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INEQUALITY AND CRIME RATES IN CHINA

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DISCUSSION PAPER 13.11

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Abstract: This paper examines the impact of intra-provincial regional inequality on crime rates in China. The results show that intra-provincial regional inequality is positively correlated with the crime rate in the regions. However, education is found to be negatively correlated with the crime rate. In addition, it is also observed in this study that regional crime rates are positively linked with the level of inflation, unemployment rate, and inequalities in consumption and employment between the rural and urban sectors.

Keywords: China, county-level, inequality, crime, education
JEL codes: D63, I24, K42, O53

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1. Introduction

China has experienced an economic miracle since the commencement of economic reforms in 1978. Despite this economic miracle there have been significant increases in inequality. The increase of inequality may lead to various kinds of disastrous consequences which in turn may hamper economic growth. Yao et al (2005) warned that 'the skewed income distribution has many undesirable consequences; it can lead to social unrest, rising *crime* [italics added], moral degradation, corruption, and regional conflict.' Han (2008) also suggests that 'rapid economic growth in China is accompanied by economic disparity, corruption, *crime* [italics added], and a great deal of frustration among China's citizens. These social problems threaten the country's further development, social stability, and harmony.' The increase in crime rate is deemed to be one of the unfortunate consequences of the rising regional inequality.

Bourguignon (1999) claims that 'the social and economic efficiency cost of any increase in inequality and poverty which goes through higher criminality may be very substantial.' The costs associated with crime can be very high and include the amounts spent on the legal system, the expenditures on policing, prisons and courts; health-care costs and potential years of life lost through murder or disability; and private security expenditures. The indirect costs include the discounted value of property damaged or lost, reductions in investment, productivity, employment and rates of social and human capital accumulation (Fajnzylber et al., 2000). It is worth pointing out that not only can crime increase the cost to society, but it can also reduce economic growth, as Gordon et al. (2009) show that a high level of crime is detrimental to growth.

The cost of crime is a crucial factor to consider when determining its impact on the economy. However, official statistics on the cost of crime are not available for China. Fajnzylber et al. (2000) report that the cost is about 5% of the gross domestic product (GDP) for the United States and other developed countries, while the cost of crime ranges from 2.5% to 11.4% for the countries in Latin America. Although China is a developing country, China's GDP was US$ 5.88 trillion in 2010 (State Statistical Bureau, 2011). Thus, if the lowest value of 2.5% for the developing countries in Latin America is used to create an estimate calculation of the cost of crime in China, it would

amount to the enormous sum of US$ 147 billion in 2010.

Many studies have reported that China's crime rate has increased dramatically along with the noteworthy rise in economic growth (Bakken, 1993, Dai, 1995, Rojek, 1996, Dutton, 1997, Liu and Messner, 2001, Hu et al., 2005, Liu, 2005, Huang and Chen, 2007, Chen and Yi, 2009, Wu and Rui, 2010). The transition from the central planning system to a market economy leads to the collapse of long-established social organization and traditional forms of status relations. Consequently, crime rates have increased significantly because of the lack of social integration. Moreover, the legal and market-oriented economic systems are not perfect yet, leaving many people marginalized in the process of economic reform. This leads to an increase in the uneven distribution of income which further increases the crime rate. Therefore, it is crucial to study the relationship between income inequality and the crime rate.

The objective of this paper is to examine the relationship between regional inequality and the incidence of crimes in China. Many existing studies are performed using data from the developed countries, while relatively little study has focused on China. This analysis can shed new light on the relationship between regional inequality and crime rates in the developing countries which are transforming from central planning economies to market-oriented economies. Moreover, this paper contributes to the literature by examining the determinants of crime rates with a focus on intra-provincial regional inequality amongst the counties and county-level cities in China. Although Cheong and Wu (2012b) prove that intra-provincial regional inequality is the crux of the problem of regional inequality in China, regrettably, no research has been conducted to examine its relationship with the crime rate. To the best of our knowledge, this is the first attempt to study the relationship between crime rate and intra-provincial regional inequality in China.

This paper is structured as follows. Section 2 presents the literature review. Section 3 offers a review of the evolution and trend of crime rates in China. Section 4 presents the research methods. Section 5 describes the data. Section 6 presents the findings and discussions. Section 7 concludes and discusses policy implications.

2. Literature review

A large pool of literature of different disciplines including sociology, criminology and economics, has been published on crime. There are several theories, based on different perspectives, that link crime to economic development (Friday, 1998). Durkheim proposed that anomie, the breakdown of social norms and values, can lead to an increase in the crime rate (Durkheim, 1893, Durkheim, 1897). Many variants of Durkheim's theory were proposed in the twentieth century. For example, Merton (1938) proposes the strain theory and he suggests that crimes emerge because there is a lack of legitimate means to attain common social goals for the poor. It implies that the inequality of opportunity is a driving force of crime. Similarly, Kennedy et al. (1998) suggest that inequality is fuelled through a weakening of social capital, which is associated with an increase in the rate of violent crime. Fajnzylber et al.(2000) suggest that 'in countries with higher income inequality, individuals have lower expectations of improving their social and economic status through legal economic activities, which would decrease the opportunity cost of participating in illegal endeavors. Pessimistic perceptions of economic improvement through legal activities could also lead to a lessening of the moral dilemma associated with breaking the law.' It is worrying that China has a very high level of inequality of opportunity as reported by Zhang and Eriksson (2010) [1]. They find that the increase in income inequality in China mirrors an increase in inequality of opportunity. Thus, they call for equal employment opportunities and education for the people living in the disadvantaged regions. Ali and Zhuang (2007) highlight the importance of equality of opportunity in policy planning, and they suggest that it is crucial for the developing countries to pursue the goal of 'inclusive growth', which is defined as growth with equal access to opportunities for the people. Zhuang (2008) argues that 'inclusive growth' is an essential element in the creation of a harmonious society in China.

The modernization theory, which is also based on Durkheim's theory, attributes the increase in crime rate to the economic and social transformation in the process of modernization and proposes that crime rate and economic growth are positively

[1] The concept of equality of opportunity was defined to account for the individual's differences and a set of arbitrarily distributed circumstances.

correlated. Another classic theory is based on the Marxian perspective, which suggests crime is associated with the unequal distribution of income and the exploitation of labour (Hopkins and Wallerstein, 1981). It is evident that income inequality can breed social discontentment and thereby lead to an increase in crime rates. For example, Zackey (2007) presents a case study of illegal deforestation in southwest China and reports that the peasants justified their illegal activities by pointing to the 'increasing inequalities, their lack of economic opportunity, and the absence of economic support from the (corrupt) government.' Deprivation theory holds that inequality is a major cause of crime, as deprivation causes frustration and therefore increases violence (Hagan and Peterson, 1995). Bourguignon (1999) claims that 'crime and violence are likely to be a socially costly by-product of, among other factors, *uneven* or *irregular* economic development process.'

In the economic literature, Becker (1968) developed an economic model of crime in 1968. Ehrlich (1973) expanded this model and incorporated both punishment and reward factors into his model. Basically, the model suggests that crime can be affected by socio-cultural factors, crime deterrence policy factors and economic inequality. Some other studies have attempted to explain crime using economic or rational choice theory as well (for instance, see Block and Heineke, 1975, Piliavin et al., 1986, Cornwell and Trumbull, 1994, Chiu and Madden, 1998). According to this approach, the decision to commit a crime is determined by the expected returns that would be gained from committing the crime. Therefore, higher economic growth will lead to a decline in the crime rate because the people will commit less crime if they have better economic prospects (Neumayer, 2003).

Bourguignon (1999) claims that 'Simple economic theory shows how property crime and, more generally, all the violence associated with illegal activity may partly be the consequence of excessive inequality and poverty.' The economic reasoning relating economic inequality to crime is sound. If the inequality level is high and the people are unable to change their income statuses easily because of the lack of opportunities in the society, then the number of property crimes will increase accordingly. This is because there appears to be no other legal way to change the structure of the income distribution. A high level of income inequality also means that the opportunity cost is low if the poor commit crime (Fleisher, 1966, Ehrlich, 1973, Chiu and Madden, 1998, Kelly, 2000).

Many empirical studies are conducted to examine the relationship between inequality and crime. Most of the studies show that a positive correlation exists between inequality and the crime rate (Fleisher, 1966, Ehrlich, 1973, Krohn, 1976, Blau and Blau, 1982, Hsieh and Pugh, 1993, Fowles and Merva, 1996, Kennedy et al., 1998, Bourguignon, 1999, Lee and Bankston, 1999, Kelly, 2000, Fajnzylber et al., 2002a, Fajnzylber et al., 2002b, Lederman et al., 2002, Messner et al., 2002, Imrohoroglu et al., 2004, Soares, 2004, Pickett et al., 2005). However, Neumayer (2003) finds that inequality is not a statistically significant determinant of homicide using data from the World Health Organization (WHO). Similarly, Neumayer (2005) shows that inequality does not exert a significant impact on crime rate using the data from the International Criminal Police Organization (Interpol). Guillaumont and Puech (2006) also find that inequality does not have any significant impact on crime.

For the case of China, Liu (2005) studies the patterns of crime from 1978 to 1999 and finds that economically motivated crimes have increased at a faster rate than less or non-economically motivated crimes. In another article, Liu (2006) shows that property crimes have increased faster than violent crimes. Both studies show that crime rates in China have been driven mostly by expanding economic motivation, which accompanies the change in economic structure from a planned economy to a market-oriented economy. Cao and Dai (2001) examine the relationship between inequality and crime in China. They argue that the widened income inequality, especially the disparity between the rural and urban areas, is one of the main causes of the upsurge in crime rates. Lo and Jiang (2006) also report that the rise in income inequality in China has been accompanied by an increase in crime rates. They argue that income and social inequality has deprived peasants of equal access to employment, education and other opportunities. This has led to a further increase in the crime rate.

Other researchers perform regression analyses to examine the relationship between inequality and crime rates in China (Hu et al., 2005, Xie and Jia, 2006, Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). Hu et al. (2005) examine the impact of inequality on crime rates in China over the period 1978 - 2003. Three different proxies of inequalities are used in their study, namely, national Gini coefficient, income disparity between rural and urban residents and Theil index for the three economic zones. They find that all the different measures

of inequality are strongly correlated with crime rates. Xie and Jia (2006) examine the impacts of economic development and regional disparity on crime rates using cross-sectional data for the provinces in 2004. They find that there is a significant relationship between crime rates and regional disparity. Huang and Chen (2007) investigate the relationship between crime rates and national Gini coefficient, rural-urban divide, intra-rural inequality as well as intra-urban inequality. They conclude that all the proxies of inequality are positively correlated with crime rates in China in the period 1978 to 2005. Edlund et al.(2008) examine the impacts of the sex ratio on crime rates in China. The analysis uses the rural-urban income inequality as a control variable together with the sex ratio, and it is found that inequality is positively correlated with crime rates. Chen and Yi (2009) investigate the impacts of the rural-urban divide on crime rates between 1988 and 2004. Results conclude there exists a positive correlation between rural-urban divide and crime rates. Shi and Wu (2010) study the impacts of rural-urban divide and floating population on crime rates. It is concluded that the disparity between the rural and urban sectors is positively correlated with crime rates. Wu and Rui (2010) compute the Gini coefficient based on grouped income data in each province over the period 1988 – 2006, and find that the Gini coefficient is positively correlated with crime rates.

It is worth noting that, except for the works of Hu et al. (2005) and Xie and Jia (2006), no study is based on regional inequality. Shi and Wu (2010) use the variable of 'regional disparity' in their study, but actually, this variable is the difference between the national income and the provincial income (or consumption) for each province. Therefore, the results derived from their study do not reveal any information on the relationship between the crime rate and regional inequality within each province. Unfortunately, there is no literature on the relationship between crime rates and intra-provincial regional inequality to this date.

3. Crime rates in China

The data on crime rates is based on the number of approved arrests in each province. This indicator reflects the total number of arrests approved by the people's procurators office in each year. Figure 1 shows the mean provincial crime rates in China from 1997

to 2007. It is observed that the mean provincial crime rate increased with GDP per capita in the study period. Provincial crime rate increased from 4.76 per 10 000 persons in 1997 to 7.42 in 2007. It can be observed that there is a peak in 2001, after which the crime rate fell in 2002 and 2003. However, the decline did not last long and crime rate increased again from 2003 to 2007.

The crime rates in the municipalities, namely, Beijing, Tianjin, Shanghai and Chongqing, are very high. These outliers can greatly affect the provincial mean crime rates of the economic zones. Therefore, they are separated from the economic zones and combined together to form the group of municipalities. The mean crime rate is calculated for each economic zone and the group of municipalities. Figure 2 shows that this group of municipalities has the highest level of crime rate among the economic zones. The north-eastern zone had the second highest crime rate in 1997, reaching a peak in 2001 and then fell monotonically up to 2007. The eastern zone had a small peak in 2001. The crime level declined for two years and increased to the end of the study period. The western zone reached a maximum in 2001, but remained relatively unchanged for the remainder of the period. In 2007, the second highest group was the eastern zone, followed by the western and the north-eastern zones. The central zone had the lowest crime rate for the whole period. The north-eastern zone changed its ranking from the second highest in 1997 to the second lowest in 2007, while the eastern zone changed to second highest in 2007.

It is worth noting that the results of income inequality as measured by Cheong (2012) are very similar to those of crime rate analyses. The eastern zone had the highest level of inequality and crime rate in 2007, while the western zone had the second highest level of inequality and crime rate. This similarity between the level of inequality and crime in the economic zones suggests the existence of causality between the two. However, it is impossible to make a conclusion based on this information alone. Econometric techniques are used to explore this issue further.

The changes in mean crime rates from 1997 to 2007 for the nation and the four economic zones are shown in Table 1. The percentage change for the nation was 55.7% in the study period and all the zones registered an increase in crime rates. Although the group of municipalities had the highest levels of crime rate in both 1997 and 2007, the

percentage change was much lower than the eastern zone which registered an 81.4% increase. The central zone had a considerable increase in crime rate, with a value of 80.1%. The western zone had an increase of 43.3%, which is about half of that of the eastern zone. The north-eastern zone had the lowest percentage increase with only 21.3% across the whole period.

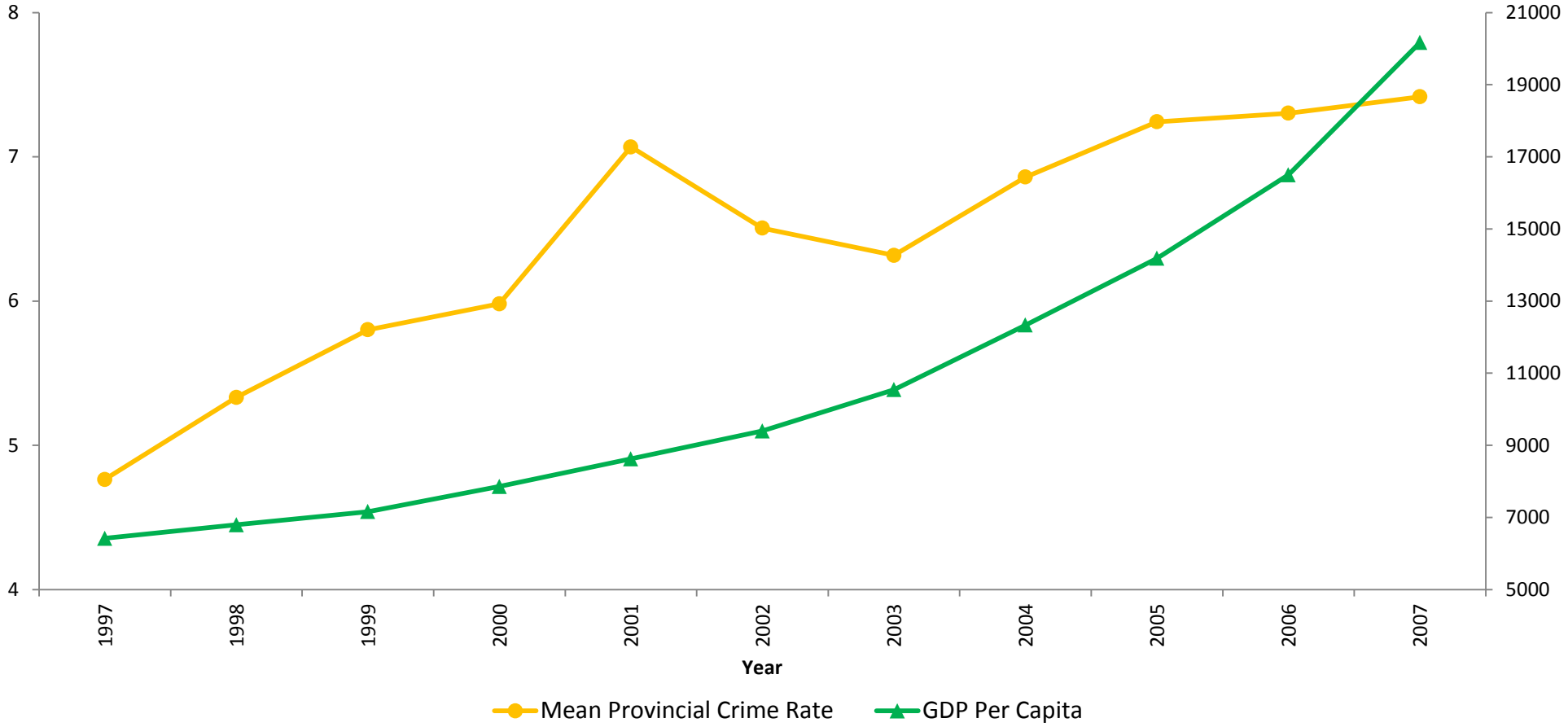

Figure 1 Mean Provincial Crime Rate and GDP Per Capita

Source: State Statistical Bureau (2010) and author's calculation based on *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons – left vertical axis. GDP per capita (Yuan, current prices) – right vertical axis.

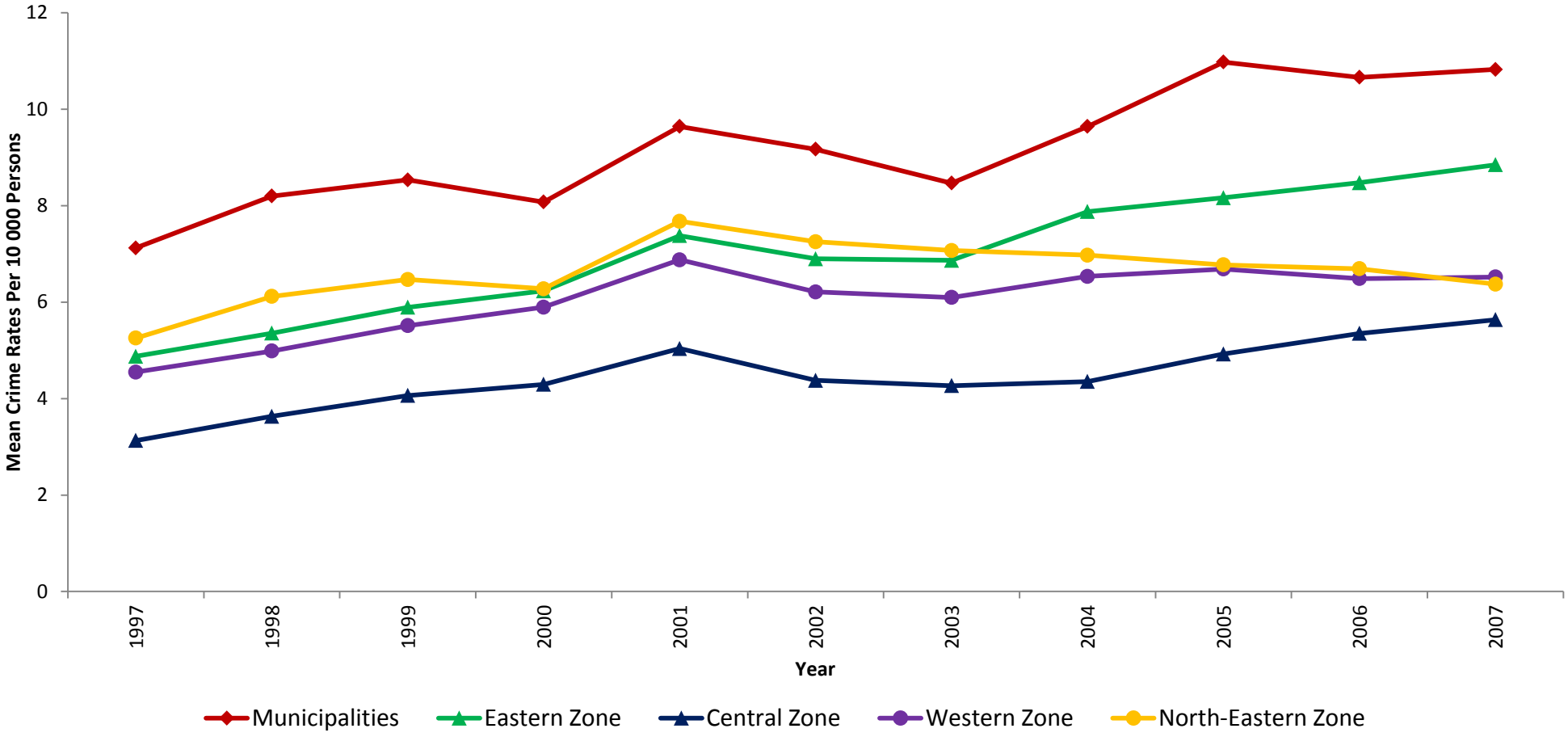

Figure 2 Mean Provincial Crime Rates for the Economic Zones and the Municipalities

Source: Author's calculation based on *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons. The municipalities of Beijing, Tianjin, Shanghai and Chongqing are separated from the economic zones and combined into the group of municipalities.

Table 1 Changes in Mean Provincial Crime Rates for the Nation, Economic Zones and the Municipalities

	1997	2007	Change	% Change from 1997 to 2007
Nation	4.76	7.42	2.65	55.71
Municipalities	7.13	10.83	3.70	51.96
Eastern Zone	4.88	8.85	3.97	81.43
Central Zone	3.13	5.64	2.51	80.05
Western Zone	4.55	6.52	1.97	43.34
North-Eastern Zone	5.25	6.37	1.12	21.29

Source: Author's calculation based on *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons. The municipalities of Beijing, Tianjin, Shanghai and Chongqing are separated from the economic zones and combined into the group of municipalities.

Figure 3 and Figure 4 show crime rates in each province in 1997 and 2007 respectively. The provinces in the eastern zone have had a surge in crime rates, while many of the provinces in the central and western zones have also registered a considerable increase in crime rates. It can be observed from Figure 4 that all the provinces which had very high levels of crime rates in 2007 are in the eastern zone.

It is difficult to compare the performance of each province in their crime fighting ability as all provinces experienced an increase in their crime rate. To make comparison between the provinces easier, the crime rate in each province is divided by the mean crime rate to compute the relative crime rate. The relative crime rates for the provinces are shown in Figure 5 for 1997 and 2007. Most of the municipalities, except Chongqing, are found in the first quadrant, it implies that the municipalities had above-average crime rates in both 1997 and 2007. Beijing and Shanghai are observed to have a high level of crime in both years. Zhejiang had a surge in crime rates and had the highest level of crime in China in 2007. Guangxi is in the second quadrant and it had a level of crime below the average value in 1997, however, crime then increased and its crime rate was higher than the average in 2007. All the provinces in the central zone are in the third quadrant. It suggests that their crime rates were below average for both years. Hainan, Heilongjiang and Jilin are in the fourth quadrant. It implies that these provinces performed well relative to other provinces in fighting crime. They had above-average crime rates in 1997, but ended up with below-average crime rates in 2007. Most of the provinces are in the first and third quadrants, implying that there was some persistence in the crime level over the study period. Ningxia and Shaanxi are not included in the figure because their crime rates are not available for the year 1997.

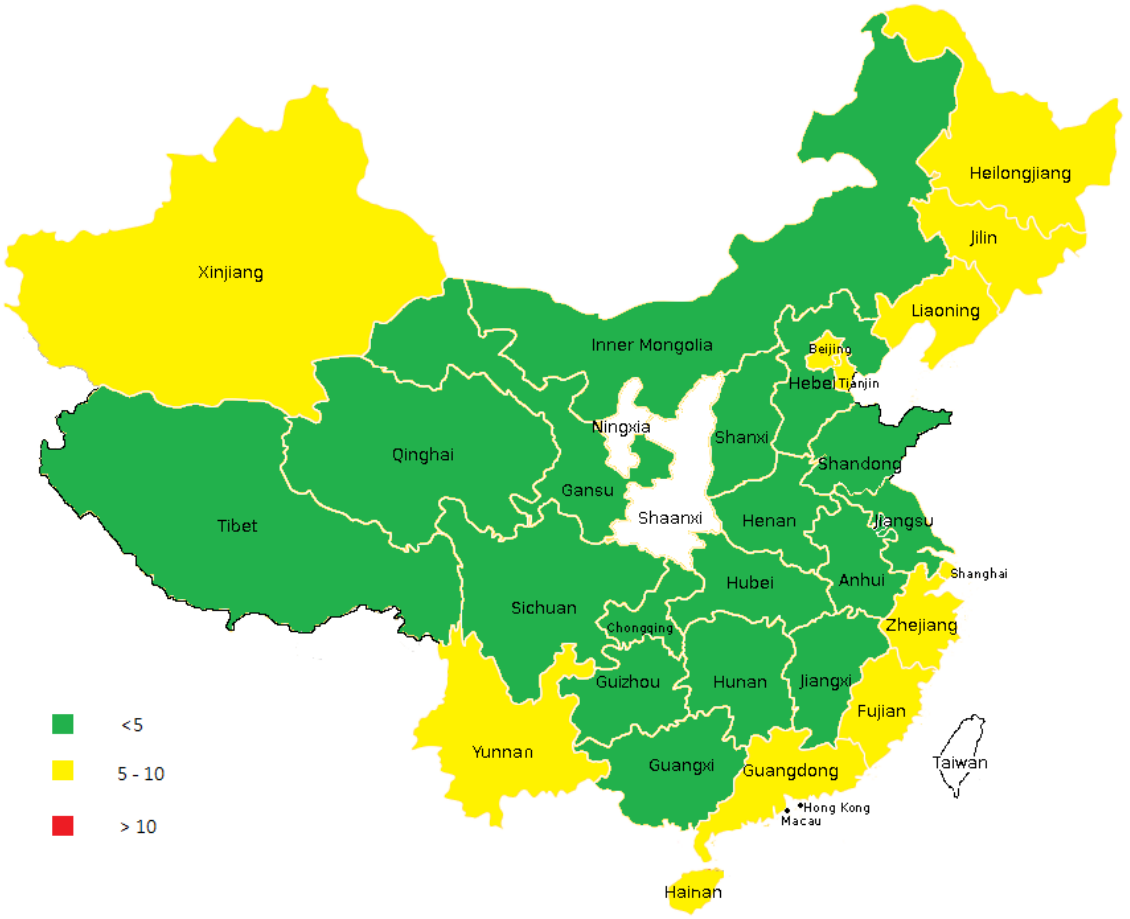

Figure 3 Crime Rates in China in 1997

Source: *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons. The data of Ningxia and Shaanxi are not available.

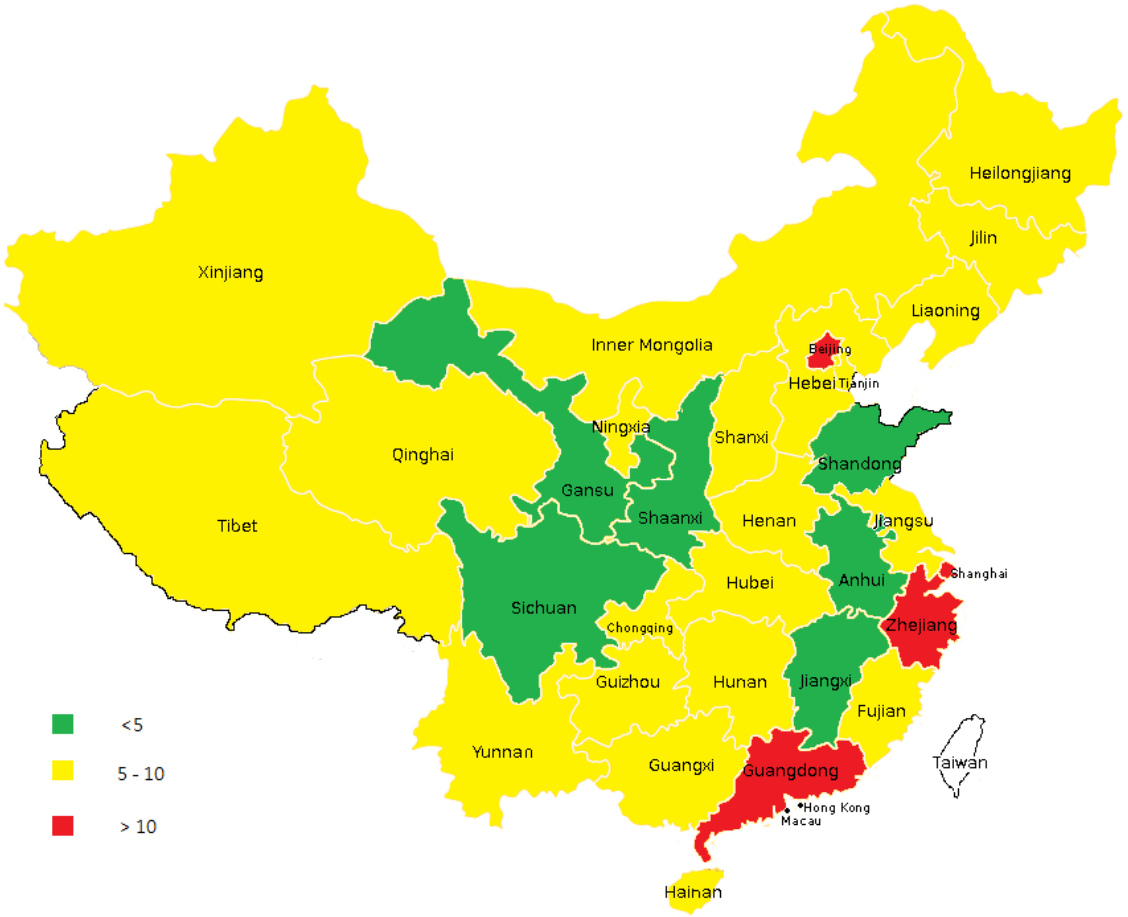

Figure 4 Crime Rates in China in 2007

Source: *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons.

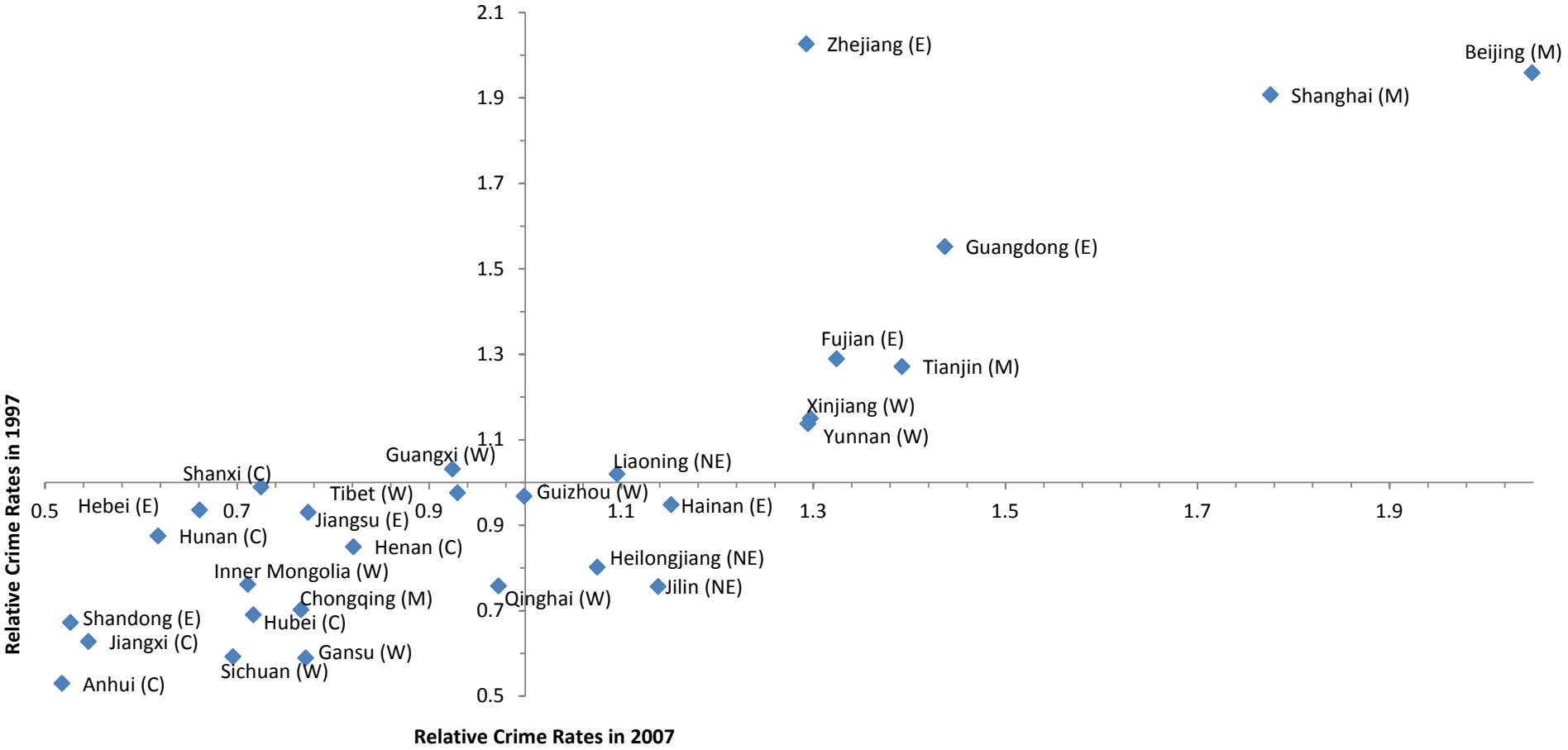

Figure 5 Relative Crime Rates for the Provinces in 1997 and 2007

Source: Author's calculation based on *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008).
Note: Crime rate is defined as approved arrests per 10 000 persons. The municipalities of Beijing, Tianjin, Shanghai and Chongqing are separated from the economic zones and combined into the group of municipalities. The zones of the provinces are shown. E is eastern zone, C is central zone, W is western zone, NE is north-eastern zone and M is the group of the municipalities.

Table 2 shows the change in crime rate for each province from 1997 to 2007. However, crime rate data for 1997 is not available for Ningxia and Shaanxi, so it is impossible to include them in the table. Zhejiang had a considerable increase in crime rate with a value of 144.1%, followed by Hunan with a value of 120.5%. Hebei had an increase of 120.3%, while Shanxi had 112.5%. These provinces, which had more than 100% of increase in crime rates, are all in the eastern zone or central zone. The provinces in the north-eastern zone had the least increase in crime. Jilin had the lowest increase at only 3.5%. The analysis shows that each province has its own characteristics, which lead to different growth rates of crime.

Table 2. Changes in Crime Rates from 1997 to 2007 for the Municipalities and Provinces

Zone	Province / Municipality	1997	2007	Change	% Change from 1997 to 2007
Municipalities	Beijing	9.76	14.53	4.77	48.88
	Tianjin	6.63	9.43	2.80	42.15
	Shanghai	8.46	14.15	5.69	67.24
	Chongqing	3.65	5.21	1.55	42.57
Eastern Zone	Fujian	6.31	9.56	3.25	51.55
	Guangdong	6.84	11.51	4.67	68.16
	Hainan	5.49	7.03	1.54	28.09
	Hebei	3.15	6.94	3.79	120.25
	Jiangsu	3.69	6.90	3.21	87.03
	Shandong	2.51	4.98	2.48	98.75
	Zhejiang	6.16	15.03	8.87	144.05
Central Zone	Anhui	2.47	3.93	1.46	59.32
	Henan	3.91	6.30	2.39	60.98
	Hubei	3.42	5.12	1.70	49.90
	Hunan	2.94	6.49	3.54	120.49
	Jiangxi	2.60	4.65	2.06	79.17
	Shanxi	3.45	7.34	3.89	112.52
Western Zone	Gansu	3.67	4.37	0.69	18.89
	Guangxi	4.40	7.65	3.24	73.68
	Guizhou	4.76	7.18	2.42	50.88
	Inner Mongolia	3.39	5.65	2.26	66.74
	Qinghai	4.63	5.62	0.99	21.38
	Sichuan	3.31	4.39	1.08	32.50
	Tibet	4.43	7.24	2.81	63.43
	Xinjiang	6.18	8.53	2.35	38.05
	Yunnan	6.17	8.43	2.27	36.77
North-eastern Zone	Heilongjiang	5.12	5.95	0.83	16.12
	Jilin	5.42	5.61	0.19	3.45
	Liaoning	5.22	7.56	2.34	44.88
	Mean	4.76	7.42	2.65	55.71

Source: Author's calculation. Crime rate is defined as approved arrests per 10 000 persons. The municipalities of Beijing, Tianjin, Shanghai and Chongqing are separated from the economic zones and combined into the group of municipalities.

4. Methods

Following the models used by other researchers (Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010), the model used in this study is:

$$ln(CRIME_{it}) = \beta_k X_{it} + v_i + v_t + \varepsilon_{it} \quad (1)$$

where $CRIME_{it}$ is the crime rate for province *i* at time *t*, β_k is the *k* x 1 vector of the coefficients on X_{it}, X_{it} is the matrix for the provincial characteristics, v_i is the fixed effect for province *i*, v_t is the time dummy and ε_{it} is the idiosyncratic disturbance. The idiosyncratic disturbances may have province-specific patterns of serial correlation and heteroskedasticity, but they are uncorrelated across the provinces (Roodman, 2006).

There are many studies which have attempted to investigate the determinants of crime rate by using regression analysis (for instances, see Glaeser and Sacerdote, 1999, Fajnzylber et al., 2000, Fajnzylber et al., 2002a, Fajnzylber et al., 2002b, Lederman et al., 2002, Neumayer, 2003, Neumayer, 2005, Guillaumont and Puech, 2006, Edlund et al., 2008, Chen and Yi, 2009, Huang and Chen, 2007, Shi and Wu, 2010, Wu and Rui, 2010). However, the study of the determinants of crime rates is always plagued by several econometric issues, for example, endogeneity, heteroskedasticity and non-stationary variables. Endogeneity is a critical issue in the study of crime rate. The inclusion of the deterrence variable in the model may cause endogeneity. It can be expected that higher expenditure on deterrence (the explanatory variable) will lead to a reduction in crime rate (the dependent variable); however, a higher crime rate may also lead to higher expenditure (Levitt, 1997, Levitt, 1998). Similarly, Gordon et al. (2009) find that low criminality (the dependent variable) can lead to a decline in inequality (the explanatory variable). The problem of reverse causality is a thorny issue in estimation. The system generalized method of moments (SGMM) estimator, which is developed by Arellano and Bover (1995) and Blundell and Bond (1998), is used in this study to tackle these issues. Furthermore, SGMM estimation can be used for unbalanced panels and multiple endogenous variables. Besides, it can be used to control for fixed effects and time effects.

Blundell and Bond (1998) report that it is better to use SGMM if the variables are non-stationary and they use Monte Carlo simulations to show that the biases due to the near unit root processes can be reduced greatly. Blundell and Bond (2000) demonstrate the use of SGMM with persistent data series in studying the dynamic production function. All the variables in this study were tested for unit root using the Fisher PP and Fisher ADF test. However, most of the variables could not pass these tests indicating that many variables are non-stationary. Therefore, the SGMM estimator is used to tackle this issue. In order to tackle the problem of heteroskedasticity, two-step SGMM is used in the study. This estimator is asymptotically efficient but there is a downward bias in the standard errors (Arellano and Bond, 1991). Therefore, a small sample correction for the two-step standard errors developed by Windmeijer (2005) is applied in the study.

The Chinese government has launched several campaigns in attempt to combat crime. These campaigns have been launched nationwide from time to time and this may result in a surge in crime rates in some of the years; therefore, time dummies are used to capture these provincial-invariant but time-specific shocks. Moreover, time dummies can also prevent the contemporaneous correlation which is a very common form of cross-individual correlation.

It is worth noting that since there is no prior knowledge regarding exogeneity of the explanatory variables, it is inappropriate to assume that they are strictly exogenous or predetermined, so all the explanatory variables are treated as endogenous in this study. The orthogonal deviations approach is used in this research to tackle the problem of gap enlargement in the panel data after the transformation of the variables (Arellano and Bover, 1995, Roodman, 2006). The problem of instrument proliferation is addressed by limiting the lags of the instruments. Thus, only lag two of the explanatory variable is used as the instrument for the transformed equations, and only the present value is used as instrument for the time dummies. Moreover, the technique of collapsing the blocks in the instrument matrix (Roodman, 2006, Roodman, 2009) is also adopted to reduce the number of instruments.

The consistency of the GMM estimator largely depends on the validity of using the lagged values as instruments and there are several tests for the estimation results. The Sargan test of over-identifying restrictions, which is suggested by Arellano and Bond

(1991), Arellano and Bover (1995), and Blundell and Bond (1998), is used to determine the validity of the instruments after GMM estimation. It tests the overall validity of the instruments and the null hypothesis is that the residuals and the instrumental variables are not correlated. The Hansen test is another test of over-identifying restrictions. Both tests will be used to ensure the validity of the instruments. Another important test is the serial correlation test, that is the AR(2) test, which tests whether second order serial correlation exists in the errors in the transformed equation. It is worth noting that the autocorrelation test is run on residuals in difference even if orthogonal deviations are used in estimation (Roodman, 2006).

5. Data

The data on crime rates is compiled from the *Law Yearbook of China* (Supreme People's Court, 1998 - 2008) and the *Procuratorial Yearbook of China* (Chinese Supreme People's Procuratorate, 1998 - 2008). These yearbooks are published in Chinese and the reports on crime rates of all the provinces are compiled in one section. The data on crime rates is based on the number of approved arrests released annually in these reports. Many researchers use the same set of data in studying the relationship between inequality and crime rates in China (Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). However, the data is not available for all years and so the dataset is an unbalanced panel. It is worth pointing out that some studies have suggested that the official crime statistics in China may be plagued by under-reporting (He and Marshall, 1997) and even under-recording by the police (Yu and Zhang, 1999). In any case, government publications are the only sources of information available and virtually all studies on crime rates in China are based on them (Hu et al., 2005, Liu, 2005, Liu, 2006, Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). The government publications are indispensable in studying crime rates in China, although caution should be exercised in interpreting the results. Chen and Yi (2009) suggest using the variable of the total number of prosecutions in each province as another proxy of crime rate and this variable is also used in the robustness tests in this study.

The regional inequality data is based on intra-provincial regional inequality measured

by Gini coefficients for each province, which is used as the explanatory variable in the regression analysis. The Gini coefficient for each province is calculated based on the procedure reported in Cheong (2012). Interested readers can refer to it for a detailed description of the measurement of intra-provincial regional inequality in China. All the provinces and autonomous regions in China are included in this study; however, the four municipalities are not included. The other explanatory variables used in this paper are compiled from the *China Statistical Yearbook* (State Statistical Bureau, 1998 - 2010). All the data is adjusted for inflation by converting the figures to 1997 constant prices using the provincial consumer price index (CPI) as the deflator. However, the provincial CPI of Tibet in 1998 is not available from *China Statistical Yearbook*, so national CPI in 1998 is used as deflator for Tibet. The dataset used in the regression analysis is an unbalanced panel dataset from 1997 to 2007, as some data is unavailable for some of the years.

The explanatory variables used in this study include both deterrence and macroeconomic variables. The deterrence variable is the expenditure for the public security agency, procuratorial agency, court and judicial agency. Macroeconomic variables include inequality, employment, economics, and education. The focus of this study is on inequality and two variables of inequality are used in estimation. The variables of inequality include the intra-provincial regional inequality in each province as mentioned earlier and the disparity between the rural and urban areas, which is measured as the ratio of consumption in the urban areas to those in the rural areas.

Many scholars report that negative correlation exists between the deterrence variable and the crime rate. Using data on the number of executions for murder in the United States, Ehrlich (1975a) shows that the death penalty has a significant impact on crime rates. Witte (1980) reports that crimes can be deterred by both expected certainty and severity of punishment. Levitt (1997) finds that an increase in the number of police officers can reduce the number of crimes. Corman and Mocan (2000) report that the number of burglaries and robberies can be reduced by an increase in the size of the police force. For the case of China, Chen and Yi (2009) study the effect of deterrence using total expenditure for the public security agency, procuratorial agency, court and judicial agency. They find that the coefficient is significant and positive in only one specification and not significant in another specification. Wu and Rui (2010) find the

coefficient of this variable is not significant. Edlund et al. (2008) use the proportion of police expenditure to government expenditure as proxy and they also find that there is no relationship between police expenditure and crime rates. In this study, the deterrence variable is also included to assess its impact on crime; however, it is impossible to investigate the effect of capital punishment because the number of capital punishment in each province is not reported in government publications. Moreover, it is impossible to obtain the total number of police officers in each province. Therefore, the deterrence variable used in estimation is the total expenditure for the public security agency, procuratorial agency, court and judicial agency. Based on the theory proposed by Becker (1968), an increase in the expenditure should reduce the number of crimes.

It should be noted that there are only two data series which are related to police expenditure in the government publications. One of them is the expenditure for the armed police force (*wuzhuang jingcha budui*) and the other is the total expenditure for the public security agency, procuratorial agency, court and judicial agency. However, the responsibilities of the armed police force in China are to respond to riots, terrorist attacks or other emergencies. They are also responsible for providing protection to government officials, properties and buildings. Other responsibilities include border control, traffic policing, firefighting services and forest patrol. Some of them even participate in mining and construction works. Therefore, the expenditure on the armed police force is not a suitable proxy variable. The other data series which is available in government publications is the total expenditure for the public security agency, procuratorial agency, court and judicial agency. Chen and Yi (2009) and Wu and Rui (2010) use this data series in their studies when investigating its impact on crime rates. However, this data includes not only the expenditure on police, but also the expenditures on procuratorates and courts. Unfortunately, all studies have to be based on this data series despite their inherent imperfections; therefore, caution should be exercised when interpreting the results.

A number of studies focus on the relationship between educational levels and crime rates, although the empirical findings are ambiguous. Ehrlich (1975b) reports that education is positively correlated with crime rates in the United States, whereas Freeman (1991), Wong (1995), Fajnzylber et al. (2002a) and Lochner and Moretti (2004) find that education is negatively correlated with crime rates. Turning to China, Huang

and Chen (2007), Shi and Wu (2010) and Wu and Rui (2010) find that education is negatively correlated with crime rates, while Edlund et al. (2008) find that education does not exert any significant impact on crime rates. In this study, the data series of educational funding are included so as to investigate the impacts of education on crime. The number of higher secondary school enrolments is also included in the analysis. Additionally, the variable of higher secondary school graduates is used in the robustness tests. The number of higher secondary school enrolments and graduates are in ratio form and they are compiled by dividing the data series by the provincial population[2].

Another important factor is employment, and several studies investigating its impact on crime have been carried out (for example, Fleisher, 1966, Wong, 1995, Raphael and Winter-Ebmer, 2001, Imrohoroglu et al., 2004, Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). Fleisher (1966), Wong (1995) and Raphael and Winter-Ebmer (2001) report that unemployment rates are positively correlated with crime rates, while Imrohoroglu et al. (2004) find that the impact of unemployment on crime rates is negligible. Huang and Chen (2007) and Edlund et al. (2008) report that positive correlation between unemployment and crime rates exists in China. Surprisingly, Shi and Wu (2010) find that the correlation is negative. However, Chen and Yi (2009) and Wu and Rui (2010) report that unemployment rates do not have any significant impact on crime rates. Two variables of employment are used in this study, namely, the urban unemployment rate[3] and the ratio of employed persons in urban areas to total employed (Fu, 2004 also use this proxy in studying regional inequality). The second variable is included not only for the purpose of studying the impact of employment on crime rates, but also for the purpose of examining the effect of disparity in employment opportunity between the rural and urban sectors. It is of interest to know whether this disparity will lead to an increase in crime.

The increase in gains from committing crimes can encourage people to engage in crime,

[2] It is better to use the number of population who are of higher secondary school enrolment age as denominator in calculation. However, because the data is not available, the number of the total provincial population is used in calculation.

[3] Starting from the *2003 China Statistical Yearbook*, the urban unemployment rate has been made available. However, the rural unemployment rate is not reported.

whereas the increase in opportunity cost of crime is likely to deter it. Therefore Fleisher (1966) argues that the impact of income on crime rates is ambiguous because both the gains and opportunity cost of crime tend to increase with the rise in income. Moreover, high income means that people can pay more to protect their possessions by increasing private expenditure on crime prevention. Therefore, empirical findings on the impact of income on crime rates show contradictory results. For example, Fleisher (1966) finds negative correlation between average family income and crime rates, while Ehrlich (1973) finds the median family income is positively correlated with crime rates. Fajnzylber et al. (2002b) also report that average income, as measured by GNP per capita, is positively correlated with crime rates. For the case of China, Chen and Yi (2009) find that disposable income per capita is positively correlated with crime rates. Shi and Wu (2010) also report that positive correlation between GRP per capita and crime rates exists. However, Edlund et al. (2008) cannot find any significant relationship between income per capita and crime rates and similarly, Wu and Rui (2010) also report there is no relationship between crime rates and lagged GRP per capita. In order to evaluate the impact of income on crime rates, provincial GRP per capita is used in this study.

Other macroeconomic variables used in this study include inflation, which is measured by the consumer price index (CPI); and economic significance, which is measured by the ratio of provincial GRP to national GDP. China's high growth rate is often quoted in the literature of development economics; it is of interest to assess the impact of growth on crime rates in a transitional economy like China. The results in Cheong and Wu (2012a) shows that secondary industry plays a major role in the economic growth and regional inequality in China, therefore emphasis is given to the growth rate of the secondary industry sector. However, the growth rates for the other two sectors, namely, the primary and tertiary sectors are also used in the analysis.

Many other scholars include the urbanization variable in their models in order to determine empirically if there is a relationship between crime rates and urbanization in China (Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). Most of these studies show that positive correlation between urbanization and crime rates exists. However, the findings of Edlund et al. (2008) are somewhat ambiguous. They find evidence supporting the relationship in the baseline

models, but the coefficient of urbanization loses its significance when additional variables are included in the robustness tests. Following Shi and Wu (2010) and Wu and Rui (2010), the proportion of non-agricultural population to provincial population is used in the estimation in this analysis. Table 3 shows the variables used in this study, while Table 4 presents the descriptive statistics of the variables.

Table 3 Variables Used in Estimation

Dependent Variables	
Crime: Approved arrests per 10 000 persons	*CRIME*
Prosecution: Number of prosecutions per 10 000 persons	*PROS*
Inequality Variables	
Gini coefficient: Intra-provincial regional inequality for each province	*GINI*
Urban to rural consumption ratio: Urban household consumption expenditure / rural household consumption expenditure	*URC*
Employment Variables	
Urban unemployment rate: Urban unemployment rate (%)	*UNEMPL*
Urban employment ratio: Ratio of employed persons at year-end in urban areas to total employed persons in both urban and rural areas	*UER*
Deterrence Variable	
Deterrence expenditure: Expenditure for the public security agency, procuratorial agency, court and judicial agency / government expenditure (%)	*DETER*
Educational Variables	
Higher secondary school enrolments: Number of enrolments in regular higher secondary schools / provincial population (%)	*EDUENR*
Higher secondary school graduates: Number of graduates in regular higher secondary schools / provincial population (%)	*EDUGRAD*
Educational funding: Educational funding / provincial GRP (%)	*EDUFUND*
Economic Variables	
Primary GRP growth: Gross regional product indices at constant prices (with preceding year = 100)	*GDPPI*
Secondary GRP growth: Gross regional product indices at constant prices (with preceding year = 100)	*GDPSI*
Tertiary GRP growth: Gross regional product indices at constant prices (with preceding year = 100)	*GDPTI*
Inflation: provincial consumer price index (price base of previous year is treated as 100)	*CPI*
GRP per capita: Provincial real GRP per capita (1000 Yuan)	*GRPPC*
Economic Significance: Provincial GRP / national GDP (%)	*ECOSIG*
Urbanization: Number of non-agricultural population / provincial population (%)	*URBAN*

Table 4 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
CRIME	293	6.006	2.100	2.465	15.029
PROS	294	6.316	2.547	2.111	18.412
GINI	279	0.283	0.072	0.141	0.469
URC	297	3.239	0.832	1.771	8.900
UER	270	0.268	0.101	0.115	0.585
UNEMPL	184	3.869	0.618	2.510	6.500
DETER	270	6.433	1.159	3.877	10.273
GDPPI	297	104.595	3.233	83.326	113.600
GDPSI	297	113.574	4.289	104.300	134.879
GDPTI	297	111.104	2.247	105.100	118.114
CPI	295	101.358	2.149	96.800	106.644
URBAN	297	28.130	9.971	13.805	52.021
GRPPC	297	9.552	5.566	2.215	33.681
ECOSIG	297	3.291	2.743	0.100	11.378
EDUENR	297	1.322	0.536	0.268	2.572
EDUGRAD	297	0.348	0.163	0.061	0.836
EDUFUND	297	4.608	1.461	2.457	12.290

6. Results and discussions

It is evident in Figure 6 that intra-provincial regional inequality and the crime rate in each province are positively correlated. In order to study this relationship further, other control variables are added to the baseline models and different specifications are tested. Robustness tests are then performed to check the results, using different proxies of education and crime rates.

Results of the SGMM estimation are shown in Table 5. All the specifications are tested for AR(2), Sargan and Hansen tests. The results show that they all pass the tests and thus the instruments are valid in all specifications. It is shown in Column (1) that the coefficients of *GINI* and *URC* are significant and positive, while the coefficient of *EDUENR* is significant and negative. The coefficients of the other explanatory variables are insignificant.

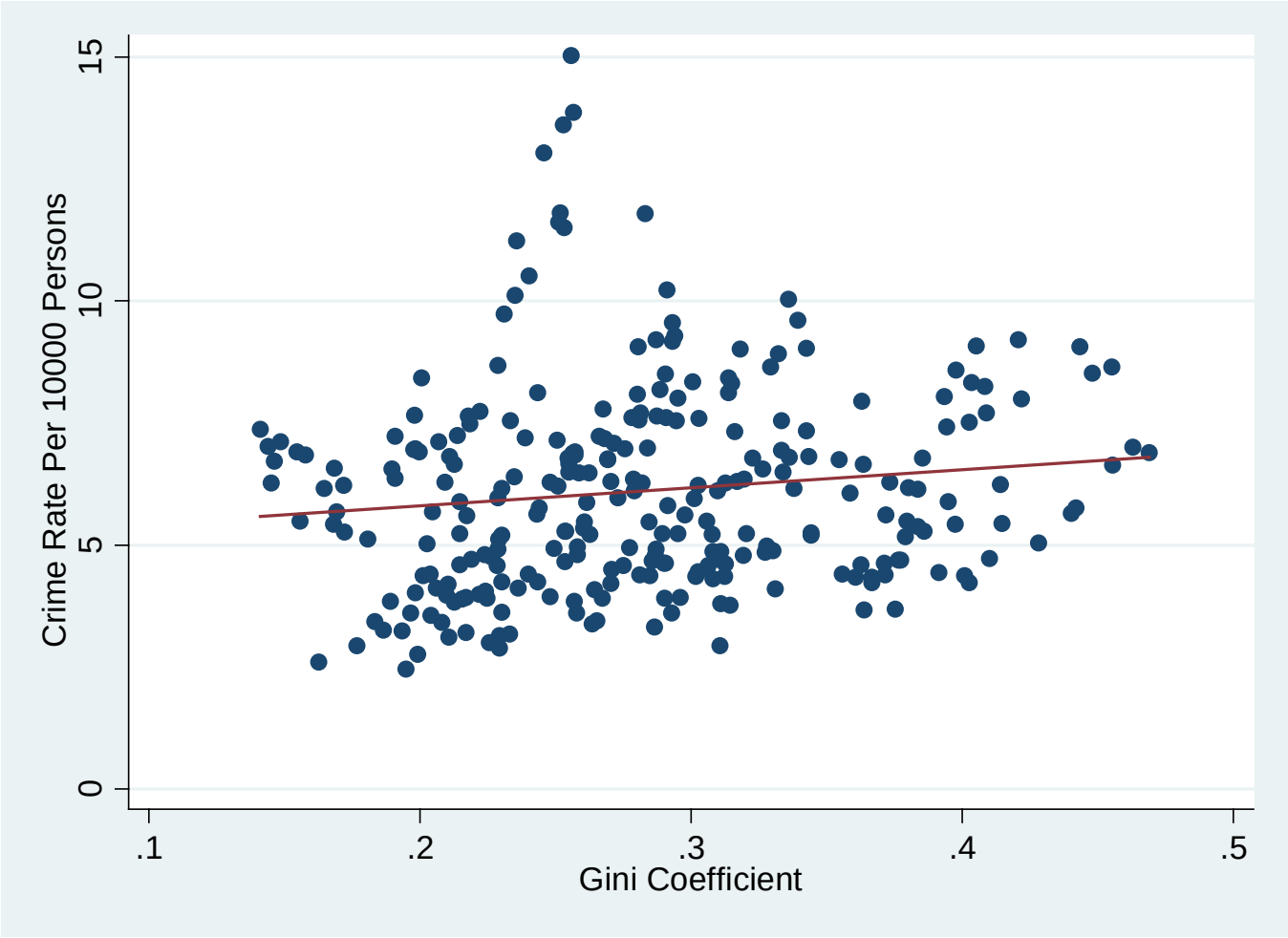

Figure 6 Crime Rate and Intra-Provincial Regional Inequality

Table 5 Crime Rates and Regional Inequality

	(1)	(2)
GINI	5.837 **	9.020 **
	(2.380)	(3.690)
URC	0.643 **	0.678
	(0.232)	(0.574)
UER	-0.986	2.114
	(3.786)	(9.848)
DETER	0.722	0.596
	(0.522)	(0.544)
GDPPI		-0.078
		(0.085)
GDPSI	-0.022	-0.178
	(0.095)	(0.118)
GDPTI	0.101	-0.083
	(0.213)	(0.126)
CPI		0.629 *
		(0.328)
URBAN		-0.032
		(0.129)
GRPPC	0.034	0.091
	(0.183)	(0.213)
ECOSIG	0.308	0.354
	(0.230)	(0.283)
EDUENR	-4.883 ***	-4.660 **
	(1.379)	(1.831)
EDUFUND	-0.077	-0.024
	(0.195)	(0.296)
Constant	6.780	-7.121
	(31.453)	(24.527)
Number of observations:	223	223
Number of instruments:	29	35
AR(2) p-value	0.460	0.719
Sargan p-value	0.160	0.233
Hansen p-value	0.996	1.000

Notes. SGMM estimator is used in regression analyses. The dependent variable is natural log of approved arrests per 10 000 persons. Standard errors (in parentheses) are asymptotically robust to heteroskedasticity. AR(2) is Arellano-Bond test for AR(2) in first-differences. Both Sargan and Hansen are tests of the overidentifying restrictions.

* Significance at the 10% level. ** Idem, 5% level. *** Idem, 1% level.

In column (2), the variables of the growth rate of the primary industry sector (*GDPPI*), inflation (*CPI*) and urbanization (*URBAN*) are then added to the baseline model. The coefficients of *GDPPI* and *URBAN* are found to be insignificant, whereas the coefficient of *CPI* is significant and positive. The coefficients of *GINI* and *EDUENR* are still significant, while the URC becomes insignificant in column (2).

It should be noted that the coefficient of the *GINI* is found to be significant and positive

in all the specifications in Table 5, while the coefficient of education is found to be significant and negative. The result is robust to different specifications and it can be concluded that a positive correlation exists between regional inequality and the crime rate, while a negative correlation exists between education and the crime rate.

Robustness tests are performed by replacing the proxy of education from the number of higher secondary school enrolments (*EDUENR*) to higher secondary school graduates (*EDUGRAD*). Moreover, the variable of the urban unemployment rate (*UNEMPL*) is included in the analysis. It is worth noting that the data of *UNEMPL* is only available from the *China Statistical Yearbook* for recent years. Therefore the robustness tests, as shown in Table 6, focus only on the latest data and the time-span is different from those of Table 5.

All the specifications in Table 6 are tested for AR(2), Sargan and Hansen tests. The results show that all the tests are passed and so the instruments are valid in all the specifications. Column (3) shows that the coefficient of *EDUGRAD* is significant and negative. It shows that the result is robust. Moreover, *GINI*, *UER*, *UNEMPL* and *DETER* are all significant and positive. In the next robustness test, the variables of *CPI* and *GRPPC* are added to the model. The results are shown in column (4). In this specification, the variable *UER* is no longer significant, while the other variables retain their significance. Finally, *URBAN* and *EDUFUND* are added to the model as shown in column (5). The result shows that *DETER* become insignificant, but the other variables retain their significance.

It can be observed from Table 6 that the coefficients of *UER* and *DETER* are significant and positive in some of the specifications. However, the coefficients of *UNEMPL* and *GINI* are significant and positive in all the specifications. Although the proxy of education is changed to the number of higher secondary school graduates, the results show that this educational variable also displays a negative correlation with crime rates in all the specifications. The results are in agreement with those of Table 5. The coefficients of *GINI* and education are found to be significant in all the specifications in both tables. The results are robust to a wide range of specifications, different choices of sample periods and various choices of proxies.

Table 6 Robustness Test (I) for Crime Rates and Regional Inequality

	(3)	(4)	(5)
GINI	5.010 **	5.099 **	5.577 *
	(2.324)	(2.426)	(3.182)
URC	0.448	0.328	0.229
	(0.549)	(0.480)	(0.869)
UER	12.104 ***	4.684	2.247
	(4.207)	(8.281)	(14.248)
UNEMPL	0.578 *	0.809 **	0.732 *
	(0.332)	(0.361)	(0.406)
DETER	1.322 **	1.274 **	1.269
	(0.609)	(0.571)	(0.754)
GDPSI	-0.050	-0.024	-0.038
	(0.092)	(0.090)	(0.092)
CPI		0.419	0.259
		(0.383)	(0.441)
URBAN			0.041
			(0.099)
GRPPC		0.067	0.011
		(0.207)	(0.249)
EDUGRAD	-9.588 **	-9.683 ***	-8.381 *
	(3.736)	(3.154)	(4.716)
EDUFUND			0.077
			(0.687)
Constant	7.764	-36.750	-18.616
	(12.722)	(43.124)	(50.421)
Number of observations:	129	129	129
Number of instruments:	19	23	27
AR(2) p-value	0.414	0.769	0.839
Sargan p-value	0.274	0.532	0.439
Hansen p-value	0.677	0.772	0.766

Notes. SGMM estimator is used in regression analyses. The dependent variable is natural log of approved arrests per 10 000 persons. Standard errors (in parentheses) are asymptotically robust to heteroskedasticity. AR(2) is Arellano-Bond test for AR(2) in first-differences. Both Sargan and Hansen are tests of the overidentifying restrictions.

* Significance at the 10% level. ** Idem, 5% level. *** Idem, 1% level.

Finally, the dependent variable of the crime rate, which is measured as the approved arrests per 10 000 population, is replaced by the number of prosecutions per 10 000 population. This approach is suggested by Chen and Yi (2009) and it is used in the robustness tests. The results are shown in Table 7. All the specifications in Table 7 are tested for AR(2), Sargan and Hansen tests. The results show that all the specifications pass these tests and so the instruments are valid. The results obtained from Table 7 are very similar to those in Tables 5 and 6. Column (6) shows that the coefficients of *GINI*, *UNEMPL* and *DETER* are significant and positive, while the coefficient of *EDUGRAD* is significant and negative. In column (7), the explanatory variables of *URBAN* and

EDUFUND are included. The results show that *UEMPL* loses its significance. The coefficients of *GINI* and *DETER* are significant and positive, whereas *EDUGRAD* is significant and negative.

It can be observed that even though the dependent variable of crime is changed from the number of approved arrests to the number of prosecutions, the results are similar to those obtained in Tables 5 and 6. The coefficients of *DETER* and *GINI* are significant and positive in all the specifications in Table 7. On the contrary, education is found to be negatively correlated with crime rates.

Table 7 Robustness Test (II) for Crime Rates and Regional Inequality

	(6)	(7)
GINI	5.993 *	7.785 **
	(3.359)	(3.227)
URC	0.171	0.024
	(0.349)	(0.643)
UER	3.525	2.975
	(9.529)	(12.820)
UNEMPL	1.109 **	0.793
	(0.480)	(0.495)
DETER	0.958 *	1.225 **
	(0.523)	(0.534)
GDPSI	-0.093	-0.038
	(0.144)	(0.085)
CPI	0.261	0.275
	(0.282)	(0.325)
URBAN		0.016
		(0.078)
GRPPC	0.166	0.117
	(0.161)	(0.213)
EDUGRAD	-11.289 ***	-11.237 **
	(3.479)	(4.221)
EDUFUND		-0.006
		(0.485)
Constant	-9.586	-14.793
	(35.657)	(39.901)
Number of observations:	129	129
Number of instruments:	23	27
AR(2) p-value	0.912	0.986
Sargan p-value	0.914	0.424
Hansen p-value	0.973	0.894

Notes. SGMM estimator is used in regression analyses. The dependent variable is natural log of number of prosecutions per 10 000 persons. Standard errors (in parentheses) are asymptotically robust to heteroskedasticity. AR(2) is Arellano-Bond test for AR(2) in first-differences. Both Sargan and Hansen are tests of the overidentifying restrictions.
* Significance at the 10% level. ** Idem, 5% level. *** Idem, 1% level.

According to the baseline model and the robustness tests, the coefficient of intra-provincial regional inequality is found to be significant and positive in all the

specifications, whereas the coefficient of the ratio of urban to rural consumption is significant and positive in one specification. This finding supports previous research which links inequality and crime rates (Fajnzylber et al., 2000, Fajnzylber et al., 2002a, Fajnzylber et al., 2002b, Lederman et al., 2002, Hu et al., 2005, Huang and Chen, 2007, Edlund et al., 2008, Chen and Yi, 2009, Shi and Wu, 2010, Wu and Rui, 2010). If the inequality level is high, it implies that the potential gains from committing crime are high, while the opportunity cost is low. Therefore, the increase in economic inequality will encourage more people to engage in crime. Given most of the crimes in China are property crimes (Hu et al., 2005), it is not surprising to find that inequality is positively correlated with the crime rate.

It can be observed that education is negatively correlated with crime rates. This finding is consistent with many earlier studies (Freeman, 1991, Wong, 1995, Lochner and Moretti, 2004, Huang and Chen, 2007, Shi and Wu, 2010, Wu and Rui, 2010). It suggests that the government should allocate more resources for the provision of education services so as to prevent crime.

For the other control variables, the coefficient of urban unemployment rate is found to be significant and positive in many specifications. This finding is in agreement with other studies (Neumayer, 2005, Huang and Chen, 2007, Edlund et al., 2008). This suggests that the government should stimulate employment in the urban areas. The coefficient of the ratio of urban employed persons to total employed persons in both rural and urban areas is significant and positive in one specification in Table 6. It implies that inequality in employment opportunities between the two sectors also contributes to an increase in the crime rate. However, the result does not imply that the government should reduce employment opportunities in the urban areas so as to reduce the ratio, but it does suggest opportunities should be created for those who live in the rural areas. In that way, the ratio of urban employed persons to total employed persons in both rural and urban areas can be reduced, which can in turn lead to a decline in the crime rate. The findings of the urban unemployment rate and the ratio of urban employed persons to total employed persons in both rural and urban areas both highlight the fact that the government should create more employment opportunities in both the rural and urban areas so as to reduce crime.

The coefficient of inflation, which is measured by CPI, is found to be significant and positive in specification (2). This is because the poor suffer more in an inflationary period, while the rich suffer less, given that rich people have much more wealth at their disposal to overcome a crisis. Consequently, an increase in inflation will drive more poor people into criminal activities as a means of survival.

The coefficient of the ratio of the expenditure for the public security agency, procuratorial agency, court and judicial agency to provincial GRP is significant and positive in some of the specifications. Chen and Yi (2009) report similar finding in their study. It should be noted that Fajnzylber et al. (2000) and Fajnzylber et al. (2002b) also report that the number of police officers is positively correlated with robbery rates using the SGMM estimator. The positive relationship between the deterrence variable and the crime rate may be due to the reverse causality effect or the inherent imperfections of the data series. As the expenditure data series used in this study also includes the expenditures on procuratorates and courts, caution should be exercised in interpreting this result.

7. Conclusions

China is a transitional economy and radical changes have taken place in the economic system since the initiation of its economic reform. The transition from a centrally planned economic system to a free market system creates many socioeconomic problems and one of the pressing issues is the considerable increase in crime. This increase in crime rates is a major concern in China because the cost of criminal behaviour is extremely high. Moreover, the increase in crime rates is detrimental to economic growth and it may create discontent among the population which may in turn lead to social instability and even political upheaval.

It is observed that both regional inequality and the crime rate have increased considerably in China, but these pressing issues have tended to be overlooked. It is notable that to date, no study focusing on the relationship between intra-provincial regional inequality and crime rate in China has been undertaken. This study explores this topic thoroughly by empirically analyzing two kinds of inequality, namely, the

intra-provincial regional inequality and the inequality in consumption between the urban and rural sectors. Furthermore, this study examines the inequality in employment opportunities between these two sectors.

The results show that intra-provincial regional inequality is positively correlated with the crime rate, whereas education is negatively correlated with it. The results are robust to alternative specifications, various choices of sample periods and changes in the proxies of crime rate and education. Moreover, the coefficients of inflation, unemployment rate, government expenditure for the public security agency, procuratorial agency, court and judicial agency, in addition to the inequalities in consumption and employment between the rural and urban sectors are found to be significant and positive in some of the specifications.

Several policy implications can be drawn from this study. Firstly, the government should allocate more resources to mitigate intra-provincial regional inequality and rural-urban inequality. Secondly, the government should formulate pro-poor policies so as to provide more education to the poor. The government should ensure equal access to higher secondary school education for the people, especially, the poor living in the underdeveloped regions. Thirdly, the government should always monitor the inflation closely while promoting economic growth. Finally, the government should create more employment opportunities in both rural and urban areas.

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