Preliminary Analysis of NZ Police & GMP Data for the Auckland & Northern Districts

Data analysis was conducted on two distinct datasets which have data related to the well-being of communities in Auckland and the far north districts of New Zealand such as Whangarei. The first dataset is at a micro level and provides the victimizations data from NZ Police. This includes information on crimes including the type of crime (assault, theft etc.) and the number of incidents, the suburb/area of occurrence, the date they were recorded, and the population of the suburb/area.

The second dataset is a higher level and provides aggregated data linked to different communities in the Northern districts. This dataset provides information on the money spent on gambling and key parameters including the Deprivation Index (DI) and the proceeds from the Gambling Machines per Capita (GMP). The dataset also includes geographical information from the area name to the territorial area which can encompass a multitude of suburbs/areas.

Looking at the two datasets, it was clear that while both were distinct, they had common information that complimented each other. The police dataset while being rich in data, lacked the detail in geographical data that the community dataset possessed. These geographical markers are essential to create macro and micro level views of the police data. For example, some valid questions will be:

Is there a correlation between the spend on gambling and the deprivation index of an area?

Is there a link between the number of crimes & the deprivation index?

Which areas of Auckland district have the highest gambling spend per capita from 2018-2020?

What are the suburbs/areas in Auckland district with the highest number of retail thefts in the 3-year period from 2018-2020?

This and other questions can only be answered by merging both datasets to form richer dataset. Thus, the datasets were merged using the Pandas library in Python. The geographical markers can also be used to create interactive dashboards at a later stage.

The rest of the report presents some of the preliminary results of the data analysis. All analysis and visualisations were done using the pandas, SciPy, NumPy, and Matplotlib packages in Python.

The datasets were provided by a third party and are probably sourced from bona fide data sources such as the Ministry of Internal Affairs (for the GMP data) and the NZ Police datasets.

Is there a Link between the spend on gambling & deprivation?

The community dataset has to important parameters that indicate community wellbeing, the GMP and the Deprivation Index. The average GMP per capita for the period 2013-2020 has remained nearly constant with minor variability. While Figure 1 appears to show the average GMP having a fall in the year 2020, this is due to available data covering 3 quarters of 2020 compared to 4 quarters for the preceding years. Once the missing quarter is factored in, the line should approximate its previous trajectory.

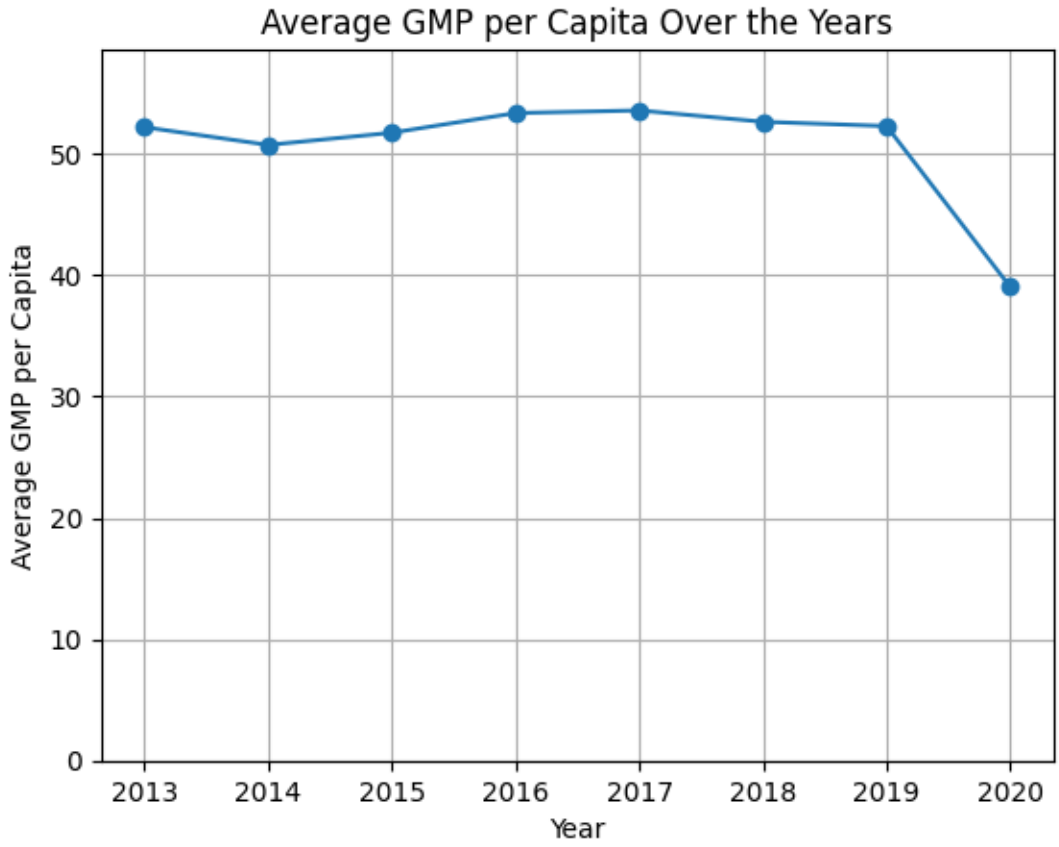

Figure 1 Average GMP for the period 2013-2020

A correlation test was run to see if there was any relationship between GMP and the Deprivation Index. However, the correlation coefficient of 0.42 indicates that potentially there is no relationship between the two or there is a non-linear relationship. This is an interesting thread that needs to be investigated further for other factors which might influence either of the parameters.

Is there a link between the number of crimes & the deprivation index?

A Pearson correlation test was conducted between the number of crime incidents and the deprivation index. The Pearson correlation coefficient of 0.12 indicates that there is a weak relationship between the number of crimes and the deprivation in an area. This suggests that there are other factors at play in the background.

Is there a Link between the number of crimes & the gambling spend?

A Pearson correlation test was conducted between the number of crime incidents and the average gambling spend (GMP). The Pearson correlation coefficient of 0.11 indicates that there

is a very weak relationship between the number of crimes and the money spend on gambling per capita in an area.

A Chi-Square test was also conducted by converting the GMP to a categorical variable by dividing it into 3 categories: *High*, *Medium*, and *Low*. The results of the Chi-Square also seem to suggest that there isn't a significant association between the number of crimes and GMP.

The areas of Auckland with the highest spend on gambling per capita

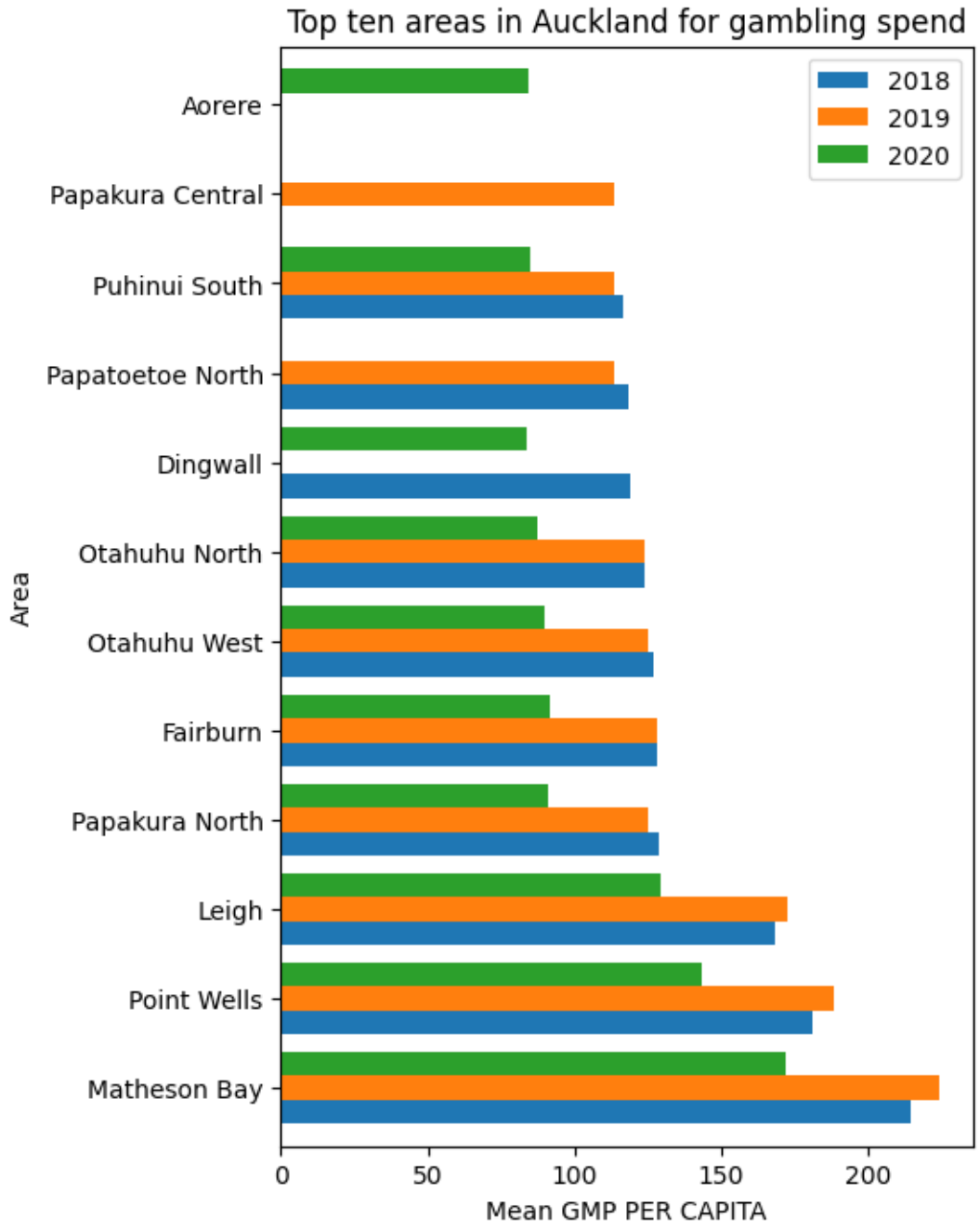

Figure 2 The top 10 areas of Auckland district with the highest gambling spend per capita for 2018-2020

Figure 2 gives a snapshot of the areas in Auckland which had the highest gambling spend (GMP) for the period of 2018-2020. An interesting trend observed is the gradual decline in the

GMP across the board in 2020. While spending remained steady during the 2018-2019 period, it saw a marked decline in 2020. A possible explanation for this is the measures taken by the government during COVID-19. This includes lockdowns and the general awareness amongst the public about viral transmission in public and enclosed places.

The Case of Retail Store Thefts in Auckland District

Figure 3 Theft in retail stores in Auckland district (2018-2020)

Since the last decade retail crime has been grabbing the headlines. A cursory glance at the headlines in NZ Herald gives the impression that retail crime is on the rise. The data from NZ police does confirm this with retail store thefts increasing by an average of 14% year-on-year when compared to 2018 (Figure 3).

However, the aggregate view needs further exploring to see areas were the businesses the hardest hit by retail theft. The figures below indicate the top 10 areas in terms of retail theft incidents recorded by NZ Police.

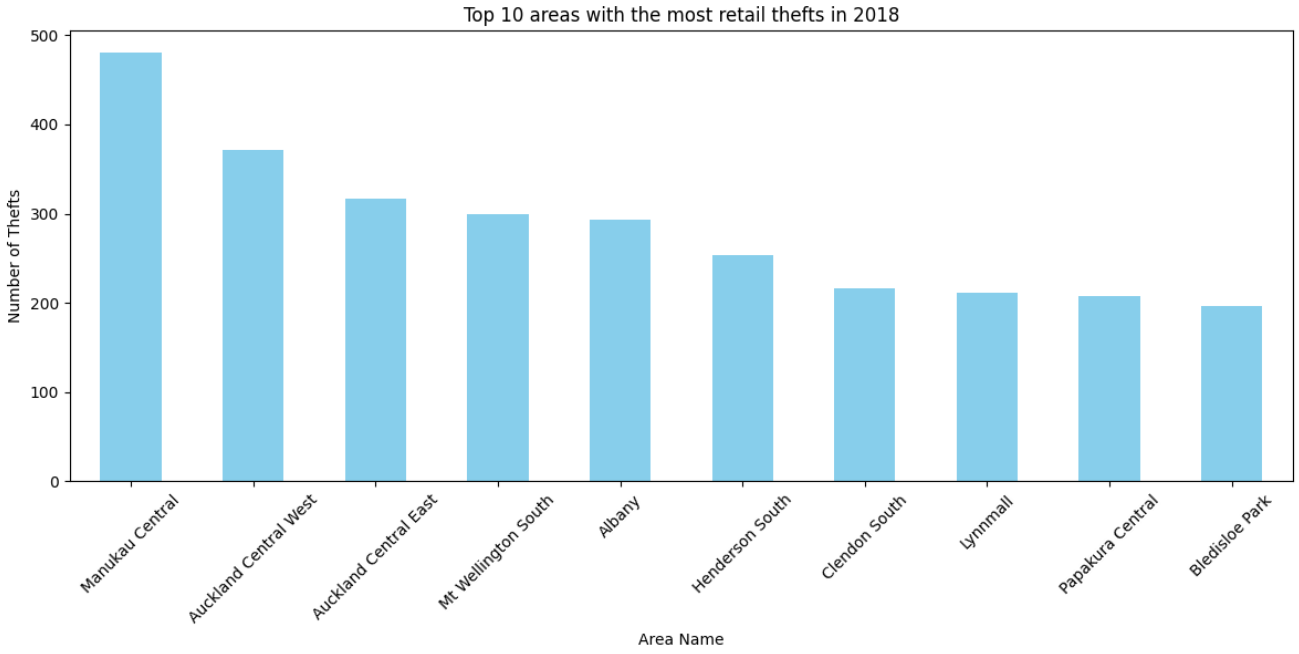

Figure 4 Top ten areas in Auckland for retail store thefts in 2018

From Figure 4 in 2018, Manukau Central had the greatest number of retail thefts with 481 incidents, followed by Auckland Central West which clocked in 371 incidents. The remaining 8 suburbs recorded an average of 249 incidents of retail theft.

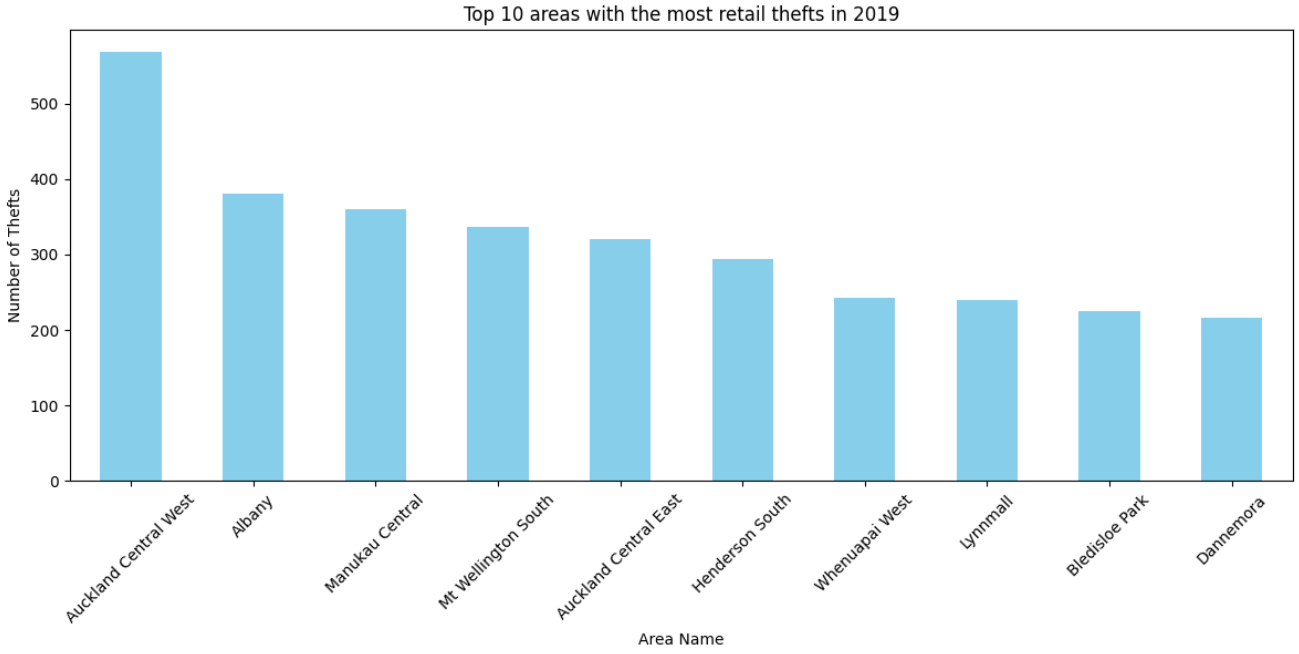

Figure 5 Top ten areas in Auckland for retail store thefts in 2019

2019 saw a change of roles with Auckland Central West recording a surge in retail crime with 569 incidents, Manukau Central recorded a sharp drop with 360 incidents (Figure 5). An interesting aspect was the rise in retail crime in Albany which rose from 293 incidents in 2018 to 380 in 2019. This is a jump of almost 30% over 2018. The causes for the spike need closer

investigation. The remaining 8 suburbs recorded an increased average of 267 incidents of retail theft.

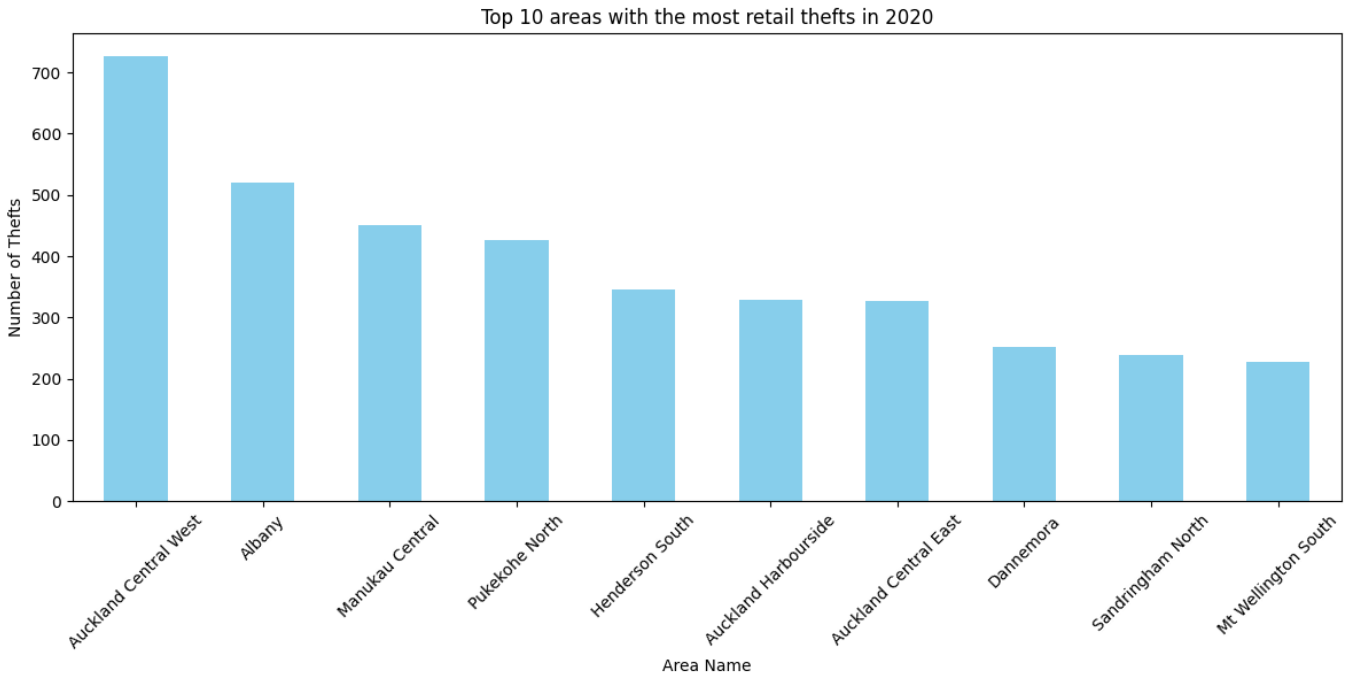

Figure 6 Top ten areas in Auckland for retail store thefts in 2020

Auckland Central West held onto its position as the hotspot for retail theft in 2020 (Figure 6). Retail theft incidents increased by 28% compared to the previous year, with 727 recorded incidents. Albany saw a jump of 37% in reported incidents, with 520 instances of retail theft. Mt. Wellington South showed a positive downward trend with a 32% decrease compared to 2019.