

# Behaviour of residential construction and real estate markets in W.A. during Covid-19 Crisis - slides

Team: 'Kalbarri Sun'

## Team members

- Lauren Prins
  - Daniel Sobral
  - Warren Villarosa
  - Sylvia Broadbent
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## Summary

### Hypothesis

Considering the information we keep receiving from the government and media, it seems that the whole world has been affected by COVID-19. We are looking at various factors of the residential real estate and construction market in WA to see if it has really been affected.

### Questions

We asked ourselves what areas we can look into to get a diversified look at the residential real estate market as that is an area of shared interest in our team. We have narrowed it down to property sales, building permits issued and their value and the first home owner grant in relation to dwellings, townhouses and apartments.

We then looked further into the behaviour of the stock value of the 10 largest property groups in WA.

### Available timeframe

We based our timeframe for the research on the dataset with the most limited data. This turned out to be the real estate information as most of that information requires payment. We started from the last quarter of the year in 2018 to the second quarter this year.

### Covid-19 period

In WA the regional travel ban started on 31 March so we have used the second quarter of 2020 as the 'COVID-19' quarter to compare against.

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## Stock market - Daniel Sobral

- Question:

- Data:
- Cleanup & exploration:
- Analysis:
- Conclusion:
- Correlation:

Data Source - Bloomberg API (in Rapid Api)

Data Profile

Raw Data:

Weekly price value for top 10 Real Estate Stocks for a 5 year period

Weekly Volume (number of shares traded) for 5 year period

Cleaning Data Process:

Retrieved 5 year price and volume data of the top 10 realestate companies by market cap.

Calculated the % change in price and volume traded in the periods between 2018 Q4 and 2019 Q4.

This analysis revealed a more intense correlation between the top 10 shares took place between start of 2019 Q4 and start of 2020 Q2:

- high liquidity for these shares in 2020 Q1
- slight increase in price change rate, with most shares sitting at a positive price change.
- At the start of 2020 Q2 both volume and share prices seen a sharp drop with all most companies closing this quarter on a 20% to 35% loss in share value with the exception of GMG registering only 5.51% loss during the first quarter of 2020. Important to mention that GMG is the largest company in the ASX with 34.69 Billion AUD in market capitalisation, 3 times bigger than the 2 second largest. This difference in size is generally and indicator of better stability it is still surprising that no other stock could withstand the 2020 Q1 Events.

After analysing the possible correlation between shares in regards to these two indicators we can see their behaviour correlates between 2019 Q4 and 2020 Q2.

So we proceed to calculating the average percentage change for both variables as it will allow us to draw comparisons with other variables related to the overall Real Estate market performance.

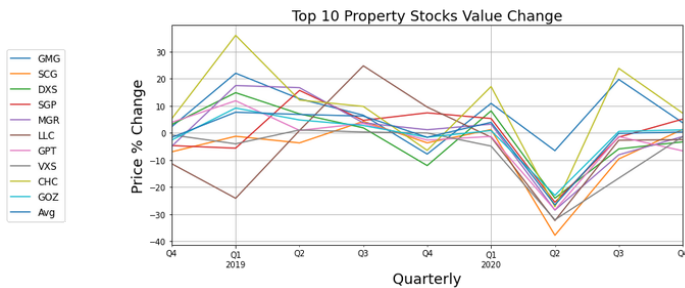
Possible external comparisons:

relationship between 3 macro factors (line chart) - [top 10 avg price change] [Paid Loan Applications]  
[ RealEstate Sales Values]

**Conclusion:**

- (Dan)From start of 2020 the Top 10 Property stocks display closer price movements,
- **(main)**Leading to end of Q2 2020 (covid outbreak and subsequent lockdown) measures all shares dropped.

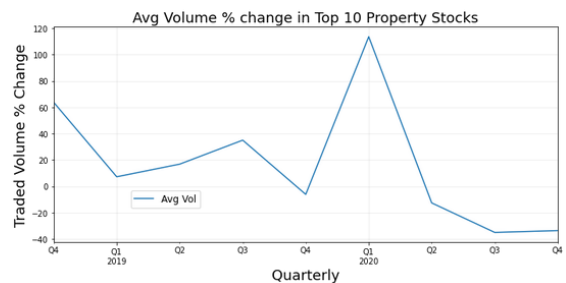
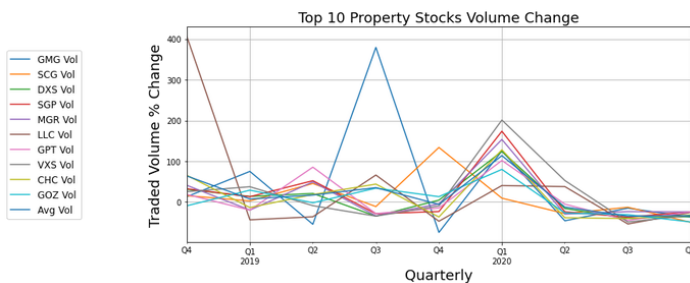
- **(main)** Followed by a V-shape recovery until end of Q3 of 2020.
- (Dan) GMG stands has the biggest realestate company with 3 times the market cap of the second largest.
- (Dan) The Average Price Movement will allow us to compare the stock market behaviour with other macroeconomic variables.



Volume(liquidity indicator) of stocks traded:

(Dan) GMG displays a more independent behavior with an individual spike of liquidity leading to 2020 Q3.

**(Main)** Spike in volume traded in the beginning of 2020(pre-covid) - Followed by a massive drop heading to end of Q2 2020(post-covid).



**Main Conclusion** - Shares Value and Volume traded dropped after March.

- Although prices saw a recovery the % change in traded volume kept negative.
- Despite the recovery in the value these stocks, they now offer significantly less liquidity than they did pre-covid.

Missing - Linear Regression between "Stock Value Change" & "Property Sales Value Change"

## Real estate - Warren Villarosa

- Question:

- Data:
- Cleanup & exploration:
- Analysis:
- Conclusion:
- Correlation:

**Introduction:**

The following data was sourced from Kaggle as a CSV file and included real estate sales nation wide. The dataset did not include commercial real estate sales. Each row was a confirmed sale and included date, price, suburb, property type and the coordinates for the suburb

**Methodology:**

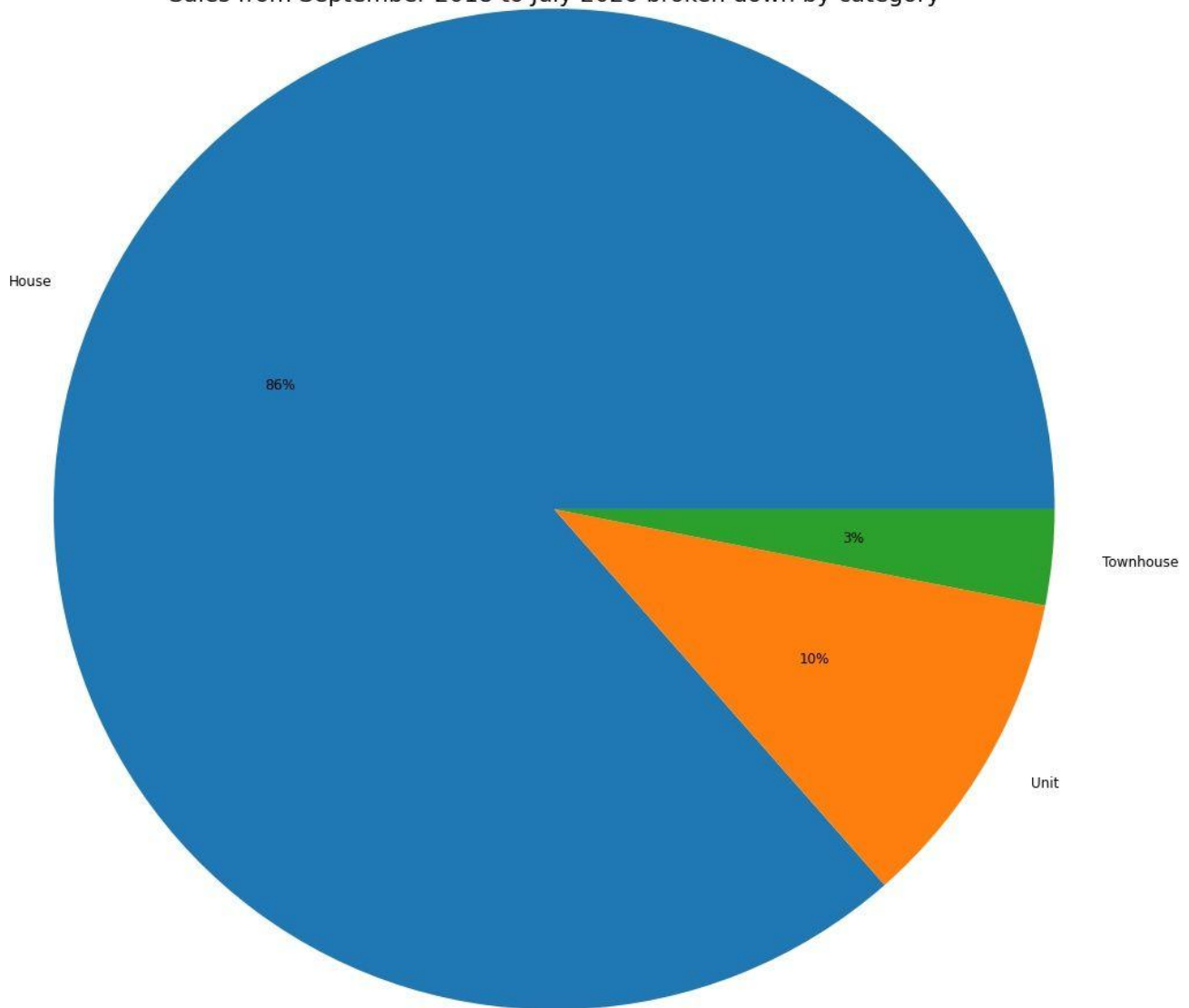
The Market of interest for the analysis was Western Australia so I cleaned the dataset and limited it to sales within Western Australia. I wanted to make sure that I used as much of the information available. Some time was spent changing the strings in the date column into Datetime format and breaking the dates into year, month and quarter columns to make grouping a little simpler.

The main libraries and modules used for the processing of this data were:

- Pandas
- Matplotlib
- Scipy
- Numpy
- Datetime

**Figure 1 - The Share of total real estate sales over the time frame examined.**

Sales from September 2018 to July 2020 broken down by category



*Share of total volume by Property Type.*

The figure above is simply here to illustrate that the Western Australian market is heavily weighted towards dwellings (houses) with only 13% of the market being shared between units and townhouses. This means that the sales of the latter two categories will only have a minor influence on the data following.

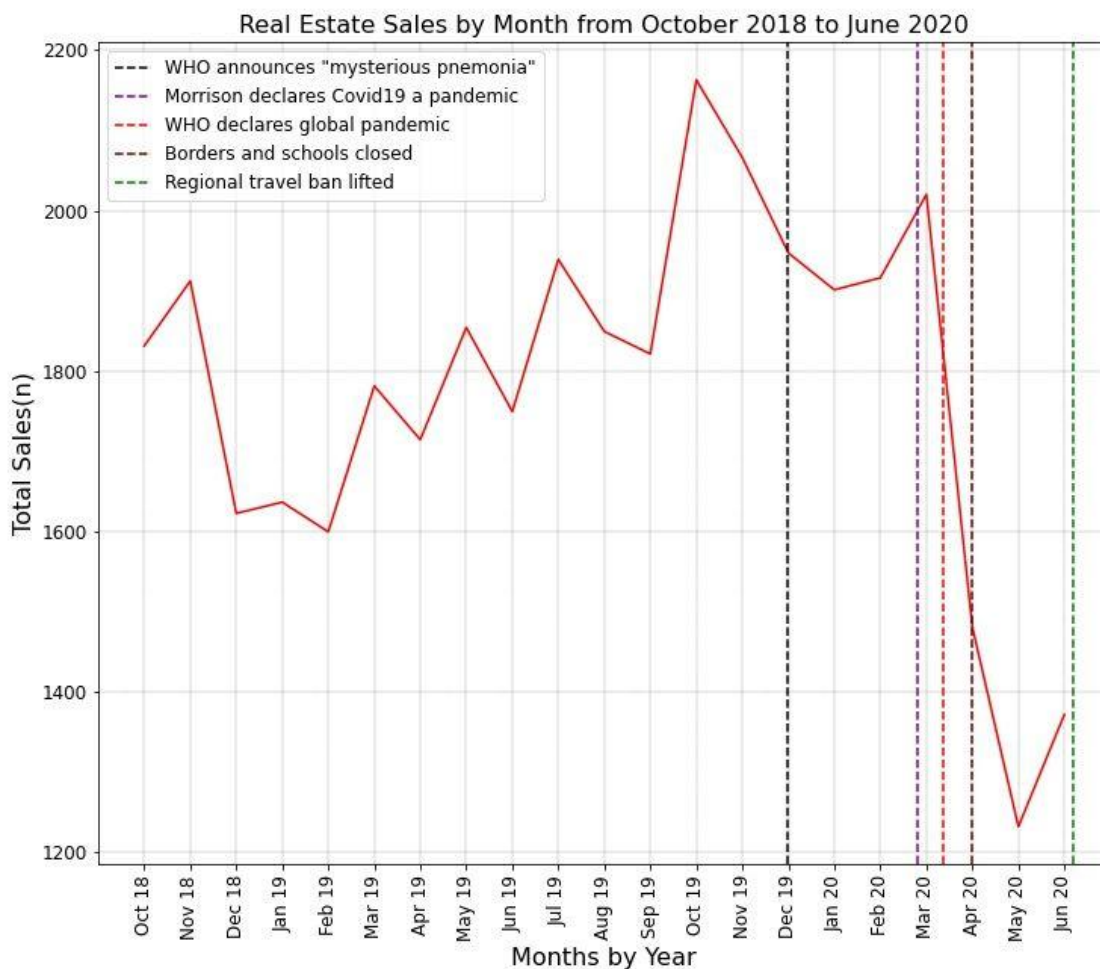
After grouping the data by year, month, date sold and adding a count of entries, I was able to produce the plot below by plotting the months against the counts which corresponded to sales volume. On the above figure and the ones following, I marked some key dates to see if they coincided with any major trends in the data. The dates are as follows:

- Dec 31st 2019 - WHO announces a "mysterious pneumonia"
- Late February (Around the 23rd) 2020 - Scott Morrison Declares Covid 19 a pandemic
- March 11 2020 - WHO Declares Covid19 a global pandemic
- March 31 2020 - Regional borders and schools closed within Western Australia

- June 6 2020 - Regional travel ban lifted

The dates were sourced from various news articles from the ABC.

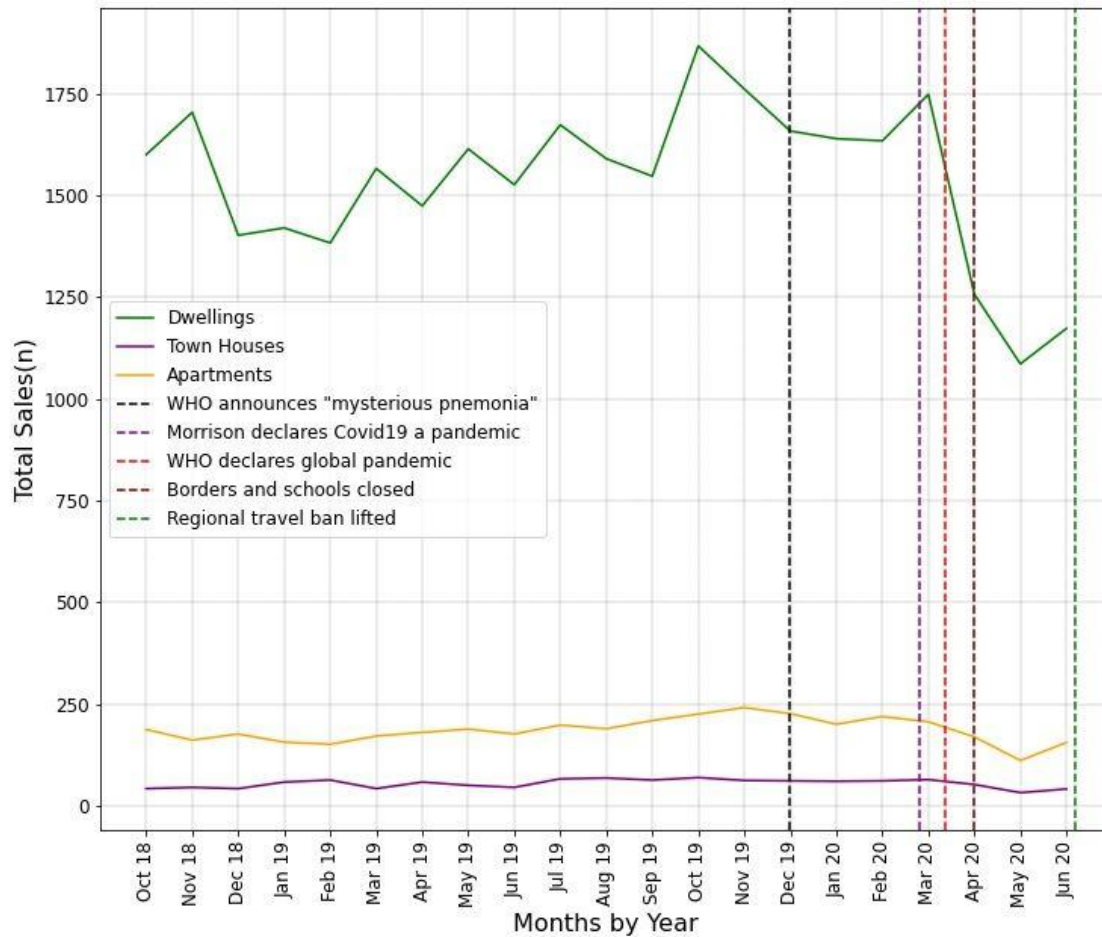
**Figure 2 - Total volume of real estate sales from Oct 2018 to June 2020**



*Total volume of real estate sales over the period examined*

This particular figure illustrates the trend followed by the total volume of sales during the period being examined. I chose this graph because I thought it would be interesting to explore the effect that Covid19 had on the overall volume of sales. The sharpest drop in volume appears to follow shortly after Scott Morrison declared Covid 19 a pandemic (Indicated by the purple intermittent vertical line) in late February 2020 ([ABC News](#)). While the correlation between the two can only be suggested as a best guess with the limited data on hand, the market does show a strong reaction not long after the announcement.

**Figure 3 - Volume of realestate sales from Oct 2018 to June 2020 by housing category**



*Total volume of realestate sales by category Oct 2018 to Jun 2020*

After breaking the dataset up into property type I was able to plot individual trend lines for each property type against the monthly periods. The above figure provides an insight into the influence the various housing categories had on the overall volume of sales.

When compared to the previous line graph an almost identical trend can be noticed in dwellings (green); this is likely because they make up the lions share of the total volume of sales. The market's reaction had a less severe but noticeable effect on the sale of units (yellow), while the low volume of town house (purple) sales was barely affected at all.

**Figure 4 - mean and median house price by month**





Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020
Baldivis	Baldivis	Baldivis	Baldivis	Baldivis	Baldivis	Baldivis
Canning Vale	Morley	Thornlie	Canning Vale	Canning Vale	Scarborough	Ellenbrook
Morley	Scarborough	Canning Vale	Scarborough	Scarborough	Canning Vale	Canning Vale
Dianella	Canning Vale	Ellenbrook	Dianella	Thornlie	Dianella	Dianella
East Perth	Dianella	Scarborough	East Perth	Ellenbrook	Morley	Butler
Gosnells	Como	Dianella	Ellenbrook	Rockingham	Rockingham	Scarborough
Perth	Gosnells	Maylands	Morley	Perth	Como	Duncraig
Thornlie	Maylands	East Perth	Como	South Perth	Maylands	Thornlie
Clarkson	Bayswater	Morley	Byford	Dianella	Duncraig	Wanneroo
Scarborough	South Perth	Secret Harbour	South Perth	Morley	Ellenbrook	Claremont

I also wanted to explore the effect that Covid might have had on the best performing suburbs by volume. I had wanted to plot these in bar charts but didn't feel those bar plots added any value to the big picture. Not even a pandemic could shake Baldivis from its top spot; while Canning Vale, Scarborough and Dianella rarely fell out of the top 10 if ever. I started to wonder why anyone would willingly buy in Baldivis but thought better of it. After all, I myself made the mistake of buying in the same postcode as Armadale.

**Figure 5 - Scatter Plot Showing Correlation between number of permits issued and number of real estate sales for W.A.**

The r-squared is: 0.2547026417198125

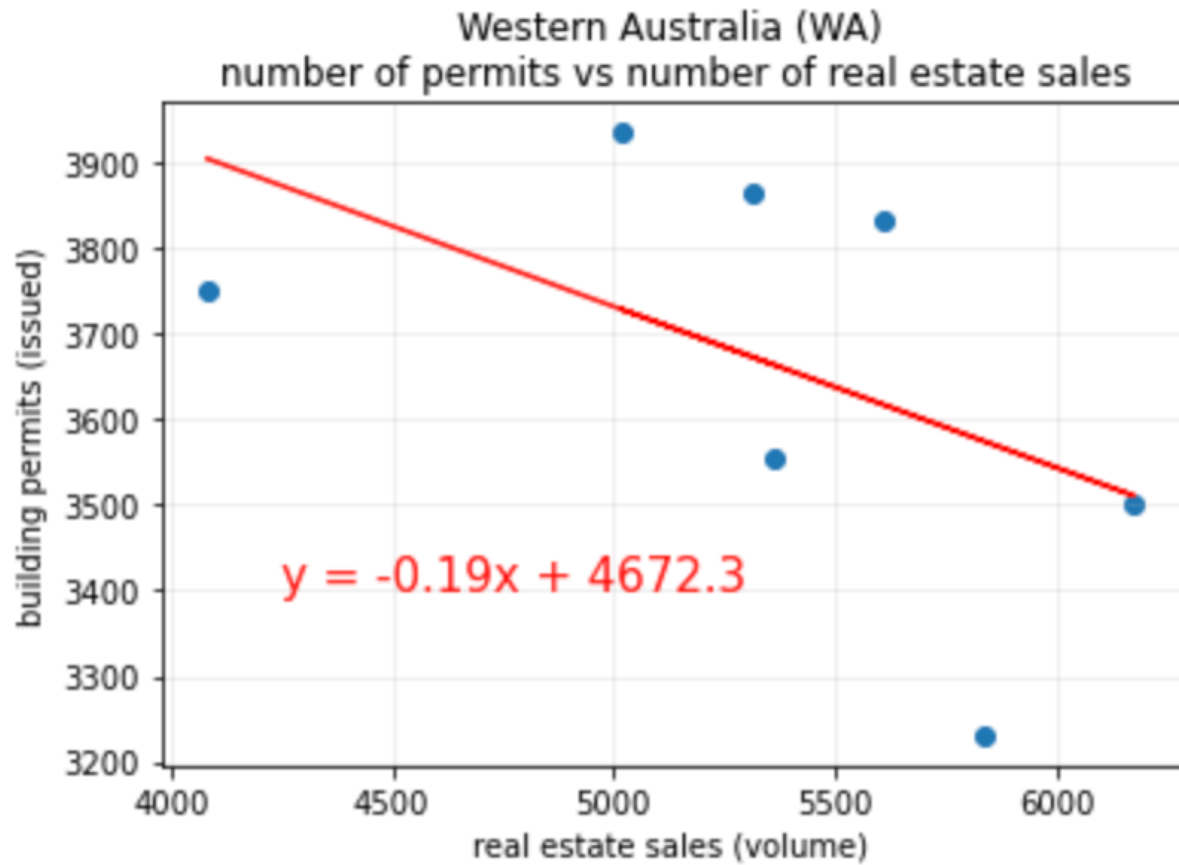
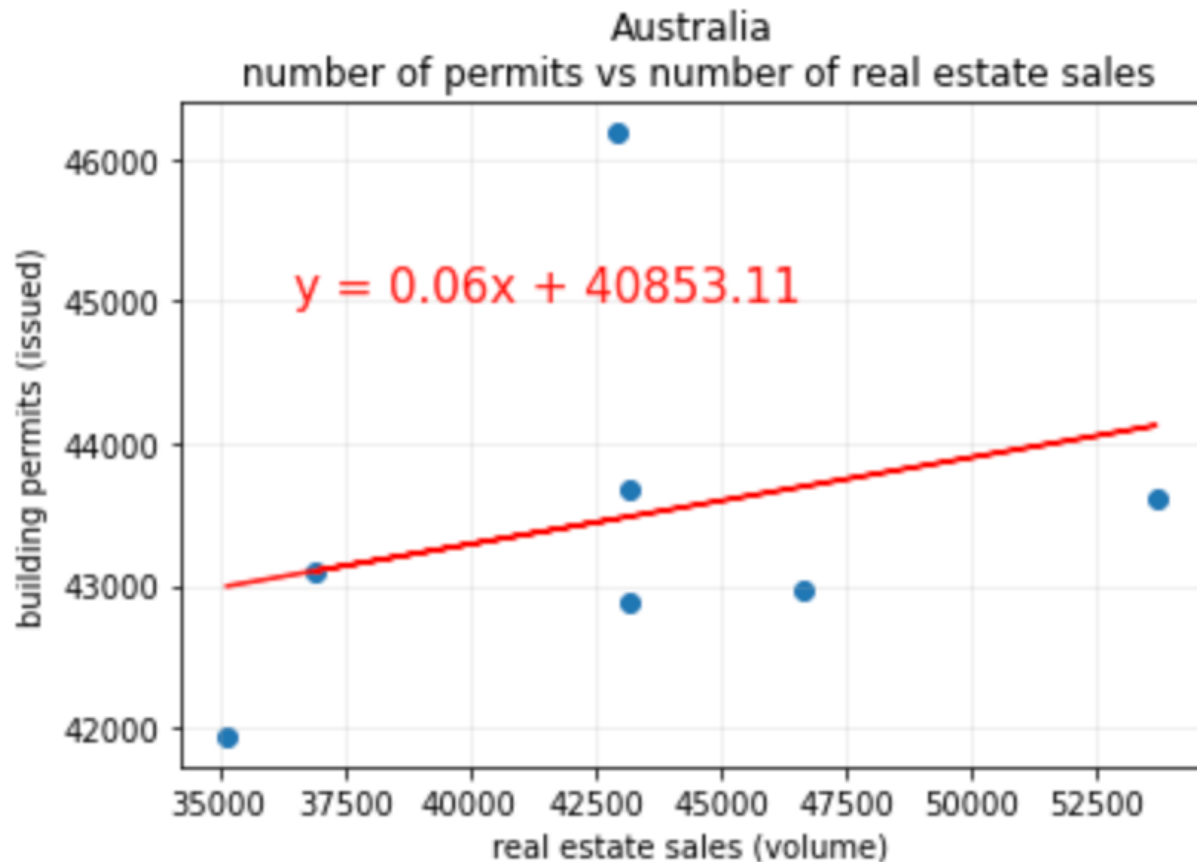


Figure 6 - Scatter Plot Showing Correlation between number of permits issued and number of real estate sales.

The r-squared is: 0.07987105331653124



*Number of Permits in Australia vs Total Real Estate Sales*

## Permits & construction value - Sylvia Broadbent

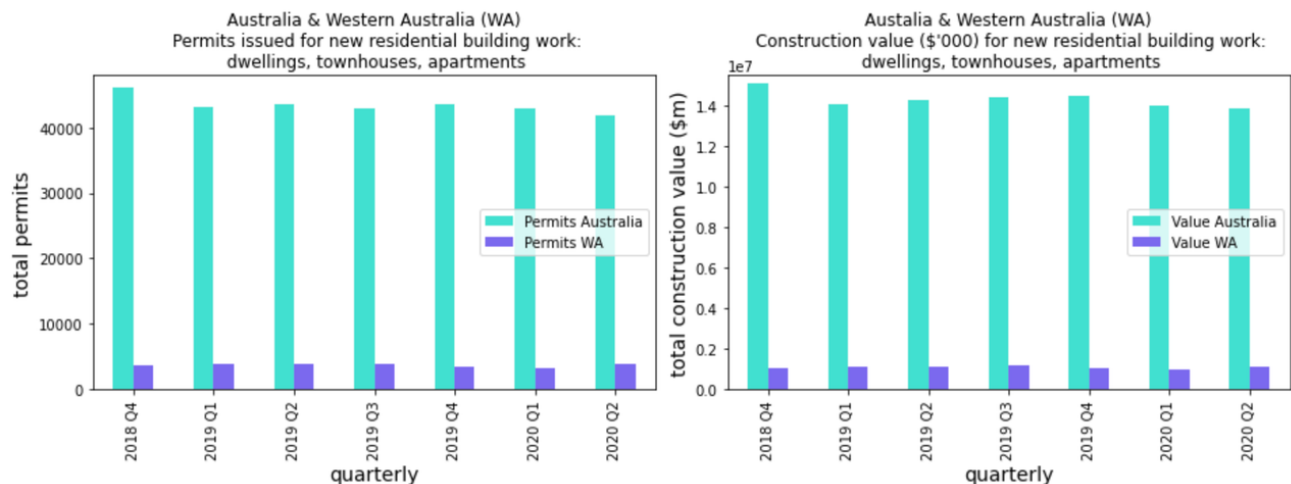
- Question: Are the number of permits issued for residential construction impacted by the COVID-19 crisis?
- Data: Statistics about construction is publicly available via the ABS (Australian Bureau of Statistics). In WA the Data is collected by the Building Commission.
- Cleanup & exploration:
  - Data for WA starts in 1970!
  - Export excel files and turn them into csv files.
  - Creating Pandas Dataframe in Jupyter.
  - Manipulating them to create the final Dataframes with required information.
  - No mean or median values as there is not enough information to make an accurate representation.

	dwellings	townhouses	apartments	dwellings_\$'000	townhouses_\$'000	apartments_\$'000	total_permits	total_value		permits_au	value_au
2018Q4	3068	240	247	910726	56850	84852	3555	1052428	2018Q4	46181	15107274
2019Q1	2821	299	815	824553	69611	218410	3935	1112574	2019Q1	43091	14062628
2019Q2	2996	343	526	878667	74793	171036	3865	1124496	2019Q2	43681	14315655
2019Q3	2770	265	799	826658	66966	294430	3834	1188054	2019Q3	42972	14390276
2019Q4	2897	268	336	877361	67937	119569	3501	1064867	2019Q4	43616	14496008
2020Q1	2718	220	293	830906	53003	89497	3231	973406	2020Q1	42878	13992118
2020Q2	2878	196	676	851247	52387	208546	3750	1112180	2020Q2	41943	13845277

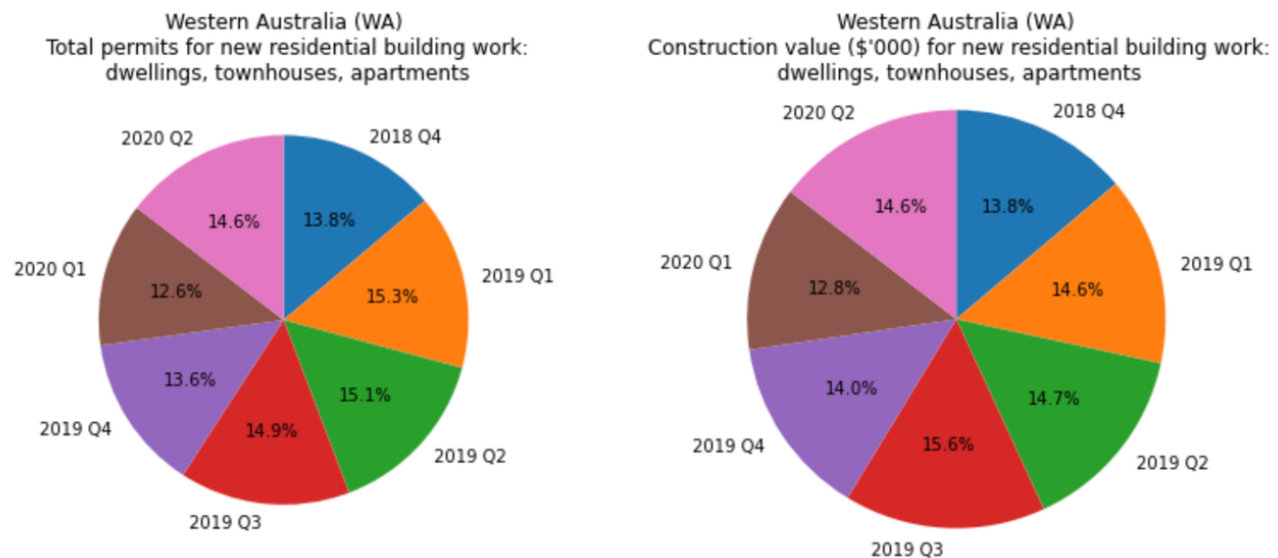
(All information I am presenting shows the number of permits on the left and the value of permits in \$'000 on the right.)

- Analysis:

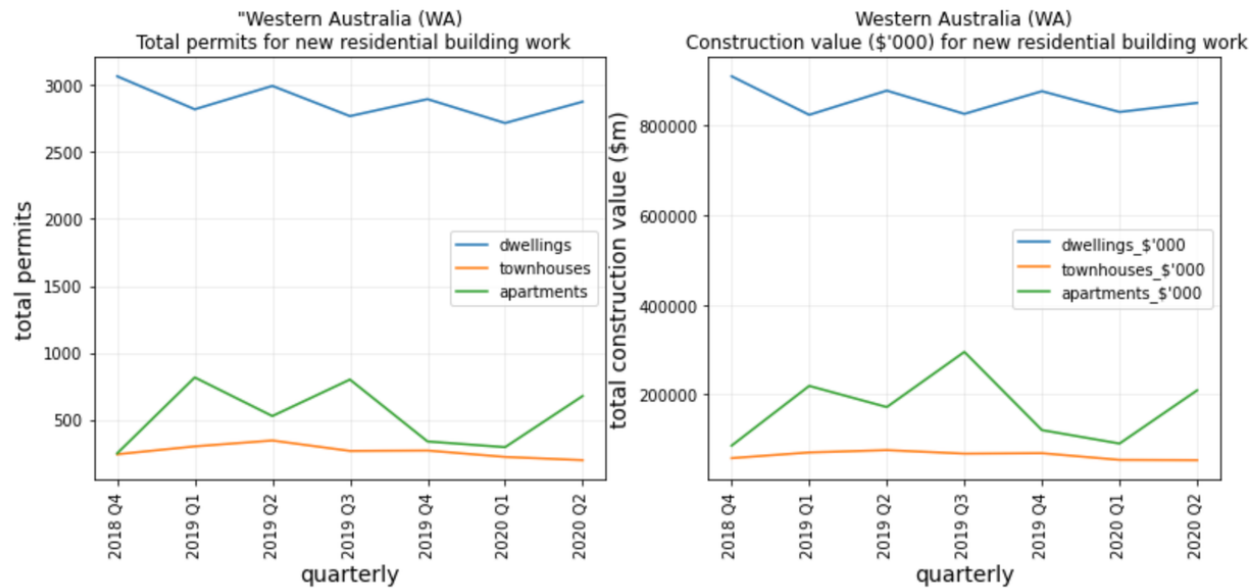
- Permits issued & value Australia wide compared to WA per quarter.



- Permits issued & value for WA of each quarter.

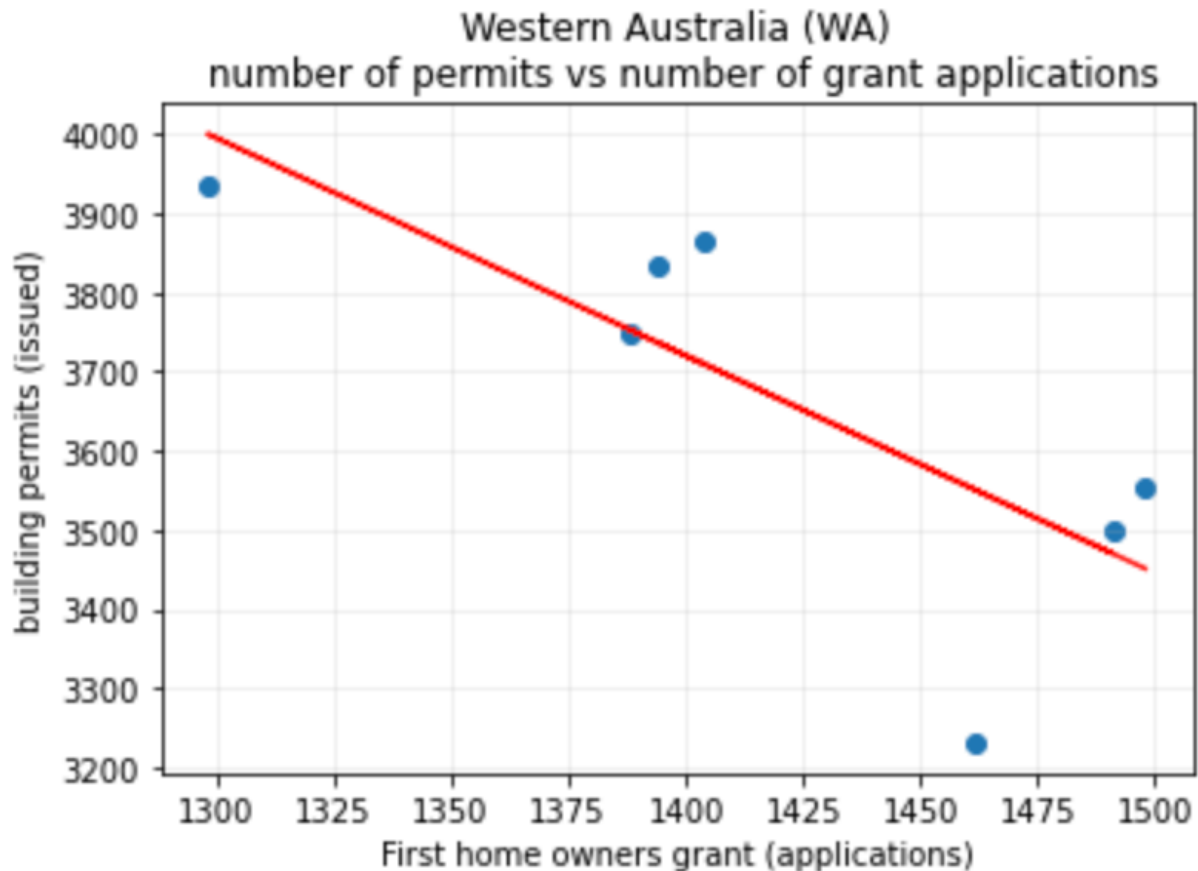


- Permits issued & value for WA of each quarter separated by type of residential construction.



- Conclusion:
  - Dip in the issuing of permits in 2020 Q1. This may be related to the announcement of COVID-19 in December by WHO. But quickly recovered in the 2nd quarter.
  - The amount of permits issued versus the value it represents remains fairly constant. Indicates that the average value per permit does not vary much, which means that the distribution of high spec homes versus low spec homes is fairly equal.
- Correlation - First home owners grant applications vs Building permits:

The r-squared is: 0.5971298445529775

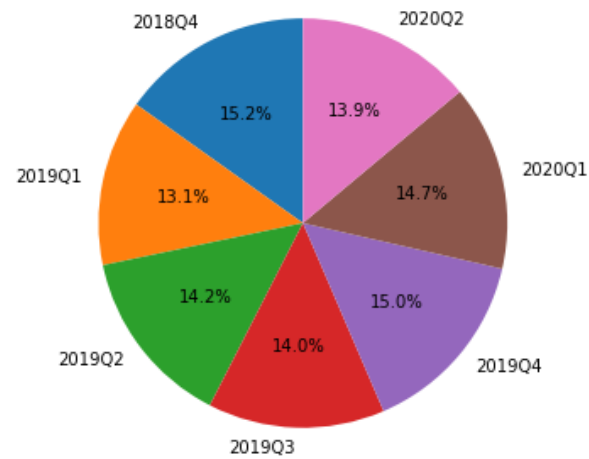


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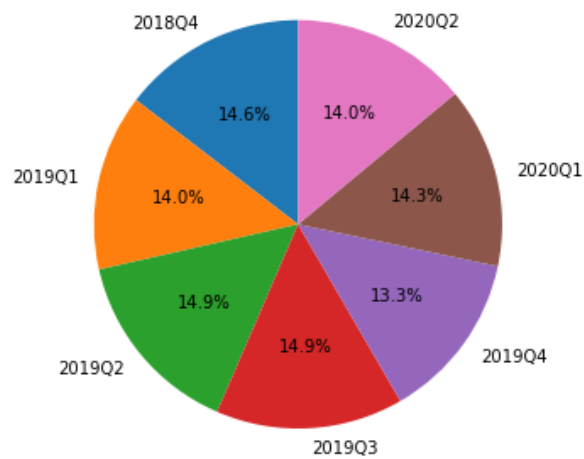
## First home owners grant - Lauren Prins

- Question: Are the number of applications and paid grants for first home owners impacted by the COVID-19 crisis?
- Data:
  - Revenue WA, [www.wa.gov.au](http://www.wa.gov.au)
  - Excel spreadsheet format
- Cleanup & exploration:
  - Month by month
  - Established houses v new dwellings
  - Applications made vs Applications paid
- Analysis:

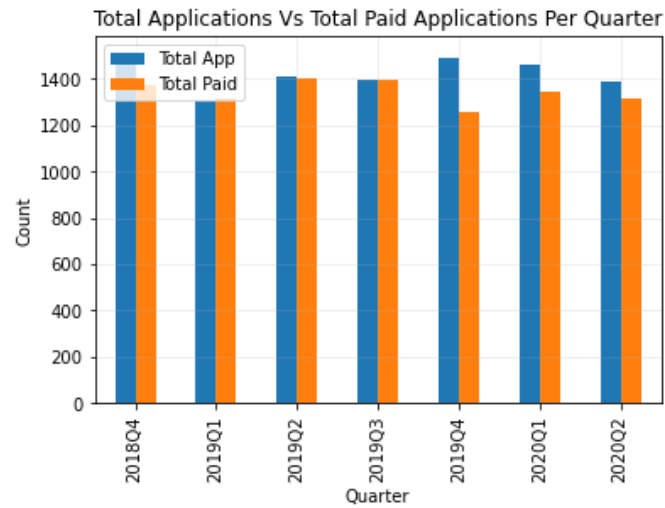
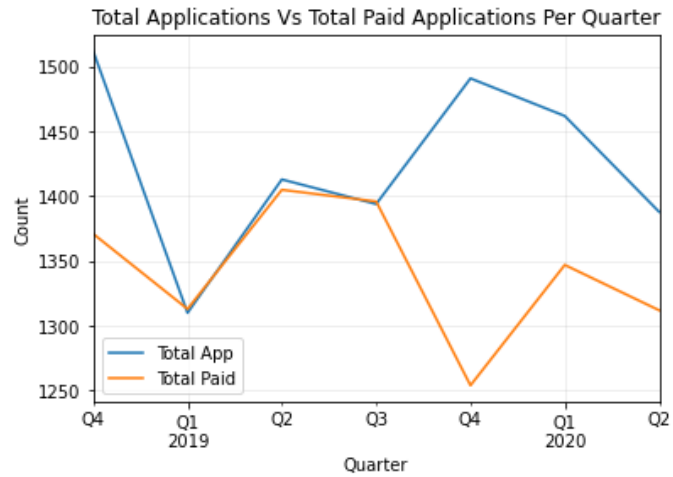
Total Applications made in WA for First Home Owner Grants



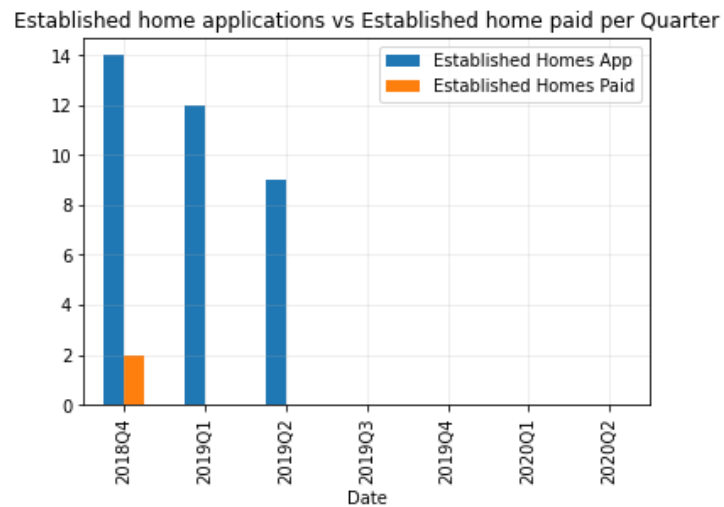
Total Paid Applications in WA for First Home Owner Grants



- “utilising Matplotlib to display a bar and line graph for total applications made and paid; both displaying a slight decrease for 2020.”

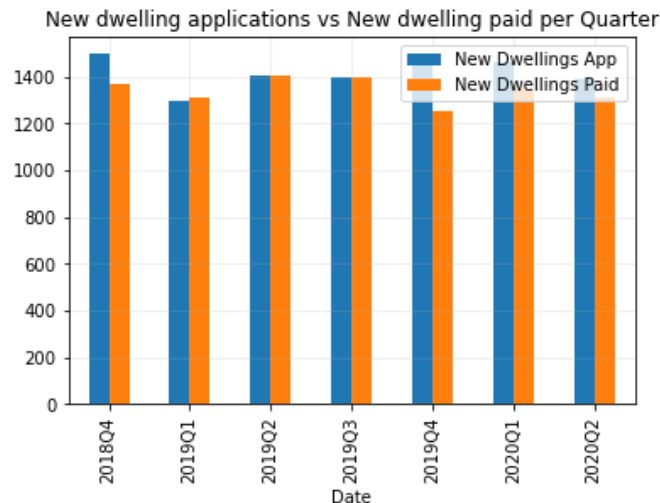


- "Grants only available for new dwellings from start of 2019"





I found it interesting that the excel document informs the viewer that the grant guidelines changed in 2019 and the FHOOG would only be available for New Dwellings. I displayed this information in the first graph below where you can see a sudden decline and a flat line from 2019 in applications and paid grants to established homes. The second graph shows a steady amount of paid grants for new dwellings.



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## Conclusion

Did we find what we expected to find? Not quite

- R-Square value of 0.59 between building permits and first home owner grants as they both showed no significant decreases in the data sets since the announcement of the covid pandemic.
- R-Square value of 0.08 between building permits and volume of sales in WA as there was a decrease in house sales, median house price & average house price,
- Drop in share values and share volumes from Mar 2020.

## Limitations & difficulties

time, accessibility, & data

## If we had more time

- Extend our data time to include more previous years to compare to and expand with Q3 and Q4 of 2020.
- Compare WA's performance against other states and possibly the world.
- Add commercial as well as residential development.
- Include the rest of 2020 to see data trends past the apparent recovery of WA.
- Explore trends by suburb in more detail.

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**Questions??**