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| Group 3 |
| Sydney Property Market Report |
| Milestone 2 |

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# Introduction:

This report seeks to give a picture of the Sydney Property Market, which has experienced a boom in the past five years. In recent years, the growth has receded. Buyers’ demands influence the decisions of construction companies. The price of properties is an important factor considered by homeowners. Real estate agents need to know how much buyers are willing to spend on property in order to make informed decisions.

## **Testing whether the mean total household income of purchasers exceeds $300,000.**

From the excel calculation we can know that the sample mean of the total household income of purchasers is $360928.33. The sample standard deviation is $273568.58. Although the population standard deviation is unknown, the sample size n=293 is large, we assume it distributed normally. We can use the sample standard deviation s to replace σ.

We assume that the null hypothesis which the population mean total household income of purchasers is $300,000 is true.

The null hypothesis is *H*0: μ = 300000, the alternative hypothesis is *H*₁: μ > 300000.



Z = (360928.33-300000) ÷ (273568.58/√293) = 3.81

If the significant level is 5% than the α = 0.05. The critical Z-score is 1.645. Therefore, the rejection region is Z>1.645.

Since Z=3.81>1.645

We reject the H0 and conclude with 95% confidence that the mean total household income of purchasers is exceeds $300000.

## **Testing whether the mean internal size of apartments sold is 90 sqm.**

Using the excel, we find the sample mean is 102.66 sqm, the standard deviation is 35.12 sqm. Because the σ is unknown. We can use T distribution to calculate the confidence interval.

If the confidence level is 95% than α/2 = 0.025. Since n is large, the critical t-score is approximately equal to ±1.96.

The null hypothesis is *H*0: μ = 90, the alternative hypothesis is *H*₁: μ ≠ 90.

Z = (102.66-90)/ (35.12/√293) ≈ 6.17

Z = 6.17 > 1.96

We reject the H0 and conclude with 95% confidence that the mean internal size of apartments sold is 90 sqm.

The 95% confidence interval:

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= 102.66-1.96 × 35.12/√293 < μ < 102.66+1.96 × 35.12/√293

= (98.64, 106.68)

The population mean is outside the 95% confidence interval therefore we reject the H0 and conclude with 95% confidence that the mean internal size of apartments sold is between 98.64 sqm to 106.68 sqm.

## **Testing whether majority of the property sold exceeds $1,500,000.**

From the collected data, 63 homes cost more than $1,500,000.   
Taking at least 50% of the total number of homes bought are non-owner occupied   
p̂= x/n   
From the chart – 63/293 = 0.2150   
Hypothesis test   
Let p represent the number of owner occupied homes.   
H˳: p = 0.50   
Hₐ: p < 0.50   
p̂ ~   
Performing a hypotheses with α= 0.05   
p̂~N (0.2150, (0.50.5)/293)   
   
 Z= (0.2150 – 0.50)/(0.50 0.50)/ 293 = -9.7568   
P – Value (Z > 5.8907) ≈ 0.00001   
Z= 1.645   
The p value is greater than we reject the null hypothesis. It is evident that not more than 50% of homes cost more than $1,500,000.   
Constructing 95% confidence interval for p.   
 p̂ p̂ (1-p)/n   
=0.2150 1.96 (0.2150 0.7850)/293   
(0.1680, 0.2620)   
We are 95% confident 16.80% to 26.20% of properties bought cost more than $1,500,000.   
Most of these properties are houses and apartments. A few are townhouses and villas. This shows that most homeowners and spectators who spend more than $1,500,000 will purchase houses or apartments. It also shows not many buy expensive properties.

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## **Less than 15% of all property sold are overseas purchases i.e. purchased by non-Australians.**

Oversea: 63 Australian: 230 Total number (n): 293

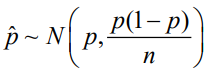
p̂ = X / n = 63 / 293 ≈ 0.2150

Hypothesis test:

Let p be the proportion of overseas purchases (0.15).

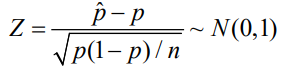
*H*0: p = 0.15

*H*1: p < 0.15



Perform a hypothesis testing with α = 0.05

p̂ ~ N (0.15, (0.15 × 0.85)/293)



Z = (0.2150- 0.15) / √ [(0.15 × 0.85)/293] ≈ 3.12

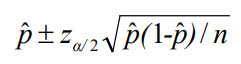
P-value (Z<3.12) = 0.9991

Zα=0.05 = -1.645

Conclusion: since the p-value > 0.05, so do not reject the null hypothesis. There is not enough evident to prove that the proportion of property sold are higher than 15%.

Confidence intervals:

Construct a 95% confidence interval for p.



= 0.2150 ± 1.96 × √ (0.2150 × 0.7850 / 293)

= (0.1680, 0.2620)

Conclusion: We are 95% confidence that between 16.80% to 26.20% of property sold are overseas purchase.

## **Testing whether more than 50% of all property sold are non-owner occupied.**

owner occupied: 158 non-owner occupied: 134 Total number (n): 293

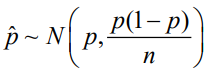
p̂ = X / n = 134 / 293 ≈ 0.4573

Hypothesis test:

Let p be the proportion of non-owner occupied (0.5).

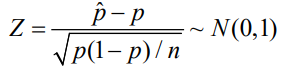
*H*0: p = 0.5

*H*1: p > 0.5



Perform a hypothesis testing with α = 0.05

p̂ ~ N (0.5, (0.5 × 0.5)/293)



Z = (0.4573 - 0.5) / √ [(0.5 × 0.5)/293] ≈ -1.46

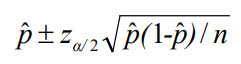
Zα=0.05 = 1.645

P-value (Z > -1.46) = 1- 0.0721 = 0.9279

Conclusion: since the p-value (0.9279) > 0.05, so we do not reject the null hypothesis. There is not enough evident to prove that the proportion of property sold are non-owner occupied is less than 50%.

Confidence intervals:

Construct a 95% confidence interval for p.



= 0.4573 ± 1.96 × √ (0.4573× 0.5427 / 293)

= (0.4002, 0.5143)

Conclusion: We are 95% confidence that between 40.02% to 51.43% of property sold are non-owner occupied.

# Conclusion:

According to the inferential statistics such as interval estimation and hypothesis test that has been done on the data, it can be concluded that most of the information Belle heard from the media is accurate. However, there is a slightly difference of the outcome between the media and the report for oversea purchases.