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Impact of Double Barrel Plan on the Crime Rate

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Abstract

Nowadays, developing countries like Philippines are experiencing inevitable crime problems. The country, Philippines, has been very active in developing methods to reduce if not eradicate the crime rate. One of such methods is called the Double Barrel Plan (DBP) which is an enforcement on the war on drugs. This study evaluated the impact of the DBP on reducing the index and non-index crime rate under quasi-experimental conditions. Quasi-experimental used were single group pre- and post-test design and interrupted time series design. The impact indicators used were the index crime rate and non-index crime rate. Results showed that crime rate after the implementation of the DBP is significantly lesser than the crime rate before the implementation of the DBP for index and non-index crimes using Wilcoxon signed-ranks test. However, using interrupted time series design in the groups studied, DBP has no definite effect on reducing those type of crimes. Nevertheless, the DBP did succeed in reducing the index and non-index crime rate in a specific location of the Philippines. Hence, the DBP has an impact on the reduction of index and non-index crimes.

Keywords: *Double Barrel Plan (DBP), crime rate, index crime, non-index crime, quasi-experiment*

Introduction

In recent years, an expanding line of research has attempted to specify casual links between drugs and crime. Based on this scientific work, efforts in the United States, Europe, Australia, and Canada have tried to attribute some share of the total crime observed in society to the use of drugs and the presence of illegal drug markets (Office of National Drug Control Policy, 2013). In relation to this issue, many countries have been developing strategic policing methods necessary to protect the community from crimes.

The Philippines, being a developing country, is not exempted from occurrences of crimes (Gillado & Cruz, 2004). Reports on crime and delinquency from 2010 to 2013 in the Philippines show a decreasing pattern from 2010-2012, but a surge occurred in 2013 with decreasing crime solution efficiency rate. (Philippine Statistics Authority, 2015).

According to the Philippine National Police (PNP), in the short period from July 1 to October 3, 2016—less than 100 days—there were a total of 732,149 surrenders and 22,415 arrests. These surrenders and arrests were part of the government's efforts to reduce the supply of illegal drugs through PNP's Double Barrel campaign (Mendoza et al., 2016). As of July 2018, the PNP data showed that the nationwide crime rate from July 2016 to June 2018 dropped by 21.48 percent compared to the same period from 2014 to 2016 (Macapagal, 2018).

As an action against illegal drugs and other forms of criminality in the Philippines, Philippine National Police (PNP) Anti-Illegal Drugs Campaign Plan - Project: "Double Barrel" was implemented (Tamayo, 2018). The Double Barrel Plan, as explained by Police Senior Superintendent Rene P. Pamuspusan, Chief of the Law Enforcement Division, Directorate for Operations of PNP, is composed of Project Tokhang (Oplan Tokhang) for the lower barrel and Project HVT (high-value target) for the upper barrel. Tamayo (2018) found out that Oplan Tokhang were able to deliver impressive results in the first three months of implementation of the illegal drugs operation, from July to September 2016 in Davao, Philippines. However, Pajarillo *et al.* (2016) stated that there are some problems in the implementation of the project most specifically the welfare of the surrenders in the Municipality of Rosario, La Union, Philippines. Moreover, Simangan (2017) established the utility of Stanton's stages in identifying early warning signs of genocide. Given the limited literature about the effectiveness of DBP in reducing crime rate in the Philippines, thus this study was conducted to assess the impact of DBP on the crime rate specifically index crime rate and non-index crime rate under the quasi-experimental condition.

Conceptual Framework

Crime prevention is often referring to the attempts to prevent crime or criminal offending before the actual act has been committed. It is an important component of an overall strategy to reduce crime and is widely supported by the public over place and time (Welsh & Farrington, 2012). It has become an increasingly important component of many national strategies on public safety and security. The concept of prevention is grounded in the notion that crime and victimization are driven by many causal or underlying factors. These are the result of wide range of factors and circumstances that influence the lives of individuals and families as they grow up, and of local environments, and the situations and opportunities that facilitate victimization and offending (United Nation Office on Drugs and Crimes, 2010). Piza (2018) showed that Closed-Circuit Television (CCTV) in public places as a crime prevention strategy offers modest support as a deterrent against auto theft while demonstrating no effect on the other types of crime and, thus, may not be beneficial to agencies suffering from other street-level crime problems or may need to deploy CCTV with other evidence-based strategies rather than a stand-alone tactic. Also, Aquino *et al.* (2016) found out that the challenges faced in policing crime reduction in Mandaluyong City, Philippines were the shortage of the Philippine National Police (PNP) in the City and the lack of awareness in the PNP programs of the community. However, Kiunisala *et al.* (2004) found out that leadership styles of the precinct chiefs as a strategy in controlling the crime rate in General Santos City, Philippines is very efficient in solving crimes since it shows a decreasing trend as the crime solution efficiency increases for the years 2000 to

2002. The National Police Commission implemented a Double Barrel Plan through the Command Memorandum Circular 16 or CMC 2016-16 on July 1, 2016 as a crime prevention strategy specifically to speed up drug-problem solution in the country. Its mission is to clear all drug affected barangays across the country, conduct no let up operations against illegal drugs personalities and dismantle drug syndicates (National Police Commission, 2016). This strategy was first developed in Davao City Police Office (DCPO) Philippines by the Police City Director Police Senior Superintendent Ronald Dela Rosa (Tamayo, 2018). The conceptual framework of this study assumes that the DBP strategy is effective in reducing crime rates in the Philippines as mentioned by Tamayo (2018). This study has the following specific objectives: to determine the rate of index crimes and non-index crimes before implementation of DBP and after its implementation; to determine if there is significant difference in the rate of index and non-index crimes before the implementation of DBP and after its implementation; and to determine if there is a definite effect on reducing those type of crimes.

Research Method

The Data

The data used in this study were secondary data on the quarterly number of index and non-index crimes in all 92 barangays of the City of Baybay, Philippines before the implementation of the Double Barrel Plan from the first quarter of 2014 (January to March 2014) to the second quarter of 2016 (April to June 2016) and after the implementation of the Double Barrel Plan from the third quarter of 2016 (July to September 2016) to the fourth quarter of 2018. The City of Baybay is a developing city, the hometown of Visayas State University located at the eastern part of the Philippines.

Secondary data on the quarterly number of index and non-index crimes in all barangays of the City of Baybay from the first quarter of 2014 to the last quarter of 2018 were collected from the Baybay City Police Office Crime Registrar. According to Reyes (2014) index crimes are serious in nature such as murder, homicide, physical injury, and rape, and crimes against property, such as robbery, theft, car napping, and cattle rustling, while, non-index crimes are all other crimes not categorized as index crimes such as kidnapping, threat and coercion, acts of lasciviousness, violations of special laws like illegal logging, prostitution/pornography and child abuse, smuggling and piracy, etc. In this study, index crimes include murder, rape, robbery, aggravated assault, burglary, larceny, vehicular accident, theft, and arson, whereas, non-index crimes include negligent manslaughter, non-aggravated assault, forgery and counterfeiting, fraud, embezzlement, stolen property, vandalism, weapons, prostitution and common law vice, sex offenses, narcotic laws, gambling, offenses against family and children, driving under the influence, liquor laws, disorderly conduct, and all other crimes not under index crimes.

The data were collected by counting and tallying the number of index and non-index crimes in each barangay from the record book of the police office. Also, secondary data on the total population of males and females in each barangay of the Baybay City for the year 2014 to 2018 were collected from the Local Government Unit (LGU) of the city.

Variables Used in the Evaluation

Two kinds of variables were identified in the evaluation. The independent variable was the implementation of the DBP, the program implemented. The dependent variables were the number of index and non-index crimes before and after the implementation of the program.

Data Analyses

Data can be understood better when they are presented through tables, graphs or charts. Thus, charts were used to summarize the index and non-index crime volume in Baybay City before and after the implementation of the DBP.

Crime rate was used in the statistical analyses of the data. Hence, the transformation of the data from crime volume to crime rate was employed in the study. Calculation for the index and non-index crime rate per 1000 inhabitants in each barangays of Baybay City were done by dividing the number of reported index crimes in a barangay by the total population of a barangay multiplied by 1,000 and dividing the number of reported non-index crimes in a barangay by the total population of a barangay multiplied by 1,000, respectively.

$$\text{Crime Rate} = \frac{\text{No. of Crimes}}{\text{Population}} \times 1{,}000$$

Impact of the DBP were evaluated under quasi-experimental conditions. Nonparametric test and simple linear regression were applied on the quantitative indicators. Randomization and control groups are not employed in the study, hence, the use of quasi-experimental design as an alternative of experimental design is appropriate in the evaluation of the impact of the intervention.

Clustering was employed for the analysis of the data using interrupted time series design. The 92 barangays were clustered according to its district. Those barangays in the east district of Baybay were clustered together, those barangays in the north district belonged to another cluster, the south district of Baybay and the poblacion district were also assigned to another clusters. Thus, the clustering of the 92 barangays of Baybay City based on its respective districts resulted to four (4) clusters.

Analyses of the Impact Indicator using the Single Group, Pre- and Post-test Design

To determine if some change took place before and after the DBP was administered, within group comparison were undertaken. For this analysis, the pre-test (crime rate before implementation of the DBP) and post-test data (crime rate after implementation of the DBP) in each barangay were compared. Since index and non-index crime rate is ratio scale, Wilcoxon signed-ranks test was used in the analyses. The test was performed with the following hypotheses based on the sample evidence that the crime rate after the implementation of the intervention is less than that before the implementation of the intervention.

H_o: The crime rate after the implementation of the DBP does not tend to be less than the crime rate before the implementation of the DBP.

H_1: The crime rate after the implementation of the DBP tend to be less than the crime rate before the implementation of the DBP.

The test statistic for the case of ties or large samples, T was computed as (Conover, 1980):

$$T = \frac{\sum_{i=1}^{n} R_i}{\sqrt{\sum_{i=1}^{n} R_i^2}}$$

where:

X_i = crime rate before the implementation of the program for the i^{th} district
Y_i = crime rate after the implementation of the program for the i^{th} district
D_i = the difference for the pair in the i^{th} district; Y_i-X_i, i=1, 2, ..., 4
R_i = signed rank; rank assigned to a pair if D_i is positive or negative of the rank assigned to a pair if D_i is negative

For the case of no ties, T^+ was computed as (Conover, 1980):

$$T^+ = \sum R_i \text{ for positive } D_i$$

where:

X_i = crime rate before the implementation of the program for the i^{th} district
Y_i = crime rate after the implementation of the program for the i^{th} district
D_i = the difference for the pair in the i^{th} district; Y_i-X_i, i=1, 2, ..., 4
R_i = signed rank; rank assigned to a pair if D_i is positive or negative of the rank assigned to a pair if D_i is negative

The null hypothesis is rejected when T or $T^+ < W_\alpha$, the quantile obtained from the Quantiles of the Wilcoxon Signed Ranks Test Statistic table. Otherwise it is accepted. Rejection of the null will indicate that the crime rate after the implementation of the DBP is less than the crime rate before the implementation of the DBP.

Analyses of the Impact Indicator Using the Regression Based Quasi-Experimental Approach (RBQEA): Interrupted Time Series (ITS) Design

After using descriptive statistics and nonparametric test in determining a change in the index and non-index crimes before and after the implementation of the DBP, the RBQEA:ITS was then used. Using this design, one can talk about a definite effect of the DBP on the index and non-index crime rate if the slopes are still the same but the y-intercept are different (Pedrera, 1994). If the effect of the intervention is significant, they will be indicated by a distinct and lasting alteration in the time series pattern. This

evaluation procedure, therefore, guards against the problem of a single fluctuation being mistaken for a significant and lasting treatment effect. The design was also used to know if the effects of the DBP is significant in all different districts of Baybay City. The program groups, or the treatment groups, will be the different clusters identified. The analyses were applied to each of these different clusters.

The series of observations of the program group before the administration of the program were the index and non-index crime rate of the program group in the first ten (10) quarters while the series of observations of the program group after the administration of the program were the index and non-index crime rate of the program group in the last ten (10) quarters. The schematic diagram is presented below.

O O O O O O O O O X O O O O O O O O O O

where:

O – observation
X – intervention

In this study, the index and non-index crime rate before the implementation of the DBP (1st quarter 2014 until 2nd quarter 2016) served as the pre-test observations while the index and non-index crime rate before the implementation of the DBP (3rd quarter 2016 until 4th quarter 2018) served as the post-test observations.

To determine whether there was a definite treatment effect, simple linear regression analysis was employed on every cluster. One regression equation was estimated for the pre-test and post-test data set, respectively. The estimated regression equation is given by

$$y = a + bx$$

where:
y = estimated mean of index and non-index crime rate in a particular quarter
x = quarter
a = estimated y-intercept
b = estimated slope.

Comparison was then undertaken in terms of the estimated parameters. If the two estimated regression lines in a district showed the same slope but different y-intercepts, then a definite treatment effect took place as cited by Pedrera (1994). The analyses were made on the index and non-index crimes, separately. The calculation was done using R software and Statistical Package for Social Science (SPSS) for faster and accurate results.

Results and Discussion

Two quasi-experimental designs namely single group, pre- and post-test design and interrupted time series design were used in this study to determine whether DBP has a significant effect on the crime rate in the City of Baybay. Graphical presentations were

presented to provide a visual picture of the data set. Then, the results of the statistical analyses undertaken using the data used were discussed.

Descriptive Statistics on the Dependent Variable

The index and non-index crime rate of the City of Baybay before and after the implementation of the DBP is presented in Figure 1. The City of Baybay showed to have a higher index and non-index crime rate before the implementation of the DBP. The implementation of the intervention, DBP, seem to be successful in reducing index crimes of the City since index crimes before and after the implementation of the DBP appeared to have a very visible difference on the crime rate as compared to the crime rate before and after the DBP of the non-index crimes.

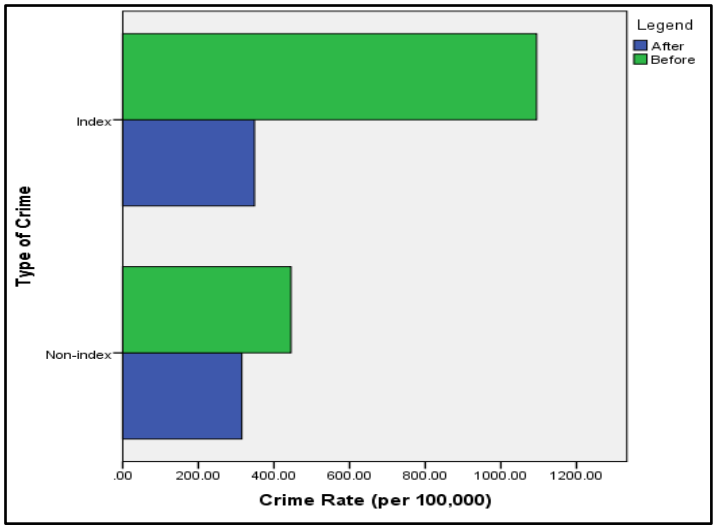

Figure 1. Crime Rate of the City of Baybay Before and After the Implementation of Double Barrel Plan, January 2014 to December 2018.

Impact of DBP on the Index and Non-Index Crime Rate of Baybay City

Results from the Single Group, Pre- and Post-test Design

Based on the descriptive statistics, there was indeed a decrease on the index crime rate and non-index crime rate after the implementation of the DBP. This can be considered statistically highly significant since p-value is lesser than 5% (Table 1). The DBP implementation is successful in reducing the crime rate in the city. This is supported by Reyes (2018), Talabong (2017), and Caliwan (2018) who said that the index crime and non-index crime in the Philippines reduced.

Table 1. Comparison of Index Crime Rate and Non-Index Crime Rate before (X) and after (Y) the implementation of Double Barrel Plan using Wilcoxon signed-ranks test.

	Median		Test Statistic, T^+ value	p-value
	Before (X)	After (Y)		
Index Crime Rate	6.2832	2.3238	3855***	<0.0001
Non-Index Crime Rate	3.0834	2.3823	2560**	0.0014

***– significant at 1% level of significance

Results from the Interrupted Time Series Design

The crime rate in the City of Baybay in time series by quarter starting from 2014 to 2018 is presented by district in the following figures. It shows the crime rate before and after the implementation of the DBP. Abrupt changes (increase or decrease) in the crime rate before and after the implementation of the DBP are emphasized.

In the east district (Figure 2a), the index crimes before the implementation of the program are shown to have a higher crime rate. There was a sudden decline change in the third quarter of the year 2015 even before the intervention of the program. A lower index crime rate was observed after the implementation of the DBP as compared to the index crime rate before its implementation. Likewise, the non-index crimes in the east district show that the program has no clear-cut impact on decreasing the non-index crime rate in the city. An increase in the non-index crime rate was observed right after the implementation of the program. There was a slight decline in the year 2017, however, an abrupt increase in the non-index crime rate was observed in the year 2018. Based on the figure, there was no clear decline on the non-index crime rate after the intervention of the program in the city which might due to the suspension of the DBP during the first quarter (January 30 to March 6) of 2017 with the aim of improving the anti-illegal drugs operations (Tamayo, 2018).

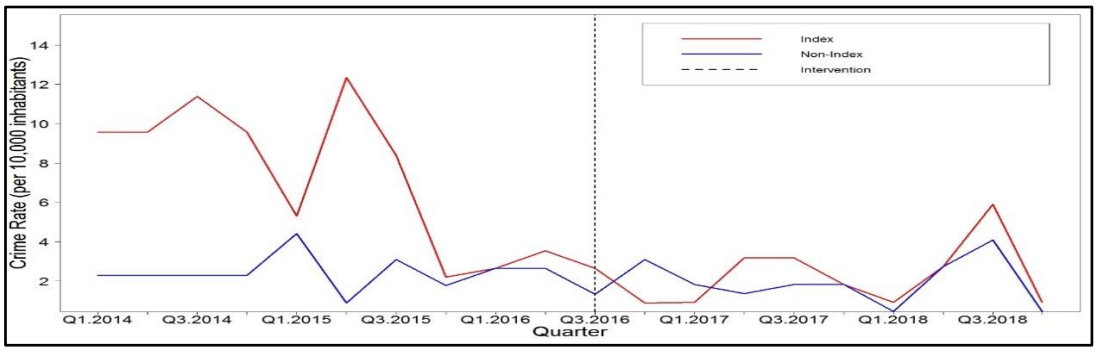

Figure 2a. Index and Non-Index Crime Rate in the East District of Baybay City, 1st Quarter 2014 to 4th Quarter 2018.

In the north district (Figure 2b), the figure shows that the index crimes before the implementation of the DBP is higher than that before its implementation. A decline in the index crime rate is observed in early 2016 even before the program was implemented and commenced. The implementation of the DBP seems to be successful in reducing the index crimes in the district since there was a continuous decrease in the index crime rate in the succeeding quarters. Additionally, the non-index crimes are high in the first two quarters of 2014 which might be due to the Super Typhoon Yolanda (Typhoon Haiyan – international name) which greatly affects the City of Baybay in the late 2013. A decline is observed in the third quarter of the same year even before the intervention of the program. Based on Figure 2b, the implementation of the DBP does not seem to be successful in reducing the number of non-index crimes in the north district since there was no clear pattern on the decline of the non-index crime rate after its implementation.

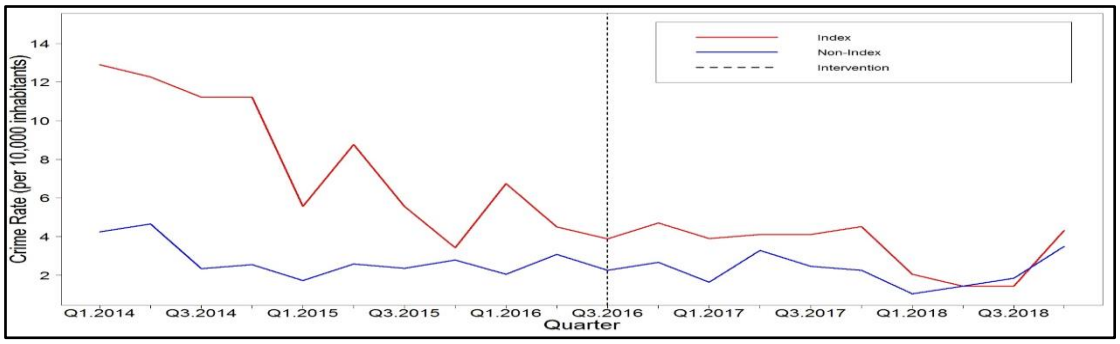

Figure 2b. Index and Non-Index Crime Rate in the North District of Baybay City, 1st Quarter 2014 to 4th Quarter 2018.

In the poblacion district (Figure 2c), there was a higher index crime rate before the implementation of the DBP. A decline in the index crime rate was observed beginning in the first quarter of 2015 until after the implementation of the intervention. The last two quarters of the year 2018 showed relatively low index crime rate. The implementation of the DBP seems to be successful in reducing the number of index crimes in the poblacion district. Also, the non-index crimes of the district show that there was a high non-index crime rate before the implementation of the DBP. The implementation of the program appears to be successful in decreasing the index and non-index crimes in the poblacion district since there was a relatively low index and non-index crime rate after the implementation of the program.

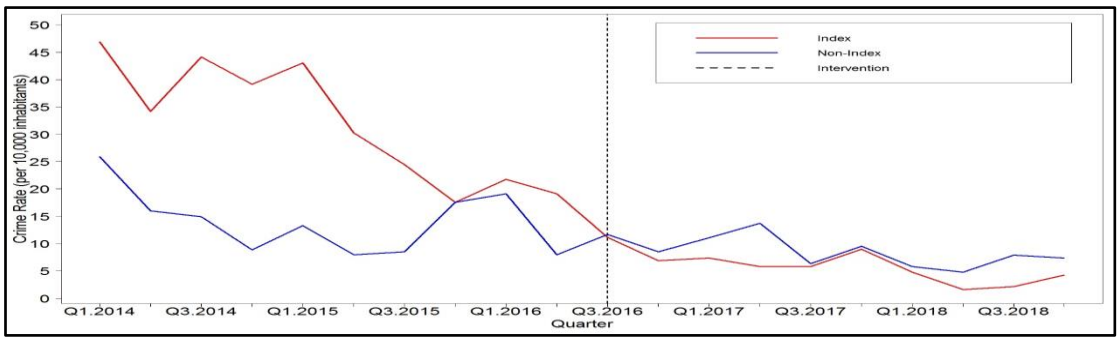

Figure 2c. Index and Non-Index Crime Rate in the Poblacion District of Baybay City, 1st Quarter 2014 to 4th Quarter 2018.

For the south district (Figure 2d), there was a higher index crime rate before the implementation of the DBP as compared to the index crime rate after the implementation of the DBP. A sudden increase in the index crime rate after two quarters since the implementation of the intervention was observed. This might be due to the suspension of the DBP during the first quarter of the year 2017 with the aim of improving the anti-illegal drugs operations (Tamayo, 2018). In terms of the non-index crimes of the district, there was a higher non-index crime rate in the first quarter of 2014 and a decline change was observed right after the implementation of the program. However, an uphill increase in the year 2017 was observed which cast doubt on the sustained effect of the DBP.

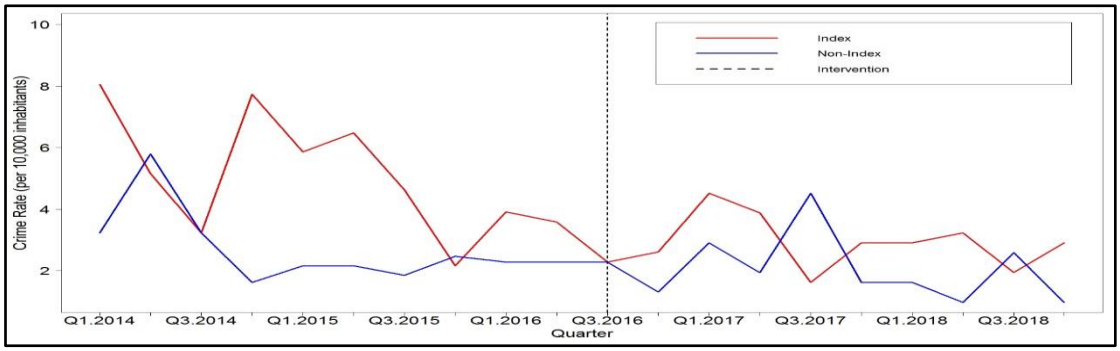

Figure 2d. Index and Non-Index Crime Rate in the South District of Baybay City, 1st Quarter 2014 to 4th Quarter 2018.

The abrupt rise of index and non-index crime rate after the implementation of the DBP might be due to some factors that can affect the number of crimes of a specific district. These factors may include the change in population size of an area since an increase in population size may increase the number of crimes of a specific area. The distance of an area (district) from a police station may also affect the number of crimes recorded each time period (quarter). Moreover, flood, earthquakes, and other calamities may cause scarcity of needs and poverty that may lead to the raise of the number of crimes of an area.

As shown in Figure 3, the different districts exhibited approximately the same before-and-after scenarios of the index crime rate. Except for the east district (Figure 3a), which shown to exhibit an increasing index crime rate even after the implementation of the DBP. However, there is no definite effect of the DBP on the index crime rates of the City of Baybay since the slopes of the regression line (Table 2) before and after the intervention of the program differ for each district.

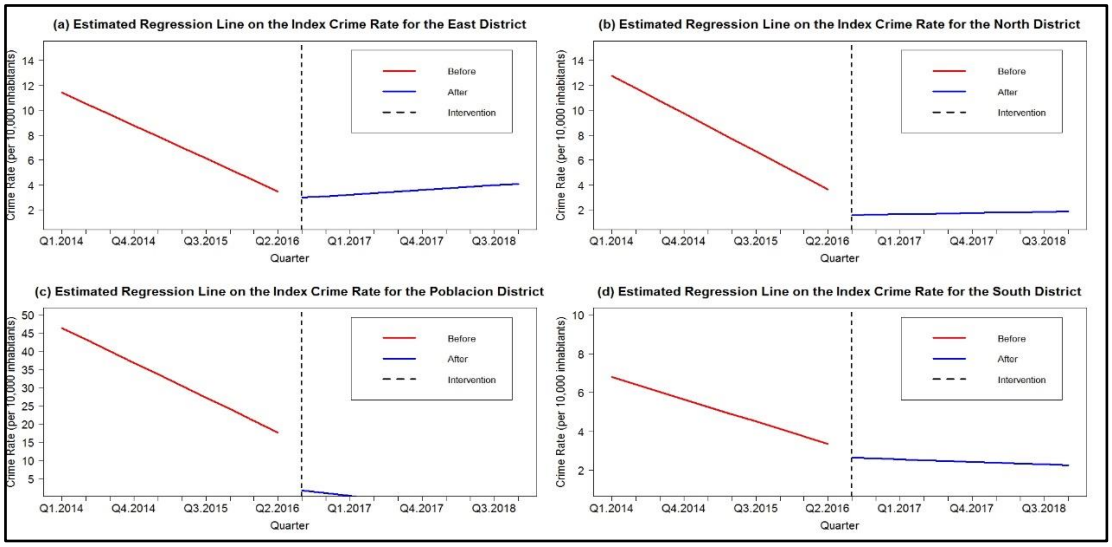

Figure 3. Estimated Regression Line on the Index Crime Rate of the City of Baybay Before and After the Implementation of the Double Barrel Plan by District, 1st Quarter 2014 to 4th Quarter 2018.

In Figure 4, on the other hand, the different districts are shown to exhibit approximately the same before-and-after scenarios of the non-index crime rate. Except for the east district (Figure 4a) and north district (Figure 4b) which exhibit little change, if any, in the non-index crime rate after the implementation of the DBP Nevertheless, it implies that the DBP has no definite effect on decreasing the non-index crime rate in each district of the City of Baybay because the slopes of the regression line (Table 2) before and after the intervention of the program differ for each district. Chiu (2018), Talabong (2017) and Macapagal (2019) pointed out in their studies that some crimes did not show a regular decline of crimes since an increase or abrupt rise was observed at some certain period.

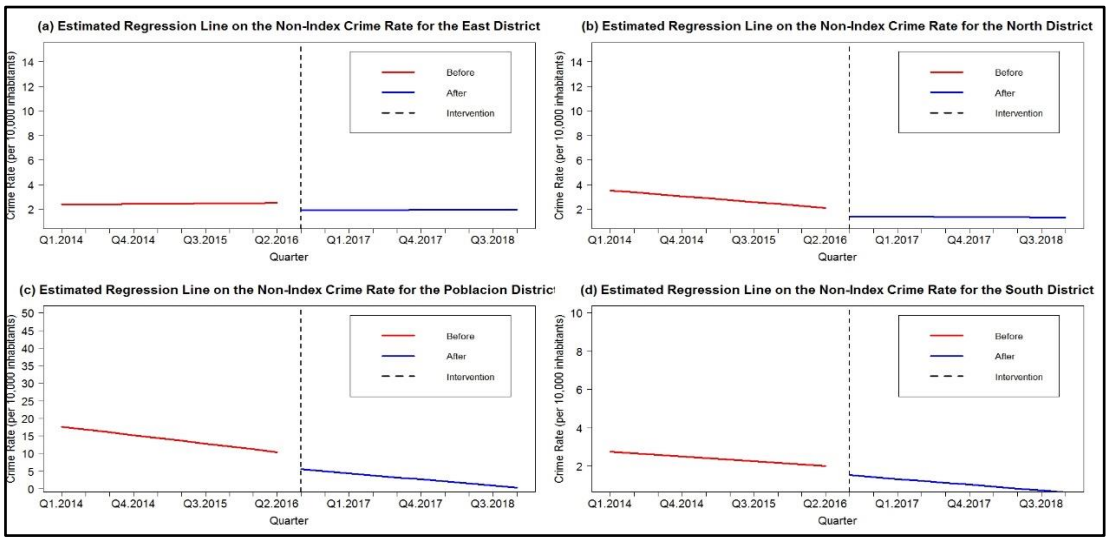

Figure 4. Estimated Regression Line on the Non-Index Crime Rate of the City of Baybay Before and After the Implementation of the Double Barrel Plan by District, 1st Quarter 2014 to 4th Quarter 2018.

Table 2. Estimated Regression Line Coefficients of the Index Crime Rate and Non-Index Crime Rate Before and After the Implementation of the DBP by District.

	District	Before		After	
		a	b	a	b
Index Crime Rate	East (26)	12.2884	-0.8796	1.6270	0.1236
	North (23)	13.7820	-1.0120	4.6679	-0.2253
	Poblacion (23)	49.6130	-3.1920	10.0243	-0.7566
	South (20)	7.1746	-0.3818	3.1132	-0.0432
Non-Index Crime Rate	East (26)	2.3794	0.0139	1.8634	0.0058
	North (23)	3.6998	-0.1586	2.3181	-0.0158
	Poblacion (23)	18.4288	-0.8053	11.8214	-0.5751
	South (20)	3.9092	-0.2192	2.6146	-0.0994

Generally, based on the results derived from the respective districts, the DBP has no definite effect on the index and non-index crime rate in the City of Baybay. But, with the different districts observed over time, it is really difficult to conclusively say so. Besides, there are factors that may affect the number of index and non-index crimes of these different districts.

Conclusion

As a whole, the crime rate in the City of Baybay decline after the implementation of the DBP. The results were considered statistically highly significant, hence, the DBP as a method of reducing the index and non-index crime rate in the City of Baybay was able to deliver impressive results in its two and a half years of implementation. Even though the implementation of the DBP was shown to have a significant impact, this impact cannot be considered definite at this time. However, one cannot conclusively say that the DBP is not an effective solution in reducing the index and non-index crimes of the City of Baybay because of several reasons/factors that may affect on its effectiveness. One possible reason may be due to the temporary suspension of the implementation of the DBP on the first (1st) quarter of the year 2017 with the aim of improving the anti-illegal drugs operations. Other possible reasons may be due to some factors that may influence the number of index and non-index crimes of the city such as the change in population size of an area, distance of an area from a police station, calamities, and poverty, among others.

It is highly recommended for future studies that the data to be collected should not be limited to the number of index and non-index crimes recorded in the city police office crime registrar but it must include also recorded index and non-index crimes in the barangays especially in the mountainous areas. Drug-related crimes should be identified and analyzed separately from index crimes, non-index crimes, or other crimes to evaluate if the primary goal of the DBP which is to speed up drug-problem solution is met in the case of Baybay City. Analyses using single group, interrupted time series design should not be limited only by district but it must consider also all the barangays of the city for better interpretation of results. Other designs may also be employed like ARIMA regression to compare the results, provided that its assumptions are met.

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