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# Poverty aversion or inequality aversion? The influencing factors of crime in China

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## Poverty aversion or inequality aversion? The influencing factors of crime in China

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#### ABSTRACT

This paper aims to understand whether and how poverty aversion and inequality aversion affect the criminal behaviors. We analyze the relationship between the three variables through a theoretical model and an empirical model. The panel data of 27 provincial-level regions in China were collected for testing the hypothesis. The investigation revealed: 1. Inequality significantly increases crime, while the poverty reduction does not reduce crime. 2. The widening consumption gap between urban and rural residents may be the cause of crime, the effect is more significant for visible consumer goods. 3. The excessive consumption difference between the rich and ordinary people may lead to crime. 4. The increasing inequality of distribution between the state and the people has a positive impact on crime too. The research shows that the Chinese residents are not affected by poverty but by inequality in the choice of crime.

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Poverty; inequality; crime; China

#### 1. Introduction

For a long time, it has been accepted that social unrest is caused by material shortages. Historically, many periods of social unrest and uprisings have been associated with both famine and poverty. China's state policy believes that if the people are rich, the state is easy to govern, and if the people are poor, it is rather difficult to govern. Therefore, China has been sparing no efforts to improve the income level of its residents. Especially, the income level of Chinese residents has risen sharply in the past 20 years. But oddly, rising incomes did not improve security in China during this period. Since 1988, with the improvement of people's income level, criminal cases in China have been increasing year after year. In 2000, the average annual disposable income of urban residents in China was only 6,280 yuan, and the number reached 36,396 yuan in 2017; in the same period, the number of prosecuted criminal people nearly doubled from 708,836 to 1,663,975. Figure 1 depicts that the disposable income of Chinese residents shows a positive relation with the number of crimes. This makes us wonder whether the wealth of the people is related to the crime.

So what are the real reasons for the increasing crime? The ancient Chinese sage Confucius pointed out the idea "Inequality and insecurity are more dangerous to the rulers than poverty" in his book the Analects of Confucius 2600 years ago. He believed

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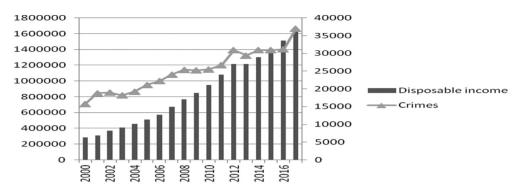


Figure 1. Disposable income and crime. Source: China Statistical Yearbook.

that people would pay more attention to the distribution of inequality rather than the amount of benefits gained, and worry more about the stability of their surroundings rather than poverty. In his philosophy, if wealth is distributed equally, the concept of abundance disappears. At present, China faces problems of unfair distribution of resources and a serious gap between the rich and the poor. In 2013, the China's National Bureau of Statistics released the annual GINI coefficient from 2003 to 2012, all the numbers were greater than 0.4. According to the evaluation criteria of the United Nations Development Program (UNDP), China's inequality is quite serious. In 1985, Chinese leader Deng Xiaoping put forth the idea of "let some people get rich first, and bring along the poor". The differential development strategies in China between regions have resulted in some people being wealthy. However, the widening gap between the rich and the poor is far away from the second part of the goal. The resulting hatred of the inequality may lead to a rise in the crime.

Discontent with poverty may lead to crime. The Strain Theory (Merton, 1938) suggests that if efforts to achieve personal goals by legal means are hindered, people may try various illegal means to achieve their goals. Economists believe that the realization of goals leads to maximize individual utility; and this process is often achieved by increasing income and consumption. If the above viewpoints are true, then abundant personal wealth can obviously make the vast majority of goals to achieve, and poor people are more likely to become criminals. Therefore, some scholars believe that there is a positive correlation between poverty and crime. For example, Flango and Sherbenou (2010) regarded crime as the joint resultant of the individual propensity to crime and situational factors which determine inducements to crime, and income level is the key to solve this problem. Berk and Others (1980) believed that poverty caused by less property will increase property crime cases. In his research, poverty is apparently causally related to crime at the individual level. Other studies have come to similar conclusions. Bignon, Caroli, and Galbiati (2017) took the crime rates of France in the nineteenth century as the research object, and found that phylloxera crisis caused a large decrease in the income of fruit farmers thus, resulting in a substantial increase in the property crime rate. Patterson (2010) divided poverty indicators into indirect poverty and direct poverty, and found that direct poverty had a stronger correlation with community crime. The above studies defined poverty as the absolute poverty or material poverty, which can be explained as the lack of wealth and income of low-income groups. The relationship between two variables

is not difficult to understand. Crime is mainly caused by the constraint of living conditions and the inability to meet the basic consumption intention of the individuals. Whereas, the purpose of crime is to directly improve the living standard of individuals, and even to maintain the most basic living conditions (Fafchamps & Minten, 2006; Ludwig, Duncan, & Hirschfield, 2000). The conclusion that dissatisfaction with one's poverty leads to crime is also agreed by many scholars (Crawford, Whitbeck, & Hoyt, 2011; Hannon, 2002; Kleck & Jackson, 2016).

If crime is caused solely by material poverty, then the problem may be dealt with simply by addressing the scarcity of material wealth. But the essence of poverty is not simply a change in one's condition. Many scholars have found that the unfair income distribution may also be an important cause of crime. Hsieh and Pugh (1993) found that both absolute poverty and income inequality had a positive impact on the crime rate. Blau (1982) drew a similar conclusion after studying the relevant data of 125 largest American metropolitan areas in the United States. He found that absolute poverty in general will increase the incidence of criminal violence, but poverty will no longer affect these rates once economic inequality is controlled. Demombynes and Özler (2016) examined the effects of local inequality on property and violent crimes in South Africa, and found there are many factors in regional inequality, but the unequal distribution has the most significant influence on crimes. Clark and Senik (2010) analyzed the mechanism by which inequality affects happiness. He argued that people with lower incomes are more likely to compare themselves with others, and want the government to intervene when the injustice is serious. These people are most likely to commit crimes. The above studies generally believed that crime is affected by inequality, and many scholars agreed with this conclusion too (Enamorado, Lopezcalva, Rodriguezcastelan, & Winkler, 2016; Hooghe, Vanhoutte, Hardyns, & Bircan, 2011; Pratt & Eisentraut, 2014; Rauma & Berk, 1982). Some scholars have also studied whether China conforms to this conclusion. For example, Li, Wan, Wang, and Zhang (2018) used different indicators of distribution inequality to analyze the interaction between them and criminal acts. In fact, the conclusion that unequal distribution leads to crime has not been reached. Some researchers believed that inequality may have nothing to do with the occurrence of crime. For example, Pare and Felson (2014) found that inequality is unrelated to assault, robbery, burglary, and theft when poverty is controlled. From the perspective of the impact mechanism of unequal distribution on crime, the aversion to inequality is also a behavior of hatred toward the rich, and hatred leads to crimes.

After reviewing the literature, we found that most of the existing studies believed that both poverty and unequal distribution have an impact on the rise of crime, and these two variables are generally regarded as important causes of social unrest. But the existing conclusions are less convincing in explaining the phenomenon that rising incomes accompany with rising crimes in China. Therefore, this paper attempts to explain the issue. The subsequent arrangement of the article is as follows: In the second part, we will construct a theoretical model to analyze the relationship between poverty, unequal distribution and crimes, and then make assumptions. In the third part, we will establish the econometric model and explain the empirical model and data. In the fourth part, we will conduct empirical tests and analyze the regression results. Finally, we will draw conclusions and put forward relevant suggestions based on the empirical research results. The contribution of this paper can be summarized as follows. First, we use provincial 682 👄 Z. SONG ET AL.

macro data to study crime, avoiding the problem of sample inhibition and standard difference. Second, we try to explain the reasons behind the phenomenon of the simultaneous growth of income and crime in China. Finally, the paper addresses some hot issues such as poverty aversion and hatred of the rich in China and its practical relevance in today's context.

#### 2. Theoretical model

Referring to Fehr and Schmidt's research (1999), we established an ultimatum game model to analyze the influence of poverty aversion and inequality aversion on criminal behaviors. In the model, we assume that the participants are rich A and poor B. There is a sum of money E to be allocated, and rich A is responsible for the right of distribution. The decision made by A is to give S shares to the poor, leaving (E-S) shares for themselves; the poor have a choice between accepting distributive decisions or rejecting and committing crimes against the rich. The ultimate goal of both sides is to maximize the utility. We need to add three assumptions before we establish the model: 1) each participant prefers a fair outcome, that is, everyone wants to be treated equally as well as others, 2) when faced with unfair situations, the anger effects caused by the damage to own interests are greater than the guilt effects caused by damage to others' interests, 3) the amount needs to be allocated without surplus. The model is set as follows:

$$U_{i}(X_{1}, X_{2}) = X_{i} - \alpha_{i} \max\{X_{j} - X_{i}, 0\} - \beta_{i} \max\{X_{i} - X_{j}, 0\}$$
(1)  
$$i = 1, 2, j = 3 - i$$

Where,  $\alpha_i \max\{X_j - X_i, 0\}$  represents the anger effects caused by damage to own interests;  $\beta_i \max\{X_i - X_j, 0\}$  represents the guilt effects caused by damage to others,  $\alpha_i$  and  $\beta_i$  can be considered as anger and guilt coefficients. At the same time, refer to the points of Di Tella, Perez-Truglia, Babino, and Sigman (2015), when A is faced with the uneven distribution state in which he is dominant, the guilt coefficient of A is relatively low, while the anger coefficient of B is relatively low. This means that inequality may be more likely to occur in the distribution game.

According to the hypothesis above, it is certain that  $\alpha_i > \beta_i > 0$ , and  $\beta_i < 1/2$ .<sup>1</sup> Therefore, it can be understood that when people choose to damage their own interests or the interests of others, they always choose the latter. We now analyze and solve the model. Optimal reaction of B can be calculated by considering the following situations:

(1) If poor B refuses to accept the allocation plan proposed by rich A and opts to resist, then A's benefits will be taken away, but at the same time B will be punished, assuming that the benefits of A and B benefits are 0 at this time.

(2) If B accepts the distribution plan,  $X_1^2 = E - S$ ;  $X_2^2 = S$ 

Obviously, the reject option by B is not an optimal solution for both A and B. So when B accepts the allocation S given by A, the utility function of B can be divided into two cases.

When,  $S \ge E/2$ , the utility function of B is expressed as:

<sup>1</sup>When  $\beta_i > 1/2$ , the coefficient of X<sup>i</sup> in the utility function is not positive.

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$$U_2(s) = S - \beta_2 (2S - E)$$
(2)

Since  $\beta_i < 1/2$ , so  $U_2(S) \ge 0$ . This shows that if the amount given to B in the distribution plan is greater than the amount given to A itself, then B must accept the proposal of A.

When  $S \le E/2$ , the utility function of B is expressed as:

$$U_2(s) = S - \alpha_2(E - 2S)$$
 (3)

Let  $U_2(s) \ge 0$ , and we get the lowest acceptable value of S:

$$S \ge \bar{S}(\alpha_2) = \frac{\alpha_2 E}{1 + 2\alpha_2} \tag{4}$$

From the above analysis, we get the optimal reaction of B. It can be seen that only when  $S \ge \overline{S}(\alpha_2)$ , B would accept the distribution plan proposed by A. We can know from Equation (4), the acceptance condition of B is affected by the anger coefficients  $\alpha_2$  and the total distribution E. Let us calculate the optimal reaction of A.

For A, as the decision maker of the distribution scheme, he only needs to consider the situation accepted by B.

When A knows the information of  $\alpha_2$ , his share of S given to B is also going to be in either case: 1) when  $S \ge E/2$ , the utility function of a is:

$$U_1(s) = E - S - \alpha_2(2S - E)$$
 (5)

When S = E/2, the effect of A is maximized.

2) when  $S \le E/2$ , the utility function of A is:

$$\mathbf{U}_1(\mathbf{s}) = (1 - \boldsymbol{\beta}_1)\mathbf{E} + (2\boldsymbol{\beta}_1 - 1)\mathbf{S}$$
(6)

However, the lowest value acceptable to B is analyzed above, so the optimal decision of A at this time is:

$$S^* = \bar{S}(\alpha_2) = \frac{\alpha_2 E}{1 + 2\alpha_2} \tag{7}$$

It can be seen that the value of Equation (7) is strictly less than 2/E, and is an increasing function of the anger coefficient  $\alpha_2$  and the total allocation E.

The above analysis of A strategy was based on the premise that A was aware of  $\alpha_2$ , but generally speaking, A may not know this specific value, but its distribution value. The distribution value of anger coefficient for B can be expressed as  $\bar{\alpha}$  and  $\underline{\alpha}$ :

$$\bar{\alpha} = \min\{\alpha | F(\alpha) = 1\}$$
(8)

$$-\alpha = \max\{\alpha | F(\alpha) = 0\}$$
(9)

When  $S \ge E/2$ , the utility function of A is the same as before  $U_1(s) = (1 - \beta_1)E + (2\beta_1 - 1)S$ ;

when  $S \le E/2$ , the probability that B accepts the allocation plan of A is r:

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$$\mathbf{r} = \mathbf{f}(\mathbf{x}) = \begin{cases} 0, S \le \bar{S}(\bar{\alpha}) \\ F(\frac{S}{E-2S}), S \le \bar{S}(\bar{\alpha}) \\ 1, S \ge \bar{S}(\bar{\alpha}) \end{cases}$$
(10)

The expectation effect of A is known as  $E(U_1)$ :

$$E(U_1) = \begin{cases} 0, S \leq \overline{S}(\overline{\alpha}) \\ F\left(\frac{S}{E-2S}\right) * \left[ (1-\beta_1)E + (2\beta_1 - 1)S \right], S \leq \overline{S}(\overline{\alpha}) \\ (1-\beta_1)E + (2\beta_1 - 1)S, S \geq \overline{S}(\overline{\alpha}) \end{cases}$$
(11)

Therefore, we can draw decision of A as follows:

$$\max_{\bar{S}(-\alpha) \leq S \leq \bar{S}(\bar{\alpha})} F\left(\frac{S}{E-2S}\right) * \left[ (1-\beta_1)E + (2\beta_1-1)S \right]$$
(12)

After analyzing the above model, we can draw the following conclusions:

(1) A would never come up with a plan that would hurt his interests; the share given to B will always be less than the share given to himself. In other words, there is always an imbalance in the distribution.

(2) For too small S, B will refuse the allocation plan and choose to commit a crime.

(3) The S share acceptable to B is positively correlated with the anger coefficient and the total allocation amount.

(4) The probability that B accepts the allocation plan of A increases with the amount of S.

We can find from the theoretical model that the reason influencing people to commit crimes is not the absolute value of the distribution amount S, but whether the distribution is fair and reasonable. They may not commit a crime if S is small; and they may commit a crime although S is large. In real life, the distribution process is not a pure benefit distribution experiment, but there are reasons to consider that social progress benefits the population as a whole. The decision makers who make the assignment are usually the rich. Behind the efforts to ensure fair distribution lays not only the hope of fairness, but also the consideration of self-interest. To some extent, the behavior whether residents agree to accept the distribution scheme or choose to commit crimes can be explained by the above theoretical model.

It is noteworthy that the above model assumes that the people who choose to commit crimes only are the poor, while the theory that "the rich do not commit crimes" is obviously not true. However, the data used in this article can solve this problem. The data used in this paper to measure crimes are criminal cases, which can be divided into violent crimes and property crimes. Although the people involved in crimes are usually spread across all the levels. But robbery, theft and other cases, which account for the largest number of criminal cases, are all crimes of property assault, and most violent crimes are often accompanied by the purpose of property assault too (Fajnzlber, Lederman, & Loayza, 2002). So our model is reasonable in the large sample case. Combined with the theoretical model, the following hypotheses were proposed and tested in subsequent empirical analysis:

Hypothesis1: Rising absolute incomes of the poor can not reduce crime.

Hypothesis2: Changes in economic aggregates may be related to criminal behavior.

Hypothesis3: Unbalanced distribution has a positive impact on crime.

#### 3. Data and model

#### 3.1. Data sample and collection

We collected 14 years' data, extending from 2004 to 2017. Moreover, we selected the data of 27 provinces, municipalities, and autonomous regions of China mainland; however, Beijing, Chongqing, Xinjiang and the Tibet Autonomous Region were excluded from this study. The main reason for excluding the four regions is that the relevant data of these regions may be based on following accounts: 1) Tibet is located in the western part of China. It has the harsh natural environment and a relatively small population. In addition, a large number of people have a nomadic lifestyle, which makes it extremely difficult to collect relevant data. 2) Whereas, the capital of China, Beijing is also the economic and administrative hub of China, with most of the headquarters of Chinese institutions. As compared to the single local government model in other regions, Beijing has two organ systems, namely the central government and the local government. However, these features cannot be apparent while using provincial data. 3) The gang crackdown activity of Chongqing started in 2009 and ended in 2012, a large number of people were arrested and prosecuted by Chongqing procuratorate during these time, and most of them were punished for criminal offences. Therefore, the data of Chongqing may be particular. 4) Due to the continuous years of violent and terrorist activities associated with region belief in Xinjiang, the local criminal crimes are more special. In this experiment, we used crime data which was reported in China inspection yearbook; besides the crime data reported in the annual work reports of local people's procuratorates; and the other data were obtained from National Bureau of Statistics of China, China urban statistics yearbook, China Real Estate Yearbook, etc.

#### 3.2. Descriptive of data

#### 3.2.1. Explained variables and main explanatory variables

Crime (Crime): The crime data used in this paper are the number of criminal cases prosecuted by the procuratorate per 100,000 people. It mainly includes serious violent crimes such as intentional homicide, rape and arson, and property crimes such as robbery, drug trafficking and theft. We do a logarithm of the number of crimes.

Poverty aversion (Income): According to the theoretical analysis, we believed that lowincome groups are more likely to commit crimes. China's statistics bureau uses the sampling method to divide residents into five equal groups according to their income. 686 😉 Z. SONG ET AL.

Therefore, we use the absolute income value of the lowest income group to replace the share S in the theoretical model. The absolute income refers to the disposable income of urban residents in previous years, and the consumer price index (CPI) of 2004 is taken as the base year to convert the income data of other years into the real value.

Inequality aversion (Gap1; Gap2; Gap3): The researchers usually use GINI coefficient to measure uneven distribution (Enamorado et al., 2016). However, we do not use the index in this paper for the following reason. As the basic privacy of individuals, income information is non-public. Therefore, people usually can only know their own income status, and the income level of others is often unknown. People generally measure other's income level by observing the consumption level of others (Mejía & Restrepo, 2016). Compared with the GINI coefficient and other indicators composed of income indicators, we suggest that it may be more appropriate to use consumption data to measure the inequality of distribution when studying factors affecting crime. We chose three indicators to measure inequality: first, the consumption ratio of urban residents to rural residents (Gap1). According to Ma, Wang, Chen, and Zhang (2017), the large gap between urban and rural areas is the most typical problem of unequal distribution in China. So, we use the urban-rural consumption gap to measure the inequality of distribution, which is specifically the ratio of the consumption gap between urban residents and rural residents. At the same time, nominal consumption data are processed according to the CPI of both groups. Second, the consumption ratio between highincome residents and ordinary residents (Gap2); Third, the consumption ratio between government and residents (Gap3). The reasons for the selection of other two specific indicators will be introduced later.

#### 3.2.2. Control variables

GDP per capita (GDP): The theoretical analysis of this paper believed that crime may be related to the degree of economic development. At the same time, the level of economic development is a variable that usually needs to be controlled in criminal research. Crime economics believed that more the developed the economy is, the higher the benefits of crime will be (Detotto & Otranto, 2012; Fajnzlber et al., 2002; Fowles & Merva, 2010). Some studies also argued that there is no definite relationship between the two objections (Edlund, Li, Yi, & Zhang, 2008). We choose GDP per capita as one of the control variable. Similar to the income and consumption variable, we also take CPI of 2004 as the base year value to transform the data of other years.

Population density (Density): population density usually refers to the number of people living in a unit of land. According to the above theoretical analysis, we believe that population density may be an important factor affecting criminal crimes. On the one hand, the increase in population density may increase the observation of potential criminals on the phenomenon of consumption gap and induce crime. On the other hand, the increase in population density may also affect the probability of the public security organs to solve cases, resulting in the change of the cost of crime. Based on the existing relevant research experience, some scholars believe that crimes can be understood as conflicts between people, and the greater the population density, the greater the number of conflicts may be (McCall, Land, & Parker, 2011). However, some studies also suggest that increasing populated areas, the likelihood of detection and punishment in these

areas is high (Phillips, 2006). Considering that most crimes occur in urban areas, this index is measured by urban population density, and the calculation method is the number of resident population per urban area (km<sup>2</sup>), and the logarithmic treatment is carried out.

Judicial expenditure (Judicial): From the perspective of economics, crime is considered to be the optimal choice of rational people under a series of restrictions. The probability that rational people choose to commit crimes is directly proportional to the success rate of crimes, while the success rate of crimes is often considered to be inversely proportional to judicial expenditure (Becker, 1968). Because of the existence of simultaneity between the two variables, the conclusion that whether the increase of judicial expenditure can reduce crime is still uncertain, but the existing literature on related crimes generally believes that judicial expenditure is related to crimes (Hunt, Anderson, & Saunders, 2017; Kovandzic & Sloan, 2002; Marvell & Moody, 2010). We used the proportion of judicial expenditure in the general budget expenditure.

Welfare expenditure (Welfare): In criminology, Strain Theory, Social Disorder, Social Support and other related theories believe that there is an inevitable relationship between social welfare conditions and crime (Agnew, 2010; Cullen, 1994; Sampson & Wilson, 1995). Researchers strongly believe that the beneficiaries of social welfare and social assistance programs are mainly directed to poor people, and the improvement of social welfare can therefore ease their social pressure and increase willingness to obey social rules (Foley, 2008). However, similar to the judicial expenditure, there is no consensus amongst researchers between social welfare and crime due to the simultaneity problem. We calculate this by the ratio of welfare expenditure to the general budget expenditure of local finance.

Education (Education): In the book Crimes and Punishments, Beccaria, Thomas, Ballerini, and Ciavolella (2008) pointed out that the most reliable way to prevent crime is to implement a perfect education system. Many studies have found that an increase in education reduces the level of crimes. They believed that as compared to the individuals who do not accept education, the higher educated individuals tend to have a higher legal income level. The cost of punishing the elite for their crimes is significantly higher. (Bennett, 2018; Lochner, 2010; Lochner & Moretti, 2004). Referring to the study of Ziesemer (2016), the education level is calculated as follows:  $E = \frac{\sum_{i=1}^{n} p_i y_i}{p}$ . Where, E is the average length of education in the region, p is the total population over 15 years old, y is the number of people with different educational backgrounds, and represents the average length of education of people with different educational backgrounds viz. Below primary school (y = 0), primary school (y = 6), junior high school (y = 9), senior high school (y = 12), university and above (y = 16).

Housing price (Housing): According to Maslow's hierarchy of needs, food, clothing, housing and transportation are the most basic elements for every people to survive. Therefore, housing expenditure is also one of the inevitable major expenses in people's life. The dual nature of housing may be an important factor affecting crime. For example, according to the analysis (Song, Yan, & Jiang, 2019), the impact of housing price on crime is bilateral. From a direct perspective, the rise of housing price increases the living pressure of the people without houses, which directly leads to crime. On the other hand, the rise of housing prices has a wealth effect on the homeowners and

a restraining effect on the non-homeowners. In this paper, the average selling price of commercial housing in each region is used to measure the housing price. While considering the deflating of the CPI, the data are processed logarithmic.

Age (Age): Most social scientists certainly believe that there is a relationship between crime and age. Delisi (2015) believes that people tend to commit crimes when they enter the late adolescent stage of their life; the inclination to commit crimes continues until the middle-aged period. Therefore, we add the control variable of age, which ranges from 15 to 64 of the inhabitants. The larger the number, the greater is the number of young adults in the region.

Urbanization (Urban): Some studies have shown that the number of crimes in cities are significantly higher (Soh, 2012). Therefore, the development degree of local urbanization may be positively correlated with crime, and in the process of regional urbanization, the increase of urban population is an important characteristic of urbanization. The increase of urban population means the increase of urban living pressure and the increase of population means the aggravation of contradiction. Just as Glaeser and Henderson (2017) found that the increase of urban population not only increased the crime rate of robbery, but also the murder rate. In this paper, the urbanization index is measured by the proportion of urban population to resident population.

Floating population (Floating): Floating population has been regarded as an important factor of social unrest in many criminal studies (Curran, 1998). The floating population is vulnerable to the impact of unfair treatment and regional differences, and crimes committed by migrants are harder to punish and harder to crack than crimes committed by local people. In China, the crime caused by the floating population is also one of the inevitable problems in the construction of urbanization. The statistical index of the floating population is measured by the proportion of non-local registered population in the statistical sample. The uniqueness of this calculation method is closely related to China's unique household registration system (Fan, Sun, & Zheng, 2011).

The definitions of specific variables and descriptive statistics are shown in Table 1.

According to the statistics of core explanatory variables, the urban-rural consumption gap in China is serious. As can be seen from Table 1, the average consumption gap between urban and rural areas reaches 2.44. That means the urban residents spend 2.44 times as much as rural residents. On the other hand, data show that the absolute income

Variable	Obs	Mean	Std.	Min	Max
Crime	378	2.158554	0.347753	1.247144	3.236032
Income	378	9.806141	0.4799233	8.748258	11.04445
Gap1	378	2.437708	0.539311	1.22215	4.18422
Gap2	238	1.68858	0.1983439	1.28808	2.271
Gap3	378	0.408325	0.1271384	0.233831	0.918014
GDP	378	10.22513	0.656608	8.37032	11.6662
Density	378	5.551838	1.406456	2.00986	8.56484
Judicial	378	0.062098	0.013559	0.034778	0.113711
Welfare	378	0.128728	0.043779	0.022945	0.306223
Education	378	8.555233	0.861306	6.38	11.044
Housing	378	8.32711	0.54266	7.18917	10.1165
Age	378	0.710088	0.105498	0.2819	0.842613
Urban	378	0.710088	0.105498	0.2819	0.842613
Floating	378	0.17322	0.129098	0.021078	0.645718

Table 1. Summary statistics for variables.

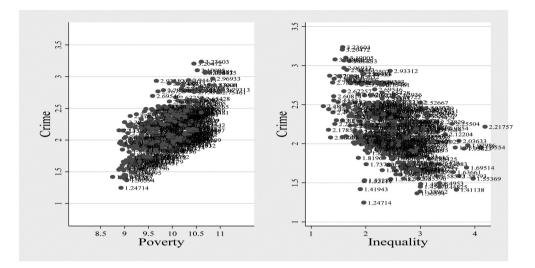


Figure 2. Correlation between crime and inequality & poverty.

of residents has an upward trend with an average annual increase of 11.9%. As can be seen from Figure 2, crime is negatively correlated with inequality of distribution, but positively correlated with income. We can find that the direction of the fitting curve is opposite to the direction of our theoretical analysis, but this part of the correlation judgment only examines the correlation between two variables. We will further analyze the relationship between the two variables in the subsequent regression.

#### 3.3. Model specification

The empirical model established in this paper is as follows:

$$\ln C_{it} = \beta_0 + \beta_1 \operatorname{Income}_{it} + \beta_2 \operatorname{Gap}_{it} + \beta_3 X_{it} + \partial_i + \rho_t + \varepsilon_{it}$$
(13)

Where,  $\beta_0$  is the constant; represents regions, i = 1, ..., N; t represents time, t= 1, ..., T.lnC<sub>it</sub> is the explained variable crime in this paper; Income and Gap are the core explanatory variables in this article, which respectively represent poverty aversion and inequality aversion. X represents the control variables, namely, per capita GDP, population density, judicial expenditure, welfare expenditure, education degree, housing price, the proportion of local young and middle-aged population, urbanization level and floating population.  $\partial_i$  and  $\rho_t$  represent provincial effect and time effect respectively; moreover,  $\varepsilon_{it}$  is the error term.

#### 4. Results

In order to test the influence of poverty aversion and inequality aversion on crime, we use panel model to analyze this problem. The results of the Hausman test indicate that the chi-squared statistic is 19.51, fixed effects are better than random effects. So, we recommend that the fixed effects model should be used instead of random effects model. On the other hand, we should consider the variable of time. To solve serious problems of social 690 👄 Z. SONG ET AL.

security, China regularly cracks down on serious crimes at different periods of time. The crackdown on criminals is done according to the laws laid down by the Chinese constitution. In these periods of time, judicial activities would be significantly different from normal years. For example, during 2008 Beijing Olympic Games, social order management was more stringent in China. And the test of annual dummy variables also confirmed the rationality of time variables (F = 2.37, Prob>F = 0.0047). Therefore, we decided to add the time virtual variable to control the time effects. The regression results are shown in Table 2:

In order to ensure the robustness of the results, we use the method of batch regression. The results show that the coefficient of poverty aversion is significant at first, but no longer significant with the addition of other variables. We come to the conclusion that poverty reduction has no effects on crime. At the same time, the widening consumption gap between urban and rural residents has a positive impact on crime. From the empirical results, inequality is significantly positive at both 10% and 5% level of confidence after gradually adding the control variables. In model 6 after adding all control variables, the coefficient of distribution inequality is 0.0711. In other words, crime increases by 7.11% for each unit of increasing consumption gap between urban and rural populations. In fact, the incomes of the poor are growing fast in China. However, this is exactly the phenomenon that we have proved before: if the distribution is fair, people will choose to accept even the small amount. If the distribution is unfair, people will choose to refuse to accept and commit crimes even if the amount is large, thereby proving hypothesis 1 and hypothesis 3. According to the regression results, the coefficient of GDP is significantly positive with the number of 0.446 in 1%. In fact, according to our research settings, the low consumption crowd (rural residents) is more likely to be the potential criminal. And some research results may also prove the speculation, such as Jin (2015) researched the crime population through the random sampling of criminal crime data of Zhejiang province, he found that a new generation of rural migrant workers has become the main criminal groups. Jin and Chen (2011) also found that the workers from the village have become an important factor of urban unrest in the process of statistical analysis of criminal crimes in Wuhan.

We also briefly describe the influence of other control variables on criminal crimes. First, an increase in population density would lead to an increase in crime. In the paper we use the data of urban population density as the measurement of population density, in other words, the increase of population in urban unit area will induce more crimes. On the one hand, the increase of population stimulates the contradiction between people, which leads to a series of negative emotions in the limited space. On the other hand, the increase in population density makes the phenomenon of consumption difference more visible and the difference between people more obvious, which may also be the cause of crime. Second, Education is inversely proportional to crime. From the perspective of economics, when the education level in the region is high, people's ability to obtain legal benefits will be improved, thus reducing their participation in illegal activities; and from the perspective of criminology, the more educated the population is, the stronger their self-control is, and the less likely they are to commit crimes. Third, the regression results verify that housing price may be the factor that leads to the increase of crime. Rising house prices increase the cost of living for those without a home but benefit those who

Table 2. Crime and poverty aversion.	and poverty	/ aversion.									
	M1	M2	M3	M4	M5	M6	М7	M8	6M	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
Income	0.878***	0.906***	0.413**	0.202	0.172	0.121	0.0996	0.103	0.0749	0.115	0.113
	(0.176)	(0.181)	(0.197)	(0.202)	(0.204)	(0.213)	(0.212)	(0.210)	(0.209)	(0.211)	(0.211)
Gap1		-0.0224	0.0475	0.0919**	0.0947***	0.0947***	0.0833**	0.0692*	0.0701*	0.0709**	0.0711**
		(0.033)	(0.035)	(0.036)	(0.036)	(0.036)	(0.036)	(0.037)	(0.038)	(0.040)	(0.041)
GDP			0.420***	0.471***	0.478***	0.486***	0.498***	0.476***	0.435***	0.451***	0.446***
Density			(0.0/8)	(0.078) 0.0575***	(0.078) 0.0556***	(0.079) 0.0530***	(0.079) 0.0550***	(0.078) 0.0556***	(0.080) 0.0542***	(0.081) 0.0558***	(0.083) 0.0555***
				(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Judicial					1.443	1.429	0.758	0.573	0.596	0.492	0.537
					(1.319)	(1.320)	(1.339)	(1.328)	(1.321)	(1.322)	(1.335)
Welfare						0.213	0.199	0.0908	0.187	0.146	0.144
						(0.263)	(0.261)	(0.261)	(0.264)	(0.265)	(0.266)
Education							-0.0503**	-0.0464**	-0.0519**	-0.0515**	-0.0521**
							(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Housing								0.224***	0.214***	0.205**	0.203**
								(0.082)	(0.082)	(0.082)	(0.082)
Age									0.501**	0.433*	0.415
i									(0.240)	(0.245)	(0.254)
Floating										0.214	0.216
Urban										(/cl.0)	(0.158) 0.096 <i>2</i>
											(0.358)
Constant	-6.756***	-7.002***			-5.382***	-4.955***	-4.336**		-5.361***	-5.902***	-5.856***
	(1.834)	(1.871)			(1.799)	(1.875)	(1.879)		(1.989)	(2.026)	(2.036)
Observations	378	378			378	378	378		378	378	378
R-squared	0.605 77	0.606 77	0.637 77	0.651	0.652 77	0.652	0.659 77	0.666	0.67	0.672 77	0.672 77
Number of 1a	77	71			71	71	17		71	71	71
Standard errors in brackets *** $p < 0.01$ , ** $p <$	n brackets *** þ	o < 0.01, ** p <	< 0.05, * p < 0.1								

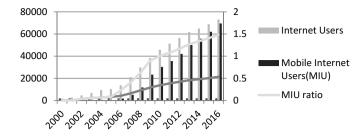
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own houses. And people without houses are likely to be potential criminal groups, so we find that the coefficient of housing prices is positive.

According to the research of Meng, Gregory, and Wang (2005), the problem of unequal income distribution in Chinese society had already become serious for a long time. From the survey data of China statistical yearbook, although the actual income level of rural residents increased year by year, the urban incomes are rising at a faster rate. However, due to geographical restrictions, class solidification and other factors, the uneven distribution exists, but the ability to obtain the income level of urban residents is limited for low-income groups. Therefore, even though the gap between the two classes is prominent, few people (low-income group) perceive the information, so there is not too much social conflict happening. However, with the development of urbanization and the prosperity of the real estate market in China (Cao, Chen, & Zhang, 2018), more and more rural residents are entering cities and towns, the large income gap that already exists is gradually observed. The widening consumption gap shows that China's rural residents have been benefited from the economic growth, but more for urban residents.

As mentioned above, we believed that people usually get the information of uneven distribution by observing consumption. So we should pay attention to the improvement of people's ability to observe information through scientific and technological progress. After entering the internet era, the number of internet users in China has soared. According to the Statistical Reports on Internet Development in China, the number of internet users in China has increased from 16.9 million in 2000 to 772 million in 2017. The invention of smart phones has made the dissemination of information more convenient, among which mobile internet users have gradually become the main group of the internet. By 2017, China's mobile internet group has reached 753 million, accounting for 97.5% of the total number of internet users. During the high-speed flow of information through the new carriers, a large number of behaviors such as flaunt wealth and wealth displays are widely known. Due to the lack of channels, the spread of these messages was limited in the past. The wide application of the internet and smart phones enabled low-income groups to break through the barriers of the original class, obtain the information of unfair distribution indirectly through other people's consumption behaviors, and feel the unfair phenomenon. Thus, it appears that use of the internet has a significant impact on increasing the crime rate in China.

The wide application of smartphones has brought obvious changes to people's life; Public at large can access more information through mobiles and communications in society. According to the analysis from the report, the rapid growth of the Internet and mobile phone networks in recent years is mainly due to the rapid increase in usage by rural residents. With the gradual decrease in prices of computers and mobile phones, communication tools are more affordable in rural areas. As can be seen from Figure 3, the growth rate of Chinese internet users was above 20% before 2010. But the growth rate gradually slowed down, which indicates that Chinese internet users basically reached a stable stage in 2010. At the same time, the number of mobile internet users began to increase since 2006 and smartphones gradually replaced the original functional machines and became the mainstream after 2010. For the reasons, we use 2010 as a time node to analyze the impact of uneven distribution on crime in different time periods. The first half of the node is the time interval of slow message propagation, and the second half of



**Figure 3.** Statistical reports on internet development in China. Source: Statistical Reports on Internet Development in China (2018).

the node is the time interval with fast message propagation. Tables 3 and 4 show the relevant regression results.

According to the regression results, the consumption gap coefficient before 2010 was 0.0545, but the results are not significant; and the number was 0.1152 in 10% confidence level after 2010. This shows that the positive impact of consumption gap on crime is gradually increasing with the passage of time. This proves that it is reasonable for us to use consumption gap to measure the inequality of distribution. In other words, people often evaluate the inequality of income distribution by observing consumption information, and then choose crime.

As mentioned above, an important difference between consumption and income is visibility, consumer information is more transparent, but not all consumption behaviors are observable. Although we verified the correlation between the overall consumption gap and crime from the previous regression results, the overall consumption is actually composed of both observable consumption and unobserved consumption. It is necessary to classify these consumption types to obtain more information. So, we calculated the consumption of different consumer goods to find out which consumption differences will have a more significant impact on the criminal behaviors. Categories of consumption include Food (Food, tobacco and liquor), Clothing, Equipment (Household facilities articles and services), Transport (Transport and communications), E&E (Education, culture and entertainment), Health (Health care and medical services), Residence (Housing maintenance, rental hotel and the charge of water and electricity) and Others. The above consumer goods data and consumer goods interpretation are from the National Bureau of Statistics of China.

According to the information of Table 5, we can find that the widening gap between education and entertainment (E&E) consumption, health consumption and residence consumption does not significantly increase criminal behaviors; the expansion of the ratio of food consumption, clothing consumption, equipment consumption and transportation consumption will significantly promote the occurrence of crime, among which the coefficient of food consumption gap is 0.0744, the clothing consumption gap is 0.028, and the equipment consumption gap is 0.0245, the transportation consumption gap is 0.0232. By observing its characteristics, we can find that on comparing with the nonsignificant consumption categories, the significant consumer goods are generally actual goods that can be purchased, in other words, it is usually visible. The food consumption gap has the highest impact on crime, and followed by clothing consumption, equipment

$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	-ES Crime Crime 0.636** 0.634** (0.244) (0.291) 0.000647 (0.049)	rime 0.117 0774 0774 445** .207)	Crime -0.0184 (0.310)				2			IIW
	0.636*** 0.634** (0.244) (0.291) 0.000647 (0.049) 0.0049)	.310) 0774 0778 .048) 445** .207)	-0.0184 (0.310)	Crime	Crime	Crime	Crime	Crime	Crime	Crime
	(0.244) (0.241) 0.000647 (0.049)	.310) 0774 445** .207)	(0.310)	-0.059	-0.145	-0.082	-0.0664	0.0399	0.00936	0.0125
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.000647 (0.049)	0774 .048) 145** .207)		(0.315)	(0.321)	(0.320)	(0.323)	(0.318)	(0.319)	(0.320)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.049)	.048) 445** .207)	0.0809*	0.0818*	0.0905*	0.062	0.0567	0.0545	0.0546	0.0545
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5	.207) .207)	(0.047)	(0.048)	(0.048)	(0.050)	(0.052)	(0.051)	(0.051)	(0.051)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		.207)	0.375*	0.243	0.256*	0.282*	0.244	0.243	0.256	0.259*
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Density Judicial Welfare Fdurcation		(0.241)	(0.245)	(0.247)	(0.249)	(0.247)	(0.248)	(0.253)	(0.245)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Judicial Welfare Felucation		-0.785**	-0.758**	-0.659*	-0.605*	-0.630*	-1.012***	-0.924**	-0.924**
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Judicial Welfare Fdurcation		(0.355)	(0.358)	(0.365)	(0.362)	(0.370)	(0.385)	(0.395)	(0.396)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Welfare Felucation			-1.176	-1.308	-1.967	-1.998	-1.612	-1.532	-1.42
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Welfare Felucation			(1.563)	(1.562)	(1.584)	(1.591)	(1.560)	(1.562)	(1.587)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Education				0.548	0.562	0.539	0.758*	0.788*	0.775*
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Education				(0.417)	(0.413)	(0.419)	(0.416)	(0.417)	(0.419)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	EddCon (C)					-0.0765*	-0.0755*	-0.107***	-0.112***	-0.111***
g mt -4.081* -4.062 -4.26 1.11 1.254 1.129 1.174 0.923 1.886 1.546 (0.333) (0.102) (0.102) (0.102) (0.102) 2.605*** 3.055**** 3.055***********************************						(0.039)	(0.040)	(0.040)	(0.041)	(0.041)
0.103       (0.102)       (0.102)       (0.102)         0.101       2.605***       3.055***       3.055***       3.055***         0.101       2.605***       3.055***       3.055***       3.055***       3.055***         0.101       2.605***       3.055***       3.055***       3.055***       3.055***       3.055***         0.101       1.11       1.254       1.129       1.174       0.923       1.886       1.546         0.102       1.89       189       189       189       189       189       189       189         ations       189       189       189       189       189       189       189       189       189         ed       0.469       0.543       0.557       0.559       0.564       0.577       0.597       0.6         r of id       27       <	Housing						0.0386	0.00153	0.000543	-0.00721
0       27       27       27       27         0       265***       3055***       3055***       3055***       3055***         0       2605***       3055***       2605***       3055***       3055***       3055***         0       373       0       0       0       0       0       0       0         nt       -4.062       -4.26       1.11       1.254       1.129       1.174       0.923       1.886       1.546         nt       -4.081*       -4.062       -4.26       1.11       1.254       1.129       1.174       0.923       1.866       1.546         ntions       189       189       189       189       189       186       1.546         ed       0.469       0.543       0.557       0.559       0.564       0.577       0.597       0.697       0.6         rofid       27							(0.103)	(0.102)	(0.102)	(0.104)
g       (0.917)       (1.018)         nt       -4.062       -4.26       1.11       1.254       1.129       1.174       0.923       1.886       1.546         nt       -4.081*       -4.062       -4.26       1.11       1.254       1.129       1.174       0.923       1.886       1.546         nt       -4.081*       -4.062       -4.26       1.11       1.254       1.129       1.174       0.923       1.886       1.546         nto       1.3531       (3.538)       (3.533)       (3.531)       (3.499)       (3.573)       (3.507)       (3.523)         ations       189       189       189       189       189       189       189       189         red       0.469       0.543       0.557       0.559       0.564       0.577       0.597       0.6         rr of id       27	Age							2.605***	3.055***	3.017***
9 nt -4.081* -4.062 -4.26 1.11 1.254 1.129 1.174 0.923 1.886 1.546 (0.333) ations 189 189 189 189 189 189 189 189 189 189								(0.917)	(1.018)	(1.025)
0.333) nt -4.081* -4.062 -4.26 1.11 1.254 1.129 1.174 0.923 1.886 1.546 (0.335) (2.782) (2.590) (3.528) (3.531) (3.499) (3.573) (3.507) (3.523) ations 189 189 189 189 189 189 189 189 189 189	Floating								-0.338	-0.351
nt -4.081* -4.062 -4.26 1.11 1.254 1.129 1.174 0.923 1.886 1.546 (2.385) (2.782) (2.590) (3.528) (3.538) (3.531) (3.499) (3.573) (3.507) (3.523) ations 189 189 189 189 189 189 189 189 189 189	nedul								(0.333)	(0.335) 0.181
-4.081*         -4.062         -4.26         1.11         1.254         1.129         1.174         0.923         1.886         1.546           (2.385)         (2.782)         (2.590)         (3.528)         (3.531)         (3.499)         (3.573)         (3.507)         (3.523)           ions         189         189         189         189         189         189         189           d         0.469         0.469         0.543         0.557         0.559         0.564         0.574         0.57         0.6           of d         27										(0.412)
(2.385)         (2.782)         (2.520)         (3.528)         (3.531)         (3.499)         (3.573)         (3.507)         (3.523)           189	-4.081* -4.062	4.26	1.11	1.254	1.129	1.174	0.923	1.886	1.546	1.525
189         189 <th189< th=""> <th189< th=""> <th189< th=""></th189<></th189<></th189<>	(2.385) (2.782) (	.590)	(3.528)	(3.538)	(3.531)	(3.499)	(3.573)	(3.507)	(3.523)	(3.533)
0.469 0.469 0.543 0.557 0.559 0.564 0.574 0.575 0.597 0.6 27 27 27 27 27 27 27 27 27 27 27 27 27 2	189 189	189	189	189	189	189	189	189	189	189
27 27 27 27 27 27 27 27 27 27 27 27 27	0.469 0.469	.543	0.557	0.559	0.564	0.574	0.575	0.597	0.6	0.6
	27 27	27	27	27	27	27	27	27	27	27

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Table 4. Crime and inequality after 2010.	and inequal	ity after 2010									
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
Income	0.666**	0.676**	0.662**	0.444	0.403	0.532*	0.534*	0.539	0.513	0.508	0.555
	(0.271)	(0.274)	(0.276)	(0.286)	(0.288)	(0.291)	(0.292)	(0.288)	(0.285)	(0.218)	(0.202)
Gap1		-0.0138	-0.00967	0.0495*	0.1213**	0.1252*	0.1222*	0.1272*	0.1193**	0.1185**	0.1152*
		(0.049)	(0.050)	(0.052)	(0.069)	(0.069)	(0.068)	(0.068)	(0.070)	(0.068)	(0.069)
GDP			0.501*	0.513***	0.531***	0.565***	0.543***	0.536***	0.406**	0.399**	0.398**
Density			(0.152)	(0.168) 0.0363**	(0.170) 0.0341**	(0.171) 0.0451***	(0.170) 0.0450***	(0.172) 0.0447***	(0.174) 0 0 0 4 6 * * *	(0.174) 0.0443***	(0.174) 0.0460***
				(0.015)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Judicial					2.607	1.481	1.482	1.509	1.324	1.281	1.804
					(2.285)	(2.321)	(2.329)	(2.338)	(2.350)	(2.367)	(2.429)
Welfare						-0.756**	-0.757**	-0.760**	-0.738**	-0.732**	-0.727**
						(0.358)	(0.359)	(0.360)	(0.362)	(0.364)	(0.364)
Education							0.00252	0.00132	-0.00225	-0.00143	0.00113
							(0.027)	(0.027)	(0.028)	(0.028)	(0.028)
Housing								-0.0368	-0.033	-0.0278	-0.0428
								(0.131)	(0.131)	(0.134)	(0.135)
Age									0.197	0.208	0.32
ī									(0.229)	(0.236)	(0.263)
Floating										-0.0389	-0.0484
Urban										(761.0)	(cer.u) -0.968
											(1.001)
Constant	-4.546	-4.617	-5.034*	-4.137	-4.065	-4.209	-4.253	-3.917	-3.35	-3.255	-3.612
	(2.820)	(2.840)	(3.024)	(2.997)	(2.994)	(2.961)	(3.008)	(3.244)	(3.313)	(3.357)	(3.378)
Observations	189	189	189	189	189	189	189	189	189	189	189
R-squared	0.322	0.322	0.323	0.349	0.355	0.373	0.373	0.374	0.377	0.377	0.381
Number of id	27	27	27	27	27	27	27	27	27	27	27
Standard errors in brackets *** $p < 0.01$ , ** $p < 0$	brackets *** p	i < 0.01, ** p <	0.05, * p < 0.1.								

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Crime	0.262	(0.195)	0.400***	(0.080)	0.0473***	(0.016)	0.209	0.116	(0.267)	-0.0546***	(0.021)	(0.080)	0.363	(0.254)	0.229	(0.159)	0.0539	(100.0)										0.00132	(Continued)
Crime	0.232	(0.196)	0.430***	(0.083)	0.0470***	(0.016)	(1320)	0.18	(0.271)	-0.0559***	(0.021)	(0.081)	0.348	(0.254)	0.222	(0.158)	0.11	(100.0)									0.0252	(1121)	
Crime	0.205	(0.196)	0.417***	(0.080)	0.0487***	(0.016)	0.449 (1 330)	0.114	(0.265)	-0.0561***	(0.021)	(0.080)	0.373	(0.253)	0.188	(0.160)	0.167	(606.0)								0.00329	(110.0)		
Crime	0.185	(0.204)	0.431***	(0.083)	0.0493***	(0.016)	0.109	0.131	(0.266)	-0.0563***	(0.021)	(0.080)	0.393	(0.254)	0.191	(0.161)	0.0496	(0000)						0.0112	(600.0)				
Crime	0.123	(0.202)	0.431***	(0.080)	0.0468***	(010)	0.24	0.0769	(0.265)	-0.0540***	(0.021)	(0.080)	0.448*	(0.255)	0.206	(0.157)	0.0361	(0000)					0.0232**	(010.0)					
Crime	0.165	(0.200)	0.450***	(0.083)	0.0475***	(0.016) 0.125	0.102 (325)	0.146	(0.266)	-0.0507**	(0.021)	(0.081)	0.354	(0.253)	0.185	(0.159)	0.00109	(////				0.0245*	(610.0)						
sion. Crime	0.251	(0.200)	0.404***	(0.082)	0.0469***	(0.016)	0.524	0.118	(0.267)	-0.0539**	(0.021)	(0.080)	0.373	(0.256)	0.222	(0.162)	0.0582	(105.0)			0.0280* (0.016)								
ier goods regres Crime	0.214	(0.193)	0.377***	(0.078)	0.0489***	(510.0)	0.278	0.0916	(0.263)	-0.0556***	(0.021)	(0.079)	0.392	(0.251)	0.16	(0.158)	0.156	(0000)		0.0744*** (0.025)									
able 5. Classification of consumer goods regression Variables Crime Crime	0.113	(0.211)	0.446***	(0.083)	0.0555***	(0.016)	(1335)	0.144	(0.266)	-0.0521**	(0.021)	(0.087)	0.415	(0.254)	0.216	(0.158)	0.0962	(occ.0) 0.0711**	(0.041)										
Table 5. Classific Variables	Income		GDP		Density	l cial	Judicial	Welfare		Education		Buisbon	Age	'n	Floating		Urban	Gap1		Food	Clothing	Equipment	Transport	E&E	:	Health	Residence	Others	

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Variables	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
									(0.007)
Constant	-5.856***	-6.444***	-6.893***	-6.307***	-5.907***	-6.413***	-6.576***	-6.866***	-6.936***
	(2.036)	(1.935)	(1.960)	(1.969)	(1.989)	(1.993)	(1.954)	(1.949)	(1.953)
Observations	378	378	378	378	378	378	378	378	378
R-squared	0.672	0.678	0.669	0.673	0.674	0.671	0.672	0.671	0.669
Number of id	27	27	27	27	27	27	27	27	27
Standard errors in brackets *** p < 0.01, ** p <	orackets *** p < 0.0	0.05,	* p < 0.1.						

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consumption and finally transport consumption. The information presented by the above four kinds of consumption is easier to be found due to the public visibility. The consumption of food, clothing, equipment and transport also includes relevant income information of consumers, but their consumption behaviors are less likely to be known. This finding is consistent with Mejía and Restrepo's (2016) conclusion, and also fits our hypothesis that visual consumption is related to crime.

We verified the interaction between the urban-rural consumption gap, which exists in rural and urban groups as an indicator of income distribution inequality and criminal acts. So does the unequal distribution of income within the same group affect crime as well? According to Li et al. (2018), income distribution inequality has a Matthew effect. According to the statistical data, it is not difficult to find that the large gap of income distribution in China is not only reflected in different categories of residents, such as rural residents and urban residents mentioned above, but also reflected in the residents of the same dimension. The difference between the average annual consumption expenditure ratio of urban residents and rural residents in 2017 is 2.3 times, while the consumption ratio between the highest group and the lowest group is 5.32 times. We collected relevant data of five groups' income among urban residents, used the ratio between the highest income group and the average income as an indicator to measure the income distribution inequality, and analyzed the relationship between it and crime.<sup>2</sup>

The regression results in Table 6 reveal that by using the ratio between the highest income group and the average income as inequality also has a positive impact on crime; its value is 0.128 at 10% level of confidence. The high-income group's consumption level is higher than the average level of consumption per unit, crime will increase by 12.8%. This result shows that the influence of inequality on crime not only exists in people living in different regions, but also in people living in the same region, the excessive consumption difference between the rich and ordinary people may lead to crime. This inequality can be interpreted as flaunt wealth phenomenon at some moments. Just as Wu and Lan (2018) found that flaunt wealth behaviors not only increase people's desire for wealth, but also cause resentment against the rich, resulting in social security turbulence.

In the above empirical research, we mainly analyzed the consumption differences among residents and the problems between criminal crimes. However, China's unique economic system and political system also created the situation of national division in essence, resulting in the uneven distribution between the government and the people in the process of economic development. National consumption is usually composed of government consumption and residents' consumption. The main channels of government consumption focus on providing public services to the whole society, including expenditure on science, education, culture, health and administration. In most countries of the world, government consumption is mainly service-oriented. However, China's government consumption is mainly aimed at promoting construction, and its characteristics are dominant rather than service-oriented (Wang & Wen, 2019). For example, the research of Alonso Carrera, Caballe, and Raurich (2015) shows that in the short term, the increase of government consumption will stimulate the growth of residents' consumption, but when the economy enters the normal development stage, the excessive increase

<sup>&</sup>lt;sup>2</sup>According to the local yearbook, there are only 20 districts have reported consumption data for different income groups in some years.

Table 6. People grouping regression.	grouping re	gression.									
	M1	M2	M3	M4	M5	M6	M7	M8	6W	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
Income	0.616***	0.544**	-0.0296	-0.0969	-0.0762	-0.137	-0.171	-0.152	-0.15	-0.0974	-0.0964
	(0.225)	(0.226)	(0.234)	(0.237)	(0.240)	(0.262)	(0.257)	(0.254)	(0.255)	(0.258)	(0.258)
Gap2		0.159**	0.117	0.132*	0.135*	0.136*	0.131*	0.132*	0.132*	0.130*	0.128*
		(0.075)	(0.071)	(0.071)	(0.072)	(0.072)	(0.070)	(0.070)	(0.070)	(0.069)	(0.070)
GDP			0.566***	0.592***	0.584***	0.593***	0.602***	0.571***	0.552***	0.567***	0.556***
Density			(0.101)	(0.102) 0.0518	(0.103) 0.0523	(0.104) 0.0476	(0.102) 0.0535	(0.102) 0.0628*	(0.104) 0.0633*	(0.105) 0.0588*	(0.108) 0.0578*
(				(0.034)	(0.034)	(0.035)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Judicial					-0.866	-0.963	-2.374	-2.338	-2.158	-2.517	-2.411
					(1.572)	(1.583)	(1.614)	(1.599)	(1.611)	(1.634)	(1.656)
Welfare						0.218	0.239	0.0147	0.07	0.0451	0.0336
						(0.372)	(0.364)	(0.375)	(0.380)	(0.380)	(0.381)
Education							-0.0937***	-0.0954***	-0.0987***	-0.0983***	-0.0984***
							(0:030)	(0:030)	(0:030)	(0:030)	(0.030)
Housing								0.236**	0.221**	0.220**	0.210*
								(0.107)	(0.108)	(0.108)	(0.111)
Age									0.378	0.226	0.204
i									(0.415)	(0.431)	(0.435)
Floating										0.274	0.27
IIrban										(0.216)	(0.217)
											(0.516)
Constant	-3.9646*	-3.498	-3.690*	-3.719*	-3.803*	-3.261	-2.079	-4.062	-3.834	-4.499*	-4.416*
	(2.353)	(2.344)	(2.185)	(2.178)	(2.187)	(2.378)	(2.358)	(2.502)	(2.515)	(2.566)	(2.578)
Observations	238	238	238	238	238	238	238	238	238	238	238
R-squared	0.595	0.599	0.653	0.657	0.658	0.658	0.674	0.682	0.683	0.686	0.686
Number of id	20	20	20	20	20	20	20	20	20	20	20
Standard errors in brackets *** p < 0.01, ** p <	brackets *** p	< 0.01, ** p <	0.05, * p < 0.1	<u> </u>							

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of government consumption expenditure may produce a crowding out effect on residents' consumption. It is geneally believed that the economic growth should mainly rely on residents' consumption. The excessive proportion of government consumption is likely to lead to inefficient and corrupt resource allocation, and the social atmosphere of corruption is often the root cause of crime. If the dividend of economic growth is seen as another form of distribution of benefits between the state and the people, it is necessary to use the ratio of government consumption to residents to test whether such inequality also causes crime. For this reason, we chose to use the ratio of government consumption to residents' consumption (Gap3) as another measure of consumption difference to further study its impact on criminal crimes.

The regression results in Table 7 show that in the process of adding control variables, the coefficient of Gap3 value is significantly negative. After controlling all variables, the coefficient was 0.156, indicating that for every unit of increase in Gap3, crime increased by 15.6%. At the same time, the poverty aversion was still insignificant in model 11. The above results show that the widening consumption gap between the government and residents also increase the value of crimes. In fact, the absolute income of Chinese residents has increased quickly in recent years, the relative income of Chinese residents is declining against the background of overall economic growth, and the positive effects brought by the increase in income may be offset. Although residents' income level and standard of living are improving, their living standard does not fully enjoy the dividends brought by economic development. The situation of a wealthy country and poor people makes residents dissatisfied with their status, and they may choose to commit crimes.

#### 4.1. Robustness check

In order to ensure the robustness of the experimental results, we did two parts of jobs.

First, we used the number of criminal arrests approved by the procuratorial organs as the explained variable and put it into the model for regression verification. According to China's criminal procedure law, an arrest must meet the following three conditions: 1) there is evidence to substantiate the crime, 2) the crime carries a penalty of imprisonment or more and, 3) arrest is necessary. As one of the most severe coercive measures in criminal proceedings, arrest deprives suspects of their personal freedom. And punishment is stronger than prosecution, so the number of arrests is usually less than prosecution. Currently, only procuratorates and courts have the right to approve arrests in China. The arrest rate index for the robustness test in this paper is a logarithm of the number of criminal suspects arrested per 100,000. We still use the urban-rural consumption gap to measure inequality. The results from Table 8 show that the coefficient of each variable does not appear big difference, the regression of this paper is basically robust.

Second, the second robustness work of this paper was to deal with the endogeneity problem. To control endogenous correlation, the core explanatory variable of Income and Gap was lagged in this experiment. Considering that the main work of this paper focused on the consumption gap between urban and rural residents, we deliberately selected the representative index of Gap1. According to robustness results in Table 9, the regression results are still robust after the lagged terms of Income and Gap.

Table 7. People and country grouping regression.	e and country	r grouping red	gression.								
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
Income	0.878***	0.906***	0.538***	0.453**	0.435**	0.368*	0.314	0.253	0.247	0.288	0.288
	(0.176)	(0.175)	(0.182)	(0.184)	(0.185)	(0.195)	(0.195)	(0.193)	(0.193)	(0.194)	(0.194)
Gap3		0.229**	0.240**	0.200*	0.196*	0.213**	0.190*	0.151*	0.137*	0.155**	0.156*
		(0.107)	(0.103)	(0.103)	(0.103)	(0.105)	(0.104)	(0.109)	(0.117)	(0.121)	(0.121)
GDP			0.383*** (0.072)	0.391*** (0.072)	0.395*** (0.072)	0.406*** (0.072)	0.429*** (0.072)	0.428*** (0.072)	0.385*** (0.075)	0.408*** (0.076)	0.404*** (0.079)
Density				0.0391**	0.0375**	0.0335**	0.0380**	0.0433***	0.0415***	0.0433***	0.0430***
				(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Judicial					1.068	1.038	0.375	0.286	0.28	0.162	0.194
					(1.324)	(1.324)	(1.338)	(1.322)	(1.318)	(1.317)	(1.328)
Welfare						0.294	0.27	0.14	0.212	0.171	0.17
						(0.267)	(0.265)	(0.265)	(0.267)	(0.268)	(0.268)
Education							-0.0532**	-0.0478**	-0.0531**	-0.0521**	-0.0526**
							(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Housing								0.240***	0.237***	0.224***	0.222***
								(0.080)	(0.080)	(0.080)	(0.081)
Age									0.420*	0.338	0.323
·									(0.239)	(0.244)	(0.254)
Floating										0.256	0.259
Urban										(861.0)	(861.0) 0.0748
											(0.358)
Constant	-6.756***	-7.135***	-7.508***	-7.013***	-6.909***	-6.354***	-5.526***	-7.069***	-6.567***	-7.176***	$-7.151^{***}$
	(1.834)	(1.833)	(1.764)	(1.760)	(1.766)	(1.835)	(1.849)	(1.898)	(1.913)	(1.945)	(1.951)
Observations	378	378	378	378	378	378	378	378	378	378	378
R-squared	0.605	0.611	0.641	0.648	0.648	0.65	0.657	0.666	0.669	0.671	0.671
Number of id	27	27	27	27	27	27	27	27	27	27	27
Standard errors in brackets *** $p < 0.01$ , ** $p <$	hbrackets *** p		0.05, * p < 0.1.								

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Table 8. Robust test 1.	t test 1.										
	M1	M2	M3	M4	M5	M6	M7	M8	6M	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
Income	0.571***	0.682***	0.314	0.0656	0.109	0.0971	0.0825	0.0884	0.032	0.0453	0.0531
	(0.180)	(0.183)	(0.203)	(0.207)	(0.208)	(0.218)	(0.218)	(0.212)	(0.207)	(0.209)	(0.209)
Gap1		0.0880***	0.0857***	0.0865**	0.0824**	0.0824**	0.0875**	0.0858**	0.0858**	0.0869**	0.086**
		(0.034)	(0.036)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
GDP			0.314*** (0.081)	0.374*** (0.080)	0.364*** (0.080)	0.366*** (0.081)	0.374*** (0.081)	0.338*** (0.079)	0.255*** (0.080)	0.260*** (0.081)	0.278*** (0.082)
Density				0.0677***	0.0704***	0.0698***	0.0712***	0.0721***	0.0694***	0.0699***	0.0710***
				(0.016)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Judicial					-2.069	-2.072	-2.520*	-2.832**	-2.785**	-2.820**	-2.990**
					(1.349)	(1.351)	(1.378)	(1.341)	(1.308)	(1.311)	(1.322)
Welfare						0.0482	0.0386	-0.144	0.0493	0.0355	0.0417
Education						(0.269)	(0.268) 0.0336	(0.264)	(0.261)	(0.263) 0.0280*	(0.263) 0.025.0*
FUNCTION							(120.0)	(0.021)	(0.021)	(0.021)	(120.0)
Housing								0.376***	0.356***	0.353***	0.362***
3								(0.083)	(0.081)	(0.081)	(0.081)
Age									1.003***	0.981***	1.048***
i									(0.237)	(0.243)	(0.252)
Floating										0.0712	0.0621
Urban										(0¢1.0)	(0:1.0) -0.36
											(0.354)
Constant	-4.186**	-5.149***	-4.868***	-3.597*	-3.831**	-3.734*	-3.320*	-6.270***	-4.813**	-4.993**	-5.165**
	(1.872)	(1.892)	(1.855)	(1.838)	(1.841)	(1.920)	(1.934)	(1.987)	(1.968)	(2.010)	(2.017)
Observations	378	378	378	378	378	378	378	378	378	378	378
R-squared	0.191	0.207	0.241	0.278	0.283	0.283	0.288	0.33	0.365	0.365	0.367
Number of id	27	27	27	27	27	27	27	27	27	27	27
Standard errors in brackets *** p < 0.01, ** p <	brackets *** p		0.05, * p < 0.1.								

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Table 9. Robust test 2.	t test 2.										
	M1	M2	M3	M4	M5	M6	М7	M8	6W	M10	M11
VARIABLES	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime	Crime
L. Income	0.659***	0.671***	0.241	0.0168	-0.06	-0.0916	-0.105	-0.0749	-0.0958	-0.0595	-0.0897
	(0.180)	(0.187)	(0.195)	(0.199)	(0.201)	(0.213)	(0.212)	(0.211)	(0.210)	(0.213)	(0.216)
L. Gap1		-0.00767	0.0548	0.0917**	0.104***	0.104***	0.0919**	0.0725**	0.0772**	0.0736**	0.0764**
		(0.035)	(0.035)	(0.036)	(0.036)	(0.036)	(0.036)	(0.037)	(0.037)	(0.037)	(0.037)
GDP			0.440***	0.484***	0.501***	0.507***	0.519***	0.495***	0.451***	0.459***	0.432***
			(0.079)	(0.078)	(0.078) 0.0547***	(0.079) 0.0523***	(0.079)	(0.079) 0.0552***	(0.083) 0.0546***	(0.083) 0.0550***	(0.090)
Density				(0.015)	(0.015)	(910.0)	(910 0)	(0.016)	(0.016)	(910.0)	(0.016)
Judicial				(	3.577**	3.557**	3.033*	2.647*	2.634*	2.564*	2.640*
					(1.530)	(1.533)	(1.559)	(1.552)	(1.547)	(1.547)	(1.551)
Welfare						0.127	0.128	0.018	0.0897	0.0467	0.0445
						(0.280)	(0.279)	(0.280)	(0.282)	(0.284)	(0.284)
Education							-0.0368*	-0.0333	-0.0376*	-0.0372*	-0.0394*
							(0.022)	(0.021)	(0.021)	(0.021)	(0.022)
Housing								0.224**	0.222**	0.217**	0.219**
								(0.087)	(0.087)	(0.087)	(0.087)
Age									0.412*	0.364	0.305
ī									(0.237)	(0.241)	(0.252)
Floating										0.1/9	0.19
Urhan										(0.163)	(0.163) 0.394
											(0.502)
Constant	-4.428	-4.525**	-5.061***	-3.768**	-3.366*	-3.112	-2.716	-4.724**	-4.077*	-4.522**	-4.131*
	(1.864)	(1.918)	(1.833)	(1.826)	(1.821)	(1.908)	(1.916)	(2.053)	(2.080)	(2.118)	(2.177)
Observations	351	351	351	351	351	351	351	351	351	351	351
R-squared	0.553	0.554	0.594	0.613	0.62	0.62	0.623	0.631	0.635	0.636	0.637
Number of id	27	27	27	27	27	27	27	27	27	27	27
Standard errors in brackets *** $p < 0.01$ , ** $p < 0.05$ ,	brackets *** p	< 0.01, ** p < (	).05, * p < 0.1.								

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#### 5. Conclusions

This paper studies the influence of poverty aversion and inequality aversion on crime. Based on ultimatum game model, we theoretically tested the relationship between variables and hypothesized that residents do not suffer from poverty but from inequality. To empirically test the hypothesis panel data of 27 provinces in China from 2004 to 2017 were used. In the selection of variable indicators, we used residents' absolute income value to measure the poverty aversion; A variety of consumption gap indicators were used to measure the inequality aversion. Our paper suggests that there is a correlation between crime and inequality.

In the course of our research, we also have come across many other meaningful conclusions. For example, we found in the time group study that people can have more channels to obtain income distribution information due to the popularity of the internet and smartphones. This change might increase the number of crimes, which have been rising faster in China after 2010. In addition, food consumption gap, clothing consumption gap, equipment consumption gap, traffic consumption gap have more significant impact on crime. We also observed that the higher the consumption level of high-income groups in society, the more is the likelihood of crimes to occur. We conclude from our study that the current inequality of distribution in China not only exists between the people, but also between the country and the people as well, and this inequality in turn influences crime. Our empirical models suggest that inequality can better explain variations in crime rates than poverty does. Based on this research, we suggest that rising income is everyone's preference, but people tend to value more the results of comparison with others. Therefore, it is very easy to raise crime when the results of comparison are intense. Hence, people are much more disgusted with the inequality in the circumstances they are living (Brosnan & De Waal, 2003; Engelmann & Strobel, 2004). The results also explain the contradictory phenomenon that resident's income levels and standard of living are rising along with crime rates in China. Rising inequality has substantially reduced the happiness boost from rising absolute incomes, and back firing the government's attempts to ensure social stability by increasing incomes.

To solve these problems, we suggest that the Government can undertake the following measures: (1) reforming taxation with new taxation policies. An important function of taxation is to adjust the income gap. The principle of taxation is to collect more taxes from the rich and help low-income groups to realize the redistribution of wealth. However, China's taxation policy has many drawbacks. According to the report released by Forbes, the property tax in China only accounted for less than 27% of the total tax revenue, while the number was 80.26% in America. Most tax revenues in China are from indirect taxes. Such taxation policy is conducive to the rich to pay less tax in China; and most of the tax burden in fact, is shared equally by the general public. China ranks second in the global tax burden pain ranking list. Excessive indirect taxation has not only resulted in narrowing the gap between the rich and the poor, but has also led to problems of distribution inequality. Therefore, the tax reforms will improve the current situation of uneven distribution between rich and the poor.

(2) Focus on rural residents: China has a large number of rural residents, and the large income gap between urban and rural areas makes China's inequality problem serious, so raising farmers' income level may be an effective means to reduce the gap. The increase in

agriculture incentives especially for crop farming and animal husbandry has always been the main sources of additional income for rural residents. On the other hand, more efforts on urbanization and industrial infrastructure development will lead to increasing employment opportunities for farmers and to increase their income. Amendment terms of expenditure, however, measures to reduce the tax burden and/or exemption of taxes, education opportunities to rural children in cities, medical, and old-age care especially for rural residents will significantly reduce the rich-poor gap.

(3) Fairness in regional development: At present, there are still substantial gaps not only between developed eastern coastal areas, backward central and western regions in China, but also in inter-regional income levels. Inequality in education, resources, welfare and other aspects are also the factors in the increasing crimes (Qian & Smyth, 2010). Therefore, ensuring a balanced state of regional development is the utmost necessity for alleviating uneven distribution and preventing crimes.

(4) The state should benefit its people and strive to increase their wealth. Efforts should be made to develop private enterprises, treat fairly between state-owned enterprises and private enterprises in the process of enterprise development, and reduce the monopoly of state-owned enterprises (Amighini, Rabellotti, & Sanfilippo, 2013). On the other hand, by reducing the tax burden, neither scrambles profits with people; nor reduces the situation of wealth in the country and poor people.

The paper analyzed the relationship among criminal crimes, income level and consumption gap. It may be reasonable to study the mechanism of criminal crimes based on the characteristics of consumption visibility. But from a practical point of view, not all consumers' behaviors can be observed. Since the analysis data used in this paper are mainly macroscopic data, the limitation of the data makes it impossible to further verify the research mechanism of them. Therefore, the follow-up research can be carried out on the aspects of conspicuous consumption or luxury consumption at the micro data level.

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#### **Informed consent**

Informed consent was obtained from all individual participants included in the study.

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