

## BUS 41201 Homework 2 Assignment

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```
library(tidyverse)

## — Attaching packages —————
tidyverse 1.2.1 —

## ✓ ggplot2 3.2.1      ✓ purrr 0.3.2
## ✓ tibble 2.1.3       ✓ dplyr 0.8.3
## ✓ tidyr 1.0.0        ✓ stringr 1.4.0
## ✓ readr 1.3.1        ✓ forcats 0.4.0

## — Conflicts —————
tidyverse_conflicts() —
## ✗ dplyr::filter() masks stats::filter()
## ✗ dplyr::lag() masks stats::lag()

library(knitr)
library(dplyr)
```

### QUESTION 1

Regress log price onto all variables but mortgage. What is the  $R^2$ ? How many coefficients are used in this model and how many are significant at 10% FDR? Re-run regression with only the significant covariates, and compare  $R^2$  to the full model. (2 points)

- $R^2 = 0.4473061$
- Number of coefficients used: 41 (this does not include the intercept)
- Number significant at 10% FDR:  $41 - 5 = 36$  (This number does not include the baseline variable STATECA)
- $R^2$  of the new model: 0.4471907
- The  $R^2$  of the new model has decreased because the number of covariates explaining the model has decreased. However, it has only decreased by a very slight amount because the parameters removed were not significant.

```
homes <- read.csv("homes2004.csv")
view(homes)
pricey <- glm(log(LPRICE) ~ .-AMMORT, data=homes)
summary(pricey)

##
## Call:
```

```
## glm(formula = log(LPRICE) ~ . - AMMORT, data = homes)
##
## Deviance Residuals:
##      Min        1Q      Median        3Q        Max
## -11.5315   -0.2036    0.0956    0.3492    2.6791
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.108e+01  5.202e-02  213.063 < 2e-16 ***
## EAPTBLY       -5.068e-02  1.954e-02   -2.594 0.009497 **
## ECOM1Y        -3.875e-02  1.603e-02   -2.418 0.015634 *
## ECOM2Y        -1.617e-01  4.002e-02   -4.041 5.35e-05 ***
## EGREENY        4.495e-02  1.167e-02    3.853 0.000117 ***
## EJUNKY        -2.107e-01  4.251e-02   -4.956 7.27e-07 ***
## ELOW1Y         5.584e-02  1.926e-02    2.900 0.003736 **
## ESFDY          7.676e-02  2.463e-02    3.117 0.001832 **
## ETRANSY       -6.172e-03  2.109e-02   -0.293 0.769743
## EABANY        -1.599e-01  2.997e-02   -5.337 9.60e-08 ***
## HOWHgood       6.894e-02  2.192e-02    3.145 0.001664 **
## HOWNgood       9.863e-02  1.827e-02    5.400 6.76e-08 ***
## ODORAY        -8.105e-02  2.758e-02   -2.938 0.003306 **
## STRNAY        -8.550e-02  1.338e-02   -6.389 1.71e-10 ***
## ZINC2          3.962e-07  4.730e-08    8.377 < 2e-16 ***
## PER           7.186e-02  5.208e-03   13.799 < 2e-16 ***
## ZADULT        -1.051e-01  9.060e-03  -11.605 < 2e-16 ***
## HHGRADBach     1.352e-01  1.912e-02    7.072 1.59e-12 ***
## HHGRADGrad     1.561e-01  2.160e-02    7.230 5.06e-13 ***
## HHGRADHS Grad  -7.271e-02  1.808e-02   -4.022 5.79e-05 ***
## HHGRADNo HS   -3.125e-01  2.651e-02  -11.788 < 2e-16 ***
## NUNITS         7.306e-04  4.333e-04    1.686 0.091767 .
## INTW          -7.311e-02  3.681e-03  -19.861 < 2e-16 ***
## METROurban    -3.385e-02  1.511e-02   -2.241 0.025044 *
## STATECO       -4.380e-03  2.460e-02   -0.178 0.858706
## STATECT        8.528e-03  2.629e-02    0.324 0.745628
## STATEGA       -1.030e-01  2.679e-02   -3.844 0.000121 ***
## STATEIL       -3.760e-01  4.868e-02   -7.724 1.20e-14 ***
## STATEIN       -1.668e-01  2.672e-02   -6.243 4.41e-10 ***
## STATELA       -2.491e-01  3.154e-02   -7.899 2.99e-15 ***
## STATEMO       -1.616e-01  2.864e-02   -5.640 1.73e-08 ***
## STATEOH       -1.016e-01  2.800e-02   -3.628 0.000287 ***
## STATEOK       -3.193e-01  2.877e-02  -11.097 < 2e-16 ***
## STATEPA       -4.375e-01  2.920e-02  -14.985 < 2e-16 ***
## STATETX       -3.139e-01  3.010e-02  -10.428 < 2e-16 ***
## STATEWA        1.277e-01  2.580e-02    4.952 7.42e-07 ***
## BATHS          2.027e-01  1.004e-02   20.195 < 2e-16 ***
## BEDRMS         2.878e-03  8.424e-03    0.342 0.732630
## MATBUY         3.072e-01  1.139e-02   26.969 < 2e-16 ***
## DWNPAYprev home 1.302e-01  1.489e-02    8.745 < 2e-16 ***
## VALUE          1.257e-06  4.078e-08   30.810 < 2e-16 ***
## FRSTHOY       -1.288e-01  1.438e-02   -8.959 < 2e-16 ***
```

```

## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.4629866)
##
##      Null deviance: 13003.4  on 15564  degrees of freedom
## Residual deviance:  7186.9  on 15523  degrees of freedom
## AIC: 32230
##
## Number of Fisher Scoring iterations: 2

# R squared
(13003.4 - 7186.9)/13003.4

## [1] 0.4473061

# number of coefficients
15564 - 15523

## [1] 41

pvals <- summary(pricey)$coef[-1,4]
length(pvals)

## [1] 41

# number of significant coefficients at 10% FDR
pvals_ordered<-pvals[order(pvals,decreasing=F)]

q<-0.1

source("fdr.R")

cutoff <- fdr_cut(pvals, q)

names(pvals)[pvals<=cutoff]

## [1] "EAPTBLY"      "ECOM1Y"      "ECOM2Y"
## [4] "EGREENY"      "EJUNKY"      "ELOW1Y"
## [7] "ESFDY"        "EABANY"      "HOWHgood"
## [10] "HOWNgood"     "ODORAY"      "STRNAY"
## [13] "ZINC2"        "PER"         "ZADULT"
## [16] "HHGRADBach"   "HHGRADGrad"  "HHGRADHS Grad"
## [19] "HHGRADNo HS"  "INTW"        "METROurban"
## [22] "STATEGA"      "STATEIL"     "STATEIN"
## [25] "STATELA"      "STATEMO"     "STATEOH"
## [28] "STATEOK"      "STATEPA"     "STATETX"
## [31] "STATEWA"      "BATHS"       "MATBUY"
## [34] "DWNPAYprev home" "VALUE"       "FRSTHOY"

names(pvals)[pvals>cutoff]

```

```
## [1] "ETRANSY" "NUNITS" "STATECO" "STATECT" "BEDRMS"

homes2 <- cbind(homes, model.matrix(~STATE-1, data=homes))
homes2 <- homes2[ -c(22) ]

pricey_2 <- glm(log(LPRICE) ~. -AMMORT-ETRANS-NUNITS-BEDRMS-STATECO-STATECT,
data=homes2)
summary(pricey_2)

##
## Call:
## glm(formula = log(LPRICE) ~ . - AMMORT - ETRANS - NUNITS - BEDRMS -
## STATECO - STATECT, data = homes2)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -11.5381  -0.2031   0.0956   0.3489   2.6785
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.109e+01  4.794e-02 231.392 < 2e-16 ***
## EAPTBLY        -4.772e-02  1.937e-02  -2.464 0.013761 *
## ECOM1Y         -3.814e-02  1.590e-02  -2.398 0.016498 *
## ECOM2Y        -1.631e-01  3.961e-02  -4.117 3.85e-05 ***
## EGREENY        4.461e-02  1.165e-02   3.829 0.000129 ***
## EJUNKY        -2.111e-01  4.251e-02  -4.966 6.92e-07 ***
## ELOW1Y         5.369e-02  1.909e-02   2.812 0.004924 **
## ESFDY          7.610e-02  2.446e-02   3.111 0.001869 **
## EABANY        -1.610e-01  2.995e-02  -5.374 7.82e-08 ***
## HOWHgood       6.957e-02  2.190e-02   3.177 0.001491 **
## HOWNgood       9.906e-02  1.825e-02   5.427 5.82e-08 ***
## ODORAY        -8.172e-02  2.756e-02  -2.965 0.003030 **
## STRNAY        -8.571e-02  1.334e-02  -6.423 1.37e-10 ***
## ZINC2          3.976e-07  4.725e-08   8.415 < 2e-16 ***
## PER           7.216e-02  5.043e-03  14.307 < 2e-16 ***
## ZADULT        -1.051e-01  9.047e-03 -11.622 < 2e-16 ***
## HHGRADBach     1.360e-01  1.911e-02   7.113 1.18e-12 ***
## HHGRADGrad     1.571e-01  2.158e-02   7.280 3.49e-13 ***
## HHGRADHS Grad  -7.287e-02  1.807e-02  -4.032 5.56e-05 ***
## HHGRADNo HS   -3.131e-01  2.650e-02 -11.815 < 2e-16 ***
## INTW          -7.318e-02  3.680e-03 -19.885 < 2e-16 ***
## METROurban    -3.446e-02  1.502e-02  -2.294 0.021802 *
## BATHS          2.031e-01  9.272e-03  21.901 < 2e-16 ***
## MATBUY         3.074e-01  1.137e-02  27.039 < 2e-16 ***
## DWNPAYprev home 1.305e-01  1.489e-02   8.767 < 2e-16 ***
## VALUE          1.257e-06  4.055e-08  31.008 < 2e-16 ***
## FRSTHOY       -1.290e-01  1.436e-02  -8.982 < 2e-16 ***
## STATECA       -1.954e-03  2.217e-02  -0.088 0.929744
## STATEGA       -1.043e-01  2.238e-02  -4.660 3.18e-06 ***
## STATEIL       -3.784e-01  4.621e-02  -8.189 2.84e-16 ***
```

```
## STATEIN      -1.689e-01  2.233e-02  -7.566  4.08e-14 ***
## STATELA      -2.509e-01  2.795e-02  -8.977  < 2e-16 ***
## STATEMO      -1.634e-01  2.452e-02  -6.664  2.76e-11 ***
## STATEOH      -1.016e-01  2.349e-02  -4.325  1.54e-05 ***
## STATEOK      -3.212e-01  2.466e-02 -13.026  < 2e-16 ***
## STATEPA      -4.394e-01  2.477e-02 -17.740  < 2e-16 ***
## STATETX      -3.154e-01  2.636e-02 -11.965  < 2e-16 ***
## STATEWA       1.267e-01  2.203e-02   5.748  9.19e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.4629644)
##
##      Null deviance: 13003.4  on 15564  degrees of freedom
## Residual deviance:  7188.4  on 15527  degrees of freedom
## AIC: 32225
##
## Number of Fisher Scoring iterations: 2

(13003.4 - 7188.4)/13003.4

## [1] 0.4471907

pvals2 <- summary(pricey_2)$coef[-1,4]
length(pvals2)

## [1] 37

length(pvals)

## [1] 41
```

## QUESTION 2

Fit a regression for whether the buyer had more than 20 percent down (onto everything but AMMORT and LPRICE). Interpret effects for Pennsylvania state, 1st home buyers and the number of bathrooms. Add and describe an interaction between 1st home-buyers and the number of baths. (2 points)

- When the house state code is in Pennsylvania, the odds of the buyer having more than 20% down increase by 82.41242%, when compared to California.
- The odds of the buyer having more than 20% down decrease by 30.92657%, when it is first home purchase than that purchase that are not.
- The odds of the buyer having more than 20% down increases by 27.69827%, for a unit increase in # of bathrooms.

Marginal Effect:

- The odds of the buyer having more than 20% down is decrease by 18.29051% for a unit increase in # of bathrooms amongst first home buyers than a unit increase in # of bathrooms amongst non-first home buyers.

Predited Value:

- Given that the # of bathrooms are the same, when the buyer is a firsthome buyer, the odds of having more than 20.01% lower than non-first home buyers.

```
homes3<-homes
homes3$gt20dwn <- factor(0.2<(homes3$LPRICE-homes3$AMMORT)/homes3$LPRICE)

reg_gt20dwn <- glm(gt20dwn ~ .-AMMORT-LPRICE, data=homes3, family='binomial')
summary(reg_gt20dwn)

##
## Call:
## glm(formula = gt20dwn ~ . - AMMORT - LPRICE, family = "binomial",
##      data = homes3)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.4502  -0.8084  -0.5985   1.0693   2.4772
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -1.293e+00  1.831e-01  -7.065 1.61e-12 ***
## EAPTBLY       1.505e-02  7.025e-02   0.214 0.830424
## ECOM1Y       -1.619e-01  5.809e-02  -2.787 0.005325 **
## ECOM2Y       -3.131e-01  1.600e-01  -1.957 0.050385 .
## EGREENY      -1.569e-03  3.984e-02  -0.039 0.968582
## EJUNKY       -9.697e-03  1.608e-01  -0.060 0.951913
## ELOW1Y        4.635e-02  6.627e-02   0.699 0.484292
## ESFDY        -2.670e-01  8.276e-02  -3.227 0.001252 **
## ETRANSY      -6.270e-02  7.616e-02  -0.823 0.410416
## EABANY       -8.187e-02  1.157e-01  -0.708 0.479137
## HOWHgood     -1.372e-01  7.947e-02  -1.726 0.084398 .
## HOWNgood      1.597e-01  6.730e-02   2.372 0.017669 *
## ODORAY       1.041e-01  9.811e-02   1.061 0.288528
## STRNAY       -9.644e-02  4.737e-02  -2.036 0.041783 *
## ZINC2        -1.277e-07  1.874e-07  -0.682 0.495530
## PER         -1.253e-01  1.855e-02  -6.752 1.46e-11 ***
## ZADULT       1.944e-02  3.188e-02   0.610 0.542024
## HHGRADBach    1.797e-01  6.596e-02   2.725 0.006431 **
## HHGRADGrad    2.729e-01  7.288e-02   3.745 0.000181 ***
## HHGRADHS Grad -2.064e-02  6.376e-02  -0.324 0.746192
## HHGRADNo HS  -7.246e-02  9.845e-02  -0.736 0.461720
## NUNITS        2.377e-03  1.428e-03   1.664 0.096100 .
## INTW         -6.327e-02  1.372e-02  -4.613 3.98e-06 ***
## METROurban   -8.000e-02  5.389e-02  -1.485 0.137672
## STATECO      -2.513e-02  8.491e-02  -0.296 0.767257
```

```

## STATECT      7.870e-01  8.825e-02  8.918 < 2e-16 ***
## STATEGA     -2.223e-01  9.455e-02 -2.351 0.018716 *
## STATEIL      5.870e-01  1.635e-01  3.590 0.000330 ***
## STATEIN      2.431e-01  9.352e-02  2.599 0.009336 **
## STATELA      5.932e-01  1.077e-01  5.506 3.67e-08 ***
## STATEMO      5.309e-01  9.730e-02  5.456 4.87e-08 ***
## STATEOH      7.642e-01  9.480e-02  8.061 7.59e-16 ***
## STATEOK      1.291e-01  1.027e-01  1.257 0.208850
## STATEPA      6.011e-01  1.007e-01  5.968 2.40e-09 ***
## STATETX      2.935e-01  1.073e-01  2.736 0.006221 **
## STATEWA      1.525e-01  8.819e-02  1.730 0.083717 .
## BATHS        2.445e-01  3.419e-02  7.152 8.57e-13 ***
## BEDRMS       -2.086e-02  2.908e-02 -0.717 0.473120
## MATBUY        2.587e-01  3.927e-02  6.588 4.45e-11 ***
## DWNPAYprev home 7.417e-01  4.857e-02 15.272 < 2e-16 ***
## VALUE        1.489e-06  1.452e-07 10.256 < 2e-16 ***
## FRSTHOY      -3.700e-01  5.170e-02 -7.156 8.29e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 18873  on 15564  degrees of freedom
## Residual deviance: 16969  on 15523  degrees of freedom
## AIC: 17053
##
## Number of Fisher Scoring iterations: 4

reg2_gt20dwn <- glm(gt20dwn ~ .-AMMORT-LPRICE+BATHS*FRSTHO, data=homes3,
family='binomial')
summary(reg2_gt20dwn)

##
## Call:
## glm(formula = gt20dwn ~ . - AMMORT - LPRICE + BATHS * FRSTHO,
##      family = "binomial", data = homes3)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.4400  -0.8054  -0.5974   1.0654   2.4456
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -1.378e+00  1.851e-01  -7.444 9.76e-14 ***
## EAPTBL        1.217e-02  7.020e-02   0.173 0.862337
## ECOM1        -1.608e-01  5.806e-02  -2.770 0.005612 **
## ECOM2        -3.181e-01  1.598e-01  -1.991 0.046511 *
## EGREENY      -2.305e-03  3.987e-02  -0.058 0.953900
## EJUNKY       -5.332e-03  1.606e-01  -0.033 0.973520
## ELOW1         4.950e-02  6.627e-02   0.747 0.455066

```

```

## ESFDY          -2.715e-01  8.276e-02  -3.280  0.001036 **
## ETRANSY        -6.147e-02  7.612e-02  -0.808  0.419333
## EABANY         -9.206e-02  1.155e-01  -0.797  0.425505
## HOWHgood       -1.324e-01  7.938e-02  -1.668  0.095245 .
## HOWNgood        1.630e-01  6.728e-02   2.423  0.015399 *
## ODORAY          1.022e-01  9.804e-02   1.043  0.297090
## STRNAY         -9.672e-02  4.736e-02  -2.042  0.041136 *
## ZINC2          -1.479e-07  1.897e-07  -0.780  0.435530
## PER            -1.266e-01  1.859e-02  -6.811  9.67e-12 ***
## ZADULT          2.195e-02  3.193e-02   0.687  0.491817
## HHGRADBach      1.818e-01  6.597e-02   2.755  0.005863 **
## HHGRADGrad      2.770e-01  7.294e-02   3.797  0.000146 ***
## HHGRADHS Grad  -1.967e-02  6.374e-02  -0.309  0.757647
## HHGRADNo HS    -7.767e-02  9.837e-02  -0.790  0.429774
## NUNITS          2.284e-03  1.415e-03   1.613  0.106646
## INTW           -6.421e-02  1.371e-02  -4.684  2.81e-06 ***
## METROurban     -8.407e-02  5.391e-02  -1.560  0.118848
## STATECO        -3.523e-02  8.516e-02  -0.414  0.679103
## STATECT         7.739e-01  8.837e-02   8.758  < 2e-16 ***
## STATEGA        -2.317e-01  9.489e-02  -2.441  0.014636 *
## STATEIL         5.738e-01  1.635e-01   3.509  0.000450 ***
## STATEIN         2.367e-01  9.369e-02   2.526  0.011534 *
## STATELA         5.893e-01  1.079e-01   5.464  4.66e-08 ***
## STATEMO         5.194e-01  9.749e-02   5.328  9.95e-08 ***
## STATEOH         7.505e-01  9.493e-02   7.906  2.66e-15 ***
## STATEOK         1.174e-01  1.029e-01   1.141  0.253976
## STATEPA         5.816e-01  1.009e-01   5.761  8.34e-09 ***
## STATETX         2.875e-01  1.075e-01   2.675  0.007473 **
## STATEWA         1.535e-01  8.829e-02   1.739  0.082036 .
## BATHS           2.994e-01  3.824e-02   7.829  4.92e-15 ***
## BEDRMS          -2.157e-02  2.913e-02  -0.741  0.458931
## MATBUY          2.590e-01  3.929e-02   6.592  4.33e-11 ***
## DWNPAYprev home 7.338e-01  4.868e-02  15.073  < 2e-16 ***
## VALUE           1.448e-06  1.458e-07   9.927  < 2e-16 ***
## FRSTHOY         -2.137e-02  1.184e-01  -0.180  0.856799
## BATHS:FRSTHOY  -2.020e-01  6.207e-02  -3.255  0.001135 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 18873  on 15564  degrees of freedom
## Residual deviance: 16958  on 15522  degrees of freedom
## AIC: 17044
##
## Number of Fisher Scoring iterations: 4

#times interpretation
exp(6.011e-01); exp(-3.700e-01); exp(2.445e-01)

```



```
## [1] 1.824124
## [1] 0.6907343
## [1] 1.276983

## change interpretation
(exp(6.011e-01)-1)*100; (exp(-3.700e-01)-1)*100; (exp(2.445e-01)-1)*100

## [1] 82.41242
## [1] -30.92657
## [1] 27.69827

#interaction interpretation in marginal terms
#BATHS:FRSTHOY -2.020e-01 6.207e-02 -3.255 0.001135 **
exp(-2.020e-01); (exp(-2.020e-01)-1)*100

## [1] 0.8170949
## [1] -18.29051

#interaction interpretation in terms of predicted values
exp(-2.137e-02-2.020e-01); (exp(-2.137e-02-2.020e-01)-1)*100

## [1] 0.7998189
## [1] -20.01811
```

### QUESTION 3

Focus only on a subset of homes worth >100k. Train the full model from Question 1 on this subset. Predict the left-out homes using this model. What is the out-of-sample fit (i.e.  $R^2$ )? Explain why you get this value. (1 point)

- OOS  $R^2$ : -0.04988871
- Although usually  $R^2$  is between 0 and 1 the value here is negative because it is the out-of-sample  $R^2$  and not the in-sample. In the case below the training sample is not a good representation of the whole dataset because it was not sampled out randomly. Therefore when we try to predict the left-out homes based on the model from the training sample, it is not a good fit.  $R^2$  compares the fit of the chosen model with that of a horizontal straight line (the null hypothesis). Since for this case the model from the training sample fits worse than a horizontal line, the  $R^2$  is negative.

```
subset <- which(homes$VALUE>100000)

train <- glm(log(LPRICE) ~ .-AMMORT, data=homes[subset,])

ptrain <- predict(train, newdata=homes[-subset,], type="response")
```

```

# Use the code ``deviance.R" to compute OOS deviance
source("deviance.R")

D <- deviance(y=log(homes$LPRICE[-subset]), pred=ptrain)

# Null model has just one mean parameter
ybar <- mean(log(homes$LPRICE[-subset]))

D0 <- deviance(y=log(homes$LPRICE[-subset]), pred=ybar)

## OOS R2
1 - D/D0

## [1] -0.04988871

summary(train) # will usually be a higher in-sample R2

##
## Call:
## glm(formula = log(LPRICE) ~ . - AMMORT, data = homes[subset,
##      ])
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -11.6497  -0.1830   0.0852   0.3182   2.6995
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.134e+01  5.567e-02 203.782  < 2e-16 ***
## EAPTPLY       -2.515e-02  2.119e-02  -1.187  0.235407
## ECOM1Y        -3.579e-02  1.722e-02  -2.078  0.037734 *
## ECOM2Y        -1.097e-01  4.803e-02  -2.284  0.022417 *
## EGREENY       4.153e-02  1.177e-02   3.529  0.000418 ***
## EJUNKY        -1.302e-01  5.122e-02  -2.542  0.011029 *
## ELOW1Y        9.975e-03  1.952e-02   0.511  0.609351
## ESFDY         1.288e-02  2.706e-02   0.476  0.634200
## ETRANSY       -5.148e-03  2.267e-02  -0.227  0.820354
## EABANY        -6.940e-02  3.846e-02  -1.805  0.071176 .
## HOWHgood     1.441e-02  2.465e-02   0.585  0.558767
## HOWNgood     6.651e-02  2.016e-02   3.299  0.000972 ***
## ODORAY       -8.135e-02  3.036e-02  -2.679  0.007391 **
## STRNAY       -7.165e-02  1.414e-02  -5.067  4.09e-07 ***
## ZINC2        3.307e-07  4.361e-08   7.583  3.62e-14 ***
## PER          7.868e-02  5.293e-03  14.863  < 2e-16 ***
## ZADULT       -1.118e-01  9.326e-03 -11.985  < 2e-16 ***
## HHGRADBach    1.349e-01  1.926e-02   7.006  2.57e-12 ***
## HHGRADGrad    1.555e-01  2.141e-02   7.264  3.98e-13 ***
## HHGRADHS Grad -3.571e-02  1.883e-02  -1.897  0.057889 .

```

```

## HHGRADNo HS      -1.821e-01  3.026e-02  -6.018  1.82e-09 ***
## NUNITS            5.284e-04  4.953e-04   1.067  0.286145
## INTW              -6.950e-02  4.392e-03 -15.825  < 2e-16 ***
## METROurban        -1.868e-02  1.628e-02  -1.147  0.251214
## STATECO            8.999e-03  2.259e-02   0.398  0.690333
## STATECT           -8.232e-03  2.449e-02  -0.336  0.736784
## STATEGA           -8.656e-02  2.515e-02  -3.441  0.000581 ***
## STATEIL           -1.098e-01  5.477e-02  -2.005  0.045025 *
## STATEIN           -1.199e-01  2.646e-02  -4.533  5.88e-06 ***
## STATELA           -1.773e-01  3.252e-02  -5.453  5.06e-08 ***
## STATEMO           -8.185e-02  2.819e-02  -2.904  0.003697 **
## STATEOH           -6.932e-02  2.733e-02  -2.536  0.011224 *
## STATEOK           -1.661e-01  3.210e-02  -5.174  2.33e-07 ***
## STATEPA           -2.805e-01  3.151e-02  -8.904  < 2e-16 ***
## STATETX           -1.277e-01  3.442e-02  -3.711  0.000207 ***
## STATEWA            1.267e-01  2.370e-02   5.346  9.13e-08 ***
## BATHS              1.805e-01  1.003e-02  17.997  < 2e-16 ***
## BEDRMS            -1.831e-02  8.588e-03  -2.132  0.033029 *
## MATBUY            3.133e-01  1.154e-02  27.148  < 2e-16 ***
## DWNPAYprev home   1.145e-01  1.466e-02   7.812  6.11e-15 ***
## VALUE              1.125e-06  3.880e-08  28.992  < 2e-16 ***
## FRSTHOY           -1.211e-01  1.502e-02  -8.058  8.48e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.375933)
##
##      Null deviance: 7300.4  on 12143  degrees of freedom
## Residual deviance: 4549.5  on 12102  degrees of freedom
## AIC: 22626
##
## Number of Fisher Scoring iterations: 2

```