

## **Crime and Corruption: An International Empirical Study**

Huaiyu Zhang

University of Dongbei University of Finance & Economics

Dalian, China, 116025

E-mail: yushengfan@sina.com

### **Abstracts**

This paper uses the homicide data of United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems (UN-CTS), and examines the influence of corruption on crime. The results indicate that corruption has a significant positive effect on crime, and higher income level, income gap and youth ratio will lead to higher crime rates, while employment has no significant effect. In the countries with low crime rates, the effect is strong, and the anti-corruption activities in these countries will result in sound effects of controlling crimes.

Key words: UN-CTS; crime rate; quantile regression

### **1. Introduction**

The economic analysis of crime began with Becker's "Crime and Punishment". The economics of crime does not see criminals as barbarians; instead, it treats crime as an economic activity in which the cost-benefit analysis can be conducted. Corruption is a social phenomenon people abominate. The beneficiaries of corruption are participants in corrupt transaction, while generally the public interests are jeopardized, rather than some certain individuals', and the credibility of the government may decline. Although there are many researches on crime or corruption, the linking of them is not sufficiently discussed. This paper aims to incorporate corruption into the framework of crime research, and assess the impact of corruption on crime through empirical evidence.

Corruption is a criminal activity which violates the principles of fairness and justice, and obstructs the operation of the judicial system. Therefore, crime may be rampant in the countries with serious corruption and unsound legal system. Some literatures study corruption in economic model, concluding that corruption weaken the deterrent effect of law, thus indulge crime. Becker and Stigler (1974) pointed out that judicial force is likely to be influenced malfeasance and corruption, and two approaches may be used to change the incentives of the law enforcement: punish the malfeasance or improve police salaries. Bowles and Garoupa (1997) argue that transactions between police and criminals may reduce the expected cost of offenders, thus increasing crime. Kugler (2005) demonstrated that the low bribery cost correlates to the high rent of the criminal activities, and to increase the police force and punishment only result in the expansion of the criminal organization. Most literatures focus in the theoretical impact of corruption on crime, and this paper offer some empirical proof.

The paper is organized as follow. Section 2 takes a close look at the potential

explaining variables including corruption, presents the data source and empirical methodology. Section 3 estimates the impact of corruption on crime in a linear model, and then investigates the impact in different quantiles basing on quantile regression, and section 4 concludes.

## 2. Data and methodology

Researchers examined a wide range of factors that contribute to crime. Among them, there are income gap, judicial deterrence, unemployment, juvenile, urbanization, education and so on. In line with them, this paper constructs a “crime supply function” (see Grogger, 1991; Ehrlich, 1996; Levitt, 1996; Corman and Mocan, 2000):

$$crime = f(cor, inc, gap, you, unem) \quad (1)$$

Where *cor* is the degree of corruption, *inc* is income (level), *gap* is income gap, *you* is the percentage of youth, *unem* is unemployment.

### Crime rate

Some problems exist in the international comparison of crime rate. Countries vary in the definitions of crime, such as the minimum amount of theft, the classification of vehicle theft. Due to the special nature of crime, significant underreporting may occur in some culture, say China. To ensure the consistence of the crime definition, this paper adopts the homicide data of United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems (UN-CTS)<sup>①</sup>. Homicide is the most serious type of crime, and the underreporting rate is low comparing to other crime, leading to stronger international comparability.

### Corruption

Previous researches usually connect corruption with organized crime (Kugler, 2005; Holmes, 2009): the corruption of judicial system makes the criminals free from the sanctions; some officials of government or judicial system are members of crime organization; government credibility and the citizen’s observance of law may decline. Due to the sensitivity of the issue of corruption, most countries do not provide relevant statistical data. In this paper, the Corruption Perceptions Index of Transparency International<sup>②</sup> (hereinafter referred to as CPI) is used to measure the degree of corruption in different countries. CPI uses a 10-point scale, and higher score indicates higher degree of incorruptness.

### Income and income gap

From the perspective of the economics of crime, income levels positively correlated to both the benefits and the opportunity cost of crime, and the net impact cannot be determined. It is generally believed that the widening income gap induce more crime. Ehrlich (1973) assumed that criminals come from low-income groups, while the victims come from high-income groups, thus the net benefit of criminal activities can be denoted by the income gap of the two income group: the greater the gap, the stronger the incentive for criminal activities. Income level is measured by

<sup>①</sup> <http://www.unodc.org/unodc/en/data-and-analysis/United-Nations-Surveys-on-Crime-Trends-and-the-Operations-of-Criminal-Justice-Systems.html>

<sup>②</sup> [http://www.transparency.org/policy\\_research/surveys\\_indices/cpi/2008](http://www.transparency.org/policy_research/surveys_indices/cpi/2008)

GNI per capita<sup>③</sup> (PPP, current international \$). Income level is measured by Income Gini coefficient<sup>④</sup>, which range from 0 to 100 and the larger scale means the fairer distribution of the country.

**Juvenile**

Juvenile delinquency is almost the problems faced by all countries, and the proportion of young people is a variable often introduced in the many study of crime. Empirical studies show that crime increases along with age until late teens, then decreased ( Hirschi and Gottfredson, 1983). Widely accepted explanation is that young people are more likely to be troubled by unemployment (Freeman, 1996; Grogger, 1998). In this paper, the proportion of youth is scaled by the percentage aged 15-24<sup>⑤</sup>.

**Unemployment**

The unemployed are easy to generate frustration, anger and other emotions and are more likely to participate in violent crime. Freeman (1999) reviews the literature and concludes that there is a stable negative correlation between the two. It is difficult to in access the unemployment data, and there is a big difference on the unemployment definitions. The national employment situation is measured, in order to ensure international comparability, by employment-to-population ratio<sup>⑥</sup>.

According to the analysis above, we get the expect sign of variables in the crime supply function:

$$crime = f( cor, inc, gap, you, unem ) \tag{2}$$

Logarithmic transformation can reduce the heteroscedasticity to some degree, and the coefficient is the elasticity which is easy to be explained.

$$\ln(CRIME_i) = \beta_0 + \beta_1 \ln(CPI_i) + \beta_2 \ln(GNI_i) + \beta_3 \ln(GINI_i) + \beta_4 \ln(R_{15-24i}) + \beta_5 \ln(EMP_i) + \varepsilon_i \tag{3}$$

Equation (3) specifies the variables. *CRIME* is homicide per 100 000 people. *CPI* is corruption perceptions index, which is opposite to *cor* in equation (2),  $\beta_1$  is expected to be negative. *GNI* denotes the gross national income, and *GINI* is the GINI coefficient to indicate the income gap. *R<sub>15-24</sub>* is the percentage aged 15-24, and *EMP* is employment-to-population ratio.

The OLS estimator of the linear model can only capture the average variation of dependent variable. Quantile regression can be more comprehensive to portrait the conditional distribution characteristics, indicating the structural features and movements in different quantile, and the estimated results are more robust. The basic quantile model is:

$$y_i = \mathbf{x}_i' \boldsymbol{\beta}_\tau + u_{\tau i} \tag{4}$$

Where  $y_i$  is crime rate,  $\mathbf{x}_i = (x_{1i}, x_{2i}, \dots, x_{ki})'$  is the vector of explanatory variables,  $\boldsymbol{\beta}_\tau = (\beta_1, \beta_2, \dots, \beta_k)'$  is the coefficient vector on quantile  $\tau$ , and  $u_\tau$  is disturbance.

③ [http://data.un.org/Data.aspx?d=WDI&f=Indicator\\_Code%3aNY.GNP.PCAP.PP.CD](http://data.un.org/Data.aspx?d=WDI&f=Indicator_Code%3aNY.GNP.PCAP.PP.CD)

④“Human Development Indices: A statistical update 2010”

<http://data.un.org/DocumentData.aspx?q=GINI&id=230>

⑤ “World Population Prospects: The 2008 Revision”

<http://data.un.org/Data.aspx?q=15-24&d=PopDiv&f=variableID%3a32>

⑥ <http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3a758>

### 3. Results

The latest available crime data of UN-CTS is to 2008. As a cross-sectional study, all the data update to 2008. According to the data situation, we strike out observations with missing value, and ultimately select 65 countries worldwide as a sample (the list of countries can be seen in Appendix).

Table 1 reports the OLS estimating results. Model 1 contains all the explanatory variables, while model 2 excludes the core variable, corruption. 1% increase of incorruption correlates to 1.5% drop in crime rate, in line with expectations, verifying the theoretical assumption. Income gap and young people proposition get the expected coefficient sign, and the elasticity are 2.6792 and 2.6658.

**Table 1 Results of Linear Model**

	Dependent variable: $\ln(CRIME)$			
	Model 1	Model 2	Model 3	Model 4
constant	-25.3672** (-5.0394)	-23.1446** (5.4443)	-21.8583** (3.9264)	-20.1698** (4.2261)
$\ln(CPI)$	-1.4982** (0.4295)	— —	-1.4762** (0.4299)	— —
$\ln(GNI)$	0.8873** (0.2287)	0.3959* (0.1962)	0.8583** (0.2276)	0.3773 (0.1947)
$\ln(GINI)$	2.6792** (0.6835)	2.4887** (0.7421)	2.8011** (0.6759)	2.5954** (0.7304)
$\ln(R_{15-24})$	2.6658** (0.9547)	3.1820** (1.0272)	2.6020** (0.9548)	3.1208** (1.0227)
$\ln(EMP)$	0.8871 (0.8009)	0.7575 (0.8713)	— —	— —
$R^2$	0.5683	0.4793	0.5594	0.4728
F	15.5366	13.8091	19.0421	18.2331
p-value	0.0000	0.0000	0.0000	0.0000
observations	65	65	65	65

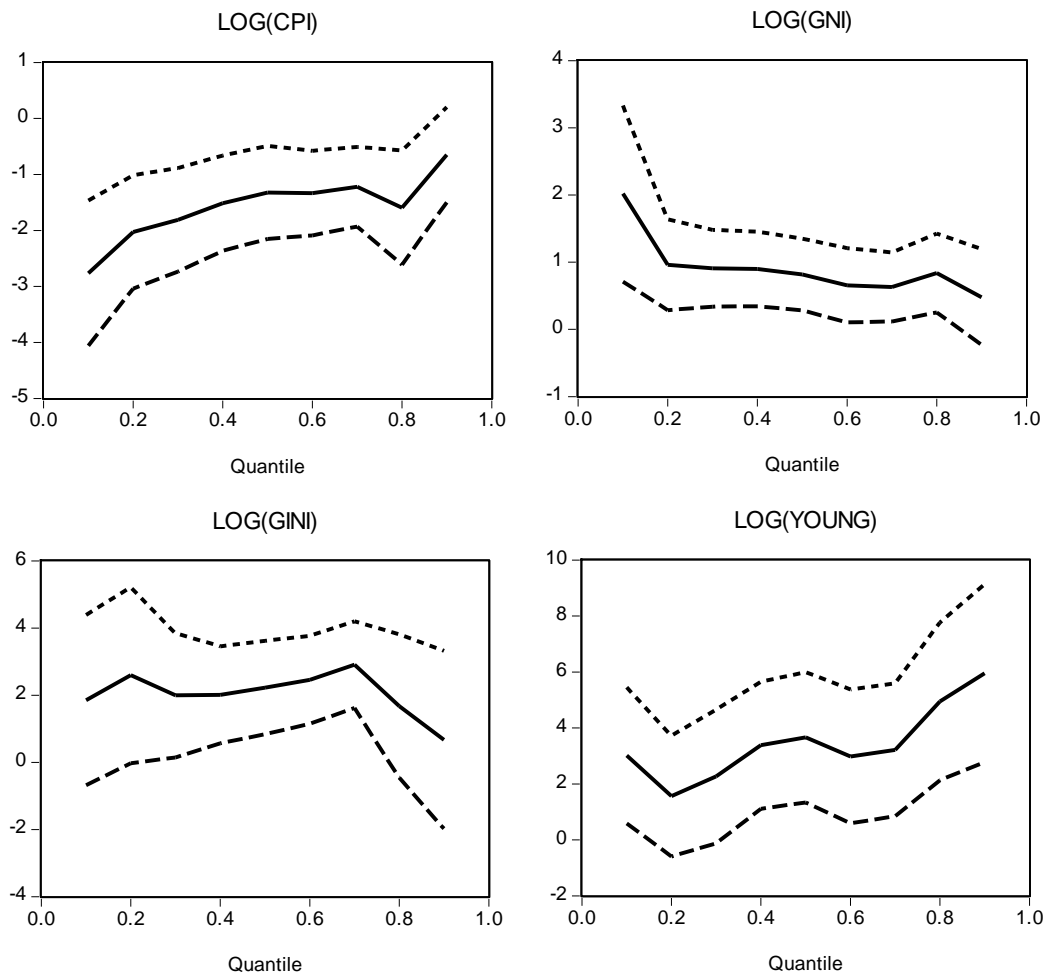
In parentheses are standard errors. “\*” and “\*\*” denote the coefficient is significant at 5% and 1% significance level.

Model 3 add CPI into Model 4, and the  $R^2$  increases to 0.5594, raising the explanatory ability. But the elasticity on CPI slightly drop to 1.48. Kelly (2000) estimates the elasticity of violent crime on income gap is about 0.5, which is far smaller than the estimation here (2.8). This can be attributed to the type of crime. The elasticity on income level is 0.86, showing that as the income increases the benefits of crime dominate the opportunity cost.

Considering the insignificance of employment, we exclude it in the quantile regression. Figure 1 present the regression coefficients.

The solid lines in Figure 1 are the coefficients, and the dashed lines are the 95% confidence interval. Rising quantile of crime, CPI weakened its impact on crime. The drop of absolute elasticity is severe along with the quantile rising, indicating corruption influences crime more severely in the countries with low crime rates, thus

the anti-corruption will result in good effect of controlling crime.



**Figure 1 Coefficients under different quantiles**

The effect of income gap shows an inverse “U” shapes, increasing at low quantile and decreasing at high. The elasticity of young people proportion increases, and even reaches 5.955. Controlling juvenile delinquency may achieve significant effect on reducing crime in the countries with high crime rate.

**4. Conclusions**

This paper reviews some economic and sociologic literatures, focusing on examining the impact of corruption on crime, and the effect of income gap, income level, juvenile and unemployment. The results from linear regression show that the incorruptness negatively correlated to crime rate, and the elasticity is about -1.48. The elasticity of crime is 0.86 to income and 2.8 to income gap, which indicates, consistent with former empirical study, that wider income gap contributes to more crime. The elasticity to young people is significantly positive, even after control employment, which may lead to diverging explanations on juvenile delinquency, disproving the argument that juvenile delinquency mainly attributes to unemployment. The insignificance of employment may result from the macro level data (Levitt, 1997), or endogeneity of unemployment ( Grönqvist, 2011).

Quantile regression makes it possible to study the elasticity on different quantiles. Along with the increasing of quantile, the absolute elasticity of crime on

CPI decreases, so do the significance of the coefficients. The increasing corruption will lead to greater crime increasing in the countries with low crime rate, thus the anti-corruption will be more effective in controlling crime in these countries. The decreasing of elasticity and significance may be caused by the change of crime generating mechanism in the countries with extremely high crime rate.

## References

- Becker, G., "Crime and punishment: An economic approach", *Journal of Political Economy*, 1968, Vol. 76, 2.
- Bowles, R., Garoupa, N., "Casual police corruption and the economics of crime", *International Review of Law and Economics*, 1997, Vol. 17, 1.
- Corman, H. and H. N. Mocan, "A Time-Series Analysis of crime, deterrence and drug abuse in New York City", *American Economic Review*, 2000, Vol. 90, 3.
- Ehrlich, I., "Participation in illegitimate activities: A theoretical and empirical investigation", *Journal of Political Economy*, 1973, Vol. 81, 3.
- Ehrlich, I., "Crime, punishment and the market for offenses", *Journal of Economic Perspectives*, 1996, Vol. 10, 1.
- Freeman, R., "Why do so Many Young American Men Commit Crimes and What Might We Do About It", *Journal of Economic Perspectives*, 1996, Vol. 10, 1.
- Freeman, R., "The Economics of Crime", *Handbook of Labor Economics*, 3c, edited by O. Ashenfelter and D. Card. Elsevier Science, 1999.
- Grogger, J., "Market Wages and Youth Crime", *Journal of Labor Economics*, 1998, Vol. 16, 10.
- Grönqvist, H. and S. Niknami, "Youth Unemployment and Crime: New Lessons Exploring", *manuscript*, SOFI Stockholm University, 2011.
- Hirschi, T. and M. Gottfredson, "Age and the Explanation of Crime", *American Journal of Sociology*, 1983, Vol. 89, 3.
- Holmes, L., "Corruption, weak states and economic rationalism in Central and Eastern Europe", Paper presented at the Princeton University Central European University Joint Conference on Corruption, Budapest, 1999.
- Holmes, L., "Crime, organised crime and corruption in post-communist Europe and the CIS", *Communist and Post-Communist Studies*, 2009, Vol. 42, 2.
- Kelly, Morgan, "Inequality and crime", *Review of Economics and Statistics*, 2000, Vol. 82, 4.
- Kugler, M., Verdier, T., Zenou, Y., "Organized crime, corruption and punishment", *Journal of Public Economics*, 2005, Vol. 89, 9.
- Levitt, S., "The effect of prison population size on crime rates: Evidence from Prison overcrowding litigation", *Quarterly Journal of Economics*, 1996, Vol. 111, 2.
- Levitt, S., "Using electoral cycles in police hiring to estimate the effect of police on crime", *American Economic Review*, 1997, Vol. 87, 3.