What factors influences the doubling rates of COVID-19 cases in cities of Metro Manila?

Michelle Pernia

Background

The National Capital Region also known as Metro Manila, with 16 cities and 1 municipality, is the hotspot of COVID-19 cases in the Philippines. On the 16th of March 2020, the whole Island of Luzon, has been placed under Enhanced Quarantine Measure (EQM) in attempt to controlling the spread of the virus. EQM is the equivalent of a lock down which is characterized by suspended public transport operation, closure of schools, limitation of operating private establishments to essential services like health facilities and super markets, limited shopping trips, and other measures ensuring physical distancing. Local authorities were given devolved authority in implementing the EQM. Like in many parts of the world, there were many roadblocks in the smooth implementation of the EQM and most of these are related to the economic impacts of quarantine on people.

When the EQM was declared, the total number of cases in Metro Manila was 142. It has now grown up to 10,343 on May 7. Different local governments in the region follow different trajectories in terms of the trends in the growth in the number of cases . It very important to know the possible factors that affect this growth to be able to formulate effective measures for flattening or managing the curve in the future.

In this project, the trend that I am interested in analyzing is the doubling rate of cases . The four main aspects that I want to investigate in this project as factors affecting the curve of cases are the following:

1. **Population density.** The population density of a city is a good indictor on the ease or challenges of doing physical distancing in the community. A densely populated community for instance may mean difficulty in home quarantining or more possibility for a close contact with a case.

2. **Measures of poverty -** Lack of means to shop for essential needs is one of the reason why people break the quarantine protocols. I am interested to know if the poverty incidence is a factor in the spread of the virus.

3. **Capacity of the local government -** Different local authorities have different financial capacity to aid to their residents. I am interested to know if financial capacity has any effect in controlling growth in cases.

4. **Number of asymptomatic cases –** The number of confirmed asymptomatic cases are also a possible indication why the virus is spreading undetected.

5. **Essential shopping venues –** Shopping areas are possible transmission points as people still converge in this areas during the ECQ

Sources of data

The main sources of data on the cases of COVID-19 would be the Department of Health (DOH). Other sources are—the Wikipedia page of Metro Manila, Philippine Statistical Authority (PSA) 2018 Poverty Statistics , and Commission on Audit (COA) 2018 Annual Financial Report of the local government. The details of the data are listed in the following table:

Table 1 Data description

Source of the data	Form of data	Data extracted
DOH Data Drop	google drive csv download	• COVID19 cases • asymptomatic patients
Metro Manila Wikipedia page	html table	• Population and population density for latest census year
PSA 2018 Poverty statistics	Excel table	• Poverty incidence • Number of poor families
2019 COA Annual Financial Report – Local Government	pdf report	• Net income of local government
Foursquare API calls	dataframe convertible text	• Shopping venues