

Final Project Script

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The Data

For this project, we use data provided by Yelp for the Yelp Dataset challenge, which can be found in JSON format from this website:

<https://www.yelp.com/dataset/challenge>

Documentation describing the variables and information contained in each json file comprising the yelp challenge dataset can be found here:

<https://www.yelp.com/dataset/documentation/json>

We then merge it with Zillow data on rental values across the United States by postal code. The Zillow rental value dataset can be downloaded from this website:

<https://www.zillow.com/research/data/>

Setting the Working Directory and Loading in Required Packages

Importing the data

First, we import the Yelp Check-In data and flatten it.

```
# Stream in Check-In Data
yelp_checkin <-
  as.data.frame(jsonlite::stream_in(file("dataset/checkin.json")), flatten =
    TRUE)
# Flatten Check-In Data
renquote <- function(l) if (is.list(l)) lapply(l, renquote) else enquote(l)
yelp_checkin_flat <- as.data.frame(lapply(unlist(renquote(yelp_checkin)),
  eval))
```

Reshaping the Data

We clean the time period variable names by collapsing the data to long form and using string functions to isolate the name of the weekday in string format.

```
# Convert from wide to Long
yelp_checkin_flat_long <- reshape(yelp_checkin_flat, varying =
  list(names(yelp_checkin_flat[1:168])), times =
  names(yelp_checkin_flat[1:168]), idvar = 'business_id', v.names = 'checkin' ,
  direction = 'long')
```

```

# Eliminate punctuation and digits
yelp_checkin_flat_long$time <- str_replace(yelp_checkin_flat_long$time,
"time.", "")
yelp_checkin_flat_long$time <- gsub('[:digit:]]+', '',
yelp_checkin_flat_long$time)

# Isolate name of weekday
yelp_checkin_flat_long$time =
substr(yelp_checkin_flat_long$time,1,nchar(yelp_checkin_flat_long$time)-2)

```

Here, we collapse the data, reshape it from long to wide, then merge them together.

```

# Aggregate Check-In by business and time period to get Check-In average and
total by business for each day of the week.
yelp_checkin_collapse_mean <- as.data.frame(aggregate(checkin ~ business_id +
time, yelp_checkin_flat_long , mean))
yelp_checkin_collapse_sum <- as.data.frame(aggregate(checkin ~ business_id +
time, yelp_checkin_flat_long , sum))

# Convert from Long to wide
yelp_checkin_wide_mean <- spread(yelp_checkin_collapse_mean, key = time,
value = checkin)
yelp_checkin_wide_sum <- spread(yelp_checkin_collapse_sum, key = time, value
= checkin)

# Merge averages and totals
yelp_checkin_wide <- inner_join(yelp_checkin_wide_mean,
yelp_checkin_wide_sum, by='business_id', match='all')
colnames(yelp_checkin_wide) <- c("business_id", "Friday_ave", "Monday_ave",
"Saturday_ave", "Sunday_ave", "Thursday_ave", "Tuesday_ave", "Wednesday_ave",
"Friday_total", "Monday_total", "Saturday_total", "Sunday_total",
"Thursday_total", "Tuesday_total", "Wednesday_total")

```

Loading in Business Dataset to Merge with Check-In Data and Aggregate by Zip Code. Eliminate Useless Columns and Merge.

```

# Import business dataset
yelp_business <- fromJSON(sprintf("[%s]",
paste(readLines("dataset/business.json"), collapse=",")),
simplifyDataFrame=TRUE, flatten=TRUE)

# Merge check-in data with business data by business
checkinbiz <- inner_join(yelp_business, yelp_checkin_wide,
by=c('business_id'), match='all')

# Eliminate unnecessary columns
checkinbiz <- checkinbiz[-c(2:6, 8:101)]

# Collapse check-in data by zipcode to get total and average check-ins for

```

each weekday and zipcode

```
checkinzipmean <- as.data.frame(aggregate(. ~ postal_code, checkinbiz[2:9],
mean))
checkinzipsum <- as.data.frame(aggregate(. ~ postal_code, checkinbiz[c(2,
10:16)], sum))

checkinfull <- inner_join(checkinzipmean, checkinzipsum, by=c('postal_code'),
match='all')
```

Importing the Yelp Review Data

Due to the large size of the Yelp Review JSON file, The Yelp Review dataset was collapsed to the zipcode level through merging, aggregation, and collapsing within the google cloud platform.

Import data

```
yelp_review_long <- read.csv("yelp_longPC_updated2.csv", header = T,
na.strings=c("NA"))
```

Check missingness

```
apply(yelp_review_long, function(x) sum(is.na(x)))
```

```
##           X           postal_code           YearMonth
##           0              0              0
## Number_of_businesses Number_of_reviews           starsav
##           0              0              0
##           starssd           usefulav           funnyav
##          168953              0              0
##           coolav           bizstars           bizstarssd
##           0              0           168953
##           bizrevcount           bizrevav           is_openave
##           0              0              0
```

Check how many unique zipcodes

```
length(unique(yelp_review_long$postal_code))
```

```
## [1] 15890
```

Convert YearMonth from character to yearmon class

```
yelp_review_long$YearMonth <- as.yearmon(yelp_review_long$YearMonth)
```

Notice that there are no missing postal code values, with 15,980 unique postal codes.

Zillow data

Here, we read in the Zillow data with information on all rental values across the US and Canada. We rename the "RegionName" variable to "postal_code" then convert the data from wide to long in order to merge it with the Yelp dataset. We change the "time" variable to a date class and cut the Zillow data to match the dates of the Yelp data (while Zillow data goes back to the 1990s, Yelp business and review data only go back to 2010).

```

# Import data
zillow <- read_csv("zecon/Zip_Zri_AllHomesPlusMultifamily.csv", col_names =
TRUE)

# Reformat to prepare for merge with Yelp dataset.
names (zillow)[2] <- "postal_code"
zillow <- as.data.frame(zillow)
zillow_long <- reshape(zillow, varying = list(names(zillow[8:95])), times =
names(zillow[8:95]), idvar = 'postal_code', v.names = 'rentprice' , direction
= 'long')

sapply(zillow_long, function(x) sum(is.na(x)))

##      RegionID postal_code      City      State      Metro      CountyName
##           0           0           0           0      113960           0
##      SizeRank      time      rentprice
##           0           0      28354

zillow_long$time<- as.Date(strptime(paste(1, zillow_long$time),"%d %Y-%m"))

zillow_long <- zillow_long[zillow_long$time >= "2010-11-01" &
zillow_long$time <= "2017-12-31",]

zillow_long$month <- match(months(zillow_long$time), month.name)
zillow_long$year <- format(zillow_long$time,format="%Y")
zillow_long$YearMonth <- as.yearmon(paste(zillow_long$year,
zillow_long$month), "%Y %m")
names(zillow_long)

## [1] "RegionID"      "postal_code" "City"          "State"         "Metro"
## [6] "CountyName"    "SizeRank"    "time"          "rentprice"     "month"
## [11] "year"          "YearMonth"

```

Notice that there are 28,354 missing values for “rentprice”. We will attempt to recitfy this through imputation later.

Merging all datasets

Here, we create the official merged dataset from which we conduct the analysis.

```

# Merge Check-In with Yelp
yelp_review_long <- left_join(yelp_review_long, checkinfull,
by=c('postal_code'), match='all')

# Merge Zillow with Yelp
Full_data_long <- inner_join(yelp_review_long, zillow_long,
by=c('postal_code', 'YearMonth'), match='all')
length(unique(Full_data_long$postal_code))

## [1] 564

```

```
sapply(Full_data_long, function(x) sum(is.na(x)))
```

```
##           X           postal_code           YearMonth
##           0              0              0
## Number_of_businesses Number_of_reviews           starsav
##           0              0              0
##           starssd           usefulav           funnyav
##           2977              0              0
##           coolav           bizstars           bizstarssd
##           0              0              2977
##           bizrevcount           bizrevav           is_openave
##           0              0              0
##           Friday_ave           Monday_ave           Saturday_ave
##           1337              1337              1337
##           Sunday_ave           Thursday_ave           Tuesday_ave
##           1337              1337              1337
##           Wednesday_ave           Friday_total           Monday_total
##           1337              1337              1337
##           Saturday_total           Sunday_total           Thursday_total
##           1337              1337              1337
##           Tuesday_total           Wednesday_total           RegionID
##           1337              1337              0
##           City           State           Metro
##           0              0              64
##           CountyName           SizeRank           time
##           0              0              0
##           rentprice           month           year
##           580              0              0
```

The final frame consists of 37492 observations and 39 variables.

Explortatory Data Analysis

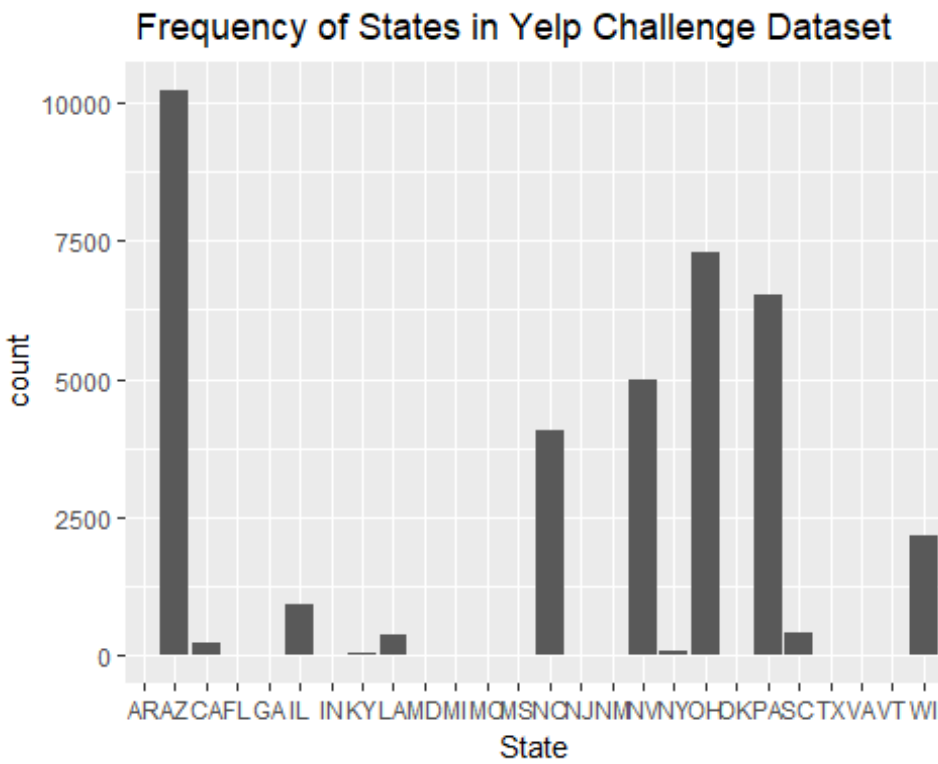
Here is where we conduct the official analysis portion of the project

```
# First, subset business data based on eventual merging with Zillow
Full <- unique(Full_data_long$postal_code)
business_zillow <- dplyr::filter(yelp_business, postal_code %in% Full)
```

```
# Assess the count of states
Full_data_long$State <- Full_data_long$State %>% as.factor
Full_data_long$State %>% summary
```

```
##   AR   AZ   CA   FL   GA   IL   IN   KY   LA   MD   MI   MO
##  22 10234  242    4   17  925  15  44  394    6    3    8
##  MS   NC   NJ   NM   NV  4981  75 7301    3  6510  405  17   6
##  VT   WI
##    7  2171
```

```
ggplot(Full_data_long, aes(State)) + geom_bar() + labs(title= " Frequency of  
States in Yelp Challenge Dataset")
```



The states most represented in the dataset are Arizona, Ohio, Pennsylvania, Nevada, North Carolina, Wisconsin, and Illinois.

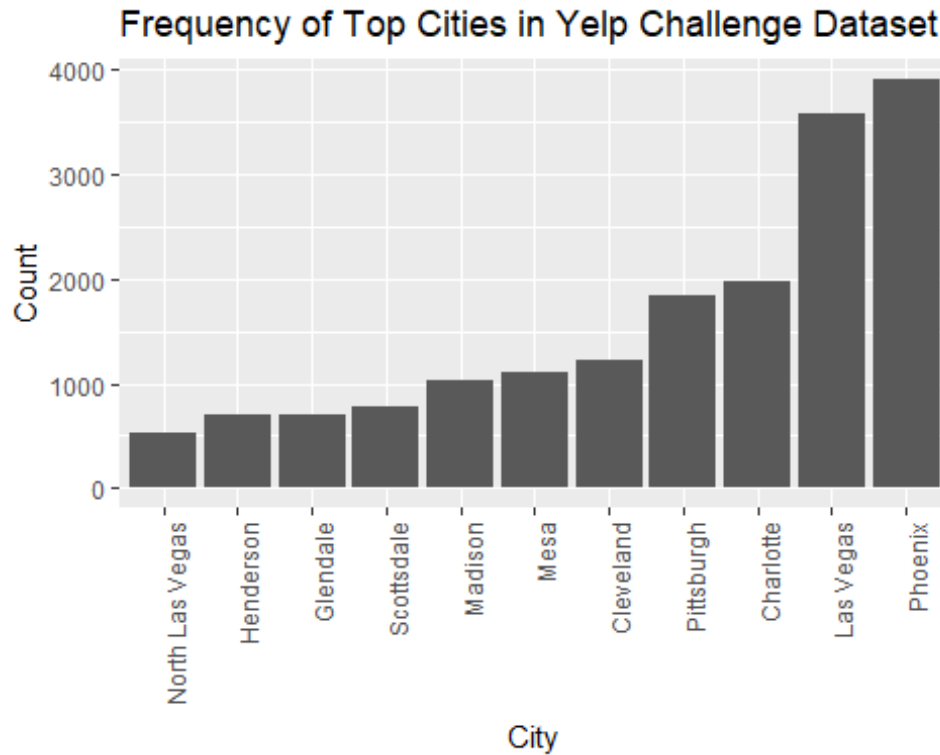
```
Full_data_long$City <- Full_data_long$City %>% as.factor
Full_data_long$City %>% summary
```

##	Phoenix	Las Vegas	Charlotte	Pittsburgh
##	3918	3580	1972	1847
##	Cleveland	Mesa	Madison	Scottsdale
##	1232	1115	1021	774
##	Glendale	Henderson	North Las Vegas	Chandler
##	695	691	522	516
##	Gilbert	Surprise	Peoria	Tempe
##	516	388	344	344
##	Champaign	Fort Mill	Gastonia	Shaler
##	258	256	251	237
##	Euclid	Lorain	Avondale	Concord
##	206	192	172	172
##	Cuyahoga Falls	Goodyear	Parma	Urbana
##	172	172	172	172
##	O'Hara	Ross	Chagrin Falls	Penn Hills
##	170	168	166	166
##	Sun City	Strongsville	Kannapolis	Queen Creek
##	159	158	156	119

##	Grafton	Amherst	Anthem	Avon
##	100	86	86	86
##	Bedford	Bellevue	Belmont	Berea
##	86	86	86	86
##	Bethel Park	Boulder City	Brecksville	Broadview Heights
##	86	86	86	86
##	Brook Park	Carefree	Carnegie	Castle Shannon
##	86	86	86	86
##	Cleveland Heights	Cornelius	Davidson	Elyria
##	86	86	86	86
##	Fairlawn	Fairview Park	Fountain Hills	Garfield Heights
##	86	86	86	86
##	Harrisburg	Hudson	Huntersville	Indian Trail
##	86	86	86	86
##	Kent	Lakewood	Litchfield Park	Lyndhurst
##	86	86	86	86
##	Malvern	Matthews	Medina	Mentor
##	86	86	86	86
##	Middleton	Mint Hill	Monroeville	Moon
##	86	86	86	86
##	Mount Charleston	Munhall	New Iberia	North Huntingdon
##	86	86	86	86
##	North Olmsted	North Ridgeville	North Strabane	Northfield
##	86	86	86	86
##	Paradise Valley	Parma Heights	Pineville	Richfield
##	86	86	86	86
##	Richmond Heights	Rocky River	Savoy	Seven Hills
##	86	86	86	86
##	Shaker Heights	Solon	South Euclid	Stallings
##	86	86	86	86
##	Stow	Streetsboro	Sun Prairie	(Other)
##	86	86	86	8891

```
temp <- row.names(as.data.frame(summary(Full_data_long$City, max=12)))
Full_data_long$City <- as.character(Full_data_long$City)
Full_data_long$top <- ifelse(
  Full_data_long$City %in% temp,
  Full_data_long$City,
  "Other"
)
Full_data_long$top <- as.factor(Full_data_long$top)

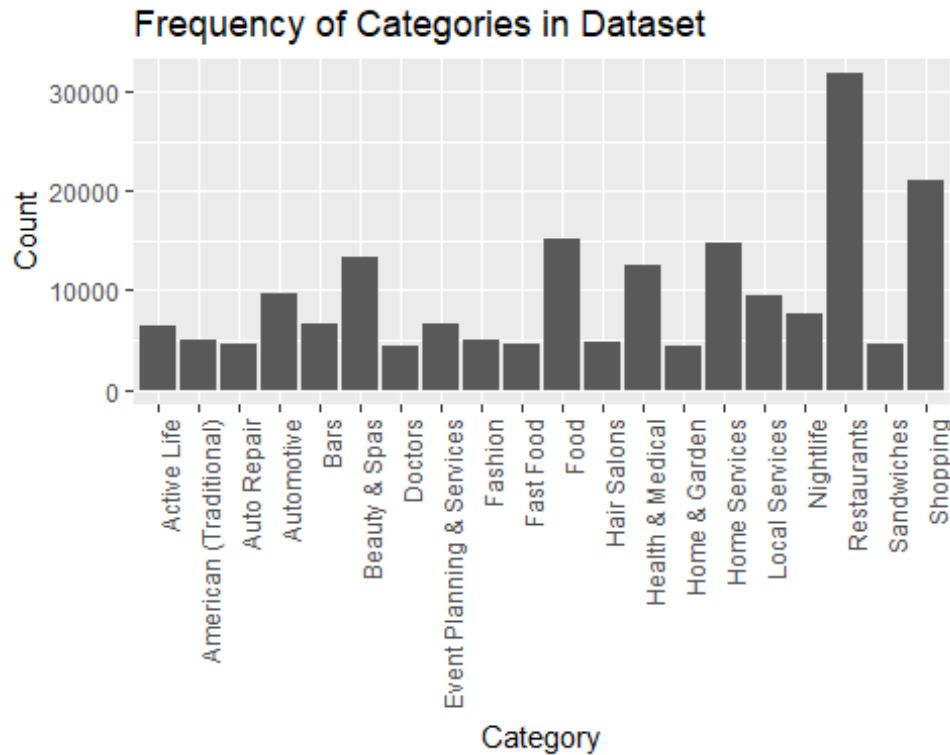
ggplot(Full_data_long[Full_data_long$top!="Other",], aes(x=factor(top,
levels=names(sort(table(top), increasing=TRUE))))) + geom_bar() +
labs(title="Frequency of Top Cities in Yelp Challenge Dataset") +
xlab("City") + ylab("Count") + theme(axis.text.x = element_text(angle = 90,
hjust = 1))
```



This assesses the count of cities in the dataset. Most frequent cities with Yelp information include Phoenix, Las Vegas, Charlotte, Pittsburgh, Cleveland.

```
# Reformat data to suit plot
catplot <- business_zillow%>%select(-starts_with("hours"), -
starts_with("attribute")) %>% unnest(categories) %>%
  select(name,
categories)%>%group_by(categories)%>%summarise(n=n())%>%arrange(desc(n))%>%head(20)
catplot <- as.data.frame(catplot)

ggplot(data=catplot, aes(x=categories, y=n)) +
  geom_bar(stat="identity") + theme(axis.text.x = element_text(angle = 90,
hjust = 1)) + labs(title="Frequency of Categories in Dataset") +
xlab("Category") + ylab("Count")
```

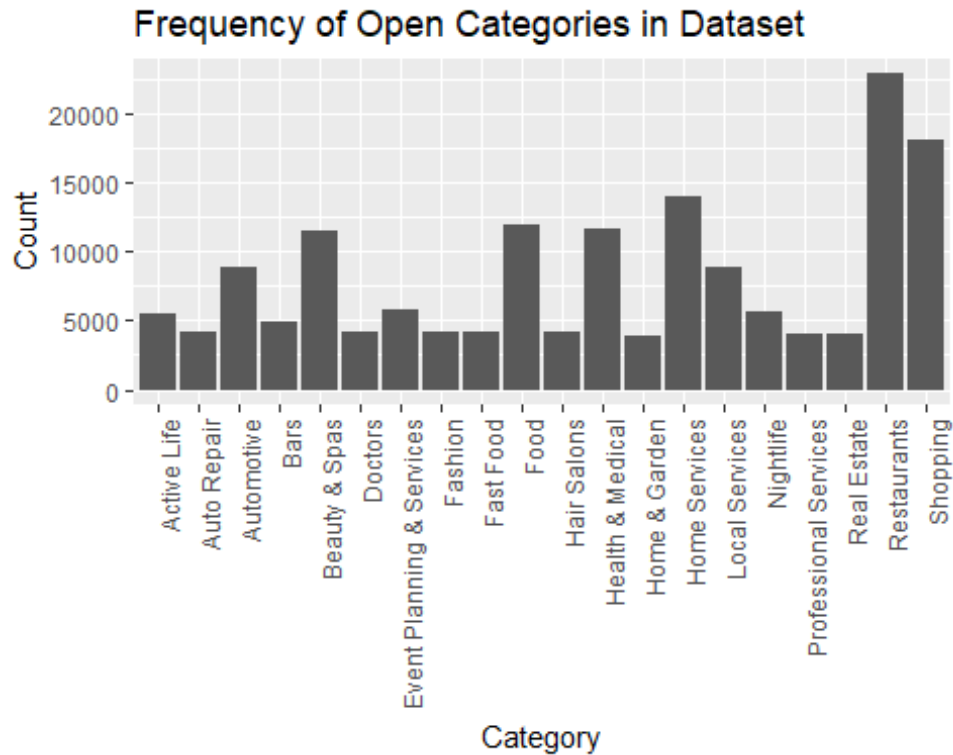
This counts the “categories” included in the dataset. These categories are tags that users might use to describe various businesses. We can see that the top category is “Restuarants” followed by “Shopping,” “Food,” “Home Services,” and “Beauty & Spa.”

The Yelp dataset also includes information on businesses that may have been open but are currently closed. The previous analyses included all of them, but here we assess the counts of categories only for businesses that are open.

```
catplot_open <- business_zillow %>%
  select(-starts_with("hours"), -starts_with("attribute")) %>%
  filter(is_open==1) %>%
  unnest(categories) %>%
  select(name, categories) %>%
  group_by(categories) %>%
  summarise(n=n()) %>%
  arrange(desc(n)) %>%
  head(20)

catplot_open <- as.data.frame(catplot_open )

ggplot(data=catplot_open , aes(x=categories, y=n)) +
  geom_bar(stat="identity") + theme(axis.text.x = element_text(angle = 90,
hjust = 1)) + labs(title="Frequency of Open Categories in Dataset") +
  xlab("Category") + ylab("Count")
```



Top categories include: “Restaurants,” “Shopping,” “Home Services,” “Food,” and “Health & Medical.” Interestingly, it seems like “Food” and “Beauty & Spas” might be closing at a higher rate than other categories.

Next, we compare the rent prices across cities. We use cities as the categorizing variable because there are far too many zip codes in the dataset.

```
# Reimport data for plotting
zillow <- read_csv("zecon/Zip_Zri_AllHomesPlusMultifamily.csv", col_names =
TRUE)

# Eliminate unnecessary columns
zillow <- zillow[-c(94:95)]

# Convert from long to wide by city
zillow_collapse_wide <- zillow %>%
  group_by(City) %>%
  summarize_all(funs(mean))
names(zillow_long)

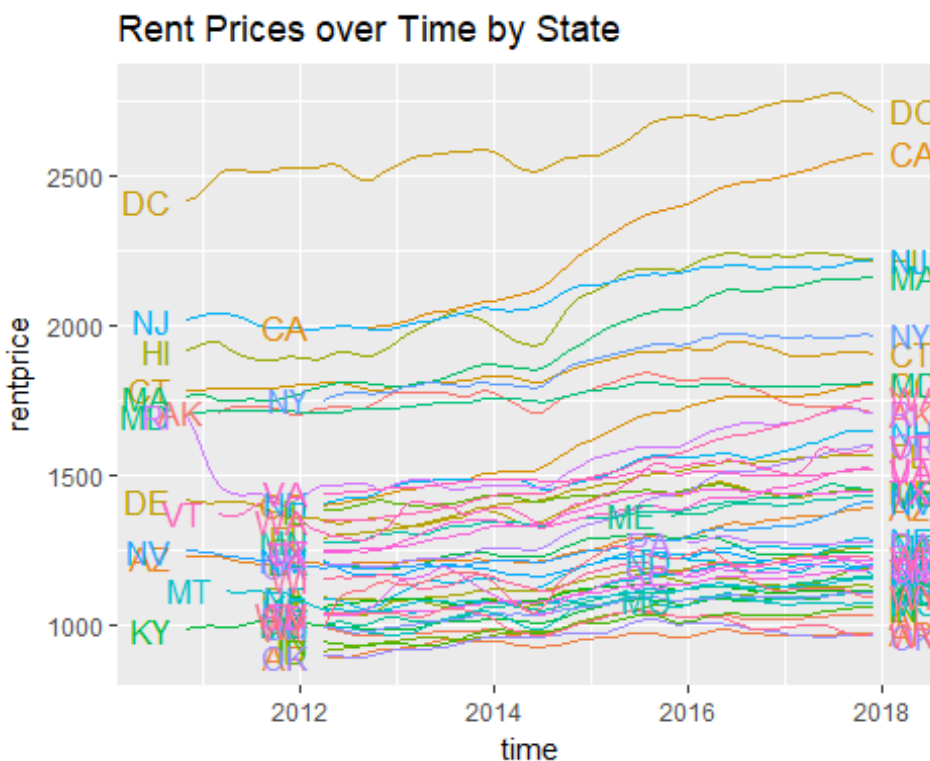
## [1] "RegionID"      "postal_code"  "City"         "State"        "Metro"
## [6] "CountyName"    "SizeRank"     "time"         "rentprice"    "month"
## [11] "year"          "YearMonth"
```

```
# Collapse to long by State and time period.
zillow_collapse_long <- zillow_long %>%
```

```
group_by(State, time) %>%
  summarize(rentprice = mean(rentprice))
```

Here, we compose a graph illustrating rents over time:

```
ggplot(zillow_collapse_long, aes(x = time, y=rentprice, group = State, colour = State)) + geom_line() + scale_colour_discrete(guide = 'none') +
  scale_x_date(expand=c(0.1, 0)) + geom_dl(aes(label = State), method = list(dl.trans(x = x + .2), "last.points")) + geom_dl(aes(label = State),
  method = list(dl.trans(x = x - .2), "first.points")) + labs(title = "Rent Prices over Time by State", xlab = "Rent Price (USD)")
```



Few states in the dataset appear to have experienced overall declines in rent over the periods in question. California, Oregon, Colorado, Massachusetts, and Washington appear to have experienced significant increases over the time period. DC, California, New Jersey, Hawaii, and Massachusetts are consistently plagued by high rent prices.

Comparing the Average Star Values Across Cities

```
# First, we collapse by state
FDL_collapse_long <- Full_data_long %>%
  group_by(State, time) %>%
  summarize(starsav = mean(starsav))

ggplot(FDL_collapse_long, aes(x = time, y=starsav, group = State, colour = State)) + geom_line() + scale_colour_discrete(guide = 'none') +
  scale_x_date(expand=c(0.1, 0)) + geom_dl(aes(label = State), method =
```



```

                                model = c('within', 'random'),
                                index = my.index)
print(my.hausman.test.train)

##
## Hausman Test
##
## data: my.formula
## chisq = 1.2796, df = 5, p-value = 0.937
## alternative hypothesis: one model is inconsistent

```

The high p-value of 0.937 indicates that we should use a random effects model instead of a fixed effects model.

Now, we build our random effects model on the training dataset and predict on the test set. We calculate the Mean Average Percent Error (MAPE) to see how accurately our model uses training values to predict rental prices in the test set.

```

my.pdm.train <- plm(data = Full_data_long_train,
                    formula = my.formula,
                    model = 'random',
                    index = my.index)
summary(my.pdm.train)

## Oneway (individual) effect Random Effect Model
## (Swamy-Arora's transformation)
##
## Call:
## plm(formula = my.formula, data = Full_data_long_train, model = "random",
##      index = my.index)
##
## Unbalanced Panel: n = 560, T = 1-74, N = 31397
##
## Effects:
##              var   std.dev share
## idiosyncratic 6321.76    79.51 0.023
## individual    270893.25   520.47 0.977
## theta:
##   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.8490 0.9817 0.9822 0.9806 0.9822 0.9822
##
## Residuals:
##   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -2126.91  -40.27   -6.88   -0.36   37.76  2068.60
##
## Coefficients:
##              Estimate Std. Error t-value Pr(>|t|)
## (Intercept) 1238.62701   22.65028  54.6848 < 2.2e-16 ***
## starsav      -2.85126    0.83058  -3.4329 0.000598 ***
## is_openave    131.20358    3.13631  41.8337 < 2.2e-16 ***
## funnyav      -10.17243    0.86013 -11.8266 < 2.2e-16 ***

```

```
## coolav      11.10536    0.96571  11.4997 < 2.2e-16 ***
## usefulav   -11.10133    0.42243 -26.2800 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    226790000
## Residual Sum of Squares: 203110000
## R-Squared:      0.10443
## Adj. R-Squared: 0.10429
## F-statistic: 731.838 on 5 and 31391 DF, p-value: < 2.22e-16

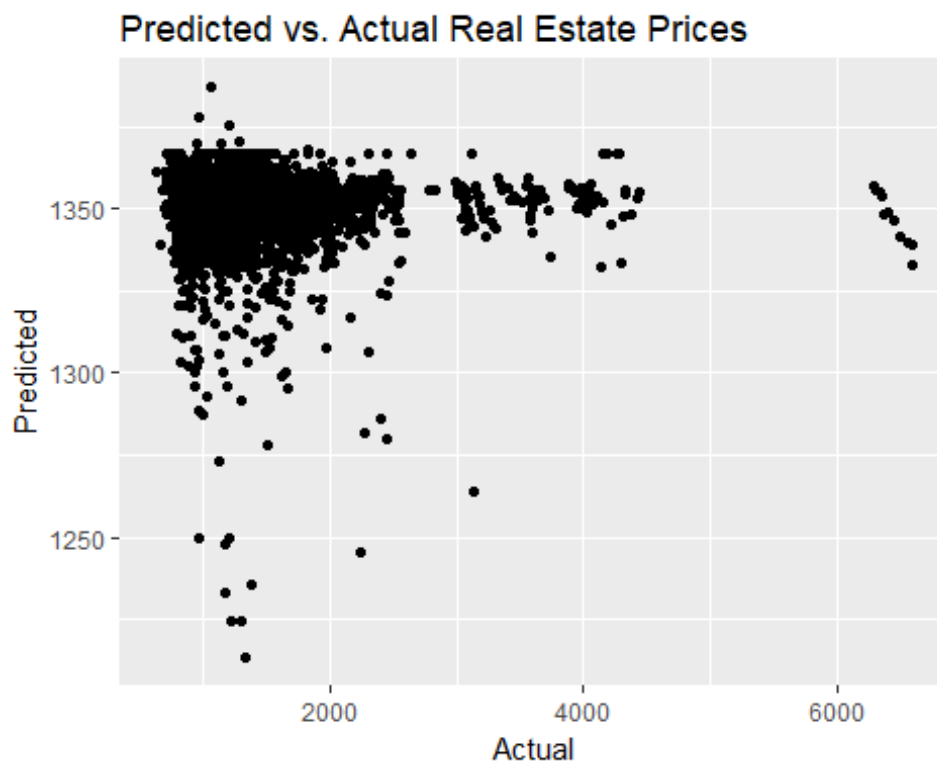
Full_data_long_test$pred.plm.test <- predict(my.pdm.train,
Full_data_long_test, type='response')

plmmape <-
100*mean(abs(Full_data_long_test$pred.plm.test/Full_data_long_test$rentprice-
1), na.rm = T)
print(plmmape)

## [1] 21.39346
```

MAPE is only 21.39% right now. We will continue working on the model to get this error lower.

```
ggplot(Full_data_long_test, aes(x=rentprice, y=pred.plm.test)) +geom_point()
+ labs(title="Predicted vs. Actual Real Estate Prices") + xlab("Actual") +
ylab("Predicted")
```



The plot above shows a significant discrepancy between actual and predicted rent prices.

Generating Lag

We first have to ensure that both sets have the same postal codes in order to conduct the fixed effects analysis dictated by the hausman test.

```
Full_data_long_train <- Full_data_long[Full_data_long$time < "2017-01-01",]
Full_data_long_test <- Full_data_long[Full_data_long$time >= "2017-01-01",]
Full_data_long_test <-
Full_data_long_test[Full_data_long_test$postal_code!="05440",]

train <- unique(Full_data_long_train$postal_code)
test<- unique(Full_data_long_test$postal_code)

Full_data_long_test <- dplyr::filter(Full_data_long_test, postal_code %in%
train)
Full_data_long_train <- dplyr::filter(Full_data_long_train, postal_code %in%
test)

length(unique(Full_data_long_test$postal_code))

## [1] 522

length(unique(Full_data_long_train$postal_code))

## [1] 522
```

To fine-tune the model, we decided to lag the dependent variable to consider the possibility that last month's rent could be the best predictor of this month's rent. We follow a similar process to the one above for training, testing, and predicting.

```
my.lag.formula <- rentprice ~ lag(rentprice, 1) + starsav + is_openave +
funnyav + coolav + usefultav + Number_of_reviews

# Conduct Hausman Test
my.hausman.test.train.lag <- phtest(x = my.lag.formula,
data = Full_data_long_train,
model = c('within', 'random'),
index = my.index)

print(my.hausman.test.train.lag)

##
## Hausman Test
##
## data: my.lag.formula
## chisq = 283.86, df = 7, p-value < 2.2e-16
## alternative hypothesis: one model is inconsistent
```

Then, we build the model on the training set and predict on the test set in order to calculate the MAPE.

```
# Regular LM using zip dummies
```

```
my.pdm.train.lag.lm <- lm (rentprice ~ lag(rentprice, 1) + starsav +  
is_openave + funnyav + coolav + usefultav + Number_of_reviews + postal_code +  
time, data = Full_data_long_train)  
summary(my.pdm.train.lag.lm)
```

```
##
```

```
## Call:
```

```
## lm(formula = rentprice ~ lag(rentprice, 1) + starsav + is_openave +  
##      funnyav + coolav + usefultav + Number_of_reviews + postal_code +  
##      time, data = Full_data_long_train)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q   Median      3Q      Max  
## -1.437e-09 -1.300e-13 -1.000e-14  1.000e-13  4.861e-10
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error  t value Pr(>|t|)  
## (Intercept)   -4.585e-10  5.035e-12 -9.106e+01 < 2e-16 ***  
## lag(rentprice, 1) 1.000e+00  8.794e-16  1.137e+15 < 2e-16 ***  
## starsav        6.049e-13  9.946e-14  6.082e+00  1.2e-09 ***  
## is_openave     -1.587e-13  4.034e-13 -3.930e-01  0.694  
## funnyav        1.056e-13  1.022e-13  1.033e+00  0.302  
## coolav         -1.514e-13  1.149e-13 -1.318e+00  0.188  
## usefultav      4.606e-14  5.158e-14  8.930e-01  0.372  
## Number_of_reviews -1.852e-16  5.422e-16 -3.420e-01  0.733  
## postal_code12919  4.765e-10  5.060e-12  9.418e+01 < 2e-16 ***  
## postal_code12958  4.752e-10  8.215e-12  5.784e+01 < 2e-16 ***  
## postal_code12979  4.763e-10  5.094e-12  9.350e+01 < 2e-16 ***  
## postal_code15003  4.756e-10  4.937e-12  9.634e+01 < 2e-16 ***  
## postal_code15009  4.766e-10  7.267e-12  6.559e+01 < 2e-16 ***  
## postal_code15017  4.761e-10  4.887e-12  9.742e+01 < 2e-16 ***  
## postal_code15024  4.761e-10  4.971e-12  9.579e+01 < 2e-16 ***  
## postal_code15025  4.758e-10  4.965e-12  9.584e+01 < 2e-16 ***  
## postal_code15026  4.758e-10  5.003e-12  9.510e+01 < 2e-16 ***  
## postal_code15034  4.759e-10  5.106e-12  9.321e+01 < 2e-16 ***  
## postal_code15035  4.755e-10  5.437e-12  8.746e+01 < 2e-16 ***  
## postal_code15037  4.758e-10  4.983e-12  9.548e+01 < 2e-16 ***  
## postal_code15044  4.762e-10  4.876e-12  9.766e+01 < 2e-16 ***  
## postal_code15045  4.755e-10  5.443e-12  8.735e+01 < 2e-16 ***  
## postal_code15046  4.762e-10  6.724e-12  7.081e+01 < 2e-16 ***  
## postal_code15055  4.755e-10  6.123e-12  7.766e+01 < 2e-16 ***  
## postal_code15056  4.760e-10  4.946e-12  9.626e+01 < 2e-16 ***  
## postal_code15057  4.763e-10  5.126e-12  9.290e+01 < 2e-16 ***  
## postal_code15063  4.759e-10  4.983e-12  9.549e+01 < 2e-16 ***  
## postal_code15068  4.758e-10  4.929e-12  9.653e+01 < 2e-16 ***  
## postal_code15071  4.759e-10  4.895e-12  9.723e+01 < 2e-16 ***
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## postal_code15085	4.759e-10	5.023e-12	9.475e+01	< 2e-16	***
## postal_code15090	4.764e-10	4.901e-12	9.720e+01	< 2e-16	***
## postal_code15101	4.760e-10	4.873e-12	9.769e+01	< 2e-16	***
## postal_code15102	4.761e-10	4.875e-12	9.765e+01	< 2e-16	***
## postal_code15104	4.754e-10	5.021e-12	9.469e+01	< 2e-16	***
## postal_code15106	4.759e-10	4.905e-12	9.701e+01	< 2e-16	***
## postal_code15108	4.761e-10	4.878e-12	9.759e+01	< 2e-16	***
## postal_code15110	4.755e-10	5.342e-12	8.900e+01	< 2e-16	***
## postal_code15112	4.755e-10	5.204e-12	9.137e+01	< 2e-16	***
## postal_code15116	4.759e-10	4.893e-12	9.727e+01	< 2e-16	***
## postal_code15120	4.760e-10	4.928e-12	9.659e+01	< 2e-16	***
## postal_code15122	4.760e-10	4.924e-12	9.667e+01	< 2e-16	***
## postal_code15126	4.758e-10	4.941e-12	9.631e+01	< 2e-16	***
## postal_code15129	4.760e-10	4.927e-12	9.661e+01	< 2e-16	***
## postal_code15131	4.759e-10	4.946e-12	9.622e+01	< 2e-16	***
## postal_code15132	4.758e-10	4.969e-12	9.575e+01	< 2e-16	***
## postal_code15133	4.755e-10	5.438e-12	8.745e+01	< 2e-16	***
## postal_code15135	4.757e-10	5.284e-12	9.003e+01	< 2e-16	***
## postal_code15136	4.758e-10	4.918e-12	9.674e+01	< 2e-16	***
## postal_code15137	4.759e-10	4.949e-12	9.617e+01	< 2e-16	***
## postal_code15139	4.759e-10	4.890e-12	9.730e+01	< 2e-16	***
## postal_code15140	4.758e-10	5.601e-12	8.496e+01	< 2e-16	***
## postal_code15142	4.763e-10	5.257e-12	9.060e+01	< 2e-16	***
## postal_code15143	4.763e-10	4.879e-12	9.762e+01	< 2e-16	***
## postal_code15144	4.756e-10	4.952e-12	9.603e+01	< 2e-16	***
## postal_code15145	4.757e-10	5.051e-12	9.418e+01	< 2e-16	***
## postal_code15146	4.761e-10	4.895e-12	9.725e+01	< 2e-16	***
## postal_code15147	4.757e-10	4.932e-12	9.644e+01	< 2e-16	***
## postal_code15148	4.757e-10	5.056e-12	9.409e+01	< 2e-16	***
## postal_code15201	4.757e-10	4.908e-12	9.693e+01	< 2e-16	***
## postal_code15202	4.758e-10	4.908e-12	9.694e+01	< 2e-16	***
## postal_code15203	4.760e-10	4.885e-12	9.744e+01	< 2e-16	***
## postal_code15204	4.758e-10	5.165e-12	9.212e+01	< 2e-16	***
## postal_code15205	4.761e-10	4.902e-12	9.712e+01	< 2e-16	***
## postal_code15206	4.758e-10	4.907e-12	9.697e+01	< 2e-16	***
## postal_code15207	4.756e-10	4.924e-12	9.659e+01	< 2e-16	***
## postal_code15208	4.756e-10	4.922e-12	9.663e+01	< 2e-16	***
## postal_code15209	4.758e-10	4.898e-12	9.713e+01	< 2e-16	***
## postal_code15210	4.757e-10	4.941e-12	9.628e+01	< 2e-16	***
## postal_code15211	4.759e-10	4.906e-12	9.699e+01	< 2e-16	***
## postal_code15212	4.759e-10	4.920e-12	9.672e+01	< 2e-16	***
## postal_code15213	4.760e-10	4.892e-12	9.731e+01	< 2e-16	***
## postal_code15214	4.758e-10	5.168e-12	9.206e+01	< 2e-16	***
## postal_code15215	4.759e-10	4.881e-12	9.750e+01	< 2e-16	***
## postal_code15216	4.759e-10	4.908e-12	9.695e+01	< 2e-16	***
## postal_code15217	4.761e-10	4.868e-12	9.779e+01	< 2e-16	***
## postal_code15218	4.758e-10	4.909e-12	9.691e+01	< 2e-16	***
## postal_code15219	4.760e-10	4.909e-12	9.695e+01	< 2e-16	***
## postal_code15220	4.760e-10	4.893e-12	9.729e+01	< 2e-16	***
## postal_code15221	4.757e-10	4.921e-12	9.667e+01	< 2e-16	***

## postal_code15222	4.761e-10	4.872e-12	9.773e+01	< 2e-16	***
## postal_code15223	4.758e-10	4.933e-12	9.645e+01	< 2e-16	***
## postal_code15224	4.758e-10	4.905e-12	9.702e+01	< 2e-16	***
## postal_code15226	4.757e-10	4.914e-12	9.681e+01	< 2e-16	***
## postal_code15227	4.759e-10	4.915e-12	9.682e+01	< 2e-16	***
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## postal_code15229	4.758e-10	4.900e-12	9.710e+01	< 2e-16	***
## postal_code15232	4.761e-10	4.869e-12	9.779e+01	< 2e-16	***
## postal_code15233	4.759e-10	4.905e-12	9.702e+01	< 2e-16	***
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## postal_code15235	4.758e-10	4.918e-12	9.675e+01	< 2e-16	***
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## postal_code15637	4.752e-10	6.005e-12	7.914e+01	< 2e-16	***
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## postal_code19464	4.762e-10	4.994e-12	9.535e+01	< 2e-16	***
## postal_code27262	4.760e-10	5.433e-12	8.762e+01	< 2e-16	***
## postal_code27278	4.754e-10	5.091e-12	9.338e+01	< 2e-16	***
## postal_code28012	4.759e-10	4.897e-12	9.719e+01	< 2e-16	***
## postal_code28025	4.759e-10	4.902e-12	9.707e+01	< 2e-16	***
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## postal_code28034	4.758e-10	4.999e-12	9.519e+01	< 2e-16	***
## postal_code28036	4.760e-10	4.873e-12	9.768e+01	< 2e-16	***
## postal_code28037	4.759e-10	6.128e-12	7.766e+01	< 2e-16	***
## postal_code28052	4.758e-10	4.951e-12	9.610e+01	< 2e-16	***
## postal_code28054	4.761e-10	4.920e-12	9.677e+01	< 2e-16	***
## postal_code28056	4.760e-10	4.899e-12	9.717e+01	< 2e-16	***
## postal_code28075	4.760e-10	4.874e-12	9.766e+01	< 2e-16	***
## postal_code28078	4.760e-10	4.873e-12	9.767e+01	< 2e-16	***
## postal_code28079	4.760e-10	4.879e-12	9.757e+01	< 2e-16	***
## postal_code28081	4.757e-10	4.953e-12	9.604e+01	< 2e-16	***
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## postal_code28104	4.761e-10	4.868e-12	9.780e+01	< 2e-16	***

## postal_code28105	4.760e-10	4.878e-12	9.758e+01	< 2e-16	***
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## postal_code28227	4.760e-10	4.899e-12	9.717e+01	< 2e-16	***
## postal_code28262	4.761e-10	4.893e-12	9.730e+01	< 2e-16	***
## postal_code28269	4.760e-10	4.889e-12	9.736e+01	< 2e-16	***
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## postal_code28730	4.756e-10	4.906e-12	9.696e+01	< 2e-16	***
## postal_code29203	4.753e-10	6.177e-12	7.694e+01	< 2e-16	***
## postal_code29204	4.768e-10	5.041e-12	9.458e+01	< 2e-16	***
## postal_code29707	4.761e-10	4.878e-12	9.760e+01	< 2e-16	***
## postal_code29708	4.762e-10	4.869e-12	9.779e+01	< 2e-16	***
## postal_code29710	4.761e-10	4.896e-12	9.723e+01	< 2e-16	***
## postal_code29715	4.759e-10	4.873e-12	9.765e+01	< 2e-16	***
## postal_code29732	4.751e-10	7.258e-12	6.546e+01	< 2e-16	***
## postal_code30101	4.758e-10	5.431e-12	8.760e+01	< 2e-16	***
## postal_code32258	4.773e-10	7.257e-12	6.578e+01	< 2e-16	***
## postal_code41076	4.761e-10	5.022e-12	9.481e+01	< 2e-16	***
## postal_code44001	4.759e-10	4.893e-12	9.726e+01	< 2e-16	***
## postal_code44011	4.762e-10	4.869e-12	9.779e+01	< 2e-16	***
## postal_code44012	4.760e-10	4.872e-12	9.772e+01	< 2e-16	***
## postal_code44017	4.758e-10	4.892e-12	9.725e+01	< 2e-16	***

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## postal_code44023	4.762e-10	4.882e-12	9.754e+01	< 2e-16	***
## postal_code44024	4.761e-10	4.877e-12	9.761e+01	< 2e-16	***
## postal_code44026	4.759e-10	4.871e-12	9.770e+01	< 2e-16	***
## postal_code44028	4.760e-10	4.956e-12	9.605e+01	< 2e-16	***
## postal_code44035	4.759e-10	4.928e-12	9.658e+01	< 2e-16	***
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## postal_code44053	4.760e-10	4.941e-12	9.633e+01	< 2e-16	***
## postal_code44054	4.760e-10	4.932e-12	9.651e+01	< 2e-16	***
## postal_code44055	4.756e-10	5.068e-12	9.384e+01	< 2e-16	***
## postal_code44056	4.762e-10	4.874e-12	9.771e+01	< 2e-16	***
## postal_code44060	4.760e-10	4.883e-12	9.748e+01	< 2e-16	***
## postal_code44062	4.761e-10	4.918e-12	9.680e+01	< 2e-16	***
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## postal_code44067	4.761e-10	4.876e-12	9.763e+01	< 2e-16	***
## postal_code44070	4.760e-10	4.886e-12	9.743e+01	< 2e-16	***
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## postal_code44087	4.761e-10	4.874e-12	9.769e+01	< 2e-16	***
## postal_code44092	4.758e-10	4.906e-12	9.700e+01	< 2e-16	***
## postal_code44094	4.760e-10	4.880e-12	9.754e+01	< 2e-16	***
## postal_code44095	4.759e-10	4.904e-12	9.704e+01	< 2e-16	***
## postal_code44102	4.757e-10	4.936e-12	9.637e+01	< 2e-16	***
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## postal_code44104	4.763e-10	5.264e-12	9.048e+01	< 2e-16	***
## postal_code44105	4.758e-10	4.971e-12	9.572e+01	< 2e-16	***
## postal_code44106	4.758e-10	4.917e-12	9.677e+01	< 2e-16	***
## postal_code44107	4.758e-10	4.897e-12	9.718e+01	< 2e-16	***
## postal_code44108	4.756e-10	4.960e-12	9.587e+01	< 2e-16	***
## postal_code44109	4.757e-10	4.927e-12	9.655e+01	< 2e-16	***
## postal_code44110	4.756e-10	4.939e-12	9.630e+01	< 2e-16	***
## postal_code44111	4.758e-10	4.924e-12	9.661e+01	< 2e-16	***
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## postal_code44113	4.758e-10	4.923e-12	9.666e+01	< 2e-16	***
## postal_code44116	4.761e-10	4.870e-12	9.776e+01	< 2e-16	***
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## postal_code44118	4.759e-10	4.888e-12	9.737e+01	< 2e-16	***
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## postal_code44120	4.758e-10	4.927e-12	9.657e+01	< 2e-16	***
## postal_code44121	4.759e-10	4.901e-12	9.711e+01	< 2e-16	***
## postal_code44122	4.762e-10	4.869e-12	9.781e+01	< 2e-16	***
## postal_code44123	4.759e-10	4.916e-12	9.681e+01	< 2e-16	***
## postal_code44124	4.761e-10	4.885e-12	9.747e+01	< 2e-16	***
## postal_code44125	4.759e-10	4.917e-12	9.679e+01	< 2e-16	***
## postal_code44126	4.759e-10	4.887e-12	9.739e+01	< 2e-16	***
## postal_code44127	4.759e-10	5.210e-12	9.135e+01	< 2e-16	***

## postal_code44128	4.759e-10	4.927e-12	9.659e+01	< 2e-16	***
## postal_code44129	4.759e-10	4.907e-12	9.698e+01	< 2e-16	***
## postal_code44130	4.760e-10	4.896e-12	9.723e+01	< 2e-16	***
## postal_code44131	4.761e-10	4.875e-12	9.767e+01	< 2e-16	***
## postal_code44132	4.759e-10	4.949e-12	9.617e+01	< 2e-16	***
## postal_code44133	4.760e-10	4.875e-12	9.764e+01	< 2e-16	***
## postal_code44134	4.759e-10	4.905e-12	9.702e+01	< 2e-16	***
## postal_code44135	4.762e-10	4.921e-12	9.677e+01	< 2e-16	***
## postal_code44136	4.761e-10	4.870e-12	9.777e+01	< 2e-16	***
## postal_code44137	4.761e-10	4.949e-12	9.619e+01	< 2e-16	***
## postal_code44138	4.760e-10	4.882e-12	9.749e+01	< 2e-16	***
## postal_code44139	4.763e-10	4.878e-12	9.763e+01	< 2e-16	***
## postal_code44140	4.760e-10	4.877e-12	9.759e+01	< 2e-16	***
## postal_code44141	4.762e-10	4.871e-12	9.777e+01	< 2e-16	***
## postal_code44142	4.760e-10	4.903e-12	9.709e+01	< 2e-16	***
## postal_code44143	4.761e-10	4.873e-12	9.769e+01	< 2e-16	***
## postal_code44144	4.761e-10	4.913e-12	9.691e+01	< 2e-16	***
## postal_code44145	4.762e-10	4.870e-12	9.780e+01	< 2e-16	***
## postal_code44146	4.760e-10	4.903e-12	9.708e+01	< 2e-16	***
## postal_code44147	4.761e-10	4.869e-12	9.778e+01	< 2e-16	***
## postal_code44149	4.762e-10	4.900e-12	9.718e+01	< 2e-16	***
## postal_code44212	4.760e-10	4.881e-12	9.752e+01	< 2e-16	***
## postal_code44221	4.759e-10	4.912e-12	9.689e+01	< 2e-16	***
## postal_code44223	4.759e-10	4.892e-12	9.729e+01	< 2e-16	***
## postal_code44224	4.761e-10	4.880e-12	9.755e+01	< 2e-16	***
## postal_code44233	4.759e-10	4.919e-12	9.676e+01	< 2e-16	***
## postal_code44234	4.757e-10	5.229e-12	9.097e+01	< 2e-16	***
## postal_code44236	4.763e-10	4.894e-12	9.733e+01	< 2e-16	***
## postal_code44240	4.759e-10	4.905e-12	9.703e+01	< 2e-16	***
## postal_code44241	4.760e-10	4.896e-12	9.723e+01	< 2e-16	***
## postal_code44253	4.757e-10	5.545e-12	8.578e+01	< 2e-16	***
## postal_code44255	4.761e-10	4.977e-12	9.566e+01	< 2e-16	***
## postal_code44256	4.761e-10	4.872e-12	9.771e+01	< 2e-16	***
## postal_code44262	4.758e-10	5.016e-12	9.486e+01	< 2e-16	***
## postal_code44264	4.761e-10	4.871e-12	9.773e+01	< 2e-16	***
## postal_code44278	4.759e-10	4.892e-12	9.728e+01	< 2e-16	***
## postal_code44280	4.760e-10	4.915e-12	9.684e+01	< 2e-16	***
## postal_code44286	4.763e-10	4.873e-12	9.774e+01	< 2e-16	***
## postal_code44313	4.755e-10	5.001e-12	9.509e+01	< 2e-16	***
## postal_code44320	4.750e-10	1.064e-11	4.465e+01	< 2e-16	***
## postal_code44321	4.764e-10	4.887e-12	9.749e+01	< 2e-16	***
## postal_code44333	4.762e-10	4.868e-12	9.781e+01	< 2e-16	***
## postal_code45612	4.756e-10	5.157e-12	9.222e+01	< 2e-16	***
## postal_code46501	4.756e-10	5.533e-12	8.597e+01	< 2e-16	***
## postal_code53508	4.758e-10	4.926e-12	9.659e+01	< 2e-16	***
## postal_code53515	4.758e-10	5.027e-12	9.466e+01	< 2e-16	***
## postal_code53521	4.757e-10	5.171e-12	9.198e+01	< 2e-16	***
## postal_code53527	4.762e-10	4.924e-12	9.672e+01	< 2e-16	***
## postal_code53528	4.765e-10	4.925e-12	9.673e+01	< 2e-16	***
## postal_code53529	4.755e-10	5.479e-12	8.678e+01	< 2e-16	***

## postal_code53532	4.761e-10	4.919e-12	9.678e+01	< 2e-16	***
## postal_code53558	4.761e-10	4.909e-12	9.698e+01	< 2e-16	***
## postal_code53562	4.762e-10	4.906e-12	9.706e+01	< 2e-16	***
## postal_code53572	4.759e-10	4.907e-12	9.698e+01	< 2e-16	***
## postal_code53575	4.760e-10	4.910e-12	9.694e+01	< 2e-16	***
## postal_code53589	4.759e-10	4.913e-12	9.687e+01	< 2e-16	***
## postal_code53590	4.760e-10	4.915e-12	9.685e+01	< 2e-16	***
## postal_code53593	4.760e-10	4.906e-12	9.704e+01	< 2e-16	***
## postal_code53597	4.762e-10	4.915e-12	9.689e+01	< 2e-16	***
## postal_code53598	4.760e-10	4.949e-12	9.618e+01	< 2e-16	***
## postal_code53703	4.760e-10	4.916e-12	9.683e+01	< 2e-16	***
## postal_code53704	4.760e-10	4.918e-12	9.679e+01	< 2e-16	***
## postal_code53705	4.761e-10	4.906e-12	9.705e+01	< 2e-16	***
## postal_code53711	4.761e-10	4.907e-12	9.702e+01	< 2e-16	***
## postal_code53713	4.760e-10	4.921e-12	9.674e+01	< 2e-16	***
## postal_code53714	4.759e-10	4.917e-12	9.678e+01	< 2e-16	***
## postal_code53715	4.761e-10	4.907e-12	9.702e+01	< 2e-16	***
## postal_code53716	4.760e-10	4.913e-12	9.689e+01	< 2e-16	***
## postal_code53717	4.762e-10	4.906e-12	9.706e+01	< 2e-16	***
## postal_code53718	4.760e-10	4.913e-12	9.690e+01	< 2e-16	***
## postal_code53719	4.761e-10	4.908e-12	9.701e+01	< 2e-16	***
## postal_code53726	4.760e-10	4.931e-12	9.653e+01	< 2e-16	***
## postal_code53911	4.752e-10	6.379e-12	7.450e+01	< 2e-16	***
## postal_code54558	4.754e-10	7.256e-12	6.552e+01	< 2e-16	***
## postal_code60007	4.767e-10	5.063e-12	9.416e+01	< 2e-16	***
## postal_code60191	4.767e-10	7.249e-12	6.576e+01	< 2e-16	***
## postal_code61801	4.758e-10	4.946e-12	9.621e+01	< 2e-16	***
## postal_code61802	4.758e-10	4.947e-12	9.619e+01	< 2e-16	***
## postal_code61820	4.759e-10	4.953e-12	9.608e+01	< 2e-16	***
## postal_code61821	4.760e-10	4.943e-12	9.630e+01	< 2e-16	***
## postal_code61822	4.762e-10	4.929e-12	9.661e+01	< 2e-16	***
## postal_code61849	4.754e-10	5.521e-12	8.611e+01	< 2e-16	***
## postal_code61853	4.758e-10	4.938e-12	9.636e+01	< 2e-16	***
## postal_code61854	4.755e-10	6.716e-12	7.079e+01	< 2e-16	***
## postal_code61856	4.759e-10	4.935e-12	9.643e+01	< 2e-16	***
## postal_code61859	4.757e-10	5.305e-12	8.967e+01	< 2e-16	***
## postal_code61864	4.762e-10	5.303e-12	8.980e+01	< 2e-16	***
## postal_code61866	4.760e-10	4.974e-12	9.570e+01	< 2e-16	***
## postal_code61873	4.759e-10	5.110e-12	9.312e+01	< 2e-16	***
## postal_code61874	4.760e-10	4.929e-12	9.657e+01	< 2e-16	***
## postal_code61877	4.756e-10	5.460e-12	8.711e+01	< 2e-16	***
## postal_code61878	4.762e-10	8.243e-12	5.777e+01	< 2e-16	***
## postal_code61880	4.769e-10	6.155e-12	7.748e+01	< 2e-16	***
## postal_code70374	4.760e-10	5.008e-12	9.505e+01	< 2e-16	***
## postal_code70435	4.758e-10	4.913e-12	9.684e+01	< 2e-16	***
## postal_code70437	4.757e-10	5.616e-12	8.471e+01	< 2e-16	***
## postal_code70563	4.760e-10	4.885e-12	9.745e+01	< 2e-16	***
## postal_code70734	4.761e-10	4.917e-12	9.682e+01	< 2e-16	***
## postal_code70806	4.760e-10	5.022e-12	9.479e+01	< 2e-16	***
## postal_code71101	4.756e-10	5.120e-12	9.289e+01	< 2e-16	***

## postal_code71854	4.750e-10	6.408e-12	7.412e+01	< 2e-16	***
## postal_code77384	4.754e-10	8.220e-12	5.783e+01	< 2e-16	***
## postal_code85003	4.759e-10	4.882e-12	9.750e+01	< 2e-16	***
## postal_code85004	4.760e-10	4.896e-12	9.722e+01	< 2e-16	***
## postal_code85006	4.757e-10	4.908e-12	9.692e+01	< 2e-16	***
## postal_code85007	4.757e-10	4.907e-12	9.695e+01	< 2e-16	***
## postal_code85008	4.759e-10	4.907e-12	9.698e+01	< 2e-16	***
## postal_code85009	4.757e-10	4.924e-12	9.661e+01	< 2e-16	***
## postal_code85012	4.759e-10	4.872e-12	9.768e+01	< 2e-16	***
## postal_code85013	4.758e-10	4.891e-12	9.729e+01	< 2e-16	***
## postal_code85014	4.758e-10	4.899e-12	9.712e+01	< 2e-16	***
## postal_code85015	4.759e-10	4.909e-12	9.695e+01	< 2e-16	***
## postal_code85016	4.759e-10	4.895e-12	9.724e+01	< 2e-16	***
## postal_code85017	4.759e-10	4.920e-12	9.674e+01	< 2e-16	***
## postal_code85018	4.760e-10	4.873e-12	9.767e+01	< 2e-16	***
## postal_code85019	4.757e-10	4.918e-12	9.673e+01	< 2e-16	***
## postal_code85020	4.758e-10	4.900e-12	9.711e+01	< 2e-16	***
## postal_code85021	4.759e-10	4.896e-12	9.721e+01	< 2e-16	***
## postal_code85022	4.759e-10	4.886e-12	9.741e+01	< 2e-16	***
## postal_code85023	4.760e-10	4.889e-12	9.736e+01	< 2e-16	***
## postal_code85024	4.759e-10	4.882e-12	9.748e+01	< 2e-16	***
## postal_code85027	4.759e-10	4.897e-12	9.718e+01	< 2e-16	***
## postal_code85028	4.760e-10	4.869e-12	9.776e+01	< 2e-16	***
## postal_code85029	4.759e-10	4.903e-12	9.706e+01	< 2e-16	***
## postal_code85031	4.761e-10	4.920e-12	9.676e+01	< 2e-16	***
## postal_code85032	4.759e-10	4.892e-12	9.728e+01	< 2e-16	***
## postal_code85033	4.760e-10	4.918e-12	9.680e+01	< 2e-16	***
## postal_code85034	4.762e-10	4.916e-12	9.687e+01	< 2e-16	***
## postal_code85035	4.761e-10	4.919e-12	9.680e+01	< 2e-16	***
## postal_code85037	4.760e-10	4.911e-12	9.692e+01	< 2e-16	***
## postal_code85040	4.758e-10	4.912e-12	9.686e+01	< 2e-16	***
## postal_code85041	4.759e-10	4.905e-12	9.701e+01	< 2e-16	***
## postal_code85042	4.760e-10	4.899e-12	9.715e+01	< 2e-16	***
## postal_code85043	4.762e-10	4.908e-12	9.702e+01	< 2e-16	***
## postal_code85044	4.761e-10	4.880e-12	9.755e+01	< 2e-16	***
## postal_code85045	4.758e-10	4.964e-12	9.586e+01	< 2e-16	***
## postal_code85048	4.761e-10	4.870e-12	9.775e+01	< 2e-16	***
## postal_code85050	4.761e-10	4.870e-12	9.776e+01	< 2e-16	***
## postal_code85051	4.759e-10	4.908e-12	9.695e+01	< 2e-16	***
## postal_code85053	4.759e-10	4.898e-12	9.717e+01	< 2e-16	***
## postal_code85054	4.760e-10	4.869e-12	9.777e+01	< 2e-16	***
## postal_code85083	4.759e-10	4.874e-12	9.765e+01	< 2e-16	***
## postal_code85085	4.762e-10	4.868e-12	9.782e+01	< 2e-16	***
## postal_code85086	4.761e-10	4.869e-12	9.778e+01	< 2e-16	***
## postal_code85087	4.758e-10	5.094e-12	9.341e+01	< 2e-16	***
## postal_code85119	4.755e-10	6.149e-12	7.734e+01	< 2e-16	***
## postal_code85120	4.760e-10	5.382e-12	8.843e+01	< 2e-16	***
## postal_code85140	4.756e-10	4.975e-12	9.560e+01	< 2e-16	***
## postal_code85142	4.756e-10	4.957e-12	9.595e+01	< 2e-16	***
## postal_code85143	4.761e-10	4.918e-12	9.680e+01	< 2e-16	***

## postal_code85201	4.759e-10	4.906e-12	9.700e+01	< 2e-16	***
## postal_code85202	4.758e-10	4.897e-12	9.717e+01	< 2e-16	***
## postal_code85203	4.758e-10	4.890e-12	9.730e+01	< 2e-16	***
## postal_code85204	4.760e-10	4.900e-12	9.714e+01	< 2e-16	***
## postal_code85205	4.758e-10	4.894e-12	9.722e+01	< 2e-16	***
## postal_code85206	4.761e-10	4.891e-12	9.734e+01	< 2e-16	***
## postal_code85207	4.760e-10	4.877e-12	9.760e+01	< 2e-16	***
## postal_code85208	4.762e-10	4.902e-12	9.714e+01	< 2e-16	***
## postal_code85209	4.760e-10	4.884e-12	9.747e+01	< 2e-16	***
## postal_code85210	4.759e-10	4.906e-12	9.700e+01	< 2e-16	***
## postal_code85212	4.760e-10	4.878e-12	9.758e+01	< 2e-16	***
## postal_code85213	4.759e-10	4.875e-12	9.762e+01	< 2e-16	***
## postal_code85215	4.760e-10	4.877e-12	9.760e+01	< 2e-16	***
## postal_code85224	4.760e-10	4.889e-12	9.735e+01	< 2e-16	***
## postal_code85225	4.759e-10	4.891e-12	9.730e+01	< 2e-16	***
## postal_code85226	4.761e-10	4.883e-12	9.749e+01	< 2e-16	***
## postal_code85233	4.759e-10	4.879e-12	9.753e+01	< 2e-16	***
## postal_code85234	4.759e-10	4.876e-12	9.760e+01	< 2e-16	***
## postal_code85248	4.761e-10	4.871e-12	9.773e+01	< 2e-16	***
## postal_code85249	4.761e-10	4.868e-12	9.779e+01	< 2e-16	***
## postal_code85250	4.760e-10	4.872e-12	9.769e+01	< 2e-16	***
## postal_code85251	4.761e-10	4.913e-12	9.690e+01	< 2e-16	***
## postal_code85253	4.775e-10	6.442e-12	7.413e+01	< 2e-16	***
## postal_code85254	4.762e-10	4.883e-12	9.753e+01	< 2e-16	***
## postal_code85255	4.764e-10	5.013e-12	9.503e+01	< 2e-16	***
## postal_code85257	4.759e-10	4.883e-12	9.746e+01	< 2e-16	***
## postal_code85258	4.762e-10	4.882e-12	9.752e+01	< 2e-16	***
## postal_code85259	4.763e-10	4.981e-12	9.563e+01	< 2e-16	***
## postal_code85260	4.760e-10	4.880e-12	9.755e+01	< 2e-16	***
## postal_code85262	4.768e-10	5.315e-12	8.971e+01	< 2e-16	***
## postal_code85266	4.766e-10	5.061e-12	9.417e+01	< 2e-16	***
## postal_code85268	4.760e-10	4.869e-12	9.778e+01	< 2e-16	***
## postal_code85281	4.760e-10	4.909e-12	9.697e+01	< 2e-16	***
## postal_code85282	4.760e-10	4.887e-12	9.739e+01	< 2e-16	***
## postal_code85283	4.760e-10	4.885e-12	9.742e+01	< 2e-16	***
## postal_code85284	4.762e-10	4.875e-12	9.769e+01	< 2e-16	***
## postal_code85286	4.761e-10	4.870e-12	9.776e+01	< 2e-16	***
## postal_code85295	4.760e-10	4.877e-12	9.761e+01	< 2e-16	***
## postal_code85296	4.760e-10	4.880e-12	9.754e+01	< 2e-16	***
## postal_code85297	4.762e-10	4.874e-12	9.770e+01	< 2e-16	***
## postal_code85298	4.761e-10	4.870e-12	9.776e+01	< 2e-16	***
## postal_code85301	4.759e-10	4.916e-12	9.680e+01	< 2e-16	***
## postal_code85302	4.759e-10	4.900e-12	9.712e+01	< 2e-16	***
## postal_code85303	4.763e-10	4.906e-12	9.708e+01	< 2e-16	***
## postal_code85304	4.758e-10	4.895e-12	9.720e+01	< 2e-16	***
## postal_code85305	4.762e-10	4.886e-12	9.747e+01	< 2e-16	***
## postal_code85306	4.759e-10	4.893e-12	9.725e+01	< 2e-16	***
## postal_code85307	4.759e-10	4.906e-12	9.700e+01	< 2e-16	***
## postal_code85308	4.760e-10	4.884e-12	9.747e+01	< 2e-16	***
## postal_code85310	4.761e-10	4.873e-12	9.769e+01	< 2e-16	***

## postal_code85323	4.760e-10	4.904e-12	9.706e+01	< 2e-16	***
## postal_code85324	4.754e-10	5.316e-12	8.942e+01	< 2e-16	***
## postal_code85326	4.754e-10	5.143e-12	9.244e+01	< 2e-16	***
## postal_code85331	4.762e-10	4.882e-12	9.754e+01	< 2e-16	***
## postal_code85335	4.759e-10	4.914e-12	9.683e+01	< 2e-16	***
## postal_code85337	4.757e-10	5.345e-12	8.900e+01	< 2e-16	***
## postal_code85338	4.760e-10	4.891e-12	9.731e+01	< 2e-16	***
## postal_code85339	4.762e-10	4.890e-12	9.739e+01	< 2e-16	***
## postal_code85340	4.760e-10	4.878e-12	9.758e+01	< 2e-16	***
## postal_code85345	4.759e-10	4.906e-12	9.700e+01	< 2e-16	***
## postal_code85351	4.760e-10	4.910e-12	9.694e+01	< 2e-16	***
## postal_code85353	4.760e-10	4.900e-12	9.714e+01	< 2e-16	***
## postal_code85354	4.757e-10	5.730e-12	8.301e+01	< 2e-16	***
## postal_code85355	4.759e-10	4.915e-12	9.681e+01	< 2e-16	***
## postal_code85361	4.758e-10	6.716e-12	7.085e+01	< 2e-16	***
## postal_code85363	4.758e-10	4.935e-12	9.641e+01	< 2e-16	***
## postal_code85373	4.758e-10	4.921e-12	9.668e+01	< 2e-16	***
## postal_code85374	4.760e-10	4.890e-12	9.735e+01	< 2e-16	***
## postal_code85375	4.760e-10	4.898e-12	9.718e+01	< 2e-16	***
## postal_code85377	4.767e-10	5.083e-12	9.378e+01	< 2e-16	***
## postal_code85378	4.757e-10	4.914e-12	9.680e+01	< 2e-16	***
## postal_code85379	4.760e-10	4.889e-12	9.736e+01	< 2e-16	***
## postal_code85381	4.760e-10	4.883e-12	9.747e+01	< 2e-16	***
## postal_code85382	4.760e-10	4.883e-12	9.749e+01	< 2e-16	***
## postal_code85383	4.761e-10	4.868e-12	9.780e+01	< 2e-16	***
## postal_code85387	4.754e-10	5.012e-12	9.487e+01	< 2e-16	***
## postal_code85388	4.761e-10	4.890e-12	9.737e+01	< 2e-16	***
## postal_code85392	4.760e-10	4.892e-12	9.730e+01	< 2e-16	***
## postal_code85395	4.762e-10	4.871e-12	9.775e+01	< 2e-16	***
## postal_code85541	4.754e-10	5.962e-12	7.974e+01	< 2e-16	***
## postal_code85935	4.764e-10	5.430e-12	8.775e+01	< 2e-16	***
## postal_code87701	4.775e-10	1.062e-11	4.497e+01	< 2e-16	***
## postal_code89002	4.760e-10	4.882e-12	9.751e+01	< 2e-16	***
## postal_code89005	4.758e-10	4.884e-12	9.741e+01	< 2e-16	***
## postal_code89011	4.759e-10	4.889e-12	9.733e+01	< 2e-16	***
## postal_code89012	4.759e-10	4.877e-12	9.758e+01	< 2e-16	***
## postal_code89014	4.761e-10	4.894e-12	9.728e+01	< 2e-16	***
## postal_code89015	4.760e-10	4.894e-12	9.727e+01	< 2e-16	***
## postal_code89030	4.759e-10	4.922e-12	9.670e+01	< 2e-16	***
## postal_code89031	4.760e-10	4.892e-12	9.731e+01	< 2e-16	***
## postal_code89032	4.761e-10	4.898e-12	9.720e+01	< 2e-16	***
## postal_code89040	4.756e-10	5.506e-12	8.639e+01	< 2e-16	***
## postal_code89044	4.759e-10	4.875e-12	9.762e+01	< 2e-16	***
## postal_code89052	4.761e-10	4.875e-12	9.767e+01	< 2e-16	***
## postal_code89074	4.759e-10	4.882e-12	9.748e+01	< 2e-16	***
## postal_code89081	4.760e-10	4.888e-12	9.739e+01	< 2e-16	***
## postal_code89084	4.761e-10	4.883e-12	9.751e+01	< 2e-16	***
## postal_code89085	4.755e-10	5.812e-12	8.181e+01	< 2e-16	***
## postal_code89086	4.760e-10	4.890e-12	9.734e+01	< 2e-16	***
## postal_code89101	4.760e-10	4.932e-12	9.650e+01	< 2e-16	***

## postal_code89102	4.760e-10	4.918e-12	9.680e+01	< 2e-16	***
## postal_code89103	4.760e-10	4.933e-12	9.649e+01	< 2e-16	***
## postal_code89104	4.759e-10	4.908e-12	9.696e+01	< 2e-16	***
## postal_code89106	4.759e-10	4.913e-12	9.686e+01	< 2e-16	***
## postal_code89107	4.758e-10	4.905e-12	9.701e+01	< 2e-16	***
## postal_code89108	4.760e-10	4.906e-12	9.703e+01	< 2e-16	***
## postal_code89109	4.770e-10	5.517e-12	8.645e+01	< 2e-16	***
## postal_code89110	4.760e-10	4.906e-12	9.702e+01	< 2e-16	***
## postal_code89113	4.759e-10	4.891e-12	9.731e+01	< 2e-16	***
## postal_code89115	4.758e-10	4.914e-12	9.683e+01	< 2e-16	***
## postal_code89117	4.760e-10	4.889e-12	9.735e+01	< 2e-16	***
## postal_code89118	4.758e-10	4.913e-12	9.684e+01	< 2e-16	***
## postal_code89119	4.762e-10	4.943e-12	9.634e+01	< 2e-16	***
## postal_code89120	4.757e-10	4.892e-12	9.724e+01	< 2e-16	***
## postal_code89121	4.759e-10	4.900e-12	9.711e+01	< 2e-16	***
## postal_code89122	4.761e-10	4.902e-12	9.713e+01	< 2e-16	***
## postal_code89123	4.760e-10	4.896e-12	9.723e+01	< 2e-16	***
## postal_code89124	4.761e-10	4.898e-12	9.721e+01	< 2e-16	***
## postal_code89128	4.759e-10	4.896e-12	9.720e+01	< 2e-16	***
## postal_code89129	4.760e-10	4.885e-12	9.743e+01	< 2e-16	***
## postal_code89130	4.760e-10	4.887e-12	9.739e+01	< 2e-16	***
## postal_code89131	4.761e-10	4.874e-12	9.767e+01	< 2e-16	***
## postal_code89134	4.760e-10	4.881e-12	9.751e+01	< 2e-16	***
## postal_code89135	4.762e-10	4.871e-12	9.776e+01	< 2e-16	***
## postal_code89138	4.758e-10	4.893e-12	9.724e+01	< 2e-16	***
## postal_code89139	4.760e-10	4.888e-12	9.738e+01	< 2e-16	***
## postal_code89141	4.760e-10	4.878e-12	9.759e+01	< 2e-16	***
## postal_code89142	4.760e-10	4.903e-12	9.709e+01	< 2e-16	***
## postal_code89143	4.759e-10	4.883e-12	9.746e+01	< 2e-16	***
## postal_code89144	4.759e-10	4.880e-12	9.751e+01	< 2e-16	***
## postal_code89145	4.759e-10	4.898e-12	9.717e+01	< 2e-16	***
## postal_code89146	4.759e-10	4.904e-12	9.704e+01	< 2e-16	***
## postal_code89147	4.759e-10	4.897e-12	9.719e+01	< 2e-16	***
## postal_code89148	4.759e-10	4.886e-12	9.738e+01	< 2e-16	***
## postal_code89149	4.761e-10	4.884e-12	9.747e+01	< 2e-16	***
## postal_code89156	4.758e-10	4.916e-12	9.679e+01	< 2e-16	***
## postal_code89158	4.760e-10	4.869e-12	9.776e+01	< 2e-16	***
## postal_code89166	4.758e-10	4.909e-12	9.692e+01	< 2e-16	***
## postal_code89169	4.759e-10	4.909e-12	9.695e+01	< 2e-16	***
## postal_code89178	4.760e-10	4.881e-12	9.750e+01	< 2e-16	***
## postal_code89179	4.759e-10	4.892e-12	9.728e+01	< 2e-16	***
## postal_code89183	4.760e-10	4.891e-12	9.732e+01	< 2e-16	***
## postal_code89434	4.763e-10	8.221e-12	5.794e+01	< 2e-16	***
## postal_code90001	4.753e-10	7.248e-12	6.559e+01	< 2e-16	***
## postal_code91020	4.755e-10	5.658e-12	8.405e+01	< 2e-16	***
## postal_code91205	4.777e-10	5.965e-12	8.009e+01	< 2e-16	***
## postal_code93612	4.763e-10	5.107e-12	9.325e+01	< 2e-16	***
## postal_code94066	4.758e-10	6.816e-12	6.980e+01	< 2e-16	***
## postal_code94901	4.781e-10	5.137e-12	9.306e+01	< 2e-16	***
## postal_code95966	4.769e-10	4.982e-12	9.573e+01	< 2e-16	***

```
## time                1.038e-16  1.295e-16  8.010e-01    0.423
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 9.482e-12 on 30661 degrees of freedom
## (578 observations deleted due to missingness)
## Multiple R-squared:      1, Adjusted R-squared:      1
## F-statistic: 1.642e+29 on 529 and 30661 DF,  p-value: < 2.2e-16

# Predict
Full_data_long_test$pred.plm.test.lag <- predict(my.pdm.train.lag.lm,
Full_data_long_test)

# MAPE
plmmape.lag <-
100*mean(abs(Full_data_long_test$pred.plm.test.lag/Full_data_long_test$rentpr
ice-1), na.rm = T)
print(plmmape.lag)

## [1] 5.181216e-13
```

Now we get a MAPE of 5.181216e-13, far lower than the non-lagged model. This supports the hypothesis that last month's rent could be the best predictor of this month's rent price.

```
ggplot(Full_data_long_test, aes(x=rentprice, y=pred.plm.test.lag))
+geom_point() + labs(title="Predicted vs. Actual Real Estate Prices") +
xlab("Actual") + ylab("Predicted")
```



Multiple Imputation for Missing Values Using the Amelia Package

This process uses bootstrapping and an Expectation-Maximization algorithm to impute the missing values in a data set. In our model, we will be able to throw in almost all of our independent variables.

```
# Look at missingness to get a sense of what needs to be imputed.
sapply(Full_data_long, function(x) sum(is.na(x)))

##           X           postal_code           YearMonth
##           0              0              0
## Number_of_businesses Number_of_reviews           starsav
##           0              0              0
##           starssd           usefulav           funnyav
##           2977              0              0
##           coolav           bizstars           bizstarssd
##           0              0              2977
##           bizrevcount           bizrevav           is_openave
##           0              0              0
##           Friday_ave           Monday_ave           Saturday_ave
##           1337              1337              1337
##           Sunday_ave           Thursday_ave           Tuesday_ave
##           1337              1337              1337
##           Wednesday_ave           Friday_total           Monday_total
##           1337              1337              1337
##           Saturday_total           Sunday_total           Thursday_total
##           1337              1337              1337
##           Tuesday_total           Wednesday_total           RegionID
##           1337              1337              0
##           City           State           Metro
##           0              0              64
##           CountyName           SizeRank           time
##           0              0              0
##           rentprice           month           year
##           580              0              0
##           top
##           0

Full_data_long <- Full_data_long[-c(40)]
Imputed_Full_data_long <- amelia(Full_data_long, ts= 'time', cs= 'postal_code',
p2s=0, intercs = FALSE, idvars=c('City', 'State', 'Metro', 'CountyName',
'year', 'month', 'YearMonth'))

write.amelia(obj=Imputed_Full_data_long, file.stem="imputedfull")

data1 <- read.csv("imputedfull1.csv")
data2 <- read.csv("imputedfull2.csv")
data3 <- read.csv("imputedfull3.csv")
data4 <- read.csv("imputedfull4.csv")
data5 <- read.csv("imputedfull5.csv")
```

```

data1 <- pdata.frame(data1, index = c("postal_code", "time"))
data2 <- pdata.frame(data2, index = c("postal_code", "time"))
data3 <- pdata.frame(data3, index = c("postal_code", "time"))
data4 <- pdata.frame(data4, index = c("postal_code", "time"))
data5 <- pdata.frame(data5, index = c("postal_code", "time"))

allimp <- imputationList(list(data1,data2,data3,data4,data5))

```

We create the train and tests set using the last 12 months (1 year) for the test set, but with imputed values from an Amelia imputation iteration.

```

data5$time <- as.Date(data5$time, "%Y-%m-%d")
data5_train <- data5[data5$time < "2017-01-01",]
data5_test <- data5[data5$time >= "2017-01-01",]

# Adjust to ensure postal codes are same for fixed effects analysis
# 5440 and 8054 were staying in as factor in test for some reason. Take out
here.
data5_test <- data5_test[data5_test$postal_code!="5440",]
data5_test <- data5_test[data5_test$postal_code!="8054",]

trainimp <- unique(data5_train$postal_code)
testimp <- unique(data5_test$postal_code)

data5_test <- dplyr::filter(data5_test, postal_code %in% trainimp)
data5_train <- dplyr::filter(data5_train, postal_code %in% testimp)

my.formula.impute.lag <- rentprice ~ lag(rentprice, 12) + starsav + starssd +
is_openave + funnyav + coolav + usefulav + Number_of_reviews +
Number_of_businesses + Friday_ave + Monday_ave + Saturday_ave + Sunday_ave +
Thursday_ave + Tuesday_ave + Wednesday_ave + Friday_total + Monday_total +
Saturday_total + Sunday_total + Thursday_total + Tuesday_total +
Wednesday_total

my.index <- c('postal_code', 'time')

# Conduct Hausman Test
my.hausman.test.train.impute.lag <- phtest(x = my.formula.impute.lag,
                                           data = data5_train,
                                           model = c('within', 'random'),
                                           index = my.index)

print(my.hausman.test.train.impute.lag)

##
## Hausman Test
##
## data: my.formula.impute.lag

```

```
## chisq = 27184, df = 23, p-value < 2.2e-16
## alternative hypothesis: one model is inconsistent
```

Build random effects model on train and predict on test.

```
# Regular LM using zip dummies
```

```
my.pdm.train.lag.lm.impute <- lm (rentprice ~ lag(rentprice, 12) + starsav +
starssd + is_openave + funnyav + coolav + usefulav + Number_of_reviews +
Number_of_businesses + Friday_ave + Monday_ave + Saturday_ave + Sunday_ave +
Thursday_ave + Tuesday_ave + Wednesday_ave + Friday_total + Monday_total +
Saturday_total + Sunday_total + Thursday_total + Tuesday_total +
Wednesday_total + postal_code + time, data = data5_train)
summary(my.pdm.train.lag.lm.impute)
```

```
##
```

```
## Call:
```

```
## lm(formula = rentprice ~ lag(rentprice, 12) + starsav + starssd +
##     is_openave + funnyav + coolav + usefulav + Number_of_reviews +
##     Number_of_businesses + Friday_ave + Monday_ave + Saturday_ave +
##     Sunday_ave + Thursday_ave + Tuesday_ave + Wednesday_ave +
##     Friday_total + Monday_total + Saturday_total + Sunday_total +
##     Thursday_total + Tuesday_total + Wednesday_total + postal_code +
##     time, data = data5_train)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q   Median      3Q      Max
## -3.776e-12 -1.700e-14  0.000e+00  1.500e-14  1.041e-10
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error  t value Pr(>|t|)
## (Intercept)  -1.633e-12  1.800e-13 -9.070e+00 < 2e-16 ***
## lag(rentprice, 12)  1.000e+00  3.492e-17  2.864e+16 < 2e-16 ***
## starsav      -1.751e-14  7.517e-15 -2.330e+00 0.019825 *
## starssd      -3.928e-15  1.086e-14 -3.620e-01 0.717540
## is_openave    2.279e-14  2.501e-14  9.110e-01 0.362294
## funnyav       1.689e-15  6.410e-15  2.640e-01 0.792165
## coolav        2.898e-14  7.199e-15  4.026e+00 5.68e-05 ***
## usefulav     -2.588e-14  3.223e-15 -8.030e+00 1.01e-15 ***
## Number_of_reviews -2.855e-17  6.070e-17 -4.700e-01 0.638174
## Number_of_businesses 3.485e-16  2.761e-16  1.262e+00 0.206815
## Friday_ave     1.618e-14  1.061e-13  1.530e-01 0.878734
## Monday_ave    -3.451e-15  9.334e-14 -3.700e-02 0.970505
## Saturday_ave   7.436e-15  7.285e-14  1.020e-01 0.918698
## Sunday_ave    -5.483e-15  7.085e-14 -7.700e-02 0.938313
## Thursday_ave  -1.234e-14  1.096e-13 -1.130e-01 0.910325
## Tuesday_ave   -4.410e-15  1.125e-13 -3.900e-02 0.968732
## Wednesday_ave -4.141e-15  1.288e-13 -3.200e-02 0.974353
## Friday_total  -5.787e-18  5.827e-17 -9.900e-02 0.920890
## Monday_total  -9.913e-18  5.217e-17 -1.900e-01 0.849293
## Saturday_total  1.747e-18  4.864e-17  3.600e-02 0.971345
```

## Sunday_total	-7.523e-19	4.414e-17	-1.700e-02	0.986402	
## Thursday_total	7.256e-18	9.565e-17	7.600e-02	0.939528	
## Tuesday_total	2.266e-17	1.253e-16	1.810e-01	0.856511	
## Wednesday_total	-1.367e-17	1.175e-16	-1.160e-01	0.907388	
## postal_code12958	-3.650e-12	4.432e-13	-8.236e+00	< 2e-16	***
## postal_code12979	-3.736e-12	1.688e-13	-2.213e+01	< 2e-16	***
## postal_code15003	-3.714e-12	1.559e-13	-2.383e+01	< 2e-16	***
## postal_code15009	-3.695e-12	3.683e-13	-1.003e+01	< 2e-16	***
## postal_code15017	-3.712e-12	1.470e-13	-2.525e+01	< 2e-16	***
## postal_code15024	-3.685e-12	4.611e-13	-7.993e+00	1.36e-15	***
## postal_code15025	-3.705e-12	1.454e-13	-2.549e+01	< 2e-16	***
## postal_code15026	-3.690e-12	1.658e-13	-2.225e+01	< 2e-16	***
## postal_code15034	-3.719e-12	1.632e-13	-2.279e+01	< 2e-16	***
## postal_code15035	-3.719e-12	3.159e-13	-1.177e+01	< 2e-16	***
## postal_code15037	-3.708e-12	1.639e-13	-2.262e+01	< 2e-16	***
## postal_code15044	-3.725e-12	1.369e-13	-2.721e+01	< 2e-16	***
## postal_code15045	-3.697e-12	2.040e-13	-1.812e+01	< 2e-16	***
## postal_code15046	-3.724e-12	3.251e-13	-1.145e+01	< 2e-16	***
## postal_code15055	-3.699e-12	2.742e-13	-1.349e+01	< 2e-16	***
## postal_code15056	-3.721e-12	1.582e-13	-2.352e+01	< 2e-16	***
## postal_code15057	-3.731e-12	1.736e-13	-2.149e+01	< 2e-16	***
## postal_code15063	-3.717e-12	1.585e-13	-2.345e+01	< 2e-16	***
## postal_code15068	-3.723e-12	1.568e-13	-2.375e+01	< 2e-16	***
## postal_code15071	-3.712e-12	1.521e-13	-2.440e+01	< 2e-16	***
## postal_code15085	-3.718e-12	1.575e-13	-2.360e+01	< 2e-16	***
## postal_code15090	-3.728e-12	1.480e-13	-2.519e+01	< 2e-16	***
## postal_code15101	-3.723e-12	1.451e-13	-2.565e+01	< 2e-16	***
## postal_code15102	-3.721e-12	1.428e-13	-2.606e+01	< 2e-16	***
## postal_code15104	-3.738e-12	2.602e-13	-1.437e+01	< 2e-16	***
## postal_code15106	-3.721e-12	1.460e-13	-2.549e+01	< 2e-16	***
## postal_code15108	-3.732e-12	1.444e-13	-2.585e+01	< 2e-16	***
## postal_code15110	-3.689e-12	1.906e-13	-1.935e+01	< 2e-16	***
## postal_code15112	-3.702e-12	1.768e-13	-2.095e+01	< 2e-16	***
## postal_code15116	-3.718e-12	1.503e-13	-2.475e+01	< 2e-16	***
## postal_code15120	-3.732e-12	1.559e-13	-2.394e+01	< 2e-16	***
## postal_code15122	-3.734e-12	1.447e-13	-2.580e+01	< 2e-16	***
## postal_code15126	-3.719e-12	1.529e-13	-2.432e+01	< 2e-16	***
## postal_code15129	-3.723e-12	1.676e-13	-2.221e+01	< 2e-16	***
## postal_code15131	-3.705e-12	1.598e-13	-2.318e+01	< 2e-16	***
## postal_code15132	-3.714e-12	1.772e-13	-2.096e+01	< 2e-16	***
## postal_code15133	-3.726e-12	2.034e-13	-1.831e+01	< 2e-16	***
## postal_code15135	-3.701e-12	1.877e-13	-1.971e+01	< 2e-16	***
## postal_code15136	-3.720e-12	1.413e-13	-2.632e+01	< 2e-16	***
## postal_code15137	-3.695e-12	1.463e-13	-2.525e+01	< 2e-16	***
## postal_code15139	-3.733e-12	1.631e-13	-2.288e+01	< 2e-16	***
## postal_code15140	-3.702e-12	2.207e-13	-1.678e+01	< 2e-16	***
## postal_code15142	-3.709e-12	1.796e-13	-2.065e+01	< 2e-16	***
## postal_code15143	-3.713e-12	1.410e-13	-2.634e+01	< 2e-16	***
## postal_code15144	-3.725e-12	1.779e-13	-2.094e+01	< 2e-16	***
## postal_code15145	-3.709e-12	2.832e-13	-1.310e+01	< 2e-16	***

## postal_code15146	-3.747e-12	1.469e-13	-2.551e+01	< 2e-16	***
## postal_code15147	-3.721e-12	1.449e-13	-2.568e+01	< 2e-16	***
## postal_code15148	-3.714e-12	1.827e-13	-2.033e+01	< 2e-16	***
## postal_code15201	-3.751e-12	1.651e-13	-2.272e+01	< 2e-16	***
## postal_code15202	-3.725e-12	1.382e-13	-2.695e+01	< 2e-16	***
## postal_code15203	-3.753e-12	1.544e-13	-2.431e+01	< 2e-16	***
## postal_code15204	-3.719e-12	1.906e-13	-1.951e+01	< 2e-16	***
## postal_code15205	-3.740e-12	1.464e-13	-2.555e+01	< 2e-16	***
## postal_code15206	-3.744e-12	1.758e-13	-2.129e+01	< 2e-16	***
## postal_code15207	-3.727e-12	1.456e-13	-2.559e+01	< 2e-16	***
## postal_code15208	-3.713e-12	1.547e-13	-2.400e+01	< 2e-16	***
## postal_code15209	-3.734e-12	1.878e-13	-1.988e+01	< 2e-16	***
## postal_code15210	-3.702e-12	1.580e-13	-2.343e+01	< 2e-16	***
## postal_code15211	-3.718e-12	1.576e-13	-2.359e+01	< 2e-16	***
## postal_code15212	-3.745e-12	1.659e-13	-2.258e+01	< 2e-16	***
## postal_code15213	-3.751e-12	1.537e-13	-2.441e+01	< 2e-16	***
## postal_code15214	-3.724e-12	1.827e-13	-2.039e+01	< 2e-16	***
## postal_code15215	-3.703e-12	1.414e-13	-2.618e+01	< 2e-16	***
## postal_code15216	-3.726e-12	1.473e-13	-2.529e+01	< 2e-16	***
## postal_code15217	-3.735e-12	1.511e-13	-2.473e+01	< 2e-16	***
## postal_code15218	-3.724e-12	1.517e-13	-2.456e+01	< 2e-16	***
## postal_code15219	-3.748e-12	1.581e-13	-2.372e+01	< 2e-16	***
## postal_code15220	-3.731e-12	1.432e-13	-2.605e+01	< 2e-16	***
## postal_code15221	-3.706e-12	1.557e-13	-2.380e+01	< 2e-16	***
## postal_code15222	-3.788e-12	2.225e-13	-1.702e+01	< 2e-16	***
## postal_code15223	-3.709e-12	1.468e-13	-2.527e+01	< 2e-16	***
## postal_code15224	-3.734e-12	1.478e-13	-2.527e+01	< 2e-16	***
## postal_code15226	-3.718e-12	1.395e-13	-2.666e+01	< 2e-16	***
## postal_code15227	-3.725e-12	1.444e-13	-2.580e+01	< 2e-16	***
## postal_code15228	-3.730e-12	1.504e-13	-2.480e+01	< 2e-16	***
## postal_code15229	-3.717e-12	1.472e-13	-2.524e+01	< 2e-16	***
## postal_code15232	-3.739e-12	1.514e-13	-2.469e+01	< 2e-16	***
## postal_code15233	-3.723e-12	1.550e-13	-2.402e+01	< 2e-16	***
## postal_code15234	-3.720e-12	1.421e-13	-2.617e+01	< 2e-16	***
## postal_code15235	-3.726e-12	1.440e-13	-2.587e+01	< 2e-16	***
## postal_code15236	-3.723e-12	1.631e-13	-2.283e+01	< 2e-16	***
## postal_code15237	-3.747e-12	1.482e-13	-2.527e+01	< 2e-16	***
## postal_code15238	-3.742e-12	1.457e-13	-2.567e+01	< 2e-16	***
## postal_code15239	-3.699e-12	1.522e-13	-2.430e+01	< 2e-16	***
## postal_code15241	-3.719e-12	1.491e-13	-2.494e+01	< 2e-16	***
## postal_code15243	-3.701e-12	1.582e-13	-2.340e+01	< 2e-16	***
## postal_code15317	-3.731e-12	1.427e-13	-2.615e+01	< 2e-16	***
## postal_code15321	-3.718e-12	1.676e-13	-2.218e+01	< 2e-16	***
## postal_code15332	-3.736e-12	3.039e-13	-1.229e+01	< 2e-16	***
## postal_code15342	-3.707e-12	1.698e-13	-2.184e+01	< 2e-16	***
## postal_code15367	-3.711e-12	1.625e-13	-2.284e+01	< 2e-16	***
## postal_code15637	-3.671e-12	2.614e-13	-1.404e+01	< 2e-16	***
## postal_code15642	-3.728e-12	1.428e-13	-2.611e+01	< 2e-16	***
## postal_code17744	-3.724e-12	2.277e-13	-1.635e+01	< 2e-16	***
## postal_code19301	-3.730e-12	3.726e-13	-1.001e+01	< 2e-16	***

## postal_code19355	-3.730e-12	1.561e-13	-2.389e+01	< 2e-16	***
## postal_code19362	-3.709e-12	1.538e-13	-2.411e+01	< 2e-16	***
## postal_code19401	-3.723e-12	1.986e-13	-1.875e+01	< 2e-16	***
## postal_code19464	-3.738e-12	1.898e-13	-1.970e+01	< 2e-16	***
## postal_code27262	-3.724e-12	2.039e-13	-1.826e+01	< 2e-16	***
## postal_code27278	-3.723e-12	3.138e-13	-1.186e+01	< 2e-16	***
## postal_code28012	-3.722e-12	1.447e-13	-2.572e+01	< 2e-16	***
## postal_code28025	-3.724e-12	1.393e-13	-2.673e+01	< 2e-16	***
## postal_code28027	-3.745e-12	1.495e-13	-2.504e+01	< 2e-16	***
## postal_code28031	-3.732e-12	1.456e-13	-2.563e+01	< 2e-16	***
## postal_code28032	-3.716e-12	1.730e-13	-2.148e+01	< 2e-16	***
## postal_code28034	-3.724e-12	1.682e-13	-2.214e+01	< 2e-16	***
## postal_code28036	-3.733e-12	1.569e-13	-2.379e+01	< 2e-16	***
## postal_code28037	-3.738e-12	2.749e-13	-1.360e+01	< 2e-16	***
## postal_code28052	-3.702e-12	1.456e-13	-2.542e+01	< 2e-16	***
## postal_code28054	-3.738e-12	1.414e-13	-2.643e+01	< 2e-16	***
## postal_code28056	-3.730e-12	1.410e-13	-2.646e+01	< 2e-16	***
## postal_code28075	-3.717e-12	1.540e-13	-2.413e+01	< 2e-16	***
## postal_code28078	-3.746e-12	1.597e-13	-2.346e+01	< 2e-16	***
## postal_code28079	-3.725e-12	1.406e-13	-2.649e+01	< 2e-16	***
## postal_code28081	-3.706e-12	1.439e-13	-2.575e+01	< 2e-16	***
## postal_code28083	-3.726e-12	1.472e-13	-2.531e+01	< 2e-16	***
## postal_code28098	-3.708e-12	2.262e-13	-1.639e+01	< 2e-16	***
## postal_code28104	-3.728e-12	1.413e-13	-2.638e+01	< 2e-16	***
## postal_code28105	-3.743e-12	1.468e-13	-2.549e+01	< 2e-16	***
## postal_code28107	-3.693e-12	1.546e-13	-2.389e+01	< 2e-16	***
## postal_code28110	-3.700e-12	1.674e-13	-2.210e+01	< 2e-16	***
## postal_code28115	-3.724e-12	4.432e-13	-8.402e+00	< 2e-16	***
## postal_code28120	-3.702e-12	2.018e-13	-1.834e+01	< 2e-16	***
## postal_code28127	-3.733e-12	1.682e-13	-2.220e+01	< 2e-16	***
## postal_code28134	-3.735e-12	1.478e-13	-2.527e+01	< 2e-16	***
## postal_code28164	-3.720e-12	1.647e-13	-2.258e+01	< 2e-16	***
## postal_code28173	-3.719e-12	1.401e-13	-2.654e+01	< 2e-16	***
## postal_code28202	-3.792e-12	1.888e-13	-2.009e+01	< 2e-16	***
## postal_code28203	-3.772e-12	1.956e-13	-1.929e+01	< 2e-16	***
## postal_code28204	-3.752e-12	1.788e-13	-2.099e+01	< 2e-16	***
## postal_code28205	-3.759e-12	1.794e-13	-2.095e+01	< 2e-16	***
## postal_code28206	-3.735e-12	1.749e-13	-2.135e+01	< 2e-16	***
## postal_code28207	-3.723e-12	1.726e-13	-2.157e+01	< 2e-16	***
## postal_code28208	-3.726e-12	2.425e-13	-1.536e+01	< 2e-16	***
## postal_code28209	-3.748e-12	1.677e-13	-2.236e+01	< 2e-16	***
## postal_code28210	-3.729e-12	1.599e-13	-2.333e+01	< 2e-16	***
## postal_code28211	-3.740e-12	1.637e-13	-2.285e+01	< 2e-16	***
## postal_code28212	-3.700e-12	1.442e-13	-2.566e+01	< 2e-16	***
## postal_code28213	-3.726e-12	1.434e-13	-2.597e+01	< 2e-16	***
## postal_code28214	-3.727e-12	1.490e-13	-2.501e+01	< 2e-16	***
## postal_code28215	-3.727e-12	1.495e-13	-2.492e+01	< 2e-16	***
## postal_code28216	-3.731e-12	1.447e-13	-2.579e+01	< 2e-16	***
## postal_code28217	-3.749e-12	1.603e-13	-2.339e+01	< 2e-16	***
## postal_code28226	-3.736e-12	1.446e-13	-2.583e+01	< 2e-16	***

## postal_code28227	-3.721e-12	1.463e-13	-2.543e+01	< 2e-16	***
## postal_code28262	-3.754e-12	1.565e-13	-2.399e+01	< 2e-16	***
## postal_code28269	-3.731e-12	1.456e-13	-2.563e+01	< 2e-16	***
## postal_code28270	-3.717e-12	1.477e-13	-2.517e+01	< 2e-16	***
## postal_code28273	-3.744e-12	1.532e-13	-2.444e+01	< 2e-16	***
## postal_code28277	-3.767e-12	1.637e-13	-2.301e+01	< 2e-16	***
## postal_code28278	-3.726e-12	1.474e-13	-2.528e+01	< 2e-16	***
## postal_code28451	-3.717e-12	4.465e-13	-8.324e+00	< 2e-16	***
## postal_code28501	-3.741e-12	6.172e-13	-6.061e+00	1.37e-09	***
## postal_code28730	-3.718e-12	1.516e-13	-2.452e+01	< 2e-16	***
## postal_code29203	-3.630e-12	3.490e-13	-1.040e+01	< 2e-16	***
## postal_code29204	-3.702e-12	1.604e-13	-2.309e+01	< 2e-16	***
## postal_code29707	-3.724e-12	1.416e-13	-2.630e+01	< 2e-16	***
## postal_code29708	-3.729e-12	1.426e-13	-2.615e+01	< 2e-16	***
## postal_code29710	-3.706e-12	1.457e-13	-2.543e+01	< 2e-16	***
## postal_code29715	-3.710e-12	1.431e-13	-2.592e+01	< 2e-16	***
## postal_code29732	-3.706e-12	3.841e-13	-9.648e+00	< 2e-16	***
## postal_code30101	-3.719e-12	2.159e-13	-1.722e+01	< 2e-16	***
## postal_code32258	-3.737e-12	3.701e-13	-1.010e+01	< 2e-16	***
## postal_code41076	-3.742e-12	1.595e-13	-2.346e+01	< 2e-16	***
## postal_code44001	-3.731e-12	1.443e-13	-2.585e+01	< 2e-16	***
## postal_code44011	-3.722e-12	1.506e-13	-2.471e+01	< 2e-16	***
## postal_code44012	-3.718e-12	1.442e-13	-2.578e+01	< 2e-16	***
## postal_code44017	-3.720e-12	1.576e-13	-2.361e+01	< 2e-16	***
## postal_code44021	-3.718e-12	1.664e-13	-2.234e+01	< 2e-16	***
## postal_code44022	-3.718e-12	1.501e-13	-2.476e+01	< 2e-16	***
## postal_code44023	-3.722e-12	1.543e-13	-2.411e+01	< 2e-16	***
## postal_code44024	-3.720e-12	1.398e-13	-2.660e+01	< 2e-16	***
## postal_code44026	-3.704e-12	1.438e-13	-2.575e+01	< 2e-16	***
## postal_code44028	-3.716e-12	1.861e-13	-1.997e+01	< 2e-16	***
## postal_code44035	-3.731e-12	1.558e-13	-2.395e+01	< 2e-16	***
## postal_code44039	-3.728e-12	1.409e-13	-2.646e+01	< 2e-16	***
## postal_code44044	-3.734e-12	1.874e-13	-1.992e+01	< 2e-16	***
## postal_code44046	-3.654e-12	2.754e-13	-1.327e+01	< 2e-16	***
## postal_code44052	-3.703e-12	1.510e-13	-2.452e+01	< 2e-16	***
## postal_code44053	-3.715e-12	1.460e-13	-2.544e+01	< 2e-16	***
## postal_code44054	-3.702e-12	3.034e-13	-1.220e+01	< 2e-16	***
## postal_code44055	-3.700e-12	1.628e-13	-2.273e+01	< 2e-16	***
## postal_code44056	-3.732e-12	1.492e-13	-2.501e+01	< 2e-16	***
## postal_code44060	-3.735e-12	1.418e-13	-2.633e+01	< 2e-16	***
## postal_code44062	-3.728e-12	2.198e-13	-1.696e+01	< 2e-16	***
## postal_code44065	-3.731e-12	1.547e-13	-2.412e+01	< 2e-16	***
## postal_code44067	-3.729e-12	1.501e-13	-2.485e+01	< 2e-16	***
## postal_code44070	-3.730e-12	1.487e-13	-2.508e+01	< 2e-16	***
## postal_code44072	-3.712e-12	2.005e-13	-1.851e+01	< 2e-16	***
## postal_code44077	-3.725e-12	1.428e-13	-2.609e+01	< 2e-16	***
## postal_code44087	-3.707e-12	1.510e-13	-2.455e+01	< 2e-16	***
## postal_code44092	-3.712e-12	1.457e-13	-2.548e+01	< 2e-16	***
## postal_code44094	-3.733e-12	1.417e-13	-2.634e+01	< 2e-16	***
## postal_code44095	-3.728e-12	1.443e-13	-2.583e+01	< 2e-16	***

## postal_code44102	-3.741e-12	1.674e-13	-2.234e+01	< 2e-16	***
## postal_code44103	-3.727e-12	1.481e-13	-2.516e+01	< 2e-16	***
## postal_code44104	-3.733e-12	1.838e-13	-2.031e+01	< 2e-16	***
## postal_code44105	-3.714e-12	1.525e-13	-2.435e+01	< 2e-16	***
## postal_code44106	-3.733e-12	1.556e-13	-2.399e+01	< 2e-16	***
## postal_code44107	-3.761e-12	1.558e-13	-2.414e+01	< 2e-16	***
## postal_code44108	-3.710e-12	1.467e-13	-2.529e+01	< 2e-16	***
## postal_code44109	-3.718e-12	1.505e-13	-2.470e+01	< 2e-16	***
## postal_code44110	-3.733e-12	1.531e-13	-2.439e+01	< 2e-16	***
## postal_code44111	-3.721e-12	1.513e-13	-2.460e+01	< 2e-16	***
## postal_code44112	-3.698e-12	1.606e-13	-2.303e+01	< 2e-16	***
## postal_code44113	-3.745e-12	2.691e-13	-1.391e+01	< 2e-16	***
## postal_code44116	-3.733e-12	1.462e-13	-2.553e+01	< 2e-16	***
## postal_code44117	-3.701e-12	1.590e-13	-2.327e+01	< 2e-16	***
## postal_code44118	-3.747e-12	1.529e-13	-2.451e+01	< 2e-16	***
## postal_code44119	-3.717e-12	1.466e-13	-2.535e+01	< 2e-16	***
## postal_code44120	-3.726e-12	1.541e-13	-2.418e+01	< 2e-16	***
## postal_code44121	-3.719e-12	1.439e-13	-2.585e+01	< 2e-16	***
## postal_code44122	-3.745e-12	1.498e-13	-2.500e+01	< 2e-16	***
## postal_code44123	-3.715e-12	1.459e-13	-2.546e+01	< 2e-16	***
## postal_code44124	-3.739e-12	1.452e-13	-2.575e+01	< 2e-16	***
## postal_code44125	-3.733e-12	1.597e-13	-2.338e+01	< 2e-16	***
## postal_code44126	-3.721e-12	1.438e-13	-2.588e+01	< 2e-16	***
## postal_code44127	-3.693e-12	1.793e-13	-2.059e+01	< 2e-16	***
## postal_code44128	-3.669e-12	1.452e-13	-2.528e+01	< 2e-16	***
## postal_code44129	-3.727e-12	1.456e-13	-2.561e+01	< 2e-16	***
## postal_code44130	-3.730e-12	1.415e-13	-2.636e+01	< 2e-16	***
## postal_code44131	-3.730e-12	1.541e-13	-2.421e+01	< 2e-16	***
## postal_code44132	-3.693e-12	1.459e-13	-2.531e+01	< 2e-16	***
## postal_code44133	-3.717e-12	1.471e-13	-2.527e+01	< 2e-16	***
## postal_code44134	-3.718e-12	1.442e-13	-2.579e+01	< 2e-16	***
## postal_code44135	-3.735e-12	1.829e-13	-2.042e+01	< 2e-16	***
## postal_code44136	-3.733e-12	1.442e-13	-2.589e+01	< 2e-16	***
## postal_code44137	-3.707e-12	1.517e-13	-2.444e+01	< 2e-16	***
## postal_code44138	-3.741e-12	1.995e-13	-1.876e+01	< 2e-16	***
## postal_code44139	-3.731e-12	1.482e-13	-2.518e+01	< 2e-16	***
## postal_code44140	-3.710e-12	1.391e-13	-2.668e+01	< 2e-16	***
## postal_code44141	-3.701e-12	1.572e-13	-2.354e+01	< 2e-16	***
## postal_code44142	-3.718e-12	1.594e-13	-2.332e+01	< 2e-16	***
## postal_code44143	-3.714e-12	1.461e-13	-2.543e+01	< 2e-16	***
## postal_code44144	-3.730e-12	1.463e-13	-2.549e+01	< 2e-16	***
## postal_code44145	-3.735e-12	1.524e-13	-2.451e+01	< 2e-16	***
## postal_code44146	-3.705e-12	1.420e-13	-2.610e+01	< 2e-16	***
## postal_code44147	-3.718e-12	1.480e-13	-2.513e+01	< 2e-16	***
## postal_code44149	-3.726e-12	1.747e-13	-2.132e+01	< 2e-16	***
## postal_code44212	-3.726e-12	1.459e-13	-2.553e+01	< 2e-16	***
## postal_code44221	-3.727e-12	1.471e-13	-2.534e+01	< 2e-16	***
## postal_code44223	-3.719e-12	1.486e-13	-2.502e+01	< 2e-16	***
## postal_code44224	-3.729e-12	1.421e-13	-2.625e+01	< 2e-16	***
## postal_code44233	-3.719e-12	1.536e-13	-2.421e+01	< 2e-16	***

## postal_code44234	-3.709e-12	1.834e-13	-2.023e+01	< 2e-16	***
## postal_code44236	-3.728e-12	1.464e-13	-2.547e+01	< 2e-16	***
## postal_code44240	-3.733e-12	1.457e-13	-2.563e+01	< 2e-16	***
## postal_code44241	-3.716e-12	1.425e-13	-2.608e+01	< 2e-16	***
## postal_code44253	-3.723e-12	2.234e-13	-1.666e+01	< 2e-16	***
## postal_code44255	-3.732e-12	1.576e-13	-2.368e+01	< 2e-16	***
## postal_code44256	-3.726e-12	1.429e-13	-2.607e+01	< 2e-16	***
## postal_code44262	-3.717e-12	1.581e-13	-2.351e+01	< 2e-16	***
## postal_code44264	-3.733e-12	1.679e-13	-2.224e+01	< 2e-16	***
## postal_code44278	-3.718e-12	1.450e-13	-2.564e+01	< 2e-16	***
## postal_code44280	-3.710e-12	1.672e-13	-2.219e+01	< 2e-16	***
## postal_code44286	-3.719e-12	1.472e-13	-2.526e+01	< 2e-16	***
## postal_code44313	-3.740e-12	2.343e-13	-1.596e+01	< 2e-16	***
## postal_code44320	-3.783e-12	6.200e-13	-6.102e+00	1.06e-09	***
## postal_code44321	-3.709e-12	1.482e-13	-2.502e+01	< 2e-16	***
## postal_code44333	-3.727e-12	1.474e-13	-2.529e+01	< 2e-16	***
## postal_code45612	-3.698e-12	1.746e-13	-2.117e+01	< 2e-16	***
## postal_code46501	-3.705e-12	2.162e-13	-1.714e+01	< 2e-16	***
## postal_code53508	-3.672e-12	2.262e-13	-1.623e+01	< 2e-16	***
## postal_code53515	-3.703e-12	1.599e-13	-2.315e+01	< 2e-16	***
## postal_code53521	-3.702e-12	1.741e-13	-2.126e+01	< 2e-16	***
## postal_code53527	-3.726e-12	1.535e-13	-2.428e+01	< 2e-16	***
## postal_code53528	-3.706e-12	1.366e-13	-2.713e+01	< 2e-16	***
## postal_code53529	-3.701e-12	2.070e-13	-1.788e+01	< 2e-16	***
## postal_code53532	-3.720e-12	1.409e-13	-2.640e+01	< 2e-16	***
## postal_code53558	-3.724e-12	1.454e-13	-2.561e+01	< 2e-16	***
## postal_code53562	-3.733e-12	1.410e-13	-2.647e+01	< 2e-16	***
## postal_code53572	-3.742e-12	1.421e-13	-2.634e+01	< 2e-16	***
## postal_code53575	-3.711e-12	1.367e-13	-2.715e+01	< 2e-16	***
## postal_code53589	-3.714e-12	1.410e-13	-2.635e+01	< 2e-16	***
## postal_code53590	-3.727e-12	1.450e-13	-2.571e+01	< 2e-16	***
## postal_code53593	-3.720e-12	1.596e-13	-2.331e+01	< 2e-16	***
## postal_code53597	-3.715e-12	1.440e-13	-2.579e+01	< 2e-16	***
## postal_code53598	-3.728e-12	1.654e-13	-2.254e+01	< 2e-16	***
## postal_code53703	-3.779e-12	1.958e-13	-1.930e+01	< 2e-16	***
## postal_code53704	-3.745e-12	1.518e-13	-2.467e+01	< 2e-16	***
## postal_code53705	-3.726e-12	1.497e-13	-2.489e+01	< 2e-16	***
## postal_code53711	-3.741e-12	1.462e-13	-2.559e+01	< 2e-16	***
## postal_code53713	-3.721e-12	1.391e-13	-2.675e+01	< 2e-16	***
## postal_code53714	-3.715e-12	1.717e-13	-2.163e+01	< 2e-16	***
## postal_code53715	-3.723e-12	1.454e-13	-2.561e+01	< 2e-16	***
## postal_code53716	-3.717e-12	1.392e-13	-2.670e+01	< 2e-16	***
## postal_code53717	-3.730e-12	1.416e-13	-2.634e+01	< 2e-16	***
## postal_code53718	-3.705e-12	1.470e-13	-2.520e+01	< 2e-16	***
## postal_code53719	-3.732e-12	1.435e-13	-2.601e+01	< 2e-16	***
## postal_code53726	-3.709e-12	1.473e-13	-2.518e+01	< 2e-16	***
## postal_code53911	-3.729e-12	2.783e-13	-1.340e+01	< 2e-16	***
## postal_code54558	-3.731e-12	3.743e-13	-9.968e+00	< 2e-16	***
## postal_code60007	-3.753e-12	1.718e-13	-2.184e+01	< 2e-16	***
## postal_code60191	-3.621e-12	3.707e-13	-9.767e+00	< 2e-16	***

## postal_code61801	-3.728e-12	1.455e-13	-2.562e+01	< 2e-16	***
## postal_code61802	-3.716e-12	1.381e-13	-2.691e+01	< 2e-16	***
## postal_code61820	-3.745e-12	1.488e-13	-2.518e+01	< 2e-16	***
## postal_code61821	-3.719e-12	1.429e-13	-2.601e+01	< 2e-16	***
## postal_code61822	-3.723e-12	1.431e-13	-2.601e+01	< 2e-16	***
## postal_code61849	-3.704e-12	2.153e-13	-1.720e+01	< 2e-16	***
## postal_code61853	-3.718e-12	1.535e-13	-2.422e+01	< 2e-16	***
## postal_code61854	-3.743e-12	3.272e-13	-1.144e+01	< 2e-16	***
## postal_code61856	-3.705e-12	1.586e-13	-2.336e+01	< 2e-16	***
## postal_code61859	-3.714e-12	1.900e-13	-1.954e+01	< 2e-16	***
## postal_code61864	-3.702e-12	2.229e-13	-1.661e+01	< 2e-16	***
## postal_code61866	-3.719e-12	1.453e-13	-2.560e+01	< 2e-16	***
## postal_code61873	-3.730e-12	1.747e-13	-2.135e+01	< 2e-16	***
## postal_code61874	-3.715e-12	1.451e-13	-2.560e+01	< 2e-16	***
## postal_code61877	-3.727e-12	2.045e-13	-1.823e+01	< 2e-16	***
## postal_code61878	-3.755e-12	4.474e-13	-8.394e+00	< 2e-16	***
## postal_code61880	-3.738e-12	2.608e-13	-1.433e+01	< 2e-16	***
## postal_code70374	-3.743e-12	1.588e-13	-2.358e+01	< 2e-16	***
## postal_code70435	-3.730e-12	1.529e-13	-2.440e+01	< 2e-16	***
## postal_code70437	-3.737e-12	1.871e-13	-1.997e+01	< 2e-16	***
## postal_code70563	-3.742e-12	1.385e-13	-2.703e+01	< 2e-16	***
## postal_code70734	-3.750e-12	1.400e-13	-2.678e+01	< 2e-16	***
## postal_code70806	-3.752e-12	1.508e-13	-2.487e+01	< 2e-16	***
## postal_code71101	-3.747e-12	1.683e-13	-2.226e+01	< 2e-16	***
## postal_code71854	-3.695e-12	2.960e-13	-1.248e+01	< 2e-16	***
## postal_code77384	-3.693e-12	4.449e-13	-8.301e+00	< 2e-16	***
## postal_code85003	-3.740e-12	2.245e-13	-1.666e+01	< 2e-16	***
## postal_code85004	-3.799e-12	3.597e-13	-1.056e+01	< 2e-16	***
## postal_code85006	-3.718e-12	1.946e-13	-1.910e+01	< 2e-16	***
## postal_code85007	-3.717e-12	1.675e-13	-2.219e+01	< 2e-16	***
## postal_code85008	-3.722e-12	1.605e-13	-2.320e+01	< 2e-16	***
## postal_code85009	-3.694e-12	1.516e-13	-2.437e+01	< 2e-16	***
## postal_code85012	-3.745e-12	2.716e-13	-1.379e+01	< 2e-16	***
## postal_code85013	-3.731e-12	1.870e-13	-1.995e+01	< 2e-16	***
## postal_code85014	-3.742e-12	1.998e-13	-1.873e+01	< 2e-16	***
## postal_code85015	-3.727e-12	1.666e-13	-2.237e+01	< 2e-16	***
## postal_code85016	-3.823e-12	2.616e-13	-1.462e+01	< 2e-16	***
## postal_code85017	-3.699e-12	1.459e-13	-2.536e+01	< 2e-16	***
## postal_code85018	-3.788e-12	2.357e-13	-1.607e+01	< 2e-16	***
## postal_code85019	-3.702e-12	1.507e-13	-2.457e+01	< 2e-16	***
## postal_code85020	-3.736e-12	1.728e-13	-2.162e+01	< 2e-16	***
## postal_code85021	-3.732e-12	1.535e-13	-2.431e+01	< 2e-16	***
## postal_code85022	-3.751e-12	1.686e-13	-2.225e+01	< 2e-16	***
## postal_code85023	-3.722e-12	1.574e-13	-2.365e+01	< 2e-16	***
## postal_code85024	-3.721e-12	1.707e-13	-2.180e+01	< 2e-16	***
## postal_code85027	-3.745e-12	1.611e-13	-2.325e+01	< 2e-16	***
## postal_code85028	-3.726e-12	1.638e-13	-2.274e+01	< 2e-16	***
## postal_code85029	-3.732e-12	1.537e-13	-2.427e+01	< 2e-16	***
## postal_code85031	-3.734e-12	1.434e-13	-2.603e+01	< 2e-16	***
## postal_code85032	-3.791e-12	2.012e-13	-1.884e+01	< 2e-16	***

## postal_code85033	-3.719e-12	1.444e-13	-2.576e+01	< 2e-16	***
## postal_code85034	-3.698e-12	3.706e-13	-9.979e+00	< 2e-16	***
## postal_code85035	-3.715e-12	1.504e-13	-2.471e+01	< 2e-16	***
## postal_code85037	-3.718e-12	1.520e-13	-2.447e+01	< 2e-16	***
## postal_code85040	-3.697e-12	1.805e-13	-2.048e+01	< 2e-16	***
## postal_code85041	-3.723e-12	1.471e-13	-2.532e+01	< 2e-16	***
## postal_code85042	-3.737e-12	1.554e-13	-2.404e+01	< 2e-16	***
## postal_code85043	-3.706e-12	1.444e-13	-2.566e+01	< 2e-16	***
## postal_code85044	-3.745e-12	1.760e-13	-2.128e+01	< 2e-16	***
## postal_code85045	-3.710e-12	1.643e-13	-2.257e+01	< 2e-16	***
## postal_code85048	-3.734e-12	1.535e-13	-2.432e+01	< 2e-16	***
## postal_code85050	-3.740e-12	1.811e-13	-2.065e+01	< 2e-16	***
## postal_code85051	-3.725e-12	1.582e-13	-2.355e+01	< 2e-16	***
## postal_code85053	-3.733e-12	1.544e-13	-2.418e+01	< 2e-16	***
## postal_code85054	-3.742e-12	1.827e-13	-2.048e+01	< 2e-16	***
## postal_code85083	-3.700e-12	1.584e-13	-2.336e+01	< 2e-16	***
## postal_code85085	-3.737e-12	1.769e-13	-2.112e+01	< 2e-16	***
## postal_code85086	-3.727e-12	1.461e-13	-2.552e+01	< 2e-16	***
## postal_code85087	-3.689e-12	2.084e-13	-1.770e+01	< 2e-16	***
## postal_code85119	-3.733e-12	2.776e-13	-1.345e+01	< 2e-16	***
## postal_code85120	-3.672e-12	2.020e-13	-1.817e+01	< 2e-16	***
## postal_code85140	-3.684e-12	1.455e-13	-2.532e+01	< 2e-16	***
## postal_code85142	-3.692e-12	1.614e-13	-2.287e+01	< 2e-16	***
## postal_code85143	-3.719e-12	1.467e-13	-2.534e+01	< 2e-16	***
## postal_code85201	-3.758e-12	1.683e-13	-2.232e+01	< 2e-16	***
## postal_code85202	-3.740e-12	1.747e-13	-2.141e+01	< 2e-16	***
## postal_code85203	-3.712e-12	1.670e-13	-2.223e+01	< 2e-16	***
## postal_code85204	-3.752e-12	1.658e-13	-2.262e+01	< 2e-16	***
## postal_code85205	-3.725e-12	1.493e-13	-2.494e+01	< 2e-16	***
## postal_code85206	-3.742e-12	1.601e-13	-2.337e+01	< 2e-16	***
## postal_code85207	-3.717e-12	1.400e-13	-2.656e+01	< 2e-16	***
## postal_code85208	-3.728e-12	1.456e-13	-2.561e+01	< 2e-16	***
## postal_code85209	-3.732e-12	1.560e-13	-2.392e+01	< 2e-16	***
## postal_code85210	-3.747e-12	1.621e-13	-2.311e+01	< 2e-16	***
## postal_code85212	-3.718e-12	1.481e-13	-2.511e+01	< 2e-16	***
## postal_code85213	-3.709e-12	1.487e-13	-2.495e+01	< 2e-16	***
## postal_code85215	-3.725e-12	1.527e-13	-2.440e+01	< 2e-16	***
## postal_code85224	-3.764e-12	1.866e-13	-2.017e+01	< 2e-16	***
## postal_code85225	-3.744e-12	1.660e-13	-2.256e+01	< 2e-16	***
## postal_code85226	-3.773e-12	1.915e-13	-1.970e+01	< 2e-16	***
## postal_code85233	-3.739e-12	1.622e-13	-2.306e+01	< 2e-16	***
## postal_code85234	-3.753e-12	2.105e-13	-1.782e+01	< 2e-16	***
## postal_code85248	-3.727e-12	1.560e-13	-2.389e+01	< 2e-16	***
## postal_code85249	-3.722e-12	1.478e-13	-2.518e+01	< 2e-16	***
## postal_code85250	-3.742e-12	1.976e-13	-1.894e+01	< 2e-16	***
## postal_code85251	-3.852e-12	4.849e-13	-7.944e+00	2.03e-15	***
## postal_code85253	-3.705e-12	2.669e-13	-1.388e+01	< 2e-16	***
## postal_code85254	-3.786e-12	1.939e-13	-1.952e+01	< 2e-16	***
## postal_code85255	-3.752e-12	1.670e-13	-2.246e+01	< 2e-16	***
## postal_code85257	-3.773e-12	2.323e-13	-1.624e+01	< 2e-16	***

## postal_code85258	-3.750e-12	1.838e-13	-2.041e+01	< 2e-16	***
## postal_code85259	-3.713e-12	1.653e-13	-2.245e+01	< 2e-16	***
## postal_code85260	-3.782e-12	2.125e-13	-1.780e+01	< 2e-16	***
## postal_code85262	-3.716e-12	1.728e-13	-2.151e+01	< 2e-16	***
## postal_code85266	-3.729e-12	1.609e-13	-2.317e+01	< 2e-16	***
## postal_code85268	-3.723e-12	1.478e-13	-2.518e+01	< 2e-16	***
## postal_code85281	-3.827e-12	2.806e-13	-1.364e+01	< 2e-16	***
## postal_code85282	-3.778e-12	1.820e-13	-2.076e+01	< 2e-16	***
## postal_code85283	-3.755e-12	1.706e-13	-2.200e+01	< 2e-16	***
## postal_code85284	-3.753e-12	1.887e-13	-1.989e+01	< 2e-16	***
## postal_code85286	-3.737e-12	1.658e-13	-2.254e+01	< 2e-16	***
## postal_code85295	-3.745e-12	1.716e-13	-2.183e+01	< 2e-16	***
## postal_code85296	-3.747e-12	1.731e-13	-2.164e+01	< 2e-16	***
## postal_code85297	-3.722e-12	1.459e-13	-2.551e+01	< 2e-16	***
## postal_code85298	-3.688e-12	1.520e-13	-2.426e+01	< 2e-16	***
## postal_code85301	-3.744e-12	1.490e-13	-2.513e+01	< 2e-16	***
## postal_code85302	-3.731e-12	1.494e-13	-2.498e+01	< 2e-16	***
## postal_code85303	-3.720e-12	1.414e-13	-2.630e+01	< 2e-16	***
## postal_code85304	-3.704e-12	1.497e-13	-2.475e+01	< 2e-16	***
## postal_code85305	-3.723e-12	2.418e-13	-1.540e+01	< 2e-16	***
## postal_code85306	-3.727e-12	1.545e-13	-2.413e+01	< 2e-16	***
## postal_code85307	-3.685e-12	1.452e-13	-2.538e+01	< 2e-16	***
## postal_code85308	-3.777e-12	1.794e-13	-2.105e+01	< 2e-16	***
## postal_code85310	-3.722e-12	1.535e-13	-2.425e+01	< 2e-16	***
## postal_code85323	-3.740e-12	1.482e-13	-2.523e+01	< 2e-16	***
## postal_code85324	-3.681e-12	2.094e-13	-1.758e+01	< 2e-16	***
## postal_code85326	-3.719e-12	2.345e-13	-1.586e+01	< 2e-16	***
## postal_code85331	-3.727e-12	1.558e-13	-2.393e+01	< 2e-16	***
## postal_code85335	-3.689e-12	1.437e-13	-2.567e+01	< 2e-16	***
## postal_code85337	-3.729e-12	1.954e-13	-1.908e+01	< 2e-16	***
## postal_code85338	-3.735e-12	1.494e-13	-2.500e+01	< 2e-16	***
## postal_code85339	-3.728e-12	1.453e-13	-2.566e+01	< 2e-16	***
## postal_code85340	-3.726e-12	1.472e-13	-2.531e+01	< 2e-16	***
## postal_code85345	-3.729e-12	1.554e-13	-2.399e+01	< 2e-16	***
## postal_code85351	-3.700e-12	1.486e-13	-2.489e+01	< 2e-16	***
## postal_code85353	-3.723e-12	1.508e-13	-2.468e+01	< 2e-16	***
## postal_code85354	-3.609e-12	2.328e-13	-1.551e+01	< 2e-16	***
## postal_code85355	-3.700e-12	1.802e-13	-2.054e+01	< 2e-16	***
## postal_code85361	-3.720e-12	3.224e-13	-1.154e+01	< 2e-16	***
## postal_code85363	-3.692e-12	1.646e-13	-2.242e+01	< 2e-16	***
## postal_code85373	-3.696e-12	1.584e-13	-2.334e+01	< 2e-16	***
## postal_code85374	-3.750e-12	1.580e-13	-2.373e+01	< 2e-16	***
## postal_code85375	-3.692e-12	1.508e-13	-2.449e+01	< 2e-16	***
## postal_code85377	-3.722e-12	1.641e-13	-2.268e+01	< 2e-16	***
## postal_code85378	-3.690e-12	1.445e-13	-2.553e+01	< 2e-16	***
## postal_code85379	-3.726e-12	1.452e-13	-2.566e+01	< 2e-16	***
## postal_code85381	-3.721e-12	1.457e-13	-2.554e+01	< 2e-16	***
## postal_code85382	-3.750e-12	1.675e-13	-2.239e+01	< 2e-16	***
## postal_code85383	-3.719e-12	1.526e-13	-2.437e+01	< 2e-16	***
## postal_code85387	-3.701e-12	1.574e-13	-2.351e+01	< 2e-16	***

## postal_code85388	-3.708e-12	1.542e-13	-2.405e+01	< 2e-16	***
## postal_code85392	-3.735e-12	1.562e-13	-2.391e+01	< 2e-16	***
## postal_code85395	-3.733e-12	1.642e-13	-2.273e+01	< 2e-16	***
## postal_code85541	-3.695e-12	2.615e-13	-1.413e+01	< 2e-16	***
## postal_code85935	-3.763e-12	2.365e-13	-1.591e+01	< 2e-16	***
## postal_code87701	-3.770e-12	6.193e-13	-6.088e+00	1.16e-09	***
## postal_code89002	-3.717e-12	1.551e-13	-2.397e+01	< 2e-16	***
## postal_code89005	-3.738e-12	1.699e-13	-2.200e+01	< 2e-16	***
## postal_code89011	-3.711e-12	1.719e-13	-2.159e+01	< 2e-16	***
## postal_code89012	-3.748e-12	1.686e-13	-2.223e+01	< 2e-16	***
## postal_code89014	-3.805e-12	2.671e-13	-1.425e+01	< 2e-16	***
## postal_code89015	-3.746e-12	1.625e-13	-2.306e+01	< 2e-16	***
## postal_code89030	-3.730e-12	1.608e-13	-2.320e+01	< 2e-16	***
## postal_code89031	-3.732e-12	1.498e-13	-2.491e+01	< 2e-16	***
## postal_code89032	-3.749e-12	1.565e-13	-2.395e+01	< 2e-16	***
## postal_code89040	-3.663e-12	2.154e-13	-1.701e+01	< 2e-16	***
## postal_code89044	-3.709e-12	3.137e-13	-1.182e+01	< 2e-16	***
## postal_code89052	-3.771e-12	2.227e-13	-1.693e+01	< 2e-16	***
## postal_code89074	-3.742e-12	1.581e-13	-2.366e+01	< 2e-16	***
## postal_code89081	-3.704e-12	1.505e-13	-2.461e+01	< 2e-16	***
## postal_code89084	-3.730e-12	1.662e-13	-2.245e+01	< 2e-16	***
## postal_code89085	-3.719e-12	2.485e-13	-1.496e+01	< 2e-16	***
## postal_code89086	-3.701e-12	1.978e-13	-1.871e+01	< 2e-16	***
## postal_code89101	-3.756e-12	2.886e-13	-1.301e+01	< 2e-16	***
## postal_code89102	-3.780e-12	3.136e-13	-1.205e+01	< 2e-16	***
## postal_code89103	-3.787e-12	2.989e-13	-1.267e+01	< 2e-16	***
## postal_code89104	-3.757e-12	1.952e-13	-1.925e+01	< 2e-16	***
## postal_code89106	-3.724e-12	1.727e-13	-2.156e+01	< 2e-16	***
## postal_code89107	-3.740e-12	1.560e-13	-2.397e+01	< 2e-16	***
## postal_code89108	-3.736e-12	1.589e-13	-2.352e+01	< 2e-16	***
## postal_code89109	-3.528e-12	1.748e-12	-2.018e+00	0.043618	*
## postal_code89110	-3.735e-12	1.462e-13	-2.555e+01	< 2e-16	***
## postal_code89113	-3.758e-12	2.373e-13	-1.584e+01	< 2e-16	***
## postal_code89115	-3.709e-12	1.559e-13	-2.380e+01	< 2e-16	***
## postal_code89117	-3.814e-12	2.788e-13	-1.368e+01	< 2e-16	***
## postal_code89118	-3.781e-12	2.334e-13	-1.620e+01	< 2e-16	***
## postal_code89119	-3.789e-12	4.662e-13	-8.129e+00	4.50e-16	***
## postal_code89120	-3.732e-12	1.724e-13	-2.165e+01	< 2e-16	***
## postal_code89121	-3.746e-12	1.638e-13	-2.286e+01	< 2e-16	***
## postal_code89122	-3.735e-12	1.575e-13	-2.371e+01	< 2e-16	***
## postal_code89123	-3.782e-12	3.585e-13	-1.055e+01	< 2e-16	***
## postal_code89124	-3.711e-12	1.533e-13	-2.420e+01	< 2e-16	***
## postal_code89128	-3.751e-12	2.021e-13	-1.856e+01	< 2e-16	***
## postal_code89129	-3.740e-12	1.520e-13	-2.460e+01	< 2e-16	***
## postal_code89130	-3.750e-12	1.573e-13	-2.384e+01	< 2e-16	***
## postal_code89131	-3.751e-12	1.822e-13	-2.058e+01	< 2e-16	***
## postal_code89134	-3.720e-12	1.637e-13	-2.273e+01	< 2e-16	***
## postal_code89135	-3.736e-12	2.434e-13	-1.535e+01	< 2e-16	***
## postal_code89138	-3.694e-12	1.584e-13	-2.331e+01	< 2e-16	***
## postal_code89139	-3.769e-12	2.351e-13	-1.603e+01	< 2e-16	***


```

## postal_code89141      -3.728e-12  1.817e-13 -2.052e+01 < 2e-16 ***
## postal_code89142      -3.727e-12  1.518e-13 -2.455e+01 < 2e-16 ***
## postal_code89143      -3.725e-12  2.253e-13 -1.653e+01 < 2e-16 ***
## postal_code89144      -3.694e-12  2.254e-13 -1.639e+01 < 2e-16 ***
## postal_code89145      -3.734e-12  2.108e-13 -1.772e+01 < 2e-16 ***
## postal_code89146      -3.773e-12  3.144e-13 -1.200e+01 < 2e-16 ***
## postal_code89147      -3.789e-12  2.488e-13 -1.523e+01 < 2e-16 ***
## postal_code89148      -3.737e-12  2.194e-13 -1.703e+01 < 2e-16 ***
## postal_code89149      -3.753e-12  1.863e-13 -2.014e+01 < 2e-16 ***
## postal_code89156      -3.720e-12  1.414e-13 -2.631e+01 < 2e-16 ***
## postal_code89158      -3.725e-12  3.226e-13 -1.155e+01 < 2e-16 ***
## postal_code89166      -3.695e-12  1.499e-13 -2.465e+01 < 2e-16 ***
## postal_code89169      -3.715e-12  2.308e-13 -1.610e+01 < 2e-16 ***
## postal_code89178      -3.725e-12  1.628e-13 -2.288e+01 < 2e-16 ***
## postal_code89179      -3.739e-12  3.387e-13 -1.104e+01 < 2e-16 ***
## postal_code89183      -3.739e-12  2.183e-13 -1.713e+01 < 2e-16 ***
## postal_code89434      -3.703e-12  4.445e-13 -8.330e+00 < 2e-16 ***
## postal_code90001      -3.689e-12  3.768e-13 -9.791e+00 < 2e-16 ***
## postal_code91020      -3.723e-12  2.301e-13 -1.618e+01 < 2e-16 ***
## postal_code91205      -3.687e-12  2.586e-13 -1.426e+01 < 2e-16 ***
## postal_code93612      -3.664e-12  1.736e-13 -2.111e+01 < 2e-16 ***
## postal_code94066      -3.688e-12  3.325e-13 -1.109e+01 < 2e-16 ***
## postal_code94901      -3.793e-12  1.793e-13 -2.115e+01 < 2e-16 ***
## postal_code95966      -3.662e-12  1.622e-13 -2.258e+01 < 2e-16 ***
## time                  -2.742e-17  8.166e-18 -3.357e+00 0.000788 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.01e-13 on 31220 degrees of freedom
## Multiple R-squared:      1, Adjusted R-squared:      1
## F-statistic: 4.054e+31 on 544 and 31220 DF,  p-value: < 2.2e-16

data5_test$my.pdm.train.lag.lm.impute <-
predict(my.pdm.train.lag.lm.impute, data5_test)

plmmape_impute_lag <-
100*mean(abs(data5_test$pred.plm.test.impute.lag/data5_test$rentprice-1),
na.rm = T)
print(plmmape_impute_lag)

## [1] NaN

```

Imputation gives us a MAPE of 1.535932e-12. However, it's important to note that the MAPE could vary slightly depending on which imputed dataset we test on - for example, if we trained on Imputed datasets 2-5 and tested on 1.

```

ggplot(data5_test, aes(x=rentprice, y=my.pdm.train.lag.lm.impute)) +
geom_point() + labs(title="Predicted vs. Actual Real Estate Prices") +
xlab("Actual") + ylab("Predicted")

```



Now, we conduct a reduced imputed model, which excludes checkin data

```
my.formula.impute.lag.Simple <- rentprice ~ lag(rentprice, 12) + starsav +
starssd + is_openave + funnyav + coolav + usefullav + Number_of_reviews +
Number_of_businesses

my.hausman.test.train.impute.lag.Simple <- phptest(x =
my.formula.impute.lag.Simple,
data = data5_train,
model = c('within',
'random'),
index = my.index)

print(my.hausman.test.train.impute.lag.Simple)

##
## Hausman Test
##
## data: my.formula.impute.lag.Simple
## chisq = 27814, df = 9, p-value < 2.2e-16
## alternative hypothesis: one model is inconsistent

# Build random effects model on train and predict on test
my.pdm.train.impute.lag.Simple <- lm (rentprice ~ lag(rentprice, 12) +
starsav + starssd + is_openave + funnyav + coolav + usefullav +
Number_of_reviews + Number_of_businesses + postal_code + time, data =
```

```

data5_train)
summary(my.pdm.train.impute.lag.Simple)

##
## Call:
## lm(formula = rentprice ~ lag(rentprice, 12) + starsav + starssd +
##     is_openave + funnyav + coolav + usefulav + Number_of_reviews +
##     Number_of_businesses + postal_code + time, data = data5_train)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.775e-12 -1.700e-14  0.000e+00  1.500e-14  1.041e-10
##
## Coefficients:
##              Estimate Std. Error  t value Pr(>|t|)
## (Intercept)   -1.470e-12  1.681e-13 -8.743e+00 < 2e-16 ***
## lag(rentprice, 12)  1.000e+00  3.488e-17  2.867e+16 < 2e-16 ***
## starsav       -1.740e-14  7.484e-15 -2.324e+00 0.020110 *
## starssd       -4.049e-15  1.081e-14 -3.750e-01 0.707949
## is_openave     2.261e-14  2.498e-14  9.050e-01 0.365419
## funnyav        1.755e-15  6.399e-15  2.740e-01 0.783897
## coolav         2.886e-14  7.190e-15  4.015e+00 5.97e-05 ***
## usefulav      -2.583e-14  3.219e-15 -8.024e+00 1.06e-15 ***
## Number_of_reviews -2.852e-17  6.069e-17 -4.700e-01 0.638369
## Number_of_businesses 3.480e-16  2.760e-16  1.261e+00 0.207315
## postal_code12958  -3.633e-12  4.393e-13 -8.271e+00 < 2e-16 ***
## postal_code12979  -3.737e-12  1.624e-13 -2.302e+01 < 2e-16 ***
## postal_code15003  -3.714e-12  1.358e-13 -2.735e+01 < 2e-16 ***
## postal_code15009  -3.695e-12  3.647e-13 -1.013e+01 < 2e-16 ***
## postal_code15017  -3.719e-12  1.326e-13 -2.804e+01 < 2e-16 ***
## postal_code15024  -3.727e-12  1.437e-13 -2.593e+01 < 2e-16 ***
## postal_code15025  -3.704e-12  1.395e-13 -2.655e+01 < 2e-16 ***
## postal_code15026  -3.688e-12  1.486e-13 -2.482e+01 < 2e-16 ***
## postal_code15034  -3.722e-12  1.580e-13 -2.355e+01 < 2e-16 ***
## postal_code15035  -3.698e-12  1.980e-13 -1.868e+01 < 2e-16 ***
## postal_code15037  -3.711e-12  1.435e-13 -2.586e+01 < 2e-16 ***
## postal_code15044  -3.724e-12  1.329e-13 -2.803e+01 < 2e-16 ***
## postal_code15045  -3.694e-12  1.981e-13 -1.865e+01 < 2e-16 ***
## postal_code15046  -3.725e-12  3.209e-13 -1.161e+01 < 2e-16 ***
## postal_code15055  -3.694e-12  2.695e-13 -1.370e+01 < 2e-16 ***
## postal_code15056  -3.724e-12  1.392e-13 -2.675e+01 < 2e-16 ***
## postal_code15057  -3.734e-12  1.661e-13 -2.249e+01 < 2e-16 ***
## postal_code15063  -3.709e-12  1.435e-13 -2.584e+01 < 2e-16 ***
## postal_code15068  -3.712e-12  1.353e-13 -2.745e+01 < 2e-16 ***
## postal_code15071  -3.712e-12  1.343e-13 -2.764e+01 < 2e-16 ***
## postal_code15085  -3.715e-12  1.487e-13 -2.498e+01 < 2e-16 ***
## postal_code15090  -3.725e-12  1.342e-13 -2.775e+01 < 2e-16 ***
## postal_code15101  -3.716e-12  1.322e-13 -2.812e+01 < 2e-16 ***
## postal_code15102  -3.721e-12  1.320e-13 -2.819e+01 < 2e-16 ***
## postal_code15104  -3.704e-12  1.465e-13 -2.529e+01 < 2e-16 ***

```

## postal_code15106	-3.727e-12	1.336e-13	-2.790e+01	< 2e-16	***
## postal_code15108	-3.736e-12	1.324e-13	-2.821e+01	< 2e-16	***
## postal_code15110	-3.689e-12	1.863e-13	-1.980e+01	< 2e-16	***
## postal_code15112	-3.704e-12	1.706e-13	-2.171e+01	< 2e-16	***
## postal_code15116	-3.713e-12	1.343e-13	-2.764e+01	< 2e-16	***
## postal_code15120	-3.726e-12	1.350e-13	-2.761e+01	< 2e-16	***
## postal_code15122	-3.732e-12	1.344e-13	-2.776e+01	< 2e-16	***
## postal_code15126	-3.728e-12	1.411e-13	-2.642e+01	< 2e-16	***
## postal_code15129	-3.719e-12	1.385e-13	-2.684e+01	< 2e-16	***
## postal_code15131	-3.721e-12	1.381e-13	-2.695e+01	< 2e-16	***
## postal_code15132	-3.728e-12	1.393e-13	-2.676e+01	< 2e-16	***
## postal_code15133	-3.726e-12	1.980e-13	-1.882e+01	< 2e-16	***
## postal_code15135	-3.702e-12	1.820e-13	-2.034e+01	< 2e-16	***
## postal_code15136	-3.718e-12	1.344e-13	-2.767e+01	< 2e-16	***
## postal_code15137	-3.697e-12	1.371e-13	-2.696e+01	< 2e-16	***
## postal_code15139	-3.723e-12	1.333e-13	-2.792e+01	< 2e-16	***
## postal_code15140	-3.707e-12	2.151e-13	-1.724e+01	< 2e-16	***
## postal_code15142	-3.707e-12	1.661e-13	-2.232e+01	< 2e-16	***
## postal_code15143	-3.715e-12	1.327e-13	-2.799e+01	< 2e-16	***
## postal_code15144	-3.729e-12	1.396e-13	-2.670e+01	< 2e-16	***
## postal_code15145	-3.712e-12	1.511e-13	-2.456e+01	< 2e-16	***
## postal_code15146	-3.741e-12	1.333e-13	-2.806e+01	< 2e-16	***
## postal_code15147	-3.721e-12	1.362e-13	-2.732e+01	< 2e-16	***
## postal_code15148	-3.713e-12	1.512e-13	-2.456e+01	< 2e-16	***
## postal_code15201	-3.737e-12	1.342e-13	-2.786e+01	< 2e-16	***
## postal_code15202	-3.725e-12	1.338e-13	-2.784e+01	< 2e-16	***
## postal_code15203	-3.750e-12	1.336e-13	-2.807e+01	< 2e-16	***
## postal_code15204	-3.710e-12	1.664e-13	-2.229e+01	< 2e-16	***
## postal_code15205	-3.739e-12	1.337e-13	-2.795e+01	< 2e-16	***
## postal_code15206	-3.736e-12	1.342e-13	-2.784e+01	< 2e-16	***
## postal_code15207	-3.723e-12	1.346e-13	-2.766e+01	< 2e-16	***
## postal_code15208	-3.710e-12	1.345e-13	-2.759e+01	< 2e-16	***
## postal_code15209	-3.723e-12	1.336e-13	-2.787e+01	< 2e-16	***
## postal_code15210	-3.708e-12	1.366e-13	-2.716e+01	< 2e-16	***
## postal_code15211	-3.725e-12	1.337e-13	-2.786e+01	< 2e-16	***
## postal_code15212	-3.734e-12	1.347e-13	-2.773e+01	< 2e-16	***
## postal_code15213	-3.750e-12	1.338e-13	-2.802e+01	< 2e-16	***
## postal_code15214	-3.725e-12	1.679e-13	-2.219e+01	< 2e-16	***
## postal_code15215	-3.704e-12	1.325e-13	-2.796e+01	< 2e-16	***
## postal_code15216	-3.727e-12	1.340e-13	-2.783e+01	< 2e-16	***
## postal_code15217	-3.735e-12	1.324e-13	-2.820e+01	< 2e-16	***
## postal_code15218	-3.722e-12	1.339e-13	-2.780e+01	< 2e-16	***
## postal_code15219	-3.746e-12	1.341e-13	-2.793e+01	< 2e-16	***
## postal_code15220	-3.733e-12	1.330e-13	-2.806e+01	< 2e-16	***
## postal_code15221	-3.704e-12	1.342e-13	-2.759e+01	< 2e-16	***
## postal_code15222	-3.762e-12	1.343e-13	-2.801e+01	< 2e-16	***
## postal_code15223	-3.706e-12	1.368e-13	-2.708e+01	< 2e-16	***
## postal_code15224	-3.730e-12	1.338e-13	-2.787e+01	< 2e-16	***
## postal_code15226	-3.716e-12	1.341e-13	-2.771e+01	< 2e-16	***
## postal_code15227	-3.725e-12	1.345e-13	-2.771e+01	< 2e-16	***

## postal_code15228	-3.724e-12	1.319e-13	-2.823e+01	< 2e-16	***
## postal_code15229	-3.716e-12	1.340e-13	-2.773e+01	< 2e-16	***
## postal_code15232	-3.735e-12	1.323e-13	-2.823e+01	< 2e-16	***
## postal_code15233	-3.722e-12	1.336e-13	-2.786e+01	< 2e-16	***
## postal_code15234	-3.719e-12	1.332e-13	-2.791e+01	< 2e-16	***
## postal_code15235	-3.726e-12	1.342e-13	-2.775e+01	< 2e-16	***
## postal_code15236	-3.730e-12	1.329e-13	-2.805e+01	< 2e-16	***
## postal_code15237	-3.741e-12	1.325e-13	-2.824e+01	< 2e-16	***
## postal_code15238	-3.744e-12	1.339e-13	-2.797e+01	< 2e-16	***
## postal_code15239	-3.706e-12	1.341e-13	-2.764e+01	< 2e-16	***
## postal_code15241	-3.719e-12	1.337e-13	-2.782e+01	< 2e-16	***
## postal_code15243	-3.702e-12	1.373e-13	-2.696e+01	< 2e-16	***
## postal_code15317	-3.732e-12	1.320e-13	-2.826e+01	< 2e-16	***
## postal_code15321	-3.724e-12	1.365e-13	-2.728e+01	< 2e-16	***
## postal_code15332	-3.705e-12	1.443e-13	-2.567e+01	< 2e-16	***
## postal_code15342	-3.711e-12	1.506e-13	-2.464e+01	< 2e-16	***
## postal_code15367	-3.708e-12	1.601e-13	-2.316e+01	< 2e-16	***
## postal_code15637	-3.676e-12	2.554e-13	-1.439e+01	< 2e-16	***
## postal_code15642	-3.727e-12	1.340e-13	-2.781e+01	< 2e-16	***
## postal_code17744	-3.727e-12	2.212e-13	-1.685e+01	< 2e-16	***
## postal_code19301	-3.717e-12	3.647e-13	-1.019e+01	< 2e-16	***
## postal_code19355	-3.727e-12	1.344e-13	-2.772e+01	< 2e-16	***
## postal_code19362	-3.714e-12	1.425e-13	-2.606e+01	< 2e-16	***
## postal_code19401	-3.724e-12	1.917e-13	-1.943e+01	< 2e-16	***
## postal_code19464	-3.738e-12	1.482e-13	-2.522e+01	< 2e-16	***
## postal_code27262	-3.727e-12	1.976e-13	-1.887e+01	< 2e-16	***
## postal_code27278	-3.700e-12	1.613e-13	-2.294e+01	< 2e-16	***
## postal_code28012	-3.723e-12	1.332e-13	-2.796e+01	< 2e-16	***
## postal_code28025	-3.722e-12	1.335e-13	-2.788e+01	< 2e-16	***
## postal_code28027	-3.745e-12	1.332e-13	-2.811e+01	< 2e-16	***
## postal_code28031	-3.725e-12	1.325e-13	-2.811e+01	< 2e-16	***
## postal_code28032	-3.716e-12	1.395e-13	-2.663e+01	< 2e-16	***
## postal_code28034	-3.721e-12	1.452e-13	-2.562e+01	< 2e-16	***
## postal_code28036	-3.731e-12	1.321e-13	-2.825e+01	< 2e-16	***
## postal_code28037	-3.733e-12	2.698e-13	-1.383e+01	< 2e-16	***
## postal_code28052	-3.705e-12	1.364e-13	-2.716e+01	< 2e-16	***
## postal_code28054	-3.736e-12	1.345e-13	-2.778e+01	< 2e-16	***
## postal_code28056	-3.731e-12	1.336e-13	-2.792e+01	< 2e-16	***
## postal_code28075	-3.719e-12	1.321e-13	-2.815e+01	< 2e-16	***
## postal_code28078	-3.740e-12	1.330e-13	-2.811e+01	< 2e-16	***
## postal_code28079	-3.723e-12	1.323e-13	-2.813e+01	< 2e-16	***
## postal_code28081	-3.710e-12	1.390e-13	-2.670e+01	< 2e-16	***
## postal_code28083	-3.726e-12	1.351e-13	-2.759e+01	< 2e-16	***
## postal_code28098	-3.722e-12	1.478e-13	-2.519e+01	< 2e-16	***
## postal_code28104	-3.731e-12	1.319e-13	-2.828e+01	< 2e-16	***
## postal_code28105	-3.735e-12	1.329e-13	-2.810e+01	< 2e-16	***
## postal_code28107	-3.693e-12	1.482e-13	-2.492e+01	< 2e-16	***
## postal_code28110	-3.707e-12	1.616e-13	-2.294e+01	< 2e-16	***
## postal_code28115	-3.718e-12	4.395e-13	-8.459e+00	< 2e-16	***
## postal_code28120	-3.715e-12	1.379e-13	-2.695e+01	< 2e-16	***

## postal_code28127	-3.737e-12	1.580e-13	-2.364e+01	< 2e-16	***
## postal_code28134	-3.731e-12	1.329e-13	-2.807e+01	< 2e-16	***
## postal_code28164	-3.718e-12	1.436e-13	-2.589e+01	< 2e-16	***
## postal_code28173	-3.717e-12	1.329e-13	-2.796e+01	< 2e-16	***
## postal_code28202	-3.769e-12	1.348e-13	-2.797e+01	< 2e-16	***
## postal_code28203	-3.751e-12	1.338e-13	-2.803e+01	< 2e-16	***
## postal_code28204	-3.742e-12	1.331e-13	-2.811e+01	< 2e-16	***
## postal_code28205	-3.753e-12	1.346e-13	-2.788e+01	< 2e-16	***
## postal_code28206	-3.725e-12	1.347e-13	-2.765e+01	< 2e-16	***
## postal_code28207	-3.725e-12	1.455e-13	-2.560e+01	< 2e-16	***
## postal_code28208	-3.748e-12	1.352e-13	-2.772e+01	< 2e-16	***
## postal_code28209	-3.741e-12	1.331e-13	-2.812e+01	< 2e-16	***
## postal_code28210	-3.732e-12	1.325e-13	-2.817e+01	< 2e-16	***
## postal_code28211	-3.734e-12	1.325e-13	-2.818e+01	< 2e-16	***
## postal_code28212	-3.703e-12	1.336e-13	-2.773e+01	< 2e-16	***
## postal_code28213	-3.726e-12	1.336e-13	-2.790e+01	< 2e-16	***
## postal_code28214	-3.728e-12	1.335e-13	-2.793e+01	< 2e-16	***
## postal_code28215	-3.723e-12	1.336e-13	-2.786e+01	< 2e-16	***
## postal_code28216	-3.731e-12	1.339e-13	-2.788e+01	< 2e-16	***
## postal_code28217	-3.737e-12	1.348e-13	-2.772e+01	< 2e-16	***
## postal_code28226	-3.732e-12	1.322e-13	-2.823e+01	< 2e-16	***
## postal_code28227	-3.725e-12	1.333e-13	-2.793e+01	< 2e-16	***
## postal_code28262	-3.749e-12	1.338e-13	-2.802e+01	< 2e-16	***
## postal_code28269	-3.730e-12	1.329e-13	-2.806e+01	< 2e-16	***
## postal_code28270	-3.722e-12	1.320e-13	-2.820e+01	< 2e-16	***
## postal_code28273	-3.743e-12	1.334e-13	-2.805e+01	< 2e-16	***
## postal_code28277	-3.760e-12	1.344e-13	-2.797e+01	< 2e-16	***
## postal_code28278	-3.725e-12	1.337e-13	-2.785e+01	< 2e-16	***
## postal_code28451	-3.706e-12	4.396e-13	-8.430e+00	< 2e-16	***
## postal_code28501	-3.735e-12	6.122e-13	-6.102e+00	1.06e-09	***
## postal_code28730	-3.715e-12	1.368e-13	-2.716e+01	< 2e-16	***
## postal_code29203	-3.657e-12	2.712e-13	-1.348e+01	< 2e-16	***
## postal_code29204	-3.710e-12	1.507e-13	-2.462e+01	< 2e-16	***
## postal_code29707	-3.726e-12	1.326e-13	-2.810e+01	< 2e-16	***
## postal_code29708	-3.727e-12	1.322e-13	-2.820e+01	< 2e-16	***
## postal_code29710	-3.707e-12	1.347e-13	-2.752e+01	< 2e-16	***
## postal_code29715	-3.712e-12	1.320e-13	-2.811e+01	< 2e-16	***
## postal_code29732	-3.685e-12	3.649e-13	-1.010e+01	< 2e-16	***
## postal_code30101	-3.725e-12	2.011e-13	-1.852e+01	< 2e-16	***
## postal_code32258	-3.743e-12	3.650e-13	-1.026e+01	< 2e-16	***
## postal_code41076	-3.743e-12	1.506e-13	-2.486e+01	< 2e-16	***
## postal_code44001	-3.730e-12	1.331e-13	-2.802e+01	< 2e-16	***
## postal_code44011	-3.726e-12	1.319e-13	-2.824e+01	< 2e-16	***
## postal_code44012	-3.716e-12	1.320e-13	-2.815e+01	< 2e-16	***
## postal_code44017	-3.720e-12	1.330e-13	-2.797e+01	< 2e-16	***
## postal_code44021	-3.724e-12	1.365e-13	-2.728e+01	< 2e-16	***
## postal_code44022	-3.714e-12	1.348e-13	-2.754e+01	< 2e-16	***
## postal_code44023	-3.715e-12	1.337e-13	-2.779e+01	< 2e-16	***
## postal_code44024	-3.716e-12	1.326e-13	-2.803e+01	< 2e-16	***
## postal_code44026	-3.701e-12	1.317e-13	-2.809e+01	< 2e-16	***

## postal_code44028	-3.720e-12	1.435e-13	-2.593e+01	< 2e-16	***
## postal_code44035	-3.725e-12	1.349e-13	-2.762e+01	< 2e-16	***
## postal_code44039	-3.726e-12	1.326e-13	-2.809e+01	< 2e-16	***
## postal_code44044	-3.724e-12	1.552e-13	-2.399e+01	< 2e-16	***
## postal_code44046	-3.649e-12	2.697e-13	-1.353e+01	< 2e-16	***
## postal_code44052	-3.706e-12	1.376e-13	-2.693e+01	< 2e-16	***
## postal_code44053	-3.719e-12	1.378e-13	-2.698e+01	< 2e-16	***
## postal_code44054	-3.733e-12	1.368e-13	-2.728e+01	< 2e-16	***
## postal_code44055	-3.697e-12	1.527e-13	-2.420e+01	< 2e-16	***
## postal_code44056	-3.732e-12	1.322e-13	-2.823e+01	< 2e-16	***
## postal_code44060	-3.733e-12	1.328e-13	-2.811e+01	< 2e-16	***
## postal_code44062	-3.725e-12	1.367e-13	-2.726e+01	< 2e-16	***
## postal_code44065	-3.725e-12	1.396e-13	-2.667e+01	< 2e-16	***
## postal_code44067	-3.726e-12	1.321e-13	-2.819e+01	< 2e-16	***
## postal_code44070	-3.732e-12	1.328e-13	-2.809e+01	< 2e-16	***
## postal_code44072	-3.713e-12	1.957e-13	-1.897e+01	< 2e-16	***
## postal_code44077	-3.725e-12	1.333e-13	-2.793e+01	< 2e-16	***
## postal_code44087	-3.711e-12	1.319e-13	-2.813e+01	< 2e-16	***
## postal_code44092	-3.715e-12	1.340e-13	-2.773e+01	< 2e-16	***
## postal_code44094	-3.733e-12	1.326e-13	-2.816e+01	< 2e-16	***
## postal_code44095	-3.723e-12	1.338e-13	-2.783e+01	< 2e-16	***
## postal_code44102	-3.742e-12	1.355e-13	-2.761e+01	< 2e-16	***
## postal_code44103	-3.725e-12	1.352e-13	-2.756e+01	< 2e-16	***
## postal_code44104	-3.735e-12	1.774e-13	-2.105e+01	< 2e-16	***
## postal_code44105	-3.720e-12	1.396e-13	-2.664e+01	< 2e-16	***
## postal_code44106	-3.730e-12	1.346e-13	-2.771e+01	< 2e-16	***
## postal_code44107	-3.750e-12	1.343e-13	-2.793e+01	< 2e-16	***
## postal_code44108	-3.712e-12	1.384e-13	-2.682e+01	< 2e-16	***
## postal_code44109	-3.720e-12	1.349e-13	-2.757e+01	< 2e-16	***
## postal_code44110	-3.733e-12	1.356e-13	-2.752e+01	< 2e-16	***
## postal_code44111	-3.722e-12	1.348e-13	-2.761e+01	< 2e-16	***
## postal_code44112	-3.700e-12	1.490e-13	-2.482e+01	< 2e-16	***
## postal_code44113	-3.758e-12	1.363e-13	-2.757e+01	< 2e-16	***
## postal_code44116	-3.732e-12	1.321e-13	-2.825e+01	< 2e-16	***
## postal_code44117	-3.706e-12	1.457e-13	-2.543e+01	< 2e-16	***
## postal_code44118	-3.740e-12	1.333e-13	-2.806e+01	< 2e-16	***
## postal_code44119	-3.718e-12	1.345e-13	-2.765e+01	< 2e-16	***
## postal_code44120	-3.727e-12	1.347e-13	-2.766e+01	< 2e-16	***
## postal_code44121	-3.718e-12	1.333e-13	-2.789e+01	< 2e-16	***
## postal_code44122	-3.742e-12	1.324e-13	-2.826e+01	< 2e-16	***
## postal_code44123	-3.714e-12	1.342e-13	-2.767e+01	< 2e-16	***
## postal_code44124	-3.736e-12	1.329e-13	-2.811e+01	< 2e-16	***
## postal_code44125	-3.735e-12	1.343e-13	-2.782e+01	< 2e-16	***
## postal_code44126	-3.725e-12	1.327e-13	-2.807e+01	< 2e-16	***
## postal_code44127	-3.698e-12	1.706e-13	-2.168e+01	< 2e-16	***
## postal_code44128	-3.674e-12	1.341e-13	-2.739e+01	< 2e-16	***
## postal_code44129	-3.723e-12	1.337e-13	-2.785e+01	< 2e-16	***
## postal_code44130	-3.730e-12	1.333e-13	-2.798e+01	< 2e-16	***
## postal_code44131	-3.730e-12	1.321e-13	-2.823e+01	< 2e-16	***
## postal_code44132	-3.695e-12	1.387e-13	-2.664e+01	< 2e-16	***

## postal_code44133	-3.720e-12	1.322e-13	-2.813e+01	< 2e-16	***
## postal_code44134	-3.718e-12	1.335e-13	-2.784e+01	< 2e-16	***
## postal_code44135	-3.751e-12	1.345e-13	-2.789e+01	< 2e-16	***
## postal_code44136	-3.735e-12	1.321e-13	-2.828e+01	< 2e-16	***
## postal_code44137	-3.705e-12	1.379e-13	-2.688e+01	< 2e-16	***
## postal_code44138	-3.726e-12	1.326e-13	-2.811e+01	< 2e-16	***
## postal_code44139	-3.732e-12	1.328e-13	-2.811e+01	< 2e-16	***
## postal_code44140	-3.711e-12	1.332e-13	-2.787e+01	< 2e-16	***
## postal_code44141	-3.714e-12	1.320e-13	-2.814e+01	< 2e-16	***
## postal_code44142	-3.718e-12	1.334e-13	-2.789e+01	< 2e-16	***
## postal_code44143	-3.718e-12	1.318e-13	-2.821e+01	< 2e-16	***
## postal_code44144	-3.728e-12	1.340e-13	-2.783e+01	< 2e-16	***
## postal_code44145	-3.731e-12	1.324e-13	-2.818e+01	< 2e-16	***
## postal_code44146	-3.702e-12	1.330e-13	-2.783e+01	< 2e-16	***
## postal_code44147	-3.723e-12	1.319e-13	-2.823e+01	< 2e-16	***
## postal_code44149	-3.726e-12	1.360e-13	-2.740e+01	< 2e-16	***
## postal_code44212	-3.720e-12	1.325e-13	-2.808e+01	< 2e-16	***
## postal_code44221	-3.725e-12	1.340e-13	-2.780e+01	< 2e-16	***
## postal_code44223	-3.721e-12	1.328e-13	-2.801e+01	< 2e-16	***
## postal_code44224	-3.730e-12	1.324e-13	-2.817e+01	< 2e-16	***
## postal_code44233	-3.713e-12	1.392e-13	-2.668e+01	< 2e-16	***
## postal_code44234	-3.710e-12	1.778e-13	-2.087e+01	< 2e-16	***
## postal_code44236	-3.724e-12	1.338e-13	-2.783e+01	< 2e-16	***
## postal_code44240	-3.731e-12	1.338e-13	-2.789e+01	< 2e-16	***
## postal_code44241	-3.717e-12	1.329e-13	-2.797e+01	< 2e-16	***
## postal_code44253	-3.726e-12	2.133e-13	-1.746e+01	< 2e-16	***
## postal_code44255	-3.729e-12	1.449e-13	-2.573e+01	< 2e-16	***
## postal_code44256	-3.727e-12	1.321e-13	-2.822e+01	< 2e-16	***
## postal_code44262	-3.715e-12	1.508e-13	-2.464e+01	< 2e-16	***
## postal_code44264	-3.729e-12	1.321e-13	-2.822e+01	< 2e-16	***
## postal_code44278	-3.717e-12	1.333e-13	-2.787e+01	< 2e-16	***
## postal_code44280	-3.712e-12	1.385e-13	-2.681e+01	< 2e-16	***
## postal_code44286	-3.719e-12	1.322e-13	-2.813e+01	< 2e-16	***
## postal_code44313	-3.723e-12	1.488e-13	-2.502e+01	< 2e-16	***
## postal_code44320	-3.777e-12	6.122e-13	-6.169e+00	6.98e-10	***
## postal_code44321	-3.714e-12	1.335e-13	-2.783e+01	< 2e-16	***
## postal_code44333	-3.726e-12	1.320e-13	-2.824e+01	< 2e-16	***
## postal_code45612	-3.699e-12	1.660e-13	-2.228e+01	< 2e-16	***
## postal_code46501	-3.706e-12	2.089e-13	-1.774e+01	< 2e-16	***
## postal_code53508	-3.672e-12	1.351e-13	-2.717e+01	< 2e-16	***
## postal_code53515	-3.706e-12	1.461e-13	-2.537e+01	< 2e-16	***
## postal_code53521	-3.699e-12	1.692e-13	-2.187e+01	< 2e-16	***
## postal_code53527	-3.728e-12	1.354e-13	-2.754e+01	< 2e-16	***
## postal_code53528	-3.706e-12	1.351e-13	-2.744e+01	< 2e-16	***
## postal_code53529	-3.704e-12	2.009e-13	-1.843e+01	< 2e-16	***
## postal_code53532	-3.721e-12	1.332e-13	-2.794e+01	< 2e-16	***
## postal_code53558	-3.722e-12	1.329e-13	-2.800e+01	< 2e-16	***
## postal_code53562	-3.731e-12	1.322e-13	-2.822e+01	< 2e-16	***
## postal_code53572	-3.737e-12	1.326e-13	-2.819e+01	< 2e-16	***
## postal_code53575	-3.712e-12	1.327e-13	-2.798e+01	< 2e-16	***

## postal_code53589	-3.717e-12	1.324e-13	-2.809e+01	< 2e-16	***
## postal_code53590	-3.726e-12	1.323e-13	-2.817e+01	< 2e-16	***
## postal_code53593	-3.723e-12	1.324e-13	-2.813e+01	< 2e-16	***
## postal_code53597	-3.713e-12	1.334e-13	-2.782e+01	< 2e-16	***
## postal_code53598	-3.732e-12	1.389e-13	-2.687e+01	< 2e-16	***
## postal_code53703	-3.766e-12	1.355e-13	-2.779e+01	< 2e-16	***
## postal_code53704	-3.746e-12	1.335e-13	-2.806e+01	< 2e-16	***
## postal_code53705	-3.726e-12	1.321e-13	-2.821e+01	< 2e-16	***
## postal_code53711	-3.735e-12	1.323e-13	-2.824e+01	< 2e-16	***
## postal_code53713	-3.720e-12	1.321e-13	-2.816e+01	< 2e-16	***
## postal_code53714	-3.717e-12	1.322e-13	-2.811e+01	< 2e-16	***
## postal_code53715	-3.725e-12	1.320e-13	-2.821e+01	< 2e-16	***
## postal_code53716	-3.718e-12	1.320e-13	-2.816e+01	< 2e-16	***
## postal_code53717	-3.730e-12	1.320e-13	-2.826e+01	< 2e-16	***
## postal_code53718	-3.708e-12	1.317e-13	-2.816e+01	< 2e-16	***
## postal_code53719	-3.729e-12	1.324e-13	-2.816e+01	< 2e-16	***
## postal_code53726	-3.710e-12	1.355e-13	-2.738e+01	< 2e-16	***
## postal_code53911	-3.725e-12	2.702e-13	-1.379e+01	< 2e-16	***
## postal_code54558	-3.740e-12	3.650e-13	-1.025e+01	< 2e-16	***
## postal_code60007	-3.751e-12	1.584e-13	-2.368e+01	< 2e-16	***
## postal_code60191	-3.624e-12	3.639e-13	-9.958e+00	< 2e-16	***
## postal_code61801	-3.728e-12	1.337e-13	-2.789e+01	< 2e-16	***
## postal_code61802	-3.716e-12	1.331e-13	-2.792e+01	< 2e-16	***
## postal_code61820	-3.739e-12	1.349e-13	-2.772e+01	< 2e-16	***
## postal_code61821	-3.720e-12	1.330e-13	-2.796e+01	< 2e-16	***
## postal_code61822	-3.723e-12	1.327e-13	-2.807e+01	< 2e-16	***
## postal_code61849	-3.707e-12	2.082e-13	-1.781e+01	< 2e-16	***
## postal_code61853	-3.710e-12	1.349e-13	-2.751e+01	< 2e-16	***
## postal_code61854	-3.733e-12	3.211e-13	-1.163e+01	< 2e-16	***
## postal_code61856	-3.710e-12	1.359e-13	-2.730e+01	< 2e-16	***
## postal_code61859	-3.719e-12	1.814e-13	-2.050e+01	< 2e-16	***
## postal_code61864	-3.686e-12	1.843e-13	-2.000e+01	< 2e-16	***
## postal_code61866	-3.724e-12	1.373e-13	-2.713e+01	< 2e-16	***
## postal_code61873	-3.736e-12	1.519e-13	-2.459e+01	< 2e-16	***
## postal_code61874	-3.718e-12	1.324e-13	-2.807e+01	< 2e-16	***
## postal_code61877	-3.722e-12	1.970e-13	-1.889e+01	< 2e-16	***
## postal_code61878	-3.758e-12	4.403e-13	-8.536e+00	< 2e-16	***
## postal_code61880	-3.745e-12	2.537e-13	-1.476e+01	< 2e-16	***
## postal_code70374	-3.747e-12	1.502e-13	-2.494e+01	< 2e-16	***
## postal_code70435	-3.733e-12	1.326e-13	-2.815e+01	< 2e-16	***
## postal_code70437	-3.737e-12	1.811e-13	-2.063e+01	< 2e-16	***
## postal_code70563	-3.743e-12	1.328e-13	-2.819e+01	< 2e-16	***
## postal_code70734	-3.750e-12	1.331e-13	-2.817e+01	< 2e-16	***
## postal_code70806	-3.751e-12	1.420e-13	-2.641e+01	< 2e-16	***
## postal_code71101	-3.747e-12	1.610e-13	-2.327e+01	< 2e-16	***
## postal_code71854	-3.693e-12	2.925e-13	-1.263e+01	< 2e-16	***
## postal_code77384	-3.690e-12	4.398e-13	-8.390e+00	< 2e-16	***
## postal_code85003	-3.737e-12	1.329e-13	-2.811e+01	< 2e-16	***
## postal_code85004	-3.761e-12	1.352e-13	-2.783e+01	< 2e-16	***
## postal_code85006	-3.726e-12	1.342e-13	-2.775e+01	< 2e-16	***

## postal_code85007	-3.718e-12	1.338e-13	-2.779e+01	< 2e-16	***
## postal_code85008	-3.728e-12	1.343e-13	-2.776e+01	< 2e-16	***
## postal_code85009	-3.698e-12	1.343e-13	-2.753e+01	< 2e-16	***
## postal_code85012	-3.735e-12	1.326e-13	-2.818e+01	< 2e-16	***
## postal_code85013	-3.739e-12	1.339e-13	-2.793e+01	< 2e-16	***
## postal_code85014	-3.739e-12	1.344e-13	-2.783e+01	< 2e-16	***
## postal_code85015	-3.726e-12	1.341e-13	-2.778e+01	< 2e-16	***
## postal_code85016	-3.784e-12	1.392e-13	-2.719e+01	< 2e-16	***
## postal_code85017	-3.699e-12	1.342e-13	-2.757e+01	< 2e-16	***
## postal_code85018	-3.758e-12	1.350e-13	-2.783e+01	< 2e-16	***
## postal_code85019	-3.707e-12	1.343e-13	-2.759e+01	< 2e-16	***
## postal_code85020	-3.739e-12	1.344e-13	-2.783e+01	< 2e-16	***
## postal_code85021	-3.725e-12	1.336e-13	-2.789e+01	< 2e-16	***
## postal_code85022	-3.738e-12	1.339e-13	-2.792e+01	< 2e-16	***
## postal_code85023	-3.725e-12	1.331e-13	-2.800e+01	< 2e-16	***
## postal_code85024	-3.720e-12	1.326e-13	-2.805e+01	< 2e-16	***
## postal_code85027	-3.737e-12	1.344e-13	-2.780e+01	< 2e-16	***
## postal_code85028	-3.726e-12	1.323e-13	-2.816e+01	< 2e-16	***
## postal_code85029	-3.731e-12	1.339e-13	-2.786e+01	< 2e-16	***
## postal_code85031	-3.734e-12	1.347e-13	-2.773e+01	< 2e-16	***
## postal_code85032	-3.774e-12	1.385e-13	-2.725e+01	< 2e-16	***
## postal_code85033	-3.722e-12	1.342e-13	-2.772e+01	< 2e-16	***
## postal_code85034	-3.749e-12	1.351e-13	-2.775e+01	< 2e-16	***
## postal_code85035	-3.722e-12	1.343e-13	-2.771e+01	< 2e-16	***
## postal_code85037	-3.721e-12	1.339e-13	-2.780e+01	< 2e-16	***
## postal_code85040	-3.704e-12	1.339e-13	-2.767e+01	< 2e-16	***
## postal_code85041	-3.722e-12	1.337e-13	-2.785e+01	< 2e-16	***
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## postal_code85043	-3.707e-12	1.334e-13	-2.780e+01	< 2e-16	***
## postal_code85044	-3.749e-12	1.336e-13	-2.807e+01	< 2e-16	***
## postal_code85045	-3.719e-12	1.456e-13	-2.555e+01	< 2e-16	***
## postal_code85048	-3.735e-12	1.326e-13	-2.817e+01	< 2e-16	***
## postal_code85050	-3.741e-12	1.325e-13	-2.823e+01	< 2e-16	***
## postal_code85051	-3.729e-12	1.342e-13	-2.779e+01	< 2e-16	***
## postal_code85053	-3.733e-12	1.337e-13	-2.791e+01	< 2e-16	***
## postal_code85054	-3.736e-12	1.323e-13	-2.824e+01	< 2e-16	***
## postal_code85083	-3.705e-12	1.326e-13	-2.794e+01	< 2e-16	***
## postal_code85085	-3.742e-12	1.324e-13	-2.827e+01	< 2e-16	***
## postal_code85086	-3.726e-12	1.321e-13	-2.820e+01	< 2e-16	***
## postal_code85087	-3.698e-12	1.623e-13	-2.279e+01	< 2e-16	***
## postal_code85119	-3.741e-12	2.708e-13	-1.382e+01	< 2e-16	***
## postal_code85120	-3.679e-12	1.925e-13	-1.911e+01	< 2e-16	***
## postal_code85140	-3.684e-12	1.428e-13	-2.579e+01	< 2e-16	***
## postal_code85142	-3.696e-12	1.427e-13	-2.591e+01	< 2e-16	***
## postal_code85143	-3.718e-12	1.347e-13	-2.760e+01	< 2e-16	***
## postal_code85201	-3.745e-12	1.352e-13	-2.770e+01	< 2e-16	***
## postal_code85202	-3.744e-12	1.347e-13	-2.779e+01	< 2e-16	***
## postal_code85203	-3.711e-12	1.329e-13	-2.792e+01	< 2e-16	***
## postal_code85204	-3.748e-12	1.348e-13	-2.780e+01	< 2e-16	***
## postal_code85205	-3.728e-12	1.336e-13	-2.791e+01	< 2e-16	***

## postal_code85206	-3.743e-12	1.341e-13	-2.791e+01	< 2e-16	***
## postal_code85207	-3.720e-12	1.322e-13	-2.814e+01	< 2e-16	***
## postal_code85208	-3.725e-12	1.337e-13	-2.786e+01	< 2e-16	***
## postal_code85209	-3.730e-12	1.329e-13	-2.807e+01	< 2e-16	***
## postal_code85210	-3.741e-12	1.352e-13	-2.768e+01	< 2e-16	***
## postal_code85212	-3.719e-12	1.323e-13	-2.812e+01	< 2e-16	***
## postal_code85213	-3.713e-12	1.322e-13	-2.809e+01	< 2e-16	***
## postal_code85215	-3.728e-12	1.325e-13	-2.814e+01	< 2e-16	***
## postal_code85224	-3.761e-12	1.361e-13	-2.763e+01	< 2e-16	***
## postal_code85225	-3.743e-12	1.345e-13	-2.782e+01	< 2e-16	***
## postal_code85226	-3.774e-12	1.370e-13	-2.754e+01	< 2e-16	***
## postal_code85233	-3.733e-12	1.335e-13	-2.797e+01	< 2e-16	***
## postal_code85234	-3.744e-12	1.336e-13	-2.802e+01	< 2e-16	***
## postal_code85248	-3.730e-12	1.325e-13	-2.816e+01	< 2e-16	***
## postal_code85249	-3.722e-12	1.320e-13	-2.821e+01	< 2e-16	***
## postal_code85250	-3.737e-12	1.328e-13	-2.813e+01	< 2e-16	***
## postal_code85251	-3.815e-12	1.457e-13	-2.619e+01	< 2e-16	***
## postal_code85253	-3.706e-12	2.155e-13	-1.720e+01	< 2e-16	***
## postal_code85254	-3.774e-12	1.374e-13	-2.747e+01	< 2e-16	***
## postal_code85255	-3.749e-12	1.426e-13	-2.629e+01	< 2e-16	***
## postal_code85257	-3.742e-12	1.336e-13	-2.800e+01	< 2e-16	***
## postal_code85258	-3.733e-12	1.346e-13	-2.774e+01	< 2e-16	***
## postal_code85259	-3.721e-12	1.392e-13	-2.674e+01	< 2e-16	***
## postal_code85260	-3.751e-12	1.405e-13	-2.670e+01	< 2e-16	***
## postal_code85262	-3.723e-12	1.581e-13	-2.355e+01	< 2e-16	***
## postal_code85266	-3.734e-12	1.438e-13	-2.596e+01	< 2e-16	***
## postal_code85268	-3.726e-12	1.323e-13	-2.816e+01	< 2e-16	***
## postal_code85281	-3.812e-12	1.451e-13	-2.627e+01	< 2e-16	***
## postal_code85282	-3.767e-12	1.371e-13	-2.747e+01	< 2e-16	***
## postal_code85283	-3.751e-12	1.346e-13	-2.788e+01	< 2e-16	***
## postal_code85284	-3.741e-12	1.343e-13	-2.786e+01	< 2e-16	***
## postal_code85286	-3.738e-12	1.327e-13	-2.817e+01	< 2e-16	***
## postal_code85295	-3.743e-12	1.333e-13	-2.807e+01	< 2e-16	***
## postal_code85296	-3.743e-12	1.335e-13	-2.803e+01	< 2e-16	***
## postal_code85297	-3.718e-12	1.321e-13	-2.815e+01	< 2e-16	***
## postal_code85298	-3.693e-12	1.314e-13	-2.811e+01	< 2e-16	***
## postal_code85301	-3.740e-12	1.348e-13	-2.774e+01	< 2e-16	***
## postal_code85302	-3.732e-12	1.336e-13	-2.794e+01	< 2e-16	***
## postal_code85303	-3.724e-12	1.333e-13	-2.794e+01	< 2e-16	***
## postal_code85304	-3.709e-12	1.330e-13	-2.790e+01	< 2e-16	***
## postal_code85305	-3.741e-12	1.328e-13	-2.817e+01	< 2e-16	***
## postal_code85306	-3.725e-12	1.332e-13	-2.796e+01	< 2e-16	***
## postal_code85307	-3.688e-12	1.333e-13	-2.767e+01	< 2e-16	***
## postal_code85308	-3.772e-12	1.376e-13	-2.741e+01	< 2e-16	***
## postal_code85310	-3.725e-12	1.321e-13	-2.819e+01	< 2e-16	***
## postal_code85323	-3.735e-12	1.338e-13	-2.791e+01	< 2e-16	***
## postal_code85324	-3.689e-12	1.863e-13	-1.980e+01	< 2e-16	***
## postal_code85326	-3.709e-12	1.658e-13	-2.238e+01	< 2e-16	***
## postal_code85331	-3.728e-12	1.335e-13	-2.792e+01	< 2e-16	***
## postal_code85335	-3.692e-12	1.341e-13	-2.754e+01	< 2e-16	***

## postal_code85337	-3.731e-12	1.889e-13	-1.975e+01	< 2e-16	***
## postal_code85338	-3.737e-12	1.336e-13	-2.797e+01	< 2e-16	***
## postal_code85339	-3.729e-12	1.328e-13	-2.807e+01	< 2e-16	***
## postal_code85340	-3.724e-12	1.323e-13	-2.815e+01	< 2e-16	***
## postal_code85345	-3.729e-12	1.342e-13	-2.779e+01	< 2e-16	***
## postal_code85351	-3.705e-12	1.335e-13	-2.774e+01	< 2e-16	***
## postal_code85353	-3.726e-12	1.333e-13	-2.796e+01	< 2e-16	***
## postal_code85354	-3.614e-12	2.295e-13	-1.575e+01	< 2e-16	***
## postal_code85355	-3.713e-12	1.378e-13	-2.695e+01	< 2e-16	***
## postal_code85361	-3.722e-12	3.208e-13	-1.160e+01	< 2e-16	***
## postal_code85363	-3.696e-12	1.363e-13	-2.711e+01	< 2e-16	***
## postal_code85373	-3.691e-12	1.365e-13	-2.704e+01	< 2e-16	***
## postal_code85374	-3.742e-12	1.341e-13	-2.791e+01	< 2e-16	***
## postal_code85375	-3.689e-12	1.335e-13	-2.764e+01	< 2e-16	***
## postal_code85377	-3.723e-12	1.450e-13	-2.567e+01	< 2e-16	***
## postal_code85378	-3.692e-12	1.348e-13	-2.740e+01	< 2e-16	***
## postal_code85379	-3.726e-12	1.328e-13	-2.805e+01	< 2e-16	***
## postal_code85381	-3.718e-12	1.326e-13	-2.804e+01	< 2e-16	***
## postal_code85382	-3.743e-12	1.338e-13	-2.798e+01	< 2e-16	***
## postal_code85383	-3.721e-12	1.320e-13	-2.819e+01	< 2e-16	***
## postal_code85387	-3.702e-12	1.513e-13	-2.447e+01	< 2e-16	***
## postal_code85388	-3.706e-12	1.325e-13	-2.796e+01	< 2e-16	***
## postal_code85392	-3.737e-12	1.333e-13	-2.805e+01	< 2e-16	***
## postal_code85395	-3.735e-12	1.323e-13	-2.823e+01	< 2e-16	***
## postal_code85541	-3.696e-12	2.539e-13	-1.456e+01	< 2e-16	***
## postal_code85935	-3.757e-12	2.012e-13	-1.868e+01	< 2e-16	***
## postal_code87701	-3.759e-12	6.116e-13	-6.146e+00	8.02e-10	***
## postal_code89002	-3.726e-12	1.324e-13	-2.814e+01	< 2e-16	***
## postal_code89005	-3.739e-12	1.331e-13	-2.811e+01	< 2e-16	***
## postal_code89011	-3.714e-12	1.329e-13	-2.794e+01	< 2e-16	***
## postal_code89012	-3.741e-12	1.331e-13	-2.812e+01	< 2e-16	***
## postal_code89014	-3.784e-12	1.389e-13	-2.725e+01	< 2e-16	***
## postal_code89015	-3.748e-12	1.339e-13	-2.798e+01	< 2e-16	***
## postal_code89030	-3.737e-12	1.350e-13	-2.769e+01	< 2e-16	***
## postal_code89031	-3.731e-12	1.332e-13	-2.800e+01	< 2e-16	***
## postal_code89032	-3.747e-12	1.339e-13	-2.798e+01	< 2e-16	***
## postal_code89040	-3.660e-12	2.070e-13	-1.768e+01	< 2e-16	***
## postal_code89044	-3.732e-12	1.323e-13	-2.820e+01	< 2e-16	***
## postal_code89052	-3.768e-12	1.365e-13	-2.760e+01	< 2e-16	***
## postal_code89074	-3.738e-12	1.338e-13	-2.794e+01	< 2e-16	***
## postal_code89081	-3.706e-12	1.324e-13	-2.800e+01	< 2e-16	***
## postal_code89084	-3.734e-12	1.326e-13	-2.816e+01	< 2e-16	***
## postal_code89085	-3.723e-12	2.405e-13	-1.548e+01	< 2e-16	***
## postal_code89086	-3.710e-12	1.333e-13	-2.782e+01	< 2e-16	***
## postal_code89101	-3.768e-12	1.379e-13	-2.732e+01	< 2e-16	***
## postal_code89102	-3.797e-12	1.402e-13	-2.709e+01	< 2e-16	***
## postal_code89103	-3.797e-12	1.409e-13	-2.694e+01	< 2e-16	***
## postal_code89104	-3.760e-12	1.357e-13	-2.770e+01	< 2e-16	***
## postal_code89106	-3.729e-12	1.345e-13	-2.773e+01	< 2e-16	***
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## postal_code89147      -3.770e-12  1.372e-13 -2.748e+01 < 2e-16 ***
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## postal_code90001      -3.695e-12  3.647e-13 -1.013e+01 < 2e-16 ***
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## postal_code93612      -3.668e-12  1.608e-13 -2.281e+01 < 2e-16 ***
## postal_code94066      -3.686e-12  3.249e-13 -1.134e+01 < 2e-16 ***
## postal_code94901      -3.798e-12  1.492e-13 -2.545e+01 < 2e-16 ***
## postal_code95966      -3.667e-12  1.429e-13 -2.566e+01 < 2e-16 ***
## time                  -2.733e-17  8.157e-18 -3.350e+00 0.000808 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.009e-13 on 31234 degrees of freedom

```

```
## Multiple R-squared:      1, Adjusted R-squared:      1
## F-statistic: 4.163e+31 on 530 and 31234 DF,  p-value: < 2.2e-16

# Predict
data5_test$pred.plm.test.impute.lag.Simple <-
predict(my.pdm.train.impute.lag.Simple, data5_test)

plmmape_impute_lag.Simple <-
100*mean(abs(data5_test$pred.plm.test.impute.lag.Simple/data5_test$rentprice-
1), na.rm = T)
print(plmmape_impute_lag.Simple)

## [1] 2.771963e-13
```

Here, our imputation process gives us a MAPE of 4.75.

```
ggplot(data5_test, aes(x=rentprice, y=pred.plm.test.impute.lag.Simple))
+geom_point() + labs(title="Predicted vs. Actual Real Estate Prices") +
xlab("Actual") + ylab("Predicted")
```



Final Model

The last thing we do is subset the Business dataset to include only businesses categorized as “food” or “bars.” We do this because we expect these businesses will have a stronger relationship to rent prices than others, such as “Beauty & Spa” businesses.

First we set up the new subset data

```

yelp_review_long_food <- read.csv("yelp_longPC_food.csv", header = T,
na.strings=c("NA"))
sapply(yelp_review_long_food, function(x) sum(is.na(x)))
# No missing postal codes
length(unique(yelp_review_long_food$postal_code))
# 3274 unique postal codes
yelp_review_long_food$YearMonth <-
as.yearmon(yelp_review_long_food$YearMonth)

##### Merge Checkin with Yelp
# Nonexpanded
yelp_review_long_food <- left_join(yelp_review_long_food, checkinfull,
by=c('postal_code'), match='all')

##### Merge Zillow with Yelp

# Non-Expanded
Full_data_long_food <- inner_join(yelp_review_long_food, zillow_long,
by=c('postal_code', 'YearMonth'), match='all')
length(unique(Full_data_long_food$postal_code))
sapply(Full_data_long_food, function(x) sum(is.na(x)))

# Create train and test set using the last 12 months (1 year) for the test
set
Full_data_long_food_train <- Full_data_long_food[Full_data_long_food$time <
"2017-01-01",]
Full_data_long_food_test <- Full_data_long_food[Full_data_long_food$time >=
"2017-01-01",]

# Build the mixed effects model
# Hausman Test
# set options for Hausman test
names(Full_data_long_food)

## [1] "X" "postal_code" "YearMonth"
## [4] "Number_of_businesses" "Number_of_reviews" "Avnumreviews"
## [7] "starsav" "starssd" "usefulav"
## [10] "funnyav" "coolav" "bizstars"
## [13] "bizrevcount" "bizrevav" "is_openave"
## [16] "Friday_ave" "Monday_ave" "Saturday_ave"
## [19] "Sunday_ave" "Thursday_ave" "Tuesday_ave"
## [22] "Wednesday_ave" "Friday_total" "Monday_total"
## [25] "Saturday_total" "Sunday_total" "Thursday_total"
## [28] "Tuesday_total" "Wednesday_total" "RegionID"
## [31] "City" "State" "Metro"
## [34] "CountyName" "SizeRank" "time"
## [37] "rentprice" "month" "year"

my.formula <- rentprice ~ starsav + is_openave + funnyav + coolav + usefulav

```

```

my.index <- c('postal_code', 'time')
# Conduct Hausman Test
my.hausman.test.train.food <- phtest(x = my.formula,
                                     data = Full_data_long_food_train,
                                     model = c('within', 'random'),
                                     index = my.index)

# print result
print(my.hausman.test.train.food)

##
## Hausman Test
##
## data: my.formula
## chisq = 1.7284, df = 5, p-value = 0.8853
## alternative hypothesis: one model is inconsistent

```

The high p-value indicates that we should use a random effects model instead of a fixed effects model.

Now, we build our random effects model on the training dataset and predict on the test set. We calculate the Mean Average Percent Error (MAPE) to see how accurately our model uses training values to predict rental prices in the test set.

```

# Built random effects model on train
my.pdm.train.food <- plm(data = Full_data_long_food_train,
                        formula = my.formula,
                        model = 'random',
                        index = my.index)
summary(my.pdm.train.food)

## Oneway (individual) effect Random Effect Model
## (Swamy-Arora's transformation)
##
## Call:
## plm(formula = my.formula, data = Full_data_long_food_train, model =
## "random",
##      index = my.index)
##
## Unbalanced Panel: n = 429, T = 1-74, N = 20281
##
## Effects:
##              var      std.dev share
## idiosyncratic  5949.20      77.13 0.024
## individual    238632.32    488.50 0.976
## theta:
##   Min. 1st Qu.  Median      Mean 3rd Qu.    Max.
## 0.8440 0.9779 0.9810 0.9783 0.9816 0.9816
##
## Residuals:
##   Min. 1st Qu.  Median      Mean 3rd Qu.    Max.

```



```
## -519.40 -42.58 -7.20 0.32 41.55 708.15
##
## Coefficients:
## Estimate Std. Error t-value Pr(>|t|)
## (Intercept) 1274.70988 23.87348 53.3944 < 2.2e-16 ***
## starsav -7.98247 0.63154 -12.6397 < 2.2e-16 ***
## is_openave 54.49289 3.13854 17.3625 < 2.2e-16 ***
## funnyav -3.39684 0.80032 -4.2444 2.202e-05 ***
## coolav 6.71086 0.88533 7.5801 3.602e-14 ***
## usefulav -6.19587 0.51782 -11.9652 < 2.2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares: 126710000
## Residual Sum of Squares: 120430000
## R-Squared: 0.049614
## Adj. R-Squared: 0.04938
## F-statistic: 211.439 on 5 and 20275 DF, p-value: < 2.22e-16

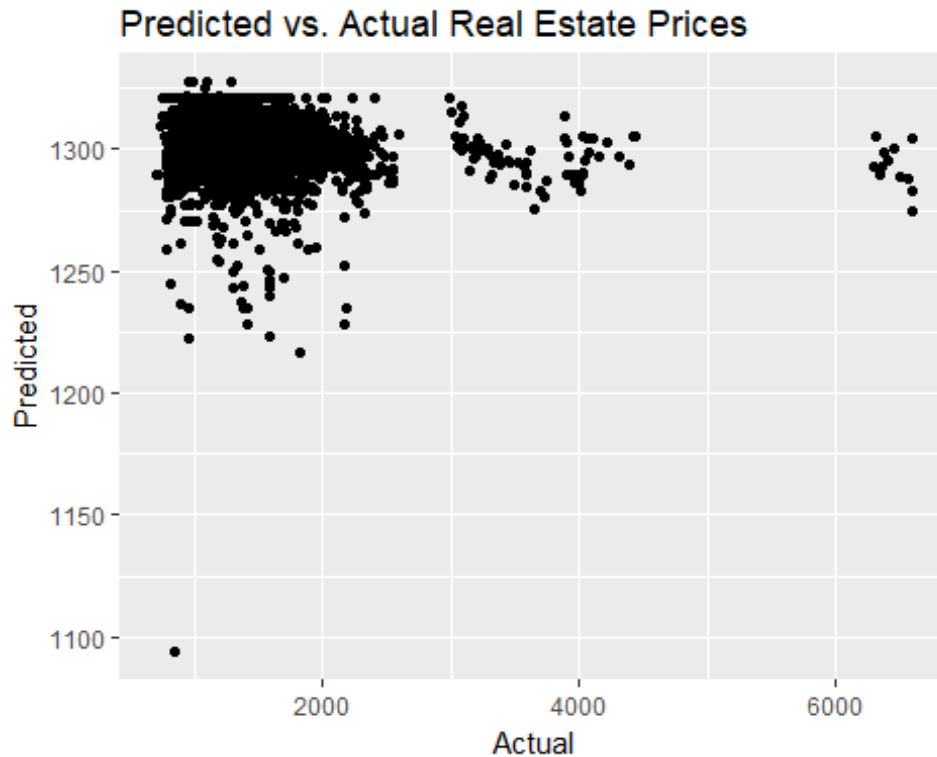
# Predict
Full_data_long_food_test$pred.plm.test <- predict(my.pdm.train.food,
Full_data_long_food_test, type='response')

# MAPE
plmmape.food <-
100*mean(abs(Full_data_long_food_test$pred.plm.test/Full_data_long_food_test$
rentprice-1), na.rm = T)
print(plmmape.food)

## [1] 18.69031
```

MAPE is only 18.69% right now. We will continue working on the model to get this error lower.

```
ggplot(Full_data_long_food_test, aes(x=rentprice, y=pred.plm.test))
+geom_point() + labs(title="Predicted vs. Actual Real Estate Prices") +
xlab("Actual") + ylab("Predicted")
```



Generating the Lag Model

We first have to ensure that both sets have the same postal codes in order to conduct the fixed effects analysis dictated by the hausman test.

Other zips were staying in as factors in test for some reason. Take out here.

```
Full_data_long_food_test <-
Full_data_long_food_test[Full_data_long_food_test$postal_code!="28803",]
Full_data_long_food_test <-
Full_data_long_food_test[Full_data_long_food_test$postal_code!="85266",]
```

```
trainimpfood <- unique(Full_data_long_food_train$postal_code)
testimpfood <- unique(data5_test$postal_code)
```

```
Full_data_long_food_test <- dplyr::filter(Full_data_long_food_test,
postal_code %in% trainimpfood)
Full_data_long_food_train <- dplyr::filter(Full_data_long_food_train,
postal_code %in% testimpfood)
```

To fine-tune the model, we decided to lag the dependent variable to consider the possibility that last month's rent could be the best predictor of this month's rent. We follow a similar process to the one above for training, testing, and predicting.

```
my.lag.formula <- rentprice ~ lag(rentprice, 1) + starsav + is_openave +
funnyav + coolav + usefulav + Number_of_reviews
```

```
# Conduct Hausman Test
```

```
my.hausman.test.food.train.lag <- phptest(x = my.lag.formula,  
      data = Full_data_long_food_train,  
      model = c('within', 'random'),  
      index = my.index)
```

```
# print result
```

```
print(my.hausman.test.food.train.lag)
```

```
##
```

```
## Hausman Test
```

```
##
```

```
## data: my.lag.formula
```

```
## chisq = 113.62, df = 7, p-value < 2.2e-16
```

```
## alternative hypothesis: one model is inconsistent
```

Then, we build the model on the training set and predict on the test set in order to calculate the MAPE.

```
# Built fixed effects model on train
```

```
my.pdm.train.impute.lag.Simple <- lm(rentprice ~ lag(rentprice, 1) +  
starsav + is_openave + funnyav + coolav + usefullav + Number_of_reviews +  
postal_code + time, data = Full_data_long_food_train)  
summary(my.pdm.train.impute.lag.Simple)
```

```
##
```

```
## Call:
```

```
## lm(formula = rentprice ~ lag(rentprice, 1) + starsav + is_openave +  
##      funnyav + coolav + usefullav + Number_of_reviews + postal_code +  
##      time, data = Full_data_long_food_train)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q   Median      3Q      Max  
## -1.963e-10 -7.000e-14  1.000e-14  7.000e-14  9.496e-10
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error   t value Pr(>|t|)  
## (Intercept)  1.599e-10  3.439e-12  4.648e+01  <2e-16 ***  
## lag(rentprice, 1) 1.000e+00  9.295e-16  1.076e+15  <2e-16 ***  
## starsav       5.453e-14  6.117e-14  8.910e-01  0.3727  
## is_openave    2.210e-14  3.040e-13  7.300e-02  0.9421  
## funnyav       2.534e-15  7.679e-14  3.300e-02  0.9737  
## coolav        3.730e-15  8.506e-14  4.400e-02  0.9650  
## usefullav     -1.278e-14  5.000e-14 -2.560e-01  0.7983  
## Number_of_reviews 2.148e-15  4.625e-15  4.640e-01  0.6423  
## postal_code15003 -1.867e-10  4.342e-12 -4.301e+01  <2e-16 ***  
## postal_code15017 -1.877e-10  3.240e-12 -5.793e+01  <2e-16 ***  
## postal_code15024 -1.875e-10  6.049e-12 -3.100e+01  <2e-16 ***  
## postal_code15034 -1.867e-10  4.076e-12 -4.580e+01  <2e-16 ***
```

## postal_code15037	-1.872e-10	4.814e-12	-3.888e+01	<2e-16	***
## postal_code15044	-1.889e-10	3.301e-12	-5.721e+01	<2e-16	***
## postal_code15056	-1.873e-10	4.148e-12	-4.516e+01	<2e-16	***
## postal_code15063	-1.868e-10	4.168e-12	-4.482e+01	<2e-16	***
## postal_code15068	-1.868e-10	3.642e-12	-5.130e+01	<2e-16	***
## postal_code15071	-1.878e-10	4.274e-12	-4.393e+01	<2e-16	***
## postal_code15090	-1.900e-10	3.218e-12	-5.904e+01	<2e-16	***
## postal_code15101	-1.884e-10	4.112e-12	-4.582e+01	<2e-16	***
## postal_code15102	-1.880e-10	3.176e-12	-5.921e+01	<2e-16	***
## postal_code15106	-1.873e-10	3.327e-12	-5.629e+01	<2e-16	***
## postal_code15108	-1.879e-10	3.235e-12	-5.809e+01	<2e-16	***
## postal_code15116	-1.879e-10	3.827e-12	-4.910e+01	<2e-16	***
## postal_code15120	-1.869e-10	3.237e-12	-5.772e+01	<2e-16	***
## postal_code15122	-1.869e-10	3.330e-12	-5.612e+01	<2e-16	***
## postal_code15131	-1.869e-10	3.506e-12	-5.332e+01	<2e-16	***
## postal_code15132	-1.867e-10	3.980e-12	-4.691e+01	<2e-16	***
## postal_code15136	-1.871e-10	3.464e-12	-5.400e+01	<2e-16	***
## postal_code15137	-1.868e-10	3.564e-12	-5.241e+01	<2e-16	***
## postal_code15139	-1.877e-10	3.409e-12	-5.507e+01	<2e-16	***
## postal_code15140	-1.866e-10	5.294e-12	-3.526e+01	<2e-16	***
## postal_code15143	-1.894e-10	3.349e-12	-5.654e+01	<2e-16	***
## postal_code15145	-1.868e-10	8.021e-12	-2.328e+01	<2e-16	***
## postal_code15146	-1.875e-10	3.209e-12	-5.842e+01	<2e-16	***
## postal_code15147	-1.870e-10	8.014e-12	-2.333e+01	<2e-16	***
## postal_code15201	-1.873e-10	3.214e-12	-5.826e+01	<2e-16	***
## postal_code15202	-1.872e-10	3.283e-12	-5.703e+01	<2e-16	***
## postal_code15203	-1.878e-10	3.166e-12	-5.931e+01	<2e-16	***
## postal_code15205	-1.873e-10	3.218e-12	-5.822e+01	<2e-16	***
## postal_code15206	-1.873e-10	3.195e-12	-5.862e+01	<2e-16	***
## postal_code15207	-1.869e-10	4.329e-12	-4.318e+01	<2e-16	***
## postal_code15208	-1.871e-10	3.241e-12	-5.771e+01	<2e-16	***
## postal_code15209	-1.875e-10	4.797e-12	-3.909e+01	<2e-16	***
## postal_code15210	-1.868e-10	3.588e-12	-5.206e+01	<2e-16	***
## postal_code15211	-1.873e-10	3.857e-12	-4.855e+01	<2e-16	***
## postal_code15212	-1.870e-10	3.377e-12	-5.537e+01	<2e-16	***
## postal_code15213	-1.876e-10	3.168e-12	-5.922e+01	<2e-16	***
## postal_code15215	-1.880e-10	3.324e-12	-5.656e+01	<2e-16	***
## postal_code15216	-1.872e-10	3.229e-12	-5.798e+01	<2e-16	***
## postal_code15217	-1.886e-10	3.140e-12	-6.007e+01	<2e-16	***
## postal_code15218	-1.872e-10	3.409e-12	-5.491e+01	<2e-16	***
## postal_code15219	-1.872e-10	3.226e-12	-5.804e+01	<2e-16	***
## postal_code15220	-1.874e-10	3.283e-12	-5.710e+01	<2e-16	***
## postal_code15221	-1.869e-10	3.341e-12	-5.593e+01	<2e-16	***
## postal_code15222	-1.887e-10	3.145e-12	-6.000e+01	<2e-16	***
## postal_code15223	-1.871e-10	4.313e-12	-4.338e+01	<2e-16	***
## postal_code15224	-1.874e-10	3.308e-12	-5.663e+01	<2e-16	***
## postal_code15226	-1.871e-10	3.349e-12	-5.586e+01	<2e-16	***
## postal_code15227	-1.871e-10	3.440e-12	-5.439e+01	<2e-16	***
## postal_code15228	-1.885e-10	3.541e-12	-5.325e+01	<2e-16	***
## postal_code15229	-1.875e-10	3.230e-12	-5.804e+01	<2e-16	***

## postal_code15232	-1.887e-10	3.150e-12	-5.990e+01	<2e-16	***
## postal_code15233	-1.873e-10	3.220e-12	-5.815e+01	<2e-16	***
## postal_code15234	-1.873e-10	3.611e-12	-5.187e+01	<2e-16	***
## postal_code15235	-1.870e-10	3.331e-12	-5.614e+01	<2e-16	***
## postal_code15236	-1.875e-10	3.254e-12	-5.762e+01	<2e-16	***
## postal_code15237	-1.882e-10	3.160e-12	-5.958e+01	<2e-16	***
## postal_code15238	-1.898e-10	3.198e-12	-5.935e+01	<2e-16	***
## postal_code15239	-1.875e-10	3.675e-12	-5.101e+01	<2e-16	***
## postal_code15241	-1.896e-10	3.228e-12	-5.874e+01	<2e-16	***
## postal_code15317	-1.889e-10	3.169e-12	-5.960e+01	<2e-16	***
## postal_code15332	-1.877e-10	3.459e-12	-5.428e+01	<2e-16	***
## postal_code15642	-1.871e-10	3.283e-12	-5.699e+01	<2e-16	***
## postal_code17744	-1.873e-10	4.507e-12	-4.157e+01	<2e-16	***
## postal_code19355	-1.901e-10	3.511e-12	-5.413e+01	<2e-16	***
## postal_code19362	-1.881e-10	4.271e-12	-4.404e+01	<2e-16	***
## postal_code27278	-1.879e-10	3.348e-12	-5.613e+01	<2e-16	***
## postal_code28012	-1.874e-10	3.233e-12	-5.797e+01	<2e-16	***
## postal_code28025	-1.873e-10	3.308e-12	-5.662e+01	<2e-16	***
## postal_code28027	-1.878e-10	3.158e-12	-5.946e+01	<2e-16	***
## postal_code28031	-1.881e-10	3.146e-12	-5.978e+01	<2e-16	***
## postal_code28032	-1.870e-10	3.531e-12	-5.295e+01	<2e-16	***
## postal_code28034	-1.869e-10	3.530e-12	-5.294e+01	<2e-16	***
## postal_code28036	-1.881e-10	3.335e-12	-5.642e+01	<2e-16	***
## postal_code28052	-1.866e-10	3.430e-12	-5.440e+01	<2e-16	***
## postal_code28054	-1.870e-10	3.222e-12	-5.805e+01	<2e-16	***
## postal_code28056	-1.874e-10	3.242e-12	-5.779e+01	<2e-16	***
## postal_code28075	-1.882e-10	3.249e-12	-5.792e+01	<2e-16	***
## postal_code28078	-1.882e-10	3.142e-12	-5.989e+01	<2e-16	***
## postal_code28079	-1.879e-10	3.196e-12	-5.881e+01	<2e-16	***
## postal_code28081	-1.870e-10	4.051e-12	-4.616e+01	<2e-16	***
## postal_code28083	-1.868e-10	3.501e-12	-5.336e+01	<2e-16	***
## postal_code28098	-1.870e-10	4.818e-12	-3.881e+01	<2e-16	***
## postal_code28104	-1.887e-10	3.155e-12	-5.981e+01	<2e-16	***
## postal_code28105	-1.880e-10	3.153e-12	-5.962e+01	<2e-16	***
## postal_code28107	-1.876e-10	7.991e-12	-2.347e+01	<2e-16	***
## postal_code28120	-1.873e-10	3.550e-12	-5.277e+01	<2e-16	***
## postal_code28134	-1.876e-10	3.239e-12	-5.794e+01	<2e-16	***
## postal_code28164	-1.872e-10	3.735e-12	-5.011e+01	<2e-16	***
## postal_code28173	-1.894e-10	3.281e-12	-5.773e+01	<2e-16	***
## postal_code28202	-1.881e-10	3.148e-12	-5.973e+01	<2e-16	***
## postal_code28203	-1.881e-10	3.148e-12	-5.975e+01	<2e-16	***
## postal_code28204	-1.879e-10	3.151e-12	-5.962e+01	<2e-16	***
## postal_code28205	-1.873e-10	3.184e-12	-5.883e+01	<2e-16	***
## postal_code28206	-1.869e-10	3.283e-12	-5.694e+01	<2e-16	***
## postal_code28207	-1.922e-10	3.606e-12	-5.330e+01	<2e-16	***
## postal_code28208	-1.869e-10	3.221e-12	-5.802e+01	<2e-16	***
## postal_code28209	-1.880e-10	3.149e-12	-5.970e+01	<2e-16	***
## postal_code28210	-1.880e-10	3.146e-12	-5.977e+01	<2e-16	***
## postal_code28211	-1.888e-10	3.141e-12	-6.012e+01	<2e-16	***
## postal_code28212	-1.872e-10	3.263e-12	-5.735e+01	<2e-16	***

## postal_code28213	-1.873e-10	3.196e-12	-5.859e+01	<2e-16	***
## postal_code28214	-1.872e-10	3.317e-12	-5.645e+01	<2e-16	***
## postal_code28215	-1.872e-10	3.300e-12	-5.673e+01	<2e-16	***
## postal_code28216	-1.872e-10	3.199e-12	-5.853e+01	<2e-16	***
## postal_code28217	-1.871e-10	3.209e-12	-5.829e+01	<2e-16	***
## postal_code28226	-1.884e-10	3.143e-12	-5.993e+01	<2e-16	***
## postal_code28227	-1.874e-10	3.183e-12	-5.887e+01	<2e-16	***
## postal_code28262	-1.875e-10	3.169e-12	-5.917e+01	<2e-16	***
## postal_code28269	-1.876e-10	3.171e-12	-5.917e+01	<2e-16	***
## postal_code28270	-1.885e-10	3.144e-12	-5.997e+01	<2e-16	***
## postal_code28273	-1.876e-10	3.164e-12	-5.929e+01	<2e-16	***
## postal_code28277	-1.886e-10	3.138e-12	-6.009e+01	<2e-16	***
## postal_code28278	-1.880e-10	3.409e-12	-5.514e+01	<2e-16	***
## postal_code28730	-1.881e-10	3.410e-12	-5.518e+01	<2e-16	***
## postal_code29707	-1.881e-10	3.233e-12	-5.819e+01	<2e-16	***
## postal_code29708	-1.888e-10	3.143e-12	-6.008e+01	<2e-16	***
## postal_code29710	-1.881e-10	3.998e-12	-4.705e+01	<2e-16	***
## postal_code29715	-1.882e-10	3.219e-12	-5.845e+01	<2e-16	***
## postal_code44001	-1.875e-10	3.254e-12	-5.761e+01	<2e-16	***
## postal_code44011	-1.888e-10	3.211e-12	-5.880e+01	<2e-16	***
## postal_code44012	-1.884e-10	3.260e-12	-5.779e+01	<2e-16	***
## postal_code44017	-1.875e-10	3.248e-12	-5.773e+01	<2e-16	***
## postal_code44021	-1.876e-10	3.339e-12	-5.619e+01	<2e-16	***
## postal_code44022	-1.902e-10	3.272e-12	-5.813e+01	<2e-16	***
## postal_code44023	-1.891e-10	3.290e-12	-5.749e+01	<2e-16	***
## postal_code44024	-1.882e-10	3.327e-12	-5.656e+01	<2e-16	***
## postal_code44026	-1.885e-10	3.227e-12	-5.841e+01	<2e-16	***
## postal_code44028	-1.880e-10	3.332e-12	-5.643e+01	<2e-16	***
## postal_code44035	-1.868e-10	3.268e-12	-5.717e+01	<2e-16	***
## postal_code44039	-1.877e-10	3.344e-12	-5.613e+01	<2e-16	***
## postal_code44044	-1.872e-10	6.053e-12	-3.093e+01	<2e-16	***
## postal_code44052	-1.866e-10	3.435e-12	-5.434e+01	<2e-16	***
## postal_code44053	-1.871e-10	4.522e-12	-4.137e+01	<2e-16	***
## postal_code44054	-1.871e-10	4.515e-12	-4.144e+01	<2e-16	***
## postal_code44055	-1.869e-10	5.284e-12	-3.537e+01	<2e-16	***
## postal_code44056	-1.882e-10	3.205e-12	-5.872e+01	<2e-16	***
## postal_code44060	-1.878e-10	3.167e-12	-5.928e+01	<2e-16	***
## postal_code44062	-1.875e-10	3.494e-12	-5.367e+01	<2e-16	***
## postal_code44065	-1.880e-10	4.783e-12	-3.930e+01	<2e-16	***
## postal_code44067	-1.880e-10	3.233e-12	-5.813e+01	<2e-16	***
## postal_code44070	-1.877e-10	3.180e-12	-5.903e+01	<2e-16	***
## postal_code44077	-1.875e-10	3.516e-12	-5.333e+01	<2e-16	***
## postal_code44087	-1.882e-10	3.207e-12	-5.868e+01	<2e-16	***
## postal_code44092	-1.873e-10	3.367e-12	-5.562e+01	<2e-16	***
## postal_code44094	-1.878e-10	3.173e-12	-5.920e+01	<2e-16	***
## postal_code44095	-1.873e-10	3.313e-12	-5.654e+01	<2e-16	***
## postal_code44102	-1.868e-10	3.239e-12	-5.768e+01	<2e-16	***
## postal_code44103	-1.867e-10	3.245e-12	-5.754e+01	<2e-16	***
## postal_code44104	-1.866e-10	4.195e-12	-4.448e+01	<2e-16	***
## postal_code44105	-1.866e-10	3.788e-12	-4.927e+01	<2e-16	***

## postal_code44106	-1.870e-10	3.210e-12	-5.826e+01	<2e-16	***
## postal_code44107	-1.875e-10	3.175e-12	-5.905e+01	<2e-16	***
## postal_code44108	-1.867e-10	3.458e-12	-5.398e+01	<2e-16	***
## postal_code44109	-1.869e-10	3.240e-12	-5.767e+01	<2e-16	***
## postal_code44110	-1.868e-10	3.354e-12	-5.569e+01	<2e-16	***
## postal_code44111	-1.870e-10	3.223e-12	-5.801e+01	<2e-16	***
## postal_code44112	-1.868e-10	3.891e-12	-4.801e+01	<2e-16	***
## postal_code44113	-1.871e-10	3.214e-12	-5.821e+01	<2e-16	***
## postal_code44116	-1.884e-10	3.145e-12	-5.992e+01	<2e-16	***
## postal_code44117	-1.871e-10	3.860e-12	-4.847e+01	<2e-16	***
## postal_code44118	-1.877e-10	3.162e-12	-5.935e+01	<2e-16	***
## postal_code44119	-1.870e-10	3.878e-12	-4.822e+01	<2e-16	***
## postal_code44120	-1.869e-10	3.225e-12	-5.797e+01	<2e-16	***
## postal_code44121	-1.873e-10	3.255e-12	-5.755e+01	<2e-16	***
## postal_code44122	-1.885e-10	3.141e-12	-6.003e+01	<2e-16	***
## postal_code44123	-1.870e-10	3.404e-12	-5.494e+01	<2e-16	***
## postal_code44124	-1.877e-10	3.162e-12	-5.937e+01	<2e-16	***
## postal_code44125	-1.870e-10	3.295e-12	-5.674e+01	<2e-16	***
## postal_code44126	-1.876e-10	3.205e-12	-5.854e+01	<2e-16	***
## postal_code44127	-1.866e-10	3.668e-12	-5.088e+01	<2e-16	***
## postal_code44128	-1.869e-10	3.305e-12	-5.655e+01	<2e-16	***
## postal_code44129	-1.872e-10	3.230e-12	-5.796e+01	<2e-16	***
## postal_code44130	-1.874e-10	3.190e-12	-5.876e+01	<2e-16	***
## postal_code44131	-1.881e-10	3.150e-12	-5.970e+01	<2e-16	***
## postal_code44132	-1.870e-10	4.040e-12	-4.629e+01	<2e-16	***
## postal_code44133	-1.881e-10	3.309e-12	-5.687e+01	<2e-16	***
## postal_code44134	-1.872e-10	3.233e-12	-5.791e+01	<2e-16	***
## postal_code44135	-1.870e-10	3.227e-12	-5.794e+01	<2e-16	***
## postal_code44136	-1.884e-10	3.158e-12	-5.965e+01	<2e-16	***
## postal_code44137	-1.869e-10	3.491e-12	-5.353e+01	<2e-16	***
## postal_code44138	-1.878e-10	3.475e-12	-5.404e+01	<2e-16	***
## postal_code44139	-1.893e-10	3.178e-12	-5.959e+01	<2e-16	***
## postal_code44140	-1.885e-10	3.752e-12	-5.025e+01	<2e-16	***
## postal_code44141	-1.890e-10	3.233e-12	-5.845e+01	<2e-16	***
## postal_code44142	-1.873e-10	3.391e-12	-5.522e+01	<2e-16	***
## postal_code44143	-1.881e-10	3.242e-12	-5.803e+01	<2e-16	***
## postal_code44144	-1.871e-10	3.227e-12	-5.797e+01	<2e-16	***
## postal_code44145	-1.889e-10	3.153e-12	-5.991e+01	<2e-16	***
## postal_code44146	-1.873e-10	3.312e-12	-5.655e+01	<2e-16	***
## postal_code44147	-1.885e-10	3.359e-12	-5.611e+01	<2e-16	***
## postal_code44149	-1.883e-10	4.476e-12	-4.206e+01	<2e-16	***
## postal_code44212	-1.879e-10	3.178e-12	-5.910e+01	<2e-16	***
## postal_code44221	-1.871e-10	3.233e-12	-5.788e+01	<2e-16	***
## postal_code44223	-1.874e-10	3.303e-12	-5.675e+01	<2e-16	***
## postal_code44224	-1.879e-10	3.160e-12	-5.946e+01	<2e-16	***
## postal_code44233	-1.891e-10	7.985e-12	-2.368e+01	<2e-16	***
## postal_code44234	-1.878e-10	4.491e-12	-4.182e+01	<2e-16	***
## postal_code44236	-1.899e-10	3.198e-12	-5.936e+01	<2e-16	***
## postal_code44240	-1.873e-10	3.212e-12	-5.830e+01	<2e-16	***
## postal_code44241	-1.874e-10	3.238e-12	-5.789e+01	<2e-16	***

## postal_code44255	-1.875e-10	3.594e-12	-5.217e+01	<2e-16	***
## postal_code44256	-1.882e-10	3.192e-12	-5.896e+01	<2e-16	***
## postal_code44262	-1.877e-10	4.783e-12	-3.924e+01	<2e-16	***
## postal_code44264	-1.884e-10	3.406e-12	-5.532e+01	<2e-16	***
## postal_code44278	-1.876e-10	3.396e-12	-5.523e+01	<2e-16	***
## postal_code44286	-1.892e-10	3.294e-12	-5.743e+01	<2e-16	***
## postal_code44313	-1.876e-10	3.271e-12	-5.736e+01	<2e-16	***
## postal_code44321	-1.882e-10	3.699e-12	-5.088e+01	<2e-16	***
## postal_code44333	-1.888e-10	3.150e-12	-5.992e+01	<2e-16	***
## postal_code46501	-1.870e-10	4.527e-12	-4.131e+01	<2e-16	***
## postal_code53508	-1.880e-10	6.036e-12	-3.115e+01	<2e-16	***
## postal_code53515	-1.883e-10	5.235e-12	-3.597e+01	<2e-16	***
## postal_code53521	-1.881e-10	3.663e-12	-5.135e+01	<2e-16	***
## postal_code53527	-1.882e-10	3.649e-12	-5.158e+01	<2e-16	***
## postal_code53528	-1.885e-10	3.817e-12	-4.939e+01	<2e-16	***
## postal_code53532	-1.879e-10	3.269e-12	-5.748e+01	<2e-16	***
## postal_code53558	-1.881e-10	4.269e-12	-4.407e+01	<2e-16	***
## postal_code53562	-1.888e-10	3.187e-12	-5.925e+01	<2e-16	***
## postal_code53572	-1.884e-10	3.237e-12	-5.819e+01	<2e-16	***
## postal_code53575	-1.881e-10	3.308e-12	-5.688e+01	<2e-16	***
## postal_code53589	-1.880e-10	3.333e-12	-5.642e+01	<2e-16	***
## postal_code53590	-1.879e-10	3.222e-12	-5.831e+01	<2e-16	***
## postal_code53593	-1.888e-10	3.196e-12	-5.906e+01	<2e-16	***
## postal_code53597	-1.884e-10	4.110e-12	-4.585e+01	<2e-16	***
## postal_code53598	-1.880e-10	3.307e-12	-5.684e+01	<2e-16	***
## postal_code53703	-1.881e-10	3.179e-12	-5.918e+01	<2e-16	***
## postal_code53704	-1.879e-10	3.186e-12	-5.897e+01	<2e-16	***
## postal_code53705	-1.887e-10	3.175e-12	-5.944e+01	<2e-16	***
## postal_code53711	-1.884e-10	3.175e-12	-5.934e+01	<2e-16	***
## postal_code53713	-1.877e-10	3.199e-12	-5.869e+01	<2e-16	***
## postal_code53714	-1.877e-10	4.122e-12	-4.554e+01	<2e-16	***
## postal_code53715	-1.884e-10	3.198e-12	-5.890e+01	<2e-16	***
## postal_code53716	-1.880e-10	3.215e-12	-5.847e+01	<2e-16	***
## postal_code53717	-1.887e-10	3.267e-12	-5.777e+01	<2e-16	***
## postal_code53718	-1.880e-10	7.982e-12	-2.355e+01	<2e-16	***
## postal_code53719	-1.883e-10	3.185e-12	-5.912e+01	<2e-16	***
## postal_code53726	-1.894e-10	3.524e-12	-5.375e+01	<2e-16	***
## postal_code61801	-1.872e-10	3.232e-12	-5.792e+01	<2e-16	***
## postal_code61802	-1.871e-10	3.331e-12	-5.619e+01	<2e-16	***
## postal_code61820	-1.871e-10	3.237e-12	-5.779e+01	<2e-16	***
## postal_code61821	-1.872e-10	3.233e-12	-5.791e+01	<2e-16	***
## postal_code61822	-1.875e-10	3.218e-12	-5.825e+01	<2e-16	***
## postal_code61849	-1.870e-10	4.821e-12	-3.879e+01	<2e-16	***
## postal_code61853	-1.874e-10	3.724e-12	-5.031e+01	<2e-16	***
## postal_code61856	-1.879e-10	4.118e-12	-4.562e+01	<2e-16	***
## postal_code61866	-1.868e-10	3.478e-12	-5.372e+01	<2e-16	***
## postal_code61873	-1.873e-10	5.249e-12	-3.569e+01	<2e-16	***
## postal_code61874	-1.874e-10	3.466e-12	-5.407e+01	<2e-16	***
## postal_code70435	-1.883e-10	3.376e-12	-5.578e+01	<2e-16	***
## postal_code70563	-1.878e-10	3.291e-12	-5.705e+01	<2e-16	***

## postal_code70734	-1.887e-10	3.609e-12	-5.230e+01	<2e-16	***
## postal_code70806	-1.876e-10	4.283e-12	-4.380e+01	<2e-16	***
## postal_code71101	-1.869e-10	5.281e-12	-3.539e+01	<2e-16	***
## postal_code85003	-1.879e-10	3.152e-12	-5.960e+01	<2e-16	***
## postal_code85004	-1.876e-10	3.169e-12	-5.921e+01	<2e-16	***
## postal_code85006	-1.873e-10	3.192e-12	-5.868e+01	<2e-16	***
## postal_code85007	-1.873e-10	3.203e-12	-5.846e+01	<2e-16	***
## postal_code85008	-1.872e-10	3.198e-12	-5.855e+01	<2e-16	***
## postal_code85009	-1.869e-10	3.273e-12	-5.711e+01	<2e-16	***
## postal_code85012	-1.883e-10	3.139e-12	-6.000e+01	<2e-16	***
## postal_code85013	-1.876e-10	3.168e-12	-5.922e+01	<2e-16	***
## postal_code85014	-1.875e-10	3.177e-12	-5.900e+01	<2e-16	***
## postal_code85015	-1.872e-10	3.204e-12	-5.841e+01	<2e-16	***
## postal_code85016	-1.878e-10	3.165e-12	-5.933e+01	<2e-16	***
## postal_code85017	-1.870e-10	3.233e-12	-5.783e+01	<2e-16	***
## postal_code85018	-1.886e-10	3.141e-12	-6.004e+01	<2e-16	***
## postal_code85019	-1.871e-10	3.265e-12	-5.730e+01	<2e-16	***
## postal_code85020	-1.874e-10	3.181e-12	-5.892e+01	<2e-16	***
## postal_code85021	-1.875e-10	3.181e-12	-5.895e+01	<2e-16	***
## postal_code85022	-1.877e-10	3.159e-12	-5.943e+01	<2e-16	***
## postal_code85023	-1.876e-10	3.167e-12	-5.925e+01	<2e-16	***
## postal_code85024	-1.878e-10	3.227e-12	-5.819e+01	<2e-16	***
## postal_code85027	-1.874e-10	3.175e-12	-5.904e+01	<2e-16	***
## postal_code85028	-1.886e-10	3.138e-12	-6.009e+01	<2e-16	***
## postal_code85029	-1.873e-10	3.186e-12	-5.880e+01	<2e-16	***
## postal_code85031	-1.870e-10	3.352e-12	-5.578e+01	<2e-16	***
## postal_code85032	-1.877e-10	3.165e-12	-5.930e+01	<2e-16	***
## postal_code85033	-1.870e-10	3.247e-12	-5.760e+01	<2e-16	***
## postal_code85034	-1.871e-10	3.200e-12	-5.847e+01	<2e-16	***
## postal_code85035	-1.870e-10	3.265e-12	-5.728e+01	<2e-16	***
## postal_code85037	-1.871e-10	3.263e-12	-5.734e+01	<2e-16	***
## postal_code85040	-1.871e-10	3.209e-12	-5.830e+01	<2e-16	***
## postal_code85041	-1.872e-10	3.221e-12	-5.813e+01	<2e-16	***
## postal_code85042	-1.874e-10	3.178e-12	-5.895e+01	<2e-16	***
## postal_code85043	-1.871e-10	3.270e-12	-5.723e+01	<2e-16	***
## postal_code85044	-1.879e-10	3.151e-12	-5.963e+01	<2e-16	***
## postal_code85048	-1.884e-10	3.139e-12	-6.000e+01	<2e-16	***
## postal_code85050	-1.884e-10	3.143e-12	-5.993e+01	<2e-16	***
## postal_code85051	-1.872e-10	3.197e-12	-5.856e+01	<2e-16	***
## postal_code85053	-1.874e-10	3.183e-12	-5.888e+01	<2e-16	***
## postal_code85054	-1.885e-10	3.137e-12	-6.009e+01	<2e-16	***
## postal_code85083	-1.886e-10	3.991e-12	-4.726e+01	<2e-16	***
## postal_code85085	-1.886e-10	3.151e-12	-5.985e+01	<2e-16	***
## postal_code85086	-1.884e-10	3.177e-12	-5.932e+01	<2e-16	***
## postal_code85143	-1.870e-10	3.494e-12	-5.352e+01	<2e-16	***
## postal_code85201	-1.873e-10	3.195e-12	-5.862e+01	<2e-16	***
## postal_code85202	-1.875e-10	3.174e-12	-5.908e+01	<2e-16	***
## postal_code85203	-1.876e-10	3.180e-12	-5.899e+01	<2e-16	***
## postal_code85204	-1.874e-10	3.178e-12	-5.897e+01	<2e-16	***
## postal_code85205	-1.875e-10	3.173e-12	-5.909e+01	<2e-16	***

## postal_code85206	-1.876e-10	3.170e-12	-5.916e+01	<2e-16	***
## postal_code85207	-1.880e-10	3.379e-12	-5.562e+01	<2e-16	***
## postal_code85208	-1.873e-10	3.295e-12	-5.686e+01	<2e-16	***
## postal_code85209	-1.878e-10	3.156e-12	-5.950e+01	<2e-16	***
## postal_code85210	-1.873e-10	3.188e-12	-5.875e+01	<2e-16	***
## postal_code85212	-1.879e-10	3.182e-12	-5.906e+01	<2e-16	***
## postal_code85213	-1.880e-10	3.278e-12	-5.736e+01	<2e-16	***
## postal_code85215	-1.880e-10	3.162e-12	-5.945e+01	<2e-16	***
## postal_code85224	-1.877e-10	3.163e-12	-5.936e+01	<2e-16	***
## postal_code85225	-1.876e-10	3.173e-12	-5.912e+01	<2e-16	***
## postal_code85226	-1.879e-10	3.152e-12	-5.963e+01	<2e-16	***
## postal_code85233	-1.879e-10	3.163e-12	-5.941e+01	<2e-16	***
## postal_code85234	-1.882e-10	3.148e-12	-5.977e+01	<2e-16	***
## postal_code85248	-1.883e-10	3.146e-12	-5.985e+01	<2e-16	***
## postal_code85249	-1.886e-10	3.173e-12	-5.946e+01	<2e-16	***
## postal_code85250	-1.883e-10	3.140e-12	-5.995e+01	<2e-16	***
## postal_code85251	-1.880e-10	3.168e-12	-5.934e+01	<2e-16	***
## postal_code85253	-1.984e-10	5.511e-12	-3.601e+01	<2e-16	***
## postal_code85254	-1.894e-10	3.165e-12	-5.985e+01	<2e-16	***
## postal_code85255	-1.914e-10	3.415e-12	-5.604e+01	<2e-16	***
## postal_code85257	-1.878e-10	3.153e-12	-5.957e+01	<2e-16	***
## postal_code85258	-1.895e-10	3.176e-12	-5.966e+01	<2e-16	***
## postal_code85259	-1.910e-10	3.420e-12	-5.583e+01	<2e-16	***
## postal_code85260	-1.890e-10	3.149e-12	-6.002e+01	<2e-16	***
## postal_code85262	-1.936e-10	3.909e-12	-4.952e+01	<2e-16	***
## postal_code85268	-1.888e-10	3.147e-12	-6.000e+01	<2e-16	***
## postal_code85281	-1.877e-10	3.172e-12	-5.915e+01	<2e-16	***
## postal_code85282	-1.878e-10	3.159e-12	-5.945e+01	<2e-16	***
## postal_code85283	-1.878e-10	3.158e-12	-5.945e+01	<2e-16	***
## postal_code85284	-1.892e-10	3.158e-12	-5.990e+01	<2e-16	***
## postal_code85286	-1.884e-10	3.144e-12	-5.994e+01	<2e-16	***
## postal_code85295	-1.881e-10	3.152e-12	-5.966e+01	<2e-16	***
## postal_code85296	-1.879e-10	3.149e-12	-5.969e+01	<2e-16	***
## postal_code85297	-1.881e-10	3.161e-12	-5.950e+01	<2e-16	***
## postal_code85298	-1.884e-10	3.220e-12	-5.852e+01	<2e-16	***
## postal_code85301	-1.871e-10	3.213e-12	-5.823e+01	<2e-16	***
## postal_code85302	-1.874e-10	3.183e-12	-5.886e+01	<2e-16	***
## postal_code85303	-1.872e-10	3.466e-12	-5.400e+01	<2e-16	***
## postal_code85304	-1.874e-10	3.291e-12	-5.695e+01	<2e-16	***
## postal_code85305	-1.877e-10	3.171e-12	-5.918e+01	<2e-16	***
## postal_code85306	-1.875e-10	3.186e-12	-5.884e+01	<2e-16	***
## postal_code85307	-1.872e-10	3.281e-12	-5.706e+01	<2e-16	***
## postal_code85308	-1.879e-10	3.154e-12	-5.958e+01	<2e-16	***
## postal_code85310	-1.881e-10	3.142e-12	-5.987e+01	<2e-16	***
## postal_code85323	-1.873e-10	3.189e-12	-5.872e+01	<2e-16	***
## postal_code85331	-1.894e-10	3.191e-12	-5.937e+01	<2e-16	***
## postal_code85335	-1.871e-10	3.346e-12	-5.591e+01	<2e-16	***
## postal_code85338	-1.875e-10	3.180e-12	-5.897e+01	<2e-16	***
## postal_code85339	-1.875e-10	3.195e-12	-5.869e+01	<2e-16	***
## postal_code85340	-1.879e-10	3.172e-12	-5.924e+01	<2e-16	***

## postal_code85345	-1.872e-10	3.205e-12	-5.841e+01	<2e-16	***
## postal_code85351	-1.871e-10	3.326e-12	-5.625e+01	<2e-16	***
## postal_code85353	-1.873e-10	3.278e-12	-5.715e+01	<2e-16	***
## postal_code85363	-1.870e-10	3.486e-12	-5.364e+01	<2e-16	***
## postal_code85373	-1.875e-10	3.496e-12	-5.363e+01	<2e-16	***
## postal_code85374	-1.876e-10	3.165e-12	-5.928e+01	<2e-16	***
## postal_code85375	-1.876e-10	3.628e-12	-5.170e+01	<2e-16	***
## postal_code85377	-1.927e-10	5.551e-12	-3.472e+01	<2e-16	***
## postal_code85378	-1.873e-10	3.288e-12	-5.696e+01	<2e-16	***
## postal_code85379	-1.876e-10	3.179e-12	-5.900e+01	<2e-16	***
## postal_code85381	-1.878e-10	3.155e-12	-5.952e+01	<2e-16	***
## postal_code85382	-1.878e-10	3.154e-12	-5.954e+01	<2e-16	***
## postal_code85383	-1.886e-10	3.140e-12	-6.005e+01	<2e-16	***
## postal_code85388	-1.876e-10	3.249e-12	-5.774e+01	<2e-16	***
## postal_code85392	-1.875e-10	3.183e-12	-5.892e+01	<2e-16	***
## postal_code85395	-1.883e-10	3.151e-12	-5.976e+01	<2e-16	***
## postal_code89002	-1.878e-10	3.525e-12	-5.326e+01	<2e-16	***
## postal_code89005	-1.877e-10	3.175e-12	-5.912e+01	<2e-16	***
## postal_code89011	-1.875e-10	3.399e-12	-5.517e+01	<2e-16	***
## postal_code89012	-1.880e-10	3.148e-12	-5.972e+01	<2e-16	***
## postal_code89014	-1.877e-10	3.164e-12	-5.933e+01	<2e-16	***
## postal_code89015	-1.875e-10	3.173e-12	-5.909e+01	<2e-16	***
## postal_code89030	-1.870e-10	3.214e-12	-5.818e+01	<2e-16	***
## postal_code89031	-1.875e-10	3.173e-12	-5.910e+01	<2e-16	***
## postal_code89032	-1.874e-10	3.177e-12	-5.899e+01	<2e-16	***
## postal_code89044	-1.880e-10	3.192e-12	-5.889e+01	<2e-16	***
## postal_code89052	-1.888e-10	3.143e-12	-6.006e+01	<2e-16	***
## postal_code89074	-1.879e-10	3.154e-12	-5.957e+01	<2e-16	***
## postal_code89081	-1.876e-10	3.242e-12	-5.785e+01	<2e-16	***
## postal_code89084	-1.878e-10	3.166e-12	-5.933e+01	<2e-16	***
## postal_code89086	-1.878e-10	3.284e-12	-5.718e+01	<2e-16	***
## postal_code89101	-1.872e-10	3.217e-12	-5.820e+01	<2e-16	***
## postal_code89102	-1.875e-10	3.186e-12	-5.886e+01	<2e-16	***
## postal_code89103	-1.871e-10	3.210e-12	-5.829e+01	<2e-16	***
## postal_code89104	-1.873e-10	3.187e-12	-5.879e+01	<2e-16	***
## postal_code89106	-1.871e-10	3.201e-12	-5.846e+01	<2e-16	***
## postal_code89107	-1.873e-10	3.193e-12	-5.865e+01	<2e-16	***
## postal_code89108	-1.873e-10	3.191e-12	-5.870e+01	<2e-16	***
## postal_code89109	-1.884e-10	3.262e-12	-5.775e+01	<2e-16	***
## postal_code89110	-1.872e-10	3.194e-12	-5.863e+01	<2e-16	***
## postal_code89113	-1.876e-10	3.163e-12	-5.933e+01	<2e-16	***
## postal_code89115	-1.871e-10	3.206e-12	-5.836e+01	<2e-16	***
## postal_code89117	-1.880e-10	3.156e-12	-5.956e+01	<2e-16	***
## postal_code89118	-1.874e-10	3.195e-12	-5.865e+01	<2e-16	***
## postal_code89119	-1.874e-10	3.217e-12	-5.824e+01	<2e-16	***
## postal_code89120	-1.875e-10	3.183e-12	-5.891e+01	<2e-16	***
## postal_code89121	-1.874e-10	3.182e-12	-5.890e+01	<2e-16	***
## postal_code89122	-1.873e-10	3.193e-12	-5.867e+01	<2e-16	***
## postal_code89123	-1.879e-10	3.181e-12	-5.908e+01	<2e-16	***
## postal_code89128	-1.875e-10	3.172e-12	-5.912e+01	<2e-16	***

```

## postal_code89129 -1.877e-10 3.158e-12 -5.946e+01 <2e-16 ***
## postal_code89130 -1.877e-10 3.164e-12 -5.934e+01 <2e-16 ***
## postal_code89131 -1.881e-10 3.145e-12 -5.982e+01 <2e-16 ***
## postal_code89134 -1.878e-10 3.179e-12 -5.908e+01 <2e-16 ***
## postal_code89135 -1.887e-10 3.141e-12 -6.009e+01 <2e-16 ***
## postal_code89138 -1.887e-10 4.269e-12 -4.420e+01 <2e-16 ***
## postal_code89139 -1.878e-10 3.161e-12 -5.942e+01 <2e-16 ***
## postal_code89141 -1.879e-10 3.165e-12 -5.938e+01 <2e-16 ***
## postal_code89142 -1.872e-10 3.305e-12 -5.664e+01 <2e-16 ***
## postal_code89143 -1.877e-10 3.326e-12 -5.644e+01 <2e-16 ***
## postal_code89144 -1.878e-10 3.434e-12 -5.470e+01 <2e-16 ***
## postal_code89145 -1.876e-10 3.180e-12 -5.899e+01 <2e-16 ***
## postal_code89146 -1.876e-10 3.181e-12 -5.898e+01 <2e-16 ***
## postal_code89147 -1.877e-10 3.177e-12 -5.909e+01 <2e-16 ***
## postal_code89148 -1.878e-10 3.158e-12 -5.947e+01 <2e-16 ***
## postal_code89149 -1.878e-10 3.157e-12 -5.950e+01 <2e-16 ***
## postal_code89156 -1.872e-10 3.323e-12 -5.634e+01 <2e-16 ***
## postal_code89158 -1.885e-10 3.157e-12 -5.970e+01 <2e-16 ***
## postal_code89166 -1.876e-10 6.051e-12 -3.101e+01 <2e-16 ***
## postal_code89169 -1.873e-10 3.187e-12 -5.876e+01 <2e-16 ***
## postal_code89178 -1.878e-10 3.163e-12 -5.936e+01 <2e-16 ***
## postal_code89183 -1.877e-10 3.168e-12 -5.924e+01 <2e-16 ***
## time -2.505e-16 1.301e-16 -1.925e+00 0.0542 .
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 7.387e-12 on 19836 degrees of freedom
## (231 observations deleted due to missingness)
## Multiple R-squared: 1, Adjusted R-squared: 1
## F-statistic: 2.185e+29 on 434 and 19836 DF, p-value: < 2.2e-16

# Predict
Full_data_long_food_test$pred.plm.test.lag <-
predict(my.pdm.train.impute.lag.Simple, Full_data_long_food_test)

# MAPE
plmmape.lag.food <-
100*mean(abs(Full_data_long_food_test$pred.plm.test.lag/Full_data_long_food_t
est$rentprice-1), na.rm = T)
print(plmmape.lag.food)

## [1] 6.675503e-13

```

MAPE is now 3.37%, which is the lowest MAPE that we've arrived to.

```

ggplot(Full_data_long_food_test, aes(x=rentprice, y=pred.plm.test.lag))
+geom_point() + labs(title="Predicted vs. Actual Real Estate Prices") +
xlab("Actual") + ylab("Predicted")

```

Predicted vs. Actual Real Estate Prices

