Session 6B: Income Distribution in Middle-Income Countries
Time: Thursday, August 9, 2012 PM

Paper Prepared for the 32nd General Conference of
The International Association for Research in Income and Wealth

Boston, USA, August 5-11, 2012

How does Hidden Income Affect Income Distribution? Evidence from Guangzhou, China

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How does Hidden Income Affect Income Distribution?

Evidence from Guangzhou, China[†]

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Abstract: A recent study estimated that almost 10 trillion yuan, or 30% of China's GDP, is hidden from the official urban income figures provided by the National Bureau of Statistics. Furthermore, nearly two thirds of the hidden income is in the hands of the top decile of the income distribution. Despite the alarmingly high level of hidden income in China, very little empirical evidence exists on its sources and distribution, mostly due to the lack of microdata. Using a unique data set based on a survey conducted by the Guangzhou Land Resources and Housing Administrative Bureau from November 2009 to January 2010, this article examined the sources and distribution of hidden income of residents from different occupational backgrounds, taking into consideration their explicit income and other socioeconomic characteristics. The results showed that government officials had not only the highest but also the most stable hidden incomes, followed by employees in state-owned enterprises and employees in colleges or research institutions. Employees of other public institutions, private enterprises, and foreign enterprises had the lowest amounts of hidden income. Among government officials, those holding higher level positions possessed more hidden income than those in lower level positions. These findings suggest that the existence of significant amounts of hidden income and their close links with occupational background should be taken into consideration in future labor and income policy designs and implementations.

Keywords: Hidden income; Occupational background; Housing affordability; China

JEL： J24；D31；R21

(1) INTRODUCTION

The accuracy of income data in urban China has long been controversial. Some scholars believe that due to the absence of large amounts of hidden income, official statistics have significantly underestimated the overall urban income level (Wang, 2010; Li and Luo, 2010; Wang, 2007). A recent study by Xiaolu Wang (2010) of the China Reform Foundation estimated that almost 10 trillion yuan, or 30% of the country's GDP, is hidden from the official urban income figures provided by the National Bureau of Statistics (NBS). Wang also estimated that, in 2008, nearly two thirds of hidden income was in the hands of the top decile of the income distribution in urban China. Furthermore, Wang's study showed that, from 2005 to 2008, hidden income expanded by 91%. This growth rate was almost 20% faster than that of the GDP.

The existence of such a large amount of hidden income has important implications for the Chinese and world economies. On the one hand, the Chinese people might be wealthier than suggested by national statistics and previous academic literature. If this is true, it would help explain certain situations in recent years, such as the consistently high housing price-to-income ratios across Chinese cities, the persistently overheated real estate market, and the immense amounts of personal funds that have been poured into the stock market. On the other hand, many people, especially blue- and white-collar workers, believe that the rosy income-growth picture is merely a myth. People of this perspective insist that they have experienced no increase—and sometimes have even seen a decrease—in their actual disposable

income compared with the consumer price indices (CPI). For instance, a survey conducted by the All China Federation of Trade Unions in 2010 revealed that there had been no income increase for more than 20% of all workers in the past 5 years (Beijing Morning Daily, 2010). The contrast between these two views highlights the serious problems in China's current income distribution. Indeed, as Wang (2010) concluded, hidden income has greatly increased the income gap and may lead to serious distortions in estimates of the national income distribution.

Despite the seemingly high level of hidden income in China, little empirical evidence exists on its sources and distribution, mostly due to a lack of microdata. Moreover, even when data are collected, hidden income is extremely difficult to measure because such income tends to be either clearly illegal or not clearly legal, thereby deterring people from revealing it.

Using a unique data set from a survey conducted by the Guangzhou Land Resources and Housing Administrative Bureau from November 2009 to January 2010, this article examined the sources and distribution of hidden income of residents from different occupational backgrounds, taking into consideration their visible income and other socioeconomic characteristics. The study population included middle- and low-income individuals (i.e., with an annual income of 100 thousand yuan or less) and families (i.e., with an annual income of 200 thousand yuan or less) from various occupational backgrounds.[1] The data set had a large sample size of 15,789 respondents.

Like most other surveys, the Guangzhou survey did not directly ask about the

sources and amounts of hidden income; therefore, we needed an indirect indicator. With the skyrocketing housing prices in China, housing expenditures have become the largest part of family consumption. Thus, it is reasonable to infer residents' hidden income from their housing affordability. We expected that one's housing affordability would be determined largely by two factors: visible (i.e., explicit) income and hidden income. The data set used in this study contained three items about housing affordability: total affordable housing price, affordable monthly mortgage payment, and affordable down payment. We expected that, after taking into account respondents' explicit income, the portion of housing affordability unexplained by explicit income would be a close approximation of their hidden income. Specifically, we expected that total affordable housing price would capture respondents' overall hidden income, affordable monthly mortgage payment would capture their stable monthly hidden income, and affordable down payment would capture their accumulated hidden income.

What is hidden income? In this paper, *hidden income* refers to all off-the-books income. This may include undisclosed financial income, property income, work benefits (both cash and in-kind), and other various income sources, some of which might be illegal. Unlike explicit income, hidden income often distorts market competition and hinders economic efficiency. Furthermore, much of individuals' hidden income may come at the expenses of business or government revenue. Some sources of hidden income may very well corrode or steal from the explicit income of other people. Because hidden income may be more accessible to more privileged

individuals in Chinese society, this income source can widen the overall income gap between the rich and the poor. Therefore, examining the sources and amounts of hidden income is not only important for understanding hidden income itself, but crucial for estimating and reevaluating the overall income distribution in China.

This paper is structured as follows. Section 2 provides a literature review. Section 3 describes the data source, sample, variables, and analytic strategy. Section 4 presents the empirical results, and section 5 concludes and discusses policy implications.

(2) LITERATURE REVIEW

Studies that have focused directly on hidden income are very scarce. The most thorough and recent study was conducted by Wang (2010). This study was commissioned by Credit Suisse and the China Society of Economic Reform and was a follow-up to a previous study conducted in 2005 and 2006. The 2010 study was based on a survey undertaken in late 2009 and covered 19 provinces, 14 counties, and 64 cities in China, with an effective sample size of 4,195 urban residents. The study set out to correct for assumed underreported income in the official NBS household survey. The study's interviewers asked questions about income and consumption from respondents they knew personally. The rationale behind this was that the respondents would be more comfortable sharing their true income because of their personal relationships with the interviewers. Even though one could reasonably suspect that respondents might underreport income to someone they personally knew, the findings revealed that the incomes reported in Wang's study were indeed much higher than the

average incomes for similar populations in the NBS official data.[2]

Wang (2010) concluded that the estimated actual incomes of every household group were higher than official data, with a startling average difference of 90%. Overall, almost 10 trillion yuan, or 30% of GDP, was hidden from the official urban income figures provided by the NBS. The existence of such a large amount of hidden income has serious implications for the overall income distribution. Nearly two thirds of the hidden income was in the hands of the top decile of the income distribution. Whereas the estimated actual income was, on average, about 107% of the official income levels for the bottom 20% of the income distribution, the averages were 264% for the top 20% and 319% for the top decile of the income distribution. One of the direct implications of Wang's study is the argument against China's continued housing bubble, especially in big cities. If hidden income does exist as Wang (2010) documents, then the actual housing affordability in urban China is at least double the figures presented in the government's official data.

After widespread speculation among scholars and citizens about the existence and extent of hidden income in China, Wang's (2010) study brought empirical evidence to this heated discussion. Luo, Yue, and Li (2011) questioned several aspects of Wang's (2010) results. First, they challenged the validity of using the Engle coefficient matching method to estimate aggregate income. Second, they questioned whether Wang's data-collection method (i.e., surveys by interviewers who knew the respondents personally) could guarantee accurate data. Third, they argued that it was illogical to count most of the underreported income as "grey income." As a reply to

Luo et al. (2011), Wang (2011) further emphasized the reliability of his survey and justified the method to estimate aggregate and hidden income. Wang also clarified the difference between "hidden income" and "grey income" in his report (2010), where he defined *hidden income* as income not reflected in the NBS income statistics and *grey income* as sources of hidden income that are not clearly legal or illegal. Although scholars still debate the degree to which hidden income exists, Wang's study clearly shows that the official income reported by the NBS has significantly underestimated the real figures (2010).[3] The public seems to agree. According to a web-based survey initiated by http://www.sina.com, one of China's most popular websites, 84% of nearly 8,000 participants believed that Wang (2010) did not overestimate hidden income, whereas only 10% of participants thought that hidden income was overestimated (Wang, 2011).

What are the sources of the hidden income? Wang (2010) speculated four sources of hidden income but did not provide empirical evidence due to a lack of data: (a) abuse of power for personal gains, (b) public investment and corruption, (c) rent seeking from land supply, and (d) distribution of other monopolistic profits. In addition, the existing literature on income differences by industry[4] provides some clues to the sources of hidden income. Since China launched its major economic reforms in the early 1980s, most industrial procedures, including production, circulation, and distribution, have been marketized, but the management system of many state-owned and collective enterprises continue to use the dual system of planned and market approaches. Along with the lack of supervision and monitoring, a

great deal of information is leaked and becomes the seedbed for illegal transactions for power, wealth, and private interest. Many people—mostly the highly privileged—gain substantial interest from these private transactions, which yield huge amounts of hidden income and create serious inequality in the income distribution (Chen & Yin, 2008).

Which occupational groups have the highest amounts of hidden income? Although no empirical study has specifically examined this question, some relevant data do exist in the literature. In 2006, a research team from the Guangzhou-Hong Kong-Macao Youth Research Institution administered a survey to a randomly selected group of 500 men and women between the ages of 18 and 35 in Guangzhou; the results revealed that the most desirable jobs were public servants in government departments (46.3%), teachers (30.7%), doctors (30.3%), and lawyers (30.3%). The preference for being a government employee most likely stemmed from the prestige, stability, and possible hidden income that could be generated by this occupation. Indeed, the results from another survey conducted by the China Youth Daily (2006) showed that 83.3% of the 17,330 study participants believed that being a public servant is a stable occupation with good health care benefits and pensions. Furthermore, 55.8% believed that this occupation could bring "additional benefits," hinting at the existence of underlying advantages associated with this occupation.

The reality reinforces this image. For example, in Guangzhou, government officials can buy three good meals with less than 10 yuan in their public canteen. The government will also cover most of their daily cell-phone, fuel, transportation, and

other expenses. Additionally, their children are often able to attend kindergartens, primary schools, and middle schools that are funded by the government and are usually of higher quality. All of these employment-related benefits translate into significantly lower out-of-pocket expenses and higher living standards for government officials.

Building on this body of suggestive evidence, in this article we used a unique data set (detailed below) to examine the sources and distribution of hidden income of residents from different occupational backgrounds, taking into consideration their explicit income and other socioeconomic characteristics. In particular, we sought to reveal if indeed government officials have a much greater advantage in obtaining hidden income as opposed to other occupations. Moreover, we investigated whether government officials in higher level positions benefited more from hidden income than officials in lower positions.

(3) DATA AND METHODS

(a) Data and sample

On May 24, 2006, by approving and circulating a series of housing-regulation policies suggested by the Ministry of Construction and eight other ministries, the General Office of the State Council (2006) issued a notification to all government agencies and stressed that restructuring the housing supply is the key to stabilizing housing prices. It was in this document that the Chinese government officially introduced the concept of “price-capped housing.” Under the price-capped housing scheme, local governments supply land for developers through competitive bidding of land prices, but to win the bid, developers also need to promise to sell their housing

with prices capped at a certain level. The price cap is usually 60 to 80% of market value, but its exact level is not uniformly specified and is usually determined on a case-by-case basis by the local government. Furthermore, price-capped housing can be sold only to families who have a total household income and assets that are worth less than the ceiling set by the local government. Price-capped housing is also limited in size and in most cases cannot be larger than 90 square meters per unit.

Guangzhou is one of the largest cities in China and had a population of 14 million people at the end of 2010. Having one of the most developed housing markets in China, Guangzhou was the first city to implement the price-capped housing scheme. Whenever demand exceeds supply, price-capped housing is allocated through lot-drawing among all applicants. The buyers are not only subject to a 5-year resale restriction but also have to pay back the 30% price gap to the government even after holding it for 5 years. This policy design is likely to constrain rent-seeking behaviors and housing misuse.

To be eligible for price-capped housing in Guangzhou, an individual applicant must have an annual income of less than 100,000 yuan, and a family applicant must have a total annual household income of less than 200,000 yuan. This group is considered to be the typical middle-income group in Guangzhou. In fact, general concerns and worries about housing and housing prices mainly originated from middle-income families. This is because low-income families can acquire government-subsidized low-income housing, and high-income families seldom need to worry about housing prices due to their high affordability; indeed, some high-income families who already owned houses even benefit from rising housing prices because of the appreciation of their existing wealth.

In November 2009, Guangzhou's Municipal Land Resources and Housing Administrative Bureau launched a 3-month survey on the demand for price-capped housing. The Bureau stipulated that every resident who wished to buy price-capped housing had to fill out a questionnaire to be assessed for eligibility. Because the eligibility check is enforced strictly by Guangzhou's Municipal Land Resources and Housing Administrative Bureau, we believe that the data collected are highly reliable. The applicants were asked to provide their names and personal identification numbers in the survey. The questionnaire asked about applicants' occupational background, education, income, work experience, various sources of financial support, housing provident funds[5], housing subsidies[6], housing affordability, and other background information. The applicants are responsible for the accuracy of their information. Any false information found in the eligibility check would lead to the denial of one's application. All of this serves the unique purpose of our study of hidden income and how it might be affected by occupational background.

The survey yielded a total of 15,789 complete questionnaires. The questionnaires distinguished between applicants who wished to purchase a house in their own name (i.e., sole applicants) and those who wished to buy housing jointly with their husband or wife (i.e., joint applicants). Sole applicants accounted for two thirds of all applicants. Because the data set only reports the occupational background information of one of the applicants in the joint-applicants group, we only examined sole applicants in this paper for simplicity and clarity. In addition, cases that had missing data on key variables (e.g., housing provident funds, housing subsidies) were

excluded.[7] This yielded a final sample size of 10,124 sole applicants.

(b) Variables and descriptive analysis

As described above, the key outcome variable in this study was hidden income, which we measured indirectly through residents' unexplained housing affordability. Specifically, after taking into account respondents' explicit income, the total affordable housing price was used to capture respondents' overall hidden income, affordable monthly mortgage payment was used to capture their stable monthly hidden income, and affordable down payment was used to capture previous hidden income accumulation.

In our data set, all three outcome variables were measured at the interval level. Specifically, total affordable housing prices were measured in five categories: less than 300,000 yuan, between 300,000 and 400,000 yuan, between 400,000 and 500,000 yuan, between 500,000 and 600,000 yuan, and more than 600,000 yuan. Affordable monthly mortgage payments were measured in four categories: less than 1,500 yuan, between 1,500 and 2,000 yuan, between 2,000 and 3,000 yuan, and more than 3,000 yuan. Affordable down payments were measured in four categories: less than 100,000 yuan, between 100,000 and 150,000 yuan, between 150,000 and 200,000 yuan, and more than 200,000 yuan.

Figures 1 to 3 present the frequency distributions for total affordable housing prices, affordable monthly mortgage payments, and affordable down payments, respectively. Across the three outcome measures, the majority of the respondents were concentrated at the lower end of the distribution. Specifically, total affordable housing

prices for nearly 60% respondents were between 300,000 and 500,000 yuan, with about 16% below 300,000 yuan and about 9% over 600,000 yuan. Affordable monthly mortgage payments had a more concentrated distribution, with nearly 45% of respondents able to pay 1,500 to 2,000 yuan per month. The affordable down payment distribution, however, was more skewed. About 37% of respondents could only pay up to 100,000 yuan for a down payment, whereas 40% could afford 100,000 to 150,000 yuan.

[Insert Figures 1 to 3 about here]

The key explanatory variable in this study was respondent's occupation. The occupational backgrounds of our mostly middle-income sample were classified into eight categories according to the nature of their work and the ownership of their employers. The first category was government officials， including officials in provincial governments，municipal governments，district governments，and other civil services. The second category was employees in state-owned enterprises. The third category was employees in public institutions, including public institutions funded by public finance and public institutions that are responsible for their own funding. The fourth category was employees in colleges or research institutions. The remaining four categories were foreign-owned and foreign-funded enterprises, privately owned enterprises, primary school or kindergarten teachers, and other jobs, which included freelancers. Figure 4 shows the distribution of the occupational backgrounds of the study sample.

[Insert Figure 4 about here]

To sort out the net effects of occupational background on hidden income, we had to account for respondents' explicit income. Because hidden income was measured by housing affordability in this study, explicit income mainly included wage income, housing provident funds, and housing subsidies from employers or the government. Individuals' annual wage income was coded into three categories: less than 50,000 yuan, between 50,000 and 80,000 yuan, and more than 80,000 yuan. Both housing provident funds and housing subsidies were self-reported in current amounts. Respondents were also asked to report any anticipated future changes in wage income during the next 3 years; this variable was classified into three categories: will remain unchanged or decline, will increase by less than 25%, and will increase by 25% or more.

In addition to occupational background and explicit income, some other factors were included in the models as control variables: sources of down payment (i.e., savings by oneself, financial support from parents or other family members, loans from friends and other acquaintances), level of education, work experience, and marital status. In particular, education level and work experience might result in the accumulation of social capital as well as the expansion of a person's sources and amount of hidden income. Education level ranged from high school or below, 3-year college, 4-year college, and master's degree or above. Work experience was classified into four categories: 5 years or fewer, 6 to 10 years, 11 to 15 years， and more than 15 years. Marital status was coded as unmarried, married, and divorced. Descriptive statistics of the variables are shown in Table 1.

[Insert Table 1 about here]

(c) Modeling strategy

Because the dependent variables—total affordable housing price, affordable monthly mortgage payment, and affordable down payment—were all ordinal variables that captured various intervals, we chose an ordered multiple-choice model as our main modeling strategy. Because of the possible nonlinear relationship between the independent variables and the dependent variable, the model had to be transformed into a continuous utility model. Therefore, an ordered logit model was used for the main analysis. The basic form of the model was expressed in the equation,

$$Y^* = \beta X + \gamma Z + \varepsilon .$$

In the equation, Y^* was transformed into a continuous variable from the discrete observations Y of the dependent variables (total affordable housing price, affordable monthly mortgage payment, and affordable down payment) and was a latent variable that represented hidden income. X was the major explanatory variable of occupational background, which included dummy variables for government officials, employees in state-owned enterprises, public institutions, colleges or research institutions, foreign enterprises, private enterprises, primary school or kindergarten teachers, and others. Z represented the control variables of annual wage income, anticipated future income change, logarithm of the amount of available housing provident funds, logarithm of the amount of housing subsidies received, main down payment sources, education level, work experience, and marital status ε

represented the error term. In this paper, ε was assumed to follow an extreme value distribution when the ordered logit model was applied. Parameter β and its significance level indicated the effects of occupational background on hidden income.

(4) RESULTS

(a) Occupational background and hidden income

Table 2 presents the ordered logit regression results on how the different occupational backgrounds affected housing affordability, our measure of hidden income, after controlling for explicit income and other factors.[8] We ran two models for each dependent variable. The first model, presented in columns 1, 3, and 5, included occupational background and controlled for explicit income, including annual wage income, expected future income change, housing provident funds, and housing subsidies. The second model, presented in columns 2, 4, and 6, was the same as the first model but also included sources of down payment, education level, work experience, and marital status as additional control variables.

The regression results on total affordable housing price in column 2 show that government officials could afford the highest total housing price among all occupations. Furthermore, the regression coefficients for government officials were substantially higher than the coefficients for other occupation groups. Employees in state-owned enterprises and colleges or research institutions could afford higher total housing prices than employees in private enterprises and other occupations. These results suggest that employees in the public sector, especially government officials, have significantly higher hidden income than those working in the private sector. This

finding provides indirect evidence on possible corruption or illegal gains in the public sector, especially among government officials, because the government controls vast amounts of public resources and power in approving and regulating private transactions.

[Insert Table 2 about Here]

Although the total affordable housing price can reflect the hidden income of residents at a given point in time, it cannot measure the stability of hidden income over time. Our second measure, affordable monthly mortgage payment, was able to measure the stability of hidden income and capture perceived future hidden income. Therefore, the results on affordable monthly mortgage payment in column 3 of Table 2 show the relationship between occupational background and stable hidden income. Consistent with the results on total affordable housing prices, these results show that government officials had the highest affordable monthly mortgage payments, indicating that their hidden income was not only high but also stable. However, employees in state-owned enterprises no longer had higher affordability in monthly mortgage payments, suggesting that their hidden income might not occur regularly each month. We suspect that most hidden income sources for state-owned enterprise employees may be performance-related bonuses or subsidies, which are neither explicit nor stable. After controlling for the rich array of variables in column 4, employees in colleges or research institutions and in primary schools or kindergartens had lower affordability of monthly mortgage payments than those working in the private sector, possibly because of the unpredictable nature of their hidden income,

usually through grants, consultation fees, training fees, or gifts from students and their families.

The analyses in columns 5 and 6 used affordable down payment as the dependent variable to test the relationship between occupational background and the accumulation of hidden income. The results were consistent with those in columns 1 and 2. Government officials appeared to have accumulated more hidden income than those working in state-owned enterprises, colleges or research institutions, and the private sector. Their hidden-income advantage, however, seemed to be smaller for affordable down payments than for total affordable housing prices and affordable monthly mortgage payments. Participants who were working in primary schools or kindergartens showed a disadvantage in accumulating hidden income compared to other occupational groups.

The effects of the control variables were mostly as expected. Increases in wage income, expected future income growth, housing provident funds, housing subsidies, and family financial support all significantly contributed to housing affordability, regardless of the outcome measure used. Longer work experience had a significant positive effect on affordable down payments (indicating higher income and wealth accumulation) but had little effect on total affordable housing prices and affordable monthly mortgage payments. Higher levels of education predicted significantly higher levels of housing affordability, probably because the greater human and social capital associated with higher education would lead to higher lifetime income, either in explicit or hidden forms.

(b) Robustness test: Regression on unmarried group only

Even though the government stipulates that married individuals should submit a family application rather than an individual application for price-capped housing, about 28% of married households in our study sample applied as individuals. The price-capped housing policy states that married couples can prequalify if they apply for the house jointly in both of their names. It was interesting that many married couples declined this benefit and chose to apply as individuals. One reasonable explanation for this decision is that married couples whose incomes exceeded the income limit for price-capped housing may have applied as individuals to avoid losing eligibility for such housing.

Housing affordability of married applicants was not completely determined by the applicant's own background but also by the spouse's background. Therefore, simply controlling for the background characteristics of the applicant might have led to estimation bias. Although we also controlled for marital status, the reliability of the estimation results was still not strong enough due to the inclusion of the married subsample. Therefore, we ran additional regressions among the unmarried group as a robustness test for the results. These results are shown in Table 3, which is structured in the same way as Table 2.

The results in Table 3 suggest that our main results in Table 2 were indeed robust. Consistent with the findings from Table 2, Table 3 shows that, among the unmarried respondents, government officials had substantial advantages in obtaining hidden income, especially with respect to total affordable housing prices. Married

government officials also tended to have more stable hidden income, as reflected by the consistently positive coefficients on affordable monthly mortgage payments and affordable down payments. Employees in state-owned enterprises and colleges or research institutions also possessed more hidden income than those in other occupations, but their hidden income was not as stable as that of government officials.

[Insert Table 3 about here]

(c) Position level and hidden income

Do government officials at higher level positions obtain more hidden income than officials at lower positions? We suspected so because government officials at higher positions tend to have more power to carry out rent-seeking behaviors and gain from approving or facilitating private transactions. Figure 5 shows the distribution of government officials' position levels in the sample. Most government officials in our sample held relatively low positions because the sample consists of applicants to price-capped housing who tended not to have a long work history or high income, Figure 5 shows that these government officials worked in four position levels including junior clerks (*banshi yuan*), senior clerks (*ke yuan*), deputy director of clerks (*fu ke ji*), and the director of clerks (*zheng ke ji*) or above. About half of the government officials were senior clerks.

The regression results on the relationship between position level and hidden income is shown in Table 4, where all control variables were included in all regressions. We ran these models among all government officials first (columns 1 to 3) and then among unmarried government officials only (columns 4 to 6). The results

clearly show that government officials who worked as a director of clerks or above had significantly higher overall hidden income (i.e., higher total affordable housing prices), anticipated more stable hidden income in future (i.e., higher affordable monthly mortgage payments), and had accumulated more hidden income over time (i.e., higher affordable down payments) compared to their peers working at lower positions. These results provide indirect support for our hypothesis that higher position levels grant government officials more power and opportunity to obtain more hidden income.

[Insert Table 4 about here]

(5) CONCLUSION AND DISCUSSION

Using survey data from applicants of price-capped housing in Guangzhou, this paper empirically studied the effects of occupational background on residents' hidden income, as measured by housing affordability. The regression results showed that government officials had the highest amount of hidden income, followed by employees of state-owned enterprises and colleges or research institutions, whose hidden incomes were both significantly higher than those of employees in other occupations. This finding provides direct evidence that helps explain the fervor among Chinese youth to take the national civil servant test to become government officials.

Further analyses verified that government officials' hidden incomes were not only substantial but also stable over time; that is, government officials accumulated significant amounts of hidden income and anticipated continued gains in the future.

Furthermore, government officials who worked as a director of clerks or held higher positions had significantly higher and more stable hidden incomes than did government officials who worked at lower position levels. This finding suggests that higher positions were associated with more power and opportunities to obtain financial gain through hidden channels.

It is important to note that our sample included only individuals who applied for price-capped housing. These residents were from middle- or low-income families, but residents with higher incomes may possess even more hidden income. However, due to the difficulties of acquiring data on hidden income, it is especially difficult to conduct an empirical analysis on this topic among high-income groups. Our study, though limited, sheds light on the sources of hidden income and their implications for the overall income distribution.

The existence of significant amounts of hidden income and the close links between hidden income and occupational background in this study should be taken into consideration in future policy designs and implementations. Specifically, political and economic policies should be designed and reinforced to curtail and ultimately eliminate hidden income among government officials. Decision making and any public or private transactions involving the government should be transparent and closely monitored. Private transactions, in particular, should be handled via the market economy instead of hidden political channels. These efforts will reduce corruption and other rent-seeking behaviors among government officials and in turn restrain their hidden income.

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† This study was supported by the National Natural Science Foundation of China (No.71003108, No.70902024) and a Fordham University Faculty Research Grant. We have benefited from comments by Lu Ming and Chen Zhao from Fudan University.

[1] It should be noted that some individuals or families are officially classified as middle or low income according to their officially reported income, but they may actually belong to the upper class if their hidden income is taken into account.

[2] Another possible explanation is that the sample in this study on average consists of individuals who are financially better off than those in the NBS general sample. This is likely because the sample is a convenience sample of the social network of the interviewers who worked for this survey. Therefore, it is important to understand who the interviewers are to gauge the potential level of sample bias. Wang (2010) described the strict training and inspection procedures adopted by the research team to ensure data quality (pp.13–14), but the issue of selection bias was not discussed.

[3] Even in a critical commentary by Luo et al. (2011), the authors admitted that the official income statistics are underestimations of the reality.

[4] Existing studies use efficient wage mechanisms (e.g., Chen & Edin, 2006) or industrial rent caused by some monopolistic factors (e.g. Krueger & Summers, 1988; Katz & Summers, 1989) to explain the income gap among industries. Actually, income inequality among different industries is a common phenomenon all around the world. Bjorklund et al. (2004) found evidence of significant income inequality among different industries in both the US and Northern European countries. Haisken-DeNew and Schmidt (1999) made a comparison between Germany and the US, and Lukyanova (2006) provided evidence for Russia.

[5] The housing provident fund is a nationwide compulsory savings scheme that has been enforced by the central government since 1994. Under this scheme, participating employees contribute a certain proportion of their salaries to their housing provident accounts, and employers contribute an equal amount (Yeung & Howes, 2006). The contribution rate varies across cities; in Guangzhou it is currently set between 5 and 12%, at the employer's discretion.

[6] Many Chinese employers, especially state-owned enterprises and other publicly financed enterprises, provide a certain amount of housing subsidies to their employees on top of their regular salaries and

work-related benefits. These benefits can largely be attributed to China's unique process of housing reform. Before the reform, Chinese urban workers lived under a system defined by free or low-rent public housing but low salaries. To facilitate the market-oriented housing reform, since the mid-1990s, most Chinese employers have been required to compensate for workers' rising housing costs by providing housing subsidies (Gao, 2006, 2010; Gao & Riskin, 2009; Stephens, 2010).

[7] Housing subsidies had 36 missing values, housing provident funds had one missing value, and income had six missing values. The other key variables did not have missing values. These relatively small numbers of missing values were excluded from our analyses given our large sample size.

[8] To verify the robustness of the results, we also tried an ordered probit model and an ordinary least squares model, which yielded the same result patterns as shown in Table 3. To save space, the detailed regression results of the probit and ordinary least squares models are not shown here but available upon request.

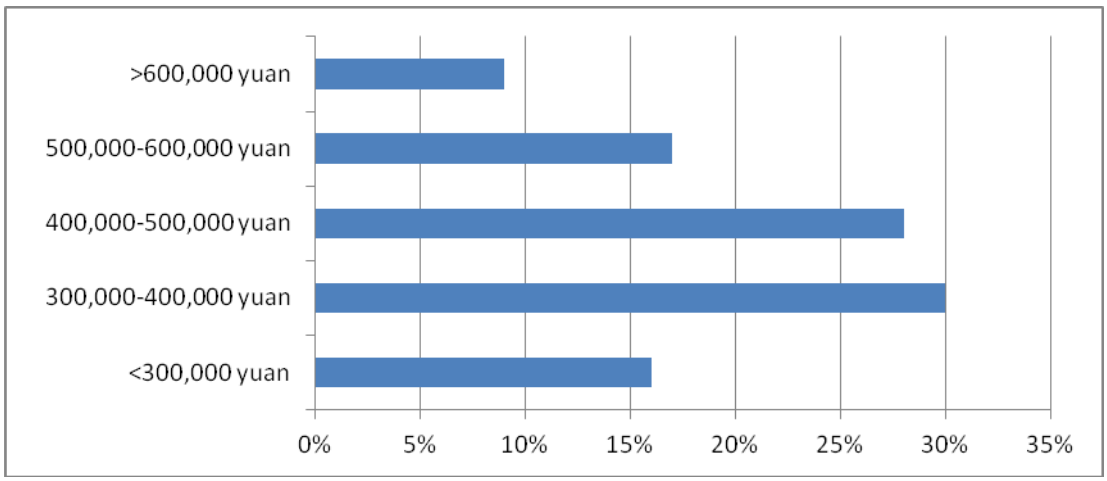

Figure 1. Distribution of total affordable housing prices (*N* = 10,124).

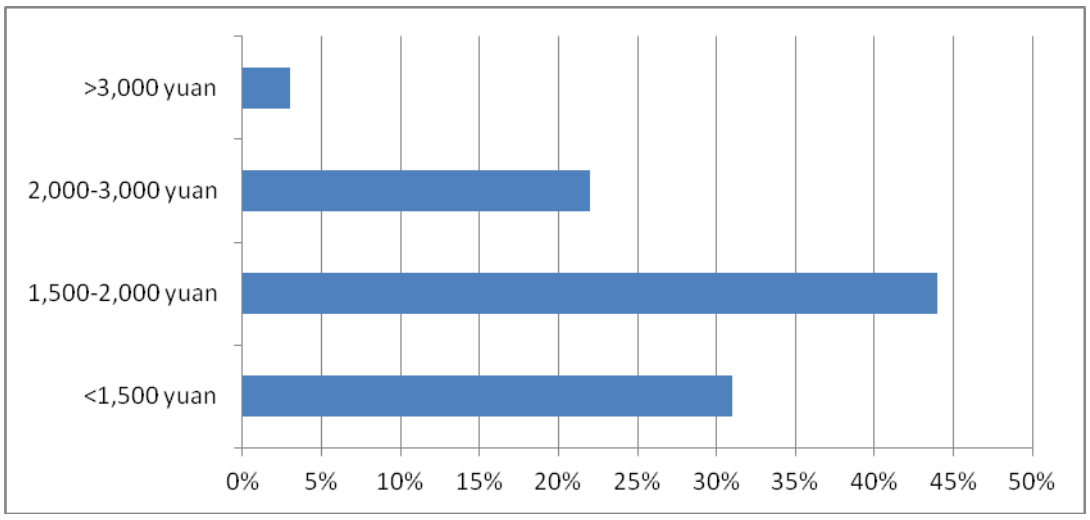

Figure 2. Distribution of affordable monthly mortgage payments (*N* = 10,124).

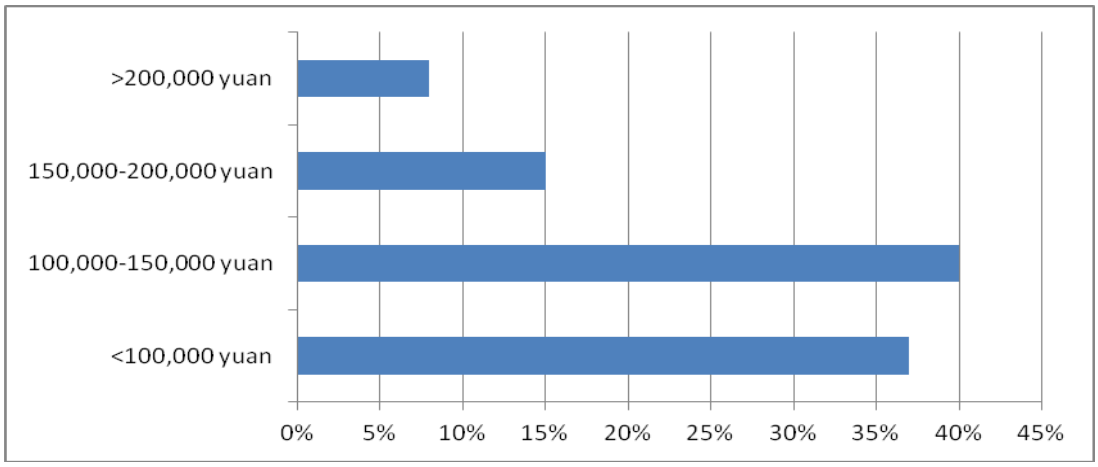

Figure 3. Distribution of affordable down payment (*N* = 10,124).

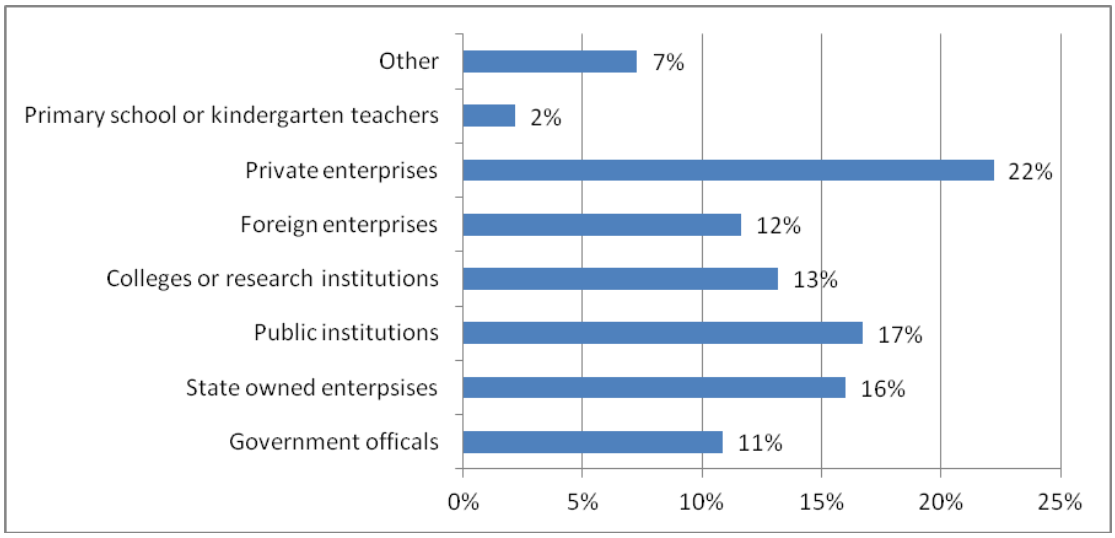

Figure 4. The distribution of the respondents' occupational backgrounds (*N* = 10,124).

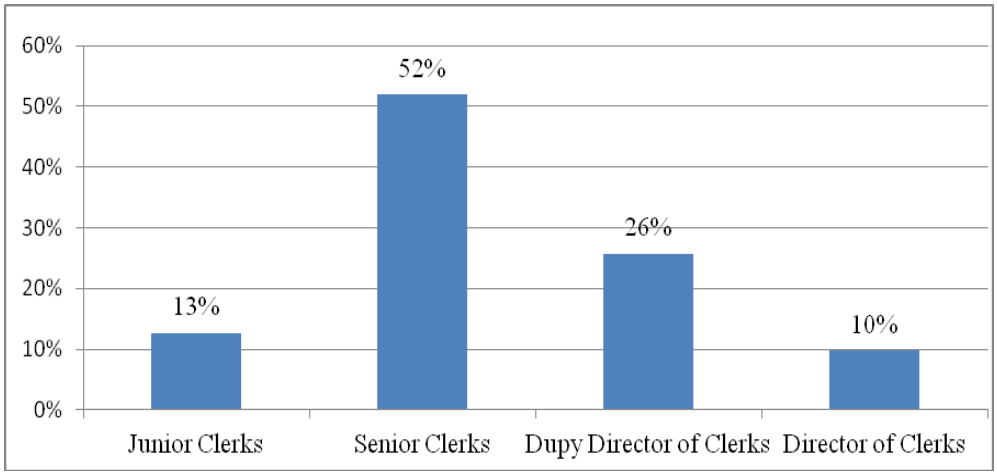

Figure 5. Distribution of government officials' position levels. Observations without information on position levels are omitted (N = 1,079).

Table 1. *Descriptive statistics of control variables*

Control Variables	%
Annual wage income	
<50,000 yuan	53
50,000-80,000 yuan	37
>80,000 yuan	9
Expected future income change	
Remain unchanged or decline	29
Increase by <25%	57
Increase by >=25%	14
Housing provident fund(monthly mean yuan)	661
Standard Deviation	611
Housing subsidy (monthly mean yuan)	168
Standard deviation	293
Main down payment source	
Savings	47
Family support	44
Loans from friends and other acquaintances	8
Education level	
High school or below	9
3-year college	17
4-year college	54
Master's degree or above	20
Work experience	
Less than 5 years	59
6-10 years	24
11-15 years	8
More than 15 years	9
Marital status	
Unmarried	74
Married	19
Divorced	6
N	10,124

Table 2. *Ordered logit model regression results on hidden income (N = 10,124)*

	Total affordable housing price		Affordable monthly mortgage payment		Affordable down payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Occupational background (Private enterprises omitted)						
Government officials	0.71***	0.56***	0.47***	0.34***	0.30***	0.22***
	(8.91)	(6.92)	(5.76)	(4.16)	(3.83)	(2.70)
State owned enterprises	0.26***	0.24***	-0.04	-0.04	0.25***	0.23***
	(4.09)	(3.74)	(-0.60)	(-0.66)	(3.66)	(3.41)
Public Institutions	0.22***	0.08	0.03	-0.12*	0.14**	0.05
	(3.47)	(1.27)	(0.45)	(-1.74)	(2.06)	(0.72)
Colleges or research institutions	0.57***	0.24***	0.19**	-0.22***	0.41***	0.17**
	(7.69)	(2.98)	(2.52)	(-2.69)	(5.66)	(2.09)
Foreign enterprises	-0.04	-0.08	-0.11	-0.13*	-0.07	-0.05
	(-0.59)	(-1.16)	(-1.53)	(-1.77)	(-0.91)	(-0.65)
Primary school or kindergarten teachers	-0.17	-0.19	-0.27**	-0.31**	-0.32**	-0.36***
	(-1.41)	(-1.53)	(-1.99)	(-2.28)	(-2.48)	(-2.65)
Other	0.04	0.14	-0.05	0.03	0.07	0.06
	(0.43)	(1.58)	(-0.53)	(0.31)	(0.82)	(0.70)
Annual wage income (50,000 yuan or less omitted)						
50,000-80,000 yuan	0.83***	0.83***	1.29***	1.22***	0.65***	0.66***
	(20.22)	(19.56)	(28.92)	(26.65)	(15.52)	(15.22)
>80,000 yuan	1.49***	1.52***	2.05***	1.95***	1.13***	1.13***
	(21.64)	(21.23)	(27.39)	(25.36)	(16.35)	(15.64)
Expected Future Income change (No change or decline omitted)						
Increase by less than 25%	0.43***	0.36***	0.61***	0.56***	0.29***	0.31***
	(10.20)	(8.33)	(13.76)	(12.27)	(6.81)	(6.90)
Increase by 25% or more	0.83***	0.68***	1.24***	1.13***	0.59***	0.58***
	(13.69)	(10.88)	(18.90)	(16.82)	(9.32)	(8.92)
Log housing provident fund	0.07***	0.05***	0.09***	0.07***	0.02**	0.02**
	(7.81)	(6.15)	(8.99)	(7.06)	(2.30)	(2.15)
Log housing subsidy	0.02**	0.03***	0.03***	0.03***	0.02**	0.02***
	(2.44)	(3.27)	(3.51)	(3.91)	(2.29)	(2.75)
Main down payment source (Self-savings omitted)						
Family support		0.50***		0.12***		0.73***
		(12.31)		(2.74)		(17.58)
Borrowing from friends and other		-0.12*		-0.22***		-0.22***
		(-1.76)		(-3.07)		(-3.02)
Work experience (5 years or less omitted)						
6-10 years		-0.03		0.01		0.29***
		(-0.72)		(0.21)		(6.21)
10-15 years		0.02		0.07		0.50***
		(0.31)		(0.83)		(6.45)
More than 15 years		0.21**		0.15*		0.85***
		(2.55)		(1.73)		(9.63)
Education level (High school or below omitted)						
3-year college		0.20**		0.08		0.19**
		(2.45)		(0.89)		(2.10)
4-year college		0.58***		0.53***		0.45***
		(7.27)		(6.05)		(5.16)
Master's degree or above		0.94***		1.00***		0.80***
		(10.01)		(9.93)		(8.13)
Marriage status (unmarried omitted)						

	Total affordable housing price		Affordable monthly mortgage payment		Affordable down payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Married		0.10*		0.16***		0.20***
		(1.96)		(3.00)		(3.92)
Divorced		-0.08		-0.16		0.13
		(-0.89)		(-1.62)		(1.40)
Pseudo R^2	0.05	0.07	0.10	0.11	0.03	0.05

Note. Regression coefficients are presented with heteroscedasticity-robust *t* statistics in parentheses.
*, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3. *Ordered logit model regression results on hidden income among the unmarried sample (N = 7,527)*

	Total affordable housing price		Affordable monthly mortgage payment		Affordable down payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Occupational background (Private enterprises omitted)						
Government officials	0.76***	0.59***	0.45***	0.33***	0.33***	0.24***
	(8.24)	(6.35)	(4.81)	(3.50)	(3.70)	(2.66)
State-owned enterprises	0.33***	0.28***	-0.05	-0.06	0.28***	0.25***
	(4.58)	(3.93)	(-0.60)	(-0.79)	(3.66)	(3.23)
Public Institutions	0.23***	0.08	-0.01	-0.16**	0.10	0.02
	(3.12)	(1.08)	(-0.10)	(-2.01)	(1.30)	(0.28)
Colleges or research institutions	0.45***	0.17*	0.05	-0.29***	0.31***	0.13
	(5.29)	(1.82)	(0.60)	(-3.02)	(3.54)	(1.45)
Foreign enterprises	-0.03	-0.08	-0.14*	-0.16**	-0.02	-0.03
	(-0.46)	(-1.03)	(-1.79)	(-2.02)	(-0.30)	(-0.38)
Primary school or kindergarten teachers	-0.17	-0.18	-0.14	-0.17	-0.18	-0.15
	(-1.14)	(-1.18)	(-0.90)	(-1.08)	(-1.18)	(-0.95)
Other	-0.02	0.07	-0.14	-0.09	0.11	0.12
	(-0.15)	(0.62)	(-1.18)	(-0.78)	(0.93)	(0.99)
Income (50,000 yuan or less omitted)						
50,000-80,000 yuan	0.82***	0.85***	1.29***	1.23***	0.60***	0.65***
	(17.45)	(17.20)	(25.09)	(23.41)	(12.50)	(12.94)
>80,000 yuan	1.48***	1.56***	2.11***	2.05***	1.01***	1.12***
	(17.51)	(17.76)	(22.64)	(21.59)	(12.06)	(12.90)
Expected Future Income growth (No change or decline omitted)						
Increase by less than 25%	0.44***	0.36***	0.61***	0.56***	0.32***	0.31***
	(8.61)	(6.99)	(11.28)	(10.22)	(6.16)	(5.76)
Increase by 25% or more	0.83***	0.68***	1.25***	1.15***	0.64***	0.59***
	(11.93)	(9.44)	(16.44)	(14.86)	(8.81)	(7.85)
Log housing provident fund	0.06***	0.06***	0.08***	0.07***	0.02*	0.02**
	(6.36)	(5.66)	(7.72)	(6.54)	(1.77)	(2.03)
Log housing subsidy	0.02**	0.02***	0.03***	0.04***	0.02**	0.03***
	(1.97)	(2.76)	(3.55)	(3.92)	(2.36)	(2.81)
Main down payment source (self savings omitted)						
Family support		0.57***		0.18***		0.88***
		(12.40)		(3.81)		(18.61)
Borrowing from friends or other		-0.07		-0.16*		-0.05
		(-0.80)		(-1.87)		(-0.65)
Working experience (5 years or less omitted)						
6-10 years		-0.07		0.04		0.35***
		(-1.31)		(0.66)		(6.26)
10-15 years		-0.11		0.13		0.53***
		(-1.02)		(1.05)		(4.89)
More than 15 years		0.17		0.13		0.93***
		(1.35)		(0.91)		(6.29)
Education level (High school or below omitted)						
3-year college		0.22*		0.06		0.11
		(1.96)		(0.47)		(0.84)
4-year college		0.66***		0.52***		0.43***
		(6.03)		(4.24)		(3.47)
Master's degree or above		0.98***		0.96***		0.73***
		(7.91)		(7.14)		(5.46)
Pseudo R^2	0.05	0.06	0.10	0.11	0.03	0.05

Note. Regression coefficients are presented with heteroscedasticity-robust *t* statistics in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4 *Ordered logit model regression results on Position Level and Hidden Income (N=1,079)*

	All government officials			Unmarried government officials		
	Total affordable housing price	Affordable monthly mortgage payment	Affordable down payment	Total affordable housing price	Affordable monthly mortgage payment	Affordable down payment
	(1)	(2)	(3)	(4)	(5)	(6)
Position level (junior clerks omitted)						
Senior clerks	0.31	0.53**	0.27	0.35	0.56*	0.19
	(1.33)	(2.21)	(1.09)	(1.26)	(1.94)	(0.63)
Deputy director of clerks	0.20	0.21	0.18	0.26	0.28	0.09
	(0.75)	(0.80)	(0.67)	(0.78)	(0.84)	(0.24)
Director of clerks or above	0.90***	0.81***	0.61**	1.33***	1.13***	0.72*
	(3.04)	(2.61)	(1.98)	(3.72)	(2.82)	(1.79)
Annual wage income (50,000 or less omitted)						
50,000-80,000 yuan	1.00***	1.46***	0.70***	1.11***	1.61***	0.85***
	(5.89)	(8.72)	(4.40)	(5.85)	(8.84)	(4.80)
>80,000 yuan	1.44***	2.04***	0.76***	1.49***	2.35***	0.93***
	(6.99)	(9.67)	(3.74)	(6.10)	(9.33)	(3.91)
Expected future income growth (No change or decline omitted)						
Increase by less than 25%	0.29**	0.48***	0.26**	0.24*	0.33**	0.24*
	(2.43)	(3.53)	(2.13)	(1.77)	(2.10)	(1.70)
Increase by 25% or more	0.51*	1.06***	0.67**	0.81**	1.24***	0.80**
	(1.68)	(3.64)	(2.21)	(2.48)	(3.61)	(2.34)
Log housing provident fund	0.13***	0.18***	0.05	0.12**	0.13**	0.01
	(2.65)	(3.02)	(0.74)	(2.31)	(2.02)	(0.09)
Log housing subsidy	0.04*	0.04	0.03	0.03	0.06*	0.03
	(1.73)	(1.37)	(1.07)	(1.11)	(1.87)	(0.97)
Main down payment source (self savings omitted)						
Family financial support	0.40***	-0.07	0.67***	0.40***	0.06	0.80***
	(3.14)	(-0.53)	(5.13)	(2.78)	(0.37)	(5.50)
Borrowing from friends or other	0.10	-0.14	-0.20	0.19	-0.10	-0.06
	(0.49)	(-0.63)	(-0.93)	(0.79)	(-0.41)	(-0.27)
Working experience (Five years or less omitted)						
6-10 years	-0.28*	-0.27*	0.35**	-0.35*	-0.25	0.38**
	(-1.85)	(-1.77)	(2.48)	(-1.95)	(-1.38)	(2.27)
10-15 years	-0.25	-0.46*	0.35	-0.91***	-0.94**	0.20
	(-1.12)	(-1.70)	(1.50)	(-3.09)	(-2.41)	(0.73)
More than 15 years	-0.02	-0.02	0.84***	-0.01	-0.14	0.72

	All government officials			Unmarried government officials		
	Total affordable housing price	Affordable monthly mortgage payment	Affordable down payment	Total affordable housing price	Affordable monthly mortgage payment	Affordable down payment
	(1)	(2)	(3)	(4)	(5)	(6)
	(-0.09)	(-0.06)	(2.62)	(-0.02)	(-0.28)	(1.18)
Education level (high school or below omitted)						
3-year college	-0.18	-0.91	-1.06*	0.03	-1.24*	-1.02
	(-0.24)	(-1.50)	(-1.66)	(0.04)	(-1.74)	(-1.21)
4-year college	-0.00	-0.58	-0.24	0.12	-0.75	-0.16
	(-0.00)	(-0.96)	(-0.40)	(0.15)	(-1.08)	(-0.20)
Master's degree or above	0.26	-0.07	-0.01	0.41	-0.32	0.10
	(0.36)	(-0.11)	(-0.02)	(0.51)	(-0.45)	(0.12)
Marriage status (unmarried omitted)						
Married	-0.02	0.02	0.17			
	(-0.12)	(0.14)	(1.01)			
Divorced	-0.50*	-0.05	0.02			
	(-1.88)	(-0.19)	(0.06)			
Pseudo R^2	0.05	0.10	0.04	0.06	0.12	0.05

Note. Regression coefficients are presented with heteroscedasticity-robust *t* statistics in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.