

# HW #4 Modeling

Shaya Engelman, Noori Selina

2024-04-14

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.3      v readr      2.1.4
## v forcats    1.0.0      v stringr   1.5.0
## v ggplot2    3.4.4      v tibble    3.2.1
## v lubridate  1.9.2      v tidyr     1.3.0
## v purrr      1.0.1
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(knitr)
library(car)
```

```
## Loading required package: carData
##
## Attaching package: 'car'
##
## The following object is masked from 'package:dplyr':
##
##     recode
##
## The following object is masked from 'package:purrr':
##
##     some
```

```
library(glmnet)
```

```
## Loading required package: Matrix
##
## Attaching package: 'Matrix'
##
## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack
##
## Loaded glmnet 4.1-8
```

```
library(pROC)
```

```
## Type 'citation("pROC")' for a citation.
##
## Attaching package: 'pROC'
##
## The following objects are masked from 'package:stats':
##
##     cov, smooth, var
```

```
library(Metrics)
```

```
##
## Attaching package: 'Metrics'
##
## The following object is masked from 'package:pROC':
##
##     auc
```

```
library(ggplot2)
```

```
train_data <- read.csv("https://raw.githubusercontent.com/d-ev-craig/DATA621_Group/main/HW4/data/train_data.csv")
test_data <- read.csv("https://raw.githubusercontent.com/d-ev-craig/DATA621_Group/main/HW4/data/test_data.csv")
```

```
colnames(train_data)
```

```
## [1] "TARGET_FLAG"           "TARGET_AMT"
## [3] "KIDSDRIV"              "AGE"
## [5] "HOMEKIDS"              "YOJ"
## [7] "INCOME"                "PARENT1"
## [9] "HOME_VAL"              "MSTATUS"
## [11] "SEX"                   "EDUCATION"
## [13] "JOB"                   "TRAVTIME"
## [15] "CAR_USE"               "BLUEBOOK"
## [17] "TIF"                   "CAR_TYPE"
## [19] "RED_CAR"               "OLDCLAIM"
## [21] "CLM_FREQ"              "REVOKED"
## [23] "MVR_PTS"               "CAR_AGE"
## [25] "URBANICITY"            "HOME_AREA"
## [27] "WORK_AREA"             "BLUEBOOK_orderNorm"
## [29] "HOME_VAL_sqrt"         "INCOME_orderNorm"
## [31] "MVR_PTS_log"           "OLDCLAIM_yej"
## [33] "TIF_yej"               "TRAVTIME_yej"
## [35] "YOJ_orderNorm"         "CLM_FREQ_log"
## [37] "CAR_AGE_sqrt"          "PARENT1.No"
## [39] "PARENT1.Yes"           "MSTATUS.No"
## [41] "MSTATUS.Yes"           "SEX.F"
## [43] "SEX.M"                 "EDUCATION.L"
## [45] "EDUCATION.Q"           "EDUCATION.C"
## [47] "JOB.1"                 "JOBBlue.Collar"
## [49] "JOBclerical"           "JOBDoctor"
```

```
## [51] "JOBHome.Maker"           "JOBLawyer"
## [53] "JOBManager"             "JOBProfessional"
## [55] "JOBStudent"             "CAR_USECommercial"
## [57] "CAR_USEPrivate"         "CAR_TYPEMinivan"
## [59] "CAR_TYPEPanel.Truck"    "CAR_TYPEPickup"
## [61] "CAR_TYPESports.Car"     "CAR_TYPESUV"
## [63] "CAR_TYPEVan"            "RED_CAR.No"
## [65] "RED_CAR.Yes"            "REVOKED.No"
## [67] "REVOKED.Yes"            "URBANICITYHighly.Rural..Rural"
## [69] "URBANICITYHighly.Urban..Urban" "HOME_AREAHighly.Rural"
## [71] "HOME_AREAHighly.Urban"   "WORK_AEARural"
## [73] "WORK_AEAUrban"
```

We will first work on the logistic regression model to predict whether the person will get into a crash or not.

Because we have both our original variables and their transformations we need to be careful not to include the same variables twice. Just to make everything easier, I first created lists of columns to help identify them.

```
target_columns <- c("TARGET_FLAG", "TARGET_AMT")
original_columns <- c("KIDSDRIV", "AGE", "HOMEKIDS", "YOJ", "INCOME", "PARENT1", "HOME_VAL", "MSTATUS",
                     "SEX", "EDUCATION", "JOB", "TRAVTIME", "CAR_USE", "BLUEBOOK", "TIF", "CAR_TYPE",
                     "RED_CAR", "OLDCLAIM", "CLM_FREQ", "REVOKED", "MVR_PTS", "CAR_AGE", "URBANICITY")

transformed_columns <- c("BLUEBOOK_orderNorm", "HOME_VAL_sqrt", "INCOME_orderNorm", "MVR_PTS_log", "OLDCLAIM_log",
                        "TIF_yej", "TRAVTIME_yej", "YOJ_orderNorm", "CLM_FREQ_log", "CAR_AGE_sqrt", "PARENT1.Yes",
                        "MSTATUS.No", "MSTATUS.Yes", "SEX.F", "SEX.M", "EDUCATION.L", "EDUCATION.C", "JOB.1",
                        "JOBBlue.Collar", "JOBClerical", "JOBDoctor", "JOBHome", "JOBLawyer", "JOBManager",
                        "JOBProfessional", "JOBStudent", "CAR_USECommercial", "CAR_USEPrivate", "CAR_TYPEMinivan",
                        "CAR_TYPEPanel.Truck", "CAR_TYPEPickup", "CAR_TYPESUV", "CAR_TYPEVan", "RED_CAR.No",
                        "RED_CAR.Yes", "REVOKED.No", "REVOKED.Yes", "URBANICITYHighly.Rural..Rural", "URBANICITYHighly.Urban..Urban" )
```

Since we used One-Hot Encoding (OHC) to transform the categorical variables, we need to worry about multicollinearity between those columns. For the variables with only two features, we can simply drop one of them as the second adds no extra knowledge. For other collinear variables, we need to be more careful and employ different strategies.

The transformed data are all numeric columns and thus easier to work with. Additionally, I assume they would return better results, for these reasons, I will start with the transformed columns. First, we build a simple model with all our variables, just to get a basic idea of what we are dealing with.

```
simple_model1 <- glm(TARGET_FLAG ~ ., data = train_data[, c(transformed_columns, "TARGET_FLAG")], family = "binomial")
summary(simple_model1)
```

```
##
## Call:
## glm(formula = TARGET_FLAG ~ ., family = "binomial", data = train_data[,
##      c(transformed_columns, "TARGET_FLAG")])
##
## Coefficients: (9 not defined because of singularities)
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    0.070243   0.252421   0.278  0.78080
## BLUEBOOK_orderNorm -0.221030   0.049045  -4.507 6.58e-06 ***
```

```

## HOME_VAL_sqrt -0.210153 0.049615 -4.236 2.28e-05 ***
## INCOME_orderNorm -0.184201 0.061869 -2.977 0.00291 **
## MVR_PTS_log 0.176977 0.037525 4.716 2.40e-06 ***
## OLDCLAIM_yej -0.209936 0.307885 -0.682 0.49532
## TIF_yej -0.236809 0.035108 -6.745 1.53e-11 ***
## TRAVTIME_yej 0.266461 0.036222 7.356 1.89e-13 ***
## YOJ_orderNorm -0.023759 0.038421 -0.618 0.53632
## CLM_FREQ_log 0.448026 0.307485 1.457 0.14510
## CAR_AGE_sqrt -0.062695 0.048695 -1.288 0.19791
## PARENT1.No -0.732591 0.109325 -6.701 2.07e-11 ***
## PARENT1.Yes NA NA NA NA
## MSTATUS.No 0.319044 0.102083 3.125 0.00178 **
## MSTATUS.Yes NA NA NA NA
## SEX.F 0.024558 0.130905 0.188 0.85119
## SEX.M NA NA NA NA
## EDUCATION.L 0.047205 0.169961 0.278 0.78121
## EDUCATION.Q 0.264556 0.101814 2.598 0.00937 **
## EDUCATION.C -0.072634 0.098073 -0.741 0.45893
## JOB.1 -0.288786 0.259777 -1.112 0.26628
## JOBBBlue.Collar 0.323142 0.160472 2.014 0.04404 *
## JOBClerical 0.364398 0.158166 2.304 0.02123 *
## JOBDoctor -0.429616 0.343365 -1.251 0.21086
## JOBHome.Maker 0.139000 0.181599 0.765 0.44402
## JOBLawyer 0.071041 0.250482 0.284 0.77670
## JOBManager -0.581935 0.204813 -2.841 0.00449 **
## JOBProfessional 0.131141 0.189016 0.694 0.48780
## JOBStudent NA NA NA NA
## CAR_USECommercial 0.784582 0.104648 7.497 6.51e-14 ***
## CAR_USEPrivate NA NA NA NA
## CAR_TYPEMinivan -0.690945 0.150168 -4.601 4.20e-06 ***
## CAR_TYPEPanel.Truck -0.092964 0.172169 -0.540 0.58922
## CAR_TYPEPickup -0.166739 0.149676 -1.114 0.26528
## CAR_TYPESports.Car 0.208593 0.204435 1.020 0.30757
## CAR_TYPESUV 0.028443 0.185918 0.153 0.87841
## CAR_TYPEVan NA NA NA NA
## RED_CAR.No -0.007097 0.103600 -0.069 0.94539
## RED_CAR.Yes NA NA NA NA
## REVOKED.No -0.744473 0.099788 -7.461 8.62e-14 ***
## REVOKED.Yes NA NA NA NA
## URBANICITYHighly.Rural..Rural -2.468869 0.136957 -18.027 < 2e-16 ***
## URBANICITYHighly.Urban..Urban NA NA NA NA
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 6611 on 5712 degrees of freedom
## Residual deviance: 5105 on 5679 degrees of freedom
## AIC: 5173
##
## Number of Fisher Scoring iterations: 5

```

Based on these results, I will remove variables causing multicollinearity problems. For the columns with only two options we simply remove any one of them. For the other variables, I will remove the variable with the

least correlation to the target variable since I assume they would have the least impact on the final model.

```
cor_mat <- cor(train_data[, c(transformed_columns, "TARGET_FLAG")])
kable(cor_mat[, "TARGET_FLAG"])
```

	x
BLUEBOOK_orderNorm	-0.1128073
HOME_VAL_sqrt	-0.1889103
INCOME_orderNorm	-0.1410905
MVR_PTS_log	0.1651326
OLDCLAIM_yej	0.2363257
TIF_yej	-0.0856103
TRAVTIME_yej	0.0603174
YOJ_orderNorm	-0.0698294
CLM_FREQ_log	0.2359834
CAR_AGE_sqrt	-0.1066532
PARENT1.No	-0.1697927
PARENT1.Yes	0.1697927
MSTATUS.No	0.1473048
MSTATUS.Yes	-0.1473048
SEX.F	0.0318414
SEX.M	-0.0318414
EDUCATION.L	-0.1353689
EDUCATION.Q	0.0998456
EDUCATION.C	-0.0127149
JOB.1	-0.0184123
JOBBlue.Collar	0.1043799
JOBClerical	0.0261655
JOBDoctor	-0.0530153
JOBHome.Maker	0.0123769
JOBLawyer	-0.0629416
JOBManager	-0.1006736
JOBProfessional	-0.0337543
JOBStudent	0.0734056
CAR_USECommercial	0.1427534
CAR_USEPrivate	-0.1427534
CAR_TYPEMinivan	-0.1339852
CAR_TYPEPanel.Truck	-0.0020186
CAR_TYPEPickup	0.0481774
CAR_TYPESports.Car	0.0574468
CAR_TYPESUV	0.0515462
CAR_TYPEVan	0.0018546
RED_CAR.No	0.0093489
RED_CAR.Yes	-0.0093489
REVOKED.No	-0.1433965
REVOKED.Yes	0.1433965
URBANICITYHighly.Rural..Rural	-0.2342684
URBANICITYHighly.Urban..Urban	0.2342684
TARGET_FLAG	1.0000000

Columns: “PARENT1.Yes”, “MSTATUS.Yes”, “SEX.M”, “CAR\_USEPrivate”, “RED\_CAR.Yes”, “REVOKED.Yes”, “URBANICITYHighly.Urban..Urban” were easily eliminated due to only having two options.

To solve the remaining singularities, we also remove columns: "JOB.1", "CAR\_TYPEVan". These were selected due to their extremely low correlation to the target variable.

```
columns_causing_multicollinearity <- c("PARENT1.Yes", "MSTATUS.Yes", "SEX.M", "JOB.1", "CAR_TYPEVan", "RED_CAR.Yes", "REVOKED.Yes", "URBANICITYHighly.Urban..Urban")

transformed_columns_filtered <- setdiff(transformed_columns, columns_causing_multicollinearity)
```

We now rerun the simple model without these columns to get a look at some of the coefficients.

```
simple_model2 <- glm(TARGET_FLAG ~ ., data = train_data[, c(transformed_columns_filtered, "TARGET_FLAG")],
summary(simple_model2)
```

```
##
## Call:
## glm(formula = TARGET_FLAG ~ ., family = "binomial", data = train_data[,
##      c(transformed_columns_filtered, "TARGET_FLAG")])
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -0.218543   0.255742  -0.855  0.39280
## BLUEBOOK_orderNorm -0.221030   0.049045  -4.507 6.58e-06 ***
## HOME_VAL_sqrt    -0.210153   0.049615  -4.236 2.28e-05 ***
## INCOME_orderNorm  -0.184201   0.061869  -2.977  0.00291 **
## MVR_PTS_log       0.176977   0.037525   4.716 2.40e-06 ***
## OLDCLAIM_yeoj     -0.209936   0.307885  -0.682  0.49532
## TIF_yeoj          -0.236809   0.035108  -6.745 1.53e-11 ***
## TRAVTIME_yeoj      0.266461   0.036222   7.356 1.89e-13 ***
## YOJ_orderNorm     -0.023759   0.038421  -0.618  0.53632
## CLM_FREQ_log       0.448026   0.307485   1.457  0.14510
## CAR_AGE_sqrt      -0.062695   0.048695  -1.288  0.19791
## PARENT1.No        -0.732591   0.109325  -6.701 2.07e-11 ***
## MSTATUS.No         0.319044   0.102083   3.125  0.00178 **
## SEX.F              0.024558   0.130905   0.188  0.85119
## EDUCATION.L        0.047205   0.169961   0.278  0.78121
## EDUCATION.Q         0.264556   0.101814   2.598  0.00937 **
## EDUCATION.C        -0.072634   0.098073  -0.741  0.45893
## JOBBlue.Collar     0.611928   0.220920   2.770  0.00561 **
## JOBClerical         0.653184   0.234964   2.780  0.00544 **
## JOBDoctor          -0.140830   0.303224  -0.464  0.64233
## JOBHome.Maker       0.427786   0.252770   1.692  0.09057 .
## JOBLawyer           0.359827   0.203121   1.771  0.07648 .
## JOBManager         -0.293149   0.204503  -1.433  0.15172
## JOBProfessional     0.419927   0.213262   1.969  0.04895 *
## JOBStudent          0.288786   0.259777   1.112  0.26628
## CAR_USECommercial   0.784582   0.104648   7.497 6.51e-14 ***
## CAR_TYPEMinivan    -0.690945   0.150168  -4.601 4.20e-06 ***
## CAR_TYPEPanel.Truck -0.092964   0.172169  -0.540  0.58922
## CAR_TYPEPickup     -0.166739   0.149676  -1.114  0.26528
## CAR_TYPESports.Car  0.208593   0.204435   1.020  0.30757
## CAR_TYPESUV         0.028443   0.185918   0.153  0.87841
## RED_CAR.No         -0.007097   0.103600  -0.069  0.94539
## REVOKED.No         -0.744473   0.099788  -7.461 8.62e-14 ***
```

```
## URBANICITYHighly.Rural..Rural -2.468869  0.136957 -18.027 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 6611  on 5712  degrees of freedom
## Residual deviance: 5105  on 5679  degrees of freedom
## AIC: 5173
##
## Number of Fisher Scoring iterations: 5
```

We see that we no longer have any singularities in the model and, notably, the Deviance and AIC of these two models are identical since we haven't actually improved the model. We just improved the accuracy of the individual coefficients by removing perfect multicollinearity. However, we still have a lot of very insignificant variables that likely are only making the model worse. Additionally, while we no longer have perfect multicollinearity, there is still definitely some collinearity in the categorical variables. We will use a combination of the `vif()` function and the correlation matrix from above to try to improve on this.

```
kable(cor_mat[, "TARGET_FLAG"])
```

	x
BLUEBOOK_orderNorm	-0.1128073
HOME_VAL_sqrt	-0.1889103
INCOME_orderNorm	-0.1410905
MVR_PTS_log	0.1651326
OLDCLAIM_yej	0.2363257
TIF_yej	-0.0856103
TRAVTIME_yej	0.0603174
YOJ_orderNorm	-0.0698294
CLM_FREQ_log	0.2359834
CAR_AGE_sqrt	-0.1066532
PARENT1.No	-0.1697927
PARENT1.Yes	0.1697927
MSTATUS.No	0.1473048
MSTATUS.Yes	-0.1473048
SEX.F	0.0318414
SEX.M	-0.0318414
EDUCATION.L	-0.1353689
EDUCATION.Q	0.0998456
EDUCATION.C	-0.0127149
JOB.1	-0.0184123
JOBBlue.Collar	0.1043799
JOB Clerical	0.0261655
JOB Doctor	-0.0530153
JOB Home.Maker	0.0123769
JOB Lawyer	-0.0629416
JOB Manager	-0.1006736
JOB Professional	-0.0337543
JOB Student	0.0734056
CAR_USE Commercial	0.1427534
CAR_USE Private	-0.1427534

	x
CAR_TYPEMinivan	-0.1339852
CAR_TYPEPanel.Truck	-0.0020186
CAR_TYPEPickup	0.0481774
CAR_TYPESports.Car	0.0574468
CAR_TYPESUV	0.0515462
CAR_TYPEVan	0.0018546
RED_CAR.No	0.0093489
RED_CAR.Yes	-0.0093489
REVOKED.No	-0.1433965
REVOKED.Yes	0.1433965
URBANICITYHighly.Rural..Rural	-0.2342684
URBANICITYHighly.Urban..Urban	0.2342684
TARGET_FLAG	1.0000000

```
kable(vif(simple_model2))
```

	x
BLUEBOOK_orderNorm	1.993802
HOME_VAL_sqrt	2.023908
INCOME_orderNorm	2.996541
MVR_PTS_log	1.132383
OLDCLAIM_yej	83.184614
TIF_yej	1.013464
TRAVTIME_yej	1.038462
YOJ_orderNorm	1.237745
CLM_FREQ_log	83.150156
CAR_AGE_sqrt	1.965782
PARENT1.No	1.375341
MSTATUS.No	2.150437
SEX.F	3.534666
EDUCATION.L	4.636526
EDUCATION.Q	2.128810
EDUCATION.C	1.815599
JOBBlue.Collar	7.719025
JOB Clerical	6.196045
JOB Doctor	1.668963
JOB Home.Maker	3.869329
JOB Lawyer	2.874183
JOB Manager	2.824372
JOB Professional	4.272581
JOB Student	5.123295
CAR_USECommercial	2.226415
CAR_TYPEMinivan	3.044063
CAR_TYPEPanel.Truck	1.972542
CAR_TYPEPickup	2.835265
CAR_TYPESports.Car	3.726374
CAR_TYPESUV	6.058698
RED_CAR.No	1.839504
REVOKED.No	1.079868
URBANICITYHighly.Rural..Rural	1.135412



Using the above tables we easily see we need to drop “OLDCLAIM\_yej”. It is obviously extremely correlated with “CLM\_FREQ\_log” since the amount of claims one made will obviously correlate with the total dollar amount claimed. We choose to keep the total amount of claims rather than the total amount of dollars since that is likely a better predictor of a single other claim. The various jobs are obviously correlated with each other and influencing the coefficients of each other. By removing the ones with the least correlation to the target variable, we’ve hopefully improved our coefficients of the ones remaining. The same is true for the various car types and education levels. The YOJ (years on job), car age, sex, and red car columns were removed simply due to their low p values and correlation to the target variable.

```
remove_columns <- c("OLDCLAIM_yej", "JOBClerical", "JOBDoctor", "JOBLawyer", "JOBHome.Maker", "JOBProf")
transformed_columns_final <- setdiff(transformed_columns_filtered, remove_columns)
```

We now will create a model using the remaining columns.

```
model_transformed <- glm(TARGET_FLAG ~ ., data = train_data[, c(transformed_columns_final, "TARGET_FLAG")],
summary(model_transformed)
```

```
##
## Call:
## glm(formula = TARGET_FLAG ~ ., family = "binomial", data = train_data[,
##      c(transformed_columns_final, "TARGET_FLAG")])
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)      0.27988    0.15135   1.849  0.06442 .
## BLUEBOOK_orderNorm -0.24743    0.03893  -6.356 2.07e-10 ***
## HOME_VAL_sqrt     -0.20699    0.04906  -4.219 2.46e-05 ***
## INCOME_orderNorm  -0.28871    0.04684  -6.163 7.12e-10 ***
## MVR_PTS_log        0.17739    0.03725   4.763 1.91e-06 ***
## TIF_yej           -0.23804    0.03484  -6.833 8.32e-12 ***
## TRAVTIME_yej       0.26846    0.03601   7.454 9.05e-14 ***
## CLM_FREQ_log       0.23906    0.03601   6.640 3.15e-11 ***
## PARENT1.No         -0.78003    0.10748  -7.257 3.94e-13 ***
## MSTATUS.No         0.29483    0.09894   2.980  0.00288 **
## EDUCATION.Q         0.34663    0.07348   4.717 2.39e-06 ***
## JOBManager         -0.71901    0.12535  -5.736 9.70e-09 ***
## JOBStudent         -0.32653    0.13591  -2.402  0.01628 *
## CAR_USECommercial   0.75442    0.07493  10.068 < 2e-16 ***
## CAR_TYPEMinivan    -0.65320    0.08737  -7.476 7.64e-14 ***
## REVOKED.No         -0.73569    0.09604  -7.660 1.86e-14 ***
## URBANICITYHighly.Rural..Rural -2.42176    0.13638 -17.758 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 6611.0  on 5712  degrees of freedom
## Residual deviance: 5142.9  on 5696  degrees of freedom
## AIC: 5176.9
##
## Number of Fisher Scoring iterations: 5
```

```
vif(model_transformed)
```

```
##          BLUEBOOK_orderNorm          HOME_VAL_sqrt
##          1.277293          2.008252
##          INCOME_orderNorm          MVRPTS_log
##          1.763207          1.125322
##          TIF_yej          TRAVTIME_yej
##          1.008581          1.035012
##          CLM_FREQ_log          PARENT1.No
##          1.150058          1.339655
##          MSTATUS.No          EDUCATION.Q
##          2.038448          1.117217
##          JOBManager          JOBStudent
##          1.057513          1.409548
##          CAR_USECommercial          CAR_TYPEMinivan
##          1.152763          1.038653
##          REVOKED.No URBANICITYHighly.Rural..Rural
##          1.006357          1.126173
```

All the predictors in our model are significant and there isn't much collinearity between them. However, since we used the transformed variables to create this model, interpreting this model and applying it to new data can be difficult. The new data would first have to undergo the same transformations.

Now that we have found the predictors we would like to include in our model, we can try using the untransformed versions of the variables and recreating the model.

```
model2 <- glm(TARGET_FLAG ~ BLUEBOOK + HOME_VAL + CAR_TYPE + INCOME + MVRPTS + TIF + TRAVTIME + CLM_FREQ + PARENT1 + MSTATUS + CAR_USE + REVOKED + URBANICITY, family = binomial(link = "logit"), data = train_data)
summary(model2)
```

```
##
## Call:
## glm(formula = TARGET_FLAG ~ BLUEBOOK + HOME_VAL + CAR_TYPE +
##      INCOME + MVRPTS + TIF + TRAVTIME + CLM_FREQ + PARENT1 +
##      MSTATUS + CAR_USE + REVOKED + URBANICITY, family = binomial(link = "logit"),
##      data = train_data)
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -3.15077    0.16910  -18.633 < 2e-16 ***
## BLUEBOOK       -0.21965    0.04713   -4.661 3.15e-06 ***
## HOME_VAL       -0.19330    0.05156   -3.749 0.000177 ***
## CAR_TYPEPanel Truck    0.46466    0.16837    2.760 0.005784 **
## CAR_TYPEPickup        0.45932    0.11509    3.991 6.58e-05 ***
## CAR_TYPESports Car    0.89508    0.12575    7.118 1.10e-12 ***
## CAR_TYPESUV          0.72029    0.09953    7.237 4.60e-13 ***
## CAR_TYPEVan          0.54929    0.14076    3.902 9.53e-05 ***
## INCOME          -0.29979    0.04974   -6.027 1.67e-09 ***
## MVRPTS           0.26724    0.03453    7.740 9.92e-15 ***
## TIF             -0.22958    0.03596   -6.385 1.71e-10 ***
## TRAVTIME         0.25352    0.03526    7.190 6.47e-13 ***
## CLM_FREQ         0.14547    0.03497    4.160 3.18e-05 ***
## PARENT1Yes        0.74855    0.10658    7.023 2.17e-12 ***
## MSTATUSYes       -0.33151    0.09475   -3.499 0.000468 ***
```

```
## CAR_USEPrivate          -0.89811    0.08202 -10.950 < 2e-16 ***
## REVOKEDYes              0.74120    0.09501   7.801 6.13e-15 ***
## URBANICITYHighly Urban/ Urban 2.34271    0.13520  17.328 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 6611.0  on 5712  degrees of freedom
## Residual deviance: 5215.9  on 5695  degrees of freedom
## AIC: 5251.9
##
## Number of Fisher Scoring iterations: 5
```

The untransformed data performs almost as well as the transformed data. We will come back to analyze them later.

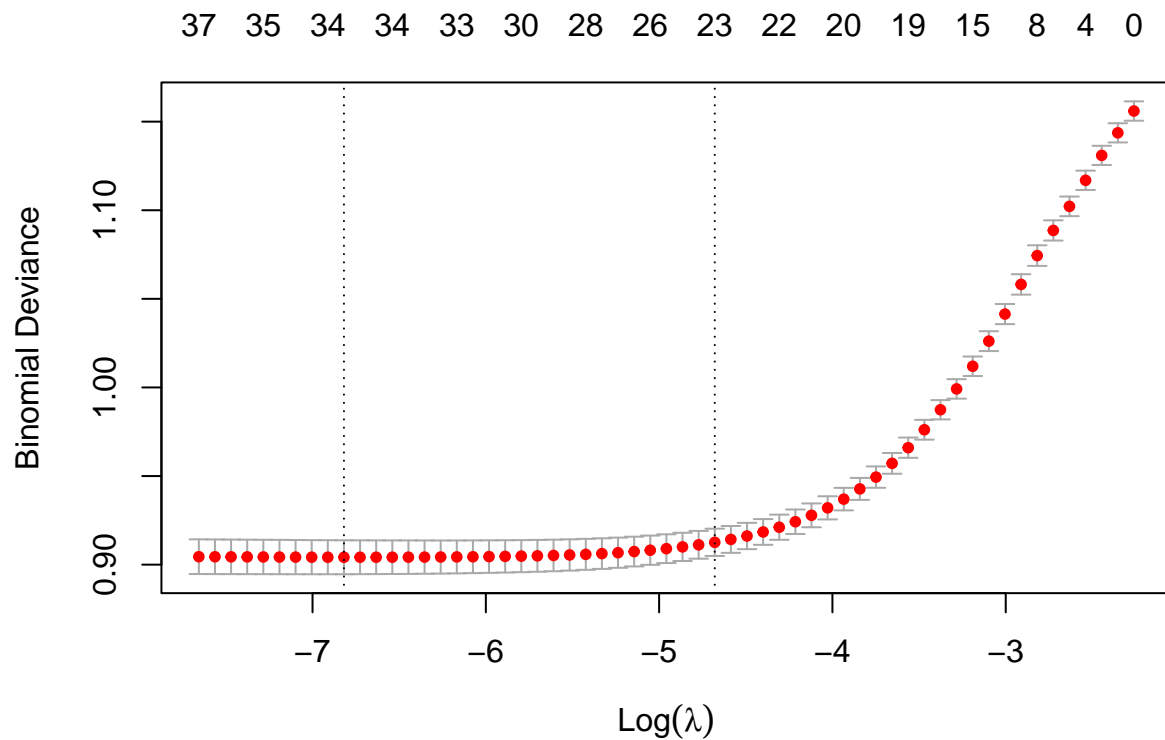
We have now created two models, using the same variables. In both cases, we used a lot of predictors in our models. We also relied on our own intuition of which variables to include and which not to. Now, we will try an automated variable selection method. We will try using Lasso regression for this. Lasso regression does both feature selection and avoids overfitting the data.

```
predictors <- subset(train_data, select = transformed_columns)
target <- train_data$TARGET_FLAG

predictors_matrix <- as.matrix(predictors)

# We'll use cv.glmnet to perform cross-validation to select lambda (regularization parameter)
lasso_model_first <- cv.glmnet(predictors_matrix, target, family = "binomial", alpha = 1)

# Plot cross-validated mean deviance (or other metric) vs. lambda
plot(lasso_model_first)
```



```
# Identify the optimal lambda value that minimizes mean cross-validated deviance
best_lambda <- lasso_model_first$lambda.min
cat("Best lambda:", best_lambda, "\n")
```

```
## Best lambda: 0.00109312
```

```
# Refit the model using the optimal lambda
lasso_model <- glmnet(predictors, train_data$TARGET_FLAG, family = "binomial", alpha = 1, lambda = best_lambda)
summary(lasso_model)
```

```
##          Length Class      Mode
## a0           1    -none-  numeric
## beta        42    dgCMatrx S4
## df           1    -none-  numeric
## dim           2    -none-  numeric
## lambda        1    -none-  numeric
## dev.ratio     1    -none-  numeric
## nulldev       1    -none-  numeric
## npasses       1    -none-  numeric
## jerr          1    -none-  numeric
## offset        1    -none- logical
## classnames    2    -none- character
## call           6    -none-   call
## nobs          1    -none-  numeric
```

Now let's run our three models on the test data and compare the results.

```
# Model1
model_transformed_predictions <- predict(model_transformed, newdata = test_data, type = "response")
model_transformed_binary_predictions <- ifelse(model_transformed_predictions >= 0.5, 1, 0)

model_transformed_rmse <- rmse(test_data$TARGET_FLAG, model_transformed_binary_predictions)

# Model2
model2_predictions <- predict(model2, newdata = test_data, type = "response")
model2_binary_predictions <- ifelse(model2_predictions >= 0.5, 1, 0)

model2_rmse <- rmse(test_data$TARGET_FLAG, model2_binary_predictions)

# Lasso Model
lasso_model_predictions <- predict(lasso_model, newx = as.matrix(test_data[, transformed_columns]), type = "response")
lasso_model_binary_predictions <- ifelse(lasso_model_predictions >= 0.5, 1, 0)

lasso_model_rmse <- rmse(test_data$TARGET_FLAG, lasso_model_binary_predictions)

# Create a dataframe to store the results
results <- data.frame(Model = c("Model_Transformed", "Model2", "Lasso Model"),
                      RMSE = c(model_transformed_rmse, model2_rmse, lasso_model_rmse))

# Add AIC of each model to the results dataframe
model_transformed_AIC <- AIC(model_transformed)
model2_AIC <- AIC(model2)
lasso_model_AIC <- NA

results$AIC <- c(model_transformed_AIC, model2_AIC, lasso_model_AIC)

# Add the Deviance of each model to the results dataframe
model_transformed_deviance <- deviance(model_transformed)
model2_deviance <- deviance(model2)
lasso_model_deviance <- deviance(lasso_model)

results$Deviance <- c(model_transformed_deviance, model2_deviance, lasso_model_deviance)

# Add additional evaluation metrics to the results dataframe
conf_matrix <- table(model_transformed_binary_predictions, test_data$TARGET_FLAG)
TP <- conf_matrix[2, 2]
FP <- conf_matrix[1, 2]
FN <- conf_matrix[2, 1]
model_transformed_accuracy <- sum(diag(conf_matrix)) / sum(conf_matrix)
model_transformed_precision <- TP / (TP + FP)
model_transformed_recall <- TP / (TP + FN)
model_transformed_f1_score <- 2 * (model_transformed_precision * model_transformed_recall) / (model_transformed_precision + model_transformed_recall)
model_transformed_roc_auc <- roc(test_data$TARGET_FLAG, model_transformed_predictions)$auc

## Setting levels: control = 0, case = 1

## Setting direction: controls < cases
```

```

conf_matrix <- table(model2_binary_predictions, test_data$TARGET_FLAG)
TP <- conf_matrix[2, 2]
FP <- conf_matrix[1, 2]
FN <- conf_matrix[2, 1]
model2_accuracy <- sum(diag(conf_matrix)) / sum(conf_matrix)
model2_precision <- TP / (TP + FP)
model2_recall <- TP / (TP + FN)
model2_f1_score <- 2 * (model2_precision * model2_recall) / (model2_precision + model2_recall)
model2_roc_auc <- roc(test_data$TARGET_FLAG, model2_predictions)$auc

```

```

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

```

```

conf_matrix <- table(lasso_model_binary_predictions, test_data$TARGET_FLAG)
TP <- conf_matrix[2, 2]
FP <- conf_matrix[1, 2]
FN <- conf_matrix[2, 1]
lasso_model_accuracy <- sum(diag(conf_matrix)) / sum(conf_matrix)
lasso_model_precision <- TP / (TP + FP)
lasso_model_recall <- TP / (TP + FN)
lasso_model_f1_score <- 2 * (lasso_model_precision * lasso_model_recall) / (lasso_model_precision + lasso_model_recall)
lasso_model_roc_auc <- roc(test_data$TARGET_FLAG, lasso_model_predictions)$auc

```

```

## Setting levels: control = 0, case = 1

```

```

## Warning in roc.default(test_data$TARGET_FLAG, lasso_model_predictions):
## Deprecated use a matrix as predictor. Unexpected results may be produced,
## please pass a numeric vector.

```

```

## Setting direction: controls < cases

```

```

results$Accuracy <- c(model_transformed_accuracy, model2_accuracy, lasso_model_accuracy)
results$Precision <- c(model_transformed_precision, model2_precision, lasso_model_precision)
results$Recall <- c(model_transformed_recall, model2_recall, lasso_model_recall)
results$F1_Score <- c(model_transformed_f1_score, model2_f1_score, lasso_model_f1_score)
results$ROC_AUC <- c(model_transformed_roc_auc, model2_roc_auc, lasso_model_roc_auc)

kable(results)

```

Model	RMSE	AIC	Deviance	Accuracy	Precision	Recall	F1_Score	ROC_AUC
Model_Transformed	0.4613315	5176.946	5142.946	0.7871732	0.4175824	0.6394231	0.5052232	0.7926252
Model2	0.4639804	5251.887	5215.887	0.7847222	0.3893250	0.6424870	0.4848485	0.7884496
Lasso Model	0.4657379	NA	5107.094	0.7830882	0.4050235	0.6292683	0.4928367	0.7941283

I do not know how to extract the AIC of a Lasso Regression model so I didn't include that. Based on the above table, selecting a model is extremely difficult. The differences between all three models are not very large. This is to be expected since they were all mostly trained on the same data. All the models have their own strengths and can be useful depending on the use case. For the chosen cutoff point of 0.5 to

determine whether someone will claim a car insurance claim, the transformed model has the best overall numbers. However, the slight increase in its prediction power might not be worth the added complication of interpreting transformed variables instead of just using the untransformed model (model2) to achieve almost as good a result. Additionally, model2 has the highest recall value and thus might be considered if the harm of a false negative is very large as it is the most likely to catch those cases. The Lasso model has the highest ROC\_AUC score and the lowest deviance. The highest ROC\_AUC score specifically means it is probably the best model to use for data with imbalanced classes and with other threshold than the 0.5 used here.

For this specific assignment, I would use the transformed model for predicting new data as it offers the best blend of metrics. However, as noted above, in other cases the other model might be better.

**Models for Target amount variable** Now, our aim is to construct predictive models for the variable TARGET\_AMT, representing the cost of car crashes. We begin by manually selecting variables based on correlation and intuition, followed by refining the model using the stepwise regression approach. Subsequently, we'll compare the predictive performance of the manually selected model with the stepwise regression model to determine which one better predicts the TARGET\_AMT.

Initially, we define a set of variables chosen based on correlation and intuition. Then, we construct a multiple linear regression model using these variables to predict the target amount (TARGET\_AMT). Finally, we present a summary of the model's results, focusing on metrics such as RMSE and R-squared to evaluate predictive accuracy.

```
selected_variables <- c("AGE", "INCOME", "HOME_VAL", "TRAVTIME", "BLUEBOOK_orderNorm",
  "MVR_PTS_log", "TIF_yeoj", "CLM_FREQ_log", "CAR_AGE_sqrt",
  "PARENT1.No", "MSTATUS.No", "SEX.F", "EDUCATION.L",
  "JOBManager", "CAR_USECommercial", "CAR_TYPEMinivan",
  "RED_CAR.No", "REVOKED.No", "URBANICITYHighly.Rural..Rural")

# Building multiple linear regression model
manual_model_amt <- lm(TARGET_AMT ~ ., data = train_data[, c(selected_variables, "TARGET_AMT")])
summary(manual_model_amt)
```

```
##
## Call:
## lm(formula = TARGET_AMT ~ ., data = train_data[, c(selected_variables,
##   "TARGET_AMT")])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -5114  -1781   -814    377  104222
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2872.13    332.63   8.635  < 2e-16 ***
## AGE             13.78     68.83   0.200  0.841359
## INCOME        -168.38    101.15  -1.665  0.096048 .
## HOME_VAL      -154.48     95.04  -1.625  0.104137
## TRAVTIME       212.35     63.53   3.343  0.000835 ***
## BLUEBOOK_orderNorm  37.13     71.45   0.520  0.603359
## MVR_PTS_log    205.19     67.33   3.047  0.002319 **
## TIF_yeoj     -234.13     62.69  -3.735  0.000190 ***
## CLM_FREQ_log   217.13     70.19   3.093  0.001988 **
## CAR_AGE_sqrt  -115.58     84.64  -1.366  0.172141
## PARENT1.No    -1011.68    219.66  -4.606  4.20e-06 ***
## MSTATUS.No     320.06    174.60   1.833  0.066833 .
```

```
## SEX.F -98.68 177.08 -0.557 0.577381
## EDUCATION.L -190.09 223.76 -0.850 0.395632
## JOBManager -965.77 202.19 -4.777 1.83e-06 ***
## CAR_USECommercial 761.19 149.15 5.103 3.44e-07 ***
## CAR_TYPEMinivan -534.33 153.72 -3.476 0.000513 ***
## RED_CAR.No 88.52 184.54 0.480 0.631482
## REVOKED.No -305.91 192.89 -1.586 0.112815
## URBANICITYHighly.Rural..Rural -1823.21 171.21 -10.649 < 2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4728 on 5693 degrees of freedom
## Multiple R-squared: 0.06608, Adjusted R-squared: 0.06297
## F-statistic: 21.2 on 19 and 5693 DF, p-value: < 2.2e-16
```

The summary of the multiple linear regression model shows that several predictors, such as Travel Time (TRAVTIME) and previous Motor Vehicle Record Points (MVR\_PTS\_log), have statistically significant coefficients. This suggests that these variables, along with certain socio-demographic factors, are closely correlated with the target amount. Essentially, they play a crucial role in accurately predicting the outcome of the model.

Next, we will utilize a stepwise model to automatically identify the most influential predictors for the target amount variable. This iterative method continuously adds or removes predictors based on their level of significance, aiming to achieve the best-fit model possible.

```
stepwise_regression <- function(data, response_var, predictor_vars) {
  # Forward stepwise selection
  step_model <- step(lm(as.formula(paste(response_var, "~ .")), data = data), direction = "both")
  return(step_model)
}
```

```
stepwise_model <- stepwise_regression(train_data, "TARGET_AMT", selected_variables)
```

```
## Start: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural +
## URBANICITYHighly.Urban..Urban + HOME_AREAHighly.Rural + HOME_AREAHighly.Urban +
## WORK_AEARural + WORK_AEAUrban
##
##
## Step: AIC=95189.53
```



```

## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural +
## URBANICITYHighly.Urban..Urban + HOME_AREAHighly.Rural + HOME_AREAHighly.Urban +
## WORK_AEARural
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural +
## URBANICITYHighly.Urban..Urban + HOME_AREAHighly.Rural + HOME_AREAHighly.Urban
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural +
## URBANICITYHighly.Urban..Urban + HOME_AREAHighly.Rural
##
##

```

```

## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural +
## URBANICITYHighly.Urban..Urban
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes + URBANICITYHighly.Rural..Rural
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No + REVOKED.Yes
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +

```

```

## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes + REVOKED.No
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No + RED_CAR.Yes
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan +
## RED_CAR.No
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +

```

```

## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV + CAR_TYPEVan
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car + CAR_TYPESUV
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
## CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
## CAR_TYPEPickup + CAR_TYPESports.Car
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +

```

```

##      JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
##      CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck +
##      CAR_TYPEPickup
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
##      JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
##      JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
##      CAR_USEPrivate + CAR_TYPEMinivan + CAR_TYPEPanel.Truck
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
##      JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
##      JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
##      CAR_USEPrivate + CAR_TYPEMinivan
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
##      JOBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
##      JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial +
##      CAR_USEPrivate
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +

```

```

## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent + CAR_USECommercial
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional + JOBStudent
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager + JOBProfessional
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer + JOBManager
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +

```

```

## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker +
## JOBLawyer
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor + JOBHome.Maker
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical + JOBDoctor
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
## TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
## SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
## JOBBBlue.Collar + JOBClerical
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +

```

```

##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1 +
##      JOBBBlue.Collar
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C + JOB.1
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q + EDUCATION.C
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L + EDUCATION.Q
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +

```



```

##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M + EDUCATION.L
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F +
##      SEX.M
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes + SEX.F
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No + MSTATUS.Yes
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
##      HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##      PARENT1.No + PARENT1.Yes + MSTATUS.No
##
##
## Step:  AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
##      INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
##      JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +

```

```

## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No + PARENT1.Yes
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## PARENT1.No
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + WORK_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
## INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
## TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## HOME_AREA + BLUEBOOK_orderNorm + HOME_VAL_sqrt + INCOME_orderNorm +
## MVR_PTS_log + OLDCLAIM_yej + TIF_yej + TRAVTIME_yej +
## YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Step: AIC=95189.53
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + CAR_TYPE + RED_CAR +
## OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY +
## BLUEBOOK_orderNorm + HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yej + TIF_yej + TRAVTIME_yej + YOJ_orderNorm +
## CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - CAR_TYPE 5 2.6824e+07 9.6798e+10 95181
## - JOB 8 1.4231e+08 9.6913e+10 95182
## - KIDSDRIV 1 1.7846e+04 9.6771e+10 95188
## - TIF 1 2.1706e+04 9.6771e+10 95188
## - HOMEKIDS 1 9.9920e+04 9.6771e+10 95188
## - TIF_yej 1 3.2336e+05 9.6771e+10 95188
## - URBANICITY 1 5.6491e+05 9.6771e+10 95188

```

```

## - TRAVTIME_yej 1 8.8398e+05 9.6772e+10 95188
## - TRAVTIME 1 9.9588e+05 9.6772e+10 95188
## - RED_CAR 1 2.2520e+06 9.6773e+10 95188
## - AGE 1 3.3136e+06 9.6774e+10 95188
## - MSTATUS 1 5.0564e+06 9.6776e+10 95188
## - HOME_VAL 1 7.0751e+06 9.6778e+10 95188
## - HOME_VAL_sqrt 1 7.2222e+06 9.6778e+10 95188
## - CAR_USE 1 1.0941e+07 9.6782e+10 95188
## - YOJ 1 1.1438e+07 9.6782e+10 95188
## - BLUEBOOK 1 1.5195e+07 9.6786e+10 95188
## - MVR_PTS_log 1 1.5402e+07 9.6786e+10 95188
## - PARENT1 1 1.8583e+07 9.6789e+10 95189
## - OLDCLAIM 1 2.0657e+07 9.6792e+10 95189
## - YOJ_orderNorm 1 2.1408e+07 9.6792e+10 95189
## - EDUCATION 3 9.2276e+07 9.6863e+10 95189
## - INCOME_orderNorm 1 3.2108e+07 9.6803e+10 95189
## <none> 9.6771e+10 95190
## - SEX 1 3.5598e+07 9.6806e+10 95190
## - INCOME 1 3.8091e+07 9.6809e+10 95190
## - CLM_FREQ 1 4.4331e+07 9.6815e+10 95190
## - CAR_AGE_sqrt 1 4.6046e+07 9.6817e+10 95190
## - CLM_FREQ_log 1 4.9325e+07 9.6820e+10 95190
## - OLDCLAIM_yej 1 5.0574e+07 9.6821e+10 95191
## - CAR_AGE 1 5.1199e+07 9.6822e+10 95191
## - BLUEBOOK_orderNorm 1 5.5949e+07 9.6827e+10 95191
## - MVR_PTS 1 6.1502e+07 9.6832e+10 95191
## - REVOKED 1 9.4481e+07 9.6865e+10 95193
## - TARGET_FLAG 1 2.9217e+10 1.2599e+11 96695
##
## Step: AIC=95181.11
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## JOB + TRAVTIME + CAR_USE + BLUEBOOK + TIF + RED_CAR + OLDCLAIM +
## CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY + BLUEBOOK_orderNorm +
## HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej +
## TIF_yej + TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt
##
## Df Sum of Sq RSS AIC
## - JOB 8 1.3398e+08 9.6932e+10 95173
## - KIDSDRIV 1 3.6630e+03 9.6798e+10 95179
## - TIF 1 3.8603e+04 9.6798e+10 95179
## - HOMEKIDS 1 2.1314e+05 9.6798e+10 95179
## - TIF_yej 1 2.4068e+05 9.6798e+10 95179
## - URBANICITY 1 4.0051e+05 9.6798e+10 95179
## - TRAVTIME_yej 1 1.0022e+06 9.6799e+10 95179
## - TRAVTIME 1 1.1083e+06 9.6799e+10 95179
## - RED_CAR 1 2.5592e+06 9.6800e+10 95179
## - AGE 1 4.8043e+06 9.6803e+10 95179
## - MSTATUS 1 4.8379e+06 9.6803e+10 95179
## - CAR_USE 1 5.9858e+06 9.6804e+10 95179
## - HOME_VAL 1 6.8119e+06 9.6805e+10 95180
## - HOME_VAL_sqrt 1 7.0629e+06 9.6805e+10 95180
## - YOJ 1 1.2085e+07 9.6810e+10 95180

```

```

## - MVR_PTS_log          1 1.6832e+07 9.6815e+10 95180
## - PARENT1              1 1.8768e+07 9.6816e+10 95180
## - OLDCLAIM             1 2.1475e+07 9.6819e+10 95180
## - YOJ_orderNorm        1 2.2096e+07 9.6820e+10 95180
## - EDUCATION            3 9.0082e+07 9.6888e+10 95180
## - SEX                  1 2.4275e+07 9.6822e+10 95181
## - INCOME_orderNorm     1 3.2936e+07 9.6831e+10 95181
## <none>                  9.6798e+10 95181
## - BLUEBOOK             1 3.4698e+07 9.6832e+10 95181
## - INCOME                1 3.8784e+07 9.6837e+10 95181
## - CLM_FREQ             1 4.5322e+07 9.6843e+10 95182
## - CAR_AGE_sqrt         1 4.6948e+07 9.6845e+10 95182
## - CLM_FREQ_log         1 5.0504e+07 9.6848e+10 95182
## - OLDCLAIM_yej         1 5.1770e+07 9.6849e+10 95182
## - CAR_AGE              1 5.2279e+07 9.6850e+10 95182
## + CAR_TYPEPanel.Truck  1 1.5352e+07 9.6782e+10 95182
## + CAR_TYPEVan           1 6.3196e+06 9.6791e+10 95183
## - MVR_PTS              1 6.4265e+07 9.6862e+10 95183
## + CAR_TYPESUV           1 1.7937e+06 9.6796e+10 95183
## + CAR_TYPEMinivan      1 1.4948e+06 9.6796e+10 95183
## + CAR_TYPESports.Car   1 7.3624e+05 9.6797e+10 95183
## + CAR_TYPEPickup       1 1.2786e+05 9.6798e+10 95183
## - BLUEBOOK_orderNorm   1 7.8753e+07 9.6876e+10 95184
## - REVOKED              1 9.3041e+07 9.6891e+10 95185
## + CAR_TYPE              5 2.6824e+07 9.6771e+10 95190
## - TARGET_FLAG          1 2.9570e+10 1.2637e+11 96702
##
## Step: AIC=95173.01
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## TRAVTIME + CAR_USE + BLUEBOOK + TIF + RED_CAR + OLDCLAIM +
## CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + URBANICITY + BLUEBOOK_orderNorm +
## HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej +
## TIF_yej + TRAVTIME_yej + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - URBANICITY          1 1.2056e+04 9.6932e+10 95171
## - KIDSDRIV            1 1.5124e+04 9.6932e+10 95171
## - TIF                 1 1.8874e+04 9.6932e+10 95171
## - HOMEKIDS            1 1.3789e+05 9.6932e+10 95171
## - TIF_yej            1 3.1574e+05 9.6932e+10 95171
## - TRAVTIME_yej       1 1.2715e+06 9.6933e+10 95171
## - TRAVTIME           1 1.4540e+06 9.6933e+10 95171
## - RED_CAR            1 3.3540e+06 9.6935e+10 95171
## - AGE                1 3.6512e+06 9.6935e+10 95171
## - HOME_VAL           1 3.8275e+06 9.6936e+10 95171
## - MSTATUS            1 3.8712e+06 9.6936e+10 95171
## - HOME_VAL_sqrt      1 4.2585e+06 9.6936e+10 95171
## + JOBProfessional    1 6.1462e+07 9.6870e+10 95171
## - YOJ                1 1.4414e+07 9.6946e+10 95172
## - MVR_PTS_log        1 1.6066e+07 9.6948e+10 95172
## - CAR_USE            1 1.7434e+07 9.6949e+10 95172
## - PARENT1            1 1.9740e+07 9.6951e+10 95172

```

```

## - OLDCLAIM          1 1.9857e+07 9.6952e+10 95172
## - YOJ_orderNorm     1 2.4373e+07 9.6956e+10 95172
## - BLUEBOOK          1 2.5812e+07 9.6958e+10 95173
## + JOB.1              1 3.9283e+07 9.6892e+10 95173
## + JOBManager         1 3.6570e+07 9.6895e+10 95173
## <none>               9.6932e+10 95173
## - SEX                1 3.4604e+07 9.6966e+10 95173
## - INCOME_orderNorm  1 3.7228e+07 9.6969e+10 95173
## - INCOME              1 3.9980e+07 9.6972e+10 95173
## - EDUCATION          3 1.0944e+08 9.7041e+10 95173
## - CLM_FREQ           1 4.5737e+07 9.6977e+10 95174
## - CAR_AGE_sqrt       1 4.7434e+07 9.6979e+10 95174
## - CLM_FREQ_log       1 5.0261e+07 9.6982e+10 95174
## - OLDCLAIM_yeoj      1 5.1070e+07 9.6983e+10 95174
## + JOBDoctor          1 1.6662e+07 9.6915e+10 95174
## - CAR_AGE            1 5.3213e+07 9.6985e+10 95174
## + JOBBBlue.Collar    1 9.3342e+06 9.6922e+10 95174
## + CAR_TYPEVan        1 7.2878e+06 9.6924e+10 95175
## + CAR_TYPEPanel.Truck 1 6.4049e+06 9.6925e+10 95175
## + JOBClerical        1 4.4882e+06 9.6927e+10 95175
## + JOBStudent         1 4.0395e+06 9.6928e+10 95175
## + CAR_TYPEMinivan    1 3.8654e+06 9.6928e+10 95175
## + CAR_TYPESUV        1 2.0110e+06 9.6930e+10 95175
## - MVR_PTS            1 6.7203e+07 9.6999e+10 95175
## - BLUEBOOK_orderNorm 1 6.7355e+07 9.6999e+10 95175
## + CAR_TYPESports.Car 1 5.2344e+05 9.6931e+10 95175
## + JOBHome.Maker      1 2.0118e+05 9.6931e+10 95175
## + CAR_TYPEPickup     1 1.2569e+05 9.6932e+10 95175
## + JOBLawyer          1 2.1917e+04 9.6932e+10 95175
## - REVOKED            1 8.9011e+07 9.7021e+10 95176
## + JOB                8 1.3398e+08 9.6798e+10 95181
## + CAR_TYPE           5 1.8488e+07 9.6913e+10 95182
## - TARGET_FLAG       1 2.9961e+10 1.2689e+11 96710
##
## Step:  AIC=95171.01
## TARGET_AMT ~ TARGET_FLAG + KIDSDRIV + AGE + HOMEKIDS + YOJ +
## INCOME + PARENT1 + HOME_VAL + MSTATUS + SEX + EDUCATION +
## TRAVTIME + CAR_USE + BLUEBOOK + TIF + RED_CAR + OLDCLAIM +
## CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
## HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj +
## TIF_yeoj + TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt
##
##              Df Sum of Sq      RSS   AIC
## - KIDSDRIV    1 1.6499e+04 9.6932e+10 95169
## - TIF          1 1.8679e+04 9.6932e+10 95169
## - HOMEKIDS     1 1.3586e+05 9.6932e+10 95169
## - TIF_yeoj     1 3.1507e+05 9.6932e+10 95169
## - TRAVTIME_yeoj 1 1.2637e+06 9.6933e+10 95169
## - TRAVTIME     1 1.4434e+06 9.6933e+10 95169
## - RED_CAR      1 3.3479e+06 9.6935e+10 95169
## - AGE          1 3.6443e+06 9.6935e+10 95169
## - HOME_VAL     1 3.8253e+06 9.6936e+10 95169
## - MSTATUS      1 3.8596e+06 9.6936e+10 95169

```

```

## - HOME_VAL_sqrt          1 4.2576e+06 9.6936e+10 95169
## + JOBProfessional        1 6.1430e+07 9.6870e+10 95169
## - YOJ                    1 1.4418e+07 9.6946e+10 95170
## - MVR_PTS_log            1 1.6055e+07 9.6948e+10 95170
## - CAR_USE                1 1.7511e+07 9.6949e+10 95170
## - PARENT1                1 1.9737e+07 9.6951e+10 95170
## - OLDCLAIM               1 1.9845e+07 9.6952e+10 95170
## - YOJ_orderNorm          1 2.4386e+07 9.6956e+10 95170
## - BLUEBOOK               1 2.5811e+07 9.6958e+10 95171
## + JOB.1                  1 3.9292e+07 9.6892e+10 95171
## + JOBManager             1 3.5475e+07 9.6896e+10 95171
## <none>                   9.6932e+10 95171
## - SEX                    1 3.4687e+07 9.6966e+10 95171
## - INCOME_orderNorm       1 3.7412e+07 9.6969e+10 95171
## - INCOME                  1 4.0052e+07 9.6972e+10 95171
## - EDUCATION              3 1.1002e+08 9.7042e+10 95171
## - CLM_FREQ               1 4.5775e+07 9.6977e+10 95172
## - CAR_AGE_sqrt           1 4.7446e+07 9.6979e+10 95172
## - CLM_FREQ_log           1 5.0320e+07 9.6982e+10 95172
## - OLDCLAIM_yeoj          1 5.1090e+07 9.6983e+10 95172
## + JOBDoctor              1 1.6636e+07 9.6915e+10 95172
## - CAR_AGE                1 5.3229e+07 9.6985e+10 95172
## + JOBBBlue.Collar        1 9.3351e+06 9.6922e+10 95172
## + CAR_TYPEVan            1 7.2797e+06 9.6924e+10 95173
## + CAR_TYPEPanel.Truck    1 6.4066e+06 9.6925e+10 95173
## + JOBClerical            1 4.4918e+06 9.6927e+10 95173
## + JOBStudent             1 4.0422e+06 9.6928e+10 95173
## + CAR_TYPEMinivan        1 3.8460e+06 9.6928e+10 95173
## + CAR_TYPE SUV           1 2.0027e+06 9.6930e+10 95173
## - MVR_PTS                1 6.7192e+07 9.6999e+10 95173
## - BLUEBOOK_orderNorm     1 6.7365e+07 9.6999e+10 95173
## + CAR_TYPESports.Car     1 5.2182e+05 9.6931e+10 95173
## + JOBHome.Maker          1 2.0667e+05 9.6931e+10 95173
## + CAR_TYPEPickup         1 1.2541e+05 9.6932e+10 95173
## + JOBLawyer              1 2.1145e+04 9.6932e+10 95173
## + URBANICITY             1 1.2056e+04 9.6932e+10 95173
## + HOME_AREA              1 1.2056e+04 9.6932e+10 95173
## + WORK_AREA              1 1.2056e+04 9.6932e+10 95173
## + URBANICITYHighly.Rural..Rural 1 1.2056e+04 9.6932e+10 95173
## + URBANICITYHighly.Urban..Urban 1 1.2056e+04 9.6932e+10 95173
## + HOME_AREAHighly.Rural  1 1.2056e+04 9.6932e+10 95173
## + HOME_AREAHighly.Urban  1 1.2056e+04 9.6932e+10 95173
## + WORK_AEARural          1 1.2056e+04 9.6932e+10 95173
## + WORK_AEAUrban          1 1.2056e+04 9.6932e+10 95173
## - REVOKED                1 8.9213e+07 9.7021e+10 95174
## + JOB                    8 1.3359e+08 9.6798e+10 95179
## + CAR_TYPE               5 1.8444e+07 9.6913e+10 95180
## - TARGET_FLAG            1 3.2132e+10 1.2906e+11 96805
##
## Step: AIC=95169.01
## TARGET_AMT ~ TARGET_FLAG + AGE + HOMEKIDS + YOJ + INCOME + PARENT1 +
## HOME_VAL + MSTATUS + SEX + EDUCATION + TRAVTIME + CAR_USE +
## BLUEBOOK + TIF + RED_CAR + OLDCLAIM + CLM_FREQ + REVOKED +
## MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + HOME_VAL_sqrt +

```

```

##      INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj +
##      TRAVTIME_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##      Df      Sum of Sq      RSS      AIC
## - TIF      1 1.8885e+04 9.6932e+10 95167
## - HOMEKIDS      1 1.2046e+05 9.6932e+10 95167
## - TIF_yeoj      1 3.1412e+05 9.6932e+10 95167
## - TRAVTIME_yeoj      1 1.2627e+06 9.6933e+10 95167
## - TRAVTIME      1 1.4418e+06 9.6933e+10 95167
## - RED_CAR      1 3.3362e+06 9.6935e+10 95167
## - AGE      1 3.6733e+06 9.6935e+10 95167
## - HOME_VAL      1 3.8210e+06 9.6936e+10 95167
## - MSTATUS      1 3.8765e+06 9.6936e+10 95167
## - HOME_VAL_sqrt      1 4.2537e+06 9.6936e+10 95167
## + JOBProfessional      1 6.1422e+07 9.6870e+10 95167
## - YOJ      1 1.4459e+07 9.6946e+10 95168
## - MVR_PTS_log      1 1.6080e+07 9.6948e+10 95168
## - CAR_USE      1 1.7538e+07 9.6949e+10 95168
## - PARENT1      1 1.9753e+07 9.6951e+10 95168
## - OLDCLAIM      1 1.9834e+07 9.6952e+10 95168
## - YOJ_orderNorm      1 2.4524e+07 9.6956e+10 95168
## - BLUEBOOK      1 2.5795e+07 9.6958e+10 95169
## + JOB.1      1 3.9295e+07 9.6892e+10 95169
## + JOBManager      1 3.5486e+07 9.6896e+10 95169
## <none>      9.6932e+10 95169
## - SEX      1 3.4671e+07 9.6966e+10 95169
## - INCOME_orderNorm      1 3.7398e+07 9.6969e+10 95169
## - INCOME      1 4.0044e+07 9.6972e+10 95169
## - EDUCATION      3 1.1009e+08 9.7042e+10 95169
## - CLM_FREQ      1 4.5762e+07 9.6977e+10 95170
## - CAR_AGE_sqrt      1 4.7487e+07 9.6979e+10 95170
## - CLM_FREQ_log      1 5.0306e+07 9.6982e+10 95170
## - OLDCLAIM_yeoj      1 5.1076e+07 9.6983e+10 95170
## + JOBDoctor      1 1.6621e+07 9.6915e+10 95170
## - CAR_AGE      1 5.3267e+07 9.6985e+10 95170
## + JOBBBlue.Collar      1 9.3492e+06 9.6922e+10 95170
## + CAR_TYPEVan      1 7.2893e+06 9.6924e+10 95171
## + CAR_TYPEPanel.Truck      1 6.4140e+06 9.6925e+10 95171
## + JOBClerical      1 4.4846e+06 9.6927e+10 95171
## + JOBStudent      1 4.0490e+06 9.6928e+10 95171
## + CAR_TYPEMinivan      1 3.8540e+06 9.6928e+10 95171
## + CAR_TYPE SUV      1 2.0030e+06 9.6930e+10 95171
## - MVR_PTS      1 6.7191e+07 9.6999e+10 95171
## - BLUEBOOK_orderNorm      1 6.7352e+07 9.6999e+10 95171
## + CAR_TYPESports.Car      1 5.2756e+05 9.6931e+10 95171
## + JOBHome.Maker      1 2.0639e+05 9.6932e+10 95171
## + CAR_TYPEPickup      1 1.2653e+05 9.6932e+10 95171
## + JOBLawyer      1 2.1588e+04 9.6932e+10 95171
## + KIDSDRIV      1 1.6499e+04 9.6932e+10 95171
## + URBANICITY      1 1.3431e+04 9.6932e+10 95171
## + HOME_AREA      1 1.3431e+04 9.6932e+10 95171
## + WORK_AREA      1 1.3431e+04 9.6932e+10 95171
## + URBANICITYHighly.Rural..Rural      1 1.3431e+04 9.6932e+10 95171
## + URBANICITYHighly.Urban..Urban      1 1.3431e+04 9.6932e+10 95171

```

```

## + HOME_AREAHighly.Rural      1 1.3431e+04 9.6932e+10 95171
## + HOME_AREAHighly.Urban      1 1.3431e+04 9.6932e+10 95171
## + WORK_AEARural              1 1.3431e+04 9.6932e+10 95171
## + WORK_AEAUrban              1 1.3431e+04 9.6932e+10 95171
## - REVOKED                     1 8.9246e+07 9.7021e+10 95172
## + JOB                         8 1.3360e+08 9.6798e+10 95177
## + CAR_TYPE                    5 1.8460e+07 9.6913e+10 95178
## - TARGET_FLAG                 1 3.2253e+10 1.2918e+11 96808
##
## Step: AIC=95167.02
## TARGET_AMT ~ TARGET_FLAG + AGE + HOMEKIDS + YOJ + INCOME + PARENT1 +
##   HOME_VAL + MSTATUS + SEX + EDUCATION + TRAVTIME + CAR_USE +
##   BLUEBOOK + RED_CAR + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
##   CAR_AGE + BLUEBOOK_orderNorm + HOME_VAL_sqrt + INCOME_orderNorm +
##   MVR_PTS_log + OLDCLAIM_yej + TIF_yej + TRAVTIME_yej +
##   YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##                               Df Sum of Sq      RSS    AIC
## - HOMEKIDS                   1 1.1884e+05 9.6932e+10 95165
## - TRAVTIME_yej               1 1.2644e+06 9.6933e+10 95165
## - TRAVTIME                   1 1.4433e+06 9.6933e+10 95165
## - RED_CAR                    1 3.3311e+06 9.6935e+10 95165
## - AGE                       1 3.6721e+06 9.6935e+10 95165
## - HOME_VAL                   1 3.8202e+06 9.6936e+10 95165
## - MSTATUS                    1 3.8695e+06 9.6936e+10 95165
## - HOME_VAL_sqrt              1 4.2506e+06 9.6936e+10 95165
## - TIF_yej                    1 5.8585e+06 9.6938e+10 95165
## + JOBProfessional            1 6.1370e+07 9.6870e+10 95165
## - YOJ                        1 1.4477e+07 9.6946e+10 95166
## - MVR_PTS_log                1 1.6081e+07 9.6948e+10 95166
## - CAR_USE                    1 1.7527e+07 9.6949e+10 95166
## - PARENT1                    1 1.9766e+07 9.6952e+10 95166
## - OLDCLAIM                   1 1.9835e+07 9.6952e+10 95166
## - YOJ_orderNorm              1 2.4537e+07 9.6956e+10 95166
## - BLUEBOOK                   1 2.5797e+07 9.6958e+10 95167
## + JOB.1                      1 3.9271e+07 9.6892e+10 95167
## + JOBManager                 1 3.5503e+07 9.6896e+10 95167
## <none>                       9.6932e+10 95167
## - SEX                        1 3.4652e+07 9.6966e+10 95167
## - INCOME_orderNorm           1 3.7430e+07 9.6969e+10 95167
## - INCOME                     1 4.0072e+07 9.6972e+10 95167
## - EDUCATION                  3 1.1017e+08 9.7042e+10 95168
## - CLM_FREQ                   1 4.5787e+07 9.6978e+10 95168
## - CAR_AGE_sqrt               1 4.7475e+07 9.6979e+10 95168
## - CLM_FREQ_log               1 5.0335e+07 9.6982e+10 95168
## - OLDCLAIM_yej               1 5.1102e+07 9.6983e+10 95168
## + JOBDoctor                  1 1.6608e+07 9.6915e+10 95168
## - CAR_AGE                    1 5.3264e+07 9.6985e+10 95168
## + JOBBlue.Collar             1 9.3422e+06 9.6922e+10 95168
## + CAR_TYPEVan                 1 7.2858e+06 9.6924e+10 95169
## + CAR_TYPEPanel.Truck        1 6.4211e+06 9.6925e+10 95169
## + JOBClerical                1 4.4861e+06 9.6927e+10 95169
## + JOBStudent                 1 4.0540e+06 9.6928e+10 95169
## + CAR_TYPEMinivan            1 3.8480e+06 9.6928e+10 95169

```



```

## + CAR_TYPESUV          1 2.0041e+06 9.6930e+10 95169
## - MVR_PTS              1 6.7208e+07 9.6999e+10 95169
## - BLUEBOOK_orderNorm  1 6.7359e+07 9.6999e+10 95169
## + CAR_TYPESports.Car   1 5.2888e+05 9.6931e+10 95169
## + JOBHome.Maker        1 2.0773e+05 9.6932e+10 95169
## + CAR_TYPEPickup       1 1.2751e+05 9.6932e+10 95169
## + JOBLawyer            1 2.3182e+04 9.6932e+10 95169
## + TIF                  1 1.8885e+04 9.6932e+10 95169
## + KIDSDRIV             1 1.6706e+04 9.6932e+10 95169
## + URBANICITY           1 1.3232e+04 9.6932e+10 95169
## + HOME_AREA            1 1.3232e+04 9.6932e+10 95169
## + WORK_AREA            1 1.3232e+04 9.6932e+10 95169
## + URBANICITYHighly.Rural..Rural 1 1.3232e+04 9.6932e+10 95169
## + URBANICITYHighly.Urban..Urban 1 1.3232e+04 9.6932e+10 95169
## + HOME_AREAHighly.Rural 1 1.3232e+04 9.6932e+10 95169
## + HOME_AREAHighly.Urban 1 1.3232e+04 9.6932e+10 95169
## + WORK_AREARural       1 1.3232e+04 9.6932e+10 95169
## + WORK_AREAUrban       1 1.3232e+04 9.6932e+10 95169
## - REVOKED              1 8.9230e+07 9.7021e+10 95170
## + JOB                  8 1.3358e+08 9.6798e+10 95175
## + CAR_TYPE             5 1.8468e+07 9.6913e+10 95176
## - TARGET_FLAG          1 3.2256e+10 1.2919e+11 96806
##
## Step: AIC=95165.02
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
## MSTATUS + SEX + EDUCATION + TRAVTIME + CAR_USE + BLUEBOOK +
## RED_CAR + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE +
## BLUEBOOK_orderNorm + HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yej + TIF_yej + TRAVTIME_yej + YOJ_orderNorm +
## CLM_FREQ_log + CAR_AGE_sqrt
##
## Df Sum of Sq RSS AIC
## - TRAVTIME_yej 1 1.2902e+06 9.6933e+10 95163
## - TRAVTIME 1 1.4692e+06 9.6933e+10 95163
## - RED_CAR 1 3.3261e+06 9.6935e+10 95163
## - AGE 1 3.7254e+06 9.6936e+10 95163
## - MSTATUS 1 3.7628e+06 9.6936e+10 95163
## - HOME_VAL 1 3.8092e+06 9.6936e+10 95163
## - HOME_VAL_sqrt 1 4.2238e+06 9.6936e+10 95163
## - TIF_yej 1 5.8268e+06 9.6938e+10 95163
## + JOBProfessional 1 6.1182e+07 9.6871e+10 95163
## - YOJ 1 1.5425e+07 9.6947e+10 95164
## - MVR_PTS_log 1 1.6134e+07 9.6948e+10 95164
## - CAR_USE 1 1.7535e+07 9.6949e+10 95164
## - OLDCLAIM 1 1.9904e+07 9.6952e+10 95164
## - BLUEBOOK 1 2.5795e+07 9.6958e+10 95165
## - PARENT1 1 2.7014e+07 9.6959e+10 95165
## - YOJ_orderNorm 1 2.7339e+07 9.6959e+10 95165
## + JOB.1 1 3.9277e+07 9.6893e+10 95165
## + JOBManager 1 3.5573e+07 9.6896e+10 95165
## <none> 9.6932e+10 95165
## - SEX 1 3.4534e+07 9.6966e+10 95165
## - INCOME_orderNorm 1 3.7399e+07 9.6969e+10 95165
## - INCOME 1 4.0038e+07 9.6972e+10 95165

```

```

## - EDUCATION          3 1.1008e+08 9.7042e+10 95166
## - CLM_FREQ           1 4.6052e+07 9.6978e+10 95166
## - CAR_AGE_sqrt       1 4.7381e+07 9.6979e+10 95166
## - CLM_FREQ_log       1 5.0585e+07 9.6982e+10 95166
## + JOBDoctor          1 1.6605e+07 9.6915e+10 95166
## - OLDCLAIM_yej       1 5.1332e+07 9.6983e+10 95166
## - CAR_AGE            1 5.3169e+07 9.6985e+10 95166
## + JOBBBlue.Collar    1 9.3386e+06 9.6923e+10 95166
## + CAR_TYPEVan        1 7.2819e+06 9.6925e+10 95167
## + CAR_TYPEPanel.Truck 1 6.4020e+06 9.6925e+10 95167
## + JOBClerical        1 4.4402e+06 9.6927e+10 95167
## + JOBStudent         1 4.0991e+06 9.6928e+10 95167
## + CAR_TYPEMinivan     1 3.8769e+06 9.6928e+10 95167
## + CAR_TYPESUV         1 2.0367e+06 9.6930e+10 95167
## - MVR_PTS           1 6.7286e+07 9.6999e+10 95167
## - BLUEBOOK_orderNorm 1 6.7362e+07 9.6999e+10 95167
## + CAR_TYPESports.Car  1 5.2865e+05 9.6931e+10 95167
## + JOBHome.Maker      1 2.1056e+05 9.6932e+10 95167
## + CAR_TYPEPickup      1 1.3123e+05 9.6932e+10 95167
## + HOMEKIDS           1 1.1884e+05 9.6932e+10 95167
## + JOBLawyer          1 2.2630e+04 9.6932e+10 95167
## + TIF                1 1.7270e+04 9.6932e+10 95167
## + URBANICITY         1 9.4070e+03 9.6932e+10 95167
## + HOME_AREA          1 9.4070e+03 9.6932e+10 95167
## + WORK_AREA          1 9.4070e+03 9.6932e+10 95167
## + URBANICITYHighly.Rural..Rural 1 9.4070e+03 9.6932e+10 95167
## + URBANICITYHighly.Urban..Urban 1 9.4070e+03 9.6932e+10 95167
## + HOME_AREAHighly.Rural 1 9.4070e+03 9.6932e+10 95167
## + HOME_AREAHighly.Urban 1 9.4070e+03 9.6932e+10 95167
## + WORK_AEARural      1 9.4070e+03 9.6932e+10 95167
## + WORK_AEAUrban      1 9.4070e+03 9.6932e+10 95167
## + KIDSDRIV           1 9.9000e+02 9.6932e+10 95167
## - REVOKED            1 8.9150e+07 9.7021e+10 95168
## + JOB                8 1.3349e+08 9.6798e+10 95173
## + CAR_TYPE           5 1.8520e+07 9.6913e+10 95174
## - TARGET_FLAG        1 3.2276e+10 1.2921e+11 96805
##
## Step: AIC=95163.1
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
## MSTATUS + SEX + EDUCATION + TRAVTIME + CAR_USE + BLUEBOOK +
## RED_CAR + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE +
## BLUEBOOK_orderNorm + HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yej + TIF_yej + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - TRAVTIME          1 5.1478e+05 9.6934e+10 95161
## - RED_CAR           1 3.3458e+06 9.6936e+10 95161
## - AGE              1 3.6872e+06 9.6937e+10 95161
## - MSTATUS          1 3.7667e+06 9.6937e+10 95161
## - HOME_VAL         1 3.8643e+06 9.6937e+10 95161
## - HOME_VAL_sqrt    1 4.2932e+06 9.6937e+10 95161
## - TIF_yej          1 5.7718e+06 9.6939e+10 95161
## + JOBProfessional   1 6.1422e+07 9.6872e+10 95161

```

```

## - YOJ 1 1.5499e+07 9.6949e+10 95162
## - MVR_PTS_log 1 1.6181e+07 9.6949e+10 95162
## - CAR_USE 1 1.7637e+07 9.6951e+10 95162
## - OLDCLAIM 1 1.9875e+07 9.6953e+10 95162
## - BLUEBOOK 1 2.5704e+07 9.6959e+10 95163
## - PARENT1 1 2.7344e+07 9.6960e+10 95163
## - YOJ_orderNorm 1 2.7491e+07 9.6961e+10 95163
## + JOB.1 1 3.9114e+07 9.6894e+10 95163
## + JOBManager 1 3.5590e+07 9.6898e+10 95163
## <none> 9.6933e+10 95163
## - SEX 1 3.4519e+07 9.6968e+10 95163
## - INCOME_orderNorm 1 3.7503e+07 9.6971e+10 95163
## - INCOME 1 4.0202e+07 9.6973e+10 95163
## - EDUCATION 3 1.1012e+08 9.7043e+10 95164
## - CLM_FREQ 1 4.6218e+07 9.6979e+10 95164
## - CAR_AGE_sqrt 1 4.7137e+07 9.6980e+10 95164
## - CLM_FREQ_log 1 5.0703e+07 9.6984e+10 95164
## + JOBDoctor 1 1.6712e+07 9.6916e+10 95164
## - OLDCLAIM_yeoj 1 5.1452e+07 9.6985e+10 95164
## - CAR_AGE 1 5.2911e+07 9.6986e+10 95164
## + JOBBBlue.Collar 1 9.4270e+06 9.6924e+10 95165
## + CAR_TYPEVan 1 7.3426e+06 9.6926e+10 95165
## + CAR_TYPEPanel.Truck 1 6.4402e+06 9.6927e+10 95165
## + JOBClerical 1 4.4922e+06 9.6929e+10 95165
## + JOBStudent 1 4.2298e+06 9.6929e+10 95165
## + CAR_TYPEMinivan 1 3.8595e+06 9.6929e+10 95165
## + CAR_TYPESUV 1 2.0252e+06 9.6931e+10 95165
## + TRAVTIME_yeoj 1 1.2902e+06 9.6932e+10 95165
## - BLUEBOOK_orderNorm 1 6.7153e+07 9.7000e+10 95165
## + CAR_TYPESports.Car 1 5.5038e+05 9.6933e+10 95165
## - MVR_PTS 1 6.7525e+07 9.7001e+10 95165
## + JOBHome.Maker 1 2.0446e+05 9.6933e+10 95165
## + HOMEKIDS 1 1.4462e+05 9.6933e+10 95165
## + CAR_TYPEPickup 1 1.4388e+05 9.6933e+10 95165
## + JOBLawyer 1 2.2556e+04 9.6933e+10 95165
## + TIF 1 1.8747e+04 9.6933e+10 95165
## + KIDSDRIV 1 2.5170e+03 9.6933e+10 95165
## + URBANICITY 1 2.5000e+03 9.6933e+10 95165
## + HOME_AREA 1 2.5000e+03 9.6933e+10 95165
## + WORK_AREA 1 2.5000e+03 9.6933e+10 95165
## + URBANICITYHighly.Rural..Rural 1 2.5000e+03 9.6933e+10 95165
## + URBANICITYHighly.Urban..Urban 1 2.5000e+03 9.6933e+10 95165
## + HOME_AREAHighly.Rural 1 2.5000e+03 9.6933e+10 95165
## + HOME_AREAHighly.Urban 1 2.5000e+03 9.6933e+10 95165
## + WORK_AEARural 1 2.5000e+03 9.6933e+10 95165
## + WORK_AEAUrban 1 2.5000e+03 9.6933e+10 95165
## - REVOKED 1 8.8979e+07 9.7022e+10 95166
## + JOB 8 1.3380e+08 9.6799e+10 95171
## + CAR_TYPE 5 1.8631e+07 9.6915e+10 95172
## - TARGET_FLAG 1 3.2364e+10 1.2930e+11 96807
##
## Step: AIC=95161.13
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
## MSTATUS + SEX + EDUCATION + CAR_USE + BLUEBOOK + RED_CAR +

```

```

##      OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
##      HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yeoj +
##      TIF_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##              Df  Sum of Sq      RSS   AIC
## - RED_CAR      1 3.3224e+06 9.6937e+10 95159
## - AGE          1 3.7190e+06 9.6937e+10 95159
## - MSTATUS      1 3.7399e+06 9.6937e+10 95159
## - HOME_VAL     1 3.8950e+06 9.6938e+10 95159
## - HOME_VAL_sqrt 1 4.3080e+06 9.6938e+10 95159
## - TIF_yeoj     1 5.8085e+06 9.6939e+10 95159
## + JOBProfessional 1 6.1537e+07 9.6872e+10 95160
## - YOJ          1 1.5452e+07 9.6949e+10 95160
## - MVR_PTS_log  1 1.6270e+07 9.6950e+10 95160
## - CAR_USE      1 1.7705e+07 9.6951e+10 95160
## - OLDCLAIM     1 1.9836e+07 9.6954e+10 95160
## - BLUEBOOK     1 2.5820e+07 9.6959e+10 95161
## - PARENT1      1 2.7232e+07 9.6961e+10 95161
## - YOJ_orderNorm 1 2.7434e+07 9.6961e+10 95161
## + JOB.1        1 3.9157e+07 9.6895e+10 95161
## + JOBManager   1 3.6002e+07 9.6898e+10 95161
## <none>                9.6934e+10 95161
## - SEX          1 3.4446e+07 9.6968e+10 95161
## - INCOME_orderNorm 1 3.7289e+07 9.6971e+10 95161
## - INCOME       1 3.9995e+07 9.6974e+10 95161
## - EDUCATION    3 1.0979e+08 9.7043e+10 95162
## - CLM_FREQ     1 4.6155e+07 9.6980e+10 95162
## - CAR_AGE_sqrt 1 4.7310e+07 9.6981e+10 95162
## - CLM_FREQ_log 1 5.0772e+07 9.6984e+10 95162
## + JOBDoctor    1 1.6722e+07 9.6917e+10 95162
## - OLDCLAIM_yeoj 1 5.1549e+07 9.6985e+10 95162
## - CAR_AGE      1 5.3114e+07 9.6987e+10 95162
## + JOBBBlue.Collar 1 9.3039e+06 9.6924e+10 95163
## + CAR_TYPEVan  1 7.3239e+06 9.6926e+10 95163
## + CAR_TYPEPanel.Truck 1 6.3965e+06 9.6927e+10 95163
## + JOBClerical  1 4.4905e+06 9.6929e+10 95163
## + JOBStudent   1 4.2321e+06 9.6929e+10 95163
## + CAR_TYPEMinivan 1 3.8838e+06 9.6930e+10 95163
## + CAR_TYPESUV  1 2.0377e+06 9.6932e+10 95163
## + CAR_TYPESports.Car 1 5.5373e+05 9.6933e+10 95163
## - BLUEBOOK_orderNorm 1 6.7372e+07 9.7001e+10 95163
## + TRAVTIME     1 5.1478e+05 9.6933e+10 95163
## + TRAVTIME_yeoj 1 3.3576e+05 9.6933e+10 95163
## + JOBHome.Maker 1 1.8492e+05 9.6933e+10 95163
## - MVR_PTS      1 6.7743e+07 9.7001e+10 95163
## + CAR_TYPEPickup 1 1.4511e+05 9.6934e+10 95163
## + HOMEKIDS     1 1.3693e+05 9.6934e+10 95163
## + JOBLawyer    1 2.3016e+04 9.6934e+10 95163
## + TIF          1 1.7363e+04 9.6934e+10 95163
## + URBANICITY   1 4.9670e+03 9.6934e+10 95163
## + HOME_AREA    1 4.9670e+03 9.6934e+10 95163
## + WORK_AREA    1 4.9670e+03 9.6934e+10 95163
## + URBANICITYHighly.Rural..Rural 1 4.9670e+03 9.6934e+10 95163
## + URBANICITYHighly.Urban..Urban 1 4.9670e+03 9.6934e+10 95163

```

```

## + HOME_AREAHighly.Rural      1 4.9670e+03 9.6934e+10 95163
## + HOME_AREAHighly.Urban      1 4.9670e+03 9.6934e+10 95163
## + WORK_AREARural             1 4.9670e+03 9.6934e+10 95163
## + WORK_AREAUrban             1 4.9670e+03 9.6934e+10 95163
## + KIDSDRIV                   1 3.2700e+03 9.6934e+10 95163
## - REVOKED                     1 8.9322e+07 9.7023e+10 95164
## + JOB                         8 1.3416e+08 9.6800e+10 95169
## + CAR_TYPE                    5 1.8619e+07 9.6915e+10 95170
## - TARGET_FLAG                 1 3.2457e+10 1.2939e+11 96809
##
## Step: AIC=95159.33
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
##   MSTATUS + SEX + EDUCATION + CAR_USE + BLUEBOOK + OLDCLAIM +
##   CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
##   HOME_VAL_sqrt + INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej +
##   TIF_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##
##      Df Sum of Sq      RSS   AIC
## - MSTATUS      1 3.6746e+06 9.6941e+10 95158
## - HOME_VAL      1 3.7492e+06 9.6941e+10 95158
## - AGE           1 3.9069e+06 9.6941e+10 95158
## - HOME_VAL_sqrt 1 4.2200e+06 9.6941e+10 95158
## - TIF_yej       1 5.6685e+06 9.6943e+10 95158
## + JOBProfessional 1 6.1533e+07 9.6875e+10 95158
## - YOJ           1 1.5489e+07 9.6952e+10 95158
## - MVR_PTS_log   1 1.6289e+07 9.6953e+10 95158
## - CAR_USE       1 1.7341e+07 9.6954e+10 95158
## - OLDCLAIM      1 1.9755e+07 9.6957e+10 95158
## - BLUEBOOK      1 2.5835e+07 9.6963e+10 95159
## - YOJ_orderNorm 1 2.7373e+07 9.6964e+10 95159
## - PARENT1       1 2.7466e+07 9.6964e+10 95159
## + JOB.1         1 3.9691e+07 9.6897e+10 95159
## + JOBManager    1 3.6673e+07 9.6900e+10 95159
## <none>          9.6937e+10 95159
## - INCOME_orderNorm 1 3.7510e+07 9.6974e+10 95160
## - SEX           1 3.7557e+07 9.6975e+10 95160
## - INCOME        1 4.0235e+07 9.6977e+10 95160
## - EDUCATION     3 1.1017e+08 9.7047e+10 95160
## - CLM_FREQ      1 4.6329e+07 9.6983e+10 95160
## - CAR_AGE_sqrt  1 4.7646e+07 9.6985e+10 95160
## + JOBDoctor     1 1.6971e+07 9.6920e+10 95160
## - CLM_FREQ_log  1 5.0914e+07 9.6988e+10 95160
## - OLDCLAIM_yej  1 5.1674e+07 9.6989e+10 95160
## - CAR_AGE       1 5.3564e+07 9.6991e+10 95160
## + JOBBlue.Collar 1 9.1926e+06 9.6928e+10 95161
## + CAR_TYPEVan   1 7.2772e+06 9.6930e+10 95161
## + CAR_TYPEPanel.Truck 1 6.2955e+06 9.6931e+10 95161
## + JOBClerical   1 4.3728e+06 9.6933e+10 95161
## + JOBStudent    1 4.0638e+06 9.6933e+10 95161
## + CAR_TYPEMinivan 1 4.0065e+06 9.6933e+10 95161
## + RED_CAR       1 3.3224e+06 9.6934e+10 95161
## + RED_CAR.No    1 3.3224e+06 9.6934e+10 95161
## + RED_CAR.Yes   1 3.3224e+06 9.6934e+10 95161
## + CAR_TYPESUV   1 2.2311e+06 9.6935e+10 95161

```

```

## + CAR_TYPESports.Car          1 5.5102e+05 9.6936e+10 95161
## + TRAVTIME                    1 4.9140e+05 9.6936e+10 95161
## + TRAVTIME_yej                1 3.1593e+05 9.6937e+10 95161
## - BLUEBOOK_orderNorm         1 6.7593e+07 9.7005e+10 95161
## + CAR_TYPEPickup              1 1.7470e+05 9.6937e+10 95161
## - MVR_PTS                     1 6.7729e+07 9.7005e+10 95161
## + JOBHome.Maker               1 1.5274e+05 9.6937e+10 95161
## + HOMEKIDS                    1 1.3200e+05 9.6937e+10 95161
## + JOBLawyer                   1 2.1855e+04 9.6937e+10 95161
## + TIF                         1 1.2550e+04 9.6937e+10 95161
## + KIDSDRIV                   1 1.1543e+04 9.6937e+10 95161
## + URBANICITY                  1 1.0545e+04 9.6937e+10 95161
## + HOME_AREA                   1 1.0545e+04 9.6937e+10 95161
## + WORK_AREA                   1 1.0545e+04 9.6937e+10 95161
## + URBANICITYHighly.Rural..Rural 1 1.0545e+04 9.6937e+10 95161
## + URBANICITYHighly.Urban..Urban 1 1.0545e+04 9.6937e+10 95161
## + HOME_AREAHighly.Rural      1 1.0545e+04 9.6937e+10 95161
## + HOME_AREAHighly.Urban     1 1.0545e+04 9.6937e+10 95161
## + WORK_AREARural             1 1.0545e+04 9.6937e+10 95161
## + WORK_AREAUrban             1 1.0545e+04 9.6937e+10 95161
## - REVOKED                     1 8.9615e+07 9.7027e+10 95163
## + JOB                         8 1.3496e+08 9.6802e+10 95167
## + CAR_TYPE                    5 1.8902e+07 9.6918e+10 95168
## - TARGET_FLAG                1 3.2458e+10 1.2939e+11 96807
##
## Step: AIC=95157.54
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
##     SEX + EDUCATION + CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ +
##     REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + HOME_VAL_sqrt +
##     INCOME_orderNorm + MVR_PTS_log + OLDCLAIM_yej + TIF_yej +
##     YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - HOME_VAL_sqrt 1 2.9449e+06 9.6944e+10 95156
## - HOME_VAL      1 3.5600e+06 9.6944e+10 95156
## - AGE           1 4.7193e+06 9.6945e+10 95156
## - TIF_yej      1 5.6108e+06 9.6946e+10 95156
## + JOBProfessional 1 6.2121e+07 9.6879e+10 95156
## - YOJ          1 1.4188e+07 9.6955e+10 95156
## - MVR_PTS_log  1 1.5980e+07 9.6957e+10 95156
## - CAR_USE      1 1.7137e+07 9.6958e+10 95157
## - OLDCLAIM     1 1.9762e+07 9.6960e+10 95157
## - YOJ_orderNorm 1 2.4913e+07 9.6966e+10 95157
## - BLUEBOOK     1 2.6059e+07 9.6967e+10 95157
## + JOB.1        1 3.9525e+07 9.6901e+10 95157
## + JOBManager   1 3.7175e+07 9.6903e+10 95157
## <none>          9.6941e+10 95158
## - SEX          1 3.8551e+07 9.6979e+10 95158
## - INCOME_orderNorm 1 3.9462e+07 9.6980e+10 95158
## - INCOME       1 4.0614e+07 9.6981e+10 95158
## - EDUCATION    3 1.0944e+08 9.7050e+10 95158
## - PARENT1      1 4.3758e+07 9.6984e+10 95158
## - CLM_FREQ     1 4.5994e+07 9.6987e+10 95158
## - CAR_AGE_sqrt 1 4.7074e+07 9.6988e+10 95158

```

```

## - CLM_FREQ_log          1 5.0801e+07 9.6991e+10 95159
## + JOBDoctor             1 1.6540e+07 9.6924e+10 95159
## - OLDCLAIM_yej          1 5.1593e+07 9.6992e+10 95159
## - CAR_AGE               1 5.2938e+07 9.6994e+10 95159
## + JOBBlue.Collar        1 8.6352e+06 9.6932e+10 95159
## + CAR_TYPEVan           1 7.1916e+06 9.6933e+10 95159
## + CAR_TYPEPanel.Truck   1 6.1877e+06 9.6934e+10 95159
## + JOBClerical           1 4.3535e+06 9.6936e+10 95159
## + CAR_TYPEMinivan       1 3.9902e+06 9.6937e+10 95159
## + MSTATUS               1 3.6746e+06 9.6937e+10 95159
## + MSTATUS.No            1 3.6746e+06 9.6937e+10 95159
## + MSTATUS.Yes           1 3.6746e+06 9.6937e+10 95159
## + RED_CAR               1 3.2570e+06 9.6937e+10 95159
## + RED_CAR.No            1 3.2570e+06 9.6937e+10 95159
## + RED_CAR.Yes           1 3.2570e+06 9.6937e+10 95159
## + JOBStudent            1 2.7803e+06 9.6938e+10 95159
## + CAR_TYPESUV           1 2.2914e+06 9.6938e+10 95159
## - MVR_PTS               1 6.7072e+07 9.7008e+10 95159
## + CAR_TYPESports.Car    1 5.1036e+05 9.6940e+10 95160
## + TRAVTIME              1 4.6572e+05 9.6940e+10 95160
## + TRAVTIME_yej          1 2.9534e+05 9.6940e+10 95160
## + CAR_TYPEPickup        1 1.7745e+05 9.6940e+10 95160
## + JOBHome.Maker         1 5.1015e+04 9.6941e+10 95160
## + URBANICITY            1 2.5864e+04 9.6941e+10 95160
## + HOME_AREA             1 2.5864e+04 9.6941e+10 95160
## + WORK_AREA             1 2.5864e+04 9.6941e+10 95160
## + URBANICITYHighly.Rural..Rural 1 2.5864e+04 9.6941e+10 95160
## + URBANICITYHighly.Urban..Urban 1 2.5864e+04 9.6941e+10 95160
## + HOME_AREAHighly.Rural 1 2.5864e+04 9.6941e+10 95160
## + HOME_AREAHighly.Urban 1 2.5864e+04 9.6941e+10 95160
## + WORK_AREARural        1 2.5864e+04 9.6941e+10 95160
## + WORK_AREAUrban        1 2.5864e+04 9.6941e+10 95160
## + JOBLawyer             1 2.1218e+04 9.6941e+10 95160
## + KIDSDRIV              1 1.8284e+04 9.6941e+10 95160
## + TIF                   1 8.4640e+03 9.6941e+10 95160
## + HOMEKIDS              1 7.3890e+03 9.6941e+10 95160
## - BLUEBOOK_orderNorm    1 6.8000e+07 9.7009e+10 95160
## - REVOKED               1 8.9780e+07 9.7030e+10 95161
## + JOB                   8 1.3418e+08 9.6806e+10 95166
## + CAR_TYPE              5 1.8716e+07 9.6922e+10 95166
## - TARGET_FLAG           1 3.2541e+10 1.2948e+11 96809
##
## Step: AIC=95155.72
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + HOME_VAL +
##     SEX + EDUCATION + CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ +
##     REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm +
##     MVR_PTS_log + OLDCLAIM_yej + TIF_yej + YOJ_orderNorm +
##     CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - HOME_VAL 1 7.8830e+05 9.6944e+10 95154
## - AGE 1 4.1230e+06 9.6948e+10 95154
## - TIF_yej 1 5.5182e+06 9.6949e+10 95154
## + JOBProfessional 1 6.2070e+07 9.6882e+10 95154

```

## - YOJ	1	1.3925e+07	9.6958e+10	95155
## - MVR_PTS_log	1	1.5769e+07	9.6959e+10	95155
## - CAR_USE	1	1.6560e+07	9.6960e+10	95155
## - OLDCLAIM	1	1.9974e+07	9.6964e+10	95155
## - YOJ_orderNorm	1	2.4973e+07	9.6969e+10	95155
## - BLUEBOOK	1	2.6709e+07	9.6970e+10	95155
## + JOB.1	1	3.9803e+07	9.6904e+10	95155
## + JOBManager	1	3.7206e+07	9.6906e+10	95156
## <none>			9.6944e+10	95156
## - SEX	1	3.8397e+07	9.6982e+10	95156
## - PARENT1	1	4.1357e+07	9.6985e+10	95156
## - EDUCATION	3	1.0951e+08	9.7053e+10	95156
## - CLM_FREQ	1	4.6412e+07	9.6990e+10	95156
## - INCOME_orderNorm	1	4.6914e+07	9.6991e+10	95156
## - CAR_AGE_sqrt	1	4.7381e+07	9.6991e+10	95157
## + JOBDoctor	1	1.6863e+07	9.6927e+10	95157
## - CLM_FREQ_log	1	5.1170e+07	9.6995e+10	95157
## - OLDCLAIM_yeoj	1	5.1920e+07	9.6996e+10	95157
## - CAR_AGE	1	5.3122e+07	9.6997e+10	95157
## - INCOME	1	5.8181e+07	9.7002e+10	95157
## + JOBBBlue.Collar	1	7.9300e+06	9.6936e+10	95157
## + CAR_TYPEVan	1	6.9511e+06	9.6937e+10	95157
## + CAR_TYPEPanel.Truck	1	6.0444e+06	9.6938e+10	95157
## + CAR_TYPEMinivan	1	4.1326e+06	9.6939e+10	95157
## + JOBClerical	1	3.6167e+06	9.6940e+10	95158
## + RED_CAR	1	3.1941e+06	9.6940e+10	95158
## + RED_CAR.No	1	3.1941e+06	9.6940e+10	95158
## + RED_CAR.Yes	1	3.1941e+06	9.6940e+10	95158
## + HOME_VAL_sqrt	1	2.9449e+06	9.6941e+10	95158
## + MSTATUS	1	2.3994e+06	9.6941e+10	95158
## + MSTATUS.No	1	2.3994e+06	9.6941e+10	95158
## + MSTATUS.Yes	1	2.3994e+06	9.6941e+10	95158
## + CAR_TYPE SUV	1	2.3390e+06	9.6941e+10	95158
## - MVR_PTS	1	6.6551e+07	9.7010e+10	95158
## + JOBStudent	1	9.2968e+05	9.6943e+10	95158
## + CAR_TYPESports.Car	1	4.9327e+05	9.6943e+10	95158
## + TRAVTIME	1	4.8239e+05	9.6943e+10	95158
## + TRAVTIME_yeoj	1	3.0530e+05	9.6943e+10	95158
## + CAR_TYPEPickup	1	1.3684e+05	9.6943e+10	95158
## + URBANICITY	1	2.4107e+04	9.6944e+10	95158
## + HOME_AREA	1	2.4107e+04	9.6944e+10	95158
## + WORK_AREA	1	2.4107e+04	9.6944e+10	95158
## + URBANICITYHighly.Rural..Rural	1	2.4107e+04	9.6944e+10	95158
## + URBANICITYHighly.Urban..Urban	1	2.4107e+04	9.6944e+10	95158
## + HOME_AREAHighly.Rural	1	2.4107e+04	9.6944e+10	95158
## + HOME_AREAHighly.Urban	1	2.4107e+04	9.6944e+10	95158
## + WORK_AREARural	1	2.4107e+04	9.6944e+10	95158
## + WORK_AREAUrban	1	2.4107e+04	9.6944e+10	95158
## + KIDSDRIV	1	9.0700e+03	9.6944e+10	95158
## + TIF	1	7.5040e+03	9.6944e+10	95158
## + JOBLawyer	1	7.4940e+03	9.6944e+10	95158
## + JOBHome.Maker	1	3.5540e+03	9.6944e+10	95158
## + HOMEKIDS	1	1.7500e+03	9.6944e+10	95158
## - BLUEBOOK_orderNorm	1	6.9184e+07	9.7013e+10	95158



```

## - REVOKED          1 8.9746e+07 9.7033e+10 95159
## + JOB              8 1.3223e+08 9.6811e+10 95164
## + CAR_TYPE         5 1.8522e+07 9.6925e+10 95165
## - TARGET_FLAG      1 3.2567e+10 1.2951e+11 96808
##
## Step: AIC=95153.76
## TARGET_AMT ~ TARGET_FLAG + AGE + YOJ + INCOME + PARENT1 + SEX +
## EDUCATION + CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED +
## MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm +
## MVR_PTS_log + OLDCLAIM_yeoj + TIF_yeoj + YOJ_orderNorm +
## CLM_FREQ_log + CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## - AGE          1 4.0182e+06 9.6948e+10 95152
## - TIF_yeoj      1 5.4800e+06 9.6950e+10 95152
## + JOBProfessional 1 6.1452e+07 9.6883e+10 95152
## - YOJ           1 1.3610e+07 9.6958e+10 95153
## - MVR_PTS_log   1 1.5996e+07 9.6960e+10 95153
## - CAR_USE       1 1.6723e+07 9.6961e+10 95153
## - OLDCLAIM      1 1.9882e+07 9.6964e+10 95153
## - YOJ_orderNorm 1 2.4375e+07 9.6969e+10 95153
## - BLUEBOOK      1 2.6843e+07 9.6971e+10 95153
## + JOB.1         1 3.9697e+07 9.6905e+10 95153
## + JOBManager    1 3.7037e+07 9.6907e+10 95154
## <none>          9.6944e+10 95154
## - SEX           1 3.8308e+07 9.6983e+10 95154
## - EDUCATION     3 1.0984e+08 9.7054e+10 95154
## - CLM_FREQ      1 4.6267e+07 9.6991e+10 95154
## - INCOME_orderNorm 1 4.6356e+07 9.6991e+10 95154
## - PARENT1       1 4.6709e+07 9.6991e+10 95155
## - CAR_AGE_sqrt  1 4.7112e+07 9.6992e+10 95155
## - CLM_FREQ_log  1 5.1022e+07 9.6995e+10 95155
## + JOBDoctor     1 1.6560e+07 9.6928e+10 95155
## - OLDCLAIM_yeoj 1 5.1746e+07 9.6996e+10 95155
## - CAR_AGE       1 5.2761e+07 9.6997e+10 95155
## - INCOME        1 5.9508e+07 9.7004e+10 95155
## + JOBBBlue.Collar 1 8.1300e+06 9.6936e+10 95155
## + CAR_TYPEVan    1 6.8907e+06 9.6938e+10 95155
## + CAR_TYPEPanel.Truck 1 6.0174e+06 9.6938e+10 95155
## + CAR_TYPEMinivan 1 4.0599e+06 9.6940e+10 95156
## + JOBClerical    1 3.6800e+06 9.6941e+10 95156
## + MSTATUS        1 3.1829e+06 9.6941e+10 95156
## + MSTATUS.No     1 3.1829e+06 9.6941e+10 95156
## + MSTATUS.Yes    1 3.1829e+06 9.6941e+10 95156
## + RED_CAR        1 3.0591e+06 9.6941e+10 95156
## + RED_CAR.No     1 3.0591e+06 9.6941e+10 95156
## + RED_CAR.Yes    1 3.0591e+06 9.6941e+10 95156
## + CAR_TYPESUV    1 2.3142e+06 9.6942e+10 95156
## + JOBStudent     1 1.1677e+06 9.6943e+10 95156
## - MVR_PTS       1 6.6852e+07 9.7011e+10 95156
## + HOME_VAL       1 7.8830e+05 9.6944e+10 95156
## + TRAVTIME       1 5.0314e+05 9.6944e+10 95156
## + CAR_TYPESports.Car 1 4.8488e+05 9.6944e+10 95156
## + TRAVTIME_yeoj  1 3.2268e+05 9.6944e+10 95156

```

```

## + HOME_VAL_sqrt      1 1.7315e+05 9.6944e+10 95156
## + CAR_TYPEPickup      1 1.3800e+05 9.6944e+10 95156
## + URBANICITY          1 3.5501e+04 9.6944e+10 95156
## + HOME_AREA           1 3.5501e+04 9.6944e+10 95156
## + WORK_AREA           1 3.5501e+04 9.6944e+10 95156
## + URBANICITYHighly.Rural..Rural 1 3.5501e+04 9.6944e+10 95156
## + URBANICITYHighly.Urban..Urban 1 3.5501e+04 9.6944e+10 95156
## + HOME_AREAHighly.Rural 1 3.5501e+04 9.6944e+10 95156
## + HOME_AREAHighly.Urban 1 3.5501e+04 9.6944e+10 95156
## + WORK_AEARural       1 3.5501e+04 9.6944e+10 95156
## + WORK_AEAUrban       1 3.5501e+04 9.6944e+10 95156
## + KIDSDRIV            1 2.1295e+04 9.6944e+10 95156
## + HOMEKIDS            1 1.7720e+04 9.6944e+10 95156
## + TIF                  1 8.9070e+03 9.6944e+10 95156
## + JOBLawyer            1 7.4540e+03 9.6944e+10 95156
## + JOBHome.Maker        1 4.1600e+02 9.6944e+10 95156
## - BLUEBOOK_orderNorm   1 6.9417e+07 9.7014e+10 95156
## - REVOKED              1 8.9228e+07 9.7034e+10 95157
## + JOB                  8 1.3158e+08 9.6813e+10 95162
## + CAR_TYPE             5 1.8344e+07 9.6926e+10 95163
## - TARGET_FLAG          1 3.2737e+10 1.2968e+11 96814
##
## Step: AIC=95152
## TARGET_AMT ~ TARGET_FLAG + YOJ + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
## CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yej + TIF_yej + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt
##
##
## Df Sum of Sq RSS AIC
## + JOBProfessional      1 6.2333e+07 9.6886e+10 95150
## - TIF_yej              1 5.5487e+06 9.6954e+10 95150
## - YOJ                  1 1.4995e+07 9.6963e+10 95151
## - CAR_USE              1 1.6170e+07 9.6965e+10 95151
## - MVR_PTS_log          1 1.6177e+07 9.6965e+10 95151
## - OLDCLAIM             1 2.0169e+07 9.6969e+10 95151
## - YOJ_orderNorm        1 2.7110e+07 9.6976e+10 95152
## - BLUEBOOK             1 2.7393e+07 9.6976e+10 95152
## + JOB.1                1 3.8003e+07 9.6910e+10 95152
## + JOBManager           1 3.6179e+07 9.6912e+10 95152
## <none>                  9.6948e+10 95152
## - SEX                  1 3.9871e+07 9.6988e+10 95152
## - PARENT1              1 4.2695e+07 9.6991e+10 95153
## - CLM_FREQ             1 4.6320e+07 9.6995e+10 95153
## - EDUCATION            3 1.1444e+08 9.7063e+10 95153
## - CAR_AGE_sqrt         1 4.7027e+07 9.6995e+10 95153
## - INCOME_orderNorm     1 4.7352e+07 9.6996e+10 95153
## - CLM_FREQ_log         1 5.1190e+07 9.7000e+10 95153
## + JOBDoctor            1 1.5996e+07 9.6932e+10 95153
## - OLDCLAIM_yej         1 5.1935e+07 9.7000e+10 95153
## - CAR_AGE              1 5.2671e+07 9.7001e+10 95153
## + JOBBlue.Collar       1 7.9709e+06 9.6940e+10 95154
## - INCOME               1 6.0484e+07 9.7009e+10 95154
## + CAR_TYPEVan          1 6.5488e+06 9.6942e+10 95154

```

```

## + CAR_TYPEPanel.Truck      1 6.2957e+06 9.6942e+10 95154
## + JOBClerical              1 4.3727e+06 9.6944e+10 95154
## + CAR_TYPEMinivan          1 4.2995e+06 9.6944e+10 95154
## + AGE                      1 4.0182e+06 9.6944e+10 95154
## + MSTATUS                  1 3.7535e+06 9.6945e+10 95154
## + MSTATUS.No               1 3.7535e+06 9.6945e+10 95154
## + MSTATUS.Yes              1 3.7535e+06 9.6945e+10 95154
## + RED_CAR                  1 3.2523e+06 9.6945e+10 95154
## + RED_CAR.No               1 3.2523e+06 9.6945e+10 95154
## + RED_CAR.Yes              1 3.2523e+06 9.6945e+10 95154
## + CAR_TYPE SUV             1 2.4791e+06 9.6946e+10 95154
## - MVR_PTS                  1 6.6509e+07 9.7015e+10 95154
## + JOBStudent               1 1.0609e+06 9.6947e+10 95154
## + HOMEKIDS                  1 8.1721e+05 9.6948e+10 95154
## + HOME_VAL                  1 6.8352e+05 9.6948e+10 95154
## + CAR_TYPESports.Car       1 6.7156e+05 9.6948e+10 95154
## + TRAVTIME                  1 5.2939e+05 9.6948e+10 95154
## + TRAVTIME_yej             1 3.4630e+05 9.6948e+10 95154
## + HOME_VAL_sqrt            1 1.6209e+05 9.6948e+10 95154
## + CAR_TYPEPickup           1 1.4277e+05 9.6948e+10 95154
## + URBANICITY                1 4.6788e+04 9.6948e+10 95154
## + HOME_AREA                1 4.6788e+04 9.6948e+10 95154
## + WORK_AREA                 1 4.6788e+04 9.6948e+10 95154
## + URBANICITYHighly.Rural..Rural 1 4.6788e+04 9.6948e+10 95154
## + URBANICITYHighly.Urban..Urban 1 4.6788e+04 9.6948e+10 95154
## + HOME_AREAHighly.Rural    1 4.6788e+04 9.6948e+10 95154
## + HOME_AREAHighly.Urban    1 4.6788e+04 9.6948e+10 95154
## + WORK_AREARural           1 4.6788e+04 9.6948e+10 95154
## + WORK_AREAUrban           1 4.6788e+04 9.6948e+10 95154
## + KIDSDRIV                 1 2.9403e+04 9.6948e+10 95154
## + JOBLawyer                 1 2.8081e+04 9.6948e+10 95154
## + TIF                       1 1.0181e+04 9.6948e+10 95154
## + JOBHome.Maker            1 9.5740e+03 9.6948e+10 95154
## - BLUEBOOK_orderNorm       1 7.1086e+07 9.7019e+10 95154
## - REVOKED                   1 8.9634e+07 9.7038e+10 95155
## + JOB                       8 1.3088e+08 9.6818e+10 95160
## + CAR_TYPE                  5 1.9387e+07 9.6929e+10 95161
## - TARGET_FLAG              1 3.2733e+10 1.2968e+11 96812
##
## Step: AIC=95150.32
## TARGET_AMT ~ TARGET_FLAG + YOJ + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
## CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yej + TIF_yej + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt + JOBProfessional
##
##
## Df Sum of Sq RSS AIC
## - TIF_yej 1 5.0484e+06 9.6891e+10 95149
## - YOJ 1 1.3187e+07 9.6899e+10 95149
## - MVR_PTS_log 1 1.6871e+07 9.6903e+10 95149
## - OLDCLAIM 1 2.1435e+07 9.6908e+10 95150
## - YOJ_orderNorm 1 2.5547e+07 9.6912e+10 95150
## + JOB.1 1 4.1625e+07 9.6844e+10 95150
## - CAR_USE 1 2.8689e+07 9.6915e+10 95150

```

## - BLUEBOOK	1	3.0317e+07	9.6916e+10	95150
## <none>			9.6886e+10	95150
## - SEX	1	3.4068e+07	9.6920e+10	95150
## - INCOME_orderNorm	1	3.4327e+07	9.6920e+10	95150
## - PARENT1	1	4.2406e+07	9.6928e+10	95151
## - CLM_FREQ	1	4.6776e+07	9.6933e+10	95151
## - CAR_AGE_sqrt	1	4.8506e+07	9.6935e+10	95151
## - INCOME	1	4.9704e+07	9.6936e+10	95151
## + JOBManager	1	1.6589e+07	9.6869e+10	95151
## - CLM_FREQ_log	1	5.1652e+07	9.6938e+10	95151
## - OLDCLAIM_yeoj	1	5.2445e+07	9.6939e+10	95151
## - CAR_AGE	1	5.3947e+07	9.6940e+10	95152
## + JOBDoctor	1	1.3114e+07	9.6873e+10	95152
## + CAR_TYPEPanel.Truck	1	8.7894e+06	9.6877e+10	95152
## + CAR_TYPEVan	1	6.2278e+06	9.6880e+10	95152
## - JOBProfessional	1	6.2333e+07	9.6948e+10	95152
## + MSTATUS	1	3.7693e+06	9.6882e+10	95152
## + MSTATUS.No	1	3.7693e+06	9.6882e+10	95152
## + MSTATUS.Yes	1	3.7693e+06	9.6882e+10	95152
## - MVR_PTS	1	6.4506e+07	9.6951e+10	95152
## + RED_CAR	1	3.1941e+06	9.6883e+10	95152
## + RED_CAR.No	1	3.1941e+06	9.6883e+10	95152
## + RED_CAR.Yes	1	3.1941e+06	9.6883e+10	95152
## + AGE	1	3.1372e+06	9.6883e+10	95152
## + JOBLawyer	1	2.9979e+06	9.6883e+10	95152
## + CAR_TYPEMinivan	1	2.6636e+06	9.6883e+10	95152
## + CAR_TYPESUV	1	2.6510e+06	9.6883e+10	95152
## + HOME_VAL	1	1.2855e+06	9.6885e+10	95152
## + JOBStudent	1	1.1288e+06	9.6885e+10	95152
## + CAR_TYPESports.Car	1	7.1815e+05	9.6885e+10	95152
## + HOME_VAL_sqrt	1	4.7602e+05	9.6886e+10	95152
## + CAR_TYPEPickup	1	4.2050e+05	9.6886e+10	95152
## + TRAVTIME	1	4.1762e+05	9.6886e+10	95152
## + HOMEKIDS	1	3.8588e+05	9.6886e+10	95152
## + JOBClerical	1	3.4248e+05	9.6886e+10	95152
## + JOBBBlue.Collar	1	2.8157e+05	9.6886e+10	95152
## + JOBHome.Maker	1	2.8107e+05	9.6886e+10	95152
## + TRAVTIME_yeoj	1	2.7122e+05	9.6886e+10	95152
## + TIF	1	5.2770e+04	9.6886e+10	95152
## + URBANICITY	1	1.2656e+04	9.6886e+10	95152
## + HOME_AREA	1	1.2656e+04	9.6886e+10	95152
## + WORK_AREA	1	1.2656e+04	9.6886e+10	95152
## + URBANICITYHighly.Rural..Rural	1	1.2656e+04	9.6886e+10	95152
## + URBANICITYHighly.Urban..Urban	1	1.2656e+04	9.6886e+10	95152
## + HOME_AREAHighly.Rural	1	1.2656e+04	9.6886e+10	95152
## + HOME_AREAHighly.Urban	1	1.2656e+04	9.6886e+10	95152
## + WORK_AREARural	1	1.2656e+04	9.6886e+10	95152
## + WORK_AREAUrban	1	1.2656e+04	9.6886e+10	95152
## + KIDSDRIV	1	1.0868e+04	9.6886e+10	95152
## - BLUEBOOK_orderNorm	1	7.4057e+07	9.6960e+10	95153
## - EDUCATION	3	1.5583e+08	9.7042e+10	95154
## - REVOKED	1	9.1648e+07	9.6978e+10	95154
## + CAR_TYPE	5	2.1863e+07	9.6864e+10	95159
## + JOB	7	6.8550e+07	9.6818e+10	95160

```

## - TARGET_FLAG          1 3.2693e+10 1.2958e+11 96809
##
## Step: AIC=95148.62
## TARGET_AMT ~ TARGET_FLAG + YOJ + INCOME + PARENT1 + SEX + EDUCATION +
##   CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
##   CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm + MVR_PTS_log +
##   OLDCLAIM_yej + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##   JOBProfessional
##
##
##           Df Sum of Sq      RSS   AIC
## - YOJ      1 1.2937e+07 9.6904e+10 95147
## - MVR_PTS_log 1 1.6644e+07 9.6908e+10 95148
## - OLDCLAIM  1 2.1160e+07 9.6912e+10 95148
## - YOJ_orderNorm 1 2.5164e+07 9.6916e+10 95148
## + JOB.1      1 4.0906e+07 9.6850e+10 95148
## - CAR_USE    1 2.8142e+07 9.6919e+10 95148
## - BLUEBOOK   1 3.0253e+07 9.6921e+10 95148
## - INCOME_orderNorm 1 3.3641e+07 9.6925e+10 95149
## <none>              9.6891e+10 95149
## - SEX        1 3.3948e+07 9.6925e+10 95149
## - PARENT1     1 4.1917e+07 9.6933e+10 95149
## - CLM_FREQ    1 4.6324e+07 9.6937e+10 95149
## - INCOME      1 4.8747e+07 9.6940e+10 95149
## - CAR_AGE_sqrt 1 4.9448e+07 9.6941e+10 95150
## + JOBManager  1 1.6830e+07 9.6874e+10 95150
## - CLM_FREQ_log 1 5.1064e+07 9.6942e+10 95150
## - OLDCLAIM_yej 1 5.1829e+07 9.6943e+10 95150
## + JOBDoctor   1 1.2956e+07 9.6878e+10 95150
## - CAR_AGE     1 5.4988e+07 9.6946e+10 95150
## + CAR_TYPEPanel.Truck 1 8.6166e+06 9.6883e+10 95150
## + CAR_TYPEVan  1 6.1187e+06 9.6885e+10 95150
## + TIF_yej     1 5.0484e+06 9.6886e+10 95150
## - JOBProfessional 1 6.2833e+07 9.6954e+10 95150
## + TIF         1 4.9230e+06 9.6886e+10 95150
## + MSTATUS     1 3.7021e+06 9.6887e+10 95150
## + MSTATUS.No  1 3.7021e+06 9.6887e+10 95150
## + MSTATUS.Yes  1 3.7021e+06 9.6887e+10 95150
## - MVR_PTS     1 6.4217e+07 9.6955e+10 95150
## + AGE         1 3.1918e+06 9.6888e+10 95150
## + JOBLawyer   1 3.1666e+06 9.6888e+10 95150
## + RED_CAR     1 3.0705e+06 9.6888e+10 95150
## + RED_CAR.No  1 3.0705e+06 9.6888e+10 95150
## + RED_CAR.Yes  1 3.0705e+06 9.6888e+10 95150
## + CAR_TYPEMinivan 1 2.5856e+06 9.6889e+10 95150
## + CAR_TYPESUV  1 2.5477e+06 9.6889e+10 95150
## + HOME_VAL    1 1.2401e+06 9.6890e+10 95151
## + JOBStudent  1 1.1721e+06 9.6890e+10 95151
## + CAR_TYPESports.Car 1 7.5851e+05 9.6890e+10 95151
## + HOME_VAL_sqrt 1 4.5893e+05 9.6891e+10 95151
## + TRAVTIME    1 4.4814e+05 9.6891e+10 95151
## + HOMEKIDS    1 4.4067e+05 9.6891e+10 95151
## + CAR_TYPEPickup 1 4.3932e+05 9.6891e+10 95151
## + JOBClerical 1 4.2070e+05 9.6891e+10 95151
## + JOBHome.Maker 1 3.7146e+05 9.6891e+10 95151

```

```

## + TRAVTIME_yeoj          1 2.9878e+05 9.6891e+10 95151
## + JOBBlue.Collar         1 2.7254e+05 9.6891e+10 95151
## + URBANICITY              1 4.1020e+04 9.6891e+10 95151
## + HOME_AREA               1 4.1020e+04 9.6891e+10 95151
## + WORK_AREA               1 4.1020e+04 9.6891e+10 95151
## + URBANICITYHighly.Rural..Rural 1 4.1020e+04 9.6891e+10 95151
## + URBANICITYHighly.Urban..Urban 1 4.1020e+04 9.6891e+10 95151
## + HOME_AREAHighly.Rural   1 4.1020e+04 9.6891e+10 95151
## + HOME_AREAHighly.Urban   1 4.1020e+04 9.6891e+10 95151
## + WORK_AEARural           1 4.1020e+04 9.6891e+10 95151
## + WORK_AEAUrban           1 4.1020e+04 9.6891e+10 95151
## + KIDSDRIV                1 1.3303e+04 9.6891e+10 95151
## - BLUEBOOK_orderNorm      1 7.4119e+07 9.6965e+10 95151
## - EDUCATION                3 1.5487e+08 9.7046e+10 95152
## - REVOKED                  1 9.0994e+07 9.6982e+10 95152
## + CAR_TYPE                 5 2.1499e+07 9.6870e+10 95157
## + JOB                       7 6.8475e+07 9.6823e+10 95159
## - TARGET_FLAG              1 3.2992e+10 1.2988e+11 96821
##
## Step: AIC=95147.38
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
## CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm + MVR_PTS_log +
## OLDCLAIM_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
## JOBProfessional
##
##
## Df Sum of Sq RSS AIC
## - MVR_PTS_log          1 1.7051e+07 9.6921e+10 95146
## - INCOME_orderNorm     1 2.0980e+07 9.6925e+10 95147
## - OLDCLAIM              1 2.1102e+07 9.6925e+10 95147
## - YOJ_orderNorm        1 2.4825e+07 9.6929e+10 95147
## - CAR_USE               1 2.8693e+07 9.6933e+10 95147
## + JOB.1                 1 3.8598e+07 9.6865e+10 95147
## - BLUEBOOK              1 3.0967e+07 9.6935e+10 95147
## - SEX                   1 3.2662e+07 9.6937e+10 95147
## <none>                  9.6904e+10 95147
## - INCOME                1 3.5988e+07 9.6940e+10 95148
## - PARENT1               1 3.9932e+07 9.6944e+10 95148
## - CLM_FREQ              1 4.5210e+07 9.6949e+10 95148
## - CAR_AGE_sqrt          1 4.8759e+07 9.6953e+10 95148
## - CLM_FREQ_log          1 5.0010e+07 9.6954e+10 95148
## - OLDCLAIM_yeoj         1 5.0815e+07 9.6955e+10 95148
## + JOBManager            1 1.6479e+07 9.6888e+10 95148
## - CAR_AGE               1 5.4228e+07 9.6958e+10 95149
## + YOJ                   1 1.2937e+07 9.6891e+10 95149
## + JOBDoctor             1 1.2566e+07 9.6891e+10 95149
## + CAR_TYPEPanel.Truck   1 9.1875e+06 9.6895e+10 95149
## + CAR_TYPEVan           1 6.4404e+06 9.6898e+10 95149
## + TIF_yeoj              1 4.7992e+06 9.6899e+10 95149
## + TIF                   1 4.7455e+06 9.6899e+10 95149
## + AGE                   1 4.3291e+06 9.6900e+10 95149
## + JOBLawyer             1 3.4163e+06 9.6901e+10 95149
## - JOBProfessional       1 6.4619e+07 9.6969e+10 95149
## + RED_CAR               1 3.1782e+06 9.6901e+10 95149

```

```

## + RED_CAR.No          1 3.1782e+06 9.6901e+10 95149
## + RED_CAR.Yes         1 3.1782e+06 9.6901e+10 95149
## + CAR_TYPESUV         1 2.7303e+06 9.6901e+10 95149
## - MVR_PTS             1 6.5421e+07 9.6969e+10 95149
## + MSTATUS             1 2.4242e+06 9.6902e+10 95149
## + MSTATUS.No          1 2.4242e+06 9.6902e+10 95149
## + MSTATUS.Yes         1 2.4242e+06 9.6902e+10 95149
## + CAR_TYPEMinivan     1 2.3059e+06 9.6902e+10 95149
## + JOBStudent          1 1.7989e+06 9.6902e+10 95149
## + JOBClerical         1 1.5286e+06 9.6903e+10 95149
## + JOBHome.Maker       1 9.8706e+05 9.6903e+10 95149
## + HOME_VAL            1 8.3347e+05 9.6903e+10 95149
## + CAR_TYPESports.Car  1 7.9898e+05 9.6903e+10 95149
## + CAR_TYPEPickup      1 6.9190e+05 9.6903e+10 95149
## + TRAVTIME            1 4.0823e+05 9.6904e+10 95149
## + TRAVTIME_yeoj       1 2.6349e+05 9.6904e+10 95149
## + HOME_VAL_sqrt       1 2.6048e+05 9.6904e+10 95149
## + JOBBlue.Collar      1 1.6015e+05 9.6904e+10 95149
## + URBANICITY           1 3.7731e+04 9.6904e+10 95149
## + HOME_AREA           1 3.7731e+04 9.6904e+10 95149
## + WORK_AREA           1 3.7731e+04 9.6904e+10 95149
## + URBANICITYHighly.Rural..Rural 1 3.7731e+04 9.6904e+10 95149
## + URBANICITYHighly.Urban..Urban 1 3.7731e+04 9.6904e+10 95149
## + HOME_AREAHighly.Rural 1 3.7731e+04 9.6904e+10 95149
## + HOME_AREAHighly.Urban 1 3.7731e+04 9.6904e+10 95149
## + WORK_AEARural       1 3.7731e+04 9.6904e+10 95149
## + WORK_AEAUrban       1 3.7731e+04 9.6904e+10 95149
## + KIDSDRIV            1 1.3531e+04 9.6904e+10 95149
## + HOMEKIDS            1 1.0663e+04 9.6904e+10 95149
## - BLUEBOOK_orderNorm  1 7.5276e+07 9.6979e+10 95150
## - EDUCATION           3 1.5119e+08 9.7055e+10 95150
## - REVOKED             1 9.0843e+07 9.6995e+10 95151
## + CAR_TYPE            5 2.2782e+07 9.6881e+10 95156
## + JOB                 7 6.9209e+07 9.6835e+10 95157
## - TARGET_FLAG        1 3.3006e+10 1.2991e+11 96820
##
## Step: AIC=95146.39
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
## CAR_AGE + BLUEBOOK_orderNorm + INCOME_orderNorm + OLDCLAIM_yeoj +
## YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt + JOBProfessional
##
##
## Df Sum of Sq RSS AIC
## - INCOME_orderNorm 1 2.0334e+07 9.6941e+10 95146
## - OLDCLAIM          1 2.0473e+07 9.6942e+10 95146
## - YOJ_orderNorm     1 2.5186e+07 9.6946e+10 95146
## - CAR_USE           1 2.8061e+07 9.6949e+10 95146
## + JOB.1             1 3.8622e+07 9.6882e+10 95146
## - BLUEBOOK          1 3.0706e+07 9.6952e+10 95146
## - SEX               1 3.2990e+07 9.6954e+10 95146
## <none>              9.6921e+10 95146
## - INCOME            1 3.5628e+07 9.6957e+10 95146
## - PARENT1           1 4.0666e+07 9.6962e+10 95147
## - CLM_FREQ          1 4.5359e+07 9.6966e+10 95147

```

```

## - CAR_AGE_sqrt          1 4.8055e+07 9.6969e+10 95147
## - CLM_FREQ_log          1 4.9648e+07 9.6971e+10 95147
## - OLDCLAIM_yeoj        1 5.0224e+07 9.6971e+10 95147
## + MVR_PTS_log          1 1.7051e+07 9.6904e+10 95147
## + JOBManager           1 1.6725e+07 9.6904e+10 95147
## - CAR_AGE              1 5.3842e+07 9.6975e+10 95148
## + YOJ                  1 1.3344e+07 9.6908e+10 95148
## + JOBDoctor            1 1.2405e+07 9.6909e+10 95148
## + CAR_TYPEPanel.Truck   1 9.6998e+06 9.6911e+10 95148
## - MVR_PTS              1 5.8289e+07 9.6979e+10 95148
## + CAR_TYPEVan          1 6.7638e+06 9.6914e+10 95148
## + TIF_yeoj             1 4.5717e+06 9.6917e+10 95148
## + AGE                  1 4.5456e+06 9.6917e+10 95148
## + TIF                  1 4.5345e+06 9.6917e+10 95148
## - JOBProfessional       1 6.3924e+07 9.6985e+10 95148
## + JOBLawyer            1 3.4780e+06 9.6918e+10 95148
## + RED_CAR              1 3.1932e+06 9.6918e+10 95148
## + RED_CAR.No           1 3.1932e+06 9.6918e+10 95148
## + RED_CAR.Yes          1 3.1932e+06 9.6918e+10 95148
## + CAR_TYPESUV          1 2.9965e+06 9.6918e+10 95148
## + MSTATUS              1 2.4374e+06 9.6919e+10 95148
## + MSTATUS.No           1 2.4374e+06 9.6919e+10 95148
## + MSTATUS.Yes          1 2.4374e+06 9.6919e+10 95148
## + CAR_TYPEMinivan       1 2.3172e+06 9.6919e+10 95148
## + JOBStudent           1 1.8788e+06 9.6919e+10 95148
## + JOBClerical          1 1.4908e+06 9.6920e+10 95148
## + HOME_VAL             1 1.0615e+06 9.6920e+10 95148
## + CAR_TYPEPickup        1 8.7308e+05 9.6920e+10 95148
## + CAR_TYPESports.Car    1 8.6083e+05 9.6920e+10 95148
## + JOBHome.Maker        1 8.2236e+05 9.6920e+10 95148
## + TRAVTIME             1 4.9326e+05 9.6921e+10 95148
## + HOME_VAL_sqrt        1 4.1214e+05 9.6921e+10 95148
## + TRAVTIME_yeoj        1 3.2939e+05 9.6921e+10 95148
## + JOBBBlue.Collar      1 1.3669e+05 9.6921e+10 95148
## + URBANICITY           1 1.1341e+05 9.6921e+10 95148
## + HOME_AREA            1 1.1341e+05 9.6921e+10 95148
## + WORK_AREA            1 1.1341e+05 9.6921e+10 95148
## + URBANICITYHighly.Rural..Rural 1 1.1341e+05 9.6921e+10 95148
## + URBANICITYHighly.Urban..Urban 1 1.1341e+05 9.6921e+10 95148
## + HOME_AREAHighly.Rural 1 1.1341e+05 9.6921e+10 95148
## + HOME_AREAHighly.Urban 1 1.1341e+05 9.6921e+10 95148
## + WORK_AEARural        1 1.1341e+05 9.6921e+10 95148
## + WORK_AEAUrban        1 1.1341e+05 9.6921e+10 95148
## + KIDSDRIV             1 6.8180e+03 9.6921e+10 95148
## + HOMEKIDS             1 2.0500e+03 9.6921e+10 95148
## - BLUEBOOK_orderNorm    1 7.5163e+07 9.6996e+10 95149
## - EDUCATION            3 1.5164e+08 9.7073e+10 95149
## - REVOKED              1 9.0975e+07 9.7012e+10 95150
## + CAR_TYPE             5 2.4314e+07 9.6897e+10 95155
## + JOB                  7 6.9214e+07 9.6852e+10 95156
## - TARGET_FLAG          1 3.3031e+10 1.2995e+11 96820
##
## Step: AIC=95145.59
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +

```



```

## CAR_USE + BLUEBOOK + OLDCLAIM + CLM_FREQ + REVOKED + MVR_PTS +
## CAR_AGE + BLUEBOOK_orderNorm + OLDCLAIM_yej + YOJ_orderNorm +
## CLM_FREQ_log + CAR_AGE_sqrt + JOBProfessional
##
## Df Sum of Sq RSS AIC
## - OLDCLAIM 1 1.9655e+07 9.6961e+10 95145
## - CAR_USE 1 3.0801e+07 9.6972e+10 95145
## - INCOME 1 3.2025e+07 9.6973e+10 95145
## + JOB.1 1 3.5281e+07 9.6906e+10 95146
## <none> 9.6941e+10 95146
## - SEX 1 3.5337e+07 9.6977e+10 95146
## - PARENT1 1 4.0571e+07 9.6982e+10 95146
## - CLM_FREQ 1 4.4314e+07 9.6986e+10 95146
## - BLUEBOOK 1 4.4831e+07 9.6986e+10 95146
## - YOJ_orderNorm 1 4.7360e+07 9.6989e+10 95146
## + INCOME_orderNorm 1 2.0334e+07 9.6921e+10 95146
## - CAR_AGE_sqrt 1 4.8043e+07 9.6989e+10 95146
## - CLM_FREQ_log 1 4.8537e+07 9.6990e+10 95146
## - OLDCLAIM_yej 1 4.9086e+07 9.6991e+10 95146
## + MVR_PTS_log 1 1.6404e+07 9.6925e+10 95147
## - CAR_AGE 1 5.3643e+07 9.6995e+10 95147
## + JOBManager 1 1.3030e+07 9.6928e+10 95147
## + CAR_TYPEPanel.Truck 1 1.0939e+07 9.6931e+10 95147
## + JOBDoctor 1 1.0815e+07 9.6931e+10 95147
## - MVR_PTS 1 5.7922e+07 9.6999e+10 95147
## + CAR_TYPEVan 1 6.7703e+06 9.6935e+10 95147
## + JOBLawyer 1 5.0453e+06 9.6936e+10 95147
## + AGE 1 4.1962e+06 9.6937e+10 95147
## + TIF 1 4.1879e+06 9.6937e+10 95147
## + TIF_yej 1 4.1544e+06 9.6937e+10 95147
## + MSTATUS 1 3.3373e+06 9.6938e+10 95147
## + MSTATUS.No 1 3.3373e+06 9.6938e+10 95147
## + MSTATUS.Yes 1 3.3373e+06 9.6938e+10 95147
## + RED_CAR 1 3.3064e+06 9.6938e+10 95147
## + RED_CAR.No 1 3.3064e+06 9.6938e+10 95147
## + RED_CAR.Yes 1 3.3064e+06 9.6938e+10 95147
## + CAR_TYPESUV 1 3.0558e+06 9.6938e+10 95147
## + CAR_TYPEMinivan 1 1.7585e+06 9.6940e+10 95147
## + CAR_TYPEPickup 1 9.8260e+05 9.6940e+10 95148
## + JOBBlue.Collar 1 9.7486e+05 9.6940e+10 95148
## + HOME_VAL 1 7.9498e+05 9.6941e+10 95148
## + JOBClerical 1 7.7913e+05 9.6941e+10 95148
## + CAR_TYPESports.Car 1 7.1280e+05 9.6941e+10 95148
## + YOJ 1 3.7273e+05 9.6941e+10 95148
## + HOMEKIDS 1 3.5576e+05 9.6941e+10 95148
## + TRAVTIME 1 3.2000e+05 9.6941e+10 95148
## + JOBStudent 1 2.1498e+05 9.6941e+10 95148
## + TRAVTIME_yej 1 1.8894e+05 9.6941e+10 95148
## + JOBHome.Maker 1 1.6553e+05 9.6941e+10 95148
## + HOME_VAL_sqrt 1 2.8378e+04 9.6941e+10 95148
## + KIDSDRIV 1 3.1390e+03 9.6941e+10 95148
## + URBANICITY 1 7.7000e+01 9.6941e+10 95148
## + HOME_AREA 1 7.7000e+01 9.6941e+10 95148
## + WORK_AREA 1 7.7000e+01 9.6941e+10 95148

```

```

## + URBANICITYHighly.Rural..Rural 1 7.7000e+01 9.6941e+10 95148
## + URBANICITYHighly.Urban..Urban 1 7.7000e+01 9.6941e+10 95148
## + HOME_AREAHighly.Rural 1 7.7000e+01 9.6941e+10 95148
## + HOME_AREAHighly.Urban 1 7.7000e+01 9.6941e+10 95148
## + WORK_AEARural 1 7.7000e+01 9.6941e+10 95148
## + WORK_AEAUrban 1 7.7000e+01 9.6941e+10 95148
## - EDUCATION 3 1.3776e+08 9.7079e+10 95148
## - JOBProfessional 1 7.4596e+07 9.7016e+10 95148
## - REVOKED 1 8.9563e+07 9.7031e+10 95149
## - BLUEBOOK_orderNorm 1 9.9077e+07 9.7041e+10 95149
## + CAR_TYPE 5 2.5271e+07 9.6916e+10 95154
## + JOB 7 6.3629e+07 9.6878e+10 95156
## - TARGET_FLAG 1 3.3010e+10 1.2995e+11 96818
##
## Step: AIC=95144.75
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + CLM_FREQ + REVOKED + MVR_PTS + CAR_AGE +
## BLUEBOOK_orderNorm + OLDCLAIM_yeoj + YOJ_orderNorm + CLM_FREQ_log +
## CAR_AGE_sqrt + JOBProfessional
##
##
## Df Sum of Sq RSS AIC
## - CLM_FREQ 1 2.4754e+07 9.6986e+10 95144
## - CLM_FREQ_log 1 2.9649e+07 9.6991e+10 95144
## - CAR_USE 1 3.0633e+07 9.6992e+10 95145
## - OLDCLAIM_yeoj 1 3.0957e+07 9.6992e+10 95145
## - INCOME 1 3.1217e+07 9.6992e+10 95145
## + JOB.1 1 3.5551e+07 9.6926e+10 95145
## <none> 9.6961e+10 95145
## - SEX 1 3.6349e+07 9.6997e+10 95145
## - PARENT1 1 3.9592e+07 9.7001e+10 95145
## - BLUEBOOK 1 4.5386e+07 9.7006e+10 95145
## - YOJ_orderNorm 1 4.7127e+07 9.7008e+10 95146
## - CAR_AGE_sqrt 1 4.8178e+07 9.7009e+10 95146
## + OLDCLAIM 1 1.9655e+07 9.6941e+10 95146
## + INCOME_orderNorm 1 1.9515e+07 9.6942e+10 95146
## + MVR_PTS_log 1 1.5813e+07 9.6945e+10 95146
## - CAR_AGE 1 5.3667e+07 9.7015e+10 95146
## + JOBManager 1 1.3747e+07 9.6947e+10 95146
## + CAR_TYPEPanel.Truck 1 1.1651e+07 9.6949e+10 95146
## - MVR_PTS 1 5.6690e+07 9.7018e+10 95146
## + JOBDoctor 1 1.0361e+07 9.6951e+10 95146
## + CAR_TYPEVan 1 7.0328e+06 9.6954e+10 95146
## + JOBLawyer 1 4.5376e+06 9.6957e+10 95146
## + AGE 1 4.4929e+06 9.6957e+10 95146
## + TIF 1 3.9664e+06 9.6957e+10 95147
## + TIF_yeoj 1 3.9265e+06 9.6957e+10 95147
## + RED_CAR 1 3.2394e+06 9.6958e+10 95147
## + RED_CAR.No 1 3.2394e+06 9.6958e+10 95147
## + RED_CAR.Yes 1 3.2394e+06 9.6958e+10 95147
## + MSTATUS 1 3.2098e+06 9.6958e+10 95147
## + MSTATUS.No 1 3.2098e+06 9.6958e+10 95147
## + MSTATUS.Yes 1 3.2098e+06 9.6958e+10 95147
## + CAR_TYPESUV 1 2.9234e+06 9.6958e+10 95147
## + CAR_TYPEMinivan 1 1.6491e+06 9.6959e+10 95147

```

```

## + JOBBBlue.Collar          1 1.2141e+06 9.6960e+10 95147
## + CAR_TYPEPickup           1 9.9054e+05 9.6960e+10 95147
## - EDUCATION                 3 1.3494e+08 9.7096e+10 95147
## + JOBClerical               1 7.9735e+05 9.6960e+10 95147
## + CAR_TYPESports.Car        1 7.5611e+05 9.6960e+10 95147
## + HOME_VAL                  1 6.9671e+05 9.6960e+10 95147
## + YOJ                       1 4.2579e+05 9.6961e+10 95147
## + TRAVTIME                  1 2.9155e+05 9.6961e+10 95147
## + HOMEKIDS                  1 2.8400e+05 9.6961e+10 95147
## + JOBStudent                1 2.3080e+05 9.6961e+10 95147
## + TRAVTIME_yeoj             1 1.6845e+05 9.6961e+10 95147
## + JOBHome.Maker             1 1.2798e+05 9.6961e+10 95147
## + HOME_VAL_sqrt             1 1.1262e+04 9.6961e+10 95147
## + URBANICITY                1 9.3570e+03 9.6961e+10 95147
## + HOME_AREA                 1 9.3570e+03 9.6961e+10 95147
## + WORK_AREA                 1 9.3570e+03 9.6961e+10 95147
## + URBANICITYHighly.Rural..Rural 1 9.3570e+03 9.6961e+10 95147
## + URBANICITYHighly.Urban..Urban 1 9.3570e+03 9.6961e+10 95147
## + HOME_AREAHighly.Rural     1 9.3570e+03 9.6961e+10 95147
## + HOME_AREAHighly.Urban     1 9.3570e+03 9.6961e+10 95147
## + WORK_AREARural            1 9.3570e+03 9.6961e+10 95147
## + WORK_AREAUrban            1 9.3570e+03 9.6961e+10 95147
## + KIDSDRIV                  1 1.2330e+03 9.6961e+10 95147
## - REVOKED                   1 7.1859e+07 9.7033e+10 95147
## - JOBProfessional            1 7.3064e+07 9.7034e+10 95147
## - BLUEBOOK_orderNorm        1 9.9681e+07 9.7061e+10 95149
## + CAR_TYPE                   5 2.6044e+07 9.6935e+10 95153
## + JOB                        7 6.3457e+07 9.6898e+10 95155
## - TARGET_FLAG               1 3.3022e+10 1.2998e+11 96817
##
## Step: AIC=95144.2
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
##     CAR_USE + BLUEBOOK + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
##     OLDCLAIM_yeoj + YOJ_orderNorm + CLM_FREQ_log + CAR_AGE_sqrt +
##     JOBProfessional
##
##
##              Df Sum of Sq      RSS   AIC
## - CLM_FREQ_log      1 5.4526e+06 9.6991e+10 95143
## - OLDCLAIM_yeoj      1 7.3466e+06 9.6993e+10 95143
## - CAR_USE            1 3.0630e+07 9.7016e+10 95144
## - INCOME             1 3.1123e+07 9.7017e+10 95144
## + JOB.1              1 3.4324e+07 9.6952e+10 95144
## <none>                      9.6986e+10 95144
## - SEX                1 3.6741e+07 9.7023e+10 95144
## - PARENT1            1 4.0549e+07 9.7026e+10 95145
## + CLM_FREQ           1 2.4754e+07 9.6961e+10 95145
## - BLUEBOOK           1 4.6674e+07 9.7033e+10 95145
## - YOJ_orderNorm       1 4.7026e+07 9.7033e+10 95145
## - CAR_AGE_sqrt        1 4.8408e+07 9.7034e+10 95145
## + INCOME_orderNorm    1 1.9254e+07 9.6967e+10 95145
## + MVR_PTS_log         1 1.6496e+07 9.6969e+10 95145
## + JOBManager          1 1.4520e+07 9.6971e+10 95145
## - CAR_AGE             1 5.3798e+07 9.7040e+10 95145
## + CAR_TYPEPanel.Truck 1 1.1576e+07 9.6974e+10 95146

```

```

## + JOBDoctor          1 1.0769e+07 9.6975e+10 95146
## - MVR_PTS            1 5.8881e+07 9.7045e+10 95146
## + CAR_TYPEVan        1 7.0125e+06 9.6979e+10 95146
## + JOBLawyer          1 5.3825e+06 9.6980e+10 95146
## + AGE                1 4.2298e+06 9.6982e+10 95146
## + TIF                1 3.8832e+06 9.6982e+10 95146
## + TIF_yeoj           1 3.7669e+06 9.6982e+10 95146
## + CAR_TYPESUV        1 3.5372e+06 9.6982e+10 95146
## + RED_CAR            1 3.4728e+06 9.6982e+10 95146
## + RED_CAR.No         1 3.4728e+06 9.6982e+10 95146
## + RED_CAR.Yes        1 3.4728e+06 9.6982e+10 95146
## + MSTATUS            1 2.9018e+06 9.6983e+10 95146
## + MSTATUS.No         1 2.9018e+06 9.6983e+10 95146
## + MSTATUS.Yes        1 2.9018e+06 9.6983e+10 95146
## - EDUCATION          3 1.3384e+08 9.7120e+10 95146
## + CAR_TYPEMinivan    1 1.8441e+06 9.6984e+10 95146
## + JOBBlue.Collar     1 1.3911e+06 9.6984e+10 95146
## + CAR_TYPEPickup     1 9.8303e+05 9.6985e+10 95146
## + JOBClerical        1 9.3804e+05 9.6985e+10 95146
## + HOME_VAL           1 6.6842e+05 9.6985e+10 95146
## + CAR_TYPESports.Car 1 5.5826e+05 9.6985e+10 95146
## + YOJ                1 3.0199e+05 9.6986e+10 95146
## + TRAVTIME           1 2.7586e+05 9.6986e+10 95146
## + JOBStudent         1 1.7303e+05 9.6986e+10 95146
## + TRAVTIME_yeoj      1 1.4944e+05 9.6986e+10 95146
## + JOBHome.Maker      1 1.3142e+05 9.6986e+10 95146
## + HOMEKIDS           1 1.1972e+05 9.6986e+10 95146
## + OLDCLAIM           1 9.4643e+04 9.6986e+10 95146
## + KIDSDRIV           1 1.8892e+04 9.6986e+10 95146
## + HOME_VAL_sqrt      1 5.7110e+03 9.6986e+10 95146
## + URBANICITY         1 5.6850e+03 9.6986e+10 95146
## + HOME_AREA          1 5.6850e+03 9.6986e+10 95146
## + WORK_AREA          1 5.6850e+03 9.6986e+10 95146
## + URBANICITYHighly.Rural..Rural 1 5.6850e+03 9.6986e+10 95146
## + URBANICITYHighly.Urban..Urban 1 5.6850e+03 9.6986e+10 95146
## + HOME_AREAHighly.Rural 1 5.6850e+03 9.6986e+10 95146
## + HOME_AREAHighly.Urban 1 5.6850e+03 9.6986e+10 95146
## + WORK_AEARural      1 5.6850e+03 9.6986e+10 95146
## + WORK_AEAUrban      1 5.6850e+03 9.6986e+10 95146
## - JOBProfessional    1 7.3667e+07 9.7060e+10 95147
## - REVOKED            1 1.0084e+08 9.7087e+10 95148
## - BLUEBOOK_orderNorm 1 1.0168e+08 9.7088e+10 95148
## + CAR_TYPE           5 2.6572e+07 9.6959e+10 95153
## + JOB                7 6.4314e+07 9.6922e+10 95154
## - TARGET_FLAG        1 3.3082e+10 1.3007e+11 96819
##
## Step: AIC=95142.53
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
## CAR_USE + BLUEBOOK + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
## OLDCLAIM_yeoj + YOJ_orderNorm + CAR_AGE_sqrt + JOBProfessional
##
##
## Df Sum of Sq RSS AIC
## - OLDCLAIM_yeoj 1 1.1729e+07 9.7003e+10 95141
## - INCOME 1 3.1074e+07 9.7022e+10 95142

```

## - CAR_USE	1	3.1353e+07	9.7023e+10	95142
## + JOB.1	1	3.4271e+07	9.6957e+10	95143
## <none>			9.6991e+10	95143
## - SEX	1	3.7237e+07	9.7029e+10	95143
## - PARENT1	1	4.0708e+07	9.7032e+10	95143
## - BLUEBOOK	1	4.6066e+07	9.7037e+10	95143
## - YOJ_orderNorm	1	4.6293e+07	9.7038e+10	95143
## + INCOME_orderNorm	1	1.9277e+07	9.6972e+10	95143
## - CAR_AGE_sqrt	1	4.8786e+07	9.7040e+10	95143
## + MVR_PTS_log	1	1.6294e+07	9.6975e+10	95144
## + JOBManager	1	1.4607e+07	9.6977e+10	95144
## - CAR_AGE	1	5.4201e+07	9.7046e+10	95144
## + CAR_TYPEPanel.Truck	1	1.1574e+07	9.6980e+10	95144
## + JOBDoctor	1	1.0551e+07	9.6981e+10	95144
## - MVR_PTS	1	5.9036e+07	9.7050e+10	95144
## + CAR_TYPEVan	1	6.7742e+06	9.6985e+10	95144
## + CLM_FREQ_log	1	5.4526e+06	9.6986e+10	95144
## + JOBLawyer	1	5.3181e+06	9.6986e+10	95144
## + AGE	1	4.2287e+06	9.6987e+10	95144
## + TIF	1	3.8104e+06	9.6988e+10	95144
## + CAR_TYPESUV	1	3.6726e+06	9.6988e+10	95144
## + TIF_yeoj	1	3.6692e+06	9.6988e+10	95144
## + RED_CAR	1	3.5085e+06	9.6988e+10	95144
## + RED_CAR.No	1	3.5085e+06	9.6988e+10	95144
## + RED_CAR.Yes	1	3.5085e+06	9.6988e+10	95144
## + MSTATUS	1	3.0149e+06	9.6988e+10	95144
## + MSTATUS.No	1	3.0149e+06	9.6988e+10	95144
## + MSTATUS.Yes	1	3.0149e+06	9.6988e+10	95144
## + CAR_TYPEMinivan	1	1.7961e+06	9.6990e+10	95144
## + JOBBlue.Collar	1	1.4843e+06	9.6990e+10	95144
## - EDUCATION	3	1.3457e+08	9.7126e+10	95144
## + CAR_TYPEPickup	1	1.0105e+06	9.6990e+10	95144
## + JOBClerical	1	9.5701e+05	9.6990e+10	95144
## + HOME_VAL	1	6.7229e+05	9.6991e+10	95144
## + OLDCLAIM	1	6.5447e+05	9.6991e+10	95144
## + CLM_FREQ	1	5.5802e+05	9.6991e+10	95144
## + CAR_TYPESports.Car	1	5.4096e+05	9.6991e+10	95144
## + TRAVTIME	1	3.6568e+05	9.6991e+10	95145
## + YOJ	1	2.8246e+05	9.6991e+10	95145
## + TRAVTIME_yeoj	1	2.1676e+05	9.6991e+10	95145
## + JOBStudent	1	1.9323e+05	9.6991e+10	95145
## + JOBHome.Maker	1	1.3346e+05	9.6991e+10	95145
## + HOMEKIDS	1	1.2165e+05	9.6991e+10	95145
## + URBANICITY	1	2.2478e+04	9.6991e+10	95145
## + HOME_AREA	1	2.2478e+04	9.6991e+10	95145
## + WORK_AREA	1	2.2478e+04	9.6991e+10	95145
## + URBANICITYHighly.Rural..Rural	1	2.2478e+04	9.6991e+10	95145
## + URBANICITYHighly.Urban..Urban	1	2.2478e+04	9.6991e+10	95145
## + HOME_AREAHighly.Rural	1	2.2478e+04	9.6991e+10	95145
## + HOME_AREAHighly.Urban	1	2.2478e+04	9.6991e+10	95145
## + WORK_AREARural	1	2.2478e+04	9.6991e+10	95145
## + WORK_AREAUrban	1	2.2478e+04	9.6991e+10	95145
## + KIDSDRIV	1	1.8732e+04	9.6991e+10	95145
## + HOME_VAL_sqrt	1	6.4230e+03	9.6991e+10	95145

```

## - JOBProfessional          1 7.4050e+07 9.7065e+10 95145
## - BLUEBOOK_orderNorm      1 1.0058e+08 9.7092e+10 95146
## - REVOKED                  1 1.1889e+08 9.7110e+10 95148
## + CAR_TYPE                 5 2.6663e+07 9.6965e+10 95151
## + JOB                      7 6.4233e+07 9.6927e+10 95153
## - TARGET_FLAG              1 3.3144e+10 1.3013e+11 96820
##
## Step:  AIC=95141.22
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
##      CAR_USE + BLUEBOOK + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
##      YOJ_orderNorm + CAR_AGE_sqrt + JOBProfessional
##
##              Df  Sum of Sq      RSS    AIC
## - CAR_USE      1 2.9982e+07 9.7033e+10 95141
## - INCOME       1 3.0069e+07 9.7033e+10 95141
## <none>          9.7003e+10 95141
## + JOB.1        1 3.2372e+07 9.6971e+10 95141
## - SEX          1 3.7327e+07 9.7040e+10 95141
## - PARENT1      1 4.0779e+07 9.7044e+10 95142
## - BLUEBOOK     1 4.5319e+07 9.7048e+10 95142
## - YOJ_orderNorm 1 4.5849e+07 9.7049e+10 95142
## - MVR_PTS      1 4.7307e+07 9.7050e+10 95142
## + INCOME_orderNorm 1 1.9118e+07 9.6984e+10 95142
## - CAR_AGE_sqrt 1 4.9810e+07 9.7053e+10 95142
## + JOBManager   1 1.5294e+07 9.6988e+10 95142
## + MVR_PTS_log   1 1.5234e+07 9.6988e+10 95142
## - CAR_AGE      1 5.5202e+07 9.7058e+10 95142
## + CAR_TYPEPanel.Truck 1 1.2561e+07 9.6990e+10 95142
## + OLDCLAIM_yeoj 1 1.1729e+07 9.6991e+10 95143
## + CLM_FREQ      1 1.0692e+07 9.6992e+10 95143
## + JOBDoctor     1 1.0589e+07 9.6992e+10 95143
## + CLM_FREQ_log  1 9.8347e+06 9.6993e+10 95143
## + OLDCLAIM      1 7.4252e+06 9.6996e+10 95143
## + CAR_TYPEVan   1 6.8691e+06 9.6996e+10 95143
## + JOBLawyer     1 5.5317e+06 9.6998e+10 95143
## + AGE           1 4.0522e+06 9.6999e+10 95143
## + TIF           1 3.6436e+06 9.6999e+10 95143
## + RED_CAR       1 3.5748e+06 9.6999e+10 95143
## + RED_CAR.No    1 3.5748e+06 9.6999e+10 95143
## + RED_CAR.Yes   1 3.5748e+06 9.6999e+10 95143
## + TIF_yeoj      1 3.5301e+06 9.7000e+10 95143
## + CAR_TYPESUV   1 3.3716e+06 9.7000e+10 95143
## + MSTATUS       1 2.6562e+06 9.7000e+10 95143
## + MSTATUS.No    1 2.6562e+06 9.7000e+10 95143
## + MSTATUS.Yes   1 2.6562e+06 9.7000e+10 95143
## + JOBBlue.Collar 1 1.7956e+06 9.7001e+10 95143
## + CAR_TYPEMinivan 1 1.4144e+06 9.7002e+10 95143
## - EDUCATION     3 1.3467e+08 9.7138e+10 95143
## + JOBClerical   1 9.4245e+05 9.7002e+10 95143
## + CAR_TYPEPickup 1 9.2148e+05 9.7002e+10 95143
## + TRAVTIME      1 4.4128e+05 9.7003e+10 95143
## + CAR_TYPESports.Car 1 4.3434e+05 9.7003e+10 95143
## + HOME_VAL      1 4.3137e+05 9.7003e+10 95143
## + URBANICITY    1 3.4475e+05 9.7003e+10 95143

```

```

## + HOME_AREA          1 3.4475e+05 9.7003e+10 95143
## + WORK_AREA          1 3.4475e+05 9.7003e+10 95143
## + URBANICITYHighly.Rural..Rural 1 3.4475e+05 9.7003e+10 95143
## + URBANICITYHighly.Urban..Urban 1 3.4475e+05 9.7003e+10 95143
## + HOME_AREAHighly.Rural 1 3.4475e+05 9.7003e+10 95143
## + HOME_AREAHighly.Urban 1 3.4475e+05 9.7003e+10 95143
## + WORK_AEARural      1 3.4475e+05 9.7003e+10 95143
## + WORK_AEAUrban      1 3.4475e+05 9.7003e+10 95143
## + TRAVTIME_yej       1 2.6516e+05 9.7003e+10 95143
## + YOJ                1 2.5405e+05 9.7003e+10 95143
## + JOBStudent         1 2.0214e+05 9.7003e+10 95143
## + HOMEKIDS           1 1.3640e+05 9.7003e+10 95143
## + JOBHome.Maker      1 1.0581e+05 9.7003e+10 95143
## + KIDSDRIV           1 1.2995e+04 9.7003e+10 95143
## + HOME_VAL_sqrt      1 3.1160e+03 9.7003e+10 95143
## - JOBProfessional    1 7.4350e+07 9.7077e+10 95144
## - BLUEBOOK_orderNorm 1 9.9635e+07 9.7103e+10 95145
## - REVOKED            1 1.2273e+08 9.7126e+10 95146
## + CAR_TYPE           5 2.6696e+07 9.6976e+10 95150
## + JOB                7 6.3035e+07 9.6940e+10 95152
## - TARGET_FLAG       1 3.3585e+10 1.3059e+11 96838
##
## Step: AIC=95140.98
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
##     BLUEBOOK + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
##     YOJ_orderNorm + CAR_AGE_sqrt + JOBProfessional
##
##              Df Sum of Sq      RSS   AIC
## + JOB.1      1 5.0046e+07 9.6983e+10 95140
## - INCOME     1 2.4703e+07 9.7058e+10 95140
## <none>              9.7033e+10 95141
## + CAR_USE    1 2.9982e+07 9.7003e+10 95141
## + CAR_USECommercial 1 2.9982e+07 9.7003e+10 95141
## + CAR_USEPrivate 1 2.9982e+07 9.7003e+10 95141
## - BLUEBOOK   1 3.8389e+07 9.7071e+10 95141
## - PARENT1    1 4.0404e+07 9.7073e+10 95141
## - YOJ_orderNorm 1 4.2705e+07 9.7076e+10 95141
## + JOBManager 1 2.2085e+07 9.7011e+10 95142
## + INCOME_orderNorm 1 2.1758e+07 9.7011e+10 95142
## - EDUCATION  3 1.1660e+08 9.7150e+10 95142
## - CAR_AGE_sqrt 1 5.1726e+07 9.7085e+10 95142
## + JOBDoctor  1 1.5740e+07 9.7017e+10 95142
## - MVR_PTS    1 5.2327e+07 9.7085e+10 95142
## + MVR_PTS_log 1 1.4627e+07 9.7018e+10 95142
## + JOBBBlue.Collar 1 1.1772e+07 9.7021e+10 95142
## - CAR_AGE    1 5.6821e+07 9.7090e+10 95142
## + OLDCLAIM_yej 1 1.0358e+07 9.7023e+10 95142
## + CLM_FREQ   1 9.1710e+06 9.7024e+10 95142
## + CLM_FREQ_log 1 8.4920e+06 9.7025e+10 95142
## + CAR_TYPEVan 1 8.1934e+06 9.7025e+10 95142
## + CAR_TYPEMinivan 1 7.4212e+06 9.7026e+10 95143
## - JOBProfessional 1 6.0798e+07 9.7094e+10 95143
## + OLDCLAIM   1 7.1024e+06 9.7026e+10 95143
## + JOBClerical 1 5.4062e+06 9.7028e+10 95143

```

```

## - SEX 1 6.4039e+07 9.7097e+10 95143
## + CAR_TYPEPanel.Truck 1 3.6802e+06 9.7029e+10 95143
## + AGE 1 3.4301e+06 9.7030e+10 95143
## + TIF 1 3.0948e+06 9.7030e+10 95143
## + RED_CAR 1 3.0868e+06 9.7030e+10 95143
## + RED_CAR.No 1 3.0868e+06 9.7030e+10 95143
## + RED_CAR.Yes 1 3.0868e+06 9.7030e+10 95143
## + TIF_yeoj 1 3.0401e+06 9.7030e+10 95143
## + MSTATUS 1 2.8035e+06 9.7030e+10 95143
## + MSTATUS.No 1 2.8035e+06 9.7030e+10 95143
## + MSTATUS.Yes 1 2.8035e+06 9.7030e+10 95143
## + CAR_TYPESUV 1 2.5784e+06 9.7030e+10 95143
## + URBANICITY 1 1.0594e+06 9.7032e+10 95143
## + HOME_AREA 1 1.0594e+06 9.7032e+10 95143
## + WORK_AREA 1 1.0594e+06 9.7032e+10 95143
## + URBANICITYHighly.Rural..Rural 1 1.0594e+06 9.7032e+10 95143
## + URBANICITYHighly.Urban..Urban 1 1.0594e+06 9.7032e+10 95143
## + HOME_AREAHighly.Rural 1 1.0594e+06 9.7032e+10 95143
## + HOME_AREAHighly.Urban 1 1.0594e+06 9.7032e+10 95143
## + WORK_AEARural 1 1.0594e+06 9.7032e+10 95143
## + WORK_AEAUrban 1 1.0594e+06 9.7032e+10 95143
## + JOBLawyer 1 9.5034e+05 9.7032e+10 95143
## + JOBHome.Maker 1 8.3295e+05 9.7032e+10 95143
## + HOME_VAL 1 5.4194e+05 9.7032e+10 95143
## + TRAVTIME 1 5.2250e+05 9.7033e+10 95143
## + TRAVTIME_yeoj 1 3.1962e+05 9.7033e+10 95143
## + CAR_TYPESports.Car 1 2.0733e+05 9.7033e+10 95143
## + YOJ 1 1.6559e+05 9.7033e+10 95143
## + HOMEKIDS 1 1.1607e+05 9.7033e+10 95143
## + CAR_TYPEPickup 1 5.0803e+04 9.7033e+10 95143
## + HOME_VAL_sqrt 1 2.8890e+03 9.7033e+10 95143
## + JOBStudent 1 2.1260e+03 9.7033e+10 95143
## + KIDSDRIV 1 1.9000e+02 9.7033e+10 95143
## - BLUEBOOK_orderNorm 1 9.4116e+07 9.7127e+10 95145
## - REVOKED 1 1.2315e+08 9.7156e+10 95146
## + JOB 7 8.7989e+07 9.6945e+10 95150
## + CAR_TYPE 5 1.8834e+07 9.7014e+10 95150
## - TARGET_FLAG 1 3.4662e+10 1.3169e+11 96884
##
## Step: AIC=95140.03
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + EDUCATION +
## BLUEBOOK + REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm +
## YOJ_orderNorm + CAR_AGE_sqrt + JOBProfessional + JOB.1
##
## Df Sum of Sq RSS AIC
## - EDUCATION 3 8.1257e+07 9.7064e+10 95139
## - INCOME 1 3.0058e+07 9.7013e+10 95140
## <none> 9.6983e+10 95140
## - PARENT1 1 4.0491e+07 9.7023e+10 95140
## + INCOME_orderNorm 1 2.4448e+07 9.6959e+10 95141
## - SEX 1 4.3627e+07 9.7027e+10 95141
## - YOJ_orderNorm 1 4.3997e+07 9.7027e+10 95141
## - MVR_PTS 1 4.8869e+07 9.7032e+10 95141
## - JOB.1 1 5.0046e+07 9.7033e+10 95141

```



## - CAR_AGE_sqrt	1	5.0092e+07	9.7033e+10	95141
## - BLUEBOOK	1	5.0218e+07	9.7033e+10	95141
## + JOBLawyer	1	1.7113e+07	9.6966e+10	95141
## + JOBBBlue.Collar	1	1.5014e+07	9.6968e+10	95141
## + MVR_PTS_log	1	1.4715e+07	9.6968e+10	95141
## + CAR_TYPEPanel.Truck	1	1.4168e+07	9.6969e+10	95141
## + OLDCLAIM_yeoj	1	1.3066e+07	9.6970e+10	95141
## - CAR_AGE	1	5.4969e+07	9.7038e+10	95141
## + CAR_USE	1	1.2308e+07	9.6971e+10	95141
## + CAR_USECommercial	1	1.2308e+07	9.6971e+10	95141
## + CAR_USEPrivate	1	1.2308e+07	9.6971e+10	95141
## + CLM_FREQ	1	1.1708e+07	9.6971e+10	95141
## + CLM_FREQ_log	1	1.0973e+07	9.6972e+10	95141
## + JOBManager	1	1.0920e+07	9.6972e+10	95141
## + OLDCLAIM	1	8.7954e+06	9.6974e+10	95142
## + CAR_TYPEVan	1	6.6749e+06	9.6976e+10	95142
## + AGE	1	5.4806e+06	9.6977e+10	95142
## + JOBClerical	1	5.3780e+06	9.6978e+10	95142
## + JOBDoctor	1	5.2726e+06	9.6978e+10	95142
## + TIF	1	3.9256e+06	9.6979e+10	95142
## + TIF_yeoj	1	3.7650e+06	9.6979e+10	95142
## + MSTATUS	1	3.0696e+06	9.6980e+10	95142
## + MSTATUS.No	1	3.0696e+06	9.6980e+10	95142
## + MSTATUS.Yes	1	3.0696e+06	9.6980e+10	95142
## + RED_CAR	1	2.7600e+06	9.6980e+10	95142
## + RED_CAR.No	1	2.7600e+06	9.6980e+10	95142
## + RED_CAR.Yes	1	2.7600e+06	9.6980e+10	95142
## + CAR_TYPE SUV	1	2.3222e+06	9.6981e+10	95142
## + CAR_TYPEMinivan	1	1.7211e+06	9.6981e+10	95142
## + URBANICITY	1	9.0742e+05	9.6982e+10	95142
## + HOME_AREA	1	9.0742e+05	9.6982e+10	95142
## + WORK_AREA	1	9.0742e+05	9.6982e+10	95142
## + URBANICITYHighly.Rural..Rural	1	9.0742e+05	9.6982e+10	95142
## + URBANICITYHighly.Urban..Urban	1	9.0742e+05	9.6982e+10	95142
## + HOME_AREAHighly.Rural	1	9.0742e+05	9.6982e+10	95142
## + HOME_AREAHighly.Urban	1	9.0742e+05	9.6982e+10	95142
## + WORK_AREARural	1	9.0742e+05	9.6982e+10	95142
## + WORK_AREAUrban	1	9.0742e+05	9.6982e+10	95142
## + JOBHome.Maker	1	7.2966e+05	9.6982e+10	95142
## + HOME_VAL	1	5.1342e+05	9.6982e+10	95142
## + TRAVTIME	1	4.3938e+05	9.6983e+10	95142
## + CAR_TYPESports.Car	1	3.3180e+05	9.6983e+10	95142
## + HOMEKIDS	1	2.7355e+05	9.6983e+10	95142
## + TRAVTIME_yeoj	1	2.4971e+05	9.6983e+10	95142
## + YOJ	1	2.4923e+05	9.6983e+10	95142
## + CAR_TYPEPickup	1	4.8435e+04	9.6983e+10	95142
## + JOBStudent	1	2.9090e+03	9.6983e+10	95142
## + KIDSDRIV	1	2.4260e+03	9.6983e+10	95142
## + HOME_VAL_sqrt	1	8.0800e+02	9.6983e+10	95142
## - JOBProfessional	1	7.1289e+07	9.7054e+10	95142
## - BLUEBOOK_orderNorm	1	1.0812e+08	9.7091e+10	95144
## - REVOKED	1	1.2298e+08	9.7106e+10	95145
## + CAR_TYPE	5	2.5288e+07	9.6958e+10	95149
## + JOB	6	3.7943e+07	9.6945e+10	95150

```

## - TARGET_FLAG          1 3.4533e+10 1.3152e+11 96878
##
## Step: AIC=95138.82
## TARGET_AMT ~ TARGET_FLAG + INCOME + PARENT1 + SEX + BLUEBOOK +
##     REVOKED + MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + YOJ_orderNorm +
##     CAR_AGE_sqrt + JOBProfessional + JOB.1
##
##
##              Df  Sum of Sq      RSS    AIC
## - INCOME      1 1.7625e+07 9.7082e+10 95138
## - CAR_AGE_sqrt 1 1.9473e+07 9.7084e+10 95138
## - CAR_AGE      1 2.1281e+07 9.7086e+10 95138
## + EDUCATION.C   1 3.7436e+07 9.7027e+10 95139
## + JOBLawyer     1 3.4783e+07 9.7029e+10 95139
## <none>          9.7064e+10 95139
## - PARENT1      1 3.5364e+07 9.7100e+10 95139
## - SEX          1 3.7898e+07 9.7102e+10 95139
## - JOBProfessional 1 3.9298e+07 9.7104e+10 95139
## - YOJ_orderNorm 1 4.2460e+07 9.7107e+10 95139
## + EDUCATION.Q   1 2.3826e+07 9.7040e+10 95139
## - BLUEBOOK      1 4.7719e+07 9.7112e+10 95140
## - MVR_PTS       1 4.8069e+07 9.7112e+10 95140
## + JOBManager    1 1.7539e+07 9.7047e+10 95140
## + CAR_TYPEPanel.Truck 1 1.7440e+07 9.7047e+10 95140
## + EDUCATION.L   1 1.5428e+07 9.7049e+10 95140
## + MVR_PTS_log   1 1.5170e+07 9.7049e+10 95140
## + OLDCLAIM_yeoj 1 1.4543e+07 9.7050e+10 95140
## + EDUCATION     3 8.1257e+07 9.6983e+10 95140
## + CLM_FREQ      1 1.2633e+07 9.7052e+10 95140
## + CLM_FREQ_log  1 1.2276e+07 9.7052e+10 95140
## + OLDCLAIM      1 1.0431e+07 9.7054e+10 95140
## + AGE           1 1.0304e+07 9.7054e+10 95140
## + INCOME_orderNorm 1 1.0190e+07 9.7054e+10 95140
## + JOBClerical   1 6.6413e+06 9.7058e+10 95140
## + CAR_TYPEVan    1 6.4969e+06 9.7058e+10 95140
## + TIF           1 3.9346e+06 9.7060e+10 95141
## + TIF_yeoj      1 3.6099e+06 9.7061e+10 95141
## + RED_CAR       1 3.1739e+06 9.7061e+10 95141
## + RED_CAR.No    1 3.1739e+06 9.7061e+10 95141
## + RED_CAR.Yes   1 3.1739e+06 9.7061e+10 95141
## + MSTATUS       1 2.8445e+06 9.7061e+10 95141
## + MSTATUS.No    1 2.8445e+06 9.7061e+10 95141
## + MSTATUS.Yes   1 2.8445e+06 9.7061e+10 95141
## + CAR_TYPE SUV   1 2.2353e+06 9.7062e+10 95141
## + JOBBlue.Collar 1 1.9299e+06 9.7062e+10 95141
## + CAR_USE       1 1.6645e+06 9.7063e+10 95141
## + CAR_USECommercial 1 1.6645e+06 9.7063e+10 95141
## + CAR_USEPrivate 1 1.6645e+06 9.7063e+10 95141
## + CAR_TYPEMinivan 1 1.1836e+06 9.7063e+10 95141
## + YOJ           1 9.6942e+05 9.7063e+10 95141
## + HOMEKIDS      1 8.0814e+05 9.7063e+10 95141
## + HOME_VAL      1 6.3325e+05 9.7064e+10 95141
## + JOBDoctor     1 4.3698e+05 9.7064e+10 95141
## + CAR_TYPESports.Car 1 3.9499e+05 9.7064e+10 95141
## + TRAVTIME      1 2.4906e+05 9.7064e+10 95141

```

```

## + JOBHome.Maker          1 2.2825e+05 9.7064e+10 95141
## + URBANICITY              1 2.2466e+05 9.7064e+10 95141
## + HOME_AREA              1 2.2466e+05 9.7064e+10 95141
## + WORK_AREA              1 2.2466e+05 9.7064e+10 95141
## + URBANICITYHighly.Rural..Rural 1 2.2466e+05 9.7064e+10 95141
## + URBANICITYHighly.Urban..Urban 1 2.2466e+05 9.7064e+10 95141
## + HOME_AREAHighly.Rural  1 2.2466e+05 9.7064e+10 95141
## + HOME_AREAHighly.Urban  1 2.2466e+05 9.7064e+10 95141
## + WORK_AREARural         1 2.2466e+05 9.7064e+10 95141
## + WORK_AREAUrban         1 2.2466e+05 9.7064e+10 95141
## + TRAVTIME_yeoj          1 1.1154e+05 9.7064e+10 95141
## + HOME_VAL_sqrt          1 4.7390e+04 9.7064e+10 95141
## + CAR_TYPEPickup         1 4.7192e+04 9.7064e+10 95141
## + KIDSDRIV               1 1.0005e+04 9.7064e+10 95141
## + JOBStudent             1 2.9760e+03 9.7064e+10 95141
## - JOB.1                  1 8.5389e+07 9.7150e+10 95142
## - BLUEBOOK_orderNorm     1 1.0375e+08 9.7168e+10 95143
## - REVOKED                1 1.1881e+08 9.7183e+10 95144
## + CAR_TYPE               5 2.8482e+07 9.7036e+10 95147
## + JOB                    6 5.0269e+07 9.7014e+10 95148
## - TARGET_FLAG            1 3.4618e+10 1.3168e+11 96879
##
## Step: AIC=95137.86
## TARGET_AMT ~ TARGET_FLAG + PARENT1 + SEX + BLUEBOOK + REVOKED +
## MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + YOJ_orderNorm +
## CAR_AGE_sqrt + JOBProfessional + JOB.1
##
##
## Df Sum of Sq RSS AIC
## - CAR_AGE_sqrt          1 2.2251e+07 9.7104e+10 95137
## + EDUCATION.C           1 4.3086e+07 9.7039e+10 95137
## - CAR_AGE               1 2.6467e+07 9.7108e+10 95137
## - JOBProfessional       1 3.3656e+07 9.7116e+10 95138
## <none>                  9.7082e+10 95138
## - YOJ_orderNorm        1 3.4287e+07 9.7116e+10 95138
## - SEX                  1 3.5429e+07 9.7117e+10 95138
## - PARENT1              1 3.6422e+07 9.7118e+10 95138
## + JOBLawyer            1 2.8564e+07 9.7053e+10 95138
## + EDUCATION.Q          1 2.5224e+07 9.7057e+10 95138
## + JOBManager           1 2.3993e+07 9.7058e+10 95138
## + INCOME               1 1.7625e+07 9.7064e+10 95139
## - MVR_PTS              1 5.0437e+07 9.7132e+10 95139
## + MVR_PTS_log          1 1.6023e+07 9.7066e+10 95139
## + CAR_TYPEPanel.Truck  1 1.5626e+07 9.7066e+10 95139
## - BLUEBOOK             1 5.3890e+07 9.7136e+10 95139
## + OLDCLAIM_yeoj        1 1.3728e+07 9.7068e+10 95139
## + CLM_FREQ             1 1.2189e+07 9.7070e+10 95139
## + CLM_FREQ_log         1 1.1573e+07 9.7070e+10 95139
## + OLDCLAIM             1 9.9401e+06 9.7072e+10 95139
## + INCOME_orderNorm     1 9.8359e+06 9.7072e+10 95139
## + AGE                  1 8.8841e+06 9.7073e+10 95139
## + HOME_VAL             1 7.3434e+06 9.7075e+10 95139
## + CAR_TYPEVan          1 5.8233e+06 9.7076e+10 95140
## + YOJ                  1 4.0785e+06 9.7078e+10 95140
## + JOBClerical          1 3.8021e+06 9.7078e+10 95140

```

```

## + TIF 1 3.4467e+06 9.7078e+10 95140
## + EDUCATION.L 1 3.1877e+06 9.7079e+10 95140
## + TIF_yeoj 1 3.1440e+06 9.7079e+10 95140
## + RED_CAR 1 2.9969e+06 9.7079e+10 95140
## + RED_CAR.No 1 2.9969e+06 9.7079e+10 95140
## + RED_CAR.Yes 1 2.9969e+06 9.7079e+10 95140
## + HOME_VAL_sqrt 1 2.1866e+06 9.7080e+10 95140
## + CAR_TYPESUV 1 2.0942e+06 9.7080e+10 95140
## + MSTATUS 1 1.7775e+06 9.7080e+10 95140
## + MSTATUS.No 1 1.7775e+06 9.7080e+10 95140
## + MSTATUS.Yes 1 1.7775e+06 9.7080e+10 95140
## + CAR_USE 1 1.7083e+06 9.7080e+10 95140
## + CAR_USECommercial 1 1.7083e+06 9.7080e+10 95140
## + CAR_USEPrivate 1 1.7083e+06 9.7080e+10 95140
## + CAR_TYPEMinivan 1 1.3644e+06 9.7080e+10 95140
## + URBANICITY 1 1.2348e+06 9.7081e+10 95140
## + HOME_AREA 1 1.2348e+06 9.7081e+10 95140
## + WORK_AREA 1 1.2348e+06 9.7081e+10 95140
## + URBANICITYHighly.Rural..Rural 1 1.2348e+06 9.7081e+10 95140
## + URBANICITYHighly.Urban..Urban 1 1.2348e+06 9.7081e+10 95140
## + HOME_AREAHighly.Rural 1 1.2348e+06 9.7081e+10 95140
## + HOME_AREAHighly.Urban 1 1.2348e+06 9.7081e+10 95140
## + WORK_AREARural 1 1.2348e+06 9.7081e+10 95140
## + WORK_AREAUrban 1 1.2348e+06 9.7081e+10 95140
## + JOBStudent 1 1.2081e+06 9.7081e+10 95140
## + EDUCATION 3 6.8823e+07 9.7013e+10 95140
## + JOBBBlue.Collar 1 7.8733e+05 9.7081e+10 95140
## + CAR_TYPESports.Car 1 4.3486e+05 9.7081e+10 95140
## + TRAVTIME 1 3.7708e+05 9.7081e+10 95140
## + JOBHome.Maker 1 2.9364e+05 9.7082e+10 95140
## + HOMEKIDS 1 2.0289e+05 9.7082e+10 95140
## + TRAVTIME_yeoj 1 1.8915e+05 9.7082e+10 95140
## + JOBDoctor 1 1.2917e+05 9.7082e+10 95140
## + CAR_TYPEPickup 1 1.6756e+04 9.7082e+10 95140
## + KIDSDRIV 1 2.7000e+02 9.7082e+10 95140
## - JOB.1 1 7.5025e+07 9.7157e+10 95140
## - BLUEBOOK_orderNorm 1 1.0594e+08 9.7188e+10 95142
## - REVOKED 1 1.1963e+08 9.7201e+10 95143
## + CAR_TYPE 5 2.6200e+07 9.7056e+10 95146
## + JOB 6 4.6434e+07 9.7035e+10 95147
## - TARGET_FLAG 1 3.4787e+10 1.3187e+11 96885
##
## Step: AIC=95137.17
## TARGET_AMT ~ TARGET_FLAG + PARENT1 + SEX + BLUEBOOK + REVOKED +
## MVR_PTS + CAR_AGE + BLUEBOOK_orderNorm + YOJ_orderNorm +
## JOBProfessional + JOB.1
##
## Df Sum of Sq RSS AIC
## - CAR_AGE 1 1.1831e+07 9.7116e+10 95136
## <none> 9.7104e+10 95137
## - YOJ_orderNorm 1 3.4267e+07 9.7138e+10 95137
## - SEX 1 3.5171e+07 9.7139e+10 95137
## - JOBProfessional 1 3.7546e+07 9.7142e+10 95137
## - PARENT1 1 3.7863e+07 9.7142e+10 95137

```

## + EDUCATION.C	1	2.4702e+07	9.7079e+10	95138
## + JOBManager	1	2.2624e+07	9.7081e+10	95138
## + CAR_AGE_sqrt	1	2.2251e+07	9.7082e+10	95138
## + INCOME	1	2.0403e+07	9.7084e+10	95138
## + JOBLawyer	1	2.0332e+07	9.7084e+10	95138
## + EDUCATION.Q	1	1.9931e+07	9.7084e+10	95138
## - MVR_PTS	1	4.9682e+07	9.7154e+10	95138
## + MVR_PTS_log	1	1.5405e+07	9.7089e+10	95138
## + CAR_TYPEPanel.Truck	1	1.5104e+07	9.7089e+10	95138
## + OLDCLAIM_yeoj	1	1.4130e+07	9.7090e+10	95138
## - BLUEBOOK	1	5.4421e+07	9.7159e+10	95138
## + CLM_FREQ	1	1.2391e+07	9.7092e+10	95138
## + CLM_FREQ_log	1	1.1899e+07	9.7092e+10	95138
## + INCOME_orderNorm	1	1.1573e+07	9.7093e+10	95138
## + OLDCLAIM	1	1.0194e+07	9.7094e+10	95139
## + AGE	1	7.7137e+06	9.7096e+10	95139
## + HOME_VAL	1	7.6295e+06	9.7096e+10	95139
## + CAR_TYPEVan	1	5.7103e+06	9.7098e+10	95139
## + YOJ	1	3.9625e+06	9.7100e+10	95139
## + TIF	1	3.8832e+06	9.7100e+10	95139
## + JOBClerical	1	3.7445e+06	9.7100e+10	95139
## + TIF_yeoj	1	3.6563e+06	9.7100e+10	95139
## + CAR_USE	1	3.2988e+06	9.7101e+10	95139
## + CAR_USECommercial	1	3.2988e+06	9.7101e+10	95139
## + CAR_USEPrivate	1	3.2988e+06	9.7101e+10	95139
## + RED_CAR	1	3.0944e+06	9.7101e+10	95139
## + RED_CAR.No	1	3.0944e+06	9.7101e+10	95139
## + RED_CAR.Yes	1	3.0944e+06	9.7101e+10	95139
## + CAR_TYPESUV	1	2.4291e+06	9.7102e+10	95139
## + HOME_VAL_sqrt	1	2.0757e+06	9.7102e+10	95139
## + JOBBBlue.Collar	1	1.8451e+06	9.7102e+10	95139
## + JOBStudent	1	1.6999e+06	9.7102e+10	95139
## + URBANICITY	1	1.5895e+06	9.7103e+10	95139
## + HOME_AREA	1	1.5895e+06	9.7103e+10	95139
## + WORK_AREA	1	1.5895e+06	9.7103e+10	95139
## + URBANICITYHighly.Rural..Rural	1	1.5895e+06	9.7103e+10	95139
## + URBANICITYHighly.Urban..Urban	1	1.5895e+06	9.7103e+10	95139
## + HOME_AREAHighly.Rural	1	1.5895e+06	9.7103e+10	95139
## + HOME_AREAHighly.Urban	1	1.5895e+06	9.7103e+10	95139
## + WORK_AREARural	1	1.5895e+06	9.7103e+10	95139
## + WORK_AREAUrban	1	1.5895e+06	9.7103e+10	95139
## + CAR_TYPEMinivan	1	1.3648e+06	9.7103e+10	95139
## + MSTATUS	1	1.3311e+06	9.7103e+10	95139
## + MSTATUS.No	1	1.3311e+06	9.7103e+10	95139
## + MSTATUS.Yes	1	1.3311e+06	9.7103e+10	95139
## + EDUCATION.L	1	9.9700e+05	9.7103e+10	95139
## + JOBDoctor	1	5.7956e+05	9.7104e+10	95139
## + TRAVTIME	1	5.4025e+05	9.7104e+10	95139
## + TRAVTIME_yeoj	1	3.1708e+05	9.7104e+10	95139
## + CAR_TYPESports.Car	1	3.0324e+05	9.7104e+10	95139
## + JOBHome.Maker	1	2.6759e+05	9.7104e+10	95139
## + HOMEKIDS	1	1.7599e+05	9.7104e+10	95139
## + CAR_TYPEPickup	1	3.1015e+04	9.7104e+10	95139
## + KIDSDRIV	1	7.6080e+03	9.7104e+10	95139

```

## - JOB.1                1 6.9229e+07 9.7173e+10 95139
## + EDUCATION            3 4.0166e+07 9.7064e+10 95141
## - BLUEBOOK_orderNorm  1 1.0643e+08 9.7211e+10 95141
## - REVOKED              1 1.1815e+08 9.7222e+10 95142
## + CAR_TYPE             5 2.5771e+07 9.7078e+10 95146
## + JOB                  6 4.0117e+07 9.7064e+10 95147
## - TARGET_FLAG          1 3.4772e+10 1.3188e+11 96884
##
## Step: AIC=95135.86
## TARGET_AMT ~ TARGET_FLAG + PARENT1 + SEX + BLUEBOOK + REVOKED +
## MVR_PTS + BLUEBOOK_orderNorm + YOJ_orderNorm + JOBProfessional +
## JOB.1
##
##
## Df Sum of Sq RSS AIC
## <none> 9.7116e+10 95136
## - YOJ_orderNorm 1 3.4013e+07 9.7150e+10 95136
## - JOBProfessional 1 3.5766e+07 9.7152e+10 95136
## - SEX 1 3.6278e+07 9.7152e+10 95136
## + EDUCATION.Q 1 3.0519e+07 9.7085e+10 95136
## + INCOME 1 2.9331e+07 9.7087e+10 95136
## - PARENT1 1 3.9375e+07 9.7155e+10 95136
## + JOBManager 1 2.7645e+07 9.7088e+10 95136
## + EDUCATION.C 1 2.3127e+07 9.7093e+10 95137
## + INCOME_orderNorm 1 1.9174e+07 9.7097e+10 95137
## - MVR_PTS 1 4.9547e+07 9.7165e+10 95137
## + MVR_PTS_log 1 1.6102e+07 9.7100e+10 95137
## + OLDCLAIM_yeoj 1 1.3904e+07 9.7102e+10 95137
## + CAR_TYPEPanel.Truck 1 1.3698e+07 9.7102e+10 95137
## - BLUEBOOK 1 5.4770e+07 9.7171e+10 95137
## + CLM_FREQ 1 1.2327e+07 9.7104e+10 95137
## + CAR_AGE 1 1.1831e+07 9.7104e+10 95137
## + CLM_FREQ_log 1 1.1709e+07 9.7104e+10 95137
## + HOME_VAL 1 1.0226e+07 9.7106e+10 95137
## + OLDCLAIM 1 1.0033e+07 9.7106e+10 95137
## + JOBLawyer 1 8.1646e+06 9.7108e+10 95137
## - JOB.1 1 6.0089e+07 9.7176e+10 95137
## + CAR_AGE_sqrt 1 7.6146e+06 9.7108e+10 95137
## + CAR_TYPEVan 1 5.8084e+06 9.7110e+10 95138
## + CAR_USE 1 5.4101e+06 9.7111e+10 95138
## + CAR_USECommercial 1 5.4101e+06 9.7111e+10 95138
## + CAR_USEPrivate 1 5.4101e+06 9.7111e+10 95138
## + AGE 1 5.2382e+06 9.7111e+10 95138
## + YOJ 1 4.5285e+06 9.7111e+10 95138
## + JOBBBlue.Collar 1 4.1979e+06 9.7112e+10 95138
## + TIF 1 3.9776e+06 9.7112e+10 95138
## + TIF_yeoj 1 3.6230e+06 9.7112e+10 95138
## + RED_CAR 1 3.4562e+06 9.7112e+10 95138
## + RED_CAR.No 1 3.4562e+06 9.7112e+10 95138
## + RED_CAR.Yes 1 3.4562e+06 9.7112e+10 95138
## + URBANICITY 1 3.2090e+06 9.7113e+10 95138
## + HOME_AREA 1 3.2090e+06 9.7113e+10 95138
## + WORK_AREA 1 3.2090e+06 9.7113e+10 95138
## + URBANICITYHighly.Rural..Rural 1 3.2090e+06 9.7113e+10 95138
## + URBANICITYHighly.Urban..Urban 1 3.2090e+06 9.7113e+10 95138

```

```
## + HOME_AREAHighly.Rural      1 3.2090e+06 9.7113e+10 95138
## + HOME_AREAHighly.Urban      1 3.2090e+06 9.7113e+10 95138
## + WORK_AREARural             1 3.2090e+06 9.7113e+10 95138
## + WORK_AREAUrban             1 3.2090e+06 9.7113e+10 95138
## + JOBStudent                 1 2.9785e+06 9.7113e+10 95138
## + HOME_VAL_sqrt             1 2.8798e+06 9.7113e+10 95138
## + CAR_TYPE SUV              1 2.4684e+06 9.7113e+10 95138
## + EDUCATION.L               1 2.2566e+06 9.7114e+10 95138
## + JOBDoctor                 1 1.9101e+06 9.7114e+10 95138
## + CAR_TYPEMinivan           1 1.8535e+06 9.7114e+10 95138
## + JOBClerical               1 1.1530e+06 9.7115e+10 95138
## + MSTATUS                   1 7.5180e+05 9.7115e+10 95138
## + MSTATUS.No                1 7.5180e+05 9.7115e+10 95138
## + MSTATUS.Yes               1 7.5180e+05 9.7115e+10 95138
## + TRAVTIME                   1 7.4024e+05 9.7115e+10 95138
## + TRAVTIME_yej              1 4.6902e+05 9.7115e+10 95138
## + JOBHome.Maker             1 2.5118e+05 9.7116e+10 95138
## + CAR_TYPESports.Car        1 2.3743e+05 9.7116e+10 95138
## + KIDSDRIV                  1 4.3710e+03 9.7116e+10 95138
## + CAR_TYPEPickup            1 1.2520e+03 9.7116e+10 95138
## + HOMEKIDS                   1 1.2600e+02 9.7116e+10 95138
## + EDUCATION                  3 4.4826e+07 9.7071e+10 95139
## - BLUEBOOK_orderNorm        1 1.0524e+08 9.7221e+10 95140
## - REVOKED                   1 1.1861e+08 9.7235e+10 95141
## + CAR_TYPE                   5 2.4413e+07 9.7092e+10 95144
## + JOB                        6 3.9210e+07 9.7077e+10 95146
## - TARGET_FLAG               1 3.5117e+10 1.3223e+11 96897
```

```
summary(stepwise_model)
```

```
##
## Call:
## lm(formula = TARGET_AMT ~ TARGET_FLAG + PARENT1 + SEX + BLUEBOOK +
##     REVOKED + MVR_PTS + BLUEBOOK_orderNorm + YOJ_orderNorm +
##     JOBProfessional + JOB.1, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -5871    -448     -82     184   100801
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -131.17     89.41  -1.467  0.14241
## TARGET_FLAG     5929.75    130.59  45.408 < 2e-16 ***
## PARENT1Yes       247.02    162.46   1.520  0.12845
## SEXM            163.38    111.95   1.459  0.14450
## BLUEBOOK       -523.40    291.87  -1.793  0.07299 .
## REVOKEDYes     -445.29    168.74  -2.639  0.00834 **
## MVR_PTS          95.68     56.10   1.706  0.08814 .
## BLUEBOOK_orderNorm 722.64    290.71   2.486  0.01296 *
## YOJ_orderNorm   78.06     55.24   1.413  0.15766
## JOBProfessional  234.68    161.95   1.449  0.14736
## JOB.1           446.32    237.62   1.878  0.06039 .
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4127 on 5702 degrees of freedom
## Multiple R-squared:  0.2874, Adjusted R-squared:  0.2862
## F-statistic:    230 on 10 and 5702 DF,  p-value: < 2.2e-16
```

After running a stepwise model to predict crash costs (TARGET\_AMT), the analysis reveals several interesting findings. It appears that the occurrence of a crash (TARGET\_FLAG) significantly increases crash costs, with a coefficient estimate of 5929.75. Surprisingly, having a revoked license in the past seven years (REVOKEDYes) is associated with a significant decrease in crash costs, with a coefficient estimate of -445.29. However, variables such as gender (SEX\_M), the value of the car (BLUEBOOK), and certain job categories (JOBProfessional and JOB1) do not show a significant effect on crash costs. It's worth noting that the adjusted R-squared value is 0.2862, indicating that the predictors, including variables like MVR\_PTS (motor vehicle record points) and BLUEBOOK\_orderNorm (transformed blue book value), explain approximately 28.62% of the variation in crash costs. Overall, this model provides valuable insights into the factors influencing crash costs, although there are some variables that require further investigation to better understand their impact.

Now, we'll compare the predictive performance of our manually selected and stepwise regression models by calculating their RMSE values. This comparison will help us decide which model is better suited for accurately predicting target amounts.

```
# Predict target amounts for the test dataset using the manually selected model
manual_predicted <- predict(manual_model_amt, newdata = test_data)

# Predict target amounts for the test dataset using the stepwise regression model
stepwise_predicted <- predict(stepwise_model, newdata = test_data)

# Calculate RMSE for the manually selected model
manual_rmse <- sqrt(mean((test_data$TARGET_AMT - manual_predicted)^2))

# Calculate RMSE for the stepwise regression model
stepwise_rmse <- sqrt(mean((test_data$TARGET_AMT - stepwise_predicted)^2))

cat("RMSE for manually selected model:", manual_rmse, "\n")
```

```
## RMSE for manually selected model: 4127.205
```

```
cat("RMSE for stepwise regression model:", stepwise_rmse, "\n")
```

```
## RMSE for stepwise regression model: 3565.341
```

The RMSE values show how closely the predictions of the stepwise regression model match the actual target amounts compared to the manually selected model. With an RMSE of 3565.341, the stepwise regression model has a lower error margin than the manually selected model, which has an RMSE of 4127.205. This suggests that the stepwise regression model is more accurate in predicting target amounts on the test dataset.