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Data Visualisation with Excel

comprehensive analysis of various aspects concerning
properties in Macquarie Fields

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Introduction

This report offers a comprehensive analysis of various aspects concerning properties in Macquarie Fields, Sydney. Data has been collected from multiple perspectives, including property prices, population demographics, workforce statistics, dwellers financial situations, dwelling statuses, and ownership patterns. The insights derived from this data are presented through visual graphs, employing a variety of data visualization principles and techniques.

Furthermore, this report not only compares and summarizes different visualization methods but also provides insights into the property market tailored to the needs of different demographic groups accordingly.

Data Summary

The data used for this report is referenced from ABS Census data and Pricerfinder. The ABS is Australia's main stats agency. They provide accurate info, showing Australia's story through data on people and economy. PriceFinder is an online platform that provides access to comprehensive property data and analytics for real estate professionals and individuals.

All data analysed in this report are quantitative (ratio-scale). This is because there is a meaningful order to the data, and a clear definition of 0.0, indicating the absence of the variable. (1.2.2 The different types of data, 2024)

This dataset comprises three formats: dollars, numbers, and percentages. Property prices and incomes are in dollars, age and category counts are in numbers, and category breakdowns are in percentages.

Required adjustments have been made during the data collection process. Median mortgage payments, originally in monthly terms, have been converted to weekly terms by dividing by 4.345. Additionally, separated and divorce rates, initially separate in the source, have been combined during collection.

Generally, datasets in dollar format exhibit an upward trend. Similarly, those in number format also show an upward trend. However, datasets in percentage format display more complex patterns. Some percentages must be multiplied by the total category count each year to accurately analyse the movements.

#	Data Categories	Data Name	Data Format	Data type
1	Property Median Price	MedianHousePrice	Dollars	Quantitative (ratio-scale)
		MedianUnitPrice	Dollars	
		TotalPrivateDwelling	Number	
2	Type Of Dwellings	OccupiedDwellings(%)	Percentage	Quantitative (ratio-scale)
		UnoccupiedDwelling(%)		
		SeparateHouse(dwellings%)		
		SemiDetached(dwellings%)	Percentage	Quantitative (ratio-scale)
		FlatUnitApartment(dwellings%)		
		0xBedroom(%)		
		1xBedroom(%)	Percentage	Quantitative (ratio-scale)
		2xBedroom(%)		
		3xBedroom(%)		
		4xBedroom(%)		
3	Ownership Status	AverageNumberBedroomsPerDwelling	Number	Quantitative (ratio-scale)
		FullyOwned(%)	Percentage	Quantitative (ratio-scale)
		OwnedWithMortgage(%)		
		Rented(%)		
		FamilyHouseHolds(%)	Percentage	Quantitative (ratio-scale)
		SinglePersonHouseHolds(%)		
		GroupHouseHold(%)		
4	Financial Status Of The Household/Personal and Family	MedianPersonalWeeklyIncome	Dollars	Quantitative (ratio-scale)
		MedianFamilyWeeklyIncome		
		MedianHouseholdWeeklyIncome		
		MedianMortgageWeeklyPayment		
		MedianWeeklyRent		
		LessThan\$650WeeklyIncome(%)	Percentage	Quantitative (ratio-scale)
		MoreThan\$3000WeeklyIncome(%)		
		HouseholdsRentPayments<30%Income(%)		
		HouseholdsRentPayments>30%Income(%)		
		HouseholdsMortgageRepayments<30%Income(%)		
5	Suburb Population And Marriage Status	Population	Number	Quantitative (ratio-scale)
		AverageNumberPeoplePerHousehold	Percentage	Quantitative (ratio-scale)
		BirthInAustralia(%)		
		MedianAge	Number	Quantitative (ratio-scale)
		Married(%)	Percentage	Quantitative (ratio-scale)
		Separated+Divorced(%)		
		Widowed(%)		
		NeverMarried(%)		
6	(Un)Employment Status	Worked full-time(%)	Percentage	Quantitative (ratio-scale)
		Worked part-time(%)		
		Unemployment(%)		
7	Family Information	Families	Number	Quantitative (ratio-scale)
		CoupleFamilyNoChildren(%)	Percentage	Quantitative (ratio-scale)
		CoupleFamilyHasChildren(%)		
		OneParentFamily(%)		
		OtherFamily(%)		
8	Ways To Commute To Work	PeopleTravelledToWorkByPublicTransport(%)	Percentage	Quantitative (ratio-scale)
		PeopleTravelledToWorkByCar(%)		
		AverageMotorVehiclesPerDwelling	Number	Quantitative (ratio-scale)

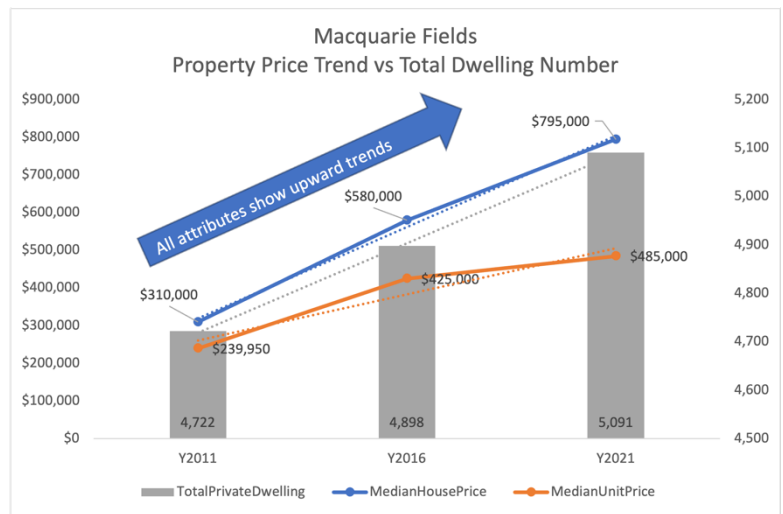
Essential adjustments and computations have been undertaken to uncover insights from the data. Weekly data has been converted to annual figures by multiplying by 52.143. Additionally, various formula-based calculations, such as supply and demand analysis, affordability assessment, and calculations related to price elasticity and gross rental yield, have been performed.

(ABS Census data, 2024) (Pricerfinder, 2024)

Property Price Analysis

This graph illustrates the overall trends in property prices and their correlation with the movement of total dwelling numbers. A combo chart is utilized, with a line chart depicting the price trend and a bar chart representing total dwelling movement. A trend line has been included to enhance the visibility of the total dwelling number trend.

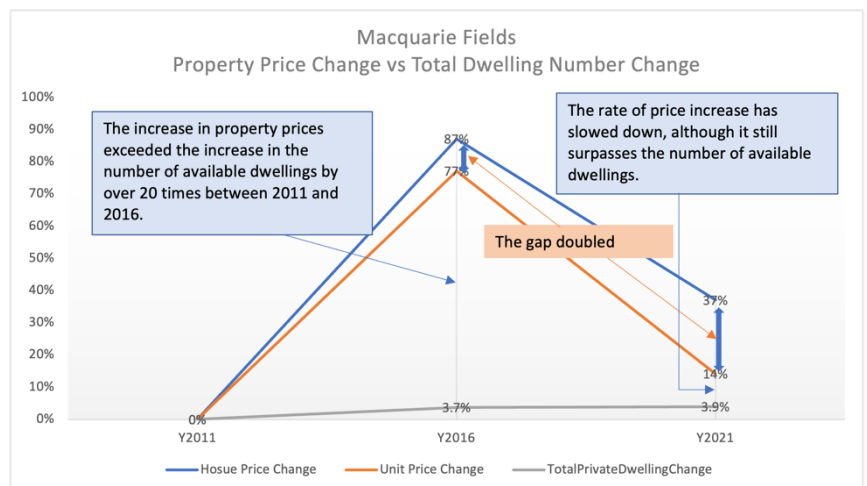
Primary and secondary Y axes are employed to accommodate different data formats. Labels are added to highlight significant data points, and prominent arrows are included to enhance storytelling. The secondary Y-axis has been rescaled, with the minimum number adjusted to 4500. This modification is intended to enhance visual clarity, ensuring that the bar chart is evenly spread across the entire graph.



Data insights:

- Since 2011, there has been a consistent increase in Total Private Dwellings, Median House Price, and Median Unit Price.
- The Median House Price exceeds the Median Unit Price and has been increasing at a faster rate.

To illustrate the percentage changes in movement for these three attributes, a line chart was created. Data labels are positioned to highlight key data points, while drop lines enhance visual clarity. Blue vertical double-ended arrows are included to emphasize the difference between house price changes and unit price changes. Text messages with arrows enhance storytelling.

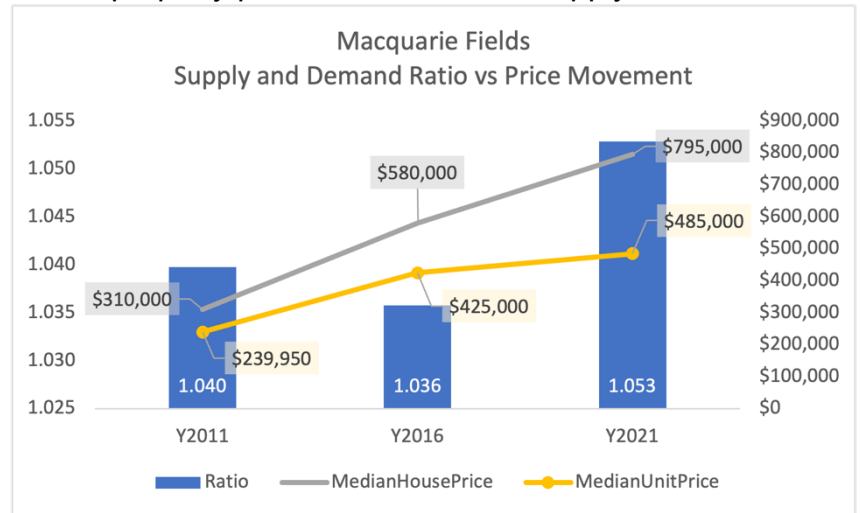


Data Insights:

- Between 2011 and 2016, the increase rate in property prices surpassed that of available dwellings by over 20 times.
- Although the rate of price increase has slowed down in 2021, it still outpaces the increase rate of available dwellings.
- Furthermore, the increase rate of house prices exceeds that of unit prices, with the difference between their increase rates doubling between 2016 and 2021.

Supply and Demand Analysis

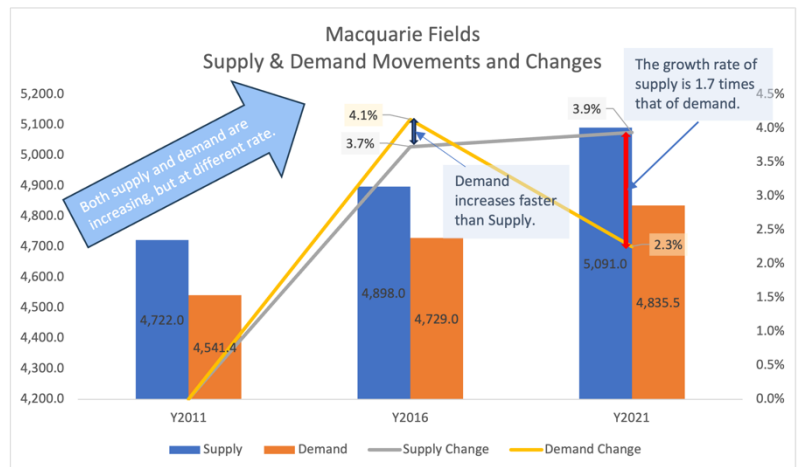
This graph illustrates the correlation between property price movement and supply and demand ratio across different years. A combo chart is utilized, featuring a line chart depicting the price trend and a bar chart representing supply and demand ratio movement. Primary and secondary Y axes are employed to accommodate different data formats. Labels are added to highlight significant data points. The Primary Y-axis has been rescaled to values between 1.025 and 1.055 to enhance visual clarity, as the ratios' values are relatively small. This adjustment allows for easier differentiation of differences in each year.



Data Insights:

- The ratio declined from 2011 to 2016, indicating strong market demand.
- Consequently, this reflects the price increase between 2016 and 2021, with houses experiencing greater increases. This suggests that the market demand for houses exceeds that of units.
- Ratios are over 1 across 2011 and 2021, indicating that supply exceeds demand in these years. This implies that property prices are not overheated.

This graph provides further insight into property supply and demand movements by comparing their change rates over time periods. A combo chart is used, featuring a line chart describing the supply and demand change rate, and a bar chart representing total supply and demand. Primary and secondary Y axes accommodate different data formats. Labels highlight significant data points, while prominent arrows and text enhance storytelling. The primary Y-axis has been rescaled, with the minimum number adjusted to 4200 to improve visual clarity, ensuring even distribution of the bar chart across the graph.



Data Insights:

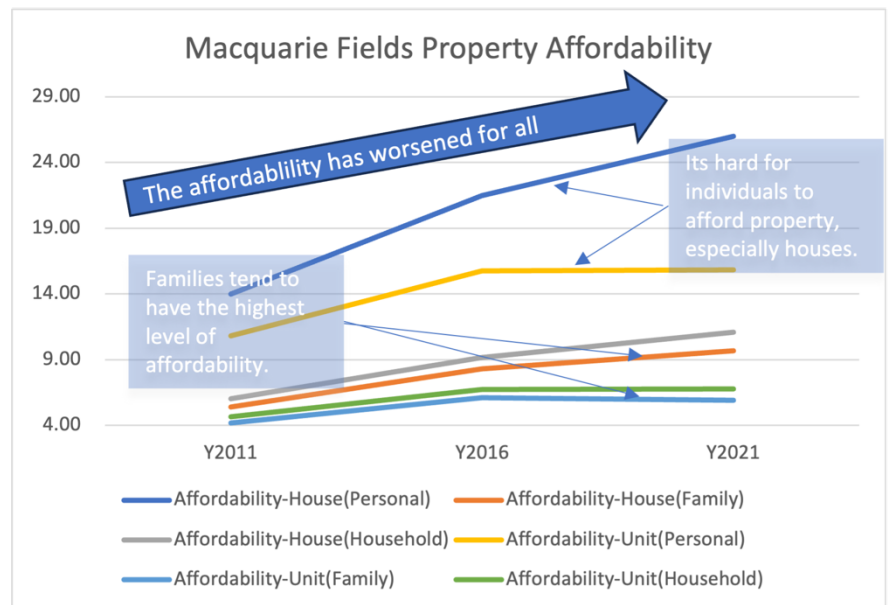
- Both supply and demand are increasing, albeit at different rates.
- Demand increased more rapidly than supply in 2016.
- However, the rate of increase in supply soon surpassed that of demand, reaching 3.9% in 2021, which is 1.7 times the rate of increase in demand.

Property Affordability Analysis

This graph is designed to illustrate variations in affordability among different groups of dwellers. By presenting all the data together as lines, it clearly depicts affordability trends overall and enables comparison between each group. Prominent arrows and text enhance storytelling.

Data Insights:

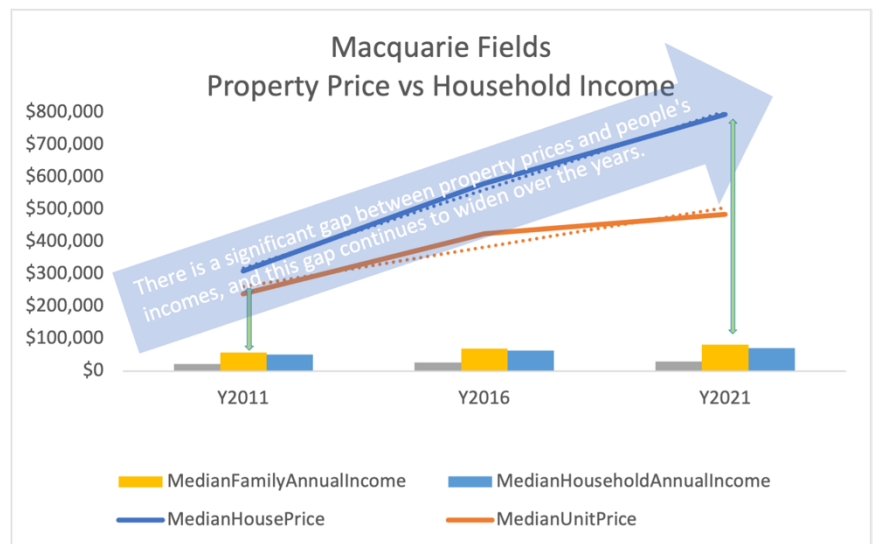
- Affordability has deteriorated for all groups.
- It has been very challenging for individuals to purchase property, particularly houses.
- Families tend to have the highest level of affordability.



This graph provides further insight into the relationships between property price and household income. A combo chart is used, featuring a line chart describing the movement of property price, and a bar chart representing household income. Trending lines are added to better show the property price trend. Prominent arrow enhances storytelling.

Data Insights:

There exists a considerable disparity between property prices and people's incomes, and this gap is widening over time. It is evident that affording properties, particularly houses, is becoming increasingly challenging for everyone.

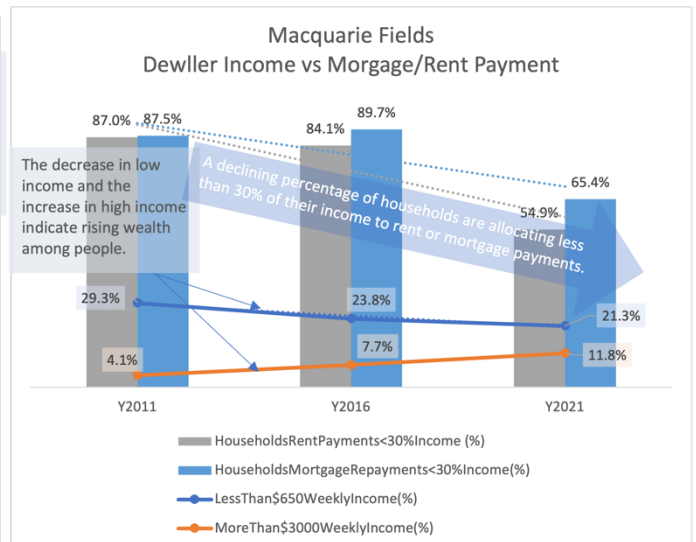
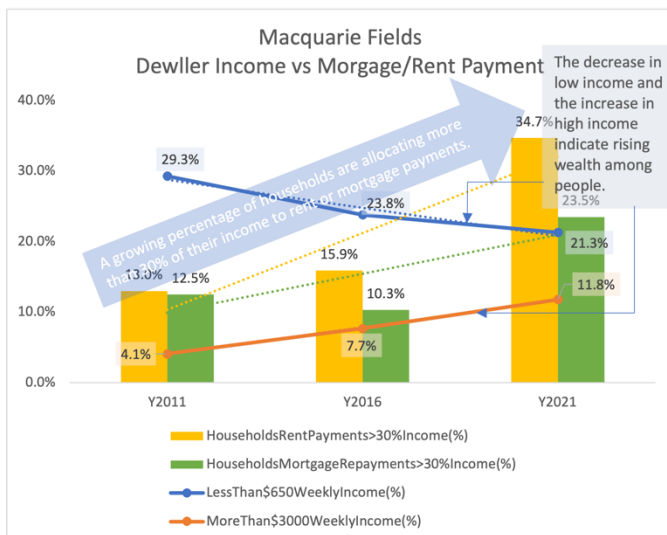
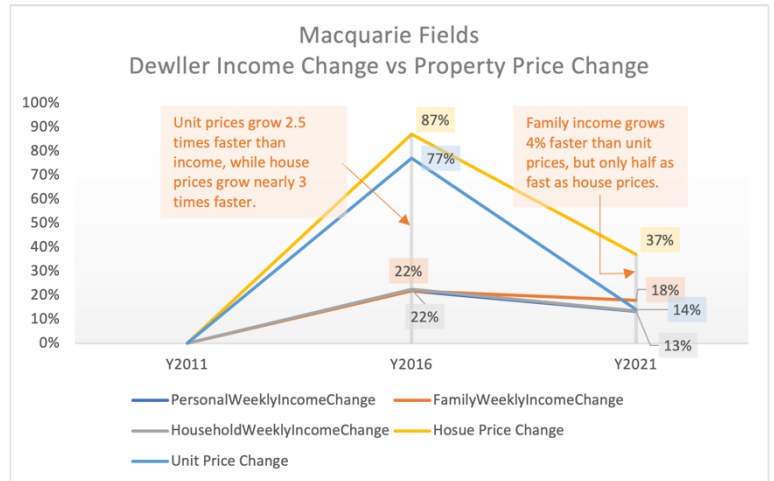


Other Dwellers' Finance Situations Analysis

To compare dweller income change and property price change, a line chart was created. Data labels are positioned to highlight key data points, while drop lines enhance visual clarity. Text messages with arrows enhance storytelling.

Data Insights:

- Overall, property prices tend to increase at a faster pace than dwellers' income.
- In 2016, unit prices surged 2.5 times faster than income, while house prices escalated nearly three times faster.
- In 2021, family income, rising by 18%, outpaced unit prices by 4%, but only half as fast as house prices.



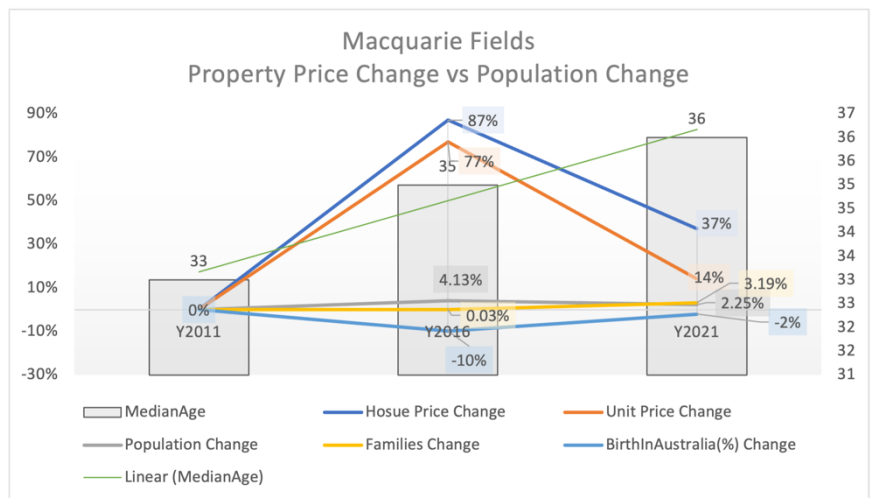
The two graphs above are designed to explore the relationship between rent and mortgage payments and people's income. A combo chart is utilized, with a line chart representing the percentage movement of low-income and high-income groups for both graphs. In the left-side graph, bar charts indicate households where rent and mortgage payments exceeded 30% of their income. Conversely, in the right-side graph, bar charts indicate households where rent and mortgage payments occupy less than 30% of their income. Data labels highlight important data points, while trend lines depict trends. Large arrows and text enhance storytelling.

Data Insights:

- The percentage of low income has decreased by 8%, while the percentage of high income has increased by 7.7%, indicating a rise in wealth among people.
- However, the left-side graph reveals a growing percentage of households allocating more than 30% of their income to rent or mortgage payments,
- Also, the right-side graph shows a declining percentage of households allocating less than 30% of their income to such payments.
- The above findings suggest increasing pressure on people to afford properties.

Regional Population and Family Analysis

This graph illustrates the property price change and population changes. A combo chart is utilized, with a line chart depicting the property price change rate and different changes in population, and a bar chart shows the age movement. A trend line has been included to enhance the visibility of the age trend. Primary and secondary Y axes are employed to accommodate different data formats. Labels are added to highlight significant data points.

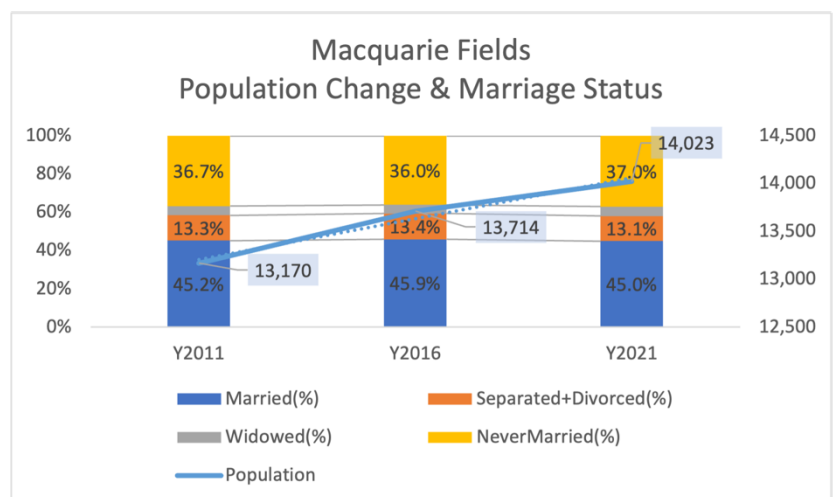


The secondary Y-axis has been rescaled, with the value adjusted between 31 and 37. This modification is intended to enhance visual clarity, ensuring that the bar chart is evenly spread across the entire graph.

Data Insights:

- The median age has steadily increased from 33 in 2011 to 36 in 2021.
- Property prices have risen much faster than the population.
- Population and families experienced a slight increase of less than 3.2% since 2011.
- The percentage change in births in Australia has decreased since 2011, particularly in 2016, dropping by 10%. This suggests that a significant number of immigrants have relocated to this region.

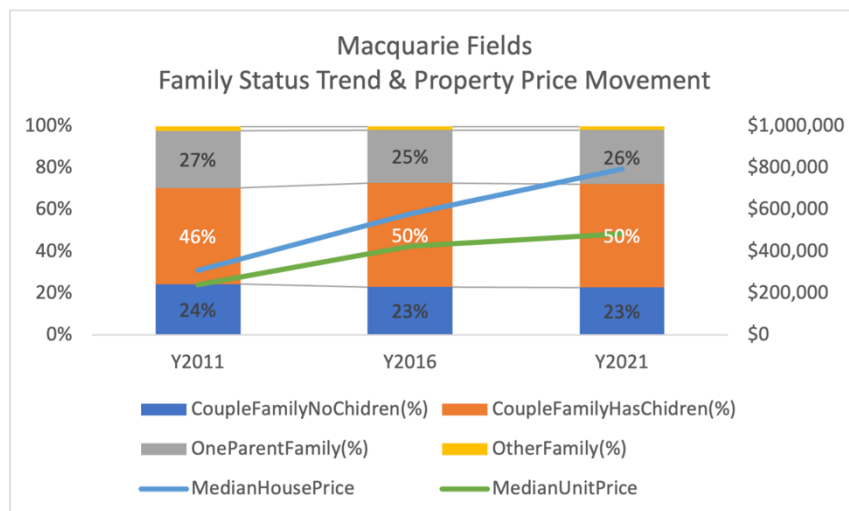
This graph illustrates population movement and marriage status across different years. A combo chart is used, featuring a line chart depicting population movement and a 100% stacked bar chart showing the compositions of different marriage statuses. Series lines have been included to enhance the visibility of potential changes in marriage status composition. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. The secondary Y-axis has been rescaled, with the value adjusted between 12,500 and 14,500 to improve visibility of population movement.



Data Insights:

There has been a steady, slight increase in population since 2011. Additionally, there is only minimal fluctuation in the composition of marriage status, indicating that marriage status has remained relatively stable over the years.

This graph illustrates property price movement and family status across different years. A combo chart is used, featuring a line chart depicting property price movement and a 100% stacked bar chart showing the compositions of different family statuses. Series lines have been included to enhance the visibility of potential changes in family status composition. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points.



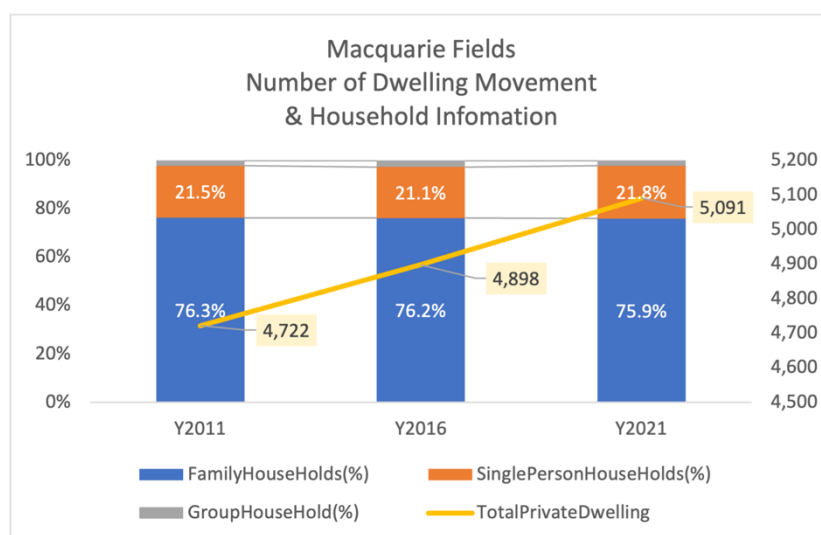
The data label for couple families with children (in orange colour) has been changed to white to enhance visibility.

Data Insight:

There is a noticeable increase in the percentage of couple families with children, rising from 46% in 2011 to 50% in 2016 and 2021. This trend could potentially contribute to the rise in property prices, as these families are more likely to consider upsizing their dwelling and seeking larger homes.

Regional Ownership and Household Analysis

This graph illustrates the total number of dwelling movements and household statuses across different years. A combo chart is employed, comprising a line chart depicting the number of dwelling movements and a 100% stacked bar chart showing the compositions of different household statuses. Series lines are included to enhance the visibility of potential changes in household status composition. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points.

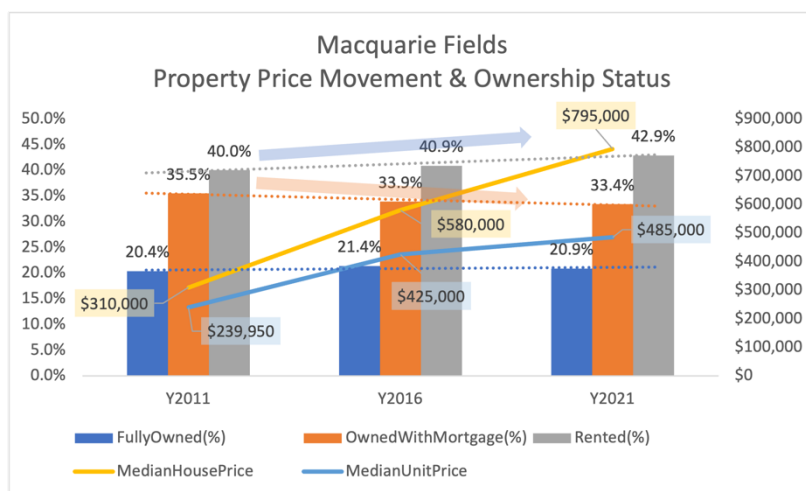


The secondary Y axis has been rescaled, with the value adjusted between 4,500 and 5,200 to better visualize the moving trend of the number of dwellings.

Data Insights:

There has been a steady, slight increase in number of dwellings since 2011. Additionally, there is only minimal fluctuation in the composition of household status, indicating that household status has remained relatively stable over the years.

This graph is intended to examine the relationship between property price and ownership status. It utilizes a combo chart, featuring a line chart representing property price movements and a bar chart indicating the percentage of ownership in different years. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. Trend lines are included to visualize trends, while arrows enhance visual representation.

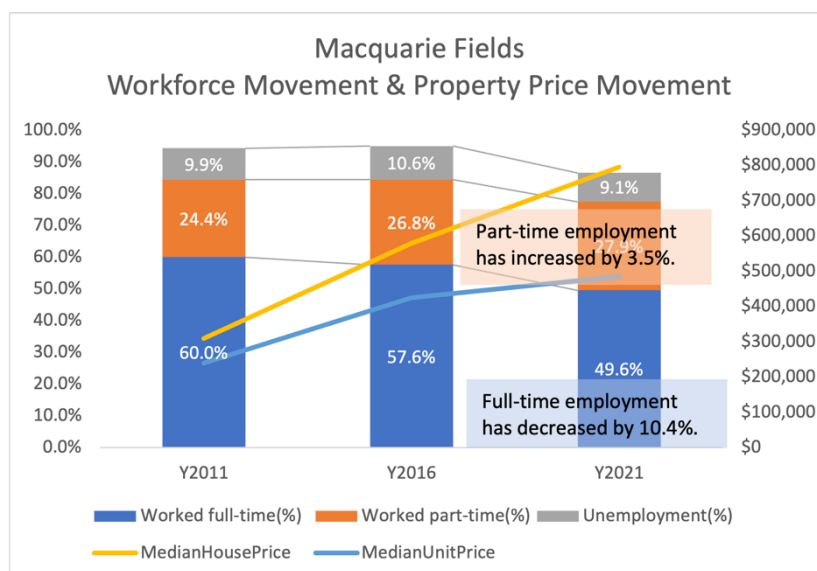


Data Insights:

The percentage of fully owned properties remains steady over the years, while there is a slight increase in the percentage of rented properties and a slight decrease in the percentage of owned properties with a mortgage. This trend may be related to the fast-rising property prices, making it increasingly difficult for people to afford buying property.

Regional Workforce Analysis

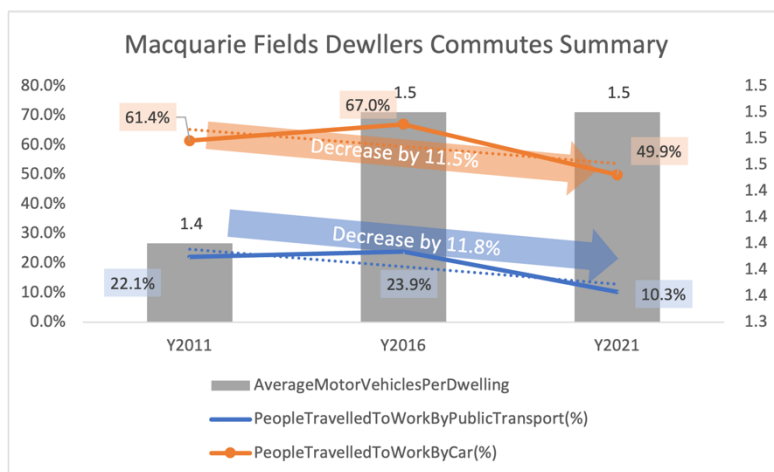
This graph illustrates the movement of the workforce and property prices across different years. It utilizes a combo chart, featuring a line chart depicting property price movements and a stacked bar chart showing the compositions of different work statuses. Series lines are included to enhance the visibility of potential changes in work status composition. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. Text added to provide better storytelling.



Data Insights:

Part-time employment has increased by 3.5% since 2011, while full-time employment has decreased by 10.4% over the same period. The unemployment rate shows a slight decrease. These changes may be related to the COVID-19 pandemic, and further investigation is needed to understand their relationship with property prices.

This graph presents the commuting patterns of dwellers. It utilizes a combo chart, with a line chart illustrating how people choose to commute to work and a bar chart depicting the average number of motor vehicles per dwelling. Primary and secondary Y axes accommodate different data formats. Labels highlight significant data points, while prominent arrows and text enhance storytelling. The secondary Y-axis has been rescaled, with values between 1.3 and 1.5 to improve visual clarity and ensure even distribution of the bar chart across the graph.



Data Insights:

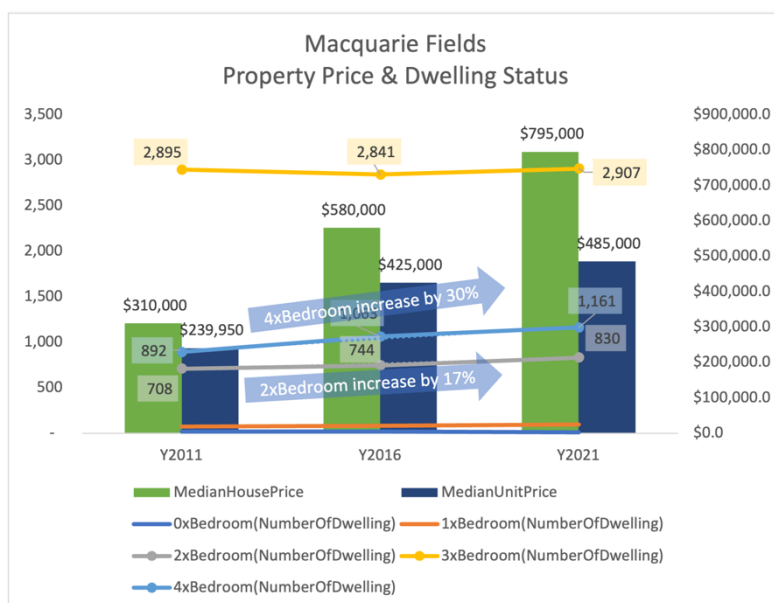
- The average number of motor vehicles per dwelling has increased from 1.4 to 1.5 since 2011.
- The proportion of people traveling to work by public transport has decreased by 11.8%, while those traveling by car has also decreased by 11.5%.
- These changes suggest a significant shift towards remote work, possibly influenced by the COVID-19 pandemic. Further investigation is needed to understand their relationship with property prices.

Regional Dwelling Status Analysis

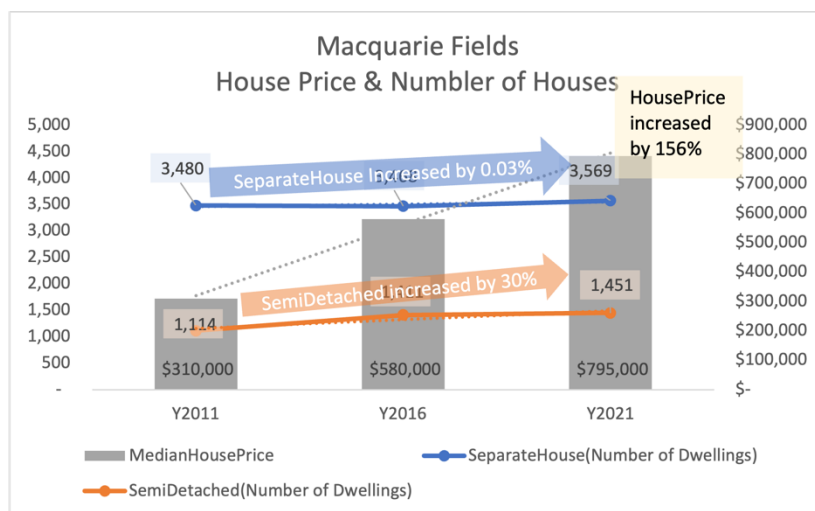
This graph presents the relation between property prices and dwelling status. It utilizes a combo chart, with a line chart illustrating movement of number of different dwelling status and a bar chart depicting movement of property price. Primary and secondary Y axes accommodate different data formats. Labels highlight significant data points, while prominent arrows and text enhance storytelling.

Data Insights:

- Dwellings with 3 bedrooms play a dominant role, representing the largest number of dwellings.
- There is relatively little fluctuation in the number of dwellings with 0, 1, and 3 bedrooms.
- However, dwellings with 4 bedrooms have increased by 30% since 2011, and those with 2 bedrooms have increased by 17% over the same period. This suggests a growing demand for dwellings with 4 and 2 bedrooms.
- Overall, the number of dwellings is increasing, which aligns with the rising trend of property prices.



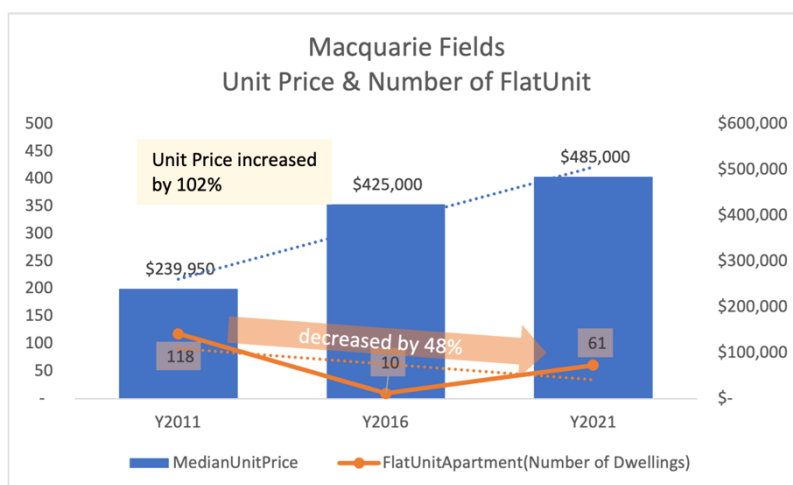
This graph illustrates the relationship between changes in house prices and the movement of different types of houses. It utilizes a combo chart, featuring a line chart showing the movement of the number of different types of houses and a bar chart representing changes in house prices. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. Prominent arrows and text are included to enhance storytelling. Trend lines added for better visualisation.



Data Insights:

- House prices have surged by 156% since 2011, indicating significant growth.
- The number of separate houses has seen a slight increase of 0.03% over the same period.
- In contrast, the number of semi-detached houses has risen by 30%, reflecting a higher demand for this housing type.
- The movements in the numbers of separate and semi-detached houses correspond with changes in house prices, albeit at a much slower rate.

This graph illustrates the relationship between changes in unit prices and the movement of number of units. It utilizes a combo chart, featuring a line chart showing the movement of the number of units and a bar chart representing changes in unit price. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. Prominent arrows and text are included to enhance storytelling. Trend lines added for better visualisation.

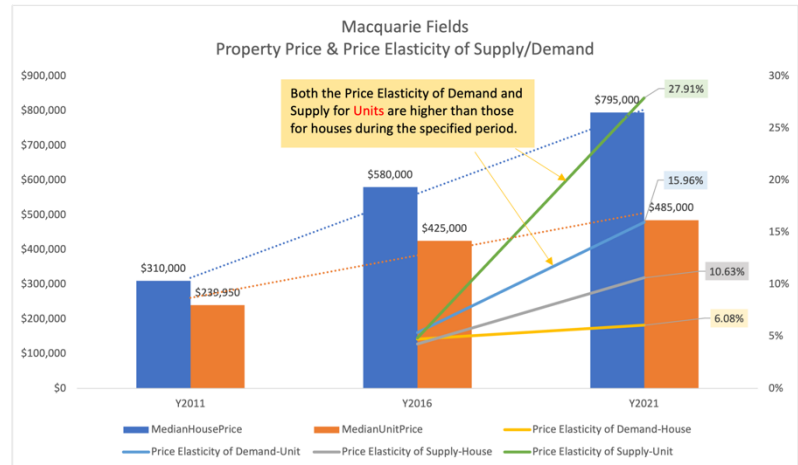


Data Insights:

- The unit price has surged by 102% since 2011, a considerable increase.
- However, during the same period, the number of units has dropped by 48%.
- This decline in the number of units available for sale may have contributed to the significant rise in unit prices. Further investigation is needed to explore the correlation between these two factors.

Regional Price Elasticity of Supply and Demand

This graph illustrates the relationship between property price and the price elasticity of supply and demand. It utilizes a combo chart, featuring a line chart showing the movement of the price elasticity of supply/demand and a bar chart representing the movements in property prices. Primary and secondary Y axes accommodate different data formats, with labels highlighting significant data points. Text and arrows are included to enhance storytelling. Trend lines added for better visualisation.

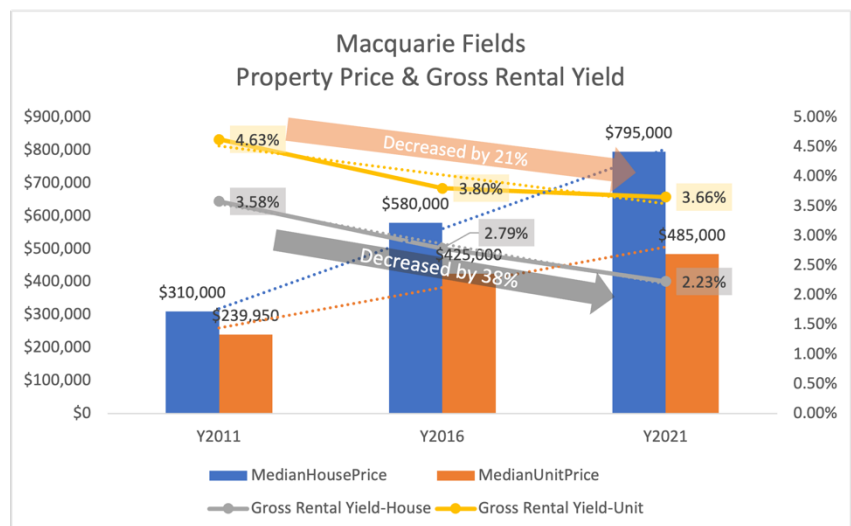


Data Insights

- The price elasticity of demand for units is higher than that of houses, indicating that unit buyers are more responsive to price changes compared to house buyers.
- Similarly, the price elasticity of supply for units is substantially higher than that of houses, suggesting that sellers of units are more responsive to price changes compared to sellers of houses.
- despite experiencing lower price increases compared to houses, units exhibit higher price elasticities, indicating a more responsive market.

Regional Gross Rental Yield Analysis

This graph depicts the correlation between property price and gross rental yield, utilizing a combo chart. The line chart showcases the movement of gross rental yield for houses and units, while the bar chart illustrates the fluctuations in property prices. Primary and secondary Y axes are employed for different data formats, with labels emphasizing key data points. Text and arrows are incorporated to enrich storytelling, alongside trend lines for improved visualization.



Data Insights:

- The gross rental yield for houses decreases over the years, suggesting a decrease in rental income relative to property value.
- In contrast, the gross rental yield for units fluctuates but generally remains relatively stable.
- Units generally have a higher gross rental yield compared to houses, indicating that units generate higher rental income relative to their property value.

Recommendation

- For people looking to buy new homes:

Considering the rising property prices and declining affordability, clients are advised to explore properties that provide favourable value propositions. Delve into properties featuring three bedrooms or more, as they constitute the bulk of available dwellings and meet the requirements of families. It's crucial to monitor affordability indicators, like the proportion of households allocating less than 30% of their income to mortgage payments, to ensure long-term financial stability.

- For people looking to rent:

Considering the declining rental yields and the rising share of rental payments in relation to income, it is advisable for clients to pursue rental properties that provide competitive rental rates compared to the property's value. Focus on rental properties located in regions with relatively high gross rental yields, particularly in units where the yield falls between 3.66% and 4.63%.

- For people looking for investment opportunities:

Contemplate investment opportunities in units, as they have demonstrated notable price appreciation over time, experiencing price adjustments ranging from 14% to 77%. Additionally, units typically offer a higher gross rental yield compared to houses, suggesting that units yield greater rental income relative to their property value.

Conclusion

In conclusion, this report offers a comprehensive analysis of the property landscape in Macquarie Fields, Sydney, covering essential factors such as property prices, population demographics, workforce statistics, dwellers' financial situations, dwelling statuses, and ownership patterns. The utilization of diverse data visualization techniques effectively communicates the insights derived from this analysis. Techniques employed include bar charts, line charts, stacked bar charts, 100% stacked bar charts, combo charts, trend lines, series lines, drop lines, rescaling and modifying axes, data labels, and storytelling techniques. Among these, combo graphs stand out as a powerful tool for illustrating multidimensional data simultaneously.

Furthermore, the report provides insights tailored to the specific needs of different demographic groups, enhancing its utility for individuals navigating Macquarie Fields' dynamic property market landscape.

References

- 1.2.2 *The different types of data*. (2024). The University of Technology, Sydney. Retrieved 20/03, from https://canvas.uts.edu.au/courses/31371/pages/1-dot-2-2-the-different-types-of-data?module_item_id=1682737
- ABS *Census data*. (2024). Australian Bureau of statistics Retrieved 20/03, from <https://www.abs.gov.au/census/find-census-data/quickstats/>
- Pricefinder*. (2024). Domaingroup. Retrieved 20/03, from <https://app.pricefinder.com.au/v4/app?page=DirectLogon&service=external>