

Volume 45, Issue 1

Effects of macroeconomic factors on property crime in Malaysia: new evidence from the FMOLS method

Paul Anthony Mariadas

School of Accounting and Finance, Taylor's University, Malaysia

Hafizah Hammad Ahmad Khan

Faculty of Business & Management, Universiti Teknologi MARA, Kedah, Malaysia

Muthaloo Subramaniam

School of Management and Business, MILA University

Uma Murthy

School of Accounting and Finance, Taylor's University, Malaysia

Amira Mas Ayu Amir Mustafa

School of Accounting and Finance, Taylor's University, Malaysia

Siti Nurul Munawwarah Roslan

School of Accounting and Finance, Taylor's University, Malaysia

Abstract

This paper explores the effects of macroeconomic factors (household debt, income level, unemployment, inflation, and imprisonment) on property crime rates in Malaysia, driven by the potential for affected individuals to break the law for financial survival. Data spanning the period of 1999 to 2022 was obtained and analyzed using the Fully Modified Ordinary Least Squares (FMOLS) approach, revealing the significant positive influence of debt, income inequality, unemployment, and inflation on local property crime. In contrast, a higher number of prisoners does not significantly increase property crime rates, suggesting that imprisonment may not be an effective preventive measure. These insights are useful for controlling property-related offenses in developing countries that are also facing rising costs of living, household debt, unemployment, and income stagnation.

Citation: Paul Anthony Mariadas and Hafizah Hammad Ahmad Khan and Muthaloo Subramaniam and Uma Murthy and Amira Mas Ayu Amir Mustafa and Siti Nurul Munawwarah Roslan, (2025) "Effects of macroeconomic factors on property crime in Malaysia: new evidence from the FMOLS method", *Economics Bulletin*, Volume 45, Issue 1, pages 638-652

Contact: Paul Anthony Mariadas - PaulAnthony.MariaDas@taylors.edu.my, Hafizah Hammad Ahmad Khan - hafizahhammad@uitm.edu.my, Muthaloo Subramaniam - mutsgs@yahoo.com, Uma Murthy - Uma.Murthy@taylors.edu.my, Amira Mas Ayu Amir Mustafa - AmiraMasAyu.AmirMustafa@taylors.edu.my, Siti Nurul Munawwarah Roslan - Munawwarah.Roslan@taylors.edu.my.

Submitted: December 25, 2024. **Published:** March 30, 2025.

1. Introduction

Amid rapid urbanization and economic growth, Malaysia faces significant socio-economic challenges. In particular, land developments have spurred economic prosperity at the cost of income equality and housing affordability, contributing to rising property crime rates. In 2019, the Gini coefficient—a measure of income inequality—was 0.407, indicating a substantial wealth disparity (World Bank, 2023). In addition, Malaysia's urban population reached 76.2% in 2022, reflecting a notable demographic shift towards urban centers (United Nations, 2023). This migration trend, combined with government initiatives promoting home ownership and financial liberalization, has led to a surge in mortgage debt accumulation. Aspiring homeowners are increasingly leveraging their assets and taking on loans to secure property, resulting in substantial mortgage obligations. In an urbanized setting, this burden presents a dual challenge: it is both a symptom of economic inequality and a contributor to socio-economic instability. Thus, the financial strain caused by extensive housing loans is not only an economic issue but also a social stressor with broader implications.

Notably, the evident correlation between high mortgage debt and property crime rates is troubling, as it suggests that financial pressure may drive individuals toward illegal activities (Bunting, 2020). In 2022, property crime in Malaysia rose by 5.2%, highlighting the urgent need to understand the underlying dynamics between financial stress and criminal behavior (Department of Statistics Malaysia, 2023). As the financial burden on households intensifies, so does their risk of engaging in or falling victim to property crimes (Godwin et al., 2024).

Malaysia's socio-economic landscape is closely linked to its financial policies and urban development strategies (Arimah, 1997; Awaworyi et al., 2022; Bourassa & Yin, 2006; Mintah et al., 2022; Yeshimar et al., 2023). Given that addressing the interrelated issues of rising mortgage debt and property crime requires a multifaceted approach, this study seeks to fill an empirical gap by investigating the macroeconomic factors that drive property crime in Malaysia. To comprehensively understand the debt-crime relationship, advanced econometric techniques, including the Fully Modified Ordinary Least Squares (FMOLS) method, are applied to determine long-term correlations between the variables.

The findings of this study are anticipated to reveal the positive influence of debt-related macroeconomic factors on property crime, indicating that greater financial burdens lead to more property offenses. By emphasizing the significance of the dynamic interplay between mortgage debt and property crime, this study offers crucial insights for Malaysian policymakers in crafting targeted interventions to alleviate citizens' financial stress and enhance community resilience. As Malaysia navigates its ongoing journey of urbanization and economic transformation, addressing these socio-economic challenges is paramount for the nation's sustainable and inclusive development. Thus, this research is valuable in informing policy debates and decision-making, contributing to safer and more equitable urban environments.

2. Literature Review

2.1 Property Crime

Safety and security are essential components of a peaceful and contented life in for any member of the public around the world. Over time, however, significant safety threats have emerged due to crime, which is a pervasive social problem that impacts the public through loss of life, loss of assets, injury, and damage. Crime weakens political stability, rule of law, and social

cohesion, which especially jeopardizes Malaysia's well-known multi-racial harmony, trust, and unity (Sharma & Dronavalli, 2024). Despite strict laws and regulations, criminal activity is challenging to combat due to various socio-economic factors, such as the rising cost of living, economic downturns, financial hardship, inflation, and unemployment (Engelen et al., 2015; Ishak & Bani, 2017; Khan et al., 2015; Lau et al., 2019; Rennó Santos et al., 2021). Becker's (1968) Economic Theory of Crime suggests that lawbreaking is the preferred option when its perceived benefits (e.g., monetary gains and associated pleasures) outweigh the costs (e.g., legal consequences and punishments). This phenomenon, along with the increase of criminal activity in Malaysia and worldwide, underscores the timeliness, relevance, and contribution of this study to the existing body of knowledge.

According to classifications by the Royal Malaysian Police, crimes are generally divided into property crime (i.e., offenses related to stealing, theft, and housebreaking), violent crime (i.e., intentional physical harm, such as murder, rape, and assault), and other crimes (e.g., drug offenses, vandalism, animal cruelty, etc.) (Hakim et al., 2022; Sharma & Dronavalli, 2024). This study's scope encompasses only property crime; some parts of the discussion, however, may include other types of crime for comparison and generalization.

Property crime poses a significant threat in Malaysia, with a total of 1,361,320 cases recorded from 2007 to 2017, accounting for 80.5% of overall crime incidents. In 2017 alone, 77,562 property crime cases were reported (Hakim et al., 2022), followed by 66,967 cases in 2019 and 52,344 in 2020 (Shaari et al., 2023). As a developing country, Malaysia is making progress toward achieving the United Nations' Sustainable Development Goals (SDGs) for 2030, particularly SDG Goal 11, which aims to make cities and human settlements inclusive, safe, resilient, and sustainable.

2.2 Macroeconomic Factors Affecting Property Crime

In light of the socio-economic pressures incurred by mortgage debt, this study aims to explore the effect of five macroeconomic factors (i.e., household debt, income level, unemployment, inflation, and imprisonment) on property crime rates in Malaysia. First, Malaysia's household debt-to-GDP ratio is among the highest in the ASEAN region, standing at 89.0% in 2021 alongside Thailand's 89.3% and notably higher than Singapore's 69.7%, Indonesia's 17.2%, and the Philippines' 9.9%. In Malaysia, this ratio includes debt from both banks and non-banks, while in Indonesia and the Philippines, only debts in the banking system are considered, for which Malaysia's equivalent figure is 73.1%. Notwithstanding these figures, in absolute terms, Malaysian households shoulder nearly RM1.4 trillion in debt (BNM, 2024). Debt, by nature, is not an advisable or welcome commitment, as it requires repayment. However, it is often unavoidable as people have limited alternatives for quick financing. Without due diligence, mismanagement of debt can leave borrowers vulnerable to adverse consequences such as stress-induced health problems, family conflicts, and other socio-economic issues. In worst-case scenarios, borrowers may become unemployed and lose their income, affecting their ability to repay debts (McCloud & Dwyer, 2011). These financial hardships shed light on the potential link between debt and crime (Aaltonen, Oksanen, & Kivivuori, 2016; Van Beek et al., 2021), particularly property crimes driven by the need for basic provisions (Hoeve et al., 2016).

Second, the inequality in income levels has been demonstrated to be a significant driver of property crime. For example, Huhta (2012) and Buba (2018) found a positive correlation between income inequality and property crime, but no such correlation with violent crime. Nilsson (2004) also revealed a significant positive relationship between the percentage of low-

income earners (less than 10% of the median income) and property crime rates. On the other hand, Atems (2020) concluded that income inequality increases both property and violent crime, whereas Baharom and Habibullah (2009) failed to establish the significant effect of income inequality on any crime type, whether total, property, and violent crime. Interestingly, this non-significant result was echoed by Bourguignon et al. (2003) and Neumayer (2005). These mixed findings across different countries, including Malaysia, indicate inconsistencies in the empirical literature on income and property crime (Chisholm & Choe, 2005). As such, it is worth exploring this relationship to gain a clearer understanding.

Therefore, in this study, income level is examined through the lens of gross domestic product (GDP) per capita. GDP per capita is a widely used measure of economic performance, serving as a general indicator of living standards and economic welfare. Ishak and Bani (2017) conducted a study among developed states in Malaysia using fixed effects estimation, concluding that real GDP per capita significantly influences both total and property crimes. However, their research was limited to certain developed states and cannot be generalized to the entire nation. In a related study, Ragnarsdottir (2014) identified a long-term equilibrium relationship between GDP and property crime, but no such correlation was found for total, violent, or other crimes within the same timeframe. Roman (2013) examined U.S. data and found a statistically significant and positive relationship between GDP per capita and crime rates, whereby for every USD1,000 appreciation in GDP per capita, crimes increase by 8.113 incidents. However, Roman's study focused primarily on violent crime, not property crime, suggesting mixed results across different contexts. This indicates a gap in the literature regarding the impact of GDP per capita on property crimes (Northrup & Klaer, 2014).

The third macroeconomic factor is unemployment, which is notoriously known to motivate crime. The literature has extensively supported a positive relationship between unemployment and crime rates across various countries (Becker, 1968; Cantor & Land, 1985; Edmark, 2005; Ehrlich, 1973; Hazra & Cui, 2018; Ishak & Bani, 2017; Nagasubramaniyan & Joseph, 2024; Papps & Winkelmann, 2000; Raphael & Ebmer, 2001; Reilly & Witt, 1996). This is because a decline in legitimate earnings can cause social stress, resource scarcity, and reduced social mobility, ultimately deteriorating a person's well-being. When coupled with poverty, these negative experiences may push unemployed individuals to engage in criminal activities (Ali, 2015; Gillani et al., 2011; Sharma & Dronavalli, 2024). Some researchers have found that unemployment can lead to all types of crime in the face of economic hardship (Khan et al., 2015; Haider et al., 2015). Others, however, have indicated that unemployment has a significantly stronger effect on property crimes than violent crimes (Altindag, 2012; Edmark, 2005; Narayan & Smyth, 2004; Raphael & Winter-Ebmer, 2001; Recher, 2020; Wu & Wu, 2012; Yearwood & Koinis, 2011), primarily due to low incomes (Aoulak, 1999; Buonanno, 2003). In essence, property crimes are more prevalent when people are struggling to manage during hard times, including periods of unemployment. They may face obstacles in accessing legitimate options to survive, and so resort to unlawful acts despite their consequences (Doyle & Gerell, 2024).

Fourth, another key indicator of crime is inflation, measured using the Consumer Price Index (CPI). Inflation reduces consumers' purchasing power, leading to higher costs of living. In this situation, people are forced to spend more prudently; some may even look for unfavorable alternatives to survive, such as committing crimes. Indeed, previous studies have linked inflation to increased crime rates, particularly when combined with unemployment (Alwee, 2013; Nunley et al., 2016; Tang, 2009; Tang & Lean, 2007). For instance, in Pakistan, Saqib, Yasmin, and Hussain (2023) identified both short- and long-term influences of CPI on crime,

observing that while higher prices exacerbate illegal behavior, lower prices cannot alleviate it. In contrast, Allen (1996) found that a decrease in inflation leads to a reduction in property crimes. These mixed findings underscore the need to shed light on the relationship between CPI and property crime to determine context-specific or method-based variations.

Fifth and finally, prison population is an important variable in the study of crime rates. This term describes individuals incarcerated in prisons, correctional facilities, or penal institutions. It excludes non-criminal detainees who are in for administrative reasons, such as illegal foreigners pending immigration investigations or deportation. In 2017, Malaysia's prison population rate was about 175 inmates per 100,000 citizens, an increase from 168 in 2015 and 2016 (Statista, 2024). In total, the number of pre-trial and remand prisoners has been rising since 2012, reaching 51,602 in 2016—a 41% increase from previous years (World Prison Brief Data, 2017; Mohamad et al., 2017). This trend is concerning because finding employment is more challenging after a person has been imprisoned, creating a cycle that may perpetuate criminal behavior (Harris et al., 2010). However, research into the impact of prison population growth on crime rates has produced mixed results. Early studies suggest that imprisoning more perpetrators significantly reduces crime (Marvel & Moody, 1994; Levitt, 1996), whereas other research found no significant relationship between the two (Kovandzic & Vieratis, 2006). Liedka et al. (2006) observed that incarcerating more criminals can, in certain situations, actually heighten crime rates, especially when the prison population hits its saturation point. These contrasting outcomes highlight the need for further exploration of how prison population growth influences crime, particularly property crime which is the focus of this study.

3. Methodology

This research's primary aim is to investigate the relationship between macroeconomic variables and property crime in Malaysia. To achieve this objective, trimestral time series data between 1999 and 2022 was collected from the Malaysian Department of Statistics (Property Crime, GDP per capita, Consumer Price Index, Unemployment, Population Growth), the World Prison Brief (Prison Population Growth), and the Bank Negara Malaysia (Household Debt), resulting in a total of 96 observations. The property crime index was the dependent variable, while the independent variables consisted of household debt, GDP per capita (as an indicator of income level), unemployment rate, CPI (as a proxy for inflation), and prison population growth. All variables except unemployment rate were transformed into logarithmic form to maintain consistent variance and facilitate interpretation (Shahbaz et al., 2016).

Data analysis began with unit root analysis, performed using the Augmented Dickey-Fuller (ADF) test. A unit root determines the non-stationarity (i.e., trend or random walk) of a time series construct. Accordingly, the ADF technique is well-established for its ability to estimate regression models based on current and lagged time series data and subsequently, detect the presence of a unit root. The null hypothesis of this test, which assumes that the variable contains a unit root, is rejected if the p-value falls below the chosen significance level; this indicates that the construct is stationary. It is essential to conduct the unit root test when dealing with time series data, particularly to guide model selection and avoid misleading regressions. The model is specified below:

$$LPCR_t = \alpha_0 + \alpha_1 LGDP_t + \alpha_2 LCPI_t + \alpha_3 U_t + \alpha_4 LPRIS_t + \alpha_5 LHD_t + \mu_t \quad (1)$$

In this equation, LPCR refers to the dependent variable—the natural logarithm of property crime per 100,000 individuals, with t denoting periods from 1999 to 2020. The independent constructs consist of the natural logarithms of GDP per capita (LGDP), CPI (LCPI),

unemployment rate (U), prison population growth (LPRIS), and household debt (LHD). The term μ represents the error component.

Next, the Johansen method was utilized for cointegration analysis, aiming to assess the existence of long-term effects (Johansen, 1988; Johansen & Juselius, 1990). Unlike the Engle-Granger test, the Johansen test can identify multiple cointegrating equations, whereby its null hypothesis assumes the absence of a cointegrating vector. If at least one cointegrating equation is detected, it implies that the variables have long-term relationships, allowing for the appropriate long-run model estimation.

Upon confirming cointegration, the long-term model estimation was performed via FMOLS. This method was employed as it effectively produces reliable results even with limited sample sizes. Developed by Phillips and Hansen (1990), FMOLS also addresses common time series data issues such as serial correlation and endogeneity (Bashier & Siam, 2014; Montalvo, 1995; Narayan & Narayan, 2004). Referring to Adom and Kwakwa (2014), this study specified the FMOLS estimator as the following equation:

$$\hat{\Phi}FME = (\sum_{t=1}^T Z_t Z_t')^{-1} (\sum_{t=1}^T Z_t Y_t^+ - T\hat{f}^+) \quad (2)$$

The correction term for endogeneity is expressed as $Y_t^+ = y_t - \hat{\lambda}_{0x} \hat{\lambda}_{xx}^{-1} \Delta_{xt}$, where $\hat{\lambda}_{0x}$ and $\hat{\lambda}_{xx}$ are the long-term covariances' kernel estimations. The serial correlation correction term is $\hat{f} = \hat{\Delta}_{0x} - \hat{\lambda}_{0x} \hat{\lambda}_{xx}^{-1} \hat{\Delta}_{xx}$, where $\hat{\Delta}_{0x}$ and $\hat{\Delta}_{xx}$ are the one-sided long-term covariances' kernel estimations.

For robustness testing of the long-term model, this study employed the Dynamic Ordinary Least Squares (DOLS) approach as suggested by Stock and Watson (1993). The purpose is to verify the consistency of the FMOLS findings under a different estimation technique. The DOLS estimator is defined in Equation (3) below:

$$y_t = a + bX_t + \sum_{i=-k}^{i=k} \phi_{t+i} + \epsilon_t \quad (3)$$

Where b refers to long-term elasticity and ϕ represents the coefficients of the lead and lag regressor differences.

4. Results and Discussion

4.1 Descriptive Analysis

Using time series data, this empirical investigation examined the influence of macroeconomic factors on property crime in Malaysia. Table 1 provides the descriptive statistics of the study variables, highlighting several key observations over the study period of 1999 to 2022. Property crime incidents ranged from 41,479 to 174,423 cases, while income levels varied between RM12,682 and RM46,526. The CPI fluctuated from 72.6% to 123%, with the highest level recorded in 2022. This peak is attributed to an oil price surge during the Russia-Ukraine conflict, which impacted consumer purchasing power. The descriptive analysis further revealed that the unemployment rate ranged from 2.4% to 4.5%, while prison population growth varied between 1.9% and 9.6%. Total household debt showed a consistent upward trend, ranging from RM25,813 to RM69,507.

Table 1. Descriptive statistics

Variables	LPCR	LGDP	LCPI	U	LPRIS	LHD
-----------	------	------	------	---	-------	-----

Mean	120597.3	27985.56	98.61200	3.372000	1.3402	42491.36
Median	133525.0	27929.00	98.30000	3.300000	1.2425	39440.00
Maximum	174423.0	46526.00	123.0000	4.5	9.5752	69507.00
Minimum	41479.00	12682.00	72.60000	2.400000	1.9387	25813.00
Std. Dev.	37790.05	11391.05	16.30785	0.400541	0.3701	13171.39
Skewness	-0.481761	0.122518	0.046362	0.515512	0.005	0.627871
Kurtosis	2.310785	1.626091	1.653995	4.910800	2.0363	2.415644
Observations	96	96	96	96	96	96

Note: Std. Dev refers to standard deviation.

4.2 Unit Root Analysis

The results of the ADF unit root test (Table 2) confirm that all variables are integrated at order I(1). Since the Johansen cointegration test (Table 3) confirms a long-run relationship among the variables, the FMOLS regression model is estimated at levels rather than first differences, ensuring that the long-run equilibrium is preserved. Additionally, incorporating a trend term in the FMOLS model could help capture deterministic trends in the long-run relationship, aligning with the research objectives.

Table 2. ADF unit root test

<i>Variable</i>	<i>Level</i>		<i>1st difference</i>	
	Intercept	Intercept & trend	Intercept	Intercept & trend
LPC	2.1609 (0.9998)	-0.6430 (0.9663)	-3.1954** (0.0334)	-3.5891 (0.0598)
LGDP	-1.2856 (0.6190)	-0.6676 (0.9643)	-4.8061*** (0.0009)	-5.2797*** (0.0016)
LCPI	-1.7238 (0.4072)	-1.5443 (0.7847)	-4.4676**** (0.0020)	-4.7130*** (0.0053)
U	-1.9061 (0.3238)	-3.2429 (0.1000)	-6.2960*** (0.0000)	-6.2106*** (0.0002)
LP	-0.4197 (0.8906)	-2.2012 (0.4677)	-5.7782*** (0.0001)	-5.6637*** (0.0007)
LHD	-0.7164 (0.8242)	-0.7485 (0.9569)	-4.6769*** (0.0012)	-6.1408*** (0.0002)

Note: The optimal lag was chosen based on the Schwarz Information Criterion; p-values are in parentheses; *** and ** denote rejection of the unit root null hypothesis at the 0.01 and 0.05 significance levels, respectively.

4.3 Cointegration Analysis

Based on the ADF test results, potential cointegration relationships could be assumed among the variables. Table 3 shows the results of the Johansen cointegration test, where both the Trace and Max-Eigen statistics support the null hypothesis of non-cointegration being rejected (Johansen & Juselius, 1990). This finding confirms the variables were indeed cointegrated, allowing for the estimation of a long-run FMOLS model to quantify their relationships.

Table 3. Johansen cointegration test

Number of cointegrating equations	Trace statistic	Max-Eigen statistic
None	222.7706***	86.1990***
At most 1	136.5716***	49.7932***
At most 2	86.7784***	35.7818**
At most 3	50.9966***	25.5362*
At most 4	25.4584*	16.4721
At most 5	8.9863	8.9863

Note: ***, ** and * indicate the null hypothesis of no cointegration is rejected at 1%, 5% and 10% significance levels, respectively.

4.4 FMOLS Analysis

The results of the FMOLS regression are presented in Table 4. The long-run elasticities show the estimation coefficients, t-statistics, and corresponding p-values for each independent factor in the model. They indicate the estimated long-term impact on property crime for every 1% growth in an independent construct, assuming the other constructs remain stable. The elasticities reveal that all variables, except for prison population growth, are statistically significant predictors of property crime. Income level (represented by GDP per capita), unemployment rate, and household debt are significant at the 1% level, with coefficients of 2.4035, 0.461, and 1.3145, respectively. This implies that a 1% increase in income level, unemployment, or household debt corresponds with a 2.4035%, 0.461%, or 1.3145% increase in property crime, respectively, in the long run. Similarly, inflation, represented by the CPI, is significant at the 10% level, with a coefficient of 4.4508. This indicates that a 1% rise in inflation is linked to a 4.4508% increase in property crime over the long term. Conversely, the coefficient for prison population growth did not achieve statistical significance, suggesting no substantial long-term relationship between imprisonment and property crime.

The positive impact of income on property crime can be attributed to higher consumption and ownership of valuable goods. When individuals have more funds, they acquire more possessions. This attracts opportunities for theft and burglary, particularly those targeting property (Ishak & Bani, 2017; Northrup & Klaer, 2014; Ragnarsdottir, 2014; Roman, 2013). Similarly, inflation raises living costs, leading to financial stress and desperation. Such circumstances may prompt individuals to commit property crime to sustain their quality of life and meet their daily needs (Alwee, 2013; Saqib, Yasmin, & Hussain, 2023; Tang, 2009; Tang & Lean, 2007). The finding that unemployment triggers property crime aligns with Recher (2020), who noted that job loss often results in financial hardship, with those affected struggling for basic provisions such as food, housing, and healthcare. Consequently, some resort to property crimes like burglary or theft as a means of survival. Lastly, household debt has a positive influence on property crime, indicating that individuals strained by debt have a greater likelihood of engaging in property crimes to alleviate their economic burden (Van Beek et al., 2023).

Table 4. FMOLS results

Variable	Coefficient	t-statistic	p-value
C	-46.7113	-4.2269	0.0006
LGDP	2.4035***	4.1645	0.0006
LCPI	4.4508*	1.9908	0.0628
U	0.4610***	4.5182	0.0003
LPRIS	-0.0488	-0.1963	0.8467
LHD	1.3145***	2.9297	0.0094
@TREND	-0.3906***	-6.8172	0.0000

Note: *** and * denote significance at the 1% and 10% levels, respectively.

4.5 Robustness Check

To verify that the study's findings are robust, long-run estimations were re-run using the DOLS technique, as reported in Table 5. The results indicate that income level (i.e., GDP per capita), inflation (i.e., CPI), unemployment, and household debt significantly contribute to property crime, while prison population growth remains insignificant. The signs of the estimated coefficients match those from the FMOLS method, notwithstanding slight value differences. Indeed, in comparison with the DOLS model, the findings of the FMOLS model appear more robust. This conclusion is based on the FMOLS's ability to satisfy the stability requirement and normality assumptions, regardless of the presence of a structural break (see Table 6). Conversely, the DOLS method fails to meet the normality assumption. Therefore, the FMOLS results are considered to be superior in terms of reliability and interpretability.

Table 5. DOLS results

Variable	Coefficient	t-statistic	p-value
C	-50.1361	-3.3872	0.0033
LGDP	2.0115**	2.3319	0.0315
LCPI	6.0845*	2.0629	0.0539
U	0.4529***	3.7469	0.0015
LPRIS	-0.0615	-0.1653	0.8705
LHD	1.3311*	1.9829	0.0628
@TREND	-0.4031***	-5.2136	0.0001

Note: *** and * denote significance at the 1% and 10% levels, respectively.

Table 6. Diagnostic test for FMOLS model

Indicator	Test statistic	Result
-----------	----------------	--------

Hansen parameter instability	0.5764 (>0.2)	The model is stable
LM test	0.2877 (0.8660)	No autocorrelation
ARCH test	0.0358 (0.8499)	No heteroskedasticity
Jarque-bera test	0.5323 (0.7663)	Normal distribution

Note: p-values are in parentheses; null hypothesis for all tests are rejected at the 1% significance level.

5. Conclusion and Recommendations

This research has established that macroeconomic factors, namely income level, unemployment, household debt, and inflation, have a significant positive effect on property crime in Malaysia. The analysis specifically shows that a 1% increase in income level is linked to a 2.4035% rise in property crime, likely due to asset purchases that increase the value of goods susceptible to theft and burglary. Unemployment is another critical factor, with a 1% growth in the unemployment rate hiking up crime by 0.461%, as economic pressures drive some individuals towards criminal activity. Additionally, a 1% rise in household debt correlates with a 1.3145% surge in property crime, reflecting the economic pressure faced by households. This study also reveals that a 1% increase in inflation boosts property crime by 4.4508% due to heightened financial pressures from inflationary costs. On the other hand, the prison population's growth does not significantly impact property crime rates, suggesting that incarceration may not be an efficient preventive tool against this type of offense. In terms of methodological contribution, the analysis indicates that, while both the FMOLS and DOLS models are widely used, the former provides more reliable and accurate results.

Overall, the findings emphasize that economic stability plays a crucial role in influencing property crime, reiterating the need for the government to implement measures to address macroeconomic issues identified in this study. Specifically, this study recommends policies targeting income equality, job creation, debt management, and inflation control to combat property crime in Malaysia over the long term. First, enhancing economic support systems, particularly by decreasing income disparity and balancing income distribution, can help lower crime levels. Measures such as expanding social safety nets and offering grants to financially disadvantaged families can alleviate financial pressure, preventing people from turning to crime. Second, reducing unemployment and creating job opportunities should be prioritized. This can be achieved through vocational training for youths, support for business development, and incentives for companies to generate employment, especially in high-crime areas.

Next, controlling household debt and promoting financial literacy are imperative to avoid financial desperation. Increasing awareness about personal finance and encouraging prudent lending practices can help citizens manage economic pressures that lead them to crime. Lastly, efforts to monitor inflation are crucial for reducing property crime. Policies such as subsidies on essential goods and services and supportive financial schemes for economically disadvantaged populations can mitigate the impact of rising living costs. Implementing these suggestions can enable the government to advance its developmental efforts and economic stability without the safety threat of property crime.

Notably, this study asserts that property crime prevention cannot rely on imprisonment, as increasing the prison population does not effectively deter fraudulent activities. Therefore,

more comprehensive measures are needed to solve the root causes that drive people to break the law, such as lack of education. Indeed, crime prevention strategies should involve collaboration between financial policymakers and law enforcement agencies to ensure a practical and efficient approach to crime reduction that encompasses both economic and societal frameworks.

While this study has made significant contributions to the literature, further research is necessary to explore the nature of the relationship between macroeconomic factors and crime, especially how it evolves over time and across different regions. Improved measures of both economic factors and crime are also required to refine future analyses.

References

- Aaltonen, M., Oksanen, A., & Kivivuori, J. (2016). Debt problems and crime. *Criminology*, 54(2), 307-331.
- Ali, A. (2015). *The Impact of Macroeconomic Instability on Social Progress: An Empirical Analysis of Pakistan*. Ph.D Dissertation. NCBA&E, Lahore, Pakistan, 1-152.
- Allen, R. C. (1996). Socioeconomic conditions and property crime: A comprehensive review and test of the professional literature. *American Journal of Economics and Sociology*, 55(3), 293-308.
- Altindag, D. T. (2012). "Crime and unemployment: Evidence from Europe," *International Review of Law and Economics*, vol. 32, pp. 145-157.
- Alwee, R., Shamsuddin, S. M. H., & Salleh Sallehuddin, R. (2013). Economic indicators selection for crime rates forecasting using cooperative feature selection. In *AIP Conference Proceedings* (Vol. 1522, No. 1, pp. 1221-1231). American Institute of Physics.
- Atems, B. (2020). Identifying the dynamic effects of income inequality on crime. *Oxford Bulletin of Economics and Statistics*, 82(4), 751-782.
- Auolak, M. A. (1999). *Prison Administration in Pakistan*. Lahore: S and S Publishers.
- Baharom, A. H., & Habibullah, M. S. (2009). Crime and income inequality: The case of Malaysia. *J. Pol. & L.*, 2, 55.
- Becker, G. S. (1968) "Crime and Punishment: An Economic Approach" *Journal of Political Economy*, 76, 1169-217.
- BNM. (2024). https://amlcft.bnm.gov.my/documents/20124/6459002/fsr21h2_en_box2.pdf
- Buba, S. A. A. D., Ishak, S. U. R. Y. A. T. I., Habibullah, M. S., & Noor, Z. M. (2018). Income inequality and property crime in selected southern and eastern european countries. *International Journal of Economics and Management*, 12, 567-581.
- Buonanno, P. (2003). The socioeconomic determinants of crime. A review of the literature. *Working Paper Dipartimento di Economia Politica, Università di Milano Bicocca*; 63.
- Cantor, D., & Land, K. C. (1985). Unemployment and crime rates in the post-World War II United States: A theoretical and empirical analysis. *American sociological review*, 317-332.
- Chisholm, J., & Choe, C. (2005). Income variables and the measures of gains from crime. *Oxford Economic Papers*, 57(1), 112-119.
- Doyle, M. C., & Gerell, M. (2024). Assessing Crime History as a Predictor: Exploring Hotspots of Violent and Property Crime in Malmö, Sweden. *International Criminal Justice Review*, 10575677241230915.
- Edmark, K (2005)."Unemployment and crime: Is there a connection?". *Scandinavian Journal of Economics*, vol. 107, pp. 353-373.
- Edmark, K. (2005). Unemployment and crime: Is there a connection?. *Scandinavian Journal of Economics*, 107(2), 353-373.

- Ehrlich, I. (1973) "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation" *Journal of Political Economy*, **38**, 521-65.
- Engelen, P., Lander, M. W., & van Essen, M. (2015). Economic and sociological theories of criminal behavior. *The Social Science Journal*, *53*(2), 1–16. <https://doi.org/10.1016/j.soscij.2015.09.001>
- Gillani, S. Y. M. Khan, R. E. A. and Gill, A. R. (2011). Unemployment and property crimes in Pakistan. *Asian Economic and Financial Review*, *1*(3), 124-133.
- Haider, A. and Ali, A. (2015), "Socio-economic determinants of crimes: a cross-sectional study of Punjab districts", *International Journal of Economics and Empirical Research*, Vol. 3 No. 11, pp. 550-560.
- Hakim, H. M., Lalung, J., Khan, H. O., Hamzah, H. H., Othman, M. F., Rasudin, N. S., ... & Edinur, H. A. (2022). Property Crime Incidence and Patterns in Malaysia from 2007 to 2017. *Planning Malaysia*, *20*.
- Hazra, D., & Cui, Z. (2018). Macroeconomic determinants of crime: Evidence from India. *Journal of Quantitative Economics*, *16*, 187-198.
- Hoeve, M., Jak, S., Stams, G. J. J., & Meeus, W. H. (2016). Financial problems and delinquency in adolescents and young adults: A 6-year three-wave study. *Crime & Delinquency*, *62*(11), 1488-1509.
- Huhta, A. (2012). Property crime and income inequality in Finland.
- Ishak, S., & Bani, Y. (2017). Determinants of crime in Malaysia: Evidence from developed states. *International Journal of Economics & Management*, *11*(3), 607–622.
- Ishak, S., & Bani, Y. (2017). Determinants of Crime in Malaysia: Evidence from Developed States. *International journal of economics & management*, *11*.
- Khan, N., Ahmed, J., Nawaz, M. and Zaman, K. (2015), "The socio-economic determinants of crime in Pakistan: New evidence on an old debate", *Arab Economics and Business Journal*, Vol. 10, pp. 73-81.
- Khan, N., Ahmed, J., Nawaz, M., & Zaman, K. (2015). The socioeconomic determinants of crime in Pakistan: New evidence on an old debate. *Arab Economic and Business Journal*, *10*(2), 73–81. <https://doi.org/10.1016/j.aebj.2015.01.001>
- Kovandzic, Tomislav V. and Lynne M. Vieraitis 2006 *The effect of county-level prison population growth on crime rates*. *Criminology & Public Policy*. This issue.
- Lau, E., Hamzah, S. N. Z., & Habibullah, M. S. (2019). The economic of deterrence: A wrong policy or a misplaced strategy? *Jurnal Ekonomi Malaysia*, *53* (1), 105–119. <https://doi.org/10.17576/JEM-2019-5301-9>
- Levitt, Steven D. (1996) The effect of prison population size on crime rates: Evidence from prison overcrowding litigation. *Quarterly Journal of Economics* **111**: 319–351.
- Liedka, Raymond V., Anne Morrison, Piehl, and Bert Useem (2006). The crime-control effect of incarceration: Does scale matter *Criminology & Public Policy*. This issue.
- Marvell, Thomas B. and Carlisle E. Moody (1994) Prison population growth and crime reduction. *Journal of Quantitative Criminology* **10**: 109–140.
- McCloud, L., & Dwyer, R. E. (2011). The fragile American: Hardship and financial troubles in the 21st century. *The Sociological Quarterly*, *52*(1), 13-35.
- Mohamad, M., Mat, A., & Muhammad, N. (2017). Measurement of drug-abuse inmates' prison climate: Confirmatory factor analysis. *International Journal of Applied Business and Economic Research*, *15*(25), 405-421.
- Nagasubramaniyan, G., & Joseph, A. (2024). Urban-rural unemployment and crime in India: a panel data analysis. *International Journal of Sustainable Economy*, *16*(1), 1-15.
- Narayan P. K. & Smyth, R. (2004) "Crime rates, male youth unemployment and real income in Australia: Evidence from Granger causality tests," *Applied Economics*, vol. 36, pp. 2079-2095.

- Nilsson, A. (2004). *Income inequality and crime: The case of Sweden* (No. 2004: 6). IFAU-Institute for Evaluation of Labour Market and Education Policy.
- Northrup, B., & Klaer, J. (2014). Effects of GDP on violent crime.
- Nunley, J. M., Stern, M. L., Seals, R. A., & Zietz, J. (2016). The impact of inflation on property crime. *Contemporary Economic Policy*, 34(3), 483-499.
- Papps, K., & Winkelmann, R. (2000). Unemployment and crime: New evidence for an old question. *New Zealand Economic Papers*, 34(1), 53-71.
- Phillips, P.C. and Hansen, B.E. (1990), "Statistical inference in instrumental variables regression with I (1) processes", *The Review of Economic Studies*, Vol. 57 No. 1, pp. 99-125.
- Ragnarsdottir, A. G. (2014). Investigating the Long-Run and Causal Relationship between GDP and Crime in Sweden.
- Raphael, S., & Winter-Ebmer, R. (2001). Identifying the effect of unemployment on crime. *The journal of law and economics*, 44(1), 259-283.
- Raphael, S., & Winter-Ebmer, R. (2001). Identifying the effect of unemployment on crime. *The journal of law and economics*, 44(1), 259-283.
- Recher, V. (2020). Unemployment and property crime: evidence from Croatia. *Crime, Law and Social Change*, 73, 357-376.
- Reilly, B., & Witt, R. (1996). Crime, deterrence and unemployment in England and Wales: an empirical analysis. *Bulletin of Economic Research*, 48(2), 137-159.
- Rennó Santos, M., Testa, A., & Weiss, D. B. (2021). Inflation and cross-national homicide: Assessing nonlinear and moderation effects across 65 countries, 1965–2015. *International Criminal Justice Review*, 31(2), 122–139. <https://doi.org/10.1177/1057567720981624>
- Recher, V. (2020). Unemployment and property crime: evidence from Croatia. *Crime, Law and Social Change*, 73(3), 357-376.
- Roman, J. (2013, September 24). 'The Puzzling Relationship Between Crime and the Economy', *The Atlantic Cities*. Retrieved March 14, 2014, from <http://www.theatlanticcities.com/jobs-and-economy/2013/09/puzzling-relationship-between-crime-and-economy/6982/>.
- Saqib, A., Yasmin, F. and Hussain, I. (2023), "Does the crime rate respond symmetrically or asymmetrically to changes in governance quality and macroeconomic variables? The application of linear and non-linear ARDL", *International Journal of Social Economics*, Vol. 50 No. 12, pp. 1756-1776. <https://doi.org/10.1108/IJSE-09-2022-0625>.
- Shaari, M.S., Harun, N. H, Esquivias, M.A., Abd Rani, M. J. & Zainal Abidin, Z (2023) Debunking conventional wisdom: Higher tertiary education levels could lead to more property crimes in Malaysia, *Cogent Social Sciences*, 9:2, 2245638, DOI: 10.1080/23311886.2023.2245638.
- Sharma, S., & Dronavalli, S. C. (2024). Data Analysis and Visualization of Crime Data. *Electronic Imaging*, 36, 1-6.
- Shepherd, J. (2006). The imprisonment puzzle: Understanding how prison growth affects crime. *Criminology & Public Policy*, 5(2), 285-298.
- Statista (2024), Prison population rates in Malaysia from 2006 to 2017(per 100,000 population). <https://www.statista.com/statistics/699723/prison-population-rates-malaysia/>
- Tang, C. F. and Lean, H. H., (2007) "Will inflation increase crime rate? New evidence from bounds and modified wald tests," *Global Crime*, vol. 8, pp. 311-323.
- Tang, C. F. (2009). "The linkages among inflation, unemployment and crime rates in Malaysia," *International Journal of Economics and Management*, vol. 3, pp. 50-61, 2009.
- United Nations. (2024). *Goal 11 | Department of Economic and Social Affairs*. United Nations. <https://sdgs.un.org/goals/goal11>.

- van Beek, G., de Vogel, V., & van de Mheen, D. (2021). The relationship between debt and crime: A systematic and scoping review. *European Journal of Probation*, 13(1), 41-71.
- Van Beek, G., De Vogel, V., Leenders, R., & van de Mheen, D. (2023). Does debt increase risk? A mixed methods approach to studying the potential underlying risk factors in the relationship between debt and crime. *Psychology, Crime & Law*, 29(6), 611-633.
- Wu, D. and Wu, Z. (2012). "Crime, inequality and unemployment in England and Wales," *Applied Economics*, vol. 44, pp. 3765-3775.
- Yearwood D. L. & Koinis, G. (2011). "Revisiting property crime and economic conditions: An exploratory study to identify predictive indicators beyond unemployment rates," *Social Science Journal*, vol. 48, pp. 145-158.
- Yearwood, D. L., & Koinis, G. (2011). Revisiting property crime and economic conditions: An exploratory study to identify predictive indicators beyond unemployment rates. *The Social Science Journal*, 48(1), 145-158.