## DATA ANALYSIS AND RESULTS

After eliminating the insignificant factors, the result of the final regression model is shown in Table 2. As indicated, the model fits the data well with an adjusted R-Square of 0.527 and is significant with an F-ratio of 24.933. For the explanatory variables, the t-statistic shows that the number of bus stops is a significant influencing factor of revisit intention. Its coefficient is positive (0.001), which indicates that the number of bus stops is positively related to revisit intention. H1 is supported. The number of bus routes, Bus Stop Num × Restaurant Type, and Bus Route Num × Restaurant Type are not statistically significant and have been removed from the final regression model. Therefore, the number of bus routes is not an influencing factor of revisit intention and restaurant type does not moderate the effect of the number of bus stops/routes on revisit intention. Accordingly, the results did not support H2-4.

**Table 2.Regression Results.**

| Model | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | -1.350 | 0.142 | | -9.527 | 0.000*** |
| Bus Stop Num | 0.001 | 0.001 | 0.095 | 1.858 | 0.065* |
| Service Quality | 0.223 | 0.038 | 0.394 | 5.893 | 0.000*** |
| Atmosphere | 0.155 | 0.040 | 0.308 | 3.828 | 0.000*** |
| Food Quality | 0.100 | 0.048 | 0.175 | 2.070 | 0.040** |
| Price and Value | 0.074 | 0.041 | 0.123 | 1.797 | 0.074* |
| Restaurant Type | -0.369 | 0.186 | -1.665 | -1.984 | 0.049** |
| Service Quality × Restaurant Type | -0.127 | 0.067 | -2.018 | -1.902 | 0.059* |
| Atmosphere × Restaurant Type | 0.127 | 0.054 | 2.011 | 2.369 | 0.019** |
| Price and Value × Restaurant Type | 0.102 | 0.043 | 1.562 | 2.349 | 0.020** |

Dependent variable: revisit intention; R Square: 0.549; Adjusted R Square: 0.527; F-ration: 24.933; Sig.:0.000[a]; *p<0.10; **p<0.05; ***p<0.01.

We examine the normal P-P plot and the scatter plot in order to validate the feasibility of this model. The results are shown in Figure 1 and Figure 2. The dots in the P-P plot distributes randomly around internal bisector, which indicates that the distribution of random error appears approximately to be a normal distribution. The standardized residual in the scatter plot shows above/below the zero line randomly and uniformly. It indicates that random error has equal variance and independent distribution. Therefore, the regression model is feasible.

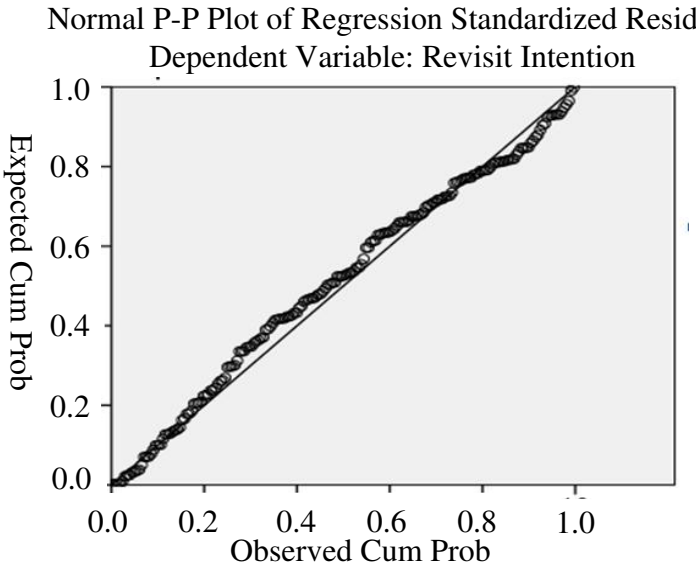


**Figure 1.Normal P-P plot.**

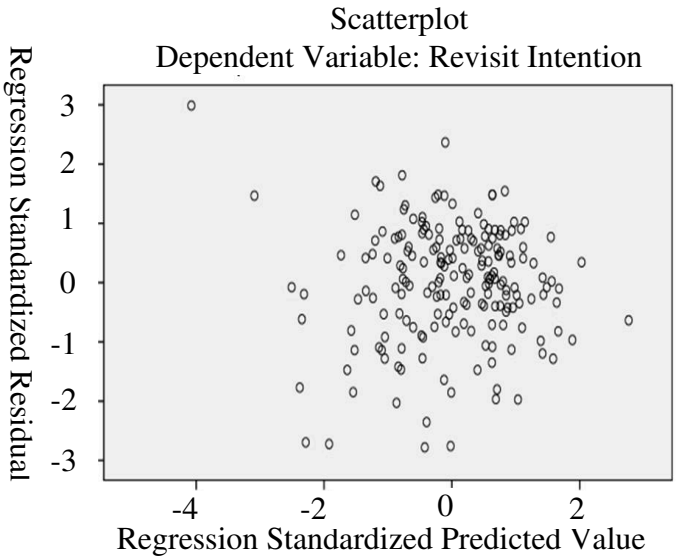


**Figure 2.Scatter plot.**

## CONCLUSION

This paper used regression analysis for identifying the relationship between the number of bus stops/routes within short walking distance and revisit intention as well as exploring the moderating effect of restaurant type on the relationship. The results indicate that the number of bus stops is a significant positive influencing factor of revisit intention while the number of bus routes is not significantly related to revisit intention. There is no moderating effects of restaurant type on the relationship between the number of bus stops/routes and revisit intention. The paper makes contributions by involving the

information of public transportation in revisit research. The results of this study have consulting value for restaurant owners on making sitting decisions. The greater the number of bus stops is, the more possibility the new restaurant has high revisit intention. Our study also aids governments to design and develop urban plans. The planning of urban public transportation will guide and impact operators' site selection. Future study will verify these findings in different cities and different industries.

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# Research on Motivation Behavior of Passive Residential Development Subject

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## Abstract

The large-scale development of passive residence is the inevitable trend of the housing industry. As one of the main way of providing, the implementation power of passive residential exploitation decides the size and the quality of passive residences. The paper makes the government and developers as the game subjects firstly, analyzes the gains and losses of variables which influence the government and developers, and establishes the evolutionary game model between government and developers under the condition of bounded rationality by evolutionary game theory. Then solves the replication dynamic equations and determines the stability of the equilibrium Jacobi matrix, paints the phase diagram of evolutionary game. At last, analyzes their strategy choices affected by gains and losses variables, puts forward the countermeasures and suggestions for the government accordingly, and promotes the scale development of the passive residential construction.

## INTRODUCTION

With the acceleration of Chinese urbanization process in recent years, the proportion of building energy consumption occupying the total consumption of resources has increased year by year, commanding and reducing building energy consumption reasonably are the key points to save energy and reduce emissions (Qiu 2012), and then green buildings appear. Many scholars of China had studied green buildings' incentive mechanism deeply, Wang and Liu (2009) determined the optimal incentive intensity and the best incentive period of government based on the analysis of influence factors that restrict the development of green buildings, and then compared the incentive effects under different incentive mechanism, which provided a theoretical reference for the government

to formulate incentive policy. Liu et al. (2014) believed that the cost of green buildings is higher than ordinary buildings; the investment payback period of incremental cost is longer, developers' profit margins are limited, the government should guide the healthy development of the green buildings through policy guidance. And as a special form of green building, passive residence which has higher requirements on energy-saving efficiency has become a research hotspot of scholars. Zhang (2015) believed that the promotion of passive low-energy buildings can improve the living environment and reduce building energy consumption significantly under China's existing conditions; it's technically feasible and economically affordable. But most of the passive research scholars put focus on the passive structure design and energy saving measures at present, there are still some gaps in the study of passive residential incentives, therefore, how to formulate incentives scientifically and effectively to promote the scale development of passive residential industry is the research emphasis at this stage.

At present, the development and use of passive residence is still in the promotion stage in China (Wu and Gong 2014), there are some passive residential demonstration projects in Beijing, Chengdu, Dalian and other cities, although the government has been encouraging the development of passive residence, the incentive effect is not significant without introducing specific incentives. For developers, the development costs and other incremental costs in passive design of passive residence and energy-saving facilities cannot be compensated appropriately, resulting in developers' hesitation about huge capital investment coupled with the lack of government incentives; then the uncertain investment payback period of passive residence is also the main reason why developers are reluctant to exploit passive residence. On the current status of the development of real estate industry, consumers' awareness of passive residence is low and they generally lack of awareness of energy conservation and environmental protection, there is a understanding blind spot at passive residential long-term social and economic benefits, the consumption choice of passive residence is uncertain, so there is a risk whether developers can achieve capital backflow within the expected time (Song et al. 2014). While the decision adjustment of developers and adjustment of government incentives are the result of a series of dynamic games, there are still some gaps in the research of the dynamic evolution game and balanced strategy between developers community and government at present, this paper aims to analyze the evolution trend of two sides' strategy choice by establishing an evolutionary game model between the government and the developers community, and provides a theoretical basis for the government to formulate incentive policies.

## EVOLUTIONARY GAME MODEL BASIC HYPOTHESIS

**Basic hypothesis.** (1) Game subjects. This paper selectes the government and developers community as the evolutionary game subjects, analyzes the evolution trend of government and developers community in the process of decision making of passive residential development.

(2) Game subjects are bounded rational. The government can collect market information and take reasonable measures in time, but as a huge group, the real estate developers with many differences among internal individuals need to learn to imitate and adjust the strategy continuously to make the final decision, therefore, both game subjects are assumed to be bounded rational, that is, follow the routine behavior strategy, do not have the ability to predict (Du and Feng 2015).

(3) Game subjects' strategy selection. The government makes a decision to motivate the development of passive residence and determines the incentive intensity firstly. The strong incentive measures refer to the specific, diversified and clear rewards and punishments incentives formulatd by government to promote developers choose to exploit passive residence, such as specific reduction amount of land transfer fees, taxes and so on; the weak incentive measures refer that the government motivates the passive residential development only by encouraging as the main way without specific incentives. Then the developers community makes the choice whether to exploit passive residence in the full consideration of government's incentives.

**Profit and loss variables.** (1) Government's profit and loss variables. Government's income $a_0$: $a_0$ represents the government's income when the developers do not choose to exploit passive residence but ordinary residence, such as land transfer revenue and taxes.

Extra income $a_1$: $a_1$ represents the unexpected income when the government takes weak incentive measures for the development of passive residential projects, the developers choose to exploit the passive residence consciously.

Society income $a_2$: $a_2$ represents the society income when the government takes strong incentive measures for the development of passive residential projects, the developer choose to exploit the passive residenc, such as resource and environment profits, the potential profits of emerging industries and the promotion of government's credibility.

Incentive costs $a_3$: $a_3$ represents the incentive costs when the government takes strong incentive measures for the development of passive residential projects, sunch as tax reduction, financial subsidies and other concessions.

Transformation costs $a_4$: $a_4$ represents the human, material incremental costs and environmental optimization incremental costs arising by government to solve the high energy consumption and pollution problems of ordinary residence.

Incremental taxes $a_5$: when the government takes strong incentive measures for the development of passive residential projects, the developers who still choose to exploit ordinary residence should pay incremental taxes in order to avoid the waste of incentive costs, such as carbon tax and energy tax (Cui and Li 2012).

(2) Developers' profit and loss variables. Developers' income $b_0$: $b_0$ represents the basic income when the developers do not choose to exploit passive residence but ordinary residence.

Potential income $b_1$: $b_1$ represents the developers' reputation, technical experience and other potential benefits when the developers choose to exploit the passive residenc.

Loss of earnings $b_2$: When the government takes weak incentive measures for the development of passive residential projects, the incremental costs of green materials and facilities can not be compensated in time, which causes developers' loss of earnings such as reduced sales and high costs of technology.

Government rewards $b_3$: $b_3$ represents the rewards when the quality of construction is beyond the expected energy-saving targets or the developers finish the construction ahead of schedule.

Penalty loss $b_4$: The developers will be punished by government if the construction quality does not meet the expected energy-saving targets or the developers failed to complete the construction within the expected time.

Incremental costs $b_5$: $b_5$ represents the increased green energy-saving costs of passive residence on the basis of the existing construction costs compared with ordinary residence, such as enclosure energy saving, photovoltaic, ground source heat pump and other costs of passive technology (Cao and Dong 2012).

## CONSTRUCTION AND SOLUTION OF EVOLUTIONARY GAME MODEL

$x$ indicates the developers' probability of choosing to exploit passive residence, $y$ indicates the government's probability of taking strong incentive measures to develop the passive residential projects. Construct the dynamic game profit and loss matrix between government and developers group accordingly, as shown in Table 1.

**Table 1.Payment Matrix of Government and Developers.**

| Real estate developers | Government | |
|---|---|---|
| | Strong intensive measures $y$ | Weak intensive measures 1-$y$ |
| Exploiting passive residence $x$ | $b_0$+$b_1$+$b_3$-$b_4$-$b_5$, $a_0$+$a_2$-$a_3$ | $b_0$+$b_1$-$b_2$-$b_5$, $a_0$+$a_1$ |
| Exploiting ordinary residence 1-$x$ | $b_0$-$a_5$, $a_0$-$a_3$-$a_4$+$a_5$ | $b_0$, $a_0$-$a_4$ |

**Evolutionary stabilization strategy of developers' exploiting behaviors.** The developers' income when exploiting passive residence projects is:

$$E_{11} = y(b_0 + b_1 + b_3 - b_4 - b_5) + (1-y)(b_0 + b_1 - b_2 - b_5) \quad (1)$$

The developers' income when exploiting ordinary residence projects is:

$$E_{12} = y(b_0 - a_5) + (1-y)b_0 \quad (2)$$

The average expected income of developers is:

$$E_1 = xE_{21} + (1-x)E_{22} \quad (3)$$

$$E_1 = (b_1 - b_2 - b_5)x + (b_2 + b_3 - b_4 + a_5)xy - a_5 y + b_0$$

The dynamic equation of developers is:

$$F(y) = x(E_{11} - E_1) \tag{4}$$
$$F(y) = x(1-x)[y(b_2 + b_3 - b_4 + a_5) + b_1 - b_2 - b_5]$$

Let $\frac{d_x}{d_t} = 0$, then $x_1^* = 0$, $x_2^* = 1$

$$y^* = \frac{b_2 + b_5 - b_1}{b_2 + b_3 + a_5 - b_4} \tag{5}$$

When $y=y^*$, $F(x)$ equal to 0, it means that if the government's probability of takting strong intentive measures is $y^*$, all values of $x$ are in steady state, there is no difference about the benefits between exploiting passive residence and ordinary residence; When $y>y^*$, $x_2^*=1$ is the only evolutionary stabilization strategy, it means that the government's strong incentive measures make developers learn and adjust the corporate strategy continuously, the strategy choice of developers transfers from exploiting ordinary residence to exploiting passive residence, and comes to Pareto optimal state finally; When $y<y^*$, $x_1^*=0$ is the only evolutionary stabilization strategy, the strategy choice of developers transfers from exploiting passive residence to exploiting ordinary residence because the benefits of developers group can not be guaranteed raised by weak incentive measures of government.

**Evolutionary stabilization strategy of government's incentive intensity.** The government's income when taking strong incentives to develop passive residence projects is:

$$E_{21} = x(a_0 + a_2 - a_3) + (1-x)(a_0 - a_3 - a_4 + a_5) \tag{6}$$

The government's income when taking weak incentives to develop passive residence projects is:

$$E_{22} = x(a_0 + a_1) + (1-x)(a_0 - a_4) \tag{7}$$

The average expected income of government is:

$$E_2 = yE_{21} + (1-y)E_{22} \tag{8}$$
$$E_2 = (a_2 - a_1 - a_5)xy + (a_5 - a_3)y + (a_1 + a_4)x + a_0 - a_4$$

The dynamic equation of government is:

$$F(y) = y(E_{21} - E_2) \tag{9}$$
$$F(y) = y(1-y)[x(a_2 - a_5 - a_1) + a_5 - a_3]$$

Let $\frac{d_y}{d_t} = 0$, then $y_1^* = 0$, $y_2^* = 1$

$$x^* = \frac{a_3 - a_5}{a_2 - a_1 - a_5} \tag{10}$$

When $x=x^*$, $F(y)$ equal to 0, it means that if the developers' probability of exploiting the passive residence is $x^*$, there is no difference about the benefits between taking strong incentive measures and weak incentive measures; when $x>x^*$, $y_2^*=1$ is the

only evolutionary stabilization strategy, it means that if the developers' probability of exploiting the passive residence is $x^*$, the government's incentive attitude shiftes from weak incentives to strong incentives, strong incentive measures become the final evolutionary stabilization strategy; when $x<x^*$, $y_1^*=0$ is the only evolutionary stabilization strategy, it means that if the developers' probability of exploiting the passive residence is $x^*$, the government's incentive attitude shiftes from strong incentives to weak incentives, weak incentive measures become the final evolutionary stabilization strategy.

**Analysis on the evolutionary tendency of game between government and developers.** The stability of the equilibrium point of the dynamic equations between the government and developers can be inferred from the local stability analysis of the Jacobin matrix (Pan et al. 2014). The Jacobin matrix is:

$$J(x, y)=\begin{bmatrix} \frac{\partial F(x)}{\partial x} & \frac{\partial F(x)}{\partial y} \\ \frac{\partial F(y)}{\partial x} & \frac{\partial F(y)}{\partial y} \end{bmatrix} \tag{11}$$

$$=\begin{bmatrix} (1-2x)\left[y(a_2-a_5-a_1)+a_5-a_3\right] & x(1-x)(a_2-a_5-a_1) \\ y(1-y)(b_2+b_3-b_4+a_5) & (1-2y)\left[x(b_2+b_3-b_4+a_5)+b_1-b_2-b_5\right] \end{bmatrix}$$

The determinant and trace of the matrix are:

$$j=\frac{\partial F(x)}{\partial x}\bullet\frac{\partial F(y)}{\partial y}-\frac{\partial F(x)}{\partial y}\bullet\frac{\partial F(y)}{\partial x} \tag{12}$$

$$tr=\frac{\partial F(x)}{\partial x}+\frac{\partial F(y)}{\partial y} \tag{13}$$

The stabilities of each equilibrium point are shown in Table 2 by the analysis of the equilibrium points according to the above equation.

**Table 2.The Stabilities of Each Equilibrium Point.**

| Local equilibrium point | Determinant | Trace | Stability |
|---|---|---|---|
| (0,0) | >0 | <0 | Stable strategy |
| (0,1) | >0 | >0 | Unstable |
| (1,0) | >0 | >0 | Unstable |
| (1,1) | >0 | <0 | Stable strategy |
| ($x^*$,$y^*$) | Uncertain | Uncertain | Saddle point |

The dynamic evolution game tendency graph of government and the developers on the development of passive residence can be drawn as Figure 1 to Figure 5 below based on the stabilities of the equilibrium points and the dynamic equation, the x-axis represents the development strategy of the developers, the y-axis represents the government's incentive strategy.