

# Impact of violent and property crimes on microfirms' performance: The Philippine experience

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## ABSTRACT

Crime creates business uncertainties that can disturb, if not destroy, the already vulnerable business environment. Microfirms, due to their smallness, are more susceptible to the effects of crime as they lack the resources to invest in protection and endure its effects. Many empirical investigations on the subject matter have not yet produced a definite conclusion. Thus, this study is imperative. This study fills the inconclusiveness, vagueness, and mixed evidence of the crimes' impact on entrepreneurship in the literature. This quantitative research used secondary data consisting of a two-panel micro-level data set with a total of 1,190 observations from 2009 to 2018. The fixed effect and random effect regression models were used to know how crime rates of physical assault, theft, and robbery affect microfirms' performance, and the causality direction and dynamics were investigated using MWALD Granger causality. The result highlighted the strong evidence depicting the negative effects of crime on microfirms' performance. A bidirectional causality also runs between microfirms' performance and crime, but there is a negative impact on both variables in the long run. The findings underscored the importance of multisectoral participation in preventing and mitigating the effect of crimes against persons and property on microfirms and promoting a business-friendly environment.

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## 1. Introduction

Microenterprises and small to medium-sized businesses are crucial for economic growth, job creation, and innovation in developing and emerging economies (Andoh, Quaye, & Akomea-Frimpong, 2018; Bouazza, Ardjouman, & Abada, 2015). In the Association of Southeast Asian Nations (ASEAN), these businesses are considered the "backbone of national economic development," constituting over 97% of businesses and employing more than half of the workforce in the region (Asia-Pacific Economic Cooperation, 2018). However, it is concerning that a high failure rate exists among such enterprises, with 08 out of 10 companies failing within 18 months, as noted by Wagner (2013), corroborated by findings from Fatoki (2014), Baporikar, Nambira, and Gomxos (2016), Bushe (2019).

The reasons for these high failure rates are often attributed to internal and external factors (Bushe, 2019; Fatoki, 2014). These factors include entrepreneur incapacity, incompetence, and environmental unfavorability, encompassing both the external environment and a company's adaptability to change. Micro and small businesses are particularly susceptible to uncertainties arising from external factors, such as criminality, compared to larger firms (Baporikar et al., 2016; Montoya, 2016; Motta, 2017).

Several studies have been dedicated to understanding and addressing the challenges faced by microenterprises to promote their growth and performance (Bouazza et al., 2015; Bushe, 2019; Rungani & Potgieter, 2018). Additionally, crime has been identified as having significant negative effects on national and local economic development. The U.S. Government Accountability Office (2017) highlighted the direct and indirect costs of crime on victims, households, and businesses, covering expenses associated with preventing crime, dealing with its consequences, and responding to it. These costs are incurred in three stages: anticipation of crime, consequences of crime, and response to crime (Arguello, 2020; Heeks, Reed, Tafsiri, & Prince, 2018; U.S. Government Accountability Office, 2017).

Various types of crime have distinct impacts on businesses, with crime costs, encompassing both tangible and intangible expenses, ranging from \$9 million to \$3.2 trillion in countries including Australia, Canada, New Zealand, Poland, the United Kingdom, the United States, and Latin America (Olavarría-Gambi, 2018; U.S. Government Accountability Office, 2017; Wickramasekera, Wright, Elsey, Murray, & Tubeuf, 2015). This financial burden is not exclusive to large enterprises, as microfirms also suffer. In England and Wales, crimes against businesses were estimated to cost £9 billion in 2015-2016 (Heeks et al., 2018). The variations in cost estimates can be attributed to fluctuations in unit costs, underreporting, changes in crime patterns, inconsistent crime category definitions, and methodological disparities (Wickramasekera et al., 2015). Importantly, these findings illustrate the detrimental economic ripple effect of crime, hindering national development and the well-being of their populations (Olavarría-Gambi, 2018).

In emerging and developing countries such as the Philippines, the increasing incidence of crime, including robbery, theft, and physical assault, imposes a significant direct cost on micro and small firms. Entrepreneurs must invest in security measures due to the heightened perceived risk of theft or damage to their products. Moreover, the fear of crime among potential customers may lead to altered buying behaviors and deter them from patronizing local businesses, diminishing the customer base. Research by Montoya (2016) reveals a decline in economic activity among firms in the face of rising crime, even when these crimes are not directly targeted at local businesses. Consequently, crime affects various aspects of businesses, including investment, sales, marketing, advertising, employment, and restructuring (Wickramasekera et al., 2015).

Matti and Ross (2016) emphasize that crime introduces uncertainties, increasing entrepreneurs' opportunity costs and distorting business prospects. This instability can disrupt or even jeopardize the already fragile business environment in developing economies, which plays a crucial role in promoting firm growth and performance, as highlighted by studies such as Fatoki (2014), Kimou (2015), Akpoviroro and Owotutu (2018), and Bushe (2019). A conducive business climate is essential for enterprises to foster innovation, enhance productivity, and ensure sustainability, as emphasized by Maruichi and Abe (2019).

While the relationship between crime and economic growth has been studied extensively, the impact of crime on the performance of microfirms has remained somewhat ambiguous (Bernales, Beuermann, Cumming, & Olid, 2019; Fullerton & Walke, 2018; Montoya, 2016; Motta, 2017). The National Capital Region (NCR) in the Philippines, with its high concentration of microenterprises and elevated crime rates, particularly in physical injury, theft, and robbery, serves as a focal point for this issue. Microfirms in this region are both victims and attractors of criminal activities, making them susceptible to both direct and indirect consequences of crime due to their small size (Bernasco, Ruiters, & Block, 2017; Demeau & Parent, 2018; Fullerton & Walke, 2018).

This study addresses two key research questions: (a) How does the crime rate impact microfirm performance? and (b) Is there a bidirectional causal relationship between microfirm performance and city-level crime rates in the Philippines? With limited research on this topic in the country, the study contributes to understanding how crime affects local microfirms, shedding

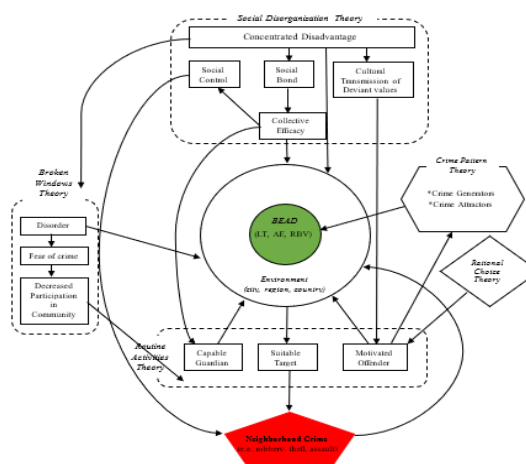
light on how the external environment, characterized by the omnipresence of both crime and business activities, influences company growth and performance. It also explores the interplay between crime trends and local business success at the city level, offering insights into future crime and business performance trends. By examining the relationship between crime and business activities, the study highlights the potential of microenterprises in economic growth, encouraging policies that promote entrepreneurship and create a business-friendly environment.

## 2. Theoretical background of the study

This study used several business and criminological theories that expand the understanding of how economic activities, entrepreneurship, and crime converge in a specific place and time. In Figure 1, the cross-link or integration of the various criminological and business theories is shown. To account for or define the advantages and disadvantages of that micro-space that influence the entrepreneurs to locate their establishment and the motivated offender to perform their criminal act, this research identified a “micro-space” known as Business Ecological Advantages and Disadvantages (BEAD). This is based on the theories of geographic location and agglomeration economies that influence business owners in their decision to decide on their final business location. The location of a business in an urban setting has benefits and drawbacks for the business owner as well as the inhabitants of the area, which also affects people’s daily activities and those of enterprises.

The Routine Action Theory (RAT) assumes that the environment has enough eligible targets, but for there to be a crime, there must also be motivated offenders and ineffective guardians, which raises the crime rate in the area. Motivated offenders scan the BEAD to locate suitable targets like individuals and establishments. Crime Pattern Theory (CPT)’s crime generators and crime attractors increase the opportunity for motivated offenders to locate suitable targets. Then, the motivated offender finds a rational reason/ opportunity to perform a criminal act (Rational Choice Theory).

In Social Disorder Theory (SDT), the concentrated disadvantages are prevalent in an urban environment. It directly increases the advantages and disadvantages of spaces in BEAD (micro-level) and environment (macro-level) as it weakens the social bond and increases the cultural transmission of anti-social behavior and criminal activities, which may create future motivated offenders. The collective efficacy or the society’s cohesion and preparedness to intervene on behalf of the common good are determined by the social bond. Increased or decreased social bonds equate to neighborhoods’ collective efficacy to create social control that reduces crime and capable guardians; therefore, it provides a supplementary link between SDT and RAT, which affects the BEAD.



**Figure 1.** Theoretical basis: The spatio-temporal concentration of economic activity, firms, and crime

The Broken Window Theory (BWT) is highly influenced by the community's concentrated disadvantages, leads to fear of crime among residents in a locality, and influences motivated offenders' perception of opportunities for crime as defined by the concept of BEAD and the environment. As a result of residents' fear of crime, law-abiding citizens are less likely to participate in community life because they are concerned about becoming a victim of crime. This leads to a lack of capable guardians, thus providing the link between BWT and RAT. Capable guardians, as previously discussed, increase social control, which may reduce neighborhood crime and affect the environment and BEAD.

In summary, this integrated and comprehensive concept map explains the omnipresence of crime and business activities in the community and shows the specific root causes of crime that may impact microfirms' performance and how it can be addressed. It also supports the idea of crime as a complex phenomenon (Curiel & Bishop, 2018) and asserts that crime and business activities are local phenomena (Matti & Ross, 2016), resulting in varying economic and illegal activities.

Guided by this integrated concept and differing from the earlier works mentioned above, this study used constructs that were not considered before. Figure 2 depicts the conceptual framework of this study, which aims to examine how crime affects the performance of microfirms using profitability measures proxied by Return-On-Sales (ROS). To address the vagueness and inconclusiveness of evidence to establish how changes in crime rate affect microfirms' performance in previous studies, this paper used variables and methodologies that were not considered in the literature. As crime and business activities are both local phenomena (Matti & Ross, 2016), this work focused on a more in-depth and microlevel analysis to fully understand the effect of crime on firm performance. To confirm the dynamics between crime and business performance in the long-run and short-run periods, the study focused on microfirms that are more susceptible to this unfavorable phenomenon. It also examined the unbiased accounting-based performance measures of local microfirms and dove into an analysis of city-level crime rates.



**Figure 2.** A conceptual framework to determine the effect of crime on firms' performance and the direction of causality among variables

### 3. Methodology

#### 3.1. Sources of data

A two-panel micro-level data set with a total of 1,190 observations from 2009 to 2018 was used in this study. The crime data were sourced from the Philippine National Police's Crime Research and Analysis Center (PNP-CRAC). The study emphasized using more objective measures to analyze the impact of crime on performance, which previous studies failed to consider. Thus, it used measures such as firms' profitability proxied by ROS. The financial statements were obtained from the owner-managers, subject to their approval, to evaluate the performance of their microfirms.

The PNP-CRAC gives assistance and advice in the conduct of in-depth studies, research, and analysis of crimes nationwide and strengthens the PNP investigation capabilities and analysis

of crime trends based on gathered facts and reports (Philippine National Police, 2020). Annual crime rates per 100,000 populations of three indicators to measure crime were used: Physical assault/injury (PHYS), Theft (THEF), and Robbery (ROBB). Apart from the fact that PHYS, THEF, and ROBB were registered as the most prevalent crimes in the country (Pinlac, 2023), prior studies claimed that these crimes have a higher probability of affecting microfirms (Brushwood, Dhaliwal, Fairhurst, & Serfling, 2016; Bressler & Bressler, 2017; Demeau & Parent, 2018; Williams, 2017). The use of the crime rate index presumes a linear, positive, and equal relationship between the different categories of crime and the local population (Demeau & Parent, 2018). Similar to the studies of BenYishay and Pearlman (2014), and Fullerton and Walke (2018), this analysis focused on the effects of changes in crime rates rather than levels to effectively establish how such changes affect firm-level outcomes.

### 3.2. Methods of data analysis

The Fixed Effect (FE) and Random Effect (RE) regression models were used to determine the effect of the crime rate on microfirms' performance. The use of FE limits the possibility of bias to time-varying covariates (such as crime rates and the firm's profit over time) by controlling for time-constant elements. The FE model is written as follows:

$$SALES_{it} = \alpha_i + \beta_1PHYS_{it} + \beta_2THEF_{it} + \beta_3ROBB_{it} + \beta_4NOCRIME_{it} + \mu_{it} \quad (1)$$

where  $SALES_{it}$  represents the ROS for firm  $i$  in year  $t$ ;  $X_{it}$  accounts for the independent variable which represents the city-level  $i$  crime rates in year  $t$ ; the intercept, and  $\alpha_i$ , takes into account the heterogeneity influence of unobserved variables which may differ across the cross-section units. The microfirms that have not recently been victims of crime are represented by the dummy variable (NOCRIME). The RE is used based on the assumption that the firm-specific effects are uncorrelated with the independent variables. Thus, the random effect panel regression model is written as follows:

$$SALES_{it} = \alpha_i + \beta_1PHYS_{it} + \beta_2THEF_{it} + \beta_3ROBB_{it} + \beta_4NOCRIME_{it} + v_{it} \quad (2)$$

where  $v_{it} = \varepsilon_i + \mu_{it}$  or random error term,  $SALES_{it}$  represents the performance proxied by sales ratio for firm  $i$  in year  $t$ ;  $\alpha_i$  are the unknown intercepts for each entity; and  $X_{it}$  accounts for one independent variable which represents the city-level  $i$  crime rates in year  $t$ . Unlike in the FE model, NOCRIME is considered an ordinary variable,  $X_{it}$ .

To determine which model should be used to analyze the panel data, the Hausman specification test was employed to determine whether or not there is a correlation between specific errors (or effects) and the regressors (predictor variables) in the model. The unique error correlation null hypothesis can be adopted if HT fails to find a regressor. This indicates that a random effect is the chosen model. However, the alternative hypothesis is the FE model if there is a significant correlation between the regressor and unique errors (Sheytanova, 2014).

The Modified Wald (MWALD) test for Granger causality (Toda & Yamamoto, 1995) was used to determine the causal relationship between crime and firm performance. This approach works with heterogeneous panel data, regardless of whether the time series are stationary at various orders and long-term non-cointegrated for some of the models or both (Rana, Alam, & Gow, 2018). The following equations were estimated to test the direction of causality from crime rate to firm performance (Equation 3) and from performance to crime rate (Equation 4):

$$Crime_{i,t} = \mu_0 + \sum_{i=1}^k \alpha_{1t} Crime_{t-1} + \sum_{i=k+1}^{dmax} \alpha_{2t} Crime_{t-i} + \sum_{i=1}^k \beta_{1t} Perf_{t-1} + \sum_{i=k+1}^{dmax} \beta_{2t} Perf_{t-i} + \varepsilon_{1t} \quad (3)$$

$$Perf_{i,t} = \sigma_0 + \sum_{i=1}^k \gamma_{1t} Perf_{t-1} + \sum_{i=k+1}^{dmax} \gamma_{2t} Perf_{t-i} + \sum_{i=1}^k \delta_{1t} Crime_{t-1} + \sum_{i=k+1}^{dmax} \delta_{2t} Crime_{t-i} + \varepsilon_{2t} \quad (4)$$

Where  $Crime_{i,t}$  can be one of three criminal activities under study: physical injury, theft, and robbery for the city  $i$  ( $i = 1; \dots; N$ ) to time  $t$  ( $t = 1; \dots$ ; subscript represented firm performance variables proxied by ROS for firm  $i$  ( $i = 1; \dots; N$ ) to time  $t$  ( $t = 1; \dots; T$ );  $k$  is the optimal time lag on the initial VAR model, and  $dmax$  is the maximum integration order on the variables system (VAR model).

To lay the groundwork for MWALD Granger causality, the stationarity of panel data and the maximal order of integration ( $dmax$ ) were analyzed. Then, the optimal lag length ( $p$ ) of the vector autoregression (VAR) was assessed in levels using the information criteria before performing the modified Wald procedure to the VAR ( $k$ ), where  $k = p + dmax$ . Furthermore, the study performed an Impulse Response Function (IRF) to determine the effects of shocks on the adjustment path of the variables to enhance the identification of bidirectional causality among the variables under study.

## 4. Result and discussion

### 4.1. Result

#### 4.1.1. Effect of crime rate on microfirms' performance

To analyze the effect of crime rate on microfirms' performance (Table 1), the test reveals that estimators of the RE model in Table 2 were more appropriate to use. The findings indicate a mixed response to the study's hypothesis, but the most important finding is that NOCRIME consistently had a negative effect on the performance of microfirms. In four of the five cities, NOCRIME revealed statistically significant results.

These findings confirmed the complexities of crime (Curiel & Bishop, 2018) that require more suitable disaggregate territorial and sectorial levels of analysis to catch the most important local disparities, as well as the fact that both business and crime are local phenomena that can result in a wide range of economic and unlawful activities (Lens & Meltzer, 2016; Matti & Ross, 2016). The varied effect of crimes on the microfirms' performance per city may be caused by the absence of other underlying variables that affect the location of firms. Rent prices, for instance, have a negative association with crime (Ceccato & Wilhelmsson, 2020); therefore, lowering rents might have a major positive impact that balances out the impact of crime on business costs or performance.

**Table 1**

Hausman test results on the effect of crime on microfirms' performance per city

City	$\chi^2$	df	p-value
Manila	0.297	4	.990
Quezon City	1.225	4	.874
Pasay	0.471	4	.976
Mandaluyong	0.000	4	.998
San Juan	0.000	4	.998

**Table 2**

Effect of crime rate on microfirms’ performance

City	Variable				R <sup>2</sup>	F	Prob (F-Stat)
	PHYS <sup>a</sup>	THEF <sup>b</sup>	ROBB <sup>c</sup>	NOCRIME <sup>d</sup>			
Manila	0.062***	-0.076**	0.006	-3.718*	.152	11.960	.000
Quezon City	0.017	-0.005	-0.157	-3.542*	.164	1.561	.039
Pasay	-0.012*	0.001	-0.002	-2.171**	.142	8.928	.000
Mandaluyong	0.008	0.006	-0.012**	-0.802	.088	4.933	.000
San Juan	-0.003	-0.007	0.009*	-2.849***	.127	0.211	.000

\*p > .1, \*\*p > .05, \*\*\*p > .001, a. PHYS = Physical Injury, b. THEF = Theft, c. ROBB = Robbery, d. NOCRIME = Dummy variable to account for the microenterprises that did/ did not experience being victimized by crime in past years

Similarly, although methodological differences prevented direct comparison with the findings of its predecessors (BenYishay & Pearlman, 2014; Hua & Yang, 2017; Kimou, 2015; Motta, 2017), this finding was consistent with the former that crime negatively affected the performance of businesses, particularly micro and small businesses. It confirmed that crime affects businesses in two ways: directly by reducing sales and indirectly by increasing expenses to cover costs incurred in anticipation of crime, crime effects, and crime response. Both channels have an impact on the profitability of microenterprises. Overall, these findings suggested that doing business in places with a high rate of crime (such as physical assault, theft, and robbery) should not employ a uniform strategy but rather mitigation strategies that vary across cities or neighborhoods.

4.1.2. Causal link between microfirms’ performance and city-level crime rates

4.1.2.1. Stationarity tests

Like previous causal analysis, panel unit root tests such as LLC (Levin, Lin, & Chu, 2002), IMP (Im, Pesaran, & Shin, 2003), Fisher-ADF, and Fisher-PP (Maddala & Wu, 1999) were applied to determine the stationarity of crime rates (Table 3). It was found that PHYS and THEF were non-stationary at the first difference, while ROBB was found to have no unit root after the second differentiation. Hence, it can be concluded that PHYS, THEF, and ROBB are integrated into order one or I (1).

**Table 3**

Panel unit root test results on crime rates

Variables	LLC			IPS			Fisher-ADF			Fisher-PP		
	t-stat			t-stat			Chi-sq			Chi-sq		
	Level	1 <sup>st</sup> Diff	2 <sup>nd</sup> Diff	Level	1 <sup>st</sup> Diff	2 <sup>nd</sup> Diff	Level	1 <sup>st</sup> Diff	2 <sup>nd</sup> Diff	Level	1 <sup>st</sup> Diff	2 <sup>nd</sup> Diff
PHYS	-2.38*	-5.20**	-	-0.31	-3.45**	-	13.99	32.41**	-	11.38	41.63**	-
THEF	-1.00	-6.63**	-	0.81	-2.96*	-	6.49	28.37*	-	3.19	32.19*	-
ROBB	-3.09**	-3.18**	-5.37**	-0.56	-1.29	-2.08*	11.80	16.91	23.36*	6.57	18.81*	35.54**

Note: All panel unit root tests are defined by Barlett Kernel and Newey-West (1994) bandwidth. The optimal number of lags is chosen by Akaike Information Criterion (AIC). Probabilities for Fisher tests are computed using an asymptotic chi-square distribution. All other tests assume asymptotic normality. \*p> 0.05, \*\*p>0.001.

#### 4.1.2.2. Panel co-integration test

Kao's cointegration test in Table 4 denotes a long-term link between microfirms' performance and the crime rates under investigation. Hence, there is a cointegration between the two series.

#### 4.1.2.3. Lag length identification.

The distinctive order of integration of the variables under observation allowed the application of causality econometric tools of the MWALD Granger approach, which requires a suitable lag length for causality model specification. Table 5 shows the results of the chosen techniques used to identify the lag length, which is equal to 8 lags.

#### 4.1.2.4. MWALD to Granger causality test

After confirming the long-run association and the optimal lag length for the model, the MWALD approach to the Granger causality test was performed. The data in Table 6 provided sufficient support for the hypothesis of a two-way causal relationship between crime rates and microfirms' performance. The results from earlier studies by Baporikar et al. (2016), Bernasco et al. (2017), and Demeau and Parent (2018) confirmed this finding. However, the discovery of evidence of the presence of a bidirectional causal relationship between performance and crime contradicted Ajide and Ajisafe's (2017) finding that as the crime rate increases, entrepreneurial activities decrease.

**Table 4**

Panel cointegration tests on microfirms' performance and crime rates

Variable		Statistic	Probability
PHYS	ADF	-3.143	.001
	Residual variance	7.521	
	HAC variance	7.455	
THEF	ADF	-2.877	.002
	Residual variance	7.372	
	HAC variance	4.936	
ROBB	ADF	-2.853	.002
	Residual variance	7.514	
	HAC variance	4.097	

Note: Optimal lag lengths are determined by Schwarz Info Criterion (SIC)

**Table 5**

Results for VAR lag order selection criteria

Lag	LR	AIC	SBC	HQC
0	-	39.98	39.99	39.98
1	2,057.48	38.25	38.34	38.28
2	630.85	37.74	37.90	37.80
3	774.85	37.10	37.33	37.19

Lag	LR	AIC	SBC	HQC
4	898.69	36.36	36.65	36.47
5	275.08	36.15	36.51	36.28
6	899.00	35.40	35.83	35.56
7	1,023.75	34.53	35.03	34.72
8	1,295.92*	33.43*	34.00*	33.64*

Note: \* indicates optimal lag order selected by the respective criterion. LR: sequential modified LR test statistic (each test at 5% level), AIC: Akaike Information Criterion, SBC: Schwarz Bayesian Criterion, and HQC: Hannan - Quinn Criterion. <sup>g</sup> indicates the VAR optimal lag. Observations included: 1180

**Table 6**

Results for MWALD to Granger causality test

Null hypothesis	$\chi^2$	df	Prob.
SALES <sup>a</sup> do not MWALD Granger cause PHYS <sup>b</sup>	19.391	8	.012
SALES <sup>a</sup> do not MWALD Granger cause THEF <sup>c</sup>	22.531	8	.004
SALES <sup>a</sup> do not MWALD Granger cause ROBB <sup>d</sup>	16.829	8	.031
PHYS <sup>b</sup> do not MWALD Granger cause SALES <sup>a</sup>	29.124	8	.000
THEF <sup>c</sup> do not MWALD Granger cause SALES <sup>a</sup>	27.866	8	.000
ROBB <sup>d</sup> do not MWALD Granger cause SALES <sup>a</sup>	27.208	8	.000

Included observations: 1179, a. SALES = Microfirms’ performance proxied by sales ratio, b. PHYS = Physical Injury, c. THEF = Theft, d. ROBB = Robbery

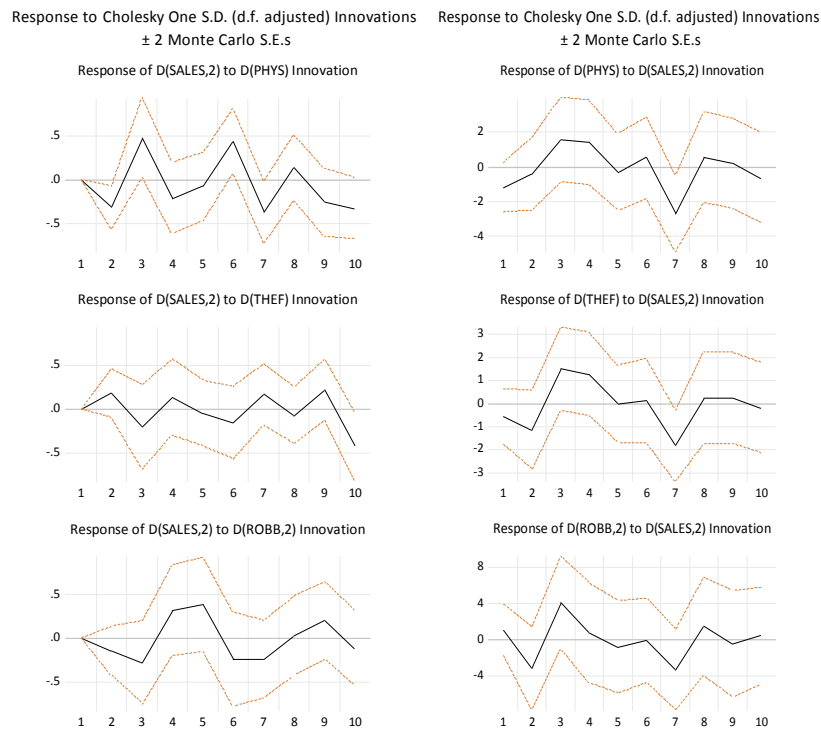
*4.1.2.5. Diagnostic test*

Having established the bidirectional causality between microfirms’ performance and crime, IRF was performed to investigate the key characteristics of the data. Figure 3 shows how microfirms’ performance reacts to the shock of each crime and vice versa. The findings imply that crime has a detrimental effect on performance throughout the long and short term. Additionally, the shocks applied to SALES have an immediate beneficial effect on PHYS, THEF, and ROBB, but over the long term, SALES have an adverse effect on all of these variables except ROBB. These results supported the MWALD to Granger causality findings that show a two-way causal relationship between crime and performance. The interesting causal association between microfirm performance and crime rates may be explained by the study’s first findings, which show that the impact of crime varies by city and may be explained by the lack of other underlying factors. As such, a broader and multidimensional investigation can be done involving other variables in doing business.

**4.2. Discussion**

The study found enough evidence depicting that being victimized by crime has constantly shown a negative effect on microfirms’ performance across cities following the prior studies. The random effect models proved the complexity of the nature of crime’s effect on performance which suggested that there was no specific crime posted neither negative nor positive effects on microfirms’ performance across cities. With this, the research confirmed the complexity of crime as a phenomenon and that both business activities and crime are omnipresent in a local setting.

Moreover, the study provided evidence depicting that performance-crime relation investigation requires more suitable disaggregate “territorial” and “sectorial” levels of analysis to catch the most important local disparities in the effect of crime on performance. As such, caution was advised when interpreting the varied effects of crime on performance per locality finding of this study. The findings of this study do not conclusively imply that a high crime rate does not affect microfirms’ performance and society but rather make a strong argument for future research to treat microfirms’ performance, crime, and other dimensions that affect doing business in a multidimensional context.



**Figure 3.** Result of the individual IRF for microfirms’ performance and individual crime

Various methodologies confirmed the bidirectional causality running from microfirms’ performance to crime rates. Empirical analyses showed microfirms’ performance has a positive impact on crime rates in the short run while having a negative impact in the long run. The finding highlights the importance of the business environment in firms’ performance, survival, and growth. It rationalizes the agglomeration theory, explaining why businesses locate themselves in certain areas even though there is a high threat of criminality as long as the gains outweigh the costs. This connoted that policies, ordinances, and laws launched by local authorities may create and encourage numerous opportunities to encourage private business investments including SMEs to survive and grow. Likewise, microfirms should religiously pay their taxes to help the government generate funds that can be used to improve the business environment.

## 5. Conclusions and recommendations

### 5.1. Conclusions

The integrated theories guided this study in explaining why entrepreneurs may locate themselves in a business environment with a high crime rate. The study concluded that being victimized by crime negatively affects microfirms’ performance. However, no single study showed either positive or negative effects on the performance of microfirms across cities. However, care should be taken when interpreting this complex result. This finding confirms that

crime is indeed a complex phenomenon and that both business activities and crime are omnipresent in a local setting and can result in varied economic and illegal activities.

Various factors, including structural inequalities in geographic distribution, unemployment, education, other sociodemographic indicators, territorial price systems on rent, and others, may contribute to the disparities in the impact of crime on performance. Despite this, the study provided a compelling case for the necessity of offering more accurate estimates that go beyond the effects of crime on microenterprises from a theoretical perspective. More importantly, the impact of crime on territorial economic performances by incorporating spatial interaction or mapping of crime and spillover effects, as well as using community-level and multidimensional variables, may improve the model's predictive power.

The theorized integrated framework of the study supported the existence of a bidirectional causal relationship between crime rates and microfirm performance. IRF's findings, which suggest that microfirm performance has a favorable short-term influence on crime rates while having a negative long-term impact, serve as additional proof of this. Similar to how physical assault and microfirm performance can be described by their respective shocks, theft and robbery variations can be affected by shocks in other crime rates but cannot be explained by shocks in performance.

All findings indicate that continuous exposure to crime will increase victimization rates, which will lead to significant losses, especially for larger microenterprises that are frequently targeted by criminals.

### ***5.2. Theoretical contributions***

This study addresses the lack of research on the microeconomic impact of crime on microfirms in the Philippines. With no established framework for reference, this work adds to the emerging research on the micro-level effects of crime on business activity, building on prior studies by Kimou (2015), and Hua and Yang (2017). The pivotal contribution of the framework developed in this study was vividly presented in the meticulous unearthing of the concept of the micro space termed "Business Ecological Advantages and Disadvantages (BEAD)." BEAD encapsulates the essence of geographic location and agglomeration economies, which exert a profound sway on business owners' critical choices regarding their final establishment location. It elegantly showcases the intricate interplay and amalgamation of diverse criminological and business theories.

Within the urban landscape, this framework underscores the multifaceted ramifications associated with establishing a business. It encompasses a comprehensive spectrum of advantages and drawbacks that not only resonate with business owners but also leave a lasting impact on the residents of the locality. The ripple effect of these decisions extends to influence the daily routines and activities of both individuals and enterprises within the area, thereby underscoring the profound significance of the BEAD framework in shedding light on this intricate nexus of business location, criminology, and urban dynamics.

It distinguishes itself by analyzing data at a higher level of aggregation, providing a more comprehensive view of how crime influences local business performance and vice versa, particularly at the city level. This research contributes to understanding how external factors affect firm-level growth and performance, shedding light on the relationship between crime and entrepreneurship. The findings can inform policies to support entrepreneurship and create a more business-friendly environment, ultimately fostering the growth of microenterprises in the Philippines.

### **5.3. Recommendations**

To avoid and manage crime that differs throughout cities or neighborhoods, it is suggested that microfirms employ a variety of practical mitigation techniques in their operations. Security plans should be tailored to specific locations, and collaborative groups like “Business Watch” can help share information on criminal trends.

Reducing the financial burden on microfirms for security can be achieved through a government-led security policy involving private stakeholders. These policies can boost economic activity by reducing security threats and perceptions of victimization. Stakeholders and local development officials should cooperate to set safety guidelines and disseminate accurate information.

The analysis acknowledges the importance of improving public safety conditions, focusing on LGU investments and business-friendly policies. While it doesn’t delve into specific safety measures, it highlights their importance for further research. The core idea is that business-friendly policies can benefit both the government and the business sector. By reducing uncertainties and enhancing managerial skills in microfirms, these policies can help them navigate the complex business environment effectively and seize opportunities.

One strategy suggested is offering incentives, such as tax breaks, to industries heavily impacted by crime, especially microenterprises. This could encourage businesses to operate in high-crime areas if the benefits outweigh the risks, as per the agglomeration theory. However, it’s stressed that addressing crime is essential for government commitment to promoting microfirms.

Furthermore, the analysis underscores the importance of businesses paying taxes to support the government in creating a conducive economic environment. This cooperation between LGUs and the business sector is seen as a mutually beneficial, win-win arrangement.

Overall, the study highlights the need for collaboration among entrepreneurs, policymakers, researchers, and residents to mitigate the adverse effects of crime. This collaboration can enhance overall security, reduce economic uncertainty, and particularly benefit entrepreneurs by maximizing profitability. Recognizing the role of crime in economic performance is crucial for fostering a safer and more stable economic environment.

### **5.4. Limitations and future research directions**

The study recognizes its limitations and offers suggestions for future research. It acknowledges that the narrow age range and limited number of cities analyzed restrict a comprehensive understanding of crime’s impact on business performance. To improve this, future research should encompass more densely populated cities with diverse economic and criminal activities. However, the scarcity of accessible data on microfirms in government databases presents a challenge. Future researchers can explore alternative performance metrics, incorporate spatial analysis of crime patterns, and consider spillover effects on neighboring areas. By including community-level and multidimensional variables, the predictive capabilities of the model can be enhanced.

Additionally, conducting independent analyses over a broader time frame can provide a more comprehensive understanding of crime’s effects. Incorporating firm-initiated strategies, such as security measures, can lead to more robust findings. The study emphasizes that both violent and property crimes significantly influence economic performance at micro and macro levels.

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