** (1.069)		
(Public employment × Housing fund)	-5.475*** (2.120)		
Observations	15,869	7,267	8,602
R squared	0.301	0.290	0.288

Notes: Samples in panels C and D include households observed in 2013 and 2015 only because the 2017 survey does not provide the necessary data. Standard errors are in parentheses and clustered at the household level. \*, \*\*, \*\*\* denote statistically significant coefficients at the 10%, 5% and 1% levels, respectively.