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*Research Article*

# Real Estate Tax, Housing Price, and Housing Wealth Effect: An Empirical Research on China Housing Market

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Housing market occupies a large part of the wealth of the whole society in most countries, and real estate tax plays an important role for the government to maintain sustainable development for the economy. As consumption being a major issue nowadays, in this paper, we want to find out (1) whether real estate taxes affect the house price in China and whether the affects vary among different tax types? (2) whether there exists wealth effect in China housing market? That is, whether the change in house wealth (price) affects the consumption? (3) whether and how do real estate taxes affect wealth effect? We set up the empirical model by using the GMM method on panel data from 2002 to 2016 to explore the relations among real estate tax, housing price, and wealth effect. We considered the influence of four different types of real estate tax on the housing price and found the results are mixed. Besides, there is a significantly negative wealth effect on China housing market. Finally, house price plays a mediator role in the effect of the real estate tax on the consumption.

## 1. Introduction

China housing market has shown rapid growth along with the glorious economic development since 2000—the wealth of housing market occupied 6.8% of the GDP in China in 2018, and the expenditure of house account for nearly 80% of the family assets. In this case, the healthy development of China real estate industry plays an essential role in household wealth and consumption, as well as the social stability. As real estate tax is the vital fiscal policy, the implementation of real estate tax policies would have a crucial impact on both housing market price and household wealth [1, 2]. Therefore, it is meaningful for the policymakers to find out how to develop an appropriate real estate tax system to manipulate the market, and accordingly, the consumption.

Real estate tax has its own unique characteristics in China. Different from other developed countries, instead of a single real estate tax, there are two subjects should pay for the taxes in China: the real estate developer and the house

buyer, and they should pay for the taxes when the transaction happens, including farmland occupation tax, urban land utilization tax, value-added tax, deed tax, and so on. Even though China government has already developed a number of tax policies in housing markets, for instance, piloting the house property tax in Chongqing and Shanghai in 2011, making the legislative plan of house property tax law in 2015, and putting the housing property tax in the fiscal and taxation reform in 2016, the major tax policies are still maintained for most of the province [3, 4]. More recently, the China government reviled that the new real estate tax policies, specific policy details are still not determined, would be applied in more cities and extend from business real estate to living real estate, which would maintain 5 years since 2022. According to these situations, in this paper, we will still consider how the multiple real estate taxes impact the housing market.

Fundamentally, as the real estate taxes overlap to some extent, and the government does not have consistent or clear principles in making a real estate tax system, we want to

explore whether and how do real estate taxes types affect the housing price. And then, as consumption being a major issue nowadays in China, with a low consumption rate, we want to explore the wealth effect in the housing market, that is, to find out whether the change in real estate value would affect the consumption. Besides, we would also test whether the real estate taxes will influence the wealth effect and what is the mechanism. It is important to administrations and governments to understand how real estate taxes impact housing market wealth, so as to inform the appropriate designs and implementations of real estate taxes.

The present literature found inconsistent results in the above questions. First, the wealth effect in the housing market is mixed. While some of the research studies argued that the change of housing prices would increase the consumption in multiple countries [5–7], however, the others found insignificant results [8, 9]. The studies referred to real estate tax mostly test the relation between tax and price, while few considered the impact of tax on consumption, and even the results of tax and housing price were inconsistent [10–12]. Leaving aside the debates in the present studies, the majority of research studies are concerned the mature markets and advanced economies, while the characteristics of the housing markets have not been yet systematically researched for China and other emerging market economies. Therefore, this paper focuses on China housing market, considers the wealth effect in China housing market, and explores how different types of real estate taxes, affect the house price and consumption. The paper contributes to the extant literature by considering the housing market characteristics in China and analyzing the wealth effect from the tax aspect. Besides, it is also meaningful for the policymakers to make an appropriate real estate tax system to develop a sustainable housing market and a macroeconomy.

## 2. Literature Review

*2.1. Real Estate Tax and House Price.* The real estate tax is the vital means and tool for government to make macroeconomic adjustments and its functions can be summarized into three aspects: increasing the local government revenue, stabilizing housing market price, and reallocating the income [13–15]. The second function, which related to the housing price, is the vital means to adjust housing market price and has attracted much attentions in the previous literature [16].

Theoretically, the impact of real estate tax is not so straightforward. First, the literatures focus on the taxation shifting perspective. Similar with other kinds of taxation, the real estate tax will also turnover, shifting between buyers and sellers of properties. As such, imposing tax would cause the fluctuation in the housing market. The housing market elasticity determines the relation between real estate tax and price [17, 18]. Second, from the capital pricing perspective, researchers argue that tax tends to restrict the growth of house. In short-term, imposing property tax will reduce the supply, which then lead to low efficiency. In long-term, imposing property tax will lead to price decrease. In this sense, imposing the property tax shall be an effective means

contributing to restrict speculative demand in housing market [19, 20].

Accordingly, plenty of prior empirical studies have tested the influence of real estate tax on housing market prices, yet research outcomes are not consistent [12, 21–28]. Some researchers argue the negative role of the tax to housing price. Slemrod et al. [21] tested the influence of estate tax on national wealth using the dataset from US estate return data and found that national wealth is negatively associated with the level of estate taxation. Similarly, Van den Noord [22] analyzed the relationship between tax and price euro nations and revealed the negative role of tax to housing price, saying the larger tax incentives trigger larger house price volatility. Also, the research of Cebula [12] explored property tax in Georgia using the dataset of single-family houses and found that the property tax level is negative to price of a household. Best and Kleven [23] analyzed the influence of UK transaction taxes on housing market, pointed out that transaction taxes significantly distort the price. Other researches show the opposite results, claiming the positive effect of the tax on housing prices. Rosen and Fullerton [24] found that the tax would transfer into public service and at least 75% of them would shift to the housing price. Cheung et al. [25] claimed tax is a regulatory component of price. Still, the rest studies argue that real estate tax does not have a significant impact on housing price. Kuang [26] has argued that property tax does not show a big effect on housing price. Rather, it is the price elasticity that plays a dominant role to impact housing price. Duca et al. [27] revealed that real estate taxes may lead to diversity in the international and regional house prices which would affect consumer's behavior in multiple dimensions. Agarwal et al. [28] found that Capital gains tax increase in the housing market leads to higher tax evasion and the house price shows the different impact on cash buyers verse financial buyers.

Specifically, in China, the studies about real estate are also mixed and vary among provinces. In the work of Wang et al. [29], they critically evaluated how China property tax policy impacts the local housing market and found consumers' demand elasticity will change due to the property tax, so as to trigger the change of housing price. Wu [30] found that the real estate tax has been completely shifted to buyers in China housing market, which further pushes the higher housing price. Bai et al. [31] examine the influence of policy experiment of property taxation in 2011 on price in China. The empirical results revealed that the property tax experiment has a negative influence on Shanghai. However, in Chongqing, the property tax experiment plays a positive role. Du and Zhang [32] empirically assessed how trial property taxes in selected control cities in China. They reveal trial property tax reduces the price growth in Chongqing, while it does not have significant influence in Shanghai. Liu [33] pointed out that a majority of urban households have purchased housing properties in the absence of a property tax which may lead to a less sensitive reaction to the new real estate tax policies. Wang et al. [34] found that with the development of digital technologies, the online listing information of house price index construction would contribute to clarify the house price structure.

As we can conclude from the above literature, the relation between real estate tax and house price has attracted plenty of attentions, however, there are still no consistent conclusions on it, especially in China housing market, which the real estate tax system is still immature. Apart from that, the literature focused on different types of real estate is even rare, which bring us an opportunity to explore it in emerging markets.

*2.2. Wealth Effect in Housing Market.* In housing market, the wealth effect refers that the real estate wealth will directly change along with the change of housing price, and consequently, the increased or decreased real estate wealth will impact the consumption expenditure of people [35].

There are mass of research studies focusing on housing price and consumption, while results are still inconsistent. First, based on the assumption of the permanent income hypothesis [36] and life-cycle hypothesis [37], the increase of house price would lead to a high consumption level. Carroll et al. [38] tested the data in the USA and found that higher house prices indicate the higher household consumption on an aggregate level. Similarly, Poterba [39] found that even though the house owners did not sell the house, the increasing house price would still make them fell wealthier and spend more. Campbell and Coco [6] claimed the real estate could substitute for saving, and he used the survey data from British and found if the house price increased 1%, the consumption would increase 1.7% accordingly. Second, however, some researchers argued the negative effect of house price on consumption, result from the high expenditure on purchasing a house or paying back the house loan [8, 36]. Phang [8] used the data from Singapore to figure out that higher house price leads to a lower total consumption, which results in the spillover effect. Burrows [40] found that no matter how the house price changed, people always maintain a low consumption level. Apart from these two opposite findings, some literature claim the insignificant relation between them [41, 42]. For example, Buiter [41] said that the wealth effect in the housing market is not significant and it only works for the people who have multiple houses. Browning et al. [42] tested housing wealth and consumption in Danish and their statistical results indicate that housing price has little influence on resident consumption. De Roiste et al. [43] investigate the housing wealth on consumption by using synthetic panel series of household survey data and found that the house wealth shows a curve shape and an asymmetric effect. Suari-Andreu [44] estimates housing wealth by Dutch panel data and measures the house price shocks by self-reported house price expectations, which lead to the results that the correlation between house prices and consumption is ascribed to common causality. Christelis et al. [45] explored the heterogeneous wealth effects in real estate industry and found that the average house wealth effect is between 2 and 5% and the consumption response to positive wealth shocks is greater than the response to negative shocks.

In Chinese market, previous studies also still have debates about whether the wealth effect of real estate is positive or negative though most studies have revealed that there is wealth effect in housing market [46–52]. Dong et al. [46] the wealth effect occurs when price-to-income ratio is low by using the data from 35 major Chinese cities. Chen et al. [47] used permanent–transitory variance decomposition analysis to indicate that short-term consumption is permanent, and the long-term consumption will change along with the house price. Koivu [48] used the structural vector autoregression method and found that the wealth effect is weakly positive but significant in China. Contrary to the former findings, Ye et al. [49] unveiled the negative effect and claimed that it is the major effect in most cities in China. Still, the mechanism is still ambiguous. Chen et al. [50] used a countrywide survey data to examine the house wealth effect and found that compared with developed economies, China has a much larger housing wealth effect and a household's consumption varies across housing tenure. Li et al. [51] considered the discontinuity in house size to identify the house wealth effect and found that the young generation with high repayment capacity is more responsive to gains in housing wealth. Wu and Bian [52] explored the house wealth effect in three different tier cities in China and the results showed that raising interest rates has a stronger negative effect on house prices in developed cites.

Even though many prior studies have explored multiple aspects of wealth effect in the housing market, there are still few of them directly tested the influence of real estate tax on wealth effect or consumption. As an important tool for the policymakers, whether and how real estate tax affects consumption is a big issue nowadays, especially in the Chinese market, where the policy system is still not mature in housing market. Some studies found that general taxes, income taxes, and sales taxes have an influence on consumption [1, 29, 30]. Thus we want to find out whether real estate also works and what the implied mechanism is.

# 3. Data and Model Specification

*3.1. Data and Variables.* We intended to explore real estate taxes, housing price and wealth effect in China, hoping to provide useful results and recommendations to the policymakers in China and other emerging markets. Therefore, we collected the data related to these above issues. In this study, specifically, all the data are collected from *The National Bureau of Statistics of the People's Republic of China* [53]. The panel data covers the period from 2002 to 2016 and contains 30 major provinces in China, including 450 observations for each variable.

To examine the above research questions in our paper, we defined the following variables from our data set. Table 1 shows all the variables and their code and definitions we would use in the following empirical analysis (see Table 1).

Here, *house price (HP)* is the average price of commercial houses per square meter. *Household consumption expenditure (HCE)* is the per capita consumption expenditure of urban residents.

Apart from these two major variables, due to the complicated real estate tax system in China, we would test the function of different types of real estate taxes.

TABLE 1: Variable explanation.

| Variables | Code | Definitions |
|---|---|---|
| Household consumption expenditure | HCE | Per capita consumption expenditure of urban residents |
| Housing price | HP | Average price of commercial houses |
| Urban land utilization tax | ULU | Average urban land utilization tax in each province |
| Farmland occupation tax | FOT | Average farmland occupation tax in each province |
| Land value-added tax | LVT | Average land value-added tax in each province |
| Deed tax | DET | Average deed tax in each province |
| Controlling variables | | |
| Income of urban residents | IUR | Per capita disposable income of urban residents |
| Savings deposit of households | SDU | Savings deposit balance of urban and rural households at year-end |
| Urbanization rate | URB | Urban population/total population |
| Provincial GDP | GDP | Provincial GDP per capita |

Accordingly, we chose four major types of property taxes in China, referring to *Urban land utilization tax (ULU), Farmland occupation tax (FOT), Land value-added tax (LVT)* and *Deed tax (DET)*. These are four traditional taxes related to real estate in the country and account for most of the part of property tax. Here, it should be highlighted that these four kinds of taxes could be divided into two types according to the subject: ULU, FOT, and LVT should be paid by the real estate developers, while the DET should be paid by the house buyers. We also want to highlight that the amount of FOT for each square meter is fixed in a province, but the specific amount varies among provinces; ULU is calculated based on the land area; LVT is associated with the value-added amount of the land, which basically according to the sales income; DET is related to the value of the house and paid by the buyer. In the following analysis, we will test the influence of these kinds of taxed respectfully, to find out whether they have different impacts to the house market.

Besides, some important control variables are also considered in this paper. First, we collected *Income of urban residents (IUR)* and *Saving deposit of urban and rural households (SDU)*, which represent the financial wealth and highly connected with the consumption [29]. Meanwhile, *urbanization rate (URB)*, which is the ratio of urban population divided by the total population in each province, representing the social-economic development level in a province in China, is a variable that could measure the overall consumption and income level and implies the characteristics in Chinese real estate market during the urbanization process [30]. What's more, due to the unbalanced development between regions, we also considered the *Provincial GDP (GDP)* as well [29].

To tease out multicollinearity problem, we tested the correlation matrix and Table 2 displays the correlations between the variables. First, we could see from the table that the variables show significant correlations (see Table 2). Second, the correlation coefficients show that there are no multicollinearity effects in our data according to the test standards [32]. Moreover, we also calculated the VIFs value among the variables and the maximum VIF is less than 10, which also exclude the influence of multicollinearity.

*3.2. Model Specification.* In this paper, we need to answer three major questions. First, we want to find out whether the taxes have impacts on the house price? And then, we also want to explore the influence of housing price on consumption, or the wealth effect in the housing market. Finally, we tested whether the real estate taxes affect the wealth effect? And, whether the effects vary among different taxes?

Accordingly, we will apply three empirical models to the above panel data of multiple provinces in China (2002 to 2016) to make the following analyses:

First, to test how real estate taxes affect price, we construct a fixed impact model. The specific model is as follows:

$$
\begin{aligned}
\ln HP_{it} = {} & \alpha + \beta_1 FOT_{it} + \beta_2 ULU_{it} + \beta_3 LVT_{it} + \beta_4 DET_{it} \\
& + \beta_5 \ln HP_{it-1} + \beta_6 \ln IUR_{it} + \beta_7 \ln SDU_{it} \\
& + \beta_8 URB_{it} + \beta_9 \ln GDP_{it} + \varphi_{it} + \varepsilon_{it},
\end{aligned}
\tag{1}
$$

where we measure all the variables by the natural logarithm referred to Basten et al. [2]. Here, $\beta_1, \beta_2, \beta_3$, and $\beta_4$ present the impact of FOT, ULU, LVY, and DET on house price, respectively, and $i$ presents the province $i$ and $t$ presents the year $t$. Here, we also added the $HP_{t-1}$ as one of the dependent variables to measure the consumption level of the last period of a household, as well as the lagging of consumption. $\varphi_{it}$ is a fixed impact vector, and $\varepsilon_{it}$ is a random error vector. We consider the fixed impact model rather than a random impact model because we can undoubtedly presume that there are natural differences among provinces and cities due to economic and tax policies, while the differences in time-series data are not large enough. Meanwhile, the Hausman test also supports the fixed-effect model ($F = 50.071$, $p < 0.001$).

Second, regarding to the wealth effect in housing market, we establish

$$
\begin{aligned}
\ln HCE_{it} = {} & \alpha + \beta_1 \ln HP_{it} + \beta_2 \ln HCE_{it-1} + \beta_3 \ln IUR_{it} \\
& + \beta_4 \ln SDU_{it} + \beta_5 URB_{it} + \beta_6 \ln GDP_{it} \\
& + \varphi_{it} + \varepsilon_{it}.
\end{aligned}
\tag{2}
$$

Here, consistently, we also measure all the variables by the natural logarithm. And, the Hausman test ($F = 43.201$, $p < 0.001$) supports this fixed-effect model as well.

TABLE 2: Correlation analysis of the variables.

| | HCE | HP | ULU | FOT | LVT | DET | IUR | SDU | URB | GDP |
|---|---|---|---|---|---|---|---|---|---|---|
| HCE | 1.000 | | | | | | | | | |
| HP | 0.925* | 1.000 | | | | | | | | |
| ULU | 0.426* | 0.243* | 1.000 | | | | | | | |
| FOT | 0.298* | 0.131* | 0.798* | 1.000 | | | | | | |
| LVT | 0.739* | 0.634* | 0.699* | 0.507* | 1.000 | | | | | |
| DET | 0.748* | 0.645* | 0.763* | 0.558* | 0.914* | 1.000 | | | | |
| IUR | 0.958* | 0.896* | 0.492* | 0.412* | 0.764* | 0.774* | 1.000 | | | |
| SDU | 0.652* | 0.565* | 0.737* | 0.541* | 0.869* | 0.912* | 0.697* | 1.000 | | |
| URB | −0.103 | 0.156* | 0.396* | 0.331* | 0.264* | 0.364* | −0.039 | 0.529* | 1.000 | |
| GDP | 0.562* | 0.428* | 0.818* | 0.623* | 0.845* | 0.907* | 0.624* | 0.952* | 0.599* | 1.000 |

Note: *represents $p < 0.05$; **represents $p < 0.01$; ***represents $p < 0.001$.

Finally, we want to explore the relation between real estate taxes and wealth effect. Therefore, we test how the real estate taxes impact the consumption? Whether the impact works through the house price? Accordingly, we set up the model as follows:

$$\ln \text{HCE}_{it} = \alpha + \beta_1 \text{FOT}_{it} + \beta_2 \text{ULU}_{it} + \beta_3 \text{LVT}_{it}$$
$$+ \beta_4 \text{DET}_{it} + \beta_5 \ln HP_{it}$$
$$+ \beta_6 \ln \text{HCE}_{it-1} + \beta_7 \ln \text{IUR}_{it} \qquad (3)$$
$$+ \beta_8 \ln \text{SDU}_{it} + \beta_9 \text{URB}_{it}$$
$$+ \beta_{10} \ln \text{GDP}_{it} + \varphi_{it} + \varepsilon_{it}.$$

The fixed-effect assumption for the third model (equation (3)) is supported by the Hausman test as well ($F = 60.4521$, $p < 0.001$).

## 4. Empirical Results

*4.1. Real Estate Tax and House Price.* In the empirical estimate section, we use the dynamic GMM method to examine the data and the model. We choose the GMM method according to the following reasons: (1) compared with other data, the consumption data are more inertia, which can be captured by the dynamic GMM method. (2) It is likely that the consumption and some explanatory variables are determined simultaneously, which leads to endogeneity of the explanatory variables. GMM method can solve this endogeneity to some extent. (3) GMM estimation uses transformed data can overcome the problem of unobservable variables being correlated with explanatory variables, or omitted variables.

We analyze equation (1) using to explore the first-order question to the policymakers. The results are shown in Table 3.

In Table 3, we can see from the full model (model 5) that all the four kinds of real estate taxes have a significantly positive effect on the house price: the farmland occupied tax shows a positive impact on house price ($\beta_1 = 0.013$, $p < 0.001$), so as the urban land utilization tax ($\beta_2 = -0.478$, $p < 0.001$). Furthermore, the land value-added tax shows a much greater positive impact on the price ($\beta_3 = 3.066$, $p < 0.001$), and the deed tax also has a large influence ($\beta_4 = 5.161$, $p < 0.001$).

TABLE 3: The impact of real estate tax on house price.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| | Independent variable: HP | | | | |
| FOT | 0.018*** | | | | 0.013*** |
| | (0.001) | | | | (0.001) |
| ULU | | 0.926*** | | | 0.478*** |
| | | (0.001) | | | (0.001) |
| LVT | | | 5.928*** | | 3.066*** |
| | | | (0.001) | | (0.001) |
| DET | | | | 9.055*** | 5.161*** |
| | | | | (0.001) | (0.001) |
| HP($t-1$) | −0.024 | −0.053 | −0.021 | −0.024 | −0.021 |
| | (0.219) | (0.230) | (0.353) | (0.250) | (0.261) |
| IUR | 1.110*** | 1.170*** | 0.910*** | 0.891*** | 1.008*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| SDU | 0.234*** | 0.326*** | 0.261*** | 0.218*** | 0.210*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| URB | 1.289*** | 3.177** | 2.850** | 1.894** | 1.593*** |
| | (0.001) | (0.002) | (0.003) | (0.003) | (0.001) |
| GDP | 0.298*** | 0.281*** | 0.220*** | 0.276*** | 0.248*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Control variables | Yes | Yes | Yes | Yes | Yes |
| Observations | 450 | 450 | 450 | 450 | 450 |
| AR(1) | 0.008 | 0.006 | 0.006 | 0.007 | 0.006 |
| AR(2) | 0.380 | 0.401 | 0.397 | 0.361 | 0.717 |
| Sargan test | 0.837 | 0.815 | 0.823 | 0.811 | 0.900 |

Note: *represents $p < 0.05$; **represents $p < 0.01$; ***represents $p < 0.001$.

According to the results, we can see that different kinds of taxes in the housing market play unequal importance to the house price.

First, the farmland occupied tax is fixed per square in each province, and the tax ranged from 30 to 40 RMB according to the specific province [43]. This means, if the real estate developer wants to use the land, he must pay this tax according to the total land area. Since the tax is fixed and the tax is much lower than the house price, which could be as high as 10 thousand RMB [43] on average, this tax, therefore, shows a small influence on the house price.

Second, the urban land utilization tax, which is associated with the land area that occupied to build the houses, is ranged from 0.6RMB to 40RMB per square

[43]. More specifically, if the land is located on the center of the first-tier city or big city such as Shanghai, then the land utilization tax coud be as high as 40RMB, while if it is located in the small cities or towns, the tax would be much lower. Thus, the urban land utilization tax also positively affects house price. However, the tax fee is still a very small percentage to the total sales income thus the impact is lower compared with the deed tax and the land value-added tax.

The value-added tax and the deed tax related to the house sales price, total price times a specific tax rate, instead of the land area. Thus, if the government increases these two taxes, the real estate developer would increase the sale price by making up the fee they should pay, however, the increase part would transfer to the consumers, and which would push the consumers to have to buy the house in a higher price. That is also why the impact taken by the deed tax is larger than the land value-added tax since the consumer in China house market is seller's market and the increased tax would finally transfer to the consumers from the house developers.

The results also show housing price of the last period is insignificant to the next period house price, which means the house price in China house market cannot be affected by the previous price, but is more affected by other factors.

### 4.2. Wealth Effect in Housing Market.
Here, we apply equation (2) and want to explore whether, in China house market, the house price has an impact on the consumption, which is called the wealth effect in the house market (see Table 4).

Table 4 (model (2)) shows that there is a positive wealth effect in China house market, which mean when the house price increases, the consumption also increases accordingly ($\beta_1 = 0.344$, $p < 0.001$). That is to say, in China, resident consumption is largely impacted by the wealth effect in the housing market. In this sense, the wealth effect caused by housing price change has triggered changes in consumption levels and overall economic development in China. The phenomena can be explained as when the house price increased, residents would feel that the wealth they have is significantly increased, so that they would feel more likely to spend instead of saving. Furthermore, we can also see from the results that the income still plays an important role in consumption ($\beta_3 = 0.645$, $p < 0.001$). What's more, the consumption of the last period shows a negative impact on next-period consumption, which figure out that the consumption still keeps a balance between income and spending for a resident, and he would not continually increase the expenditure even though the house wealth has already increased.

### 4.3. The Mediate Role of House Price.
In this part, we want to find out the relation between real estate taxes and wealth effect. Therefore, we test how the real estate taxes impact the consumption. Whether the impact works through the house price, or whether the house price plays as a mediator in the effect?

TABLE 4: The impact of housing price on consumption (wealth effect).

| Independent variable: HCE | | |
|---|---|---|
| | Model 1 | Model 2 |
| HP | 0.933*** | 0.344*** |
| | (0.001) | (0.001) |
| HCE($t-1$) | | −0.542*** |
| | | (0.001) |
| IUR | | 0.645*** |
| | | (0.001) |
| SDU | | −0.072 |
| | | (0.580) |
| URB | | 6.966*** |
| | | (0.001) |
| GDP | | 0.269*** |
| | | (0.001) |
| Control variables | No | Yes |
| Observations | 450 | 450 |
| AR(1) | 0.009 | 0.006 |
| AR(2) | 0.610 | 0.803 |
| Sargan test | 0.806 | 0.911 |

Note: *represents $p < 0.05$; **represents $p < 0.01$; ***represents $p < 0.001$.

TABLE 5: House price, tax, and consumption.

| Independent variable: | HCE Model 1 | HP Model 2 | HCE Model 3 |
|---|---|---|---|
| FOT | 0.065*** | 0.013*** | 0.091 |
| | (0.001) | (0.001) | (0.001) |
| ULU | 1.616*** | 0.478*** | 0.455 |
| | (0.001) | (0.001) | (0.001) |
| LVT | 3.748 | 3.066*** | −1.656 |
| | (0.101) | (0.001) | (0.124) |
| DET | 0.656 | 5.161*** | 0.391 |
| | (0.605) | (0.001) | (0.660) |
| HP | | | 0.196*** |
| | | | (0.001) |
| HCE($t-1$) | −0.027* | −0.021 | −0.041** |
| | (0.261) | (0.261) | (0.009) |
| IUR | 1.002*** | 1.008*** | 0.792*** |
| | (0.001) | (0.001) | (0.001) |
| SDU | 0.103*** | 0.210*** | −0.700* |
| | (0.001) | (0.001) | (0.047) |
| URB | 1.092*** | 1.593*** | 6.181*** |
| | (0.001) | (0.001) | (0.001) |
| GDP | 0.205*** | 0.248*** | 0.206*** |
| | (0.001) | (0.001) | (0.001) |
| Control variables | Yes | Yes | Yes |
| Observations | 450 | 450 | 450 |
| AR(1) | 0.007 | 0.006 | 0.005 |
| AR(2) | 0.432 | 0.717 | 0.891 |
| Sargan test | 0.817 | 0.900 | 0.903 |

Note: *represents $p < 0.05$; **represents $p < 0.01$; ***represents $p < 0.001$.

According to equation (3), we apply the GMM on the equation and can get the following results as shown in Table 5. In order to clarify the mediating effect, we refer to the method of Baron and Kenny [54].

Table 5 shows that the house price plays as a mediator in the effect of real estate tax on consumption. According to Baron and Kenny [54], we should test the three-step models. First, model (1) shows the main effect, which indicates that real estate taxes have a positive effect on housing wealth effect; second, model (2) shows that real estate tax positively affects the housing price; finally, when we put real estate tax and housing price together in the model (3), the results show that real estate taxes are insignificant on housing wealth effect while housing price plays a significant positive role. According to the above three-step model test, we can conclude that housing price plays as a mediator.

Meanwhile, the farmland occupied tax and the urban land utilization tax are also significantly positive, meaning that the increased consumption lead by these two kinds of taxes are totally shows the effect on house price. However, we can see that the land value-added tax and the deed tax, which are related to the total sale price, are not significant in the model, which claims that these two kinds of taxes do not lead to the increasing consumption all by house price, but also by themselves. The results figure out that the different kinds of taxes have different mechanisms about the effect of the real estate tax on consumption, and we can also say that they improve the consumption or the wealth effect by different ways according to their attributions of whether related to the land area or to the house sales value.

## 5. Conclusions and Discussion

This paper focuses on the China house market and wants to explore the relations among real estate tax, housing price, and the wealth effect in the house market. Based on the above empirical analysis, we have come to the following conclusions:

(1) Overall, the real estate taxes are positively affecting the housing price, which means, the house price would be improved if unveil higher real estate tax policies. More specifically, taxes that calculated by the land area (farmland occupied tax and the urban land utilization tax) have a smaller influence on the house price compared with the taxes that calculated by the house wealth (land value-added tax and deed tax). And we can also find that the deed tax, which pay by the consumer, shows the largest influence on the house price.

(2) For the wealth effect in house market, whether the change of housing price would affect the consumption, we find the significant positive wealth in China house market. It means that the increase in house price makes the consumer feel wealthier and leads to a higher willingness to spend more.

(3) The results also show the mediated role of house price on the housing price on consumption. Results show that when taking into account of the relation of real estate price and wealth effect, the house price plays as a mediator. To be more specific, the farmland occupied tax and the urban land utilization tax, which are related to the land area, affect the consumption all through house price, while land value-added tax and deed tax, related to house wealth, affect consumption through both house price and the taxes.

Based on research conclusions, this paper makes some policy recommendations to China housing market.

In the current housing market in China, the government has made policies and implementations to control housing price to stimulate the consumption. However, the administrative implementations and interventions seem to be less likely contributing to cool down the housing price, neither to improve the consumption. In this sense, China government might consider reducing the administrative interventions but promote the marketization of the housing market to reduce the costs in transactions. What's more, since for most Chinese households, a house is a rigid demand for them and accounts for a huge part of the entire family income, the influence of real estate tax might show a different role compared with forging countries as a market regulation tool. The real estate tax is viewed as a vital means of impacting housing market. Therefore, making the appropriate tax policy becomes a big issue.

The empirical results also show us that the different kinds of real estate taxes have different impacts. At the current moment, the real estate tax system has multiple types of taxes in China housing market, which would bring a large tax burden press. In this case, the government might consider reducing the repeated sections of tax and simplifying the process of taxation and reducing costs, to push the healthy development in China housing market. Also, China has not issued the real estate tax law yet, indicating the housing market might be still lack of system protection and support, so it is urgent to legalize and normalize the objects and transaction sections in the housing market in the low level. Moreover, the specific real estate policies should be made more diversified and covered multiple dimensions after referring to the mature forging housing tax systems while combining China traditional consumption culture and investment contexts.

Finally, the implementation of a differentiated real estate tax system and tax preference policy could be beneficial to enhance the social equality and guarantee the stable real estate market. While large unbalance in economic development among east, middle, and west region in China, Therefore, the government could apply the differential real estate taxes targeting at regions with different economic development and land usage to make the resource allocations in different regions more reasonable. Also, the government could consider making differentiated real estate tax systems to residents with different income levels.

From a theoretical perspective, this paper contributes to the existing literature by extending the discussion on multi-tax types of the real estate tax and exploring the differences influence of them. Meanwhile, the research also tests the mechanism of housing price as a mediator to the impact of the real estate tax on the housing wealth effect, which clarifies the cause-influence to some extent.

The study still has some limitations that can be improved in future research studies. First, even though we have considered some control variables in our empirical model,

there are still some confounding and endogeneity problems. Second, other meaningful variables that might affect the house wealth effect, such as social security insurance, are not concluded in our studies, which can be discussed afterward. Third, due to the data limitation, we only use the urbanization rate to measure the differences among rural and urban areas. If possible, the future studies should capture more specific characteristics from individual-level data.

## Data Availability

The data used to support the findings of this study are available from the author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

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