Estimating the Unofficial Income of Officials:

The Case of China

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Abstract

While government officials in many countries take bribes and corruption hurts economic growth, estimating the size and prevalence of the unofficial income are difficult since bribes are largely unobserved. We propose a way to systematically estimate the unofficial income based on observed purchases of large-ticket items under the assumption of a stable relationship between large ticket purchases and total wealth. We apply this idea to China by using a detailed data set on house purchases in a city and the characteristics of the purchasers including legal income recorded in the social security fund. In our baseline specification, the amount of unofficial income for an average government official is estimated to be 67% of his or her official permanent income, and the unofficial income (as % of government salary) tends to increase steeply with the rank of the officials and the relative importance of government agencies. We also estimate that 23% officials may acquire unofficial income.

1. Introduction

Corruption – an exchange of official power for personal gains – is pervasive in most developing countries according to various perception based surveys (e.g., Corruption Perception Index by Transparency International, or EBRD-World Bank Business Environment and Enterprise Performance Survey). While corruption could be either "grease" or "sand" for commerce and economic development in a partial equilibrium model, Kaufman and Wei (2000) argue that the "sand" view will dominate in a general equilibrium story.

While measuring corruption is important in understanding the business environment for investment and growth (Mauro, 1996; Wei, 2000; Acemoglu et al., 2001; among other papers), measuring corruption is also hard because it is generally illegal and involves transactions that are under the table.

There are four approaches to measuring corruption in the existing literature. First, one can use media reports of corruption cases. An excellent example is McMillan and Zoido's (2004) study of bribery cases under President Fujimori in Peru during the 1990s. Because Fujimori's spymaster meticulously recorded all (or most) cases in which he bribes judges, members of parliaments, cabinet ministers and owners of TV station and print media, they can infer which members of the society are more expensive to bribe. The study is very interesting but it relies on a lucky break (that the briber – the spymaster- has kept a record of the bribes). Because the bribery record is about bribes from a single source (the spy master on behalf of the President), it does not measure the overall unofficial income a given government official may receive.

The second approach to infering unreported income is to make use of some gaps between declared income and a measure of "true" income. For example, Clotfelter (1983) and Feinstein (1991) measure under-reporting of income by a sample of US taxpayers by comparing reported taxable incomes on a tax return with the taxable income determined by the Internal Revenue Service through an intensive auditing program. Fisman and Wei (2004) measure under-reporting of income by importers by

comparing the import value recorded by the customs of the importing economy (say by Chinese imports from Hong Kong recorded in the Chinese customs) with the export value of the same goods recorded in the exporting economy's customs (say the same transactions as recorded by the Hong Kong customs). The gap in general reflects a combination of tax evasion and measurement errors. Because the measurement errors are uncorrelated with the tax rate, Fisman and Wei can estimate the elasticity of tax evasion to changes in the tax rate (the sum of tariff and value added tax rates). By taking advantage of the details of the customs data, they also propose a method to estimate the relative importance of three different ways to under-report taxable income: under-reporting the quantity of imports, under-reporting the unit value, and mis-classifying the imports from a higher taxed category to a lower-taxed one. While this approach allows one to examine the relationship between tax evasion and tax rate, it does not lend itself to measuring overall unofficial income of the officials either.

The third approach to measuring unofficial income is by using information on self-declared assets by politicians. An excellent example is a study of potential unofficial income of Indian members of parliament by Fisman, Schultz, and Vig (2014). Using the legal requirement in India for candidates for members of the parliament to declare their wealth, they find that the growth of asset by those who have won elections is significantly faster than that of those who have lost an election. A similar gap is observed between those who narrowly win and those who narrowly lose. This suggests official positions are likely to have helped office holders to accumulate wealth in ways beyond their official salaries and normal financial investment. Since non-elected officials are not required to declare assets, this approach does not provide a way to estimate the prevalence and magnitude of unofficial incomes across the entire official sector.

The fourth approach is to infer from relationship among variables. Pissarides and Weber (1989) use household food expenditure to infer household income and compare that with the reported income on tax returns, and found that self-employed is likely to under-report their total income. Feldman and Slemrod (2007) infer unreported income

from unusually large charitable giving relative to reported incomes on tax returns. The maintained assumption is that the size of charitable giving should be proportional to the true total income. None of these papers study the behavior of government officials.

In this paper, we propose to infer unofficial incomes of the officials by using a combination of observable big-ticket purchase and verified official incomes of the officials. Under the premise of a stable relationship between big ticket purchases and the total household wealth, we infer unofficial income from the gap between the value of the big-ticket purchase and the wealth that could be expected from the observed legal income. The particular big-ticket purchase in our application is home purchase, although in principle the idea can be applied to other big ticket items. We apply the idea to China. For a large city, we have data on all home purchases that require a mortgage from the Housing Provident Fund system and the purchasers' official income as recorded and verified by the social security fund in the city. Relative to household food expenditures using in Pissarides and Weber (1989), housing expenditure is likely to be more precisely recorded. Indeed, the housing value recorded is verified by the Housing Provident Fund which has to provide a mortgage loan to the home buyers. Relative to the relationship between charitable giving and household income used in Feldman and Slemrod (2007), the relationship between home value and household wealth is likely to be tighter. In any case, since the previous papers have not studied the unofficial incomes of government officials, this paper fills an important gap.

This approach has comparative strength and weakness. Because the data cover near universe of all home transactions in the city, we can infer unofficial incomes of the officials by rank and by sector. This allows to estimate the prevalence and size of unofficial income across a broad spectrum of the official sector. On the other hand, very egregious types of unofficial income such as those that allow officials to obtain houses without going through a mortgage process are not captured in the data. In other words, the data tend to underestimate the size of the unofficial incomes in the right tail.

In our estimation, we consider the possibility that officials may obtain a better deal on unit prices of house purchase (Fang, Gu and Zhou, 2014), and that officials may be

"different" from non-officials in some dimensions other than rank-seeking such as greater job security.

By our estimation, the amount of unofficial income for an average government official is 67% of his or her official permanent income. More interestingly, we find that the unofficial income (as % of government salary) increases with the rank of the officials and the relative importance of government agencies. For example, at the level of a director general of a government department (which is ranked at the same level as a mayor of most cities, or one level below a vice minister, in the Chinese political hierarchy), the unofficial income is over 300% of the official income. (Again, the estimation is obtained even though the most egregious types of briber taking is not captured by the data).

We discuss several reasons for why our estimates may be a lower bound. While we find some evidence that real estate companies offer discounts to government officials when they purchase a house, we reason that the unofficial income would be even bigger when taking into account the housing discount.

In the rest of the paper, we first discuss the research methodology and the data in Section 2, and then report the baseline estimates and several extensions in Section 3. We conclude in Section 4.

2. Research Strategy and Data

2.1 Empirical specification

The basic framework assumes a stable relationship between a big ticket purchase (home purchase) and the true permanent income (or the annuity of total wealth). The underlying logic dates back to the neoclassical housing demand theory developed since the 1960s (Muth, 1960; Olsen, 1969).[1] The general form of households' housing

[1] See Arnott (1987) and Megbolugbe, Marks and Schwartz (1991) for example for literature review on the neoclassical housing demand theory.

demand function is:

$$V = f(Y, P_H, P_O, H) \quad (1)$$

where V is the value of housing demand; Y is the permanent income of the household; P_H is the housing price, while P_O is the price of all non-housing goods and services; and H includes all other household characteristics which could affect household's preference on housing consumption, such as age and education level of the household members. As suggested by Equation (1), controlling for other factors, there exists a stable linkage between a household' permanent income and its housing demand, and that is the key assumption in our method.

In the empirical analysis, we consider a log-linearized version of Equation (1):

$$\ln V = \alpha_Y \bullet \ln Y + \beta \bullet L + \gamma \bullet T + \delta \bullet H + \quad \varepsilon \quad (2)$$

where: V is the total value of the unit purchased; Y is the household's permanent income, with the income elasticity of α_Y; L is a vector of locational submarket (district) fixed effects, while T is a vector of time (year) fixed effects, which are both used to capture the prices of all housing and non-housing goods/service, as well as other unobserved macro-level factors affecting households' housing consumption; H is a vector of household characteristics other than income; ε is the error term.

The household permanent income is decomposed into two components, the part that can be inferred from official income, Y_o, and the part that is due to (unreported) unofficial income, Y_u. Let y_u represent the ratio of the unofficial income to the official income. We have:

$$Y = Y_o + Y_u = Y_o + Y_o \bullet y_u = Y_o \bullet (1 + y_u) \quad (3)$$

Accordingly, Eq. (2) becomes:

$$\ln V = \alpha_Y \bullet \ln Y_o + \alpha_Y \bullet \ln(1 + y_u) + \beta \bullet L + \gamma \bullet T + \delta \bullet H + \quad \varepsilon \quad (4)$$

We assume only government officials have unofficial incomes (which tend to under-estimate the size of unofficial income of the officials). We use a dummy variable

OFFICIAL to represent households with at least one member serving as a government official. Eq. (4) can be rewritten as:

$$\ln TP = \alpha_Y \bullet \ln Y_o + \alpha_{GOV} \bullet OFFICIAL + \beta \bullet L + \gamma \bullet T + \delta \bullet H + \quad \varepsilon \qquad (4')$$

From Eq.(4) and Eq.(4'), since

$$\alpha_Y \bullet \ln(1+y_u) = \alpha_{OFFICIAL} \qquad (5)$$

we have

$$y_u = \exp(\alpha_{OFFICIAL} / \alpha_Y) - 1 \qquad (5')$$

In other words, we can estimate the unofficial income as a multiple of the official income by comparing the two slope coefficients in Equation (4').

2.2 Data

The key data for the study are residential mortgage contracts provided by the Housing Provident Fund (HPF) system in a large city in China.[2] All home purchase transactions in the city that involve a mortgage from the HPF system are recorded in the database. By regulation, it is compulsory for each employee and his/her (full-time) employer to contribute a specific percentage of his/her monthly income from the employer to the HPF account. The contributors can then obtain a mortgage loan with a subsidized interest rate for home purchase (about 1.5 percentage points, or nearly 30%, lower than the interest rates for mortgage loans from commercial banks; the interest rate is determined by the Ministry of Housing and Urban-Rural development and does not vary with borrowers).[3] The data cover all the 209,861 HPF mortgage loans issued during 2006-2013. Mortgage refinancing is uncommon in China, and there are no refinancing cases in the sample. As a result, each mortgage contract refers to a new transaction of residential housing.

[2] As required by the data provider, the name of the city has to remain anonymous.
[3] Chen and Han (2014) provide additional details about the Housing Provident Fund system in China.

We clean the data by applying the following filters (which result in an ultimate sample of 107,371 observations). First, we exclude 52,495 transactions of new, affordable housing units. In most cases the price of an affordable housing unit is substantially lower than a comparable unit in the private market due to government subsidies. As a result, we focus on housing transactions at the market prices (including both the new home sales and resales)[4]. Second, to obtain maximize comparability across households, we only include observations for which information for both husband and wife are recorded. This leads us to drop another 49,995 observations. The annual distribution of the sample adopted is listed in the first column of Table 1.

For each transaction, we have the following information: (1) transaction date, names of both the buyer and seller, and the total value of the dwelling unit; (2) loan-level characteristics, including the loan to value ratio, interest rate, and maturity, based on which we can calculate both the down payment and monthly service; (3) major attributes of the housing unit, including size in squared meters, floor level, and the address and name of the complex (which can then be converted to complex-level dummies); and (4) household characteristics, including the current monthly income (of both the husband and the wife), current monthly consumption expenditures, total financial wealth (including bank deposit, stock, and bond), outstanding debt, and homeownership of the household at the time of application, and the gender, age, *hukou* (local residence registration) status, education level, and professional title of both the main applicant and his/her spouse. The summary statistics of the key variables are listed in Table 2. All the monetary variables are deflated using CPI series in the city and presented in real term.

As a key variable in the empirical analysis, the official permanent income variable is imputed via the following procedures. We start with the monthly income of the couple, which is defined as all reported before-tax incomes from wages and bonuses from all jobs for both the husband and the wife. It is important to note that this reported income

[4] In unreported regressions, we find some evidence that, after controlling for family income, households with an official have a higher probability of obtaining an affordable housing unit.

is verified by both the payroll slips issued by the employer and the couple's contribution record in the Housing Provident Fund system. Second, we estimate the cumulative income from the year of home purchase to the years of retirement of the couple. According to the Chinese labor law, in the baseline case, we assume that men retire at 60 and women with high education (a bachelor degree or more) at 55 and women without a bachelor degree at 50. For future income, we need an assumption on the growth rate of household income. We have information on each household's reported and verified income from 2006 to 2013. Because the income growth appears high during this period and is unlikely to repeat in the future, we assume the future annual growth to be ½ of the actual annual growth rate during 2006-2013 for each household. This way, the relative differences in the growth rates across households are preserved. We assume a discount rate of 5% and compute the present discounted value of the life time wealth based on the trajectory of the income and also takes into account the reported financial wealth and debt at the time of mortgage application.[5] Finally, we calculate the annuity of the life time wealth until expected age of death (assumed to be 80 for men and 84 for women in the baseline case, which are the life expectancy at birth according to the *Life Insurance Mortal Rate Table* issued by China Insurance Regulatory Commission). This is our baseline case. We will investigate sensitivity of the conclusions to variations in each of these parameters later. (All main results turn out to be robust.) The permanent income variable is then winsorized at 1% to minimize the impact of possible outliers. (All main results are robust if we use the unwinsorized data, as shown in Appendix Table 1.)

As shown in Table 1, 6316 households (or 5.9% of the total) have a member who works as a civil servant but not as a government official, and 5,364 households (or about 5.0% of the sample) have at least one member as a government official. Of these, 604 households (or 0.6% of the total) feature both husband and wife as government officials.

[5] Note, unlike the salary information, the information on monthly consumption expenditures, financial wealth, outstanding debt, and homeownership is self reported and not independently verified. As a robustness check, we will re-compute permanent income by ignoring all such information and find that our results still hold qualitatively.

We can discern the ranks of the officials by their administrative levels (Table 3). First, officials can be ranked at six levels from *fu ke* (deputy section chief) as the bottom, to *zheng ke* (section chief), *fu chu* (deputy division chief), *zheng chu* (division chief), *fu ju* (deputy director general), and finally to *zheng ju* (director general).[6] A uniform set of official ranks used throughout the Chinese bureaucracy including in both central government ministries and local governments. For example, mayors of small cities are typically ranked at *zheng chu or fu ju*, whereas mayors of prefectural cities are often *zheng ju*. While in the United States, it may not be entirely clear whether the police chief in the city of Cleveland is ranked higher or lower than a Deputy Director General in the Ministry of Education, there is no such ambiguity in China. Every official position anywhere in the country is given a rank from a common set of nomenclature so that the relative hierarchical position is defined clearly and nationally.

Note that officials ranked at or higher than a *vice minister* level, which is one step higher than *zheng ju,* are not captured by this database. As a result, we are not able to say anything about unofficial incomes of the most senior officials in the country. Nonetheless, we have captured non-official government employees and six levels of government officials from the bottom, which constitute the bulk of the bureaucracy. Not surprisingly, the number of households with an official decreases with the rank of the officials.

We can also divide the government bureaus into 6 groups: general offices of local CCP committee and government (including the departments of the CCP committee), bureaus in the legal system (public security bureaus, courthouses, prosecutor's office, etc.), bureaus in charge of the distribution of financial and other resources (bureaus of financial, taxation, customs, land resources, mining resources, etc.), bureaus in charge of mega projects (bureaus of transportation, highway, housing, urban facilities, etc.), bureaus in charge of the economic system (development and reform commission, state-owned assets supervision and admission commission, urban planning bureau, etc.), and

[6] Since there are some households with two government officials, the aggregated number of these three dummies is larger than the share of official households.

other bureaus. We will use this information to see if differences in potential rent-seeking opportunities are also reflected in the differences in implicit unofficial incomes.

Table 3 also provides the summary statistics on imputed permanent official income, reported current income, wealth, consumption, and debt for each group of official households. Note that the annual income of an average household with no one working in the government (11499 yuans om Column 3 of Table 3) tends to higher than an average income of households with a government official (10234 yuan), and is at a level somewhere between a household with a *fu chu* official (deputy division chief) and that with a *zheng chu* official (division chief). Interestingly, the computed life-time household wealth is not monotonically increasing with the official rank. Even though higher-ranked officials do have a higher level of current income, they typically are older and closer to retirement, and in the sample (2006-2013), tend to experience a slower growth of salary.

3. Empirical Results

3.1 Baseline results

Table 4 lists the results of the basic specification. First, in column (1) we introduce the total value of the apartment purchased in logarithm as the dependent variable. On the right hand side, our main variables of interest are (a) a dummy variable for households with non-official civil servants, (b) another dummy variable for households with at least one official, and (c) the household's imputed permanent income in logarithm. In order to allow for potentially non-linear relationship between household permanent income and value of home purchase, we allow for five separate coefficients for the household income in the five quintiles. The household's other major attributes, such as gender of the official, age, *hukou* status, education level, and professional status[7] of both the husband and wife, as well as the district-month fixed effects,[8] are also controlled in the

[7] A "professional status" (or "*zhi cheng*" in Chinese), is a government designation of the level of professional qualification. There are four levels: (a) advanced level (*zheng gao ji*) which is equivalent to a full professor,(b) associate advanced level (*fu gao ji*; equivalent to an associate professor equivalent, (c) mid-level (*zhong ji*), and (d) no professional status.

[8] We have also introduced district fixed effects and monthly fixed effects, and found the results to be robust.

model.

The coefficients on log of household permanent income are 0.146, 0.172, and 0.149, respectively, for the first three income quintiles, and are all statistically significant at the 1% level. This confirms that the value of housing purchase goes up as a family's (official) permanent income rises. A formal F test for the equality of these three coefficients yields a F statistic of 1.58, which is insignificant. In other words, we cannot reject the null that the three coefficients are the same.

The coefficients on log permanent income for the next two quintiles are 0.038 and 0.012, respectively, and are both statistically significant at the 1% level. This means that as the household income rises, the value of home purchase continues to rise, but the pace of increase declines a bit once the household income gets into the 4^{th} or 5^{th} income quintile. This appears intuitively sensible: once a family is rich enough, there is limit to how big a home one wants to buy.

The dummy for households with non-official civil servants is positive (0.027) and statistically significant at the 1% level. Since of the income of most households in this category is the 3^{rd} income quintile, the implied unofficial income as a share of official income is [exp(0.027/0.149)-1] = 20%.

The government official dummy is also positive (0.076) and statistically significant at the 1% level. This implies that the unofficial income is about 67% [= exp(0.076/0.149)-1) of the official income for an average household with an official.

The coefficients on other control variables are generally consistent with expectations. For example, the value of home purchase tends to be higher for applicants with advanced education levels or advanced professional titles.

A beauty of the data set is that we can differentiate officials by their ranks in the hierarchical system, and by the type of government bureaus. This allows us to investigate possible gradients of the unofficial income: do higher ranked officials gather more unofficial incomes?

We report the results in Column 2 of Table 4. (If both husband and wife are officials, we use the higher of the two ranks.) All coefficients for the official ranks are positively and statistically significant, and strikingly, the size of the point estimates indeed rises monotonically with the rank. For the most junior officials at the *fu ke* level, the unofficial income is inferred to be 33% of their reported incomes. This rises to 52% for *zheng ke* officials (one level above *fu ke*), 60% for *fu chu* officials (two levels above *fu ke),* 129% for *fu chu* officials (three levels above *fu ke),* and 189% for *fu* ju (four levels above *fu* ke). The most senior officials at the rank of *zheng ju* (five levels above *fu ke)* are found to have an unofficial income that are more than 300% of their reported official incomes. These estimated ratios of unofficial to official incomes by rank are presented in Figure 1 for easy inspection.

One interesting pattern from the figure is that a Director General of a government department (*zheng ju*) tends to have an unofficial income multiple that is more than twice that of a head of division (*zheng chu*) within a department (305% vs. 129%), who in turn has an unofficial income multiple that is more than twice that of a head of a section (*zheng ke*) within a division (129% vs. 52%). In comparison, their respective deputies (*fu ju, fu chu,* and *fu ke*) only have an unofficial income multiple that is only modestly higher than the head of the government official just below them. This suggests that, at a given level of government office, unofficial incomes accrue disproportionately to the head of the office relative to the deputy heads.

In column (3), we distinguish the government bureaus by function. While all the dummies are significantly positive, there are interesting variations. The magnitude of unofficial income is the largest for two types of government bureaus: those in charge of taxes and government-controlled resources (such as land) and those in charge of mega project investment, such as new highways or new water treatment plants. On average, an official in these offices could bring an additional unofficial income of 96% and 102%, respectively. Officials in the general offices[9] and other less critical bureaus

[9] One may be surprised to find that officials in the most critical bureaus such as the general offices of local CCP committee and government cannot get higher unofficial income. One explanation is, although these bureaus are critical on the macro-level in operating a city, there are few direct links between them and market participants;

(in the "others" category) are revealed to have a much smaller unofficial income, about 39% and 29% of their official incomes, respectively.

In column (4), both sets of dummies are included. This provides information on how the unofficial income depends on a combination of the rank of an official and the functionality of his office. For example, for an official at the *zheng chu* level in a bureau in charge of the financial and resource affairs, the corresponding coefficient would be 0.136+0.058=0.194, indicating an unofficial income of about 268%; by contrast, an official at the bottom rank in the general office could only get an unofficial income of about 14%.

The estimates so far reveal average unofficial income for all officials in a given combination of rank and offices. A given average can come back from different distributions. For example, the unofficial income could either be symmetrically distributed around the mean, or follow a bimodal distribution (indicating a few very bad apples amongst a majority of clean officials). For this reason, we also compute the ratio of unofficial income to official income for each household with an official and investigate the resulting distribution.

In Figure 2, we plot two separate density functions of unofficial incomes: for non-official civil servants, and for government officials, respectively. Both distributions have a mean that is positive, and the distribution for government officials is somewhat to the right of that for non-official civil servants. The relative position of the two curves are is not surprising: from Column 1 of Table 4, we already that the average ratio of the unofficial to official incomes is higher for households with a government official.

A formal computation of skewness and kurtosis indicates that the density function is not exactly normal distribution. Nonetheless, the additional information we gain from Figure 2 is that the densities of the two distributions are approximately bell-shaped. This suggests that the phenomenon of unofficial income is wide-spread and not driven

another possible reason is officials in these bureaus are regulated in a stricter way and thus have fewer opportunity for seeking unofficial incomes.

by a few very bad apples.

In Figure 3, we plot the density functions of the unofficial income multiple for four types of households: those with non-official civil servants, *zheng ke* officials, *zheng chu* officials, and *zheng ju* officials, respectively. (We skip the densities for the other three ranks in order not to overcrowd the graph.) Unsurprisingly, the mass tends to move to the right as the rank rises. In Figure 4, we present another version of Figure 3 after taking out the top and bottom 5% of the unofficial income for each of the four sets of households. The truncation is meant to allow us to see the middle part of the distribution more clearly. Indeed, we can see that the density shifts progressively to the right as the official rank increases. One important take-away is that, unofficial incomes are common and widespread for each type of households with officials. So the regression results in Table 4 are not driven by a small number of bad officials with very high level of unofficial incomes.

We may estimate the fraction of officials at a given rank that likely have an unofficial income. From Figure 3, for any given rank, suppose α = probability that the estimated unofficial income is negative. Let us assume that this represents the proportion of officials whose idiosyncratic shocks to preferences lead them to buy a smaller home than what their income would have indicated when they have no unofficial income. It is reasonable to assume that the same proportion of officials would have the opposite preference shocks and have bought a larger home than indicated by their income even if they have no unofficial income. Under these assumptions, the proportion of officials who have unofficial income should be $1-2\alpha$. Based on this strategy, 23% of the officials are estimated to acquire unofficial income.

We also compute $1-2\alpha$ for households with an official at each of the official rank, and summarize the results in Figure 4. Based on these estimates, 11% of the non-official civil servants may have unofficial income. This proportion rises with the rank. For *zheng ju* officials, the highest rank in the sample, we estimate that 50% of them likely have unofficial incomes. To the best of our knowledge, this is the first paper that proposes such a method to estimate proportion of official households with an unofficial

income.

3.2 Sensitivity to Alternative Measures of Permanent Income (Life Time Income)

In the baseline estimation, we compute permanent income of a household by assuming (a) future real annual income growth to retirement to be ½ of the realized real annual income growth during 2006-2013, (b) a discount rate of 5%, (c) a retirement age of 60 for men and 55(or 50) for educated (or less educated) women, and (d) a (uniform) life expectancy of 80 years for men and 84 years for women at the time of home purchase. Finally, we incorporate self-reported gross financial asset and gross debt at the time of home purchase in computing a household's life time income. The average and median household life-time incomes in the baseline case are reported in Panel A of Table 5. We now check the sensitivity of the main conclusions to variations in each of these assumptions.

We first vary the assumption on future income growth. In Panel B of Table 5, we assume that the future annual income growth is only 1/3 of the realized growth during 2006-2013 (i.e., slower than the baseline case). Unsurprisingly, as a result, household life time incomes (and therefore their annuity, household permanent incomes) are smaller than in the baseline. In Panel C of Table 5, future income is assumed to grow at the same pace as during 2006-2013 (i.e., faster than the baseline case). As a result, household life time income is greater than the baseline case.

We re-do the regressions in Table 4 with the new measures of household permanent income and report the results in Table 6. While the point estimates do change from those in Table 4, some crucial features do not. In particularly, the coefficients on households with non-official civil servants and on households with officials of different ranks are all positive and statistically significant. Moreover, the coefficients increase monotonically as the official rank increases. This means that the evidence of unofficial income is still statistically significant and that unofficial incomes still tend to increase with official ranks. It is easy to verify that the proportion of official households with an

unofficial income also rises with the bureaucratic rank of the officials. In this sense, the main conclusions are robust to alternative assumptions on future income growth.

In Panel D and E of Table 5, we experiment with two different discount rates, 3% and 10%, respectively, which are below and above the assumed rate in the baseline case, respectively. The corresponding regression results are reported in Panel B of Table 6. Again, the main conclusion from the baseline case survive with the alternative assumptions on the discount rate.

The baseline calculation of life time resources takes into account net financial asset reported by the household in addition to life-time labor income. As indicated in Table 2, the median household reports gross financial asset on the order of 88,000 yuan (in 2010 price) and no financial debt (outside mortgage). Unlike the labor income in the database, which is verified by the government pension scheme, self-reported gross financial asset and debt are not verified by a third party. Measurement errors could be an issue for these variables. To check the sensitivity of the results, we re-compute life time income based solely on current and future labor income and ignore self-reported financial assets and debt. Some summary statistics of the re-computed life time incomes are reported in Panel F of Table 5; the regression results are reported in the first two columns of Table 6, Panel C. We find that the main conclusions regarding the existence of unofficial incomes and the gradient of the unofficial income as a function of the official ranks are not sensitive to the omission of the financial asset and debt.

In computing life time incomes, we can also subtract consumption expenditure from income in each year. The summary statistics for the new measure of life time incomes are reported in Panel G of Table 5, whereas the new regression results are reported in Columns 3-4 of Table 6, Panel C. Again, the main conclusions are not affected.

In Panel H of Table 5 we vary the assumption for retirement age. Senor officials at the *minister* level or above (for both men and women) retire at 65. If we assume all officials can expect to rise to such a level and retire at 65, this would boost the life time legal wealth of households with an official. If we keep the retirement age for non-

official households constant, this tends to increase the life time wealth of the households with an official relative to other households and rationalize purchasing a somewhat more expensive home for the former type of households. These are not realistic assumptions and may exaggerate the difference in the legal wealth between the two types of households. In Panel H, we adopt these extreme assumptions. Not surprisingly, the permanent incomes for the official households become larger. Nonetheless, this new assumption on retirement ages is not quantitatively big enough to change the main conclusions (see the results in Column 1-2 of Table 6, Panel D).

Finally, based on the *Life Insurance Mortality Table* issued by China Insurance Regulatory Commission, in Panel G of Table 5 we allow the life expectancy to vary with the age of home purchasers. This modification affects the household permanent income measures relatively modestly, and does not affect the main results either (Column 3-4 of Table 6, Panel D). (As a sensitivity check, we also use the average life expectancy for home purchasers (80.8 for men and 84.3 for women). Again the results are basically the same.)

3.3 Additional Robustness Checks and Extensions

In the baseline estimation, we assume that the households with and without government officials are the same beyond those characteristics that are controlled for in Table 4. We now investigate whether unobserved differences (other than unofficial income) could cause them to behave systematically differently in home purchase decisions.

Could the two types of households face systematically different levels of risks and/or have different degrees of risk aversion? If government jobs are more secure (i.e., less likely to be fired) than non-government jobs, households with an official may face a systematically lower level of risk. If they have the same degree of risk aversion, households with an official may allocate a bigger fraction of their investment to a relatively riskier asset such as housing. In this scenario, households with an official may buy a more valuable home for a given level of income. On the other hand, if people

with a higher degree of risk aversion are more like to select themselves to enter the government sector (attracted by its greater job security), households with a government official may be more risk averse on average than other households. In this scenario, households with an official may choose to invest less in a risky asset such as housing.

To tackle possible effects of risks and risk preference, our strategy is to compare households with an official with those likely facing similar risks and with a similar level of risk aversion. First, we restrict the comparison group in the sample to those households with at least one member working in a (non-profit) public institution such as a (government owned) university or research institute. The jobs in these institutions are likely to be similarly secure as government jobs and therefore likely to attract people with comparable degrees of risk aversion. The regression results are reported in Column 1 of Table 7. We find that the basic conclusions are qualitatively similar to the baseline estimation – unofficial incomes of the officials exist and tend to rise with the rank of the officials.

Second, we restrict the comparison group to those households with at least a member working in a state-owned enterprise (SOE). Again, under the assumption that the risk profile and risk aversion are similar between the two groups, the results in Column 2 of Table 7 suggests that the main conclusions from Table 4 are not driven by differential risks or risk aversion.

Third, we combine households working in either a government-owned non-profit institution or a state-owned enterprise to form a larger comparison group. Again, the regression results (in Column 3 of Table 7) are very similar to the baseline case in Table 4.

Could government officials anticipate a much faster growth of future income than non-officials? Since we have household (legal) income history for 2006-2013 for all households in the sample, we can compare the actual income growth during this period. From Table 8, we see that the income growth of the recent past was in fact slower for households with an official (10.6%) than for households with no one in the government

(13.8%). In fact, the growth rates tend to be systematically slower, the more senior is the official rank. So the actual data on income growth in the recent past do not support the notion that income growth is likely to be much faster for officials.

Our procedure could have under-estimated the officials' life time wealth if many of them expect to leave the government before retirement and work in a more lucrative private sector job. Such a phenomenon is relatively common in the United States and known as "revolving doors." However, unlike the United States, the "revolving doors" phenomenon is relatively uncommon in China. For the eight-year (2006-2013) period, since we know the employment history of both husband and wife, we can compute an average quit rate for government officials in the sample. We find that the quit rate is 0.22% per annum. For an official who is 20 years away from retirement, the probability that he/she will stay in the government until retirement is 96% (= (1-0.0022)^20). In other words, once entering the government, an overwhelming majority of the officials expect to stay in the government forever. (The low turnover rate would not be surprising if the opportunity to obtain unofficial income is rich for officials.)

In Table 9, we examine the sensitivity of the results to allowing government officials to quit the government job and obtain a better paying private sector job before retirement. Since the average level of permanent income of a non-official household is 245% higher than that of an official household, we assume that a given household with an official can expect to leave the government job at the rate of 0.22% a year and see a jump in income that is commensurate to the private sector job; we assume further that once an official leaves the government, he/she stays outside the government until retirement. As the table demonstrates, this modification reduces the implied unofficial income by a modest amount but does not fundamentally change our conclusion.

Government officials may receive in-kind or other non-salary benefits such as free medical care and allowance for heating expense in the winter. Most importantly, government officials do not need to contribute to their pension plans but expect to

receive a pension in retirement[10]. These do not show up as part of the payroll information recorded in the data base but are nonetheless part of the officials' legal income. If we do not consider them in their life-time wealth, we may under-estimate their true legally obtained wealth and therefore over-state the extent of the unofficial incomes of the officials.

We now attempt to assign a monetary value to these benefits. After consulting government documents governing these benefits during the sample period, we identify three types of benefits that are not included in the salary. By regulations, all other benefits should be counted in the official salary. (Note that the use of a government car is for officials at the rank of *vice minister* or higher and is not relevant for the officials in our sample.) Banquets outside official functions are not formally allowed, and should be considered as part of the unofficial income.

We impute the equivalent monetary values for these benefits based on the statistics on urban household consumption provided by the local statistics bureau in the sample city. More precisely, for each type of benefit, we assume the monetary value is equal to what the average of the top 20% households pay for that benefit in the city in the same year. As listed in Table 10, for instance, in 2012, an average family in the top 20% of the household income distribution pay 380 yuan a month for central heating. We take this as the monetary value of free central heating to households with an official. Similarly, we calculate the values for other benefits. The total value of all non-salary benefits for an official was 2,947 yuan in 2012. That is substantially smaller than the unofficial income estimated before.

In Table 11, we re-estimate the specification with a revised estimate of the officials' life-time income that take into account the monetary values of these benefits. The results turn out to be very similar to the baseline case, with the estimated unofficial incomes slightly smaller. Therefore, our results are unlikely to be driven by the omission of the legal non-salary benefits.

[10] A change in rule in January 2015 now required civil servants to also contribute to their pensions.

One potential reason for why households with an official buy a more expensive homes is that they may over-pay. Since many government officials are not directly involved in market activities, it is possible that they have less information about the "reasonable" price of a specific housing unit (information disadvantage), or are less skilled in the bargaining with the sellers (skill disadvantage). In this case, they might have to spend more for an otherwise equivalent housing unit.

This hypothesis can be rejected in two ways. First, as shown in Appendix Table 3, the results are robust for households with only one member working in the government; in other words, official households buy more expensive homes even when one household member works outside the government. Second, since the total value of a house can be written as the product of size (floor space in squared meters) and unit cost (price in yuan per squared meters), we run separate regressions with size and unit cost as dependent variables, respectively. The results are reported in Table 12. We see that the households with an official pay more for their homes almost entirely because they buy physically larger homes. Indeed, the size of the home purchase tends to rise monotonically with the rank of the officials. We therefore reject the information disadvantage or skill disadvantage hypothesis.

An opposite story from the "information disadvantage" or "skill disadvantage story" is the notion that government officials in offices with discretionary power over permits, licenses or other resource allocation decisions may receive a discount from real estate developers when they buy a home (Fang, Gu and Zhou, 2014). The discount is estimated to be 1.05% on average and may go up with the rank of the officials. Since the discount appears small, we do not expect it to alter our results too much. Nonetheless, the discount might be considered a form of unofficial income, and may also lead officials to buy a bigger house than they otherwise would have. We follow Fang, Gu and Zhou's (2014) strategy to test whether similar pattern exists in our data. Column 1 of Table 12 can be regarded as one way to check for discounts; we find no evidence of discount by that specification. However, the sample includes all home purchase transactions, including those for which the sellers are not real estate

companies.

In Columns 3 and 4 of Table 12, we re-do the exercise but restrict the sample to only newly built units (when the purchase is done from real estate companies). We control for a full set of households' attributes, hedonic attributes of the unit, and monthly fixed effects. Following Fang, Gu and Zhou (2014), we also narrow the group of official households to those who may hold power over real estate companies, including development and reform committee, taxation, housing administration, land administration, and construction planning.

In column 3, the coefficient for official households is negative – consistent with the discount story of Fang, Gu, and Zhou (2014) – but is statistically insignificant. In Column 4, we allow for potentially different discount rates for officials of different ranks. This time, we indeed find some evidence of gradients in the discount, and the price discounts are especially significant for officials on the *zheng chu* and *zheng ju* levels.[11]

Additional robustness checks are reported in Table 13. First, in Column 1, we impose linearity on the effect of household permanent income on the home value. In Columns 2 and 3, we deal with potential nonlinearity by introducing the square and cubic terms of the permanent income. Second, we use a propensity score matching procedure to select non-official households with the most similar attributes to the households with an official. The results are in Column 4. Our key findings remain robust in all these cases.

While 90% of the households with an official have a non-official spouse, 10% of the households have both the husband and the wife as officials. In Column (1) of Appendix Table 3, we use two separate dummies to denote two-official households and one-official households. We find that households with one official tend to have an unofficial income that is about 60.4%, of the official income. In comparison, the ratio

[11] Another related question is, whether the government official households receive preferential treatment in the terms of mortgages, such as lower interest rate or higher (or lower) loan-to-value ratio. We run regressions with the interest rate or loan-to-value (LTV) ratio as the dependent variables, respectively, but found no significant differences between the official and non-official households.

increases to about 125.9% for households with two officials. In Column (2) of Appendix Table 3, we check if the unofficial income differs when the husband or the wife is an official and find no statistically significant difference.

Some of the home buyers already own a home before the purchase. While we do not know the value of these homes, the data base has an indicator variable for ownership of other homes. We use a logit model to see if, other things equal, households with an official are more likely to be home owners already. The results are in Appendix Table 4. Controlling for household income, age of household head, and other factors, households with an official have a higher probability of owning a prior home by 29.9%.The homeownership rate also generally increases with the rank of the official, but does not significantly vary with the type of bureaus.

In Column 1-2 of Appendix Table 5, we re-do the regressions in Table 4 by adding a dummy for prior home ownership. We find this extra control variable does not alter the results on the coefficients for households with an official. This suggests that the baseline results are not driven by prior home ownership. In the latter two columns we use the average housing value in the corresponding years to impute the value of the existing unit and then use the total value of the two units as the dependent variable. Again the results are consistent with the conclusions earlier.

4. Evidences from a Cross Section of Regions

We now check if our key conclusions can be corroborated by a different data set. The Urban Household Survey (UHS) is an annual survey by the National Bureau of Statistics of China (NBSC). Each year about 50,000 households in a stratified sample of cities are surveyed. The sample of households in a given city is proportional to its population. In each city, households are chosen using a stratified three-stage approach (neighborhood, housing complex, and household) probability proportional size (PPS) random sampling. Chosen households by law have to participate in the survey and

provide accurate information.[12]

Through the China Data Center at Tsinghua University, we are able to obtain micro-level data of the UHS in 8 provinces plus the national capital from 2002 to 2009. The eight provinces are Liaoning, Anhui, Hubei, Guangdong, Sichuan, Shaanxi, and Gansu, which spread over both coastal and inland regions.

Of the 152,055 households covered in the sample, 3,280 reported purchases of housing units in the survey years. We focus on these home purchasers in the following analysis. (Households that do not make a home purchase in a survey year do not report the value of their existing home.) Table 14 lists the major statistics of the key variables.

Respondents' occupation has two attributes: ownership and industry classification of the employers. We define civil servants/government officials as someone whose ownership of employers is "government" and industry affiliation is "public management." This classification includes both officials and non-official government workers. While the data set has multiple cities, a shortcoming is that we are not able to differentiate government employees by rank or office.

We use the UHS data to perform two tasks. First, we will check if we can uncover the existence of unofficial income in this multi-city sample too. Second, we will check if there are cross-city variations in the estimated extent of unofficial income that can be linked to some cross-city variations in corruption. The latter should help to further bolster the case that what we interpret as unofficial income is indeed associated with some under-the-table payment.

In our regressions, the dependent variable is the value of the dwelling unit purchased (overwhelmingly an apartment). For the right hand side, "household permanent income" includes all pre-tax incomes such as wages and bonuses. We control all plausible variables that the UHS database allows us to control. They include household size, *hukou* status of the family, and the gender, age, education level of the

[12] Official statistics such as urban household disposal income, or household expenditures on consumption reported by NBSC are based on the UHS.

household head as control variables. In addition, we control for separate city and year fixed effects.

The regression results are in the first column of Table 15. The coefficients on both the dummy variable for households with someone working in the government and household income are positive and statistically significant. On average, the unofficial income is estimated to be 25.2% ($\exp(0.244/0.908) \approx 1.252$) of the reported legal income. This estimate is lower than the corresponding number in the more detailed single-city database partly because we are not able to separate non-official civil service workers from government officials. Nonetheless, the results from the multi-region data set suggests unofficial income is a prevalent phenomenon, not unique to the single city sample.

Because only 2.2% of the households in the UHS sample purchased a home during the survey years, one may wonder if the households that made a purchase and those that did not are systematically different. For this reason, we also implement a Heckman two-stage estimation to account for potential selection; we obtain similar results. In a separate exercise, we exclude the city used in the first half of the paper from the multi-city UHS sample but obtain essentially the same result as in Table 15. This suggests that the particular city in the first half of the paper is not that unique and does not play a dominant role in the patterns reported in Table 15. These regression results are not reported to save space,

We now explore possible cross-city variations in unofficial incomes. Since Mr. Xi Jingping assumed the position of Secretary General of the Communist Party in 2013 and later of State President in 2014, an aggressive anti-corruption campaign has been pursued and many officials have been arrested or indicted for corruption. This allows us to separate cities into two categories: those with either Party chief or mayor found to be corrupt in subsequent years, and those with no exposed corruption cases at the top. One hypothesis of interest is that if the top leaders of a city are rotten, the governance mechanism of the city is likely to have broken down, and the problem of unofficial incomes in the city in general is likely to be more severe than the national average even

before the corruption cases of the top city officials are exposed.

It is important to note that some of the top city officials not exposed for corruption could still be corrupt, and therefore the bribe-taking behavior of their underlines may not be different from their counterparts in cities with deposed top officials. This means that the estimated difference in unofficial incomes between cities with and without exposed corrupt top officials could be a lower bound of the true magnitude.

In the second column of Table 15, we add an interaction term between a dummy for households with a government sector employee and a dummy for cities with exposed corruption at the top of the city government. Indeed, the coefficient for the interaction term is positive and statistically significant. This is consistent with the idea that rotten tops make rotten bottoms more likely.

Because top city officials not exposed for corruption could still be corrupt, if the interaction term is not significant, it does not disapprove the idea that corruption at the top enables corruption among the underlines. The data pattern supports the idea that what we interpret as unofficial income is indeed linked to corruption.

To see if cities with different levels of political authority exhibit different levels of unofficial incomes, we separate the cities into (a) the national capital (Beijing), (b) provincial capitals, and (c) others. While the point estimates are consistent with the notion that the unofficial incomes are the highest in the national capital, and followed by provincial capitals, the differences among the three types of cities are not statistically significant.

In another specification not reported here, we also investigate possible differences in unofficial incomes among the east coast, central part of the country, and western inland regions, but find no statistically significant differences.

Conclusion

This paper proposes a methodology to infer the prevalence and severity of

unofficial incomes of the officials by making use of observed big-ticket purchases such as home. Applying the methodology to China, we find that officials tend to buy a more expensive home that could be expected from the life-time wealth inferred from their legal income. We find this difference is not likely explained by differences in information, skills, risks and risk preference. We interpret it as evidence of unofficial incomes.

Furthermore, we find that the extent of the unofficial income as a multiple of the legal income tends to rise steeply with the rank of the officials. For example, while officials at the bottom of the ranks have unofficial income that is 20% of the legal income, the most senior officials at the rank of *zheng ju* may have unofficial income that is more than 300% of the legal income.

We corroborate the basic finding of prevalence of unofficial incomes in a cross section of cities as well. In cities with top leaders that are subsequently arrested or indicted on a major corruption charge, we find a higher level of unofficial incomes for the official ranks in general.

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Table 1: Annual Sample Distribution

	Total	With No One Working in the Government	With Non-Official Civil Servants	With One Government Official	With Two Government Officials
2006	6573	5387 (81.96%)	550 (8.37%)	570 (8.67%)	66 (1.00%)
2007	5927	4574 (77.17%)	603 (10.17%)	671 (11.32%)	79 (1.33%)
2008	6194	5116 (82.60%)	498 (8.04%)	508 (8.20%)	72 (1.16%)
2009	16848	14535 (86.27%)	1141 (6.77%)	1043 (6.19%)	129 (0.77%)
2010	11266	9806 (87.04%)	714 (6.34%)	648 (5.75%)	98 (0.87%)
2011	9489	8813 (92.88%)	436 (4.59%)	226 (2.38%)	14 (0.15%)
2012	22697	21192 (93.37%)	936 (4.12%)	510 (2.25%)	59 (0.26%)
2013	28377	26275 (92.59%)	1438 (5.07%)	584 (2.06%)	80 (0.28%)
Total	107371	95698 (89.13%)	6316 (5.88%)	4760 (4.43%)	604 (0.56%)

Note: Share in parentheses.

Table 2: Summary Statistics of Key Variables

	Average	Std. Dev.	10th Percentile	50th Percentile	90th Percentile
A. Transaction and Mortgage					
Total value of the unit (in thousand yuan RMB; in real term of 2010)	1092.48	598.41	471.03	1000.00	1815.15
Downpayment (in thousand yuan RMB; in real term of 2010)	463.84	425.35	128.47	332.06	990.00
Monthly service (in yuan RMB; in real term of 2010)	3388.29	1860.10	1493.00	3288.00	4974.00
B. Housing Attribute					
Floor level of the unit	6.76	5.34	2.00	5.00	15.00
Floor area of the unit (in square meters)	92.66	30.89	57.09	89.08	134.66
Unit price (in yuan per square meter; in real term of 2010)	11671.29	5545.56	5324.60	10924.06	18792.73
C. Household Characteristics					
Current reported monthly household income (in yuan RMB; in real term of 2010)	11300.70	6410.87	5198.02	10108.27	18513.49
Current reported monthly household consumption expenditures (in yuan RMB; in real term of 2010)	1150.24	15956.08	354.99	458.38	2171.08
Current reported household financial wealth (in thousand yuan RMB; in real term of 2010)	233.89	447.09	0.00	88.75	568.18
Current reported household outstanding debt (in thousand yuan RMB; in real term of 2010)	0.95	22.77	0.00	0.00	0.00
Current reported housing ownership (1=owning at least 1 unit; 0=o/w)	0.17	0.37	0.00	0.00	1.00
The applicant is male (1=yes; 0=o/w)	0.59	0.49	0.00	1.00	1.00
Age of the husband	34.63	6.92	28.00	33.00	45.00
Age of the wife	33.27	6.67	27.00	31.00	44.00
The household is with local *hukou* (1=yes; 0=o/w)	0.81	0.40	0.00	1.00	1.00
The husband is with a master or PhD degree (1=yes; 0=o/w)	0.21	0.40	0.00	0.00	1.00
The husband is with an education level lower than bachelor (1=yes; 0=o/w)	0.16	0.36	0.00	0.00	1.00
The wife is with a master or PhD degree (1=yes; 0=o/w)	0.17	0.38	0.00	0.00	1.00
The wife is with an education level lower than bachelor (1=yes; 0=o/w)	0.16	0.36	0.00	0.00	1.00
The husband is with a high professional status (1=yes; 0=o/w)	0.06	0.23	0.00	0.00	1.00
The husband is with a middle professional status (1=yes; 0=o/w)	0.12	0.33	0.00	0.00	1.00
The wife is with a high professional status (1=yes; 0=o/w)	0.04	0.19	0.00	0.00	1.00
The wife is with a middle professional status (1=yes; 0=o/w)	0.13	0.34	0.00	0.00	1.00

Table 3: Features of Households by Type

	Percentage	Winsorized Life Time Household Income (in thousand yuan RMB)	Current Monthly Household Income (in yuan RMB)	Current Monthly Household Expenditure (in yuan RMB)	Current Household Financial Wealth (in thousand yuan RMB)	Current Household Debt (in thousand yuan RMB)
HHs with no one working in the government	89.13%	547.78 (1057.49)	11498.50 (6618.53)	1171.92 (16859.26)	236.65 (450.19)	0.97 (23.24)
HHs with no-official civil servants	5.88%	250.33 (484.88)	9206.82 (3959.68)	930.83 (1920.84)	179.06 (352.42)	0.45 (11.34)
HHs with government officials	4.99%	158.80 (232.74)	10235.80 (3967.31)	1021.75 (4570.64)	249.29 (485.45)	1.16 (24.28)
FU KE level	1.85%	195.61 (292.29)	9379.17 (3401.43)	941.13 (1138.80)	211.45 (365.96)	0.90 (20.39)
ZHENG KE level	1.94%	144.63 (213.11)	10133.48 (3744.62)	1092.53 (7101.77)	246.81 (491.98)	0.90 (16.10)
FU CHU level	1.07%	124.05 (126.63)	10987.63 (3737.75)	1291.71 (9676.58)	289.35 (535.98)	1.85 (37.70)
ZHENG CHU level	0.36%	124.63 (92.09)	12776.15 (4284.81)	1042.60 (1083.63)	322.35 (723.85)	1.05 (20.74)
FU JU level	0.06%	140.91 (96.07)	14886.08 (5878.86)	1022.23 (988.24)	294.32 (406.24)	0 (0)
ZHENG JU level	0.02%	123.48 (94.95)	17319.76 (11934.63)	926.27 (767.91)	235.70 (475.45)	0 (0)
General offices	1.42%	156.25 (182.59)	10166.68 (4258.43)	1123.09 (8380.70)	227.94 (462.48)	0.78 (14.50)
Legal system	1.74%	160.09 (226.16)	9992.08 (3438.19)	963.71 (952.95)	239.85 (448.84)	1.40 (26.54)
Resource allocation	0.58%	140.86 (155.02)	10398.61 (3579.02)	968.93 (1468.02)	275.61 (542.68)	2.34 (46.69)
Mega projects	0.09%	151.91 (243.72)	10936.35 (4492.52)	1098.45 (1023.87)	252.25 (563.12)	0 (0)
Economic system	0.50%	155.04 (243.87)	10314.53 (3885.03)	1616.97 (14141.17)	244.06 (471.01)	3.05 (50.03)
Others	1.35%	157.20 (258.25)	10399.34 (3782.50)	973.84 (1114.96)	255.80 (499.42)	0.64 (12.30)

Note: Standard deviations in parentheses; all the monetary variables are in real term (2010 yuan).

Table 4: Evidence of Unofficial Income: Basic Specification

	(1) log(winsorized home value)	(2) log(winsorized home value)	(3) log(winsorized home value)	(4) log(winsorized home value)
With Non-Official Civil Servant(s)	0.027***	0.027***	0.026***	0.027***
	(0.005)	(0.005)	(0.005)	(0.005)
With Government Official(s)	0.076***			
	(0.005)			
FU-KE Official		0.043***		0.025**
		(0.008)		(0.011)
ZHENG-KE Official		0.073***		0.058***
		(0.008)		(0.011)
FU-CHU Official		0.081***		0.071***
		(0.011)		(0.013)
ZHENG-CHU Official		0.144***		0.136***
		(0.018)		(0.019)
FU-JU Official		0.184***		0.170***
		(0.043)		(0.044)
ZHENG-JU Official		0.243***		0.231***
		(0.081)		(0.081)
Official in General Offices			0.049***	-0.005
			(0.009)	(0.012)
Official in Legal System			0.069***	0.023*
			(0.008)	(0.012)
Official in Financial and Resource System			0.100***	0.058***
			(0.014)	(0.016)
Official in Bureaus On Mega Projects			0.105***	0.058
			(0.035)	(0.036)
Official in Bureaus On Economic System			0.062***	0.013
			(0.015)	(0.017)
Official in Other Bureaus			0.038***	
			(0.009)	
log(Winsorized Life Time Income)_1	0.142***	0.140***	0.143***	0.140***
	(0.007)	(0.007)	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.172***	0.173***	0.172***	0.173***
	(0.018)	(0.018)	(0.018)	(0.018)
log(Winsorized Life Time Income)_3	0.149***	0.149***	0.149***	0.149***
	(0.019)	(0.019)	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.038***	0.037***	0.038***	0.037***
	(0.013)	(0.013)	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.012***	0.012***	0.012***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)
Gender of Applicant	-0.005**	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
log(Age of Husband)	-0.251	-0.189	-0.257	-0.185
	(0.357)	(0.357)	(0.357)	(0.357)
log(Age of Husband)^2	0.088*	0.079	0.089*	0.078
	(0.051)	(0.051)	(0.051)	(0.051)
log(Age of Wife)	0.330	0.393	0.324	0.397
	(0.348)	(0.348)	(0.348)	(0.348)
log(Age of Wife)^2	-0.008	-0.017	-0.007	-0.018
	(0.050)	(0.050)	(0.050)	(0.050)
Local *HUKOU*	0.000	0.001	0.000	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Phd or Master Education – Husband	0.057***	0.057***	0.058***	0.057***
	(0.003)	(0.003)	(0.003)	(0.003)
Lower than Bachelor Education – Husband	-0.105***	-0.105***	-0.105***	-0.105***
	(0.004)	(0.004)	(0.004)	(0.004)
Phd or Master Education –Wife	0.036***	0.036***	0.036***	0.035***
	(0.003)	(0.003)	(0.003)	(0.003)
Lower than Bachelor Education –Wife	-0.068***	-0.068***	-0.068***	-0.068***
	(0.004)	(0.004)	(0.004)	(0.004)
High Profession Status – Husband	0.096***	0.096***	0.096***	0.096***
	(0.005)	(0.005)	(0.005)	(0.005)
Middle Profession Status – Husband	0.045***	0.045***	0.045***	0.046***
	(0.003)	(0.003)	(0.003)	(0.003)
High Profession Status – Wife	0.056***	0.055***	0.056***	0.055***
	(0.006)	(0.006)	(0.006)	(0.006)

Middle Profession Status – Wife	0.030***	0.030***	0.030***	0.030***
	(0.003)	(0.003)	(0.003)	(0.003)
District-Month Fixed Effect	YES	YES	YES	YES
N	107130	107130	107130	107130
R^2	0.497	0.498	0.497	0.498

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level.

Table 5: Measures of Life Time Income under Alternative Assumptions (in thousand yuan RMB)

	Average	Std. Dev.	Median
A. Basic assumptions: 1/2 of realized income growth rate between 2008-2013; discount rate of 5%; including current net wealth; not considering consumption expenditures			
HHs with no one working in the government	547.79	1057.49	212.00
HHs with no-official civil servants	250.33	484.88	140.42
HHs with government officials	158.80	232.74	118.35
B. 1/3 of realized income growth rate			
HHs with no one working in the government	309.00	544.30	166.51
HHs with no-official civil servants	157.16	217.07	114.56
HHs with government officials	125.46	133.94	104.10
C. Following the realized income growth rate			
HHs with no one working in the government	1362.03	2046.10	451.46
HHs with no-official civil servants	767.36	1348.11	271.77
HHs with government officials	349.85	667.09	175.12
D. Discount rate of 3%			
HHs with no one working in the government	575.66	1201.80	194.52
HHs with no-official civil servants	249.55	544.35	128.19
HHs with government officials	145.93	251.56	104.09
E. Discount rate of 10%			
HHs with no one working in the government	434.62	653.66	229.15
HHs with no-official civil servants	299.06	311.05	155.82
HHs with government officials	176.94	171.20	142.52
F. Not considering current net wealth			
HHs with no one working in the government	534.57	1057.69	196.75
HHs with no-official civil servants	240.26	484.53	130.29
HHs with government officials	144.33	231.40	105.57
G. Considering consumption expenditures			
HHs with no one working in the government	286.60	879.37	150.77
HHs with no-official civil servants	149.31	403.75	103.25
HHs with government officials	114.38	191.50	92.36
H. Later retirement for officials			
HHs with no one working in the government	547.79	1057.49	212.00
HHs with no-official civil servants	250.33	484.88	140.42
HHs with government officials	185.49	298.53	135.32
I. Changing life expectancy over age			
HHs with no one working in the government	546.73	1056.07	211.42
HHs with no-official civil servants	249.73	484.29	140.06
HHs with government officials	158.08	232.38	117.67

Note: in all the scenarios, it is assumed that: (1) males are retired at 60 and females are retired at 55 (for those with bachelor or higher educations) or 50 (others); (2) the life expectancy is 84 for males and 80 for females.

Table 6: Evidence of Unofficial Income: Different Ways to Infer Life Time Income

A. With different assumptions on income growth rate

	1/3 of realized income growth rate		100% of realized income growth rate	
	(1)	(2)	(3)	(4)
With Non-Official Civil Servant(s)	0.031***	0.031***	0.019***	0.019***
	(0.005)	(0.005)	(0.005)	(0.005)
FU-KE Official	0.046***	0.028**	0.035***	0.018
	(0.008)	(0.011)	(0.008)	(0.011)
ZHENG-KE Official	0.070***	0.056***	0.070***	0.056***
	(0.008)	(0.011)	(0.008)	(0.011)
FU-CHU Official	0.076***	0.066***	0.085***	0.075***
	(0.011)	(0.013)	(0.011)	(0.013)
ZHENG-CHU Official	0.138***	0.131***	0.150***	0.143***
	(0.018)	(0.019)	(0.018)	(0.019)
FU-JU Official	0.179***	0.166***	0.189***	0.175***
	(0.043)	(0.043)	(0.043)	(0.044)
ZHENG-JU Official	0.240***	0.228***	0.253***	0.241***
	(0.080)	(0.081)	(0.082)	(0.082)
Official in General Offices		-0.005		-0.006
		(0.012)		(0.013)
Official in Legal System		0.024**		0.021*
		(0.012)		(0.012)
Official in Financial and Resource System		0.055***		0.062***
		(0.016)		(0.017)
Official in Bureaus On Mega Projects		0.058		0.058
		(0.036)		(0.036)
Official in Bureaus On Economic System		0.012		0.012
		(0.017)		(0.017)
log(Winsorized Life Time Income)_1	0.163***	0.163***	0.103***	0.102***
	(0.007)	(0.007)	(0.006)	(0.006)
log(Winsorized Life Time Income)_2	0.199***	0.199***	0.089***	0.089***
	(0.020)	(0.020)	(0.012)	(0.012)
log(Winsorized Life Time Income)_3	0.179***	0.180***	-0.016	-0.016
	(0.023)	(0.023)	(0.011)	(0.011)
log(Winsorized Life Time Income)_4	0.111***	0.112***	-0.003	-0.003
	(0.019)	(0.019)	(0.007)	(0.007)
log(Winsorized Life Time Income)_5	-0.006*	-0.006*	0.055***	0.055***
	(0.003)	(0.003)	(0.005)	(0.005)
N	107130	107130	107130	107130
R^2	0.504	0.504	0.490	0.490

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

B. With different discount rate

	Discount rate = 3%		Discount rate = 10%	
	(1)	(2)	(3)	(4)
With Non-Official Civil Servant(s)	0.026***	0.026***	0.030***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)
FU-KE Official	0.042***	0.024**	0.045***	0.027**
	(0.008)	(0.011)	(0.008)	(0.011)
ZHENG-KE Official	0.073***	0.058***	0.072***	0.057***
	(0.008)	(0.011)	(0.008)	(0.011)
FU-CHU Official	0.082***	0.072***	0.079***	0.069***
	(0.011)	(0.013)	(0.011)	(0.013)
ZHENG-CHU Official	0.144***	0.136***	0.143***	0.135***
	(0.018)	(0.019)	(0.018)	(0.019)
FU-JU Official	0.184***	0.170***	0.184***	0.170***
	(0.043)	(0.044)	(0.043)	(0.043)
ZHENG-JU Official	0.242***	0.230***	0.247***	0.235***
	(0.081)	(0.081)	(0.081)	(0.081)
Official in General Offices		-0.005		-0.005
		(0.012)		(0.012)
Official in Legal System		0.023*		0.024**
		(0.012)		(0.012)
Official in Financial and Resource System		0.059***		0.057***
		(0.016)		(0.016)
Official in Bureaus On Mega Projects		0.058		0.059*
		(0.036)		(0.036)
Official in Bureaus On Economic System		0.013		0.012
		(0.017)		(0.017)
log(Winsorized Life Time Income)_1	0.143***	0.142***	0.138***	0.138***
	(0.007)	(0.007)	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.167***	0.167***	0.168***	0.168***
	(0.017)	(0.017)	(0.020)	(0.020)
log(Winsorized Life Time Income)_3	0.121***	0.121***	0.131***	0.131***
	(0.018)	(0.018)	(0.022)	(0.022)
log(Winsorized Life Time Income)_4	0.008	0.008	0.048***	0.048***
	(0.012)	(0.012)	(0.016)	(0.016)
log(Winsorized Life Time Income)_5	0.012***	0.012***	0.002	0.002
	(0.003)	(0.003)	(0.004)	(0.004)
N	107130	107130	107130	107130
R^2	0.497	0.497	0.499	0.499

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

C. With different components

	Not considering current net wealth		Considering consumption expenditures	
	(1)	(2)	(3)	(4)
With Non-Official Civil Servant(s)	0.024***	0.024***	0.027***	0.027***
	(0.005)	(0.005)	(0.005)	(0.005)
FU-KE Official	0.042***	0.025**	0.043***	0.027**
	(0.008)	(0.011)	(0.008)	(0.011)
ZHENG-KE Official	0.071***	0.057***	0.069***	0.055***
	(0.008)	(0.011)	(0.008)	(0.011)
FU-CHU Official	0.077***	0.068***	0.080***	0.071***
	(0.011)	(0.013)	(0.011)	(0.013)
ZHENG-CHU Official	0.138***	0.131***	0.142***	0.136***
	(0.018)	(0.019)	(0.018)	(0.019)
FU-JU Official	0.178***	0.165***	0.183***	0.170***
	(0.043)	(0.044)	(0.043)	(0.043)
ZHENG-JU Official	0.234***	0.223***	0.238***	0.226***
	(0.081)	(0.081)	(0.083)	(0.083)
Official in General Offices		-0.006		-0.006
		(0.012)		(0.013)
Official in Legal System		0.021*		0.021*
		(0.012)		(0.012)
Official in Financial and Resource System		0.059***		0.056***
		(0.016)		(0.017)
Official in Bureaus On Mega Projects		0.056		0.054
		(0.036)		(0.037)
Official in Bureaus On Economic System		0.012		0.012
		(0.017)		(0.017)
log(Winsorized Life Time Income)_1	0.166***	0.166***	0.050***	0.050***
	(0.006)	(0.006)	(0.004)	(0.004)
log(Winsorized Life Time Income)_2	0.167***	0.167***	0.140***	0.139***
	(0.017)	(0.017)	(0.017)	(0.017)
log(Winsorized Life Time Income)_3	0.115***	0.115***	0.125***	0.126***
	(0.018)	(0.018)	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.008	0.008	0.102***	0.102***
	(0.012)	(0.012)	(0.015)	(0.015)
log(Winsorized Life Time Income)_5	0.014***	0.014***	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
N	107130	107130	107130	107130
R^2	0.499	0.499	0.500	0.500

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

D. With different settings on retirement age or life expectancy

	Later retirement for officials		Changing life expectancy with age	
	(1)	(2)	(3)	(4)
With Non-Official Civil Servant(s)	0.027***	0.028***	0.027***	0.027***
	(0.005)	(0.005)	(0.005)	(0.005)
FU-KE Official	0.029***	0.012	0.043***	0.025**
	(0.008)	(0.011)	(0.008)	(0.011)
ZHENG-KE Official	0.055***	0.041***	0.073***	0.058***
	(0.008)	(0.011)	(0.008)	(0.011)
FU-CHU Official	0.062***	0.053***	0.081***	0.071***
	(0.011)	(0.013)	(0.011)	(0.013)
ZHENG-CHU Official	0.127***	0.120***	0.144***	0.136***
	(0.018)	(0.019)	(0.018)	(0.019)
FU-JU Official	0.171***	0.158***	0.184***	0.171***
	(0.043)	(0.044)	(0.043)	(0.044)
ZHENG-JU Official	0.223***	0.212***	0.243***	0.232***
	(0.081)	(0.081)	(0.081)	(0.081)
Official in General Offices		-0.007		-0.005
		(0.012)		(0.012)
Official in Legal System		0.023*		0.023*
		(0.012)		(0.012)
Official in Financial and Resource System		0.058***		0.058***
		(0.016)		(0.016)
Official in Bureaus On Mega Projects		0.055		0.058
		(0.036)		(0.036)
Official in Bureaus On Economic System		0.011		0.013
		(0.017)		(0.017)
log(Winsorized Life Time Income)_1	0.137***	0.137***	0.141***	0.140***
	(0.007)	(0.007)	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.169***	0.169***	0.173***	0.173***
	(0.018)	(0.018)	(0.018)	(0.018)
log(Winsorized Life Time Income)_3	0.137***	0.137***	0.149***	0.148***
	(0.019)	(0.019)	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.035***	0.036***	0.037***	0.037***
	(0.013)	(0.013)	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.012***	0.012***	0.012***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)
N	107130	107130	107130	107130
R^2	0.498	0.498	0.498	0.498

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Table 7: Evidence of Unofficial Income: Controlling for Risks and Risk Preference

	(1) With employees of public institutions as the comparison group	(2) With employees of SOEs as the comparison group	(3) With employees of public institutions or SOEs as the comparison group
With Non-Official Civil Servant(s)	0.050***	0.013**	0.041***
	(0.005)	(0.006)	(0.005)
FU-KE Official	0.054***	0.010	0.041***
	(0.011)	(0.012)	(0.012)
ZHENG-KE Official	0.086***	0.038***	0.071***
	(0.011)	(0.012)	(0.011)
FU-CHU Official	0.101***	0.048***	0.084***
	(0.013)	(0.014)	(0.013)
ZHENG-CHU Official	0.165***	0.110***	0.146***
	(0.019)	(0.020)	(0.019)
FU-JU Official	0.211***	0.155***	0.184***
	(0.044)	(0.046)	(0.044)
ZHENG-JU Official	0.251***	0.195**	0.246***
	(0.082)	(0.084)	(0.082)
Official in General Offices	-0.008	-0.011	-0.006
	(0.013)	(0.013)	(0.013)
Official in Legal System	0.022*	0.026**	0.025**
	(0.012)	(0.012)	(0.012)
Official in Financial and Resource System	0.059***	0.051***	0.059***
	(0.017)	(0.017)	(0.017)
Official in Bureaus On Mega Projects	0.061*	0.042	0.054
	(0.036)	(0.037)	(0.036)
Official in Bureaus On Economic System	0.013	0.010	0.012
	(0.017)	(0.018)	(0.017)
log(Winsorized Life Time Income)_1	0.150***	0.176***	0.165***
	(0.010)	(0.012)	(0.009)
log(Winsorized Life Time Income)_2	0.177***	0.179***	0.184***
	(0.025)	(0.032)	(0.023)
log(Winsorized Life Time Income)_3	0.170***	0.167***	0.170***
	(0.029)	(0.040)	(0.026)
log(Winsorized Life Time Income)_4	0.091***	0.065**	0.084***
	(0.022)	(0.030)	(0.019)
log(Winsorized Life Time Income)_5	0.014**	0.015*	0.017***
	(0.007)	(0.008)	(0.005)
N	44309	29156	57447
R^2	0.551	0.553	0.540

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Table 8: Real Income Growth of Government Official Households

	2008	2009	2010	2011	2012	2013	Average
Full Sample	13.15% (25.17%)	20.35% (28.98%)	20.21% (31.29%)	17.07% (27.79%)	13.00% (24.55%)	10.36% (21.52%)	13.79% (8.36%)
HHs with no one working in the government	14.17% (26.32%)	21.28% (30.43%)	21.21% (32.69%)	16.69% (28.92%)	13.42% (25.49%)	10.73% (22.53%)	14.24% (8.75%)
HHs with no-official civil servants	8.38% (16.89%)	16.25% (18.55%)	15.43% (20.44%)	20.70% (19.31%)	10.98% (17.69%)	8.82% (12.88%)	12.46% (5.82%)
HHs with government officials	6.13% (14.57%)	13.01% (14.54%)	11.66% (15.96%)	18.53% (15.45%)	8.75% (13.26%)	6.44% (10.26%)	10.56% (4.75%)
FU KE Level	7.43% (15.36%)	14.92% (17.57%)	12.75% (15.48%)	20.57% (17.86%)	8.81% (13.67%)	7.31% (9.66%)	11.42% (4.90%)
ZHENG KE Level	5.74% (15.06%)	12.49% (13.24%)	11.25% (16.77%)	18.00% (14.29%)	8.78% (11.78%)	5.94% (9.78%)	10.31% (4.67%)
FU CHU Level	3.99% (10.86%)	10.65% (9.86%)	9.84% (14.23%)	17.12% (12.29%)	7.93% (11.24%)	5.59% (11.94%)	9.34% (4.18%)
ZHENG CHU Level	4.45% (13.70%)	9.86% (10.17%)	8.60% (10.77%)	15.57% (9.90%)	6.19% (10.23%)	6.06% (8.24%)	8.39% (3.24%)
FU JU Level	2.25% (8.46%)	9.20% (12.48%)	10.32% (24.42%)	11.51% (10.48%)	13.90% (45.64%)	6.31% (7.80%)	7.61% (2.82%)
ZHENG JU Level	4.65% (9.25%)	11.49% (13.07%)	5.64% (3.50%)	8.80% (16.72%)	8.38% (8.92%)	2.74% (6.52%)	7.39% (3.94%)
General Offices	6.96% (14.64%)	13.41% (13.72%)	12.69% (13.18%)	18.27% (14.31%)	8.82% (14.73%)	5.52% (11.44%)	10.75% (4.78%)
Legal System	5.13% (13.32%)	13.15% (14.50%)	10.77% (15.54%)	19.66% (16.01%)	9.03% (11.91%)	6.37% (9.19%)	10.42% (4.37%)
Resource Allocation	4.93% (11.61%)	9.86% (13.33%)	9.92% (12.00%)	17.08% (13.10%)	8.49% (10.99%)	4.78% (8.61%)	9.22% (4.11%)
Mega Projects	5.56% (10.76%)	8.86% (10.77%)	11.95% (15.18%)	21.47% (17.15%)	7.81% (10.56%)	7.85% (7.18%)	10.31% (4.64%)
Economic System	6.07% (17.86%)	12.22% (14.70%)	10.92% (16.55%)	18.24% (13.71%)	7.14% (12.53%)	9.35% (11.70%)	10.61% (5.26%)
Others	6.52% (14.78%)	12.91% (14.02%)	11.49% (18.43%)	19.27% (16.07%)	8.30% (13.85%)	6.69% (8.76%)	10.62% (4.83%)

Note: Standard deviations in parentheses; all the monetary variables are in real term (2010 yuan).

Table 9: Evidence of Unofficial Income: Controlling for the "Revolving Door" Effect

	Considering the "revolving door" effect	
	(1)	(2)
With Non-Official Civil Servant(s)	0.027***	0.027***
	(0.005)	(0.005)
FU-KE Official	0.037***	0.021*
	(0.008)	(0.011)
ZHENG-KE Official	0.068***	0.054***
	(0.008)	(0.011)
FU-CHU Official	0.077***	0.068***
	(0.011)	(0.013)
ZHENG-CHU Official	0.141***	0.134***
	(0.018)	(0.019)
FU-JU Official	0.181***	0.168***
	(0.043)	(0.044)
ZHENG-JU Official	0.242***	0.231***
	(0.081)	(0.081)
Official in General Offices		-0.006
		(0.012)
Official in Legal System		0.021*
		(0.012)
Official in Financial and Resource System		0.058***
		(0.016)
Official in Bureaus On Mega Projects		0.057
		(0.036)
Official in Bureaus On Economic System		0.012
		(0.017)
log(Winsorized Life Time Income)_1	0.141***	0.140***
	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.175***	0.175***
	(0.018)	(0.018)
log(Winsorized Life Time Income)_3	0.141***	0.141***
	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.036***	0.036***
	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.012***	0.012***
	(0.003)	(0.003)
N	107130	107130
R^2	0.498	0.498

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Table 10: Annual Equivalent Value of Non-Monetary Benefits

	Average Value of All Urban Households	Average Value of Households Ranked in Top 20% of Income
Medical Care	829	1138
Central Heating	265	380
Pension Fund Contribution	715	1064
Health Insurance Contribution	232	332
Unemployment Insurance Contribution	23	33
Annual Aggregated Value	2064	2947
Monthly Value	172	246

Table 11: Evidence of Unofficial Income: Considering Non-Wage Benefits

	(1)	(2)
With Non-Official Civil Servant(s)	0.027***	0.027***
	(0.005)	(0.005)
FU-KE Official	0.043***	0.025**
	(0.008)	(0.011)
ZHENG-KE Official	0.073***	0.058***
	(0.008)	(0.011)
FU-CHU Official	0.081***	0.071***
	(0.011)	(0.013)
ZHENG-CHU Official	0.144***	0.136***
	(0.018)	(0.019)
FU-JU Official	0.184***	0.170***
	(0.043)	(0.044)
ZHENG-JU Official	0.243***	0.231***
	(0.081)	(0.081)
Official in General Offices		-0.005
		(0.012)
Official in Legal System		0.023*
		(0.012)
Official in Financial and Resource System		0.058***
		(0.016)
Official in Bureaus On Mega Projects		0.058
		(0.036)
Official in Bureaus On Economic System		0.013
		(0.017)
log(Winsorized Life Time Income)_1	0.140***	0.140***
	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.173***	0.173***
	(0.018)	(0.018)
log(Winsorized Life Time Income)_3	0.149***	0.149***
	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.037***	0.037***
	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.012***	0.012***
	(0.003)	(0.003)
N	107130	107130
R^2	0.498	0.498

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Table 12: Evidence of Unofficial Income: Size vs. Unit Price

	(1) Full Sample log(winsorized unit price)	(2) Full Sample log(winsorized unit size)	(3) New Units log(winsorized unit price)	(4) New Units log(winsorized unit price)
With Non-Official Civil Servant(s)	-0.002	0.030***	0.000	0.000
	(0.003)	(0.004)	(0.002)	(0.002)
With Government Official(s)			-0.010*	
			(0.006)	
FU-KE Official	0.009	0.033***		0.002
	(0.006)	(0.009)		(0.009)
ZHENG-KE Official	0.012**	0.053***		-0.006
	(0.006)	(0.009)		(0.008)
FU-CHU Official	0.009	0.069***		-0.021
	(0.007)	(0.011)		(0.014)
ZHENG-CHU Official	0.008	0.106***		-0.088***
	(0.010)	(0.015)		(0.025)
FU-JU Official	0.007	0.144***		0.066
	(0.024)	(0.035)		(0.050)
ZHENG-JU Official	-0.024	0.247***		-0.159**
	(0.044)	(0.066)		(0.071)
Official in General Offices	-0.013**	0.002		
	(0.007)	(0.010)		
Official in Legal System	0.002	0.010		
	(0.006)	(0.010)		
Official in Financial and Resource System	0.006	0.029**		
	(0.009)	(0.013)		
Official in Bureaus On Mega Projects	0.020	-0.002		
	(0.019)	(0.029)		
Official in Bureaus On Economic System	-0.013	0.009		
	(0.009)	(0.014)		
log(Winsorized Life Time Income)_1	0.037***	0.102***	0.015***	0.015***
	(0.004)	(0.006)	(0.003)	(0.003)
log(Winsorized Life Time Income)_2	0.041***	0.108***	0.011	0.011
	(0.010)	(0.015)	(0.009)	(0.009)
log(Winsorized Life Time Income)_3	0.038***	0.093***	0.029***	0.028***
	(0.010)	(0.016)	(0.010)	(0.010)
log(Winsorized Life Time Income)_4	0.019***	0.003	0.006	0.006
	(0.007)	(0.010)	(0.007)	(0.007)
log(Winsorized Life Time Income)_5	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Unit Attributes	Yes	No	Yes	Yes
Complex Fixed Effects	Yes	No	Yes	Yes
N	105963	107130	50532	50532
R^2	0.875	0.252	0.939	0.939

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Table 13: Evidence of Unofficial Income: Other Specifications

	(1) Linear term of life time income	(2) Square term of life time income	(3) Square and cubic terms of life time income	(4) Propensity score matching
With Non-Official Civil Servant(s)	0.029***	0.026***	0.024***	0.028
	(0.005)	(0.005)	(0.005)	(0.019)
Official on *FU-KE* Level	0.026**	0.025**	0.024**	0.009
	(0.011)	(0.011)	(0.011)	(0.015)
Official on *ZHENG-KE* Level	0.059***	0.056***	0.054***	0.057***
	(0.011)	(0.011)	(0.011)	(0.015)
Official on *FU-CHU* Level	0.075***	0.068***	0.064***	0.069***
	(0.013)	(0.013)	(0.013)	(0.018)
Official on *ZHENG-CHU* Level	0.142***	0.133***	0.129***	0.134***
	(0.019)	(0.019)	(0.019)	(0.024)
Official on *FU-JU* Level	0.183***	0.166***	0.161***	0.152***
	(0.044)	(0.044)	(0.044)	(0.056)
Official on *ZHENG-JU* Level	0.247***	0.228***	0.223***	0.204**
	(0.082)	(0.081)	(0.081)	(0.095)
Official in General Offices	-0.004	-0.005	-0.005	-0.010
	(0.012)	(0.012)	(0.012)	(0.015)
Official in Legal System	0.024**	0.022*	0.021*	0.011
	(0.012)	(0.012)	(0.012)	(0.015)
Official in Financial and Resource System	0.062***	0.057***	0.055***	0.052**
	(0.017)	(0.016)	(0.016)	(0.020)
Official in Bureaus On Mega Projects	0.058	0.059*	0.060*	0.058
	(0.036)	(0.036)	(0.036)	(0.046)
Official in Bureaus On Economic System	0.011	0.012	0.011	0.017
	(0.017)	(0.017)	(0.017)	(0.021)
log(Winsorized Life Time Income)	0.051***	0.351***	0.682***	
	(0.001)	(0.009)	(0.045)	
log(Winsorized Life Time Income)^2		-0.024***	-0.081***	
		(0.001)	(0.008)	
log(Winsorized Life Time Income)^3			0.003***	
			(0.000)	
log(Winsorized Life Time Income)_1				0.123***
				(0.021)
log(Winsorized Life Time Income)_2				0.189***
				(0.056)
log(Winsorized Life Time Income)_3				0.249***
				(0.078)
log(Winsorized Life Time Income)_4				0.034
				(0.071)
log(Winsorized Life Time Income)_5				-0.006
				(0.031)
N	107130	107130	107130	8946
R^2	0.491	0.496	0.497	0.594

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at

Table 14: Summary Statistics of Key Variables: UHS Data

	Average	Std. Dev.	Min	Max
A. All Home Purchasers				
Total value of the unit (in thousand yuan RMB)	116.19	182.43	0.02	2977.92
Monthly income (in yuan RMB)	4908.24	4316.37	345.00	73873.93
Household Size	3.15	0.96	1.00	8.00
The household is with local hukou	0.98	0.14	0.00	1.00
The household head is male	0.71	0.45	0.00	1.00
Age of the applicant	48.55	11.50	22.00	94.00
The household head is with high school education level	0.40	0.49	0.00	1.00
The household head is with a bachelor degree	0.39	0.49	0.00	1.00
The household head is with a master or PhD degree	0.16	0.37	0.00	1.00
B. Home Purchasers with Government Official(s)				
Total value of the unit (in thousand yuan RMB)	152.95	214.67	0.04	2106.39
Monthly income (in yuan RMB)	5706.59	5060.14	834.41	73873.93
Household Size	3.08	0.79	1.00	6.00
The household is with local hukou	0.99	0.08	0.00	1.00
The household head is male	0.66	0.48	0.00	1.00
Age of the applicant	44.35	8.76	23.00	74.00
The household head is with high school education level	0.23	0.42	0.00	1.00
The household head is with a bachelor degree	0.50	0.50	0.00	1.00
The household head is with a master or PhD degree	0.26	0.44	0.00	1.00

Table 15: Evidence of Unofficial Income: UHS Data

	(1) log(home value)	(2) log(home value)	(3) log(home value)
With Government Official(s)	0.244**	0.197**	0.185*
	(0.097)	(0.099)	(0.156)
With Government Official(s) *		0.712**	
Corrupted City Chief		(0.356)	
With Government Official(s) *			0.439
Capital City			(0.299)
With Government Official(s) *			0.174
Provincial Capital Cities			(0.363)
log(Monthly Income)	0.908***	0.908***	0.907***
	(0.068)	(0.068)	(0.068)
Household Attributes	YES	YES	YES
City Fixed Effect	YES	YES	YES
Year Fixed Effect	YES	YES	YES
N	3270	3270	3270
R^2	0.240	0.240	0.240

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level.

Figure 1: Mean Ratios of Unofficial to Official Incomes as a Function of Ranks

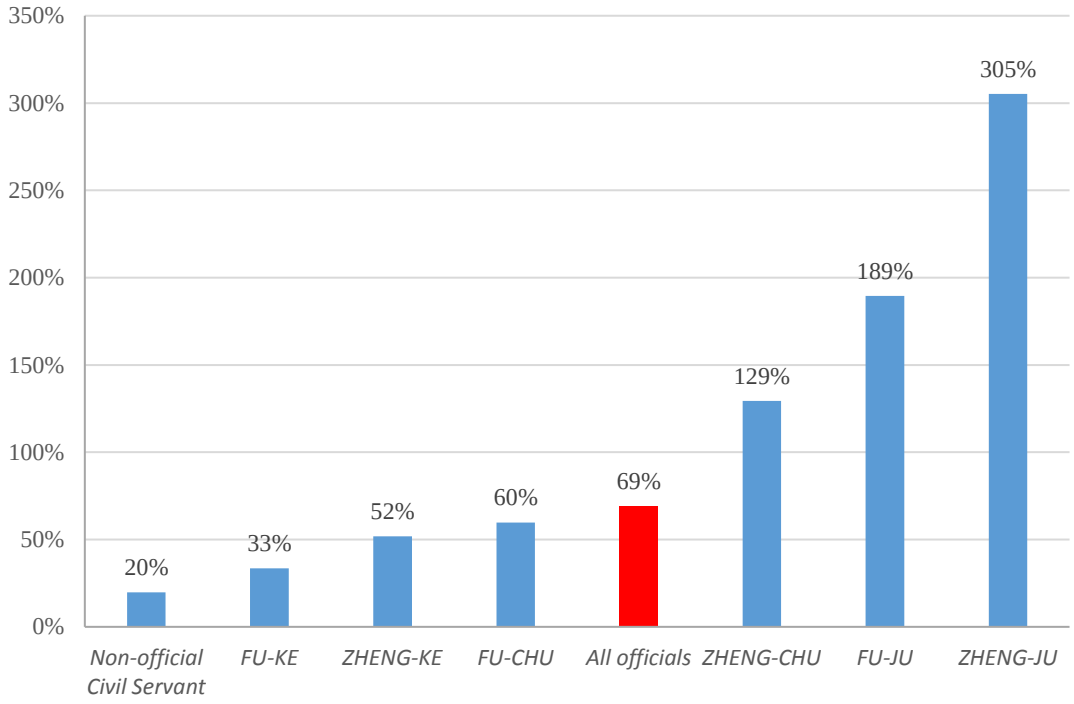


Figure 2: Distribution of Unofficial Income

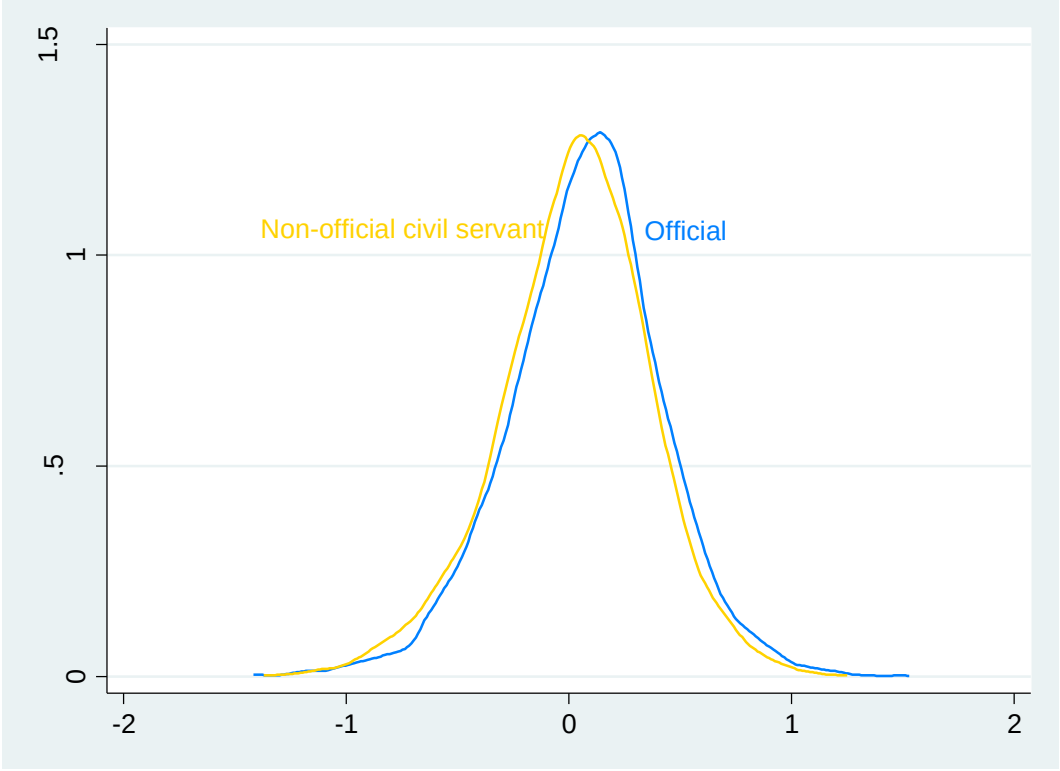


Figure 3: Distribution of Unofficial Income: By Rank

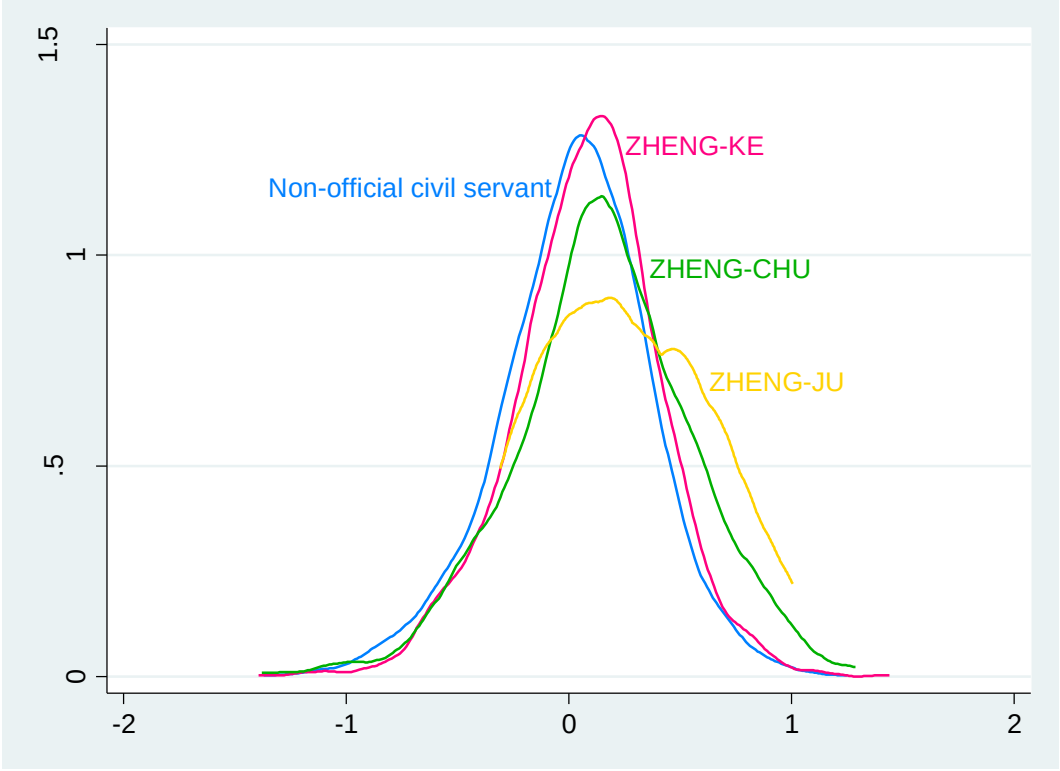


Figure 4: Distribution of Unofficial Income: By Rank (truncated at 5%)

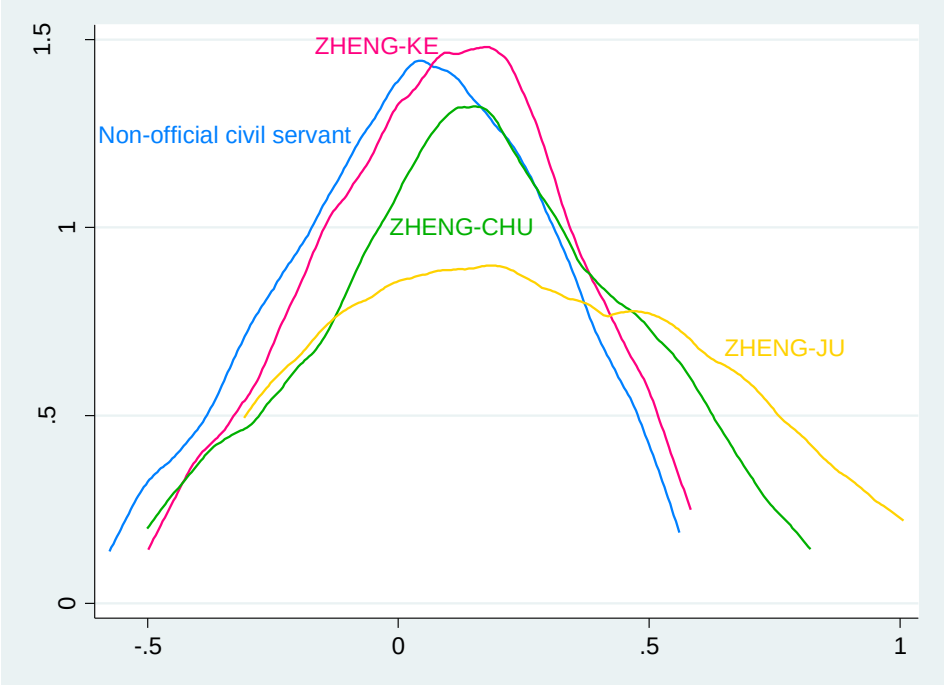
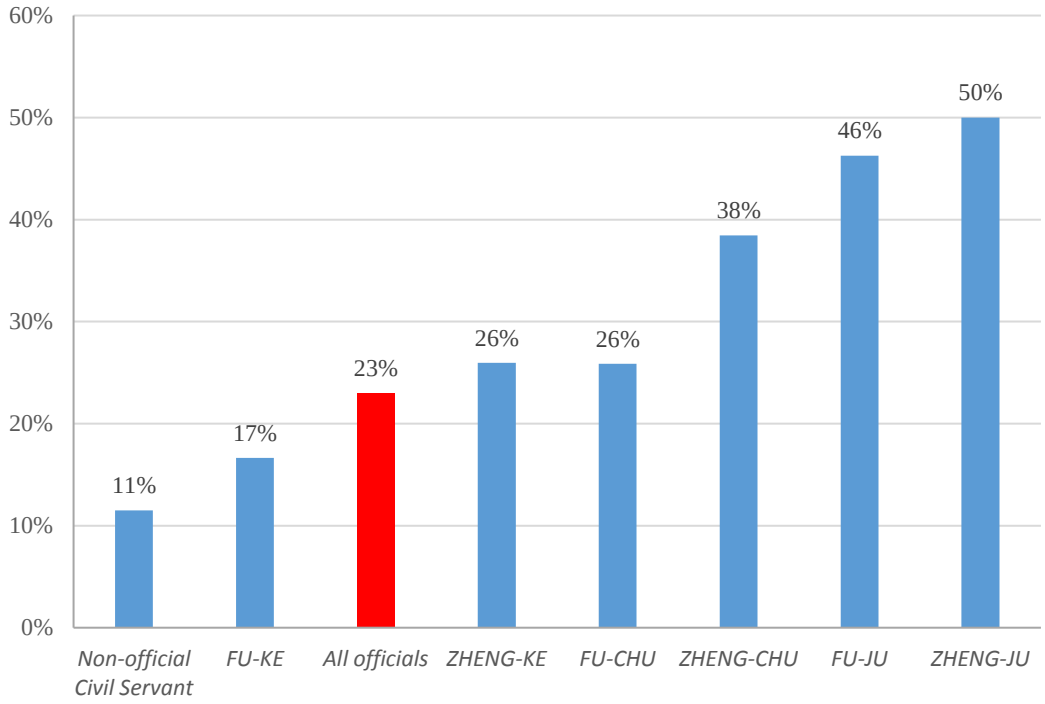


Figure 5: Imputed Portion of Official Households with Unofficial Incomes



Appendix Table 1 (online posting only): Results Based on Raw (Unwinsorzed) Data

	(1) log(home value)	(2) log(home value)	(3) log(home value)	(4) log(home value)
With Non-Official Civil Servant(s)	0.029***	0.029***	0.028***	0.029***
	(0.005)	(0.005)	(0.005)	(0.005)
With Government Official(s)	0.080***			
	(0.005)			
FU-KE Official		0.046***		0.027**
		(0.008)		(0.012)
ZHENG-KE Official		0.075***		0.060***
		(0.008)		(0.011)
FU-CHU Official		0.086***		0.075***
		(0.011)		(0.013)
ZHENG-CHU Official		0.151***		0.143***
		(0.018)		(0.020)
FU-JU Official		0.183***		0.168***
		(0.044)		(0.045)
ZHENG-JU Official		0.340***		0.328***
		(0.083)		(0.083)
Official in General Offices			0.052***	-0.004
			(0.010)	(0.013)
Official in Legal System			0.072***	0.024*
			(0.009)	(0.012)
Official in Financial and Resource System			0.104***	0.059***
			(0.015)	(0.017)
Official in Bureaus On Mega Projects			0.108***	0.058
			(0.036)	(0.037)
Official in Bureaus On Economic System			0.064***	0.013
			(0.016)	(0.018)
Official in Other Bureaus			0.041***	
			(0.010)	
log(Life Time Income)_1	0.112***	0.111***	0.113***	0.110***
	(0.006)	(0.006)	(0.006)	(0.006)
log(Life Time Income)_2	0.167***	0.169***	0.167***	0.169***
	(0.019)	(0.019)	(0.019)	(0.019)
log(Life Time Income)_3	0.152***	0.152***	0.152***	0.152***
	(0.020)	(0.020)	(0.020)	(0.020)
log(Life Time Income)_4	0.038***	0.038***	0.038***	0.038***
	(0.013)	(0.013)	(0.013)	(0.013)
log(Life Time Income)_5	0.012***	0.012***	0.012***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)
N	107062	107062	107062	107062
R^2	0.495	0.495	0.495	0.495

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Appendix Table 2 (online posting only): Down Payment and Monthly Service

	(1) log(winsorized downpayment)	(2) log(winsorized downpayment)	(3) log(winsorized monthly service)	(4) log(winsorized monthly service)
With Non-Official Civil Servant(s)	0.057***	0.057***	-0.005	-0.005
	(0.009)	(0.009)	(0.005)	(0.005)
FU-KE Official	0.069***	0.035*	0.015*	0.005
	(0.015)	(0.020)	(0.008)	(0.011)
ZHENG-KE Official	0.086***	0.054***	0.056***	0.046***
	(0.014)	(0.020)	(0.008)	(0.011)
FU-CHU Official	0.084***	0.057**	0.092***	0.084***
	(0.019)	(0.024)	(0.010)	(0.013)
ZHENG-CHU Official	0.204***	0.182***	0.115***	0.108***
	(0.033)	(0.035)	(0.017)	(0.019)
FU-JU Official	0.168**	0.141*	0.207***	0.200***
	(0.078)	(0.079)	(0.042)	(0.042)
ZHENG-JU Official	0.375**	0.347**	0.245***	0.237***
	(0.146)	(0.147)	(0.078)	(0.079)
Official in General Offices		0.021		0.010
		(0.022)		(0.012)
Official in Legal System		0.037*		0.010
		(0.021)		(0.011)
Official in Financial and Resource System		0.097***		0.031**
		(0.030)		(0.016)
Official in Bureaus On Mega Projects		0.118*		0.007
		(0.065)		(0.035)
Official in Bureaus On Economic System		0.019		-0.001
		(0.031)		(0.017)
log(Winsorized Life Time Income)_1	0.152***	0.151***	0.181***	0.180***
	(0.012)	(0.012)	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.226***	0.226***	0.177***	0.177***
	(0.033)	(0.033)	(0.017)	(0.017)
log(Winsorized Life Time Income)_3	0.185***	0.186***	0.174***	0.174***
	(0.035)	(0.035)	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.031	0.031	0.037***	0.037***
	(0.023)	(0.023)	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.000	0.000	0.027***	0.027***
	(0.005)	(0.005)	(0.003)	(0.003)
N	107130	107130	107130	107130
R^2	0.327	0.327	0.478	0.478

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Appendix Table 3 (online posting only): Two versus One Officials in a Household

	(1) log(winsorized home value)	(2) log(winsorized home value)
With Two Government Officials	0.119***	0.119***
	(0.015)	(0.015)
With One Government Official	0.070***	
	(0.005)	
With Husband as Government Official		0.071***
		(0.006)
With Wife as Government Official		0.070***
		(0.010)
With Non-Official Civil Servant(s)	0.027***	0.027***
	(0.005)	(0.005)
log(Winsorized Life Time Income)_1	0.142***	0.142***
	(0.007)	(0.007)
log(Winsorized Life Time Income)_2	0.172***	0.172***
	(0.018)	(0.018)
log(Winsorized Life Time Income)_3	0.149***	0.149***
	(0.019)	(0.019)
log(Winsorized Life Time Income)_4	0.038***	0.038***
	(0.013)	(0.013)
log(Winsorized Life Time Income)_5	0.012***	0.012***
	(0.003)	(0.003)
N	107130	107130
R^2	0.498	0.498

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Appendix Table 4 (online posting only): Prior Home Homeownership

	(1) OWN	(2) OWN
With Non-Official Civil Servant(s)	0.230***	0.232***
	(0.040)	(0.040)
FU-KE Official	0.346***	0.237***
	(0.062)	(0.084)
ZHENG-KE Official	0.299***	0.169**
	(0.058)	(0.081)
FU-CHU Official	0.390***	0.251***
	(0.076)	(0.095)
ZHENG-CHU Official	0.365***	0.244*
	(0.128)	(0.136)
FU-JU Official	-0.061	-0.182
	(0.299)	(0.303)
ZHENG-JU Official	0.900	0.795
	(0.652)	(0.646)
Official in General Offices		0.301***
		(0.092)
Official in Legal System		0.036
		(0.087)
Official in Financial and Resource System		0.156
		(0.116)
Official in Bureaus On Mega Projects		0.197
		(0.259)
Official in Bureaus On Economic System		0.178
		(0.124)
log(Winsorized Life Time Income)_1	0.149***	0.151***
	(0.056)	(0.056)
log(Winsorized Life Time Income)_2	0.981***	0.986***
	(0.157)	(0.157)
log(Winsorized Life Time Income)_3	0.879***	0.885***
	(0.176)	(0.176)
log(Winsorized Life Time Income)_4	0.366***	0.365***
	(0.131)	(0.131)
log(Winsorized Life Time Income)_5	-0.179***	-0.179***
	(0.049)	(0.049)
N	102714	102714
Pseudo R^2	0.331	0.331

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.

Appendix Table 5 (online posting only): Controlling for Current Homeownership

	(1) log(winsorized home value)	(2) log(winsorized home value)	(3) log(winsorized total home value)	(4) log(winsorized total home value)
With Non-Official Civil Servant(s)	0.026***	0.026***	0.040***	0.040***
	(0.005)	(0.005)	(0.005)	(0.005)
FU-KE Official	0.039***	0.023**	0.076***	0.049***
	(0.008)	(0.012)	(0.009)	(0.013)
ZHENG-KE Official	0.068***	0.056***	0.097***	0.070***
	(0.008)	(0.012)	(0.009)	(0.013)
FU-CHU Official	0.077***	0.068***	0.118***	0.094***
	(0.011)	(0.014)	(0.012)	(0.015)
ZHENG-CHU Official	0.140***	0.133***	0.146***	0.126***
	(0.019)	(0.020)	(0.021)	(0.022)
FU-JU Official	0.201***	0.191***	0.147***	0.123**
	(0.045)	(0.046)	(0.050)	(0.050)
ZHENG-JU Official	0.238***	0.233**	0.274***	0.250***
	(0.091)	(0.091)	(0.093)	(0.094)
Official in General Offices		-0.007		0.025*
		(0.013)		(0.014)
Official in Legal System		0.024*		0.026*
		(0.012)		(0.014)
Official in Financial and Resource System		0.049***		0.070***
		(0.017)		(0.019)
Official in Bureaus On Mega Projects		0.039		0.086**
		(0.037)		(0.041)
Official in Bureaus On Economic System		0.007		0.027
		(0.018)		(0.020)
log(Winsorized Life Time Income)_1	0.128***	0.128***	0.147***	0.147***
	(0.007)	(0.007)	(0.008)	(0.008)
log(Winsorized Life Time Income)_2	0.160***	0.160***	0.226***	0.227***
	(0.019)	(0.019)	(0.021)	(0.021)
log(Winsorized Life Time Income)_3	0.145***	0.145***	0.171***	0.172***
	(0.020)	(0.020)	(0.022)	(0.022)
log(Winsorized Life Time Income)_4	0.035***	0.036***	0.047***	0.047***
	(0.013)	(0.013)	(0.015)	(0.015)
log(Winsorized Life Time Income)_5	0.011***	0.011***	0.014***	0.014***
	(0.003)	(0.003)	(0.004)	(0.004)
Current Homeownership	0.097***	0.097***		
	(0.004)	(0.004)		
N	102714	102714	107130	107130
R^2	0.466	0.466	0.447	0.447

Appendix Table 6 (online posting only): Using Current Income to Replace Permanent Income as a Regressor

	(1) log(winsorized home value)	(2) log(winsorized home value)
With Non-Official Civil Servant(s)	0.028***	0.028***
	(0.005)	(0.005)
Official on *FU-KE* Level	0.041***	0.027**
	(0.008)	(0.011)
Official on *ZHENG-KE* Level	0.063***	0.052***
	(0.008)	(0.011)
Official on *FU-CHU* Level	0.063***	0.056***
	(0.010)	(0.013)
Official on *ZHENG-CHU* Level	0.120***	0.115***
	(0.018)	(0.019)
Official on *FU-JU* Level	0.173***	0.163***
	(0.042)	(0.043)
Official on *ZHENG-JU* Level	0.197**	0.188**
	(0.079)	(0.079)
Official in General Offices		-0.011
		(0.012)
Official in Legal System		0.021*
		(0.012)
Official in Financial and Resource System		0.050***
		(0.016)
Official in Bureaus On Mega Projects		0.051
		(0.035)
Official in Bureaus On Economic System		0.009
		(0.017)
log(Winsorized Current Household Income)	0.238***	0.238***
	(0.003)	(0.003)
N	107130	107130
Pseudo R^2	0.521	0.521

Note: (1) standard errors are reported in parentheses; (2) * significant at the 90% level; ** significant at the 95% level; *** significant at the 99% level; (3) all other control variables in Table 4 are also included here but not reported to save space.