Research Article

Managing police operations by developing Crime Involving Firearms (CIF) Index in Davao region

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Abstract

This study attempted to employ the economic tools in establishing the relationship of gun management and ownership with the likelihood of crime occurrence and managing regional peace in Davao Region.

The study employed an index analysis by constructing weighted valuation using the crime factors and management of firearms and differentiating the crimes involving loose firearms and those that are licensed. In this paper, the index developed was termed as Crimes Involving Firearms or the CIF. The weighted index equation was developed for such purpose.

The study found that the crime related crimes moved in the same direction with the total crimes, an indication that loose firearms and the management of licensing and gun permitting should be reviewed in the lens of peace management and security.

Magnitude and severity of firearm related crimes were found to be more pronounced in Davao del Norte and Davao de Oro formerly Compostela Valley.

On this, an effective management of operational capabilities on both applications for arms and in operational management to pursue loose firearms were recommended which led to the enhancement of the police operational capabilities officially implemented under the Enhanced Management Police Operations implemented by the Police Regional Office of the Region 11.

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Introduction

Gun ownership is a matter of sensitive policy issue in most of the countries, especially in the United States (Kaplan & Geling, 1998) and in Europe (Kellerman et al., 1993). In most of studies, the researchers found the positive relationship between homicide, and other crimes with owning a gun. In said countries, gun ownership is largely part of their political exercise as being enshroud in the constitution, particularly in the United States.

Kalesan and colleagues (2016) found out that gun ownership is deeply associated with gun culture, and they further pointed out the need to change the orientation of gun culture among the US citizens to be embedded with the public health issue to prevent the use of firearms from unthinking and irresponsible gun owners.

In the Philippines, the 2011 study of Kaufman enumerated the elements that created the gun culture, especially in Mindanao. These include cultural beliefs that owning a gun is better status symbol, a symbol of status and acceptance of the society. The credibility of the leaders within the geographic location also determines the tendency to own a gun. This is imperative of the rule of law and enforcement of laws which redounds to the most fundamental self-preservation because of the persistent threats of war, pillaging and banditry.

The presence of guns and arms, have been found to weaken the Philippine State, and there even are concerns that the oligarchy, politicians and big businesses in the country are themselves beneficiaries of guns (Quimpo, 2015) in the form of protection during elections, eliminating business competitors, and show of power and might.

Such other crimes like kidnapping, assault, murder and extortion were also found to be associated with firearms. The increase of the volume of these crimes tend to move in the same direction as the proliferation of loose firearms (Kruakham & Lee, 2014). Places where there is

prevalent firearms produce a seemingly "inexhaustible pool of drifting guns for hire" (Van der Koef, 1988).

This paper attempted to show the relationship of the prevalence of crimes and loose firearms within Davao Region. This study was founded on the premise that proliferation of firearms would contribute to increase of criminality.

In addition, the study attempted to develop index of firearm-related crimes within Police Offices (PO) Area of Responsibility (AOR)to provide comparison of incidents of crimes involving firearms. An index value is a weighted comparison to determine severity of the incidents among the Police Offices. Information that can be derived from the study would be useful in crafting operational plans to address proliferation of firearms which eventually would lead to reduction of criminality in PRO 11. Hence, to proactively prevent crimes, loose firearms use must be addressed.

Method

The data were obtained from R7 of the Regional Police Office, made through a request by the researchers. The data provided include incidences of total murder and homicide and involving firearms from 2017 to 2019.The crimes involving firearms were also used.

The data would determine the presence of co-movement of the murder and homicide and physical injury with the proliferation of firearms.

The Police Offices included in the study were Davao City Police Office (DCPO), Davao del Norte Provincial Police Office (DNPO), Compostela Valley Provincial Police Office (CVPPO), Davao Oriental Provincial Police Office (DOPPO), Davao Occidental Provincial Police Office (DOcPPO), Davao del Sur Provincial Police Office (DSPPO).

Descriptive statistics were employed in order to obtain recognizable information and derive pattern from the data.

Given the objective to determine statistical relationship between the crime and the proliferation of firearms, a non-parametric test was employed. The Wilcoxon Rank Test was employed because of the limitation of data set such as requirement of large sample set and the normal distribution assumption. The data employed was limited to an aggregated through year report in each of the Police Office.

The Wilcoxon Signed Rank Test follows the following equation

$$Z = \frac{T - \tilde{\,}_T}{\dagger_T}$$

Where the Mean is given as

$$E(T) = \tilde{\,}_T = \frac{n(n+1)}{4} \text{, and a variance of}$$

$$Var(T) = \dagger_T^2 = \frac{n(n+1)(2n+1)}{24}$$

In addition, an index of the crimes involving firearms was constructed. An index is used to normalize the effect of an incident in a Police Office compared to the incidents in other Police Offices to show severity of the incident within the chosen period.

The intention of constructing the index is to measure the incident through a weighted assignment of the crime involving firearms such as physical injury, murder and homicide.

In this study, a subjective judgement was employed in determining the weight of the three crimes. The physical injury was assigned 10%, murder with 60% and homicide with 30%.

On this, the Crime-Involving-Firearms (CIF) index which will be used in the foregoing study was given as

$$CIF = \frac{PI_i - \min_{pi}}{\max_{pi} - \min_{pi}} * .10 + \frac{M - \min_{mur}}{\max_{murd} - \min_{mur}} * 0.60 + \frac{H - \min_{hom}}{\max_{hom} - \min_{hom}} * .30$$

Where CIF is the crime involving firearms, *pi* as the physical injury, *mur* as murder, and *hom* as the homicide. Given this, the incident and the amount occurring in a police officer will be compared though an index.

The value of the index would is given $0 < CIF < 1$, such that index values would range from 0 which means negligible incident of crimes involving firearms to 1 which is an extremely alarming situation. In this study, the following index range was used with the following descriptions.

Table 1
Index ratings and description

Lower bound	Upper bound	Description
0.81	1	Extremely alarming
0.61	0.79	Alarming
0.41	0.59	Serious
0.21	0.39	Moderate
0	0.19	Negligible

Results and Analysis

As presented in table 1, the homicide involving firearms was compared to the whole homicide crimes which occurred within the area of operation of the Regional Police Office 11 disaggregated to the Police Offices over a three-year period.

In 2017, lowest homicide incident was posted in CVPPO with 6%, DCPO came second with 7%. On the same year, highest homicide involving firearm was observed in DSPPO (34%), followed by DOPPO with 18% homicide incident, DNPPO with 15% and DOcPPO with 10%.

The following year revealed a different configuration. The lowest homicide incidence involving firearm was observed in DNPPO, followed by DSPPO, and the DCPO with 14%. Note that this figure was a reverse incident configuration compared to the previous year. Highest was posted in CVPPO, then in DOcPPO (15%), and DCPO (14%), then followed by DOPPO (13%).

In 2019, lowest homicide involving firearms was observed in CVPPO (9%), followed by DOcPPO (10%) and DCPO (10%), then with DNPPO (11%). Highest incidents occurred in DOPPO (22%), followed by DSPPO (9%).

It was observed that on a year-on-year occurrence, homicide incidents involving firearm oscillated and that frequency of homicide incidents was observed to be de-concentrated which may suggest that firearms users may be highly mobile, moving away from previous location where homicide was committed to avoid the law enforces, giving the impression of the presence of inexhaustible pool of gun-for-hire.

Table 2
% of homicides related to loose firearms

Police Office	2017	2018	2019
DCPO	7	14	10
DNPPO	15	5	11
CVPPO	6	16	9
DSPPO	34	8	19
DOcPPO	10	15	10
DOPPO	18	13	22

Table 2 presents the incidents of murder that involved firearms. Note that in 2017 highest incident was observed in CVPPO (77%), then coming closely second was DNPPO (74%), and then with DOPPO (65%), and the DSPPO (62%) and then by the DOcPPO with 51%. The DCPO posted the lowest murder incident involving firearms.

The following year, CVPPO posted the highest (74%) followed by DNPPO (73%), and the DSPPO (63%). A significant decrease in the murder incident was observed in DOcPPO with 51% in 2017 to 24% in 2018. DCPO remained to post the lowest murder incident in 2018.
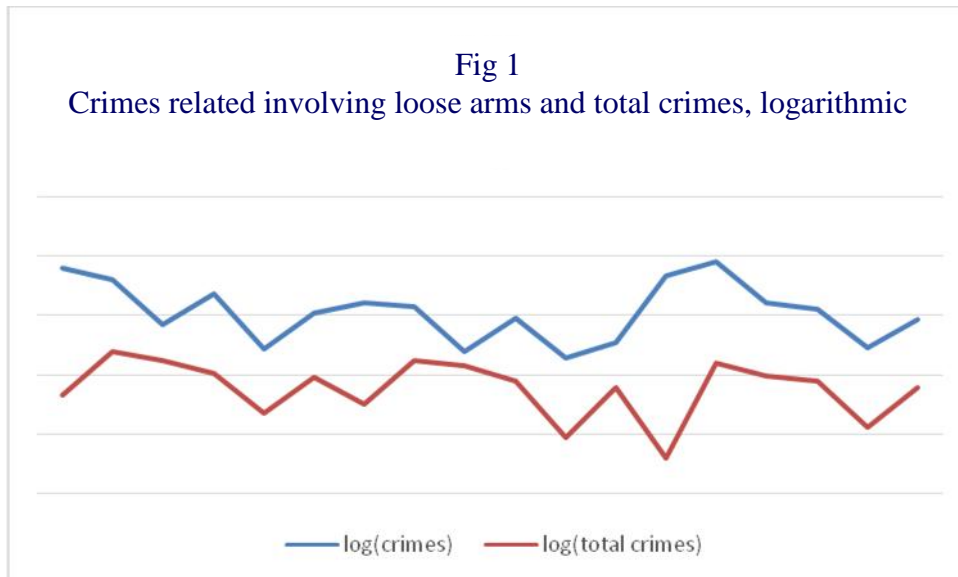
By 2019, DNPPO posted the highest (74%) followed by DSPPO (73%) and CVPPO (70%). Lowest incident was posted in DCPO though comparing with the two last years, murder involving firearm increased in the said police.

Given the foregoing, it seems that murder involving firearms concentrate in the AOR of CVPPO, DNPPO, DOPPO and DSPPO.

Table 3
% of murders related to loose firearms

Police Office	2017	2018	2019
DCPO	25	23	39
DNPPO	74	73	74
CVPPO	77	74	70
DSPPO	62	63	73
DOcPPO	51	24	43
DOPPO	65	61	64

Comparing the crimes involving firearms and the total crimes suggest a pattern as presented in figure 1. The logarithmic values of the two data set were plotted and revealed a pattern showing co-movements of the two variables.

Fig 1
Crimes related involving loose arms and total crimes, logarithmic

It can be observed that where a spike in the total crimes occurs the same behaviour was observed in crimes involving firearms. A dip in the crimes involving firearms corresponds with a dive in the total crimes. This behaviour suggests a frontloading of firearms in the total crimes in Davao Region.

Given this rudimentary observation, a statistical test was required order. With this, a non-parametric test was employed, the Wilcoxon-rank test.

This statistic was employed because of its ability to statistically determine two-related variables without requirement of the usual parametric test of normal distribution and the large-sample size requirement.

The Wilcoxon Signed Rank Test follows the following equation

$$Z = \frac{T - \tilde{}_T}{\dagger_T}$$, using a statistical software to

run the test revealed a result of

$Z = -3.724; p < 0.01$, indicating a Z-test result that is statistically significant and a probability value of less than 0.01 indicating statistical meaning.

Thus, it can be inferred that there was a statistical relationship in the movement or changes in the incidence of total crimes in Region 11 and the crimes involving loose firearms. This means that it is statistically sound to infer that any initiative to address the loose firearms would lead to reducing criminality in Davao Region.

Addressing loose firearms would lead to reduced crimes and ultimately leads to improved peace and order situation in Region 11.

The next necessary thing to do would be to determine where to concentrate resources resources to address firearms-related crimes. It had been noted earlier that the guns-for-hire were highly mobile, moving from one place to the other, except that they themselves concentrate

their criminal operations within the Region. With this, the index would give the

As presented in table 4, the crime involving firearms index was presented. Comparing incidents on a year-on-year basis would reveal that DNPPO was the host to most severe case of crimes involving firearms with respect to all other Police Offices. It is being followed by the DSPPO, and the CVPPO. The DCPO posted mild cases of crimes involving firearms.

By 2018, DNPPO's case worsened, posting the all-time high index rate. The same was observed with CVPPO which moved to next higher notch which qualified the incident into an extremely alarming case. DCPO incidents also worsened, while DOcPPO improved with a significant index value reduction. DSPPO and DOPPO situations remained the same.

By 2019, the situation in DNPPO continued at extremely alarming situation. The persistence of the situation could be due to the Kapa Ministry and other money-scheming activities in Davao del Norte, more particularly in Tagum City. On the same year CVPPO's case improved posting lower CIF index value within the "serious" level of occurrence of crimes involving firearms from a previous extremely alarming. DSPPO remained at the "serious" category for over three years.

The occurrence of crimes involving firearms in each PPO would also reveal that the DNPPO posted high CIF across period of the study, oscillating between alarming to extremely cases alarming in 2018, CIF index ratings from 0.8800 to 1.0000.

It is being followed by CVPPO with serious cases of CIF in 2017 with 0.4825, worsened in 2018 to extremely alarming cases at CIF of 0.8485, but declined in 2019 to serious situation with 0.4203.

Comparably better in terms of CIF are the Police Offices of DOcPPO with index ratings of 0.0200 in 2017, went down to 0.000 indicating a negligible incident, but spiked up in 2019 with 0.2538.

The DOPPO is another police office which posted better in terms of crimes involving firearms ratings given a 0,2444 in 2017, went down to 0.2008 in 2018 but increased in 2019 to 0.29444, although all of these index ratings are described moderate.

The Davao City Police Office started with 0.0877 CIF rating in 2017, went up to 0.3692 by 2018 but dived to 0.2501 in 2019. This year must also be noted because this is an election year.

Note that the CIF is a rating that harmonized the crimes related to firearms across all the police offices. And comparably, CIF is alarmingly high in DNPPO and CVPPO, add to the group the

DSPPO. The geographic position of DNPPO and CVPPO may reveal the movement of the gun owners, such that an incident in DNPPO drags the index of CVPPO. The two provinces would also indicate of the fluid nature of due to the presence of NPAs, and the political landscape of the mentioned provinces as well as the mining activities which was considered to be associated also with firearms with the intention of protecting the mining pits from possible encroachment of another miners who are also armed with weapons. The DSPPO "serious" level of crimes involving firearms could be attributed to the presence of NPAs, and the bandits in some hinterland which continue to serve as mercenaries.

Table 4
CIF index per Police Office, 2017-2019

Police Office	2017	Description	2018	Description	2019	Description
DCPO	0.0877	Negligible	0.3692	Moderate	0.2501	Moderate
DNPPO	0.8800	Extremely alarming	1.0000	Extremely alarming	0.9000	Extremely alarming
CVPPO	0.4825	Serious	0.8485	Extremely alarming	0.4203	Serious
DSPPO	0.5157	Serious	0.5708	Serious	0.5986	Serious
DOcPPO	0.0200	Negligible	0.0000	Negligible	0.2538	Moderate
DOPPO	0.2444	Moderate	0.2008	Moderate	0.2944	Moderate

The DSPPO maintains serious level of crimes involving firearms for three years while DOPPO maintains a moderate incident over three years relative to crimes involving firearms.

Conclusion

On the light of the foregoing, it was determined that crime involving firearms move in the same direction as the total crimes, an indication that the total crimes occurring in Region 11 is heavily-capped by the use of firearms. This is a policy input in the management of arms and in securing the regional peace.

The use of percentage share of firearm-related crimes to the total crimes occurring within the Area of Responsibility of a Police Office, the fluid nature of guns-for-hire and the place of crime commission lead to suspicion that crimes involving firearms may concentrate in geographic places, and thus may be effectively contained.

To address this, the CIF index was constructed. The CIF which stands for "Crimes-Involving Firearms" index compares incidents of crimes like physical abuse, murder and homicide committed with the use of firearms. The CIF is used to normalize the crime incidents using weighted values to put weights on serious crime and lower weights on some other crimes.

Although limited to the actual data of illegal firearms, it can be deduced that firearms involved in the mentioned crimes are generally loose and illegal, although it must be admitted here that there are instances when registered guns were involved in some of the crimes.

The study determined that DNPPO and CVPPO are Police Offices with alarming incidents of crimes involving firearms suggesting the fluidity of movement of criminals in the two areas. Add to this the presence of the NPAs, the political landscape in the said province, add to that the mining presence which for so many years a flash point of small-scale miners in the said areas.

The DSPPO is a contained situation of its own. The presence of NPAs, the bandits mixed with the financial fiasco of KAPA and other financial scheming firms posed the threat of the crimes as the NPAs, bandits and other illegal gun owners may offer services to the disgruntled individuals who have lost their hard-earned money to the firms involved in the scam. The proximity of the Davao del Sur to Makilala, where there are NPA presence, is also a reason of the continued presence of loose firearms.

Given this, it is recommended that the Police Regional Office 11 must directly address the gun issue, with particular dent in DNPPO and CVPPO. Addressing gun proliferation is expected to reduce the total crime volume in the region.

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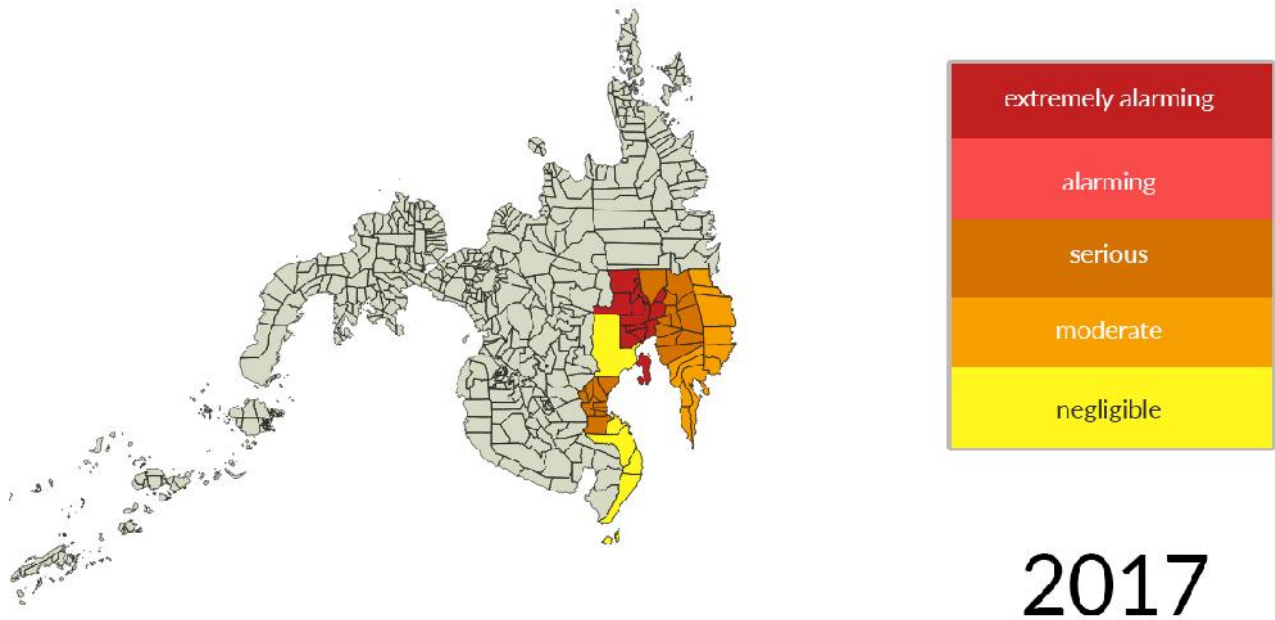
Appendix

Fig 2 Severity of crimes involving firearms in 2017 was determined using an index. Extremely alarming cases are found in Davao del Norte, Compostela Valley and Davao del Sur indicate "serious" case, while Davao Oriental with "moderate" case, and Davao City and Davao Occidental with "negligible" incidents.
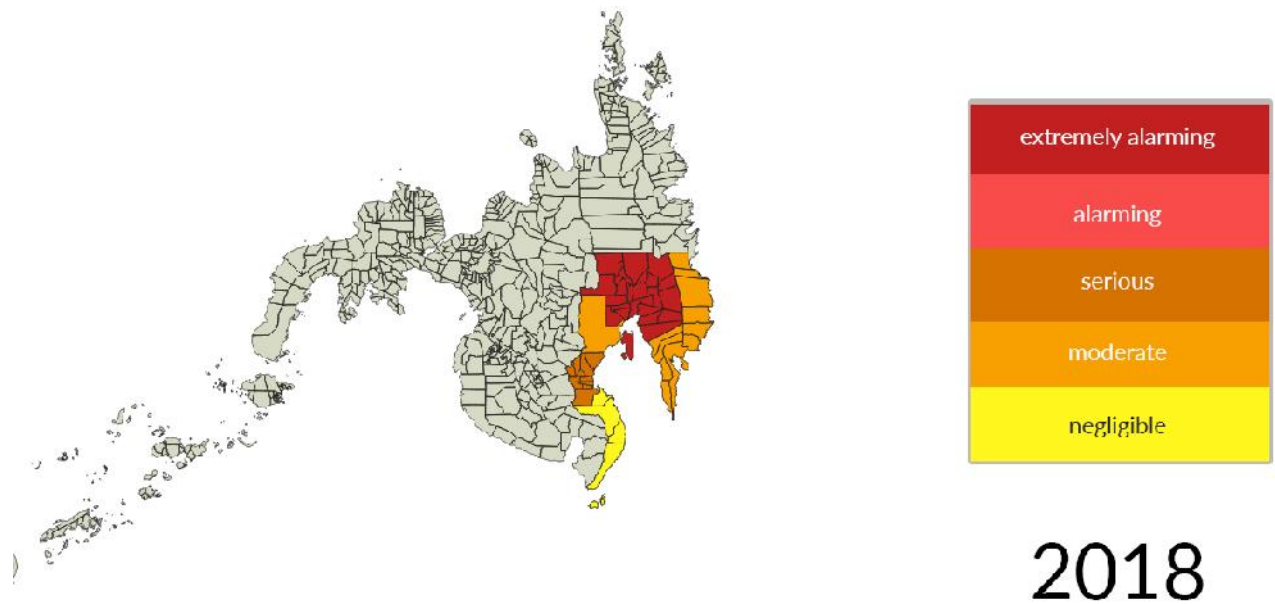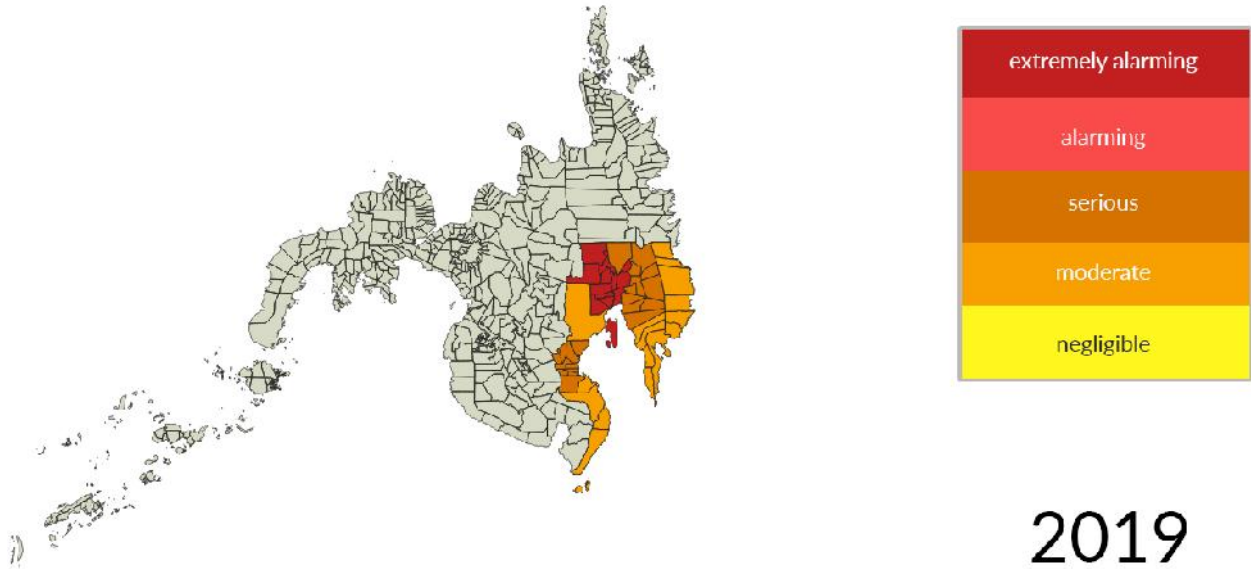

Fig 3 Severity of crimes involving firearms determined in 2018 using an index. Extremely alarming cases expanded to include Davao del Norte and Compostela Valley. Davao del Sur indicate "serious" case, while Davao Oriental and Davao City with "moderate" situation and Davao Occidental with "negligible" status.

Fig 4 Severity of crimes involving firearms determined in 2019 which is an election year revealed concentration of extremely alarming situation in Davao del Norte, while Compostela Valley reverted to serious status along with Davao del Sur. Davao City, Davao Oriental are now joined by Davao Occidental in "moderate" firearms-related crimes.

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