678 Final project with Melbourne housing prices

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1. Abstract

This report investigates the determinants of housing prices using a dataset with variables such as Distance, Rooms, BuildingArea, YearBuilt, and Landsize. Employing various models—null, complete pooling, partial pooling, and no pooling—we explore the effects of these predictors. The Bayesian regression approach via Stan provides a holistic view of the influence each variable has on housing prices, with an emphasis on understanding the nuances of each model's implications.

2. Introduction

Housing prices are influenced by a myriad of factors, and dissecting these can help stakeholders make informed decisions. With this in mind, our study applies multiple regression models to parse out the effects of proximity, property size, and age on housing prices. By comparing models that incorporate different assumptions about data structure, we aim to pinpoint the most influential factors.

3. Method

The study started with data cleansing, followed by logarithmic transformations to normalize price distribution. We fitted a series of models: a null model to establish a baseline, complete pooling to ignore group structure, partial pooling to account for group variations without overfitting, and no pooling to fully recognize group differences. Bayesian models provided posterior distributions for each predictor, with 'stan_glm' offering further insight. Model diagnostics checked for convergence and fit.

4. Results

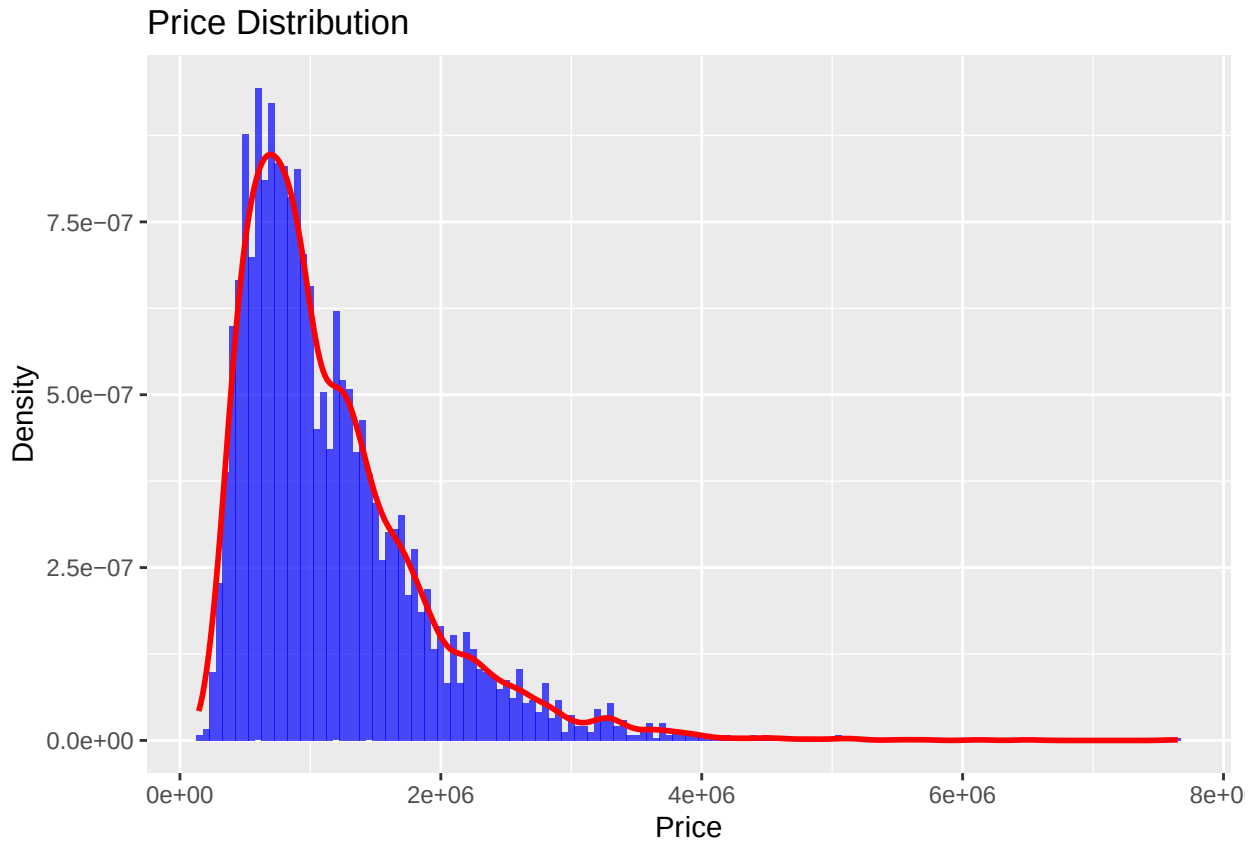
4.1 Data cleaning

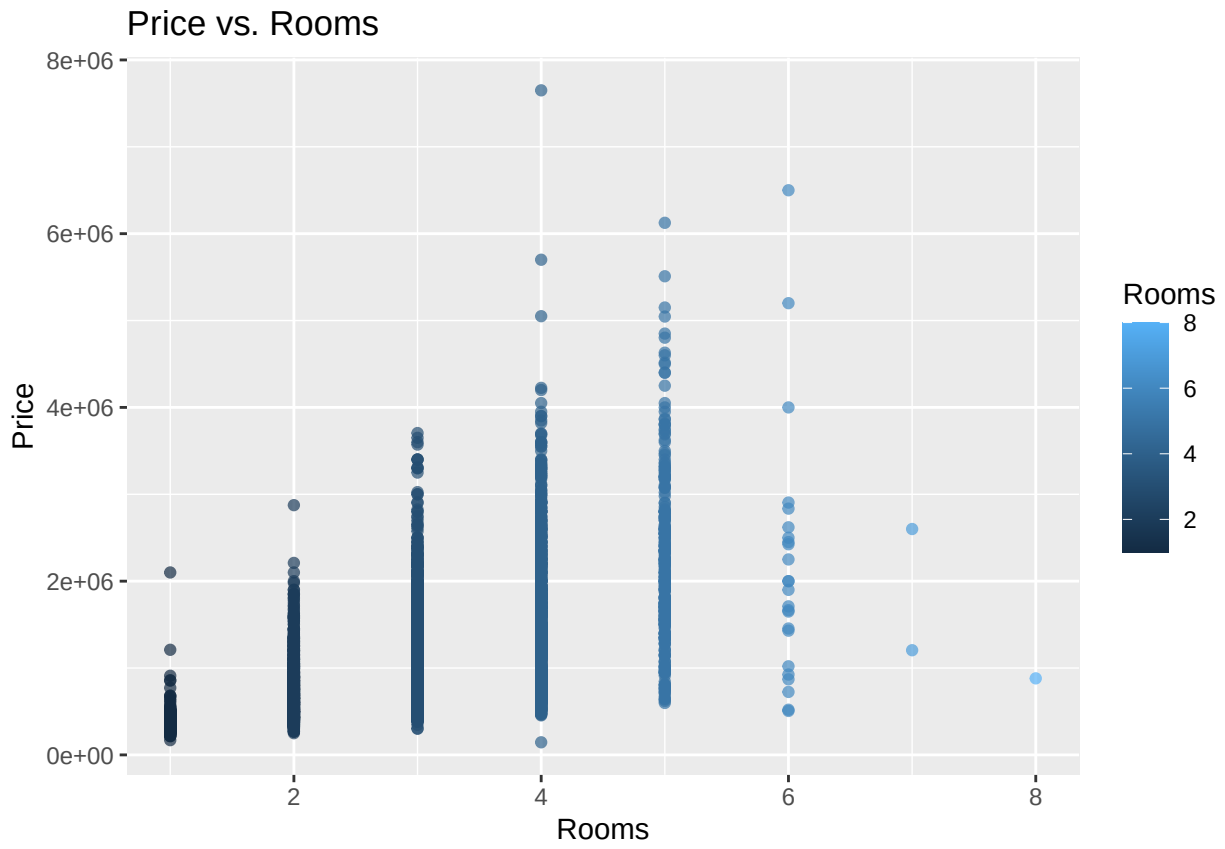
I have included the code for data cleaning in the Appendix.

4.2 EDA for overview

```
## Warning: Using ‘size‘ aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use ‘linewidth‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```

```
## Warning: The dot-dot notation (‘..density..‘) was deprecated in ggplot2 3.4.0.
## i Please use ‘after_stat(density)‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```





Analysis:

1. Price Distribution Analysis: The histogram shows a right-skewed distribution, indicating most houses are low-priced, with few high-priced outliers, reflecting market diversity.

2.Price vs. Rooms Analysis: The scatter plot suggests a trend where more rooms typically correspond to higher prices, highlighting a size-value correlation in the housing market.

4.3 NULL MODEL

```
# Build a null model
null_model <- glm(log(Price) ~ 1, data = filtered_data, family = gaussian())
summary(null_model)
```

```
##
## Call:
## glm(formula = log(Price) ~ 1, family = gaussian(), data = filtered_data)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 13.797070   0.008109    1701   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## (Dispersion parameter for gaussian family taken to be 0.3179811)
##
##     Null deviance: 1537.4  on 4835  degrees of freedom
## Residual deviance: 1537.4  on 4835  degrees of freedom
## AIC: 8186.1
##
## Number of Fisher Scoring iterations: 2
```

4.4 Linear Mixed-Effects Model (LMM)

```
model <- glmer(log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize + (1 | Suburb),
               data = filtered_data,
               family = gaussian)
```

```
## Warning in glmer(log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + :
## calling glmer() with family=gaussian (identity link) as a shortcut to lmer() is
## deprecated; please call lmer() directly
```

```
summary(model)
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize +
##     (1 | Suburb)
##    Data: filtered_data
##
## REML criterion at convergence: 1814.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -12.4528  -0.5867   0.0523   0.6259   4.2994
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  Suburb   (Intercept) 0.05297  0.2302
##  Residual             0.08016  0.2831
## Number of obs: 4836, groups:  Suburb, 55
##
## Fixed effects:
##                Estimate Std. Error t value
## (Intercept)   1.926e+01  2.385e-01  80.740
## Distance     -4.562e-02  5.082e-03  -8.977
## Rooms         2.942e-01  5.689e-03  51.710
## BuildingArea  1.188e-03  5.803e-05  20.482
## YearBuilt    -3.117e-03  1.180e-04 -26.415
## Landsize      9.409e-06  4.408e-06   2.135
##
## Correlation of Fixed Effects:
##             (Intr) Distnc Rooms  BldngA YerBlt
## Distance    -0.137
## Rooms       -0.238 -0.009
```

```
## BuildingAre  0.088  0.009 -0.572
## YearBuilt   -0.971 -0.056  0.194 -0.086
## Landsize     0.011  0.034 -0.041 -0.019 -0.024
```

Analysis: Intercept: The model's intercept is approximately 19.26. This is the base level of the log-transformed price when all other variables are held at zero.

Distance: The coefficient for 'Distance' is -0.0456, indicating a negative relationship with the log-transformed price.

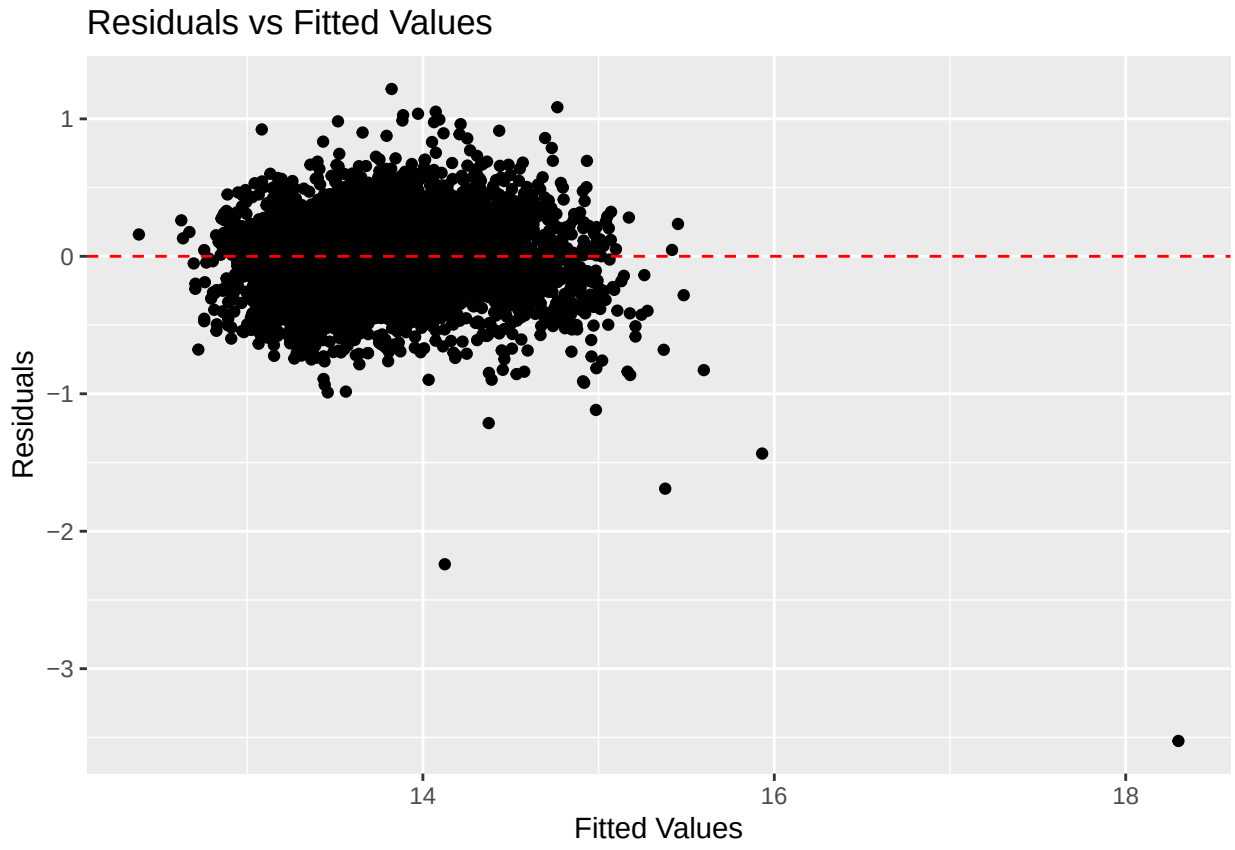
Rooms: The coefficient for 'Rooms' is around 0.2942, suggesting a positive relationship with the log-transformed price.

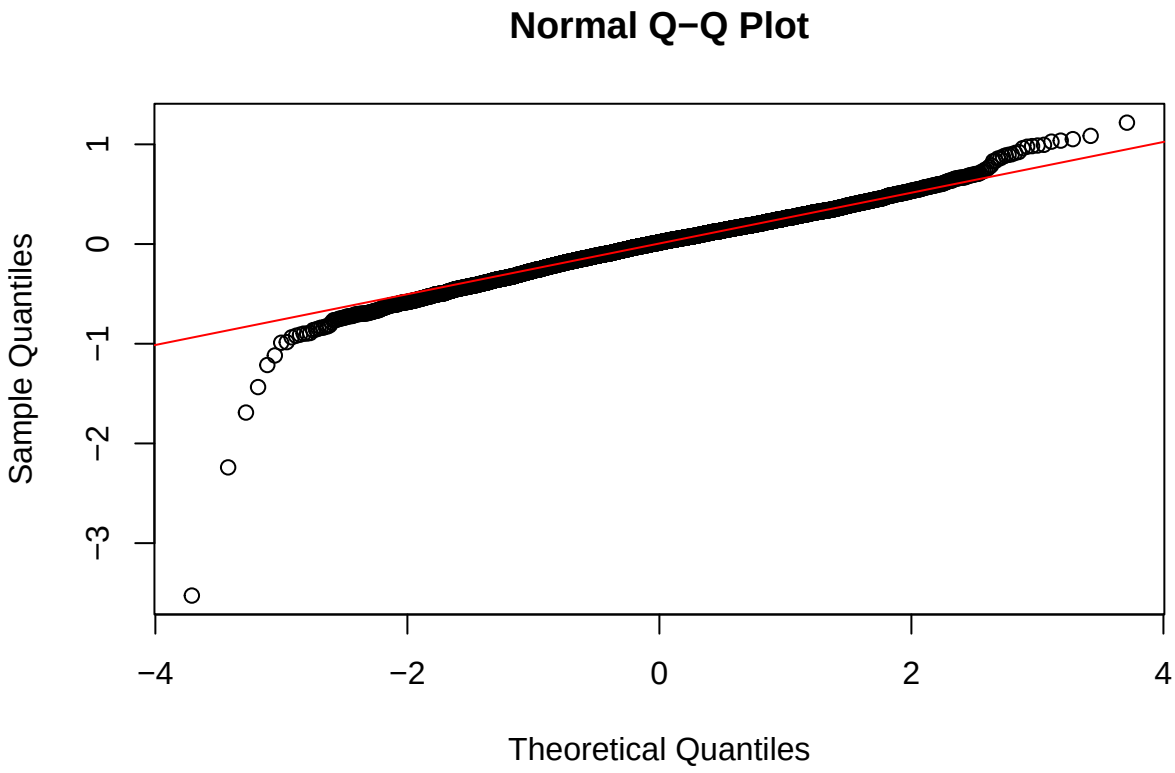
BuildingArea: The 'BuildingArea' coefficient is approximately 0.00118, showing a positive relationship with the log-transformed price.

YearBuilt: The 'YearBuilt' coefficient is about -0.00312, indicating a negative relationship with the log-transformed price.

Landsize: The coefficient for 'Landsize' is approximately 9.409e-06, indicating a very small positive effect on the log-transformed price.

4.5 Plot for LMM





Analysis: Overall, these plots suggest that while the model captures a significant portion of the variance in the data (as indicated by the relatively linear pattern in the residuals plot and the mostly normal distribution in the Q-Q plot), there may be some non-linearity or heteroscedasticity that isn't fully addressed by the model.

4.6 Complete pooling model

```r
# Build a complete pooling model
complete_pooling_model <- lm(log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize, data =
summary(complete_pooling_model)
```

```
##
## Call:
## lm(formula = log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt +
##     Landsize, data = filtered_data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.9178 -0.2337 -0.0133  0.2233  1.2370
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.970e+01  2.784e-01  70.767   <2e-16 ***
## Distance     -3.620e-02  1.414e-03 -25.610   <2e-16 ***
## Rooms         2.958e-01  6.879e-03  42.999   <2e-16 ***
## BuildingArea  1.727e-03  7.046e-05  24.512   <2e-16 ***
## YearBuilt    -3.431e-03  1.424e-04 -24.101   <2e-16 ***
## Landsize      1.177e-05  5.426e-06   2.169   0.0302 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3525 on 4830 degrees of freedom
## Multiple R-squared:  0.6096, Adjusted R-squared:  0.6091
## F-statistic:  1508 on 5 and 4830 DF,  p-value: < 2.2e-16
```

Analysis:

Intercept: The model's intercept is approximately 19.70. This is the base level of the log-transformed price when all other variables are held at zero.

Distance: The coefficient for 'Distance' is -0.0362, indicating a negative relationship with the log-transformed price.

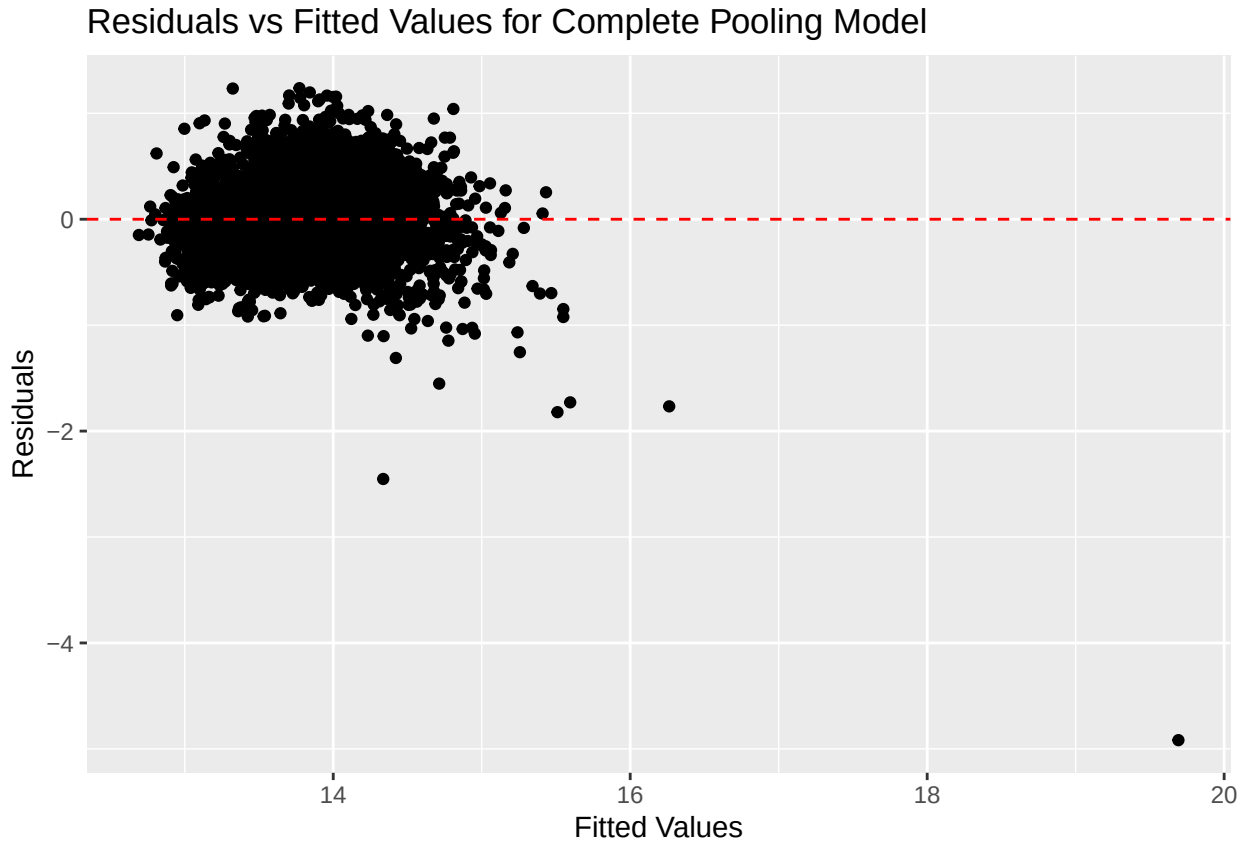
Rooms: The coefficient for 'Rooms' is around 0.2958, suggesting a positive relationship with the log-transformed price.

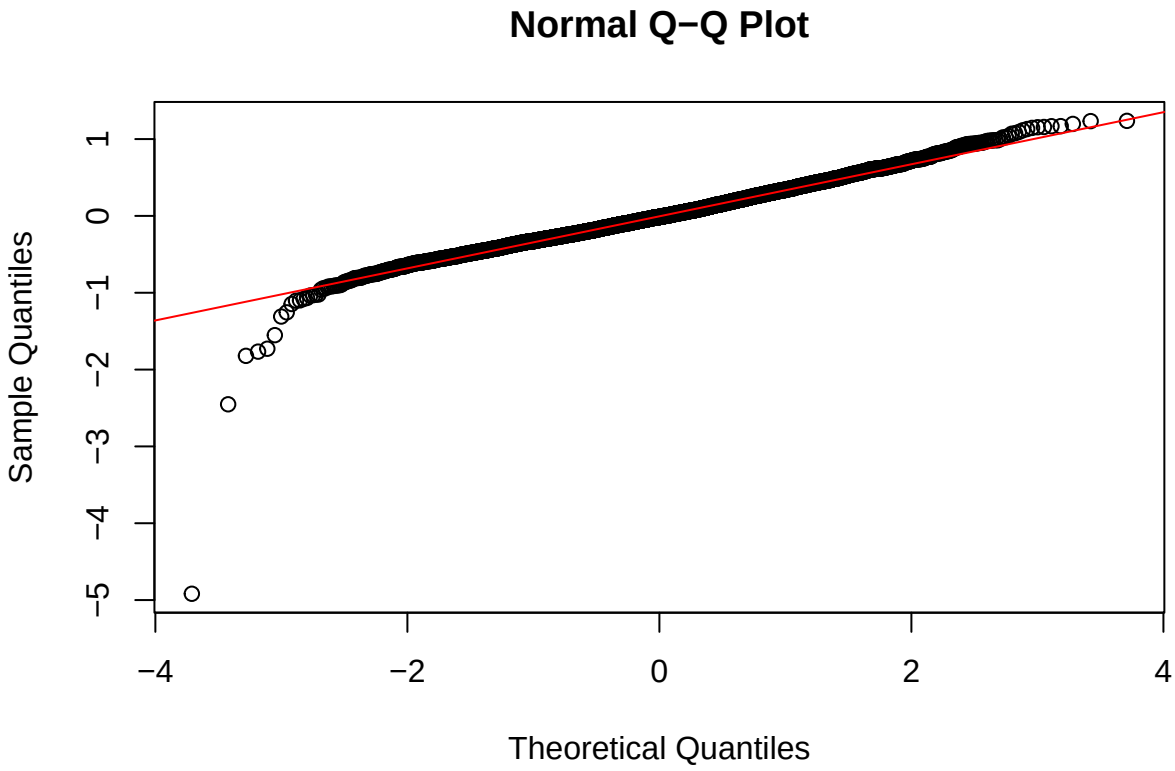
BuildingArea: The 'BuildingArea' coefficient is approximately 0.0017, showing a positive relationship with the log-transformed price.

YearBuilt: The 'YearBuilt' coefficient is about -0.0034, indicating a negative relationship with the log-transformed price.

Landsize: The coefficient for 'Landsize' is approximately 1.18e-05, indicating a very small positive effect on the log-transformed price.

4.7 Plot for Complete pooling model





Analysis: These plots indicate that the complete pooling model, like the previous model, captures significant variance in the data but may still be improved by addressing potential non-linear relationships or heteroscedasticity.

4.8 No pooling

```
# Build individual models for each suburb
no_pooling_models <- lapply(unique(filtered_data$Suburb), function(suburb) {
  suburb_data <- filtered_data[filtered_data$Suburb == suburb, ]
  lm(Price ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize, data = suburb_data)
})
```

Due to no pooling's stratified analysis of each suburb, many results were obtained, which I have presented in the appendix.

Analysis:

The no pooling analysis across various Melbourne suburbs reveals that the number of rooms consistently has a positive impact on housing prices, while distance from the city center generally has a negative effect. The building area's influence varies by suburb, but it is often significant. Year built and land size show mixed results across the different suburbs, suggesting that these factors may be context-dependent or influenced by other unaccounted variables.

4.9 Partial pooling

```
# Build a partial pooling model
partial_pooling_model <- lmer(log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize + (1

# Print the model summary
summary(partial_pooling_model)
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize +
##     (1 | Suburb)
##    Data: filtered_data
##
## REML criterion at convergence: 1814.7
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -12.4528  -0.5867   0.0523   0.6259   4.2994
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  Suburb   (Intercept) 0.05297  0.2302
##  Residual             0.08016  0.2831
## Number of obs: 4836, groups:  Suburb, 55
##
## Fixed effects:
##                Estimate Std. Error t value
## (Intercept)   1.926e+01  2.385e-01  80.740
```

```
## Distance     -4.562e-02  5.082e-03  -8.977
## Rooms         2.942e-01  5.689e-03  51.710
## BuildingArea  1.188e-03  5.803e-05  20.482
## YearBuilt    -3.117e-03  1.180e-04 -26.415
## Landsize      9.409e-06  4.408e-06   2.135
##
## Correlation of Fixed Effects:
##             (Intr) Distnc Rooms  BldngA YerBlt
## Distance    -0.137
## Rooms       -0.238 -0.009
## BuildingAre  0.088  0.009 -0.572
## YearBuilt   -0.971 -0.056  0.194 -0.086
## Landsize     0.011  0.034 -0.041 -0.019 -0.024
```

Analysis:

Intercept (const): The average log-transformed price across all suburbs is approximately 19.26 when all other predictors are zero.

Distance: The coefficient of -0.046 suggests that as the distance increases, the log-transformed price tends to decrease.

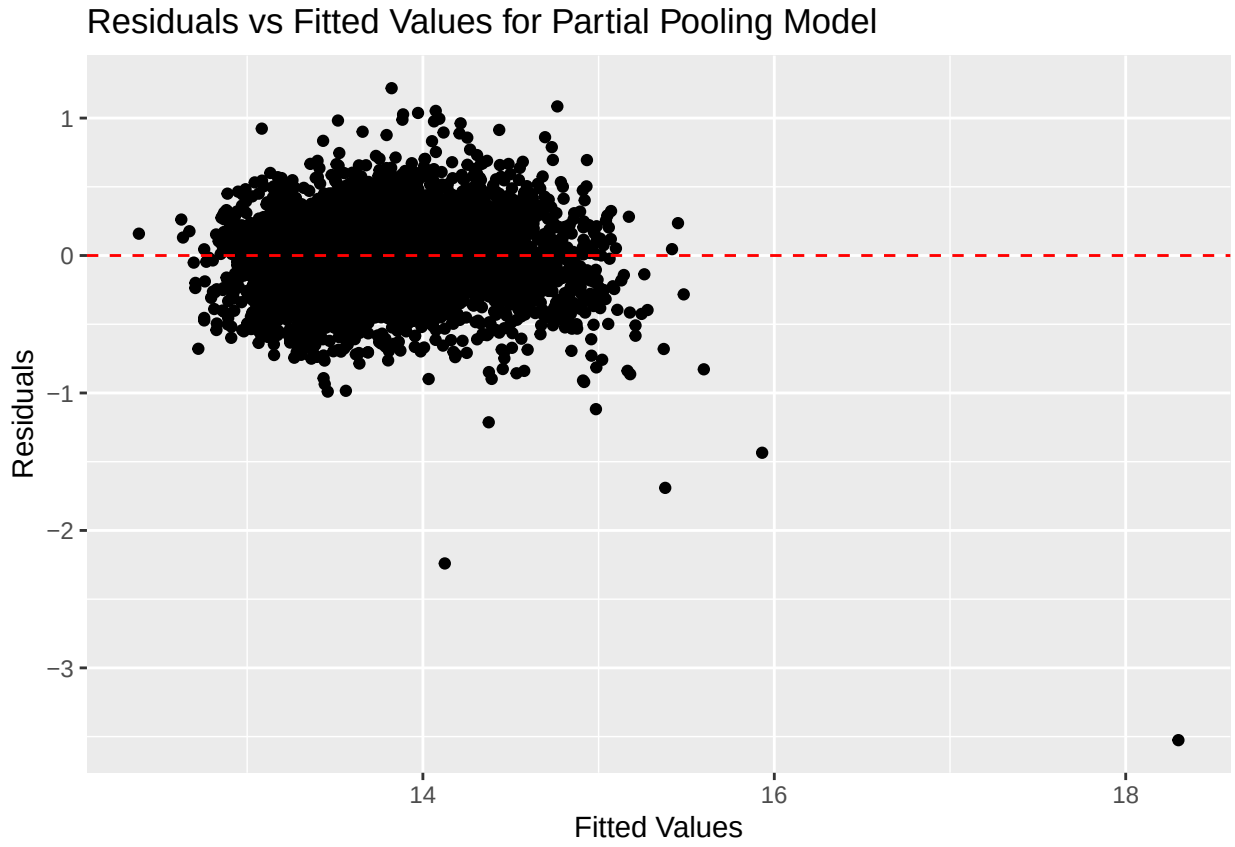
Rooms: A coefficient of 0.294 indicates that each additional room is associated with an increase in the log-transformed price.

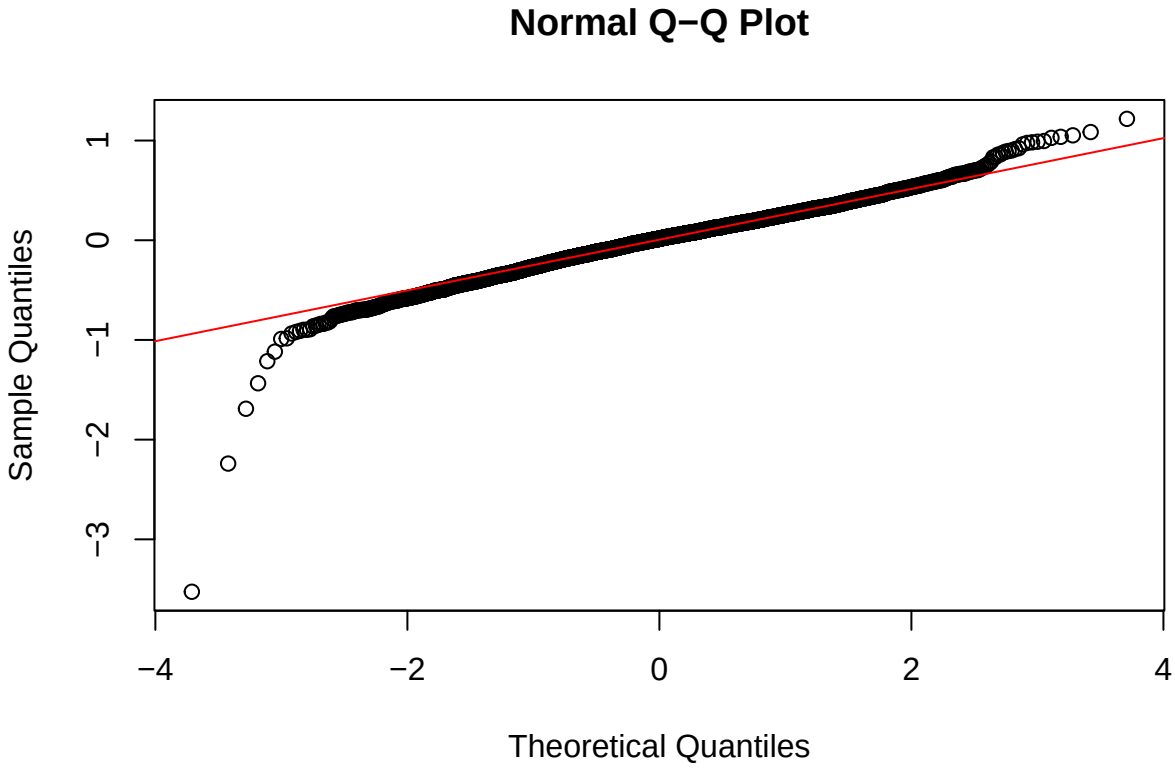
BuildingArea: The coefficient of 0.0012 shows a positive relationship between building area and log-transformed price.

YearBuilt: The coefficient of -0.003 suggests newer properties (with a more recent year built) have a higher log-transformed price.

Landsize: The coefficient is very small (0.000), indicating a marginal positive effect on the log-transformed price.

4.10 Plot for Partial pooling





Analysis:

Overall,The results obtained by fitting partial pooling are not significantly different from the previous models, these plots indicate that the partial pooling model captures a significant portion of the variance in the data.

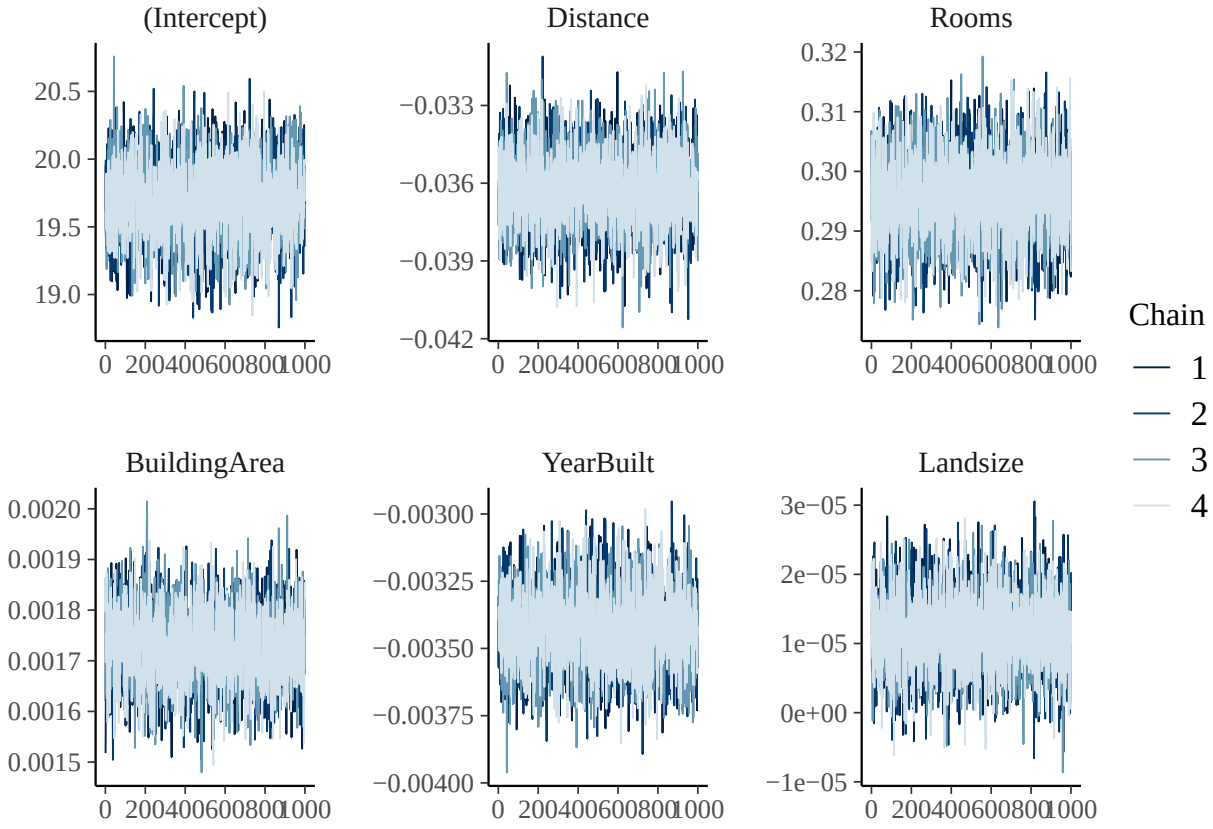
4.11 Stan Glm

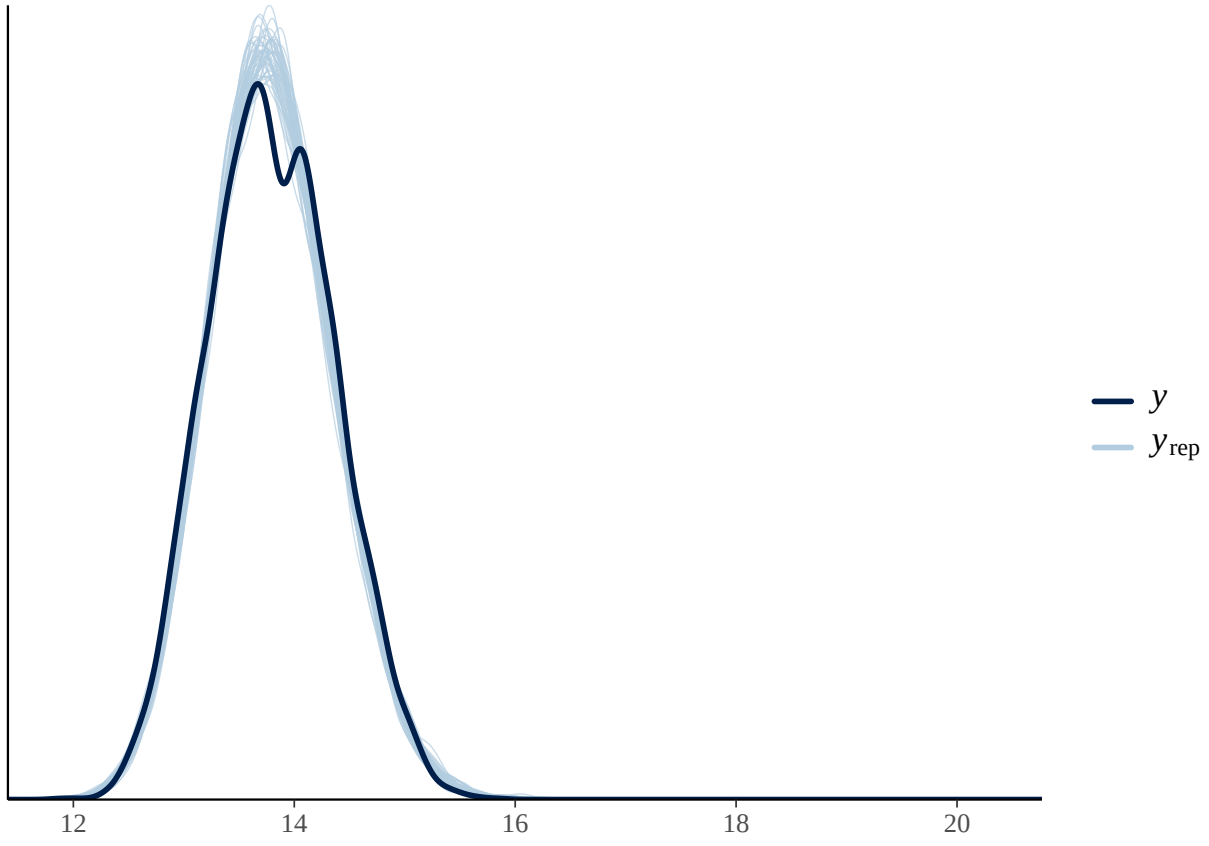
```
# Assuming 'model' is your fitted stan_glm model
summary_model <- summary(model)

# Print the summary with four decimal places
print(summary_model, digits = 6)
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize +
##     (1 | Suburb)
##    Data: filtered_data
##
## REML criterion at convergence: 1814.7
##
## Scaled residuals:
##        Min         1Q     Median         3Q        Max
## -12.452789  -0.586735   0.052282   0.625948   4.299390
##
## Random effects:
##  Groups   Name        Variance  Std.Dev.
##  Suburb   (Intercept) 0.0529724 0.230157
##  Residual             0.0801647 0.283134
## Number of obs: 4836, groups:  Suburb, 55
##
## Fixed effects:
##                  Estimate   Std. Error   t value
## (Intercept)   1.92565e+01  2.38501e-01  80.73955
## Distance     -4.56238e-02  5.08212e-03  -8.97731
## Rooms         2.94156e-01  5.68860e-03  51.70967
## BuildingArea  1.18847e-03  5.80253e-05  20.48185
## YearBuilt    -3.11744e-03  1.18018e-04 -26.41487
## Landsize      9.40943e-06  4.40809e-06   2.13458
##
## Correlation of Fixed Effects:
##             (Intr) Distnc Rooms  BldngA YerBlt
## Distance    -0.137
## Rooms       -0.238 -0.009
## BuildingAre  0.088  0.009 -0.572
## YearBuilt   -0.971 -0.056  0.194 -0.086
## Landsize     0.011  0.034 -0.041 -0.019 -0.024
```

The chain generated by stan_glm fitting is longer, so I have included it in the Appendix.

4.12 Plot for Stan Glm





Analysis:

The posterior predictive check indicates that the model generally captures the central tendency of the observed data well, with some examination of the tails needed. The trace plots suggest good convergence and mixing of the MCMC chains for all parameters, with no apparent divergences or trends, indicating reliable posterior estimates.

5. Discussion

5.1 Implication

The 'Rooms' feature stands out across models as a key price predictor, asserting the importance of property size in valuation. However, the influence of 'BuildingArea' and 'YearBuilt' varied, indicating that their effects might be context-dependent. Future research could introduce additional predictors and employ machine learning to enhance predictive power. These findings can inform real estate valuations and contribute to housing market policy formulations.

5.2 Limitation

data completeness issues due to missing values, a focus on select variables without considering other influential factors, and potential biases arising from model assumptions. The analysis might not capture market dynamics fully due to its cross-sectional nature, and findings are specific to Melbourne, limiting generalizability. Additionally, the observational design identifies correlations but not causal relationships, and the no pooling model risks overfitting, especially in less-represented suburbs.

6. Conclusion

In Melbourne's diverse real estate market, housing prices are influenced by a mix of property features and location-specific factors. Across various models, the number of rooms consistently shows a positive impact on prices, indicating a preference for larger properties. Distance from the city center generally correlates negatively with prices, although this varies by suburb. Building area, year built, and land size have mixed influences, highlighting the uniqueness of each suburb. These findings emphasize the complexity of Melbourne's housing market, where property values are shaped by both general trends and localized characteristics, necessitating nuanced, area-specific analysis.

Acknowledgement

I am particularly grateful to my Professor Fotios for providing me with great assistance in data processing, basic concepts of different models, and model selection. It was also in this class that I learned about how to conduct multi level analysis, as well as the corresponding code, which greatly helped me to complete my project.

Reference

[1] Hox, Joop. Multilevel modeling: When and why. In Classification, data analysis, and data highways:proceedings of the 21st Annual Conference of the Gesellschaft f¨ur Klassifikation eV, University of Potsdam, March 12–14, 1997 (pp. 147-154). Springer, 1998.

[2] Dedrick, Robert F and Ferron, John M and Hess, Melinda R and others. Multilevel modeling: A review of methodological issues and applications. Review of educational research, 79(1):69–102, Sage Publications Sage CA: Los Angeles, CA, 2009.

[3] https://github.com/XiangliangLiu/MA678-midterm-project/blob/master/MA678_midterm_project.pdf

Appendix

Data cleaning

```
# Read the data
melbourne_data <- read.csv('Melbourne_housing_FULL.csv')

# Remove rows with missing values in 'Price', 'Distance', 'Rooms', 'BuildingArea', 'YearBuilt', 'Landsi
cleaned_data <- melbourne_data %>%
  filter(!is.na(Price) & !is.na(Distance) & !is.na(Rooms) & !is.na(BuildingArea) & !is.na(YearBuilt) &

# Convert data types
cleaned_data$Date <- dmy(cleaned_data$Date)  # Convert 'Date' to date format
cleaned_data$Postcode <- as.character(cleaned_data$Postcode)  # Convert 'Postcode' to character type

# Filter for suburbs with more than 50 samples
suburb_counts <- table(cleaned_data$Suburb)
suburbs_over_50 <- names(suburb_counts[suburb_counts > 50])
filtered_data <- cleaned_data %>% filter(Suburb %in% suburbs_over_50)
# Convert 'Distance' to numeric if it is not
filtered_data$Distance <- as.numeric(as.character(filtered_data$Distance))
```

Stan Glm

```
# Fitting the model with stan_glm

filtered_data$Log_Price <- log(filtered_data$Price)


stan_model <- stan_glm(
  Log_Price ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize,
  data = filtered_data,
  family = gaussian(),
  prior = normal(0, 2.5, autoscale = TRUE),
  prior_intercept = normal(0, 10, autoscale = TRUE),
  seed = 12345
)
```

```
##
## SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).
## Chain 1:
## Chain 1: Gradient evaluation took 1.5e-05 seconds
```

```
## Chain 1: 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds.
## Chain 1: Adjust your expectations accordingly!
## Chain 1:
## Chain 1:
## Chain 1: Iteration:    1 / 2000 [  0%]  (Warmup)
## Chain 1: Iteration:  200 / 2000 [ 10%]  (Warmup)
## Chain 1: Iteration:  400 / 2000 [ 20%]  (Warmup)
## Chain 1: Iteration:  600 / 2000 [ 30%]  (Warmup)
## Chain 1: Iteration:  800 / 2000 [ 40%]  (Warmup)
## Chain 1: Iteration: 1000 / 2000 [ 50%]  (Warmup)
## Chain 1: Iteration: 1001 / 2000 [ 50%]  (Sampling)
## Chain 1: Iteration: 1200 / 2000 [ 60%]  (Sampling)
## Chain 1: Iteration: 1400 / 2000 [ 70%]  (Sampling)
## Chain 1: Iteration: 1600 / 2000 [ 80%]  (Sampling)
## Chain 1: Iteration: 1800 / 2000 [ 90%]  (Sampling)
## Chain 1: Iteration: 2000 / 2000 [100%]  (Sampling)
## Chain 1:
## Chain 1:  Elapsed Time: 0.031 seconds (Warm-up)
## Chain 1:                0.235 seconds (Sampling)
## Chain 1:                0.266 seconds (Total)
## Chain 1:
##
## SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).
## Chain 2:
## Chain 2: Gradient evaluation took 6e-06 seconds
## Chain 2: 1000 transitions using 10 leapfrog steps per transition would take 0.06 seconds.
## Chain 2: Adjust your expectations accordingly!
## Chain 2:
## Chain 2:
## Chain 2: Iteration:    1 / 2000 [  0%]  (Warmup)
## Chain 2: Iteration:  200 / 2000 [ 10%]  (Warmup)
## Chain 2: Iteration:  400 / 2000 [ 20%]  (Warmup)
## Chain 2: Iteration:  600 / 2000 [ 30%]  (Warmup)
## Chain 2: Iteration:  800 / 2000 [ 40%]  (Warmup)
## Chain 2: Iteration: 1000 / 2000 [ 50%]  (Warmup)
## Chain 2: Iteration: 1001 / 2000 [ 50%]  (Sampling)
## Chain 2: Iteration: 1200 / 2000 [ 60%]  (Sampling)
## Chain 2: Iteration: 1400 / 2000 [ 70%]  (Sampling)
## Chain 2: Iteration: 1600 / 2000 [ 80%]  (Sampling)
## Chain 2: Iteration: 1800 / 2000 [ 90%]  (Sampling)
## Chain 2: Iteration: 2000 / 2000 [100%]  (Sampling)
## Chain 2:
## Chain 2:  Elapsed Time: 0.04 seconds (Warm-up)
## Chain 2:                0.232 seconds (Sampling)
## Chain 2:                0.272 seconds (Total)
## Chain 2:
##
## SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).
## Chain 3:
## Chain 3: Gradient evaluation took 5e-06 seconds
## Chain 3: 1000 transitions using 10 leapfrog steps per transition would take 0.05 seconds.
## Chain 3: Adjust your expectations accordingly!
## Chain 3:
## Chain 3:
```

```
## Chain 3: Iteration:    1 / 2000 [  0%]  (Warmup)
## Chain 3: Iteration:  200 / 2000 [ 10%]  (Warmup)
## Chain 3: Iteration:  400 / 2000 [ 20%]  (Warmup)
## Chain 3: Iteration:  600 / 2000 [ 30%]  (Warmup)
## Chain 3: Iteration:  800 / 2000 [ 40%]  (Warmup)
## Chain 3: Iteration: 1000 / 2000 [ 50%]  (Warmup)
## Chain 3: Iteration: 1001 / 2000 [ 50%]  (Sampling)
## Chain 3: Iteration: 1200 / 2000 [ 60%]  (Sampling)
## Chain 3: Iteration: 1400 / 2000 [ 70%]  (Sampling)
## Chain 3: Iteration: 1600 / 2000 [ 80%]  (Sampling)
## Chain 3: Iteration: 1800 / 2000 [ 90%]  (Sampling)
## Chain 3: Iteration: 2000 / 2000 [100%]  (Sampling)
## Chain 3:
## Chain 3:  Elapsed Time: 0.031 seconds (Warm-up)
## Chain 3:                0.234 seconds (Sampling)
## Chain 3:                0.265 seconds (Total)
## Chain 3:
##
## SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).
## Chain 4:
## Chain 4: Gradient evaluation took 6e-06 seconds
## Chain 4: 1000 transitions using 10 leapfrog steps per transition would take 0.06 seconds.
## Chain 4: Adjust your expectations accordingly!
## Chain 4:
## Chain 4:
## Chain 4: Iteration:    1 / 2000 [  0%]  (Warmup)
## Chain 4: Iteration:  200 / 2000 [ 10%]  (Warmup)
## Chain 4: Iteration:  400 / 2000 [ 20%]  (Warmup)
## Chain 4: Iteration:  600 / 2000 [ 30%]  (Warmup)
## Chain 4: Iteration:  800 / 2000 [ 40%]  (Warmup)
## Chain 4: Iteration: 1000 / 2000 [ 50%]  (Warmup)
## Chain 4: Iteration: 1001 / 2000 [ 50%]  (Sampling)
## Chain 4: Iteration: 1200 / 2000 [ 60%]  (Sampling)
## Chain 4: Iteration: 1400 / 2000 [ 70%]  (Sampling)
## Chain 4: Iteration: 1600 / 2000 [ 80%]  (Sampling)
## Chain 4: Iteration: 1800 / 2000 [ 90%]  (Sampling)
## Chain 4: Iteration: 2000 / 2000 [100%]  (Sampling)
## Chain 4:
## Chain 4:  Elapsed Time: 0.036 seconds (Warm-up)
## Chain 4:                0.232 seconds (Sampling)
## Chain 4:                0.268 seconds (Total)
## Chain 4:
```

No pooling

```r
# Iterate over each suburb and print model summary
for(suburb in unique(filtered_data$Suburb)) {
  suburb_data <- filtered_data[filtered_data$Suburb == suburb, ]
  model <- lm(log(Price) ~ Distance + Rooms + BuildingArea + YearBuilt + Landsize, data = suburb_data)


 # Print suburb name and model summary
```

```r
  cat("\n\nSuburb:", suburb, "\n")
  print(summary(model)$r.squared)  # Print the R-squared value
  print(summary(model)$coefficients)  # Print the coefficient estimates
}
```

```
##
##
## Suburb: Airport West
## [1] 0.5433654
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  17.8158217164 1.9411336945  9.1780498 5.788604e-12
## Distance     -0.0475246169 0.0140898786 -3.3729614 1.516769e-03
## Rooms         0.0190638131 0.0368546490  0.5172702 6.074461e-01
## BuildingArea  0.0013796245 0.0005001355  2.7585014 8.304445e-03
## YearBuilt    -0.0020421709 0.0009669339 -2.1120068 4.014664e-02
## Landsize      0.0001999289 0.0001047526  1.9085810 6.256741e-02
##
##
## Suburb: Ascot Vale
## [1] 0.7206609
##                  Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  18.248616768 1.122108e+00 16.2628025 1.109524e-27
## Distance     -0.119123928 3.154430e-02 -3.7764014 2.960685e-04
## Rooms         0.036112209 5.086805e-02  0.7099192 4.797204e-01
## BuildingArea  0.004073247 7.074860e-04  5.7573528 1.360403e-07
## YearBuilt    -0.002268334 5.562323e-04 -4.0780347 1.027853e-04
## Landsize     -0.000151474 4.899065e-05 -3.0918957 2.698870e-03
##
##
## Suburb: Balwyn
## [1] 0.7504635
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  15.5255588745 2.9944368661  5.1848009 2.436018e-06
## Distance     -0.0908425243 0.0463023372 -1.9619425 5.419053e-02
## Rooms         0.1665876437 0.0518978977  3.2099112 2.090432e-03
## BuildingArea  0.0011785216 0.0005078028  2.3208252 2.354635e-02
## YearBuilt    -0.0007655416 0.0014759459 -0.5186786 6.058020e-01
## Landsize      0.0005870962 0.0001590890  3.6903626 4.693400e-04
##
##
## Suburb: Balwyn North
## [1] 0.6819213
##                  Estimate   Std. Error  t value     Pr(>|t|)
## (Intercept)  8.6102751090 2.000749e+00 4.303527 4.117249e-05
## Distance     0.1781774287 8.573779e-02 2.078167 4.041951e-02
## Rooms        0.1121576096 2.742734e-02 4.089263 9.123507e-05
## BuildingArea 0.0007530275 2.135947e-04 3.525497 6.552542e-04
## YearBuilt    0.0015597729 9.751922e-04 1.599452 1.130762e-01
## Landsize     0.0006842133 9.951684e-05 6.875352 6.729234e-10
##
##
## Suburb: Bentleigh
## [1] 0.6651987
```

```
##                    Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)  14.8841555058 2.5630454162  5.80721489 1.537984e-07
## Distance      0.0009409399 0.0382291508  0.02461315 9.804307e-01
## Rooms         0.2026508956 0.0433167392  4.67835067 1.297109e-05
## BuildingArea  0.0011711314 0.0003932717  2.97791959 3.936700e-03
## YearBuilt    -0.0010165774 0.0012417642 -0.81865579 4.156473e-01
## Landsize      0.0005245260 0.0001826902  2.87112209 5.349305e-03
##
##
## Suburb: Bentleigh East
## [1] 0.7705352
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  32.9155360155 4.2553584832  7.735079 2.355675e-12
## Distance     -1.5893038410 0.2998494849 -5.300339 4.718645e-07
## Rooms         0.1530668738 0.0251056090  6.096919 1.114735e-08
## BuildingArea  0.0010862692 0.0003507251  3.097210 2.386857e-03
## YearBuilt     0.0010286171 0.0006871286  1.496979 1.367860e-01
## Landsize      0.0006485303 0.0000903800  7.175596 4.660342e-11
##
##
## Suburb: Brighton
## [1] 0.7669558
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.777211e+01 1.869683e+00  9.5054138 3.051349e-15
## Distance     -6.891478e-02 9.261865e-02 -0.7440702 4.587723e-01
## Rooms         2.777815e-01 4.922131e-02  5.6435216 1.911535e-07
## BuildingArea  2.524454e-03 4.785834e-04  5.2748463 9.083941e-07
## YearBuilt    -2.033655e-03 8.550735e-04 -2.3783401 1.950545e-02
## Landsize     -4.561443e-05 9.585953e-05 -0.4758466 6.353367e-01
##
##
## Suburb: Brighton East
## [1] 0.6989248
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  14.2070161006 2.2610278449  6.283433 1.625207e-08
## Distance     -0.2600466253 0.1278310460 -2.034299 4.523499e-02
## Rooms         0.0664509463 0.0338015814  1.965912 5.277796e-02
## BuildingArea  0.0012066940 0.0003490804  3.456780 8.781606e-04
## YearBuilt     0.0009598350 0.0009052991  1.060241 2.922256e-01
## Landsize      0.0008086326 0.0001366710  5.916637 7.773922e-08
##
##
## Suburb: Brunswick
## [1] 0.6919665
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.837958e+01 9.618333e-01 19.1089032 2.950906e-42
## Rooms         3.188178e-01 2.480253e-02 12.8542456 4.622623e-26
## BuildingArea  5.734093e-04 2.420163e-04  2.3693007 1.907789e-02
## YearBuilt    -2.865197e-03 4.880033e-04 -5.8712662 2.622630e-08
## Landsize      1.825145e-05 3.697708e-05  0.4935883 6.223094e-01
##
##
## Suburb: Brunswick West
## [1] 0.7471959
```

```
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   2.592105e+01 2.036188e+00 12.7301877 3.238840e-20
## Distance     -3.072211e-01 1.062434e-01 -2.8916738 5.045596e-03
## Rooms         2.419361e-01 4.051563e-02  5.9714271 7.845647e-08
## BuildingArea  1.843350e-03 6.213131e-04  2.9668615 4.065029e-03
## YearBuilt    -5.888214e-03 1.043053e-03 -5.6451742 2.970653e-07
## Landsize     -1.393892e-05 5.069906e-05 -0.2749345 7.841432e-01
##
##
## Suburb: Camberwell
## [1] 0.6131638
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   4.039531e+00 6.8514158516  0.58959071 5.571061e-01
## Distance      1.567558e+00 0.8189170979  1.91418427 5.912810e-02
## Rooms         3.728483e-01 0.0427650184  8.71853583 2.862435e-13
## BuildingArea -1.130933e-05 0.0001267083 -0.08925485 9.290997e-01
## YearBuilt    -1.713755e-03 0.0011411601 -1.50176596 1.370461e-01
## Landsize      2.623200e-04 0.0001367986  1.91756381 5.869127e-02
##
##
## Suburb: Carnegie
## [1] 0.8075809
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.784523e+01 2.135042e+00  8.3582538 1.475709e-12
## Distance     -1.044022e-01 5.032792e-02 -2.0744386 4.121413e-02
## Rooms         3.491943e-01 5.868429e-02  5.9503878 6.531568e-08
## BuildingArea  2.808072e-03 8.460900e-04  3.3188814 1.355925e-03
## YearBuilt    -2.182468e-03 1.015841e-03 -2.1484346 3.466598e-02
## Landsize     -1.331356e-05 7.454489e-05 -0.1785979 8.586994e-01
##
##
## Suburb: Coburg
## [1] 0.4256745
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.842287e+01 1.258873e+00 14.6344097 3.461163e-29
## Distance     -1.342938e-01 4.627700e-02 -2.9019553 4.362337e-03
## Rooms         1.247092e-01 3.836356e-02  3.2507197 1.468594e-03
## BuildingArea  1.983736e-03 5.760333e-04  3.4437867 7.741516e-04
## YearBuilt    -2.251469e-03 6.337898e-04 -3.5523912 5.338547e-04
## Landsize      2.974575e-05 6.607373e-05  0.4501903 6.533289e-01
##
##
## Suburb: Doncaster
## [1] 0.8243468
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   8.8012286456 3.3984688910  2.58976290 1.191556e-02
## Distance     -0.0322885327 0.0243192553 -1.32769414 1.890700e-01
## Rooms        -0.0001608480 0.0330427960 -0.00486787 9.961314e-01
## BuildingArea  0.0016111020 0.0003529867  4.56420044 2.379019e-05
## YearBuilt     0.0024487616 0.0016963203  1.44357269 1.538137e-01
## Landsize      0.0009033203 0.0001184773  7.62441385 1.620341e-10
##
##
## Suburb: Elwood
```

```
## [1] 0.883963
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.653259e+01 1.671278e+00  9.8921834 1.784010e-15
## Distance     -1.096569e-01 1.114541e-01 -0.9838753 3.281805e-01
## Rooms         2.706085e-01 4.621492e-02  5.8554367 1.037461e-07
## BuildingArea  6.647407e-03 8.751893e-04  7.5953925 5.329400e-11
## YearBuilt    -1.703571e-03 7.356027e-04 -2.3158844 2.315891e-02
## Landsize      2.533154e-05 4.959535e-05  0.5107643 6.109405e-01
##
##
## Suburb: Essendon
## [1] 0.7952274
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  17.6921447584 1.6760658604 10.555757 1.267506e-18
## Distance     -0.2597130550 0.1065507468 -2.437459 1.632246e-02
## Rooms         0.2626078413 0.0342924769  7.657885 6.444195e-12
## BuildingArea  0.0009701222 0.0003523927  2.752958 6.865468e-03
## YearBuilt    -0.0015372231 0.0007054066 -2.179201 3.135603e-02
## Landsize      0.0005682475 0.0000979707  5.800177 5.934274e-08
##
##
## Suburb: Footscray
## [1] 0.7196241
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.981842e+01 1.205985e+00 16.4333923 7.740175e-29
## Distance      7.576566e-03 4.646093e-02  0.1630739 8.708259e-01
## Rooms         2.724012e-01 3.805698e-02  7.1577201 2.136283e-10
## BuildingArea  3.317999e-03 7.313603e-04  4.5367505 1.758495e-05
## YearBuilt    -3.840421e-03 6.067326e-04 -6.3296764 9.397172e-09
## Landsize      3.567574e-05 6.683587e-05  0.5337814 5.948087e-01
##
##
## Suburb: Glen Iris
## [1] 0.7705663
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.800202e+01 2.1104336836  8.5300081 2.439037e-13
## Distance      3.188064e-02 0.0382535760  0.8334028 4.067303e-01
## Rooms         4.969578e-01 0.0422945974 11.7499115 3.781961e-20
## BuildingArea  1.390410e-04 0.0003789018  0.3669578 7.144753e-01
## YearBuilt    -2.933040e-03 0.0010776609 -2.7216726 7.740589e-03
## Landsize      8.414684e-05 0.0001020269  0.8247514 4.116008e-01
##
##
## Suburb: Glenroy
## [1] 0.6238551
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  15.3823187938 1.703325e+00  9.030758 9.120875e-15
## Distance     -0.0707782584 1.940785e-02 -3.646888 4.149644e-04
## Rooms         0.0695420904 2.958005e-02  2.350979 2.059120e-02
## BuildingArea  0.0009717264 4.582777e-04  2.120388 3.632872e-02
## YearBuilt    -0.0008900603 8.586173e-04 -1.036621 3.022942e-01
## Landsize      0.0005740219 8.931018e-05  6.427284 3.896740e-09
##
##
```

```
## Suburb: Hampton
## [1] 0.7703634
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  -1.254437e+01 1.059984e+01 -1.1834492 2.418150e-01
## Distance      2.199756e+00 7.664459e-01  2.8700732 5.847823e-03
## Rooms         3.834796e-01 5.640023e-02  6.7992556 8.726358e-09
## BuildingArea  7.638619e-04 4.789749e-04  1.5947849 1.165971e-01
## YearBuilt    -2.478747e-03 1.053346e-03 -2.3532118 2.228348e-02
## Landsize      7.818084e-06 2.869447e-05  0.2724596 7.863078e-01
##
##
## Suburb: Hawthorn
## [1] 0.8908644
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)   1.818239e+01 1.414663e+00 12.852805 5.564572e-23
## Distance      2.932457e-01 7.989432e-02  3.670419 3.889868e-04
## Rooms         3.689914e-01 4.350823e-02  8.480957 1.948312e-13
## BuildingArea  2.968037e-03 5.965903e-04  4.975000 2.684374e-06
## YearBuilt    -3.604990e-03 6.656542e-04 -5.415710 4.145574e-07
## Landsize     -1.338538e-05 2.421742e-05 -0.552717 5.816784e-01
##
##
## Suburb: Ivanhoe
## [1] 0.8200647
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  34.6384521753 5.8612527317  5.909735 3.685597e-07
## Distance     -2.2876324099 0.6582510455 -3.475319 1.108036e-03
## Rooms         0.2030435618 0.0500149586  4.059657 1.845685e-04
## BuildingArea  0.0018018357 0.0005598638  3.218347 2.338109e-03
## YearBuilt    -0.0019302177 0.0012098319 -1.595443 1.173163e-01
## Landsize      0.0004670562 0.0001539717  3.033389 3.930222e-03
##
##
## Suburb: Keilor East
## [1] 0.5599774
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.417586e+01 2.126007e+00  6.6678322 4.275672e-09
## Distance     -1.228322e-01 3.591744e-02 -3.4198478 1.028927e-03
## Rooms         4.534353e-02 3.864429e-02  1.1733563 2.444672e-01
## BuildingArea  2.127522e-03 4.426749e-04  4.8060611 8.013284e-06
## YearBuilt     2.159245e-04 1.028353e-03  0.2099712 8.342751e-01
## Landsize      4.266714e-05 4.350848e-05  0.9806625 3.299982e-01
##
##
## Suburb: Kensington
## [1] 0.7923287
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   2.109516e+01 1.278289e+00 16.5026544 2.298267e-24
## Distance     -1.309414e-01 7.232389e-02 -1.8104867 7.506641e-02
## Rooms         1.926485e-01 5.648729e-02  3.4104744 1.145862e-03
## BuildingArea  2.886382e-03 1.110074e-03  2.6001702 1.163310e-02
## YearBuilt    -3.942919e-03 6.190981e-04 -6.3688112 2.625356e-08
## Landsize     -7.558435e-06 3.537723e-05 -0.2136525 8.315191e-01
##
```

```
##
## Suburb: Kew
## [1] 0.7368567
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  17.0428289887 2.2970243537  7.419525 4.707098e-11
## Distance     -0.4480853202 0.3410636489 -1.313788 1.920485e-01
## Rooms         0.3583351880 0.0395767589  9.054182 1.600928e-14
## BuildingArea  0.0005221090 0.0002975071  1.754946 8.245884e-02
## YearBuilt    -0.0008961270 0.0008119647 -1.103653 2.725026e-01
## Landsize      0.0003130141 0.0000873584  3.583103 5.354997e-04
##
##
## Suburb: Maidstone
## [1] 0.6880562
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)   1.847377e+01 1.596085e+00 11.574433 4.391564e-15
## Distance     -5.904926e-02 2.045538e-02 -2.886735 5.960820e-03
## Rooms         2.626905e-01 4.646309e-02  5.653745 1.016829e-06
## BuildingArea  9.011920e-04 4.990057e-04  1.805975 7.761346e-02
## YearBuilt    -2.747291e-03 7.887684e-04 -3.483013 1.115814e-03
## Landsize     -2.206926e-05 1.328794e-05 -1.660849 1.036967e-01
##
##
## Suburb: Malvern East
## [1] 0.8496908
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  17.0032561051 1.6078564438 10.575108 1.369590e-16
## Distance     -0.0256831472 0.0219782857 -1.168569 2.462297e-01
## Rooms         0.2572453008 0.0474185397  5.424994 6.637523e-07
## BuildingArea  0.0019813262 0.0005812067  3.408987 1.046213e-03
## YearBuilt    -0.0020337525 0.0008111260 -2.507320 1.429938e-02
## Landsize      0.0006355237 0.0001233586  5.151841 1.975175e-06
##
##
## Suburb: Maribyrnong
## [1] 0.7362119
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   1.999338e+01 1.878436e+00 10.64363123 3.348190e-16
## Distance     -3.552949e-02 1.454723e-02 -2.44235445 1.715750e-02
## Rooms         2.246762e-01 5.060544e-02  4.43976340 3.336193e-05
## BuildingArea  3.156685e-03 6.716794e-04  4.69968973 1.288941e-05
## YearBuilt    -3.687978e-03 9.574334e-04 -3.85194197 2.592629e-04
## Landsize      3.435926e-07 7.199927e-06  0.04772167 9.620759e-01
##
##
## Suburb: Moonee Ponds
## [1] 0.8308323
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  21.2007944700 1.267673e+00 16.724188 1.335766e-30
## Distance     -0.2022538946 7.044666e-02 -2.871022 5.004173e-03
## Rooms         0.1727330035 3.733571e-02  4.626483 1.127754e-05
## BuildingArea  0.0040608899 5.270128e-04  7.705487 1.020202e-11
## YearBuilt    -0.0036876164 5.906224e-04 -6.243611 1.071050e-08
## Landsize      0.0001150154 8.948793e-05  1.285262 2.016994e-01
```

```
##
##
## Suburb: Newport
## [1] 0.7301638
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  19.6841688133 8.297053e-01 23.7242896 3.010328e-39
## Distance     -0.0662313592 1.661509e-02 -3.9862184 1.414304e-04
## Rooms        -0.0063048044 2.580741e-02 -0.2443021 8.075856e-01
## BuildingArea  0.0048295076 6.048447e-04  7.9847064 6.077199e-12
## YearBuilt    -0.0031210357 4.171648e-04 -7.4815413 6.183224e-11
## Landsize      0.0001944838 6.085973e-05  3.1956076 1.959015e-03
##
##
## Suburb: Northcote
## [1] 0.8001586
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  24.2277501812 1.4677811162 16.506378 6.359136e-30
## Distance     -0.7576166453 0.2287448397 -3.312060 1.302040e-03
## Rooms         0.0909208914 0.0399956598  2.273269 2.521554e-02
## BuildingArea  0.0024738392 0.0006420229  3.853195 2.094064e-04
## YearBuilt    -0.0035718679 0.0005360518 -6.663288 1.627705e-09
## Landsize      0.0007911629 0.0001189040  6.653795 1.701437e-09
##
##
## Suburb: Pascoe Vale
## [1] 0.673018
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  17.1739249779 1.8028499345  9.525987 1.183592e-15
## Distance     -0.0945466518 0.0310236710 -3.047565 2.958203e-03
## Rooms         0.1554308773 0.0285691465  5.440515 3.848422e-07
## BuildingArea  0.0023048247 0.0003715881  6.202634 1.292237e-08
## YearBuilt    -0.0018538205 0.0008650156 -2.143107 3.455522e-02
## Landsize      0.0002668251 0.0001049853  2.541547 1.258796e-02
##
##
## Suburb: Port Melbourne
## [1] 0.7339457
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.838362e+01 1.407554e+00 13.0606810 5.030494e-22
## Distance     -5.559637e-01 2.141443e-01 -2.5962102 1.110398e-02
## Rooms         2.821998e-01 4.827738e-02  5.8453846 9.099279e-08
## BuildingArea  3.143002e-03 6.912224e-04  4.5470193 1.790864e-05
## YearBuilt    -1.756781e-03 5.576365e-04 -3.1504052 2.251191e-03
## Landsize      9.314240e-06 1.065732e-05  0.8739754 3.845942e-01
##
##
## Suburb: Prahran
## [1] 0.7567529
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   1.483902e+01 3.695292e+00  4.0156549 1.522928e-04
## Distance      5.481743e-01 7.156007e-01  0.7660338 4.463467e-01
## Rooms         3.460076e-01 6.357969e-02  5.4421085 8.036517e-07
## BuildingArea  4.096370e-03 9.199809e-04  4.4526685 3.292226e-05
## YearBuilt    -2.433821e-03 7.956286e-04 -3.0589915 3.191397e-03
```

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## Landsize     -1.272443e-05 2.452453e-05 -0.5188448 6.055785e-01
##
##
## Suburb: Preston
## [1] 0.5629455
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   2.140202e+01 1.807955e+00 11.8376930 1.256055e-21
## Distance     -1.323488e-01 1.098409e-01 -1.2049139 2.307103e-01
## Rooms         1.796595e-01 2.959167e-02  6.0712872 1.675817e-08
## BuildingArea  7.776102e-04 3.168829e-04  2.4539360 1.562953e-02
## YearBuilt    -3.674585e-03 7.437643e-04 -4.9405242 2.669543e-06
## Landsize     -7.139126e-05 9.901585e-05 -0.7210084 4.723675e-01
##
##
## Suburb: Reservoir
## [1] 0.6757131
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  16.1883792297 1.360502e+00 11.898825 1.064250e-24
## Distance      0.2565482325 4.156884e-02  6.171648 4.063642e-09
## Rooms         0.1936434785 2.490578e-02  7.775043 4.814141e-13
## BuildingArea  0.0009873783 2.596058e-04  3.803376 1.928656e-04
## YearBuilt    -0.0033065928 6.325033e-04 -5.227787 4.540022e-07
## Landsize      0.0001913119 4.448718e-05  4.300383 2.736226e-05
##
##
## Suburb: Richmond
## [1] 0.7742217
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)   1.885377e+01 1.005483e+00 18.750958 1.352691e-41
## Distance     -2.630915e-01 2.339567e-01 -1.124531 2.625375e-01
## Rooms         1.406256e-01 3.965518e-02  3.546210 5.180446e-04
## BuildingArea  6.526051e-03 7.291569e-04  8.950132 1.070641e-15
## YearBuilt    -2.758134e-03 4.374880e-04 -6.304479 2.906320e-09
## Landsize     -2.011541e-05 1.012609e-05 -1.986494 4.875284e-02
##
##
## Suburb: South Melbourne
## [1] 0.7708776
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   2.163767e+01 1.3941261832 15.52059623 4.009460e-20
## Distance     -6.354931e-01 0.3678459489 -1.72760670 9.062543e-02
## Rooms         1.773389e-01 0.0659468009  2.68912128 9.882557e-03
## BuildingArea  4.366589e-03 0.0009301758  4.69437006 2.345065e-05
## YearBuilt    -3.785464e-03 0.0006487136 -5.83533895 4.773622e-07
## Landsize      3.349440e-06 0.0001466903  0.02283341 9.818798e-01
##
##
## Suburb: South Yarra
## [1] 0.8478414
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   1.729731e+01 1.446947e+00 11.95434745 2.782912e-20
## Distance     -3.157471e-02 1.037986e-01 -0.30419202 7.616838e-01
## Rooms         3.825510e-01 5.805274e-02  6.58971482 2.906710e-09
## BuildingArea  5.268781e-03 8.559800e-04  6.15526266 2.045894e-08
```

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## YearBuilt    -2.471738e-03 7.037904e-04 -3.51203755 6.974934e-04
## Landsize     -5.285270e-07 1.532158e-05 -0.03449559 9.725583e-01
##
##
## Suburb: St Kilda
## [1] 0.8260078
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)   2.008967e+01 1.508149e+00 13.3207475 8.243475e-23
## Distance      5.803373e-02 6.386397e-02  0.9087084 3.659860e-01
## Rooms         1.904796e-01 6.078458e-02  3.1336833 2.345442e-03
## BuildingArea  4.965551e-03 8.547251e-04  5.8095296 9.812206e-08
## YearBuilt    -3.979895e-03 7.696819e-04 -5.1708309 1.446419e-06
## Landsize     -2.315909e-05 3.472814e-05 -0.6668681 5.066012e-01
##
##
## Suburb: Sunshine
## [1] 0.7434406
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  19.5476898064 1.7733823317 11.022829 1.680664e-14
## Distance     -0.0838426044 0.0206572916 -4.058741 1.895185e-04
## Rooms         0.1733553422 0.0407540847  4.253692 1.020609e-04
## BuildingArea  0.0008225735 0.0002628095  3.129923 3.034364e-03
## YearBuilt    -0.0030237360 0.0009039078 -3.345182 1.643985e-03
## Landsize      0.0005023269 0.0001438474  3.492081 1.069995e-03
##
##
## Suburb: Sunshine West
## [1] 0.547643
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  12.0930010214 2.7626574942  4.3773074 5.820007e-05
## Distance     -0.0529415687 0.0145962113 -3.6270761 6.532512e-04
## Rooms         0.1073563623 0.0496893948  2.1605488 3.535936e-02
## BuildingArea  0.0001508319 0.0005311144  0.2839913 7.775448e-01
## YearBuilt     0.0005952896 0.0013658900  0.4358254 6.647673e-01
## Landsize      0.0005383294 0.0001330404  4.0463609 1.732400e-04
##
##
## Suburb: Surrey Hills
## [1] 0.7649747
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  20.5125476701 1.9713823317 10.4051595 3.817750e-15
## Distance     -0.1830673265 0.0642612356 -2.8487987 5.975073e-03
## Rooms         0.0210509616 0.0605448966  0.3476918 7.292686e-01
## BuildingArea  0.0037484375 0.0007729497  4.8495231 8.902728e-06
## YearBuilt    -0.0026311894 0.0008782201 -2.9960476 3.949961e-03
## Landsize      0.0001533421 0.0001260653  1.2163706 2.285296e-01
##
##
## Suburb: Templestowe Lower
## [1] 0.4889473
##                   Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  17.1474575988 4.7193717396  3.6334196 0.0006011383
## Distance     -0.0961320056 0.0354172492 -2.7142708 0.0087719316
## Rooms         0.0318545592 0.0420935180  0.7567569 0.4523122581
```

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## BuildingArea  0.0013610208 0.0006126965  2.2213622 0.0303139351
## YearBuilt    -0.0013153409 0.0023909960 -0.5501226 0.5843846938
## Landsize      0.0004808302 0.0002012599  2.3891004 0.0202218038
##
##
## Suburb: Thornbury
## [1] 0.7807161
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  15.950047469 1.5455103254 10.320246 1.023878e-16
## Distance      0.329699541 0.1012562214  3.256092 1.616896e-03
## Rooms         0.302545293 0.0418720518  7.225471 1.895061e-10
## BuildingArea  0.002292759 0.0005000374  4.585175 1.528603e-05
## YearBuilt    -0.002813358 0.0007209420 -3.902337 1.886945e-04
## Landsize      0.000181281 0.0001416370  1.279899 2.040225e-01
##
##
## Suburb: Williamstown
## [1] 0.812074
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  12.8521180126 1.3752911624  9.3450161 7.056202e-14
## Distance     -0.0521382600 0.0494557449 -1.0542407 2.954504e-01
## Rooms         0.2405725247 0.0490901162  4.9006306 6.079699e-06
## BuildingArea  0.0006371480 0.0005949433  1.0709390 2.879286e-01
## YearBuilt     0.0001671976 0.0006859260  0.2437545 8.081442e-01
## Landsize      0.0012621869 0.0002072210  6.0910188 5.641841e-08
##
##
## Suburb: Yarraville
## [1] 0.7007597
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  18.9382308090 1.1228932350 16.865567 2.798750e-32
## Distance     -0.1431039144 0.0599048319 -2.388854 1.860355e-02
## Rooms         0.1019165506 0.0362833909  2.808904 5.884076e-03
## BuildingArea  0.0031887846 0.0006390755  4.989684 2.280032e-06
## YearBuilt    -0.0025685971 0.0005607480 -4.580662 1.228601e-05
## Landsize      0.0003545857 0.0001009464  3.512615 6.449099e-04
##
##
## Suburb: Brunswick East
## [1] 0.8207308
##                    Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)   2.096253e+01 1.3233157662 15.840912 1.074938e-20
## Distance      2.203071e-01 0.1180705514  1.865894 6.817325e-02
## Rooms         9.736336e-02 0.0725934432  1.341214 1.861629e-01
## BuildingArea  4.489132e-03 0.0011660260  3.849942 3.491826e-04
## YearBuilt    -4.573927e-03 0.0006609044 -6.920709 9.728374e-09
## Landsize      6.665487e-05 0.0001685886  0.395370 6.943215e-01
##
##
## Suburb: Fawkner
## [1] 0.7100041
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  15.234787556 2.066110e+00  7.373658 5.756851e-10
## Distance      0.240280853 4.895179e-02  4.908520 7.381280e-06
```

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## Rooms         0.061540337 3.321869e-02  1.852582 6.886267e-02
## BuildingArea  0.002527038 5.426102e-04  4.657188 1.823676e-05
## YearBuilt    -0.002861928 1.029443e-03 -2.780074 7.248610e-03
## Landsize      0.000437439 9.842387e-05  4.444440 3.863912e-05
##
##
## Suburb: Hawthorn East
## [1] 0.8069247
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)   2.302710e+01 2.446522e+00  9.412176 2.789724e-13
## Distance     -1.668739e-01 6.583313e-02 -2.534801 1.397135e-02
## Rooms         1.295478e-01 6.990922e-02  1.853086 6.895937e-02
## BuildingArea  5.413091e-03 9.492675e-04  5.702388 4.195410e-07
## YearBuilt    -4.590863e-03 1.176260e-03 -3.902931 2.500400e-04
## Landsize     -1.036339e-05 9.959437e-05 -0.104056 9.174839e-01
##
##
## Suburb: West Footscray
## [1] 0.5236154
##                    Estimate   Std. Error    t value     Pr(>|t|)
## (Intercept)  27.6980390111 2.799578e+00  9.8936485 1.221195e-13
## Distance     -0.1059565564 4.370378e-02 -2.4244254 1.877571e-02
## Rooms         0.1131806700 4.324804e-02  2.6170126 1.153379e-02
## BuildingArea  0.0001144775 3.568418e-04  0.3208076 7.496178e-01
## YearBuilt    -0.0070574541 1.417917e-03 -4.9773380 7.191875e-06
## Landsize      0.0001749143 9.824487e-05  1.7803915 8.074420e-02
##
##
## Suburb: Craigieburn
## [1] 0.7321889
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  1.6998361128 2.416915e+00 0.7033082 4.836791e-01
## Rooms        0.0320330387 1.675193e-02 1.9121999 5.903134e-02
## BuildingArea 0.0006711695 2.101241e-04 3.1941576 1.933544e-03
## YearBuilt    0.0054529612 1.205440e-03 4.5236255 1.849672e-05
## Landsize     0.0007603198 8.359522e-05 9.0952548 2.180512e-14
##
##
## Suburb: Epping
## [1] 0.6738428
##                   Estimate   Std. Error   t value     Pr(>|t|)
## (Intercept)  16.471412818 2.2813859690  7.219915 1.810184e-09
## Rooms         0.068701420 0.0305814714  2.246505 2.878287e-02
## BuildingArea  0.001372607 0.0002942902  4.664128 2.078744e-05
## YearBuilt    -0.001869959 0.0011448233 -1.633404 1.082019e-01
## Landsize      0.000261894 0.0001152388  2.272619 2.705347e-02
##
##
## Suburb: Mill Park
## [1] 0.6255374
##                   Estimate   Std. Error  t value     Pr(>|t|)
## (Intercept)  5.0959980992 3.3803278812 1.507546 1.380917e-01
## Rooms        0.0571195882 0.0193018999 2.959273 4.739176e-03
## BuildingArea 0.0005660419 0.0002143335 2.640941 1.106205e-02
```

```
## YearBuilt    0.0038504053 0.0016901509 2.278143 2.711594e-02
## Landsize     0.0006739862 0.0001175868 5.731818 6.043655e-07
##
##
## Suburb: Werribee
## [1] 0.6500065
##                   Estimate   Std. Error     t value     Pr(>|t|)
## (Intercept)   1.244086e+01 2.3480825906  5.29830473 1.961064e-06
## Rooms         3.436803e-02 0.0360333743  0.95378319 3.442208e-01
## BuildingArea  1.934618e-03 0.0004322648  4.47553973 3.699997e-05
## YearBuilt    -1.357491e-05 0.0011922782 -0.01138569 9.909555e-01
## Landsize      6.332793e-04 0.0001156093  5.47775530 1.012846e-06
```