

## **Dynamics of Homicide Rates in Asian Countries: A Quantitative Study**

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### **Abstract**

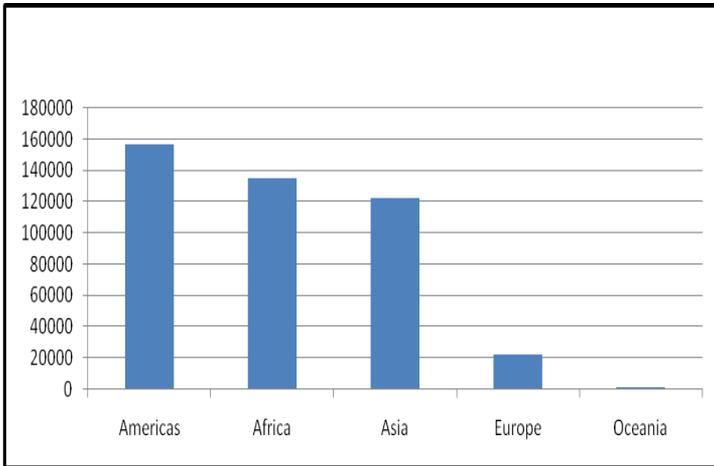
*The rate of violent crimes has increased considerably in all regions of the globe during the recent decades. Specifically, the residents of the terrorism-affected countries have witnessed an unprecedented surge in homicide rates. This study revisits the role of macroeconomic and socioeconomic factors in determining the homicide rate in Asian countries worst affected by terrorism. Social inequalities, economic development, urbanization, poverty, unemployment, and other economic and demographic variables are analyzed and found to be associated with homicide rates in the target countries. Data were collected from fourteen worst terrorism affected countries with the highest rate of homicide on the basis of/considering the quality and availability of data from year 2000 to 2011. Panel-unit root test and panel-cointegration test were applied to check for log-run relation between the variables and POLS test was applied for hypothesis testing. Lastly, outcomes were tested for robustness using panel GMM estimators. This study tried to fill the gap in the relatively unexplored geographical region and provides an opportunity to better understand homicide variation around the Asian world. The results show that all studied economic variables are cointegrated and have a significant relation to the homicide rates in selected Asian countries. It is also found that all religions play a vital role in diminishing the homicidal rate.*

*Keywords: Income inequality, Unemployment, Urbanization, Female Population and Drugs*

Homicide is one of the major crimes in Asian countries. The heightened occurrence of crimes and violent behavior in recent years has turned it into a major concern across the world. A country's social stability and development are adversely affected by crime and violence, particularly by the homicides. According to the Intentional homicide data for the year 2013, homicides claimed 437,000 lives all over the world, out of which thirty-six per cent homicides took place in America (North and South), thirty-one per cent in Africa, and twenty-eight percent in Asia, while Europe with five percent and Oceania with 0.3 per cent represented the lowest rates of homicides at the regional level (See Table 1).

Different Criminologists and Sociologists have attempted to explain the variation in homicide rates via several statistical procedures by using different economic, social, and demographic variables. Becker (1974) introduced an economic approach to analyze the determinants of crime from the viewpoint of a rational choice to maximize utility subject

to resource constraints. Land, McCall and Cohen (1990) identified that resource-deprivation, population density, percentage of youth unemployed, and percentage of families living below poverty line have a strong relationship with the homicide rate. Fajnzylber et al. (2002) also found that income inequality raises homicide rates, whereas economic growth reduces it in both developed and developing countries. On the contrary, Fougere, Kramarz and Pouget (2009) found that youth unemployment has no positive effect on homicides and appeared to be unrelated to labor market conditions.



*Figure 1.* Total number of homicides by region (2012 or later year)  
Source: Global Study on Homicide 2013 by UNODC.

Currently, Asian countries are suffering from many terrorist activities and have a high rate of homicide (Raza & Jawaid, 2013). Therefore, this study revisits the determinants of this crime and investigates their relationship with homicide rate in Asian Countries worst affected by terrorism. This research is an endeavor to assist policy makers to enhance/deepen their understanding of the underlying forms and courses linked with different patterns, settings and risk factors of homicides in the terrorism effected Asian region alone. The outcome of this study can be a strategic means/help in supporting governments' efforts to address root causes of homicides and enhance criminal justice response.

## Literature Review

### Development of the hypotheses

**Income inequality:** It refers to the extent to which income is distributed in an uneven manner among a population. Fleisher (1966) was a pioneer in studying the role of income on the decision to commit criminal acts by people and stated that low income increases tendency to commit crime. According to the theory of modernization proposed in the 1960s, a nation

faces economic and social changes which result in emerging vital consequences for cruel crime rates. When large groups of people leave their known rural homes and come to settle in the anonymous urban corporation, social organizations, role allocations, and traditional forms of status relations and control are disrupted and eventually destroyed (Shelley, 1981). Ehrlich (1973) examined the effect of income level and found a significant crime inducing impact of income inequality. Savolainen (2000) identified economic inequality as a strong predictor of homicide rates of a country. Wilkinson and Pickett have found proof that homicide is related to income inequality (as measured by metrics, such as the Gini index) in 23 countries (Pickett et al., 2005; Wilkinson and Pickett, 2006; Wilkinson and Pickett, 2009). Fajnzylber et al. (2002) found that higher degree of income inequality encourages more criminal activity. Further investigations revealed that income inequality has a stronger impact in more thickly populated nations, wealthier countries, and in nations with larger internal security powers. As a result, the underlying hypothesis is proposed:

- H1: Income inequality has a positive relationship with homicide rates in Asian countries.

***Unemployment:*** It occurs when people are workless and they are actively seeking work with no success. The relationship between crime and unemployment has been of attention to both economists and sociologists. Ehrlich (1973) found that the unemployment rate is a corresponding indicator of income opportunities accessible in the legal employment market. Therefore, when the unemployment rate increases, the opportunities in the legal sector decrease, leading individuals to be involved in criminal activities. It has been discussed that having a job with a good pay is likely to lessen the chances of an individual turning to criminal acts (Hirschi, 1969). Similarly, several other studies have specified that unemployment is associated with suicide not only in the studies of individuals, but also in the studies of combined data from different regions and nations (Lester & Yang, 1994; Platt, 1984). Gould, Weinberg and David (2002) proved in their research that the decline in unskilled workers' salaries leads to a rise in crime. Raphael and Winter-Ebmer (2001) proposed that employment situations among population subclasses may influence crime rate. A recent study concluded that growth in unemployment is linked with the increased rate of homicide (Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009). Grogger and Alajbegovic (1998) estimated a structural model using individual-level statistics, and suggested that decreasing salaries may be an important cause of growing youth crime. Similarly, Becker's economic theory says that unemployed people are depressed of legal income resources and thus, are more likely to develop some income from illegal activities. This leads to the following hypothesis:

- H2: Unemployment strongly influences and causes an increase in homicide rates in Asian countries.

**Urbanization:** It is known as a shift in population from rural to urban areas and the conduct in which each society adjusts to the change (Sharif & Raza, 2016). When people shift, they make groups on the basis of their ethnicity and may get involved in crime for the survival of their ethnic groups. Cubbin, C., et al. (2000) examined the effect of urbanization on the variability of homicide rates of different countries and found a strong linkage between the rates of homicide in all regions. Cole and Gramajo (2009) made use of regression analysis to investigate the cross-country variation in homicide rates for a huge sample of 60 countries. There was another important finding that the nations possessing a high level of ethnic or cultural heterogeneity had high rates of homicide. Moreover, the nations that have a high rank given by World Bank for the excellence of governance indicator are likely to have lesser homicide rates. Several other researchers/scholars have also argued that higher violent homicide rates are the result of cultural, ethnic, or racial differences (Avison and Loring, 1986). Urbanization has also been linked with criminality (Wilson and Herrnstein, 1985; Fajnzylber, Lederman, and Loayza, 2002), although it is not clear that it necessarily has a strong effect on homicide. As a result, the third hypothesis is:

- H3: Urbanization and ethnicity positively affect the homicide rates in Asian countries.

**Female Population.** The relationship between homicide rates and female population has always been viewed under positive indicators. In spite of the fact that for females the risk of homicide was considerably lesser than the males, their possibility of being killed by the husband or intimate acquaintance was high. Dreze and Khera (2000) explored the relationship of homicide rates with female-male ratio and suggested that low female-male percentage and high rates of murder are shared signs of a masculine atmosphere. In addition to this, the findings from Pantazis' (2000) study revealed that half of the female population worries about being raped, while almost one in two people worries about being robbed. According to the data assembled by the United Nations Office on Drugs and Crime (UNODC), the highest number of women killed by their partners or family members was found in Asia, i.e. 19,700 women. Compared to the past, the female members in gangs seems to be aggressive in more grounds and even use many of the similar weapons as males (Thrasher, 1927). As a result, the underlying hypothesis is proposed:

- H4: Increase in female population has a positive impact on homicide rates in Asian countries.

**Drugs:** It is any substance that when inhaled, injected, consumed, or absorbed via a patch of skin, causes a physiological change in the body. Previous research has consistently found strong connections between abuse of illicit drugs and crimes of violence. Zahn and Bencivengo (1974) reported that homicide was the leading cause of death among drug users, higher even than deaths due to adverse effects of drugs. The New York City Police Department (1983) classified about 24% of known homicides in 1981 as drug related. Blumstein (1995) found that predominantly, dramatic growth in youth homicide in the mid-1980s is attributed to the recruitment of young people into illicit drug markets. Miron (2001) showed that drug prevention strategies are one of the main factors of crime across countries. Raphael and Winter-Ebmer (2001) argued that gun availability and illicit drug use have a strong correlation. Hagelstam and Hakkanen (2006) and Shaw et al. (2006) also suggested that illicit drug use may be related to homicide crimes.

This leads to the following hypothesis:

- H5: Use of drugs positively effects, homicide rates in Asian countries.

### **Research Methodology**

In order to determine the factors that cause variation in homicide rates in the Asian countries, the technique of Cointegration was applied by forming a panel data of fourteen Asian countries for the period of 11 years from 2000 to 2010. Homicide rates and drug related crime data for the countries were calculated from the United Nations Office on Drugs and Crime (UNODC) by using data for population and crime. Homicide rates are expressed as per 100,000 inhabitants while the data for remaining variables were collected from The World Bank. The countries were selected on the basis of high homicide rates and terrorists' activities as well as the quality and availability of data. Following are the countries that were selected for this study:

#### **List of Countries in Sample**

- |               |                 |               |               |
|---------------|-----------------|---------------|---------------|
| 1. Pakistan   | 2. India        | 3. Bhutan     | 4. Nepal      |
| 5. Bangladesh | 6. Sri Lanka    | 7. Kazakhstan | 8. Tajikistan |
| 9. Kyrgyzstan | 10. Philippines | 11. Singapore | 12. Thailand  |
| 13. Russia    |                 | 14. China     |               |

The variables of interest in this research are: Intentional homicides per 100000 people, Income Inequality which is measured by

GDP per Capita<sup>1</sup>, Urbanization rate, Unemployment, percentage of Female Population, and Drugs.

For stationary test, unit root test was applied by using Levin Lin Chu Tests. The test was performed at both levels and first differences for both independent and dependent variables. Cointegration test was then performed on the data to determine the long run relationship between dependent and independent variables by taking hypothesis of no cointegration (recently used by Raza et al. 2016; Imtiaz et.al, 2017). After Cointegration test, ordinary least square regression was applied to find out the coefficient and significance of each independent variable. Sensitivity analysis was performed to analyze the robustness of the outcome. The consistent relationship of the homicide rate with other independent variables was tested through an econometric methodology of Generalized Method of Moments (GMM) estimator.

In accordance with the previous empirical studies, the model used to determine the factors that cause variation in homicide rates of the Asian countries is given below:

$$HR_{it} = \beta_0 + \beta_1 IE_{it} + \beta_2 URB_{it} + \beta_3 UNEMP_{it} + \beta_4 FEM_{it} + \beta_5 DR_{it} + \varepsilon_t$$

Where HR is the homicide rate per 100,000 populations, IE is income inequality measures as log of GDP Per Capita; used as the proxy, URB stands for Urbanization rate which is a percentage of total population, UNEMP is the number of unemployed population in Millions, FEM stands for the female population, as a percentage of total population, and  $\varepsilon_t$  is the error. A dummy variable will be created for DRUGS by taking the value of one for the states that are listed as a major producer of any illegal drugs. This dummy variable of drugs does not vary over time either.  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are the coefficients of independent variables, while  $\beta_0$  is the constant.

Additionally, in order to check whether religion causes variation in homicide rate, religion dummies were included in the model. As the selected countries have their official religion as Islam, Buddhism, Hinduism, Christianity, and Confucianism, we have taken the dummies of all these religions.

### Data Analysis

Table 1. *Descriptive Statistics*

	HR	IE	URB	UNEMP	FEM	DR
Mean	5.893	3.125	40.221	487.250	2.972	0.285

<sup>1</sup> See Kuznets, S. (1955).

Median	4.400	3.052	33.702	64.303	3.039	0.000
Maximum	23.900	4.541	100.000	3404.219	6.469	1.000
Minimum	0.400	2.369	13.431	0.380	-1.293	0.000
Observations	154	154	154	154	154	154

Analysis was performed in order to determine what causes change in homicide rates of Asian countries. Table 1 shows the basic properties of data. Maximum homicide rate per 100,000 in the data is 23.900 which belongs to Russia in 2000, while the minimum rate is of Singapore, i.e. 0.400.

**Table 2. Stationary Test Results**

Variables	Level			1st Difference		
	C	C&T	Results	C	C&T	Results
HR	-0.825	-0.499	Non Stationary	-7.676	-7.739	Stationary
IE	-0.925	0.240	Non Stationary	-5.959	-5.624	Stationary
URB	1.579	0.841	Non Stationary	-1.389	-1.286	Stationary
UNEMP	0.288	-0.029	Non Stationary	-	-14.914	Stationary
FEM	2.331	17.278	Non Stationary	-	-21.175	Stationary

Source: Authors’ Estimation

In order to examine the level of integration of the variables, unit root test was performed by using Levin Lin Chu Statistics. The test was performed at both levels of independent and dependent variables. Table 2 presents the effects of unit root test. First, differencing of all the variables yields rejections of the null hypothesis on unit root for each variable. Based on these test results, it is concluded that all series are first differentiated stationary.

Since results obtained from unit root tests showed that there is no trend in data series at first difference, we proceeded for Cointegration test on the data. To check co-integration in the panel, this research focused on ADF test statistic based on residual-based test of Kao (1999) and PP-test statistic based on the concept of Pedroni (1995). Both PP-statistic and ADF-statistics have a same null hypothesis of no co-integration in the panel.

Table 3 shows the panel co-integration of the determinants causing variation in homicide rates among Asian countries. As most of the statistics indicate the rejection of null hypothesis, i.e. no co

integration, we conclude that there is a long run relationship of the independent variable group with homicide rate.

In order to determine coefficient and significance of each variable, pool ordinary least square (POLS) regression was performed. The first regression reported in Table 4 shows that all explanatory variables are significant determinants of homicide rates of Asian countries. It suggests that there is a positive relationship of urbanization rate, the number of unemployed people, female population, and drug usage with homicide rates, while a negative relationship exists between GDP per capita as a proxy for income equality and homicide rates of Asian countries. Regression results indicate that GDP per capita is reflecting a larger variation in homicide rates of a country. Not only it is statistically significant, but also larger in amount. Its negative coefficient indicates that the number of homicides decreases with its improvement. An inverse relationship exists between income inequality and GDP per capita. Similarly, an inverse relationship exists between homicide rates and GDP per capita, therefore, it shows that the increase in GDP per capita reduces income inequality and in turn reduces homicide rates and vice versa. Thus, a positive relationship exists between income inequality and the homicide rate of a country.

Table 3. *Co-integration*

Test	Statistics	Prob.
Pedroni Residual Cointegration Tests		
• Panel $v$ -Statistic	-0.064	0.526
• Panel $\rho$ -Statistic	2.614	0.995
• Panel PP-Statistic	-3.0312	0.001
• Panel ADF-Statistic	-2.545	0.005
• Group $\rho$ -Statistic	4.142	1.000
• Group PP-Statistic	-20.150	0.000
• Group ADF-Statistic	-7.204	0.000
Kao Residual Cointegration Tests		
Test	Statistics	Prob.
• ADF-Statistic	1.361	0.087

Urbanization rate is also promoting an environment conducive to homicides. As discussed in the theoretical background, when individuals and groups shift towards urban homes, the loss of control and neediness lead to wrongdoings. Also, it is easier for criminals and to be criminals to commit crimes in non-rural gatherings than in rural region. Also a high proportion of unemployed people and the increase in female population promote violent acts of homicides as per the regression analysis. An unemployed person cannot fulfill his needs and is involved in such crimes. Similarly, an increase in the number of female persons in a house increases responsibilities of a male person who is earning for the house.

If expenses could not be met by the male person, he may get involved in such types of crime.

Table 4. *Determinants of Homicide Rate of Asian Countries by Ordinary Least Square Regression*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-84.139	11.382	-7.392	0.000
IE	-4.344	1.230	-3.532	0.0005
URB	0.088	0.031	2.816	0.005
UNEMP	0.0006	0.0003	2.016	0.046
FEM	1.984	0.219	9.059	0.000
DR	2.544	0.835	3.046	0.003

*Adjusted R-squared = 0.535, F-statistic = 36.236, Probe(F-statistic) = 0.000*

The dummy variable of drug identified in the countries with a high number of drug activities is also found to be significant. It indicates that an increase in drug related activities increases the homicide rate, as the illegal trade of drugs is immensely lucrative and also involves frequent violent disputes for market shares among the producers, distributors and sellers of drugs. An indirect influence on the rate of homicide is also created due to the existence of such drug mafias which aid and abet different types of organized crime. Moreover, the use of illegal drugs results in the intellectual and moral decay of the citizens and contributes to the proliferation of violent crimes like homicides. Hence, the drug-related variable has a positive and significant coefficient in the homicide regressions. The additional GMM regression was applied in order to check the robustness of the core results. The GMM estimator, introduced by Hansen (1982), is an improved estimator.

Table 5. *Determinants of Homicide Rate of Asian Countries by GMM*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-80.634	11.647	-6.923	0.000
IE	-4.228	1.289	-3.279	0.001
URB	0.084	0.033	2.557	0.012
UNEMP	0.0006	0.0003	1.851	0.066
FEM	1.908	0.223	8.536	0.000
DR	2.632	0.869	3.028	0.003

*Adjusted R-squared = 0.523*

Table 5 shows the results obtained by applying GMM regression on our model of homicides. The results from GMM estimator also show that all independent variables are the significant determinants of homicide rates of Asian countries and has the same nature as per the results obtained from Ordinary Least Square Regression. Thus, these results indicate that our core results are robust.

### **Relationship between Homicide Rate and Religion:**

Lastly, in order to examine whether religion determines the variation in homicide rate, dummy variables of religions were created and the following model was used to test the relation:

$$HR_{it} = \beta_0 + \beta_1 IE_{it} + \beta_2 URB_{it} + \beta_3 UNEMP_{it} + \beta_4 FEM_{it} + \beta_5 DR_{it} + \beta_6 R_{it} + \varepsilon_t$$

Table 6 shows that the dummy variable of all religions found significant, other than Muslim religion, in determining homicide rates. Also, the nature of all dummy variables was found to be negative, however, for Christianity, the relationship is positive. It is assumed that the positive sign is not because of the religion, but because of the people who are not following the principles of Christianity.

*Table 6. Homicide Rate: Religion Factor*

Variable	Coefficient	t-Statistic (Prob.)	F-Statistic (Prob.)	Adj R <sup>2</sup>
Islam	-0.189	-0.217 (0.829)	30.010 (0.000)	0.532
Buddhist	-3.625	-2.536 (0.012)	32.377 (0.000)	0.552
Hinduism	-2.051	-2.283 (0.024)	31.925 (0.000)	0.548
Christianity	6.400	7.371 (0.000)	50.132 (0.000)	0.658
Confucianism	-7.662	-3.895 (0.000)	35.682 (0.000)	0.576

### **Discussions and Policy Implication**

With the aid of empirical studies and theoretical literature, the current research has highlighted individual macroeconomic elements which could determine the dynamics of homicide rates. The study utilized the macroeconomic variables of income inequality in terms of GDP per Capita, Urbanization rate, Unemployment, percentage of Female Population, and a dummy variable of drug as the determinants of homicide rates of Asian countries.

The outcome of regression results established the positive link of urbanization, unemployment, female population, and usage of drugs with homicide rate which is consistent with modernization and cultural theory of homicides, while other things remain constant. Nevertheless, the model found a negative relationship of GDP per capita with homicide rate. As there is an inverse relationship between GDP per Capita and income inequality, thus a positive relationship is found to exist between the homicide rate and income inequalities.

It is also clear from the estimated model that drug usage is positively and significantly related to the variation of homicide rates, which means the higher the usage of drugs is in a country, the higher the homicide rates will be and vice versa. Therefore, involvement in drugs is referred to the felonious behavior of intentional killings. The robustness and efficiency of our model were checked by using the GMM estimator which shows the same results as obtained by OLS Regression. All independent variables are significantly associated with the dependent variable of homicide rate and induce the same nature.

The dummy variable of religion was created in order to determine whether religion of a country causes variation in homicide rates. The results concluded that all religions are significant in determining the variation in homicide rates, except Islam. However, all other religions depict a negative relationship, except Christianity which depicts a positive relationship. It is presumed that the positive sign is not because of the religion, but because of the masses who are not pursuing the rules of Christianity.

On the basis of the above analysis and interpretation, it is urged that governments in Asian countries should consider steps to increase GDP per capita of the rural areas and reduce income inequality. In order to increase GDP per Capita, it is important that the GDP of the country should be increased first, by increasing the output of commodities and services. Increase in investments and reduction in taxes also lead to a jump in GDP and GDP per capita, which in turn decreases income inequality and reduces homicide rate. Income differences could also be scaled down by redistribution (of?) through taxes and benefits, and by reducing conflicts in pre-tax incomes.

Urbanization leads to an increase in the homicide rate due to a larger urban population which lacks facilities and work opportunities. Their frustration results in intentional killings and murders. The government should fill this void by producing new opportunities of employment for people and initiating new projects related to building and improving the infrastructure of the country. Job opportunities could also be created by increasing the investments and lowering the interest rates, so that local companies could take advantage of lower financing costs and start new businesses. Moreover, foreign investments should also be attracted by creating congenial investment conditions in the country. The governance should be improved along with ensuring the availability of a suitable layer of resources to the citizens. As a result, reduction in unemployment will curtail the violent crimes as well as the rate of homicide.

An increment in the number of female members in a household increases responsibilities of the male family members. If the male bread-winners/income earners have employment opportunities, they will be able to meet the family expenses and crime rate could be reduced eventually. Moreover, awareness should be created in the society about

the females not being a burden and the need for educating and allowing them to contribute financially in order to sustain the family.

The production, distribution, sale and use of drugs should be rigorously curbed and banned. Tougher drug policies should be devised and strictly implemented by the government and criminal justice organizations. Drug dealers should be imprisoned in order to effectively reduce violent crime and to lower the addiction and use of drugs. These steps will surely help the governments deal with the rising homicide rate in their countries and bring stability and security to their citizens.

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