**Erwin Kurniawan A.**[1]
*Mulawarman University, Samarinda, Indonesia*

**Adi Wijaya**[2]
*Mulawarman University, Samarinda, Indonesia*

**Andriawan Kustiawan**[3]
*Mulawarman University, Samarinda, Indonesia*

# The Determinants Affecting the Violent Crime in Indonesia and Thailand (1990–2019)

**Abstract.** *Due to the global increase in crime, many countries and regions have ceased to be safe places to live. The growth of global crime figures leads to the deterioration of humankind's quality of life. This study aims to examine the causality of the total violent crime determinants in Indonesia and Thailand from 1990 to 2019. The data were collected from the Global Economy and the Nasdaq Database. The variables used in this study are the total violent crime, Gross National Income per capita (GNIpc), unemployment rate, social security expenditure, and value of alcoholic beverage consumption. All the variables were converted into a logarithmic form. Both Indonesia and Thailand's total violent crimes contain these wrongdoings: murder, rape, robbery (with firearms and without firearms), which includes gang robbery, and causing bodily injuries. This research has two models as both analyze different countries: Indonesia and Thailand. The empirical tests have proven the variables affecting the model of Indonesia and Thailand in the long run and short run based on the data from 1990–2019. In the long run, total violent crime, the unemployment rate, and alcoholic beverage consumption will affect the model of Indonesia by bringing equilibrium whenever disequilibrium happens. In the short run, the GNIpc has a unidirectional relationship with the Unemployment rate. In Thailand, alcoholic beverage consumption is the only reliant variable which will be self-perpetuated and affect the model in the long run. In the short run, alcoholic beverage consumption will be affected by the Unemployment rate and GNIpc of Thailand. In addition, instead of total violent crime being the dependent variable, it could affect Thailand's social security expenditures in the short run. This study provided a clearer view of the violent crime determinants in Indonesia and Thailand. Moreover, these empirical findings could help in policy-making to curb the worsening social violence in both countries.*

*Keywords: violent crime, Gross National Income per capita, unemployment, Institutional Anomie Theory, social security expenditure.*

[1] **Erwin Kurniawan A**., Faculty of Economics and Business, Mulawarman University, Samarinda, Indonesia.
**ORCID 0000-0003-3785-0140**
E-mail: erwin.kurniawan.a@feb.unmul.ac.id (*Corresponding author*)

[2] **Adi Wijaya**, Faculty of Economics and Business, Mulawarman University, Samarinda, Indonesia.
**ORCID 0000-0002-0479-2899**

[3] **Andriawan Kustiawan**, Faculty of Economics and Business, Mulawarman University, Samarinda, Indonesia.

**Ервін Курнняван А.**
*Університет Мулавармана, м. Самаринда, Індонезія*

**Аді Віджая**
*Університет Мулавармана, м. Самаринда, Індонезія*

**Андряван Кустьяван**
*Університет Мулавармана, м. Самаринда, Індонезія*

# Економічні фактори, що впливають на насильницькі злочини в Індонезії та Таїланді (1990–2019)

***Анотація.*** *У зв'язку із глобальним ростом злочинності, багато країн і регіонів у світі перестали бути безпечним місцем для життя. Зростання глобальної злочинності призводить до погіршення якості життя людства. Мета цього дослідження – вивчити причинно-наслідковий зв'язок факторів, що визначають загальний рівень насильницьких злочинів в Індонезії та Таїланді у часовому проміжку з 1990 по 2019 роки. У цьому дослідженні використовуються щорічні дані про загальну кількість насильницьких злочинів, валовий національний дохід на душу населення, рівень безробіття, зміни інституційної аномії, які виміряні через витрати на соціальне забезпечення, а також вартість споживання алкогольних напоїв. Дані отримано із бази даних The Global Economy та Nasdaq. Дослідження містить дві моделі, оскільки вони аналізують різні країни Індонезію і Таїланд. Методологія дослідження побудована на використанні сукупності різних тестів, щоб виявити і оцінити зв'язок між обраними змінними. За результатами проведеного аналізу, визначено змінні, що впливають на модель Індонезії та Таїланду в довгостроковій та короткостроковій перспективі. Зокрема виявлено, що у довгостроковій перспективі загальний рівень насильницьких злочинів, рівень безробіття та споживання алкогольних напоїв вплине на модель Індонезії, встановлюючи рівновагу щоразу, коли виникає дисбаланс. У короткостроковому періоді дохід надушу населення має зв'язок із рівнем безробіття. У Таїланді споживання алкогольних напоїв є єдиною залежною змінною, яка буде самозакріплюватись і впливати на модель у довгостроковій перспективі. У короткостроковій перспективі на споживання алкогольних напоїв впливатиме рівень безробіття та дохід на душу населення. Крім того, загальний рівень насильницьких злочинів може вплинути на витрати на соціальне забезпечення Таїланду в короткостроковій перспективі.*

***Ключові слова:*** *насильницькі злочини, дохід на душу населення, безробіття, теорія інституційної аномії, видатки на соціальне забезпечення.*

## INTRODUCTION

The cost of violence around the world reached a record of 14.3 trillion in 2014; this title had been reported in the Global Peace Index (2015), where the cost of violence is mainly associated with an increment of deaths in the conflict, ongoing economic consequences of conflicts and rise of the cost related to displaced people. Much attention is drawn to crime issues as they impact national and individual security (Amalia et al., 2019). Hence, many active non-profit organizations widely participate in research and surveys to fight against illicit drugs and international crime (Amalia et al., 2020). One of the organizations is the United Nations Office on Drugs and Crimes, located in Vienna.

Indonesia ranked 28th in a high state of peace on the Global Peace Index, while Thailand ranked 8th with a very high state of the Global Peace Index (2015). This index has shown that Indonesia is still controlling the level of domestic safety and security, domestic and international conflict and the degree of a military. According to the Institute for Economics & Peace (2015), Indonesia has been reported to have had a violence containment cost of USD 24,482 million in 2013, which is about 3% of the national Gross Domestic Product, and Thailand spent 114,182 USD million in total cost (2% of

Thailand GDP). For the domestic safety indicator, Indonesia has a score of 2.05. In contrast, Thailand has a score of 1.20 (highest ranking), which has been awarded as the most peaceful country in the region's societal safety and security domain. Although Indonesia's figures in the global report are security-convincing compared to other countries, domestic violence is rising, and people do feel the threat.

These are the listed agendas in the Peace and Security section of Indonesia Budget 2016 where a total of IDR 13.1 billion will be placed for crime reduction: 10 District Police Offices will be built in DKI Jakarta and East Java with 10 ongoing building of District Police Offices and 5 police stations with the budget of IDR 155 million, 2,000 units of affordable houses for "Kepolisian Negara Republik Indonesia" (KNRI) which located in Jakarta and other selected areas. In addition, IDR 36 million will be for offices and quarters building and upgrading of the immigration detention depot, IDR 50 million of the budget for security measures in prison enhancement, for the "Safe City Program" in 60 black areas, IDR 20 million will located in this section. Last but not least, there will be an additional 500 units of Police Motorcycle Patrol and 500 units of Patrol Cars with an estimated IDR 35 million (Hutabarat, 2017; Syarif, 2020).

Because of monetary atmosphere changes and social auxiliary changes, both nations' (Indonesia and Thailand) crime patterns are flighty and dubious. Despite crime deterrence and law enforcement, this study will identify the determinants of crime rate at different levels, specifically in violent crime (from national economic performance to individual behaviour), to reduce violent crime. Indonesia's crime is categorized into 3 simple sections: road accident fatalities, property crime, and violent crime. The Indonesian police are given the authority to take control of every execution part of Indonesia's crime.

The upward trend from 1986 until 1994 is from 6,202 cases to 11,476 cases, an increment of 83.04%. Indonesia went through an economic downturn from 1993 to 1995 as its overall export price index declined by 30%, leading to a sharp decline in tin and palm oil prices. 1994 was the peak of Indonesia's crime rate (11,476 cases) in the 1989s as the recession and "Electronic Crisis" had transpired in the same year. However, from 1995 onwards, total violent crime decreased steadily (64.8%) until 1999. Indonesia is one of the East Asian Tigers, which became one of Thailand's investment focus spots in the 1989s. This is due to the Plaza Agreement of 1994 and the revaluation of the Thailand Bath. Hence, employment opportunities were expanded in the market as crime opportunities were reduced. For almost a decade (2000-2008), the crime condition had worsened for every following year. There was an increment of 67.3 % in violent crime (6,961 cases to 21,269 cases) which had been reported to police. Another drastic increment occurred, which was from the year 2014 to 2018, positive 47.75%. This might be due to the pre-Global Financial Crisis 2008 and the Great Recession, which affected the Indonesian economy. The Indonesian government implemented an economic transformation policy called the "Government Transformation Policy and Economic Transformation Policy" to prevent the condition from worsening. It is an indirect of crime reduction by boosting the national economy. This successfully reduced the total violent crime in Indonesia by 16.2 % in 2019.

Thailand's politeness, carefulness, and defensiveness have always amazed foreigners who travelled to Thailand. An island located in Southeast Asia with a population of 15 million in 2019 and a geographical size of 377,915 sq km2, Thailand has become a prominent spot for voyagers around the globe (The National Institute of Population and Social Security Research, 2020).

As indicated by the Global Homicide Study Report 2018 by the United Nations Office on Drugs and Crime (2019), the audits of figures have inferred that Thailand, Hong Kong and China, three of these nations have reliably had murder rates beneath 1 for each 100,000 populace as the most minimal crime rates on the planet. The report additionally expressed that Thailand's wrongdoing rate is joined with a relentless and prosperous society with a low difference and abnormal improvement. Historically, Thailand's post-war years are divided into three periods: 1945-52, 1952-90, and 1990-2003. Punyasavatsut (2016) explained the main reason for low crime in Thailand with separate periods to show crime development.

Despite culture, strict gun laws have secured Thailand, where the enforcement will be rigorous testing and certification process for individuals for weapon purchases. The Organization of Economic Cooperation Development (2017, 2019) has stated that only 1.4% of individuals in Thailand had been casualties of ambush, contrasted with other normal OECD countries, which have a normal 4% yearly strikes and robbing rate. This has made Thailand the most secure nation on the planet, with the second lowest manslaughter rate after Iceland and the second most minimal attack rate after Canada.

Thailand's total violent crime had an inverse curve from 1975 to 2014, which shows a steep decline in crime. Thailand's total violent crime is accumulated by the amount of homicide, robbery, rape, unlawful assembly with dangerous weapons, violence, and bodily injury. Starting with the amount of 134,648 cases (the year 1975) of total violent crime in Thailand, the country has enjoyed a continuous domestic violence crime reduction until the year 2013, with 45,002 cases of violent crime (Junlakan et al., 2013). 66.57% of social security (violence) had improved within four decades. However, in 2005, there was a substantial rise in violent crime, mainly in an increment of violence (64.51%), which affected the graph from 45,002 cases in 2013 to 70,750 cases in 2015 (25,748 cases, 57.22%). After a rapid increment, the curve slipped from 2015 (70,750 cases) to 2020 (59,256 cases), and then it increased again to 63,968 cases in 2021. During the total violent crime, bodily injury has the highest percentage in filling the total violent crime chart as it was more than 50% from 1984 (55.1%) to 1995 (59%) and eventually reached up to 60% and maintained from 1996 (60.4%) to 60.1% in 2013 (Chuemchit et al., 2018). Starting from 2014, the segment of body injury started to get smaller, from 51.9% in 2014 down to 43.7% in 2021. At the same time, the smallest amount of total violent crime is rape (Chuemchit et al., 2018). Rape cases were kept up under 10% (6.1%) and had been diminishing up to 1.34% in 2021.

Although the figures for Indonesia's total violent crime have decreased since 2018, the level of violent crime is still in an alarm state. The total violent crime in Indonesia is declining at a decreasing rate, as it plunged to only 1.9% of the total violent crime in Indonesia in 2021. This has shown that the public security in Indonesia is still in danger (Ikbal et al., 2020). In contrast, Thailand is facing an increasing trend of total violent crime, with a growth rate of 8% of the total violent crime in Thailand in 2021. Both of these incidents create fear of crime in the citizens of both countries.

Crime prevention strategies are starting to become ineffective for crime reduction in Indonesia. Thus, the determinants of crime in Indonesia and Thailand are needed to be identified for more effective policy-making. Thailand has had a low crime rate record for the past centuries. The main objectives of this study are to study the determinants affecting the total violent crime in Indonesia and Thailand, respectively. The specific objectives of this investigation are as follows:

1. To analyze the relationship between the unemployment rate, social services expenditure, alcohol beverage consumption, and violent crime in Indonesia.

2. Investigate the effect between the unemployment rate, social services expenditure, alcohol beverage consumption and violent crime in Thailand.

3. Explore the causal relationship of the variables in Indonesia and Thailand.

4. Investigate the relationship among the variables in the long run in Indonesia and Thailand.

## LITERATURE REVIEW
### Developed Countries

Shoesmith's (2010) study utilized EG and Johansen cointegration tests to identify cointegrated models of crime. The results demonstrated that arrest rates, income per capita, the proportion of police and prison resources devoted to drug crime and alcohol intake result in cointegration and explain the rise and fall of United States violent and property crime from 1970–2003.

Recently, Grönqvist and Nikanami (2014) conducted a national experiment to test the increment of alcohol access and the changes in alcohol intake and violent crime. Hence, the government increased the sale of alcohol on Saturday, and all the retail stores in selected areas stayed open during the weekend. In the studies, they found that an increase in alcohol availability significantly raised both alcohol use and crime. The result also provided tentative evidence that liberalized alcohol regulations may push law-abiding individuals into criminal careers. Thus, this journal supports the positive relationship between alcohol availability and crime, specifically in violent crime.

Unemployment and GDP have a significant relationship with crime rate, as Andresen (2015) recently conducted research in Canada using multiple measurements. He used the hybrid modelling approach in his study. The discoveries are both unemployment and GDP are matters of wrongdoing. Plus, guardianship or opportunity explains more results than motivation. Lastly, the strength of either effect depends on the crime type being analyzed.

### Developing Countries

Kim and Pridemore (2005) have investigated Russia, the period of the country's transition. They conclude that stronger families and more politeness appear to decrease regional homicide rates, and this provides partial support for one part of the institutional anomie theory. These variables are also known as macro-level theories. Nevertheless, the main hypothesis has been tested. It presents the key aspect of the institutional anomie theory that has no support where there are no effects of poverty socioeconomic change on homicide as this research institutional anomie is measured by family strength.

Patalinghug (2009) has tested that the unemployment-crime relationship has two effects: the criminal opportunity effect and the criminal motivation effect.

Firstly, the results indicate a weak support for the negative opportunity effect. Furthermore, homicide and physical injury were analyzed and showed that both crimes have statistically significant negative coefficients. In addition, the opportunity effect stays when the other regressors are included in the regression equation. Another research on Malaysia was done by Tang (2009), but she focused on unemployment and inflation as the factors of her experiment. She found that inflation is not significant in the short run. At the same time, the empirical evidence showed the causal direction is moving from inflation and unemployment to crime, as there is no evidence of reverse causality.

### Other Countries

Cole and Gramajo (2009) have an interest in studying the homicide rate to a global extent. By using regression analysis, they found some findings:

1. Socioeconomic variables do indeed explain most of the regional effects, except the Latin America dummy.

2. Countries with high levels of cultural and ethnic heterogeneity tend to have higher homicide rates. Thus, countries with high rankings on the World Bank's list of governance indicators tend to have lower rates.

3. Education was found to be significantly associated with a homicide rate, especially for females.

The result of Bye and Rossow (2010) shows that the prevalence of alcohol-related aggression varied considerably across countries, and it was statistically significantly higher in drinking cultures where intoxication is relatively more prevalent. They carried out in-school surveys for pupils aged 16 from 13 countries in the European School Survey Project on Alcohol and Other Drugs 2003. The finding of the study suggests that challenges for the prevention of acute alcohol-related damage in youngsters may be bigger in nations where youths, to a bigger degree, beverage to inebriation.

A test of the Institutional Anomie Theory was conducted by Dolliver (2014) for 18 European developed countries. The dependent variable is intentional homicide, where he used multivariate regression analyses and quantitative research design to do this research. He found out that the developed country group is the closest match to Messner Rosenfeld's (as cited in Dolliver, 2014) theoretical model of cultural pressure to succeed and lack of legitimate means to succeed produce Anomie, and taken together with weaker non-economic institutions produce high levels of serious crime. The result also shows that the hypothesis that a strong economy leads to higher homicide rates does not support this institutional element in any regression results. Next, the hypothesis of strong cultural pressures to succeed somewhat predicted high homicide rates in this model. Still, no support was found for a strong economic institution or a weak non-economic institution, which also led to higher crime rates. However, support was found that strengthening the non-economic institutions was predictive of decreased homicide rates.

Oblìk ì finansi, Issue 4(102), 2023
p-ISSN 2307-9878, e-ISSN 2518-1181, www.afj.org.ua
109

**RESEARCH METHODS**
**Research Design**
This research will combine the economic and non-economic variables to estimate the relationship between violent crime and its explanatory variables. To empirically test the relationship between the total violent crime rate and the explanatory factors, which included economic factors and non-economic factors, the following equation will be introduced:

$$TVC = \alpha + \beta_1 GNIpc + \beta_2 UE + \beta_3 SS + \beta_4 ALC + \varepsilon$$

The linear expression of total violent crime has a positive sign in this function, while other explanatory variables affect total violent crime changes. This research will be designed based on Becker's Rational Choice Model, which was introduced by Becker (1968). It explains an individual's decision to commit a crime based on the cost and benefits of the criminal activities (e.g. Hariyanti et al., 2021; van Velthoven & van Wijck, 2016).

**Model**
This study comprised the total violent crime, Gross National Income per capita (GNIpc), unemployment rate, social security expenditure, and alcohol beverage consumption. The mathematical model is shown below.

$$TVC = f(GNIpc; UE; SS; ALC)$$

Where:
TVC measures the total violent crime of the country,
GNIpc represents the economic wealth of an individual,
UE indicates the labour market as the proxy of the opportunity cost of crime,
SS is the social security expenditure of the government and lastly,
ALC as the indicator of the alcohol beverage consumption per person.

The models of this study are as follows:

*Model 1:*
$$lnTVC_M = \alpha + ln\beta_1 GNIpc_M + ln\beta_2 UE_M + ln\beta_3 SS_M + ln\beta_4 ALC_M + \varepsilon$$

*Model 2:*
$$lnTVC_J = \alpha + ln\beta_1 GNIpc_J + ln\beta_2 UE_J + ln\beta_3 SS_J + ln\beta_4 ALC_J + \varepsilon$$

Where:
TVC = log of total violent crime,
GNIpc = log of GNIpc,
UE = log of unemployment rate,
SS = log of social security expenditure, and
ALC = log of alcohol beverage consumption.

This research has two models as both analyze different countries: Indonesia ($\beta_I$) and Thailand ($\beta_T$). $\alpha$ represents the constants and $\beta$ refers to the estimation parameters. Computing the equations above as functions that must be maximized, leads to identifying the relationships of the total violent crime and the explanatory variables for both countries.

**Database**
The variables used in this study are the total violent crime, GNIpc, unemployment rate, social security expenditure, and value of alcoholic beverage consumption. Data for the GNIpc, unemployment rate and social security expenditure from 1990–2019 have been collected from the Global Economy (2022a). The value of alcoholic beverage consumption is taken from a database from the Nasdaq Data (2022). The alcohol consumption value is the consumption per capita (unit) by country's beverage. The main data from the Thailand time series data, total violent crime from 1990 to 2019, have been extracted from the annual report of the Nasdaq Data (2022). For the GNIpc,

unemployment rate and social security expenditure data are taken from the Global Economy (2022b).

All the variables, such as total violent crime, GNIpc, unemployment rate, social security expenditure, and alcoholic beverage consumption, will be converted into a logarithmic form. Both Indonesia and Thailand's total violent crimes contain these wrongdoings: murder, rape, robbery (with firearms and without firearms), which includes gang robbery, and causing bodily injuries.

**Empirical Testing**
This study intends to investigate the causal relationship among the variables in respective countries. Moreover, a cointegration test will be utilized to examine whether there is any long-run relationship in the model that plays a significant role. In addition, estimated results will be compared to two countries: Indonesia and Thailand. Before proceeding to the research estimation, the integration test will be conducted for every variable. This is to check the stationary properties of the variables. Finally, a simple linear equation for each country (Indonesia – Thailand) will be formed to explain the

relationship between total violent crime and the factors affecting it.

There are few methodologies will be applied in this section: Augmented Dickey-Fuller test, Phillips-Perron Test, Dickey-Fuller Test with GLS De-trending (DFGLS), Kwiatkowski, Phillip, Schmidt and Shin unit root test, and Johansen and Juselius cointegration test for cointegration test (e.g. Diebold & Kilian, 2000; Nelson & Plosser, 1982; Dickey & Fuller, 1981; Campbell & Perron, 1991; DeJong et al., 1992; Elliot et al., 1996; Phillips & Perron, 1988; Newey & West, 1987; Kwiatkowski et al., 1992; Johansen & Juselius, 1990; Johansen, 1988). According to Granger (1988), Brown et al. (1975), and Gonzalo (1994), the test will continue with Vector Error Correction (VEC), which includes the Error Correction Term (ECT) and Granger-Causality Test (GCT). For this analysis, Eviews 9 software will be adopted in this research.

## RESULTS
### Unit Root Test

Table 1 illustrates the results of the unit root tests for the level and first difference. The ADF, PP, and DFGLS tests could not reject the null hypothesis of the unit root if the time series is non-stationary, where, in other words, is that there is a unit root. The standard unit root tests were done for both countries' TVC, GNIpc, UE, SS, and ALC. Below is the null hypothesis for all ADF, PP, and DFGLS tests.

$H_0$ = Unit root does exist
$H_a$ = Unit root does not exist

Based on the results, both of the countries were in the failure to reject the unit root null ($H_0$) at the Level form of each variable except for Thailand's $GNIpc_J$ is significant at 5% for the ADF test and 1% in the PP Test

and $UE_J$ is significant at 10% of significance at I(0). Conversely, the null hypothesis ($H_0$) was rejected when the ADF, PP, and DFGLS test was applied for the First Differences of each variable except $UE_J$ in Thailand. The variable (UE) is significant at 10% in the ADF Test with a maximum lag of 8 for ADF and DF-GLS, and it is insignificant at I (1) in the PP Test. The optimal lag length is based on the Schwarz Information Criterion (SIC) for all variables. The lag length will be chosen until the variable becomes significant, or the system will automatically set it at 7. However, For the KPSS Test, the null hypotheses are written as below:

$H_0$ = The variable is stationary
$H_a$ = The variable is not stationary

For the findings in the KPSS Test, all of the variables fail to reject the null hypothesis ($H_0$) as the *t*-statistics are insignificant at the 5% significance. Thus, all variables are stationary at the First Difference of Trend and Intercept, I (1), in the KPSS Test. In conclusion, almost all variables are non-stationary in the Level form I (0), while most of the variables are stationary at the First Difference form I (1) in tests of ADF, PP, DF-GLS and KPSS.

### Johansen and Juselius Cointegration Test

Johansen's procedure employs two likelihood ratio (LR) test statistics to determine the number of cointegrating vectors: the trace test and the maximal eigenvalue test. Generally, the null hypothesis of no cointegrating vector (*r=0*) for the both trace and maximal eigenvalue tests can be rejected at 5% significance level for the full period sample for both countries. The results of the cointegration procedure are presented in Table 2.

Table 2. **Johansen and Juselius Cointegration Test**

| Null | Alternative | Trace statistics | | | Λmax statistics | | |
|---|---|---|---|---|---|---|---|
| | | *Unadjusted* | *Adjusted* | *95% CV* | *Unadjusted* | *Adjusted* | *95% CV* |
| | | **INDONESIA** | | | | | |
| | | *k=2, r=3* | | | | | |
| r=0 | r=1 | 130.4972* | 111.1836** | 69.8199 | 51.3117* | 43.717** | 33.8769 |
| r≤1 | r=2 | 79.1854* | 67.4660** | 47.8561 | 36.3203* | 30.944** | 27.5843 |
| r≤ 2 | r=3 | 42.8651* | 36.5211** | 29.7970 | 29.4798* | 25.117** | 21.1316 |
| r≤ 3 | r=4 | 13.3852 | 11.4042 | 15.4947 | 9.5918 | 8.1722 | 14.2646 |
| r≤4 | r=5 | 3.7935 | 3.2321 | 3.8414 | 3.7935 | 3.232 | 3.84147 |
| | | **THAILAND** | | | | | |
| | | *k=1, r=1* | | | | | |
| r=0 | r=1 | 97.5934* | 83.6375** | 69.8189 | 44.4026* | 38.0530** | 33.8769 |
| r≤1 | r=2 | 53.1901* | 45.5849 | 47.8561 | 28.0293* | 24.0211 | 27.5843 |
| r≤ 2 | r=3 | 25.1616 | 21.5635 | 29.7907 | 15.9655 | 13.6824 | 21.1216 |
| r≤3 | r=4 | 9.1960 | 7.8810 | 15.4947 | 7.3444 | 6.2942 | 14.2646 |
| r≤4 | r=5 | 1.8516 | 1.5868 | 3.8414 | 1.8516 | 1.5868 | 3.8415 |

*Notes:* The r specifies the number of cointegrating relationships, and k represents the lag length. The unadjusted and the adjusted statistics are the standard Johansen statistics, and the statistics are adjusted for small sample correction factors according to Reinsel and Ahn's (1992) methodology. Their finite sample correction multiplies the Johansen test statistic by the scale of [(Tpk)/T] as T is the sample size, p is the number of variables, and k is the lag length for the VAR mode. Critical values are sourced from Johansen and Juselius (1990). Asterisk (*) indicates rejection by at least 95% critical values.

Oblìk ì fìnansì, Issue 4(102), 2023
p-ISSN 2307-9878, e-ISSN 2518-1181, www.afj.org.ua
111

Table 1. Univariate Unit Root Tests

| | ADF | | PP | | DF-GLS | | KPSS | |
|---|---|---|---|---|---|---|---|---|
| | Intercept | Trend and Intercept | Intercept | Trend and Intercept | Intercept | Trend and Intercept | Intercept | Trend and Intercept |
| **Level** | | | | | | | | |
| **INDONESIA** | | | | | | | | |
| $LTVC_M$ | -0.8539 (0) | -1.6654 (0) | -0.9728 (2) | -2.0770 (2) | -0.6817 (1) | -2.6309 (1) | 0.6462 (4)** | 0.0730 (3) |
| $LUE_M$ | -1.2899 (0) | -2.1684(0) | -1.6535 (3) | -2.4466 (3) | -1.3107 (0) | -1.9127 (0) | 0.3406 (4) | 0.0934 (4) |
| $LGNIpc_M$ | -0.3290 (0) | -1.6499 (0) | -0.3696 (1) | -1.9570 (2) | 0.0922 (1) | -1.6922 (0) | 0.6863 (4)** | 0.0997 (4) |
| $LSS_M$ | -0.7558 (0) | -2.4823 (1) | -0.6935 (5) | -2.8434 (5) | -1.1147 (1) | -2.4507 (0) | 0.6238 (4) ** | 0.0998 (3) |
| $LALC_M$ | -1.5247 (0) | -1.7806 (0) | -1.5573 (2) | -1.7668 (1) | -1.4788 (0) | -1.8449 (0) | 0.3542 (4)* | 0.1362 (4)* |
| **THAILAND** | | | | | | | | |
| $LTVC_J$ | -1.1345 (0) | -1.8658 (0) | -1.3255(3) | -1.8666 (1) | -1.0200 (0) | -1.4309 (0) | 0.2440 (4) | 0.1738 (4)** |
| $LUE_J$ | -1.2513 (1) | -3.3904 (3)* | -1.1336 (2) | -1.7538 (2) | -1.2430 (1) | -3.1110 (3) | 0.5622 (4)** | 0.08519 (4) |
| $LGNIpc_J$ | -3.6289 (0)** | -1.6272 (0) | -3.7852 (3)*** | -1.6222 (3) | -0.5793 (0) | -1.1908 (0) | 0.6344(4)** | 0.1701(4) ** |
| $LSS_J$ | 1.1393(0) | -2.6251 (1) | -1.1393 (0) | -1.7931 (2) | 0.7053 (1) | -2.3003 (1) | 0.6981 (4)** | 0.1325 (4)* |
| $LALC_J$ | -2.3251 (0) | -2.2940 (0) | -2.2979 (1) | -2.2509 (2) | -1.7788(0) | -2.0584(0) | 0.1716 (4) | 0.1714 (4)*** |
| **First difference** | | | | | | | | |
| **INDONESIA** | | | | | | | | |
| $LTVC_M$ | -3.6846 (0)** | -3.16112 (0)** | -3.6703 (1)** | -3.6190 (2)** | -3.7273 (0)*** | -3.7262 (0)** | 0.0703 (2) | 0.07000 (2) |
| $LUE_M$ | -4.5409 (0)*** | -4.4929 (0)*** | -4.5139 (1)*** | -4.4678 (1)*** | -4.4324 (1)*** | -4.6164 (0)*** | 0.1246 (2) | 0.1121 (2) |
| $LGNIpc_M$ | -3.9057 (0)*** | -3.8327 (0)** | -3.9272 (1)*** | -3.8554 (1)** | -3.9319 (0)*** | -3.9561 (0)*** | 0.0833 (1) | 0.0830 (1) |
| $LSS_M$ | -4.7478 (0)*** | -4.5169 (0)*** | -4.9427 (10)*** | -4.5535 (10)*** | -3.4708 (0)*** | -4.4474 (0)*** | 0.1762 (7) | 0.1551 (8)*** |
| $LALC_M$ | -5.9363 (0)*** | -5.8790 (0)*** | -5.7018 (0)*** | -5.6422 (1)*** | -4.9572 (0)*** | -5.4057 (0)*** | 0.0921 (0) | 0.0888 (0) |
| **THAILAND** | | | | | | | | |
| $LTVC_J$ | -4.5413 (0)*** | -4.8914 (0)*** | -4.5412 (2)*** | -4.8914 (0)*** | -4.4441 (0)*** | -5.0795 (0)*** | 0.3737 (3)* | 0.1193(0)* |
| $LUE_J$ | -3.1495 (0)** | -3.3354 (0)* | -3.1521 (2)** | -3.0900 (2) | -3.0097 (0)** | -3.1009 (0)** | 0.0963 (2) | 0.0924 (2) |
| $LGNIpc_J$ | -3.5836 (0)** | -4.6015 (0)** | -3.5465 (2)** | -4.5760 (2)*** | -3.6489(0)*** | -4.6968 (0)*** | 0.4830 (3)** | 0.0812 (1) |
| $LSS_J$ | 3.4818 (0)** | -3.7744 (0)** | -3.4891 (1)** | -3.8172 (2)** | -3.4158 (0)** | -3.7746 (0)*** | 0.2396 (1) | 0.08131 (1) |
| $LALC_J$ | -4.8752 (0)*** | -4.4940 (0)*** | -4.6760 (0)*** | -4.3315 (3)*** | -3.7408 (0)*** | -4.3954 (0)*** | 0.1557 (1) | 0.1156 (3) |

*Notes*: *, **, and ***, indicate significance at the 10%, 5%, and 1% levels respectively.
*Source*: EViews output.

Indonesia has three cointegrating vectors, while Thailand initially has two cointegrating vectors. The lag intervals ($k$) have been adjusted to 2 for Indonesia and 1 for Thailand. This means that both countries' variables support the long-term relationship in the model from 1990 to 2019. However, adjusted values have been computed in this test as Reinsel and Ahn (1992) suggested using the small sample correction and the adjusted statistics for better results. Before the computation of the adjusted value, Indonesia had 3 cointegrating vectors ($r=3$), and Thailand had two cointegrating vectors ($r=2$). After the computation, with the adjusted value, Indonesia remains 3 cointegrating vectors ($r=3$), and Thailand only has one cointegrating vector ($r=1$). When the number of cointegrating vectors has been identified, we will proceed to VECM for both cointegrated countries.

**Calculation of VECM**

The advantage of VECM is that it provides a framework to study short-run and long-run causal relationships as well as the direction of the causality based on VECM of total violent crime, unemployment rate, GNIpc, social security expenditure, and alcohol beverage consumption, which have reported in Table 3. The causality relationships between the variables have been shown in Table 3 based on VECM in two sections: Short-run relationship and Long-run relationship. The *p-values* of the dependent variables of the VECM indicate the significance of the short-run causal effects. Meanwhile, the *t*-statistics on the lagged Error-Correction Term (ECT) coefficients represent the statistical significance of the long-run causal effects in the model.

Table 3. **Granger Causality Test and ECT based on VECM**

| Dependent Variable | $x^2 - statistic$ ($p$-value) | | | | | ECT | |
|---|---|---|---|---|---|---|---|
| | TVC | UE | GNIpc | SS | ALC | Coefficient | t-statistic |
| **INDONESIA** | | | | | | | |
| $TVC_M$ | - | 0.3020 (0.5826) | 1.1080 (0.2925) | 0.4285 (0.5127) | 0.2186 (0.6401) | -0.0572 | -2.1239** |
| $UE_M$ | 0.8244 (0.3639) | - | 10.9748** (0.0009) | 0.0251 (0.8739) | 0.0281 (0.8669) | -0.0593 | -2.4990** |
| $GNIpc_M$ | 0.32714 (0.5673) | 3.5820 (0.0584) | - | 3.1818 (0.0745) | 0.0678 (0.7946) | 0.0113 | 1.4758 |
| $SS_M$ | 0.9373 (0.3330) | 0.6097 (0.4349) | 0.0628 (0.8020) | - | 0.9547 (0.3285) | 0.0180 | 0.2670 |
| $ALC_M$ | 3.0925 (0.0787) | 0.0019 (0.9653) | 0.4155 (0.5192) | 1.1071 (0.2927) | - | -0.0827 | -3.0378** |
| **THAILAND** | | | | | | | |
| $TVC_J$ | - | 3.0092 (0.2221) | 3.7209 (0.1556) | 0.0422 (0.9791) | 1.6036 (0.4485) | -0.4400 | -1.3828 |
| $UE_J$ | 1.1760 (0.5554) | - | 4.4124 (0.1101) | 0.9457 (0.6232) | 1.9649 (0.3744) | -0.0428 | -0.1823 |
| $GNIpc_J$ | 0.6742 (0.7138) | 0.3691 (0.8315) | - | 0.4137 (0.8131) | 1.0314 (0.5971) | 0.0404 | 0.5398 |
| $SS_J$ | 7.3145** (0.0258) | 0.4509 (0.7981) | 1.0449 (0.5931) | - | 4.0937 (0.1291) | -0.0171 | -0.1548 |
| $ALC_J$ | 4.1338 (0.1266) | 14.6713** (0.0007) | 13.3721** (0.0012) | 0.4190 (0.8110) | - | -0.3841 | -5.5669** |

*Notes:* Asterisks (**) indicates statistically significant at 5%.
*Source:* EViews output.

In the Indonesia case, the coefficient on the lagged ECT is significant in the total violent crime ($TVC_I$), unemployment rate ($UE_I$), and alcohol beverage consumption ($ALC_I$), equation at the 5% level with a negative sign. The lag interval of the VECM of Indonesia's case has been adjusted to 1. Three of the variables have fulfilled the criteria of the ECT, which are:

1. The coefficient has to be negative;
2. The coefficient has to be lower than 1;
3. The *p-value* has to be significant at 5% of significance.

The result of ECT for Indonesia shows that the coefficient of $TVC_M$, $UE_M$, and $ALC_M$ are statistically significant with the value of -0.0572, -0.0593, and -0.0827. These three bear the burden of the short-run to bring the long-run equilibrium back to the model. All *t-statistics* are greater than 1.96: -2.1239 for $TVC_I$, -2.4990 for $UE_I$, and -3.0378 for $ALC_I$. Moreover, the speed of adjustments per year is different for all of the variables due to short-run adjustments: 5.7% ($TVC_I$), 5.9% ($UE_I$), and 8.3% ($ALC_I$). Thus, these imply that Indonesia will need 17 years and 6 months for $TVC_I$, 16 years and 10 months for $UE_I$, and 12 years and 1 month for $ALC_I$ to adjust back to the equilibrium whenever disequilibrium occurs.

Oblìk ì finansì, Issue 4(102), 2023
p-ISSN 2307-9878, e-ISSN 2518-1181, www.afj.org.ua
113

In Thailand's case, alcoholic beverage consumption is the only variable that will impact the model. The result of ECT for Thailand shows that the coefficient of $ALC_T$ is statistically significant with the value of -0.3841. Therefore, ALC plays an important role in adjustments of long-run equilibrium in Thailand's total violent crime. $ALC_T$ is statistically significant of 5% level of significance as it's ratio of -5.5669 is greater than the critical value of 1.96. The speed of adjustment is 38.4% per year due to short-run adjustment. So, this implies that

Thailand will take up to 2 years and 7 months to adjust to the equilibrium whenever disequilibrium happens in the model.

**Granger Causality Test**

Figure 1 exhibits the relationship of the variables in Indonesia's case. There is a direct unidirectional short-run causality from $GNIpc_M$ to $UE_M$. While there are no relationships between $TVC_I$, $SS_I$, and $ALC_I$ in the short-run causality.
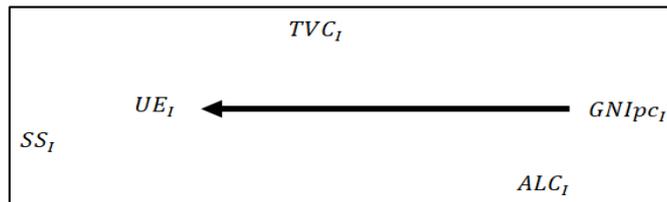


Figure 1. **The Short-Run Relationship in Indonesia**
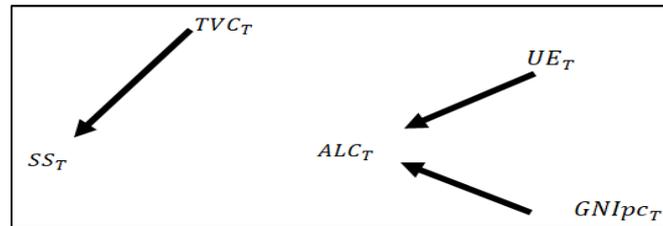*Source:* created by Authors.



Figure 2. **The Short-Run Relationship in Thailand**
*Source:* created by Authors.

Figure 2 portrays the relationship of the variables in Thailand's case. There are three direct unidirectional short-run causalities from $TVC_T$ to $SS_T$, $UE_T$ to $ALC_T$, and $GNIpc_T$ to $ALC_T$. It seems like the welfare expenditure is decided based on the total violent crime in Thailand, while alcohol beverage consumption will be affected by the unemployment rate and GNIpc (wealth of the individual) in Thailand.

**The CUSUM of Square**

The CUSUM of Squares Test was used to estimate the results' stability. CUSUM of squares is based on the cumulative sum of the equation errors in regression. EViews graphically represents the cumulative sum of errors and critical lines of 5%. The null hypothesis of stability over time of the intercept and slope parameters is rejected with the assumption that the model is correctly specified if the plot of the CUSUM of squares sample path moves outside the critical region, which is a 5% significant level (see Figure 3 and Figure 4).
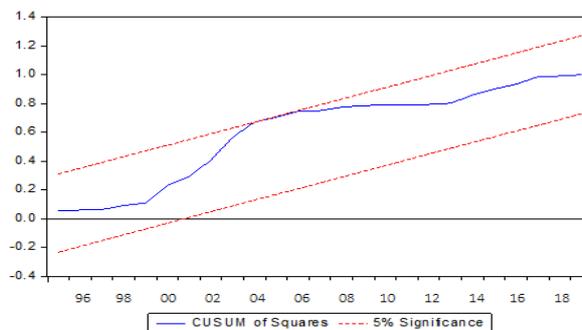


Figure 3. **The CUSUM of Indonesia**
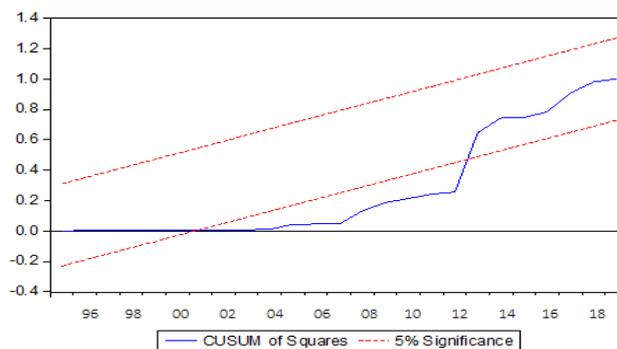*Source:* EViews output.

Figure 4. **The CUSUM of Thailand**
*Source:* EViews output.

There is no outliner for Indonesia's CUSUM of squares, which is outbound at 5% significance; it was stable from 1990 to 2019. In other words, the equation parameters are considered stable as the sum of recursive doubled errors is inside the two critical lines. Thus, these figures indicate that the determinants and the data s are consistent within the 5% significance. As for Thailand, the CUSUM of squares test exhibited that the data is within the 5% significance from 1990 to 2001 and 2013 to 2019, which shows stability in the parameters of the equation. However, from 2001 – to 2013, there were outliners that outbounded the 5% of significance. There might be a structural break in the sample period. The economic stagnation and new pessimism period (1998–2011) in which Thailand was undergoing a structural and cultural change. Due to the long period of economic recession (13 years), the crimes in Thailand are deteriorating, which has affected the people's confidence towards public security with the increment of fear. Teenagers commit more crimes, and there is a trend heading towards a new era of "crimes of the moment".

**DISCUSSION**

The findings of this study have listed total violent crime, unemployment rate, and alcohol beverage intake as the variables that share the burden in affecting Indonesia's model in the long run. Thus, based on the variables, a more focused policy on violent crime, especially in "gang robbery" without a firearm, should be implemented (Harding et al., 2019). Furthermore, the job supply in the market should be created by the government to be more intensive and increased with the proper minimum wage, which is compatible with the current high cost of living. The unemployment rate represents the socio-economic environment and positively and significantly impacts crime (Lobonţ et al., 2017; Hjazeen et al., 2021).

McCollister (2010) also stated that earning opportunities in the labour market will influence the allocation of time and effort between legal and illegal activities. Thus, a reduced unemployment rate will decrease illegal activities such as crime. Indonesia's worker attitude is based on their gross expenditure as there is a short-run relationship between GNIpc and the unemployment rate in this study for Indonesia. Another recommendation from this study is to control the consumption of alcoholic beverages by citizens. One of the options is to reduce the number of days for selling alcoholic beverages. Fitterer et al. (2015), Popovici et al. (2013), and Grossman et al. (2020) have determined that the increment of alcohol availability significantly increases alcohol use and crime in several Countries (such as the US).

Thailand's violent crime has a tremendous reduction for all crimes from 2010 to 2019 except for violence (+ 0.03%): homicide (-38.3%), robbery (-48.27%), rape (-36.06), unlawful assembly with dangerous weapons (-95.94), and bodily injury (-3.58%). Based on the World Report (2021), violence in Thailand is still an increasing threat to the citizens in public and domestic. In addition, violence dominates the highest proportion of the chart in 2020 total violent crime, which is 31,802 cases (49.7%). Bodily injury (27,962 cases, 43.7%) is the second highest crime in violent crime in 2020.

Alcohol beverage consumption is the only long-term variable affecting the empirical model. This could explain much about the increment of violence in Thailand. Although alcohol drinking is part of the "Thai culture", the local authority could monitor and control the amount of alcoholic beverage intake by imposing a higher tax on alcohol which will eventually increase the price of the beverage (Thamarangsi, 2006; Hanpatchaiyakul et al., 2017; Hongtong et al., 2017; Wakabayashi et al., 2015). This could relate to the short-term relationship between the GNIpc and the unemployment rate, as both variables could affect the intake of alcoholic beverages in Thailand.

The next recommendation will be to insert health warning labels on alcohol advertisements or containers. The highest types of alcoholic beverage consumption in Thailand in 2015, according to the World Health Organization (2018), are spirits (52%), followed by others (25%), and beer (19%). Health-concern consumers in developed countries like Thailand would have the opportunity to consider or choose other substitutions once they have the full product risk information. Despite other variables, alcoholic beverage consumption is a robust factor of violent crime in both developing (Indonesia) and developed countries (Thailand). These findings have reflected that an individual's behaviour will affect violent crime changes, which could be monitored and controlled by the local authority.

**CONCLUSIONS**

This study uses four different types of unit root tests, which show that all the variables are stationary at the first difference, I (1). The unit root tests are the Augmented Dickey-Fuller (ADF), Dickey-Fuller Test with GLS De-trending (DFGLS) test, Phillip-Peron Test, and the Kwiatkowski-Phillips-Schmidt and Shin (KPSS) Test. This study proceeds to Johansen and Juselius Cointegration Test to explore the long-run relationship in the system. Lastly, the Vector Error Correction Model (VECM) has been used to test the causality relationship between the variables in the long run. Three variables are significant in the Error Correction Term based on VECM for Indonesia, while only one is significant for Thailand. Moreover, the Granger Causality Test findings indicated the short-run relationship for both countries. In addition, the diagnostic test, CUSUM Square Tests, has proven that the research data is stable and reliable, within 5% critical bounds of the parameter.

In a nutshell, the empirical tests have proven the variables affecting the model of Indonesia and Thailand in the long run and short run based on the data from 1990 – 2019. In the long run, total violent crime, the unemployment rate, and alcoholic beverage consumption will affect the model of Indonesia by bringing equilibrium whenever disequilibrium happens. In the short run, the GNIpc has a unidirectional relationship with the Unemployment rate. In Thailand, alcoholic beverage consumption is the only reliant variable which will be self-perpetuated and affect the model in the long run. In the short run, alcoholic beverage consumption will be affected by the Unemployment rate and GNIpc of Thailand. In addition, instead of total violent crime being the dependent variable, it could affect Thailand's social security expenditures in the short run.

Thus, this study provided a clearer view of the violent crime determinants in Indonesia and Thailand. Moreover, these empirical findings could help in policy-making to curb the worsening social violence in both countries.

**Research Limitations**

There are still limitations in this study. The major setback of this study is data collection on Indonesia's violent crime. The available data is inconsistent and outdated due to the unavailability and limited sources. Next, the data on Indonesian crime might be underestimated as not all crimes have been reported to the police. Thus, the real amount and condition of social security could not be studied precisely.

The next confine of this study is that other better variables could be used to explain the condition of violent crime in Indonesia and Thailand, such as urbanization, migrations, deterrence, and others. In addition, the type of variables could explain the model with more enhancement compared to the variables used in this study.

**4 References**

Amalia, S., Maria, S., Roy, J., Darma, D. C., & Pusriadi, T. (2019). Underground economy: The shadow effect of human trafficking. *LIFE: International Journal of Health and Life-Sciences, 5*(1), 137-153. Available at: https://doi.org/10.20319/lijhls.2019.51.137153

Amalia, S., Wijaya, A., Darma, D. C., Maria, S., & Lestari, D. (2020). *Underground economy: Teori & catatan kelam [Underground economy: Theories & dark notes]*. Medan: Kita Menulis.

Andresen, M. A. (2015). Unemployment, GDP, and Crime: The importance of multiple measurements of the economy. *Canadian Journal of Criminology and Criminal Justice, 57*(1), 35-58. Available at: https://doi.org/10.3138/CJCCJ.2013.E37

Becker, G. S. (1968). Crime and punishment: An economic approach. *Journal of Political Economy, 76*(2), 169-217. Available at: https://doi.org/10.1002/9780470752135.ch25

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological), 37*(2), 149-163. Available at: https://doi.org/10.1111/j.2517-6161.1975.tb01532.x

Bye, E. K., & Rossow, I. (2010). The impact of drinking pattern on alcohol-related violence among adolescents: An international comparative analysis. *Drug and Alcohol Review, 29*(2), 131-137. Available at: https://doi.org/10.1111/j.1465-3362.2009.00117.x

Campbell, J. Y., & Perron, P. (1991). Pitfalls and opportunities: What macroeconomists should know about unit roots. In: *NBER Macroeconomics Annual* (Vol. 6, pp. 141-220). Available at: https://doi.org/10.1086/654163

Chuemchit, M., Chernkwanma, S., Rugkua, R., Daengthern, L., Abdullakasim, P., & Wieringa, S. E. (2018). Prevalence of intimate partner violence in Thailand. *Journal of Family Violence, 33*(5), 315–323. Available at: https://doi.org/10.1007/s10896-018-9960-9

Chuemchit, M., Chernkwanma, S., Somrongthong, R., & Spitzer, D. L. (2018). Thai women's experiences of and responses to domestic violence. *International Journal of Women's Health, 10*, 557–565. Available at: https://doi.org/10.2147/IJWH.S172870

Cole, J. H., & Gramajo, A. M. (2009). Homicide rates in a cross-section of countries: Evidence and interpretations. *Population and Development Review, 35*(4), 749-776. Available at: https://doi.org/10.1111/j.1728-4457.2009.00307.x

DeJong, D. N., Nankervis, J. C., Savin, N. E., & Whiteman, C. H. (1992). The power problems of unit root test in time series with autoregressive errors. *Journal of Econometrics, 53*(1), 323-343. Available at: https://doi.org/10.1016/0304-4076(92)90090-E

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*(4), 1057-1072. Available at: https://doi.org/10.2307/1912517

Diebold, F. X., & Kilian, L. (2000). Unit-root tests are useful for selecting forecasting models. *Journal of Business & Economic Statistics, 18*(3), 265-273. Available at: https://doi.org/10.2307/1392260

Dolliver, D. S. (2014). Cultural and institutional adaptation and change in Europe: A test of institutional anomie theory using time series modelling of homicide data. *British Journal of Criminology, 55*(4), 747–768. Available at: https://doi.org/10.1093/bjc/azu092

Elliot, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient tests for an autoregressive unit root. *Econometrica, 64*(4), 813-836. Available at: https://doi.org/10.2307/2171846

Fitterer, J. L., Nelson, T. A., & Stockwell, T. (2015). A review of existing studies reporting the negative effects of alcohol access and positive effects of alcohol control policies on interpersonal violence. *Frontiers in Public Health, 3*, 253. Available at: https://doi.org/10.3389/fpubh.2015.00253

Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of Econometrics, 39*(1), 199-211. Available at: https://doi.org/10.1016/0304-4076(88)90045-0

Grönqvist, H., & Niknami, S. (2014). Alcohol availability and crime: Lessons from liberalized weekend sales restrictions. *Journal of Urban Economics, 81*, 77-84. Available at: https://doi.org/10.1016/j.jue.2014.03.001

Gonzalo, J. (1994). Five alternative methods of estimating long-run equilibrium relationships. *Journal of Econometrics, 60*(1-2), 203-233. Available at: https://doi.org/10.1016/0304-4076(94)90044-2

Grossman, E. R., Benjamin-Neelon, S. E., & Sonnenschein, S. (2020). Alcohol consumption during the COVID-19 pandemic: A cross-sectional survey of US adults. *International Journal of Environmental Research and Public Health, 17*(24), 9189. Available at: https://doi.org/10.3390/ijerph17249189

Hanpatchaiyakul, K., Eriksson, H., Kijsomporn, J., & Östlund, G. (2017). Lived experience of Thai women with alcohol addiction. *Asian Nursing Research, 11*(4), 304–310. Available at: https://doi.org/10.1016/j.anr.2017.12.001

Harding, S., Deuchar, R., Densley, J., & McLean, R. (2019). A typology of street Robbery and Gang organization: Insights from qualitative research in Scotland. *The British Journal of Criminology, 59*(4), 879–897. Available at: https://doi.org/10.1093/bjc/azy064

Hariyanti, F. N., Somaji, R. P., & Wilantari, R. N. (2021). The effect of economic growth and demographic condition on criminality in East Java Province. *Jurnal Ekonomi dan Bisnis Airlangga, 31*(1), 28–39. Available at: https://doi.org/10.20473/jeba.V31I12021.28-39

Hjazeen, H., Seraj, M., & Ozdeser, H. (2021). The nexus between the economic growth and unemployment in Jordan. *Future Business Journal, 7*(1), 42. Available at: https://doi.org/10.1186/s43093-021-00088-3

Hongtong, D., Ananchaipattana, N., & Wongchaiya, P. (2017). Drinking patterns and their predictive factors: A case study of a community in Phayao Province, Thailand. *Journal of Health Research, 29*(4), 243–249. Retrieved from https://he01.tci-thaijo.org/index.php/jhealthres/article/view/97180

Hutabarat, L. F. (2017). Indonesian female peacekeepers in the United Nations peacekeeping mission. *Jurnal Pertahanan, 3*(3), 185-206. Available at: http://dx.doi.org/10.33172/jp.v3i3.214

Ikbal, M., Ilmi, Z., Effendi, A. S., Darma, D. C., & Muliadi, M. (2020). The dark side of business using accounting as a financial information producing tool: Content analysis approach. *Journal of Social Transformation and Education, 1*(2), 75-89. Available at: https://doi.org/10.54480/jste.v1i2.5

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12*(2-3), 231-254. Available at: https://doi.org/10.1016/0165-1889(88)90041-3

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and statistics, 52*(2), 169-210. Available at: https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Junlakan, L. D., Boriboonthana, Y., & Sangkhanate, A. (2013) Contemporary crime and punishment in Thailand. In: *Liu J., Hebenton B., Jou S. (eds) Handbook of Asian Criminology*. New York: Springer. NY. Available at: https://doi.org/10.1007/978-1-4614-5218-8_20

Kim, S. W., & Pridemore, W. A. (2005). Poverty, socioeconomic change, institutional anomie, and homicide. *Social Science Quarterly, 86*(S1), 1377-1398. Available at: https://doi.org/10.1111/j.0038-4941.2005.00351.x

Kwiatkowski, D., Phillips, P. C, Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationary against the alternative of a unit root. *Journal of Econometrics, 54*(1-3), 159-178. Available at: https://doi.org/10.1016/0304-4076(92)90104-Y

Lobonţ, O-R., Nicolescu, A-C., Moldovan, N-C., & Kuloğlu, A. (2017). The effect of socioeconomic factors on crime rates in Romania: Amacro-level analysis. *Economic Research-Ekonomska Istraživanja, 30*(1), 91-111. Available at: https://doi.org/10.1080/1331677X.2017.1305790

McCollister, K. E., French, M. T., & Fang, H. (2010). The cost of crime to society: New crime-specific estimates for policy and program evaluation. *Drug and Alcohol Dependence, 108*(1-2), 98–109. Available at: https://doi.org/10.1016/j.drugalcdep.2009.12.002

Nelson, C. R., & Plosser, C. I. (1982). Trends and random walks in macroeconomic time series: Some evidence and implications. *Journal of Monetary Economics, 10*(2), 139-162. Available at: https://doi.org/10.1016/0304-3932(82)90012-5

Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. *International Economic Review, 28*(3), 777-787. Available at: https://doi.org/10.2307/2526578

Patalinghug, E. E. (2009). Identifying the link between unemployment and crime in the Philippines. *International Journal of Comparative and Applied Criminal Justice, 33*(1), 83-95. Available at: https://doi.org/10.1080/01924036.2009.9678797

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335–346. Available at: https://doi.org/10.2307/2336182

Popovici, I., Homer, J. F., Fang, H., & French, M. T. (2012). Alcohol use and crime: Findings from a longitudinal sample of U.S. adolescents and young adults. *Alcoholism, Clinical and Experimental Research, 36*(3), 532–543. Available at: https://doi.org/10.1111/j.1530-0277.2011.01641.x

Punyasavatsut, A. (2016). Determinants of the weighted crime rate in Thailand. *Journal of Economics, Business and Management, 4*(2), 161-165. Available at: http://dx.doi.org/10.7763/JOEBM.2016.V4.384

Reinsel, G. C., & Ahn, S. K. (1992). Vector autoregressive models with unit roots and reduced rank structure: estimation. likelihood ratio test, and forecasting. *Journal of Time Series Analysis, 13*(4), 353-375. Available at: https://doi.org/10.1111/j.1467-9892.1992.tb00113.x

Shoesmith, G. L. (2010). Four factors that explain both the rise and fall of US crime, 1970–2003. *Applied Economics, 42*(23), 2957-2973. Available at: https://doi.org/10.1080/00036840801964765

Syarif, R. P. (2020). A proposal for UN reform and the role of Indonesia. *Padjadjaran Journal of International Law, 4*(1), 15-30. Available at: https://doi.org/10.23920/pjil.v4i1.340

Thamarangsi, T. (2006). Thailand. Alcohol today. *Addiction, 101*(6), 783-787. Available at: https://doi.org/10.1111/j.1360-0443.2006.01477.x

Tang, C. F. (2009). The linkages among inflation, unemployment and crime rates in Malaysia. *International Journal of Economics and Management, 3*(1), 50-61. Retrieved from http://www.ijem.upm.edu.my/vol3no1/bab04.pdf

The Global Economy. (2022a). *Indonesia economic indicators*. Retrieved from https://www.theglobaleconomy.com/Indonesia/

The Global Economy. (2022b). *Thailand economic indicators*. Retrieved from https://www.theglobaleconomy.com/Thailand/

The Global Peace Index. (2015). *Measuring peace, its causes and its economic value*. Retrieved from https://www.economicsandpeace.org/wp-content/uploads/2015/06/Global-Peace-Index-Report-2015_0.pdf

The Institute for Economics & Peace. (2015). *Peace and corruption*. Retrieved from https://www.economicsandpeace.org/wp-content/uploads/2015/06/Peace-and-Corruption.pdf

The Nasdaq Data. (2022). *A premier source for financial, economic and alternative datasets*. Retrieved from https://data.nasdaq.com/

The National Institute of Population and Social Security Research. (2020). *Population projections for Thailand*. Retrieved from http://www.ipss.go.jp/sitead/index_english/eisuikei/gh2401e.asp

The Organization of Economic Cooperation Development. (2017). *How immigrants contribute to Thailand's economy*. Paris: OECD Development Pathways.

The Organization of Economic Cooperation Development. (2019). *Thailand: Gender budgeting action plan*. Paris: Public Governance Directorate Senior Budget Officials.

The United Nations Office on Drugs and Crime. (2019). Global study on Homicide 2018: Trends, contest , data. *United Nation Publications*. Vienna: UNODC.

The World Health Organization. (2018). *Global status report on alcohol and health*. Geneva: WHO. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf

The World Report. (2021). *Lack of accountability for state-sponsored rights violations*. Retrieved from https://www.hrw.org/world-report/2021/country-chapters/thailand

van Velthoven, B., & van Wijck, P. (2016). Becker's theory on crime and punishment, a useful guide for law enforcement policy in the Netherlands?. *Recht der Werkelijkheid, 37*(1), 6–31. Available at: https://doi.org/10.5553/RdW/138064242016037001002

Wakabayashi, M., McKetin, R., Banwell, C., Yiengprugsawan, V., Kelly, M., Seubsman, S. A., Iso, H., Sleigh, A., & Thai Cohort Study Team (2015). Alcohol consumption patterns in Thailand and their relationship with non-communicable disease. *BMC Public Health, 15*, 1297. Available at: https://doi.org/10.1186/s12889-015-2662-9