# Variable Selection:
# Forward Selection / Stepwise SAS Macro

**Purpose**:

The macro performs an automated forward selection and stepwise variable selection process for PROC GENMOD which does not come with model selection options. Note that the GENMOD procedure in SAS versions prior to 9.4 does not come with model selection options.

**Introduction**:

SAS users of SAS 9.2 and prior versions may face situations where some "powerful" options are only available in certain SAS procedures but not available in others. For example, the model selection options are available in PROC REG, LOGISTIC, PHREG, etc., but not in PROC GENMOD, CATMOD, MIXED, etc. This forward/stepwise selection macro could be used with the procedures GENNMOD, CATMOD, MIXED, GLIMMIX, etc.

**Illustration:**

- Dataset used in this code: **claim_history.sas7bdat** or **claim_history.csv**
- The claim_history.sas7bdat dataset comes from the help library of SAS Enterprise-Miner version 7.1
- Data description: **observations 10302**, **Variables 27**

**Variables in Table: CLAIM_HISTORY**

| Variable Number | Name | Type | Format | Label | Length |
|---|---|---|---|---|---|
| 1 | ID | Numeric | BEST | | 8 |
| 2 | KIDSDRIV | Numeric | BEST | | 8 |
| 3 | BIRTH | Numeric | DATE | | 8 |
| 4 | AGE | Numeric | BEST | | 8 |
| 5 | HOMEKIDS | Numeric | BEST | | 8 |
| 6 | YOJ | Numeric | BEST | | 8 |
| 7 | INCOME | Numeric | DOLLAR | | 8 |
| 8 | PARENT1 | Character | $CHAR | | 3 |
| 9 | HOME_VAL | Numeric | DOLLAR | | 8 |
| 10 | MSTATUS | Character | $CHAR | | 4 |
| 11 | GENDER | Character | $CHAR | | 3 |
| 12 | EDUCATION | Character | $CHAR | | 13 |
| 13 | OCCUPATION | Character | $CHAR | | 13 |
| 14 | TRAVTIME | Numeric | BEST | | 8 |
| 15 | CAR_USE | Character | $CHAR | | 10 |
| 16 | BLUEBOOK | Numeric | DOLLAR | | 8 |
| 17 | TIF | Numeric | BEST | | 8 |
| 18 | CAR_TYPE | Character | $CHAR | | 11 |
| 19 | RED_CAR | Character | $CHAR | | 3 |
| 20 | OLDCLAIM | Numeric | DOLLAR | | 8 |
| 21 | CLM_FREQ | Numeric | BEST | | 8 |
| 22 | REVOKED | Character | $CHAR | | 3 |
| 23 | MVR_PTS | Numeric | BEST | | 8 |
| 24 | CLM_AMT | Numeric | DOLLAR | | 8 |
| 25 | CAR_AGE | Numeric | BEST | | 8 |
| 26 | CLAIM_FLAG | Numeric | BEST | | 8 |
| 27 | URBANICITY | Character | $CHAR | | 21 |

Interesting target varaibles could be:

**CLAIM_FLAG** : binary variable 1 if claim occurred and 0 otherwise
**CLM_AMT**: claim amount including 0
**CLM_FRQ**: number of claims takes the values 0, 1, 2, etc
**EXPO**: the exposition, I added this variable, takes the value 1 always

- For a **Binomial** (logistic model) the target should be CLAIM_FLAG
- For a Severity model using **Gamma**, **Inverse Gaussian** or **Log Normal** the target should be CLM_AMT without the cero values
- For a Frequency model using **Poisson** or **Negative Binomial** and the **Zero Inflated Poisson** and **Zero Inflated Negative Binomial**, the target should be CLM_FRQ
- For the Cost of Claim model (or risk premium) it is possible to use the CLM_AMT including the cero values

In this example I perform a stepwise variable selection using the variable CLM_AMT (with ceros) as the target for an Tweedie model.

The next lines contain the two SAS macros for the forward selection/stepwise selection process using a Tweedie error function.

```
*------------------------------------------------------------------------*;
*STEPWISE SELECTON MACRO FOR PROC GENMOD;
*------------------------------------------------------------------------*;

*
The first part of the macro is the construction of all single factor
models and saving their results in a dataset (aggregated), where those
with p-values greater than 0.2 could be easily filtered out
;

************************* MACRO PARAMETERS ******************************;

*Put the name of the modeling dataset:;

%let dataset = GRIDWORK.CLAIM_HISTORY;

*Put here the name of the name of the target varible;

%let target = CLM_AMT;

*Put here the name of all the potential explanatory variables, the
categorical and the coninous:;

%let explanatory =
GENDER
CAR_USE
EDUCATION
CAR_TYPE
MSTATUS
OCCUPATION
RED_CAR
URBANICITY
REVOKED
PARENT1
AGE
BIRTH
BLUEBOOK
```

```
CAR_AGE
HOMEKIDS
HOME_VAL
INCOME
KIDSDRIV
MVR_PTS
TIF
TRAVTIME
YOJ
;

*Put the name of the character variables with commas:;

%let char=
"GENDER"       ,
"CAR_USE"      ,
"EDUCATION"    ,
"CAR_TYPE"     ,
"MSTATUS"      ,
"OCCUPATION"   ,
"RED_CAR"      ,
"URBANICITY"   ,
"REVOKED"      ,
"PARENT1"
;

*Put the name of the character variables with commas:;

%let char_2=
GENDER       ,
CAR_USE      ,
EDUCATION    ,
CAR_TYPE     ,
MSTATUS      ,
OCCUPATION   ,
RED_CAR      ,
URBANICITY   ,
REVOKED      ,
PARENT1
;

*Put the name of the continous variables. Include the target variable also:;

%let interval =
CLM_AMT
AGE
BIRTH
BLUEBOOK
CAR_AGE
HOMEKIDS
HOME_VAL
INCOME
KIDSDRIV
MVR_PTS
TIF
TRAVTIME
YOJ
;

*In order to minimize the number of models that needed to be run, a stepwise
selection model was created, considering susceptible for entry all those
variables with a p-value in a single model less than 0.2, and with a p-value
in the aggregated model of less than 0.25;
```

```
%let single_model=0.2;
%let aggregated_model=0.05;

*Set the power Tweedie distribution parameter;

%let power = 1.5;

************************* END MACRO PARAMETERS ****************************;


/* Creation of the Aggregated Data Set*/


data explanatory;
      set /*tmp1*/
      &dataset
            (keep= &explanatory);
run;

proc contents data = explanatory varnum nodetails noprint
      out=explanatory_names (keep=name);
run;

data explanatory_names;
      set explanatory_names;
      j = _n_;
run;

* Determine the number of observations;
data _NULL_;
      if 0 then
            set explanatory_names nobs=n;
      call symputx('nrows',n);
      stop;
run;

proc datasets lib=RMTWORK nolist;
      delete pva;
run;

*http://support.sas.com/kb/35/591.html;
*http://www.amadeus.co.uk/sas-training/tips/5/1/64/
using-the-in-operator-with-the-macro-language-in-sas-92.php;
ods select none;
*https://support.sas.com/documentation/cdl/en/statug/63347/
HTML/default/viewer.htm#statug_genmod_sect010.htm;
options minoperator mlogic mprint;
%macro agrega / mindelimiter=',';
      %do obs = 1 %to &nrows;

data _null_;
      set explanatory_names;

      if j = &obs then
            call symputx("var", put(name, 30.));
run;

%if %upcase(&var) in(&char_2) %then
      %do;
            ods output Type3=pva&obs (rename=source=parm keep=source ProbChiSq);

            proc genmod data=&dataset NAMELEN=50;
```

```
                  if _resp_ > 0 then
                        d = 2*(_resp_*(_resp_**(1-&power)-_mean_**(1-&power))/
                                 (1-&power)-(_resp_**(2-&power)-_mean_**(2-&power))/
                                 (2-&power));
                  else d = 2* _mean_**(2-&power)/(2-&power);
                  variance var = _mean_**&power;
                  deviance dev = d;
                  class &var;
                  model &target =  &var / link=log type3 scale=pearson;

                  *scwgt expos;
                  title "&var";
            run;

      %end;
%else
      %do;
            ods output Type3=pva&obs (rename=source=parm keep=source ProbChiSq);

            proc genmod data=&dataset NAMELEN=50;
                  if _resp_ > 0 then
                        d = 2*(_resp_*(_resp_**(1-&power)-_mean_**(1-&power))/
                                 (1-&power)-(_resp_**(2-&power)-_mean_**(2-&power))/
                                 (2-&power));
                  else d = 2* _mean_**(2-&power)/(2-&power);
                  variance var = _mean_**&power;
                  deviance dev = d;
                  model &target =  &var / link=log type3 scale=pearson;

                  *scwgt expos;
                  title "&var";
            run;

      %end;

data pva&obs;
      length parm $30;
      set pva&obs;
run;

proc append base=pva data=pva&obs force;
run;

      %end;
%mend agrega;

%agrega;

ods select all;

proc sort data=pva out=aggregate;
      by ProbChiSq;
run;

data elegibles;
      set aggregate;
      where probchisq le &single_model;
run;

proc sort data = elegibles;
      by probchisq;
run;
```

```
data elegibles;
      set elegibles;
      rename parm = source;
run;

title "Aggregate (all potential explanatory variables)";

proc print data=aggregate;
run;

title "Elegibles (individual model threshold = &single_model)";

proc print data=elegibles;
run;
/* STEPWISE PROCESS */

%let i = 1;

proc sql noprint;
      select count(source) into: totalfactor from elegibles;
quit;
* Also, the necessary set of macro variables needed to be initialized
as null, as the variables had to exist in order to be used in the rest
of the code;

%let catvar=;
%let invars=;
%let tempvar=;
%let tempcat=;

*options NOSYNTAXCHECK;/*Use this oiption before the last macro called
ONE only if you are sure that the failure of the macro is due to a lack
of convergence problem*/
options mlogic;

%macro one;
      %do %while (&i le &totalfactor);

data elegibles;
      set elegibles;

      if _n_ = 1 then
            do;
                  call symput('testvar',source);

                  if upcase(source) in (&char) then
                        do;
                              call symput('catvar_t',source);
                        end;
                  else
                        do;
                              call symput('catvar_t','');
                        end;

                  delete;
            end;
run;

title "Step &i";
title2 "Elegibles (aggregated model threshold = &aggregated_model)";
ods output parameterestimates = parms type3 = type3;

proc genmod data=&dataset NAMELEN=50;
```

```
      if _resp_ > 0 then
            d = 2*(_resp_*(_resp_**(1-&power)-_mean_**(1-&power))/
                  (1-&power)-(_resp_**(2-&power)-_mean_**(2-&power))/
                  (2-&power));
      else d = 2* _mean_**(2-&power)/(2-&power);
      variance var = _mean_**&power;
      deviance dev = d;
      class &catvar &catvar_t;
      model &target = &invars &testvar / link=log type3 scale=pearson;

      *scwgt expos;
run;

data stay;
      set type3;

      If source = "&testvar" and probchisq le &aggregated_model then
            do;
                  call symput ('invars',"&tempvar"||" "||strip("&testvar"));
                  call symput ('catvar',"&tempcat"||" "||strip("&catvar_t"));
            end;
      else if source = "&testvar" then
            delete;
run;

%let tempvar = &invars;
%let tempcat = &catvar;
%let i = %eval(&i+1);
      %end;
%mend one;

%one;

title "Selected Variables";
proc print data=stay;
run;


proc datasets lib=RMTWORK KILL nolist;
run;


/*
After the process was finished, the resulting model would need to be run one
more time, as two problems could arise.

First, the last factor considered could be not significant, and so, the model
would need to be rerun to have the pvalues
without that variable.

Also, if the last model did not converge, the model would also need to be
rerun to have the values of the next to last model.
*/
```

In order to minimize the number of models that needed to be run, a stepwise selection model was created, considering susceptible for entry all those variables with a p-value in a single model less than 0.2, and with a p-value in the aggregated model of less.

The execution of the above two macros create three outputs:

- A summary table called **Aggregate** with the all potential variables in a single GLM sorted by its p-values
- A summary table named **Eligible** with those selected variables with a threshold p-value less or equal to 0.2 in the single GLM. Sorted by p-value.
- A summary table with the **selected variables**
- The whole variable selection process step by step

Aggregate table:

**Aggregate (all potential explanatory variables)**

| Obs | parm | ProbChiSq |
|---|---|---|
| 1 | URBANICITY | <.0001 |
| 2 | MVR_PTS | <.0001 |
| 3 | OCCUPATION | <.0001 |
| 4 | CAR_USE | <.0001 |
| 5 | HOME_VAL | <.0001 |
| 6 | PARENT1 | <.0001 |
| 7 | MSTATUS | <.0001 |
| 8 | CAR_TYPE | <.0001 |
| 9 | CAR_AGE | <.0001 |
| 10 | HOMEKIDS | <.0001 |
| 11 | REVOKED | <.0001 |
| 12 | KIDSDRIV | <.0001 |
| 13 | EDUCATION | <.0001 |
| 14 | INCOME | <.0001 |
| 15 | TIF | <.0001 |
| 16 | AGE | <.0001 |
| 17 | BIRTH | <.0001 |
| 18 | TRAVTIME | 0.0013 |
| 19 | YOJ | 0.0100 |
| 20 | RED_CAR | 0.6838 |
| 21 | GENDER | 0.7309 |
| 22 | BLUEBOOK | 0.8052 |

Eligible table:

**Elegibles (individual model threshold = 0.2)**

| Obs | source | ProbChiSq |
|---|---|---|
| 1 | URBANICITY | <.0001 |
| 2 | MVR_PTS | <.0001 |
| 3 | OCCUPATION | <.0001 |
| 4 | CAR_USE | <.0001 |
| 5 | HOME_VAL | <.0001 |
| 6 | PARENT1 | <.0001 |
| 7 | MSTATUS | <.0001 |
| 8 | CAR_TYPE | <.0001 |
| 9 | CAR_AGE | <.0001 |
| 10 | HOMEKIDS | <.0001 |
| 11 | REVOKED | <.0001 |
| 12 | KIDSDRIV | <.0001 |
| 13 | EDUCATION | <.0001 |
| 14 | INCOME | <.0001 |
| 15 | TIF | <.0001 |
| 16 | AGE | <.0001 |
| 17 | BIRTH | <.0001 |
| 18 | TRAVTIME | 0.0013 |
| 19 | YOJ | 0.0100 |

The summary table of the model selection process:

**Selected Variables**

| Obs | Source | NumDF | DenDF | FValue | ProbF | ChiSq | ProbChiSq | Method |
|---|---|---|---|---|---|---|---|---|
| 1 | URBANICITY | 1 | 8074 | 170.93 | <.0001 | 170.93 | <.0001 | LR |
| 2 | MVR_PTS | 1 | 8074 | 18.84 | <.0001 | 18.84 | <.0001 | LR |
| 3 | OCCUPATION | 7 | 8074 | 6.00 | <.0001 | 41.99 | <.0001 | LR |
| 4 | CAR_USE | 1 | 8074 | 14.04 | 0.0002 | 14.04 | 0.0002 | LR |
| 5 | HOME_VAL | 1 | 8074 | 9.41 | 0.0022 | 9.41 | 0.0022 | LR |
| 6 | PARENT1 | 1 | 8074 | 3.24 | 0.0717 | 3.24 | 0.0717 | LR |
| 7 | MSTATUS | 1 | 8074 | 6.41 | 0.0114 | 6.41 | 0.0114 | LR |
| 8 | CAR_TYPE | 5 | 8074 | 7.69 | <.0001 | 38.45 | <.0001 | LR |
| 9 | CAR_AGE | 1 | 8074 | 9.87 | 0.0017 | 9.87 | 0.0017 | LR |
| 10 | REVOKED | 1 | 8074 | 6.62 | 0.0101 | 6.62 | 0.0101 | LR |
| 11 | KIDSDRIV | 1 | 8074 | 10.68 | 0.0011 | 10.68 | 0.0011 | LR |
| 12 | TIF | 1 | 8074 | 11.76 | 0.0006 | 11.76 | 0.0006 | LR |
| 13 | TRAVTIME | 1 | 8074 | 12.24 | 0.0005 | 12.24 | 0.0005 | LR |

The table shows that only 11 of the 22 original potential variables have been selected

The whole variable selection process step by step:

## Step 1

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 10302 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 1E4 | 1613429.4199 | 156.6436 |
| Scaled Deviance | 1E4 | 3551.5750 | 0.3448 |
| Pearson Chi-Square | 1E4 | 4679141.7495 | 454.2856 |
| Scaled Pearson X2 | 1E4 | 10300.0000 | 1.0000 |
| Log Likelihood | | -1775.7875 | |
| Full Log Likelihood | | -1775.7875 | |
| AIC (smaller is better) | | 3555.5750 | |
| AICC (smaller is better) | | 3555.5762 | |
| BIC (smaller is better) | | 3570.0552 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 5.9049 | 0.1070 | 5.6952 | 6.1146 | 3045.82 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.5903 | 0.1129 | 1.3690 | 1.8116 | 198.39 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 21.3140 | 0.0000 | 21.3140 | 21.3140 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 10300 | 205.96 | <.0001 | 205.96 | <.0001 |

## Step 2

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 10302 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 1E4 | 1573273.3031 | 152.7598 |
| Scaled Deviance | 1E4 | 3427.0866 | 0.3328 |
| Pearson Chi-Square | 1E4 | 4727963.8804 | 459.0702 |
| Scaled Pearson X2 | 1E4 | 10299.0000 | 1.0000 |
| Log Likelihood | | -1713.5433 | |
| Full Log Likelihood | | -1713.5433 | |
| AIC (smaller is better) | | 3433.0866 | |
| AICC (smaller is better) | | 3433.0889 | |
| BIC (smaller is better) | | 3454.8069 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 5.7188 | 0.1102 | 5.5028 | 5.9348 | 2692.55 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.4738 | 0.1151 | 1.2482 | 1.6994 | 163.93 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.1348 | 0.0145 | 0.1064 | 0.1631 | 86.85 | <.0001 |
| Scale | | 0 | 21.4259 | 0.0000 | 21.4259 | 21.4259 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 10299 | 168.95 | <.0001 | 168.95 | <.0001 |
| MVR_PTS | 1 | 10299 | 87.47 | <.0001 | 87.47 | <.0001 |

## Step 3

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9637 |
| Missing Values | 665 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9627 | 1398914.4558 | 145.3116 |
| Scaled Deviance | 9627 | 2952.5782 | 0.3067 |
| Pearson Chi-Square | 9627 | 4561216.8767 | 473.7942 |
| Scaled Pearson X2 | 9627 | 9627.0000 | 1.0000 |
| Log Likelihood | | -1476.2891 | |
| Full Log Likelihood | | -1476.2891 | |
| AIC (smaller is better) | | 2972.5782 | |
| AICC (smaller is better) | | 2972.6010 | |
| BIC (smaller is better) | | 3044.3118 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 5.8919 | 0.1295 | 5.6380 | 6.1458 | 2068.47 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6675 | 0.1198 | 1.4326 | 1.9024 | 193.58 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.1165 | 0.0154 | 0.0863 | 0.1468 | 57.11 | <.0001 |
| OCCUPATION | Clerical | 1 | -0.1170 | 0.1134 | -0.3394 | 0.1053 | 1.06 | 0.3023 |
| OCCUPATION | Doctor | 1 | -1.4261 | 0.2610 | -1.9377 | -0.9144 | 29.84 | <.0001 |
| OCCUPATION | Home Maker | 1 | -0.2883 | 0.1471 | -0.5766 | -0.0001 | 3.84 | 0.0499 |
| OCCUPATION | Lawyer | 1 | -0.7308 | 0.1386 | -1.0024 | -0.4592 | 27.81 | <.0001 |
| OCCUPATION | Manager | 1 | -1.2293 | 0.1404 | -1.5044 | -0.9542 | 76.70 | <.0001 |
| OCCUPATION | Professional | 1 | -0.3476 | 0.1178 | -0.5786 | -0.1167 | 8.70 | 0.0032 |
| OCCUPATION | Student | 1 | 0.0770 | 0.1323 | -0.1822 | 0.3363 | 0.34 | 0.5602 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 21.7668 | 0.0000 | 21.7668 | 21.7668 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9627 | 200.02 | <.0001 | 200.02 | <.0001 |
| MVR_PTS | 1 | 9627 | 57.43 | <.0001 | 57.43 | <.0001 |
| OCCUPATION | 7 | 9627 | 17.75 | <.0001 | 124.26 | <.0001 |

## Step 4

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9637 |
| Missing Values | 665 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9626 | 1388137.4213 | 144.2071 |
| Scaled Deviance | 9626 | 2979.3026 | 0.3095 |
| Pearson Chi-Square | 9626 | 4485012.9332 | 465.9270 |
| Scaled Pearson X2 | 9626 | 9626.0000 | 1.0000 |
| Log Likelihood | | -1489.6513 | |
| Full Log Likelihood | | -1489.6513 | |
| AIC (smaller is better) | | 3001.3026 | |
| AICC (smaller is better) | | 3001.3301 | |
| BIC (smaller is better) | | 3080.2096 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 5.5574 | 0.1463 | 5.2707 | 5.8441 | 1443.11 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6691 | 0.1190 | 1.4359 | 1.9023 | 196.75 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.1119 | 0.0154 | 0.0818 | 0.1420 | 53.00 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.1328 | 0.1241 | -0.1105 | 0.3761 | 1.14 | 0.2847 |
| OCCUPATION | Doctor | 1 | -1.0845 | 0.2684 | -1.6106 | -0.5585 | 16.33 | <.0001 |
| OCCUPATION | Home Maker | 1 | 0.0108 | 0.1588 | -0.3005 | 0.3221 | 0.00 | 0.9457 |
| OCCUPATION | Lawyer | 1 | -0.3892 | 0.1547 | -0.6925 | -0.0859 | 6.33 | 0.0119 |
| OCCUPATION | Manager | 1 | -1.0204 | 0.1462 | -1.3069 | -0.7339 | 48.72 | <.0001 |
| OCCUPATION | Professional | 1 | -0.1403 | 0.1248 | -0.3848 | 0.1043 | 1.26 | 0.2609 |
| OCCUPATION | Student | 1 | 0.1660 | 0.1330 | -0.0947 | 0.4266 | 1.56 | 0.2120 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4392 | 0.0914 | 0.2601 | 0.6183 | 23.10 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 21.5853 | 0.0000 | 21.5853 | 21.5853 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9626 | 203.31 | <.0001 | 203.31 | <.0001 |
| MVR_PTS | 1 | 9626 | 53.26 | <.0001 | 53.26 | <.0001 |
| OCCUPATION | 7 | 9626 | 12.76 | <.0001 | 89.29 | <.0001 |
| CAR_USE | 1 | 9626 | 23.13 | <.0001 | 23.13 | <.0001 |

## Step 5

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9111 |
| Missing Values | 1191 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9099 | 1280635.3663 | 140.7446 |
| Scaled Deviance | 9099 | 2642.2852 | 0.2904 |
| Pearson Chi-Square | 9099 | 4410008.8477 | 484.6696 |
| Scaled Pearson X2 | 9099 | 9099.0000 | 1.0000 |
| Log Likelihood | | -1321.1426 | |
| Full Log Likelihood | | -1321.1426 | |
| AIC (smaller is better) | | 2666.2852 | |
| AICC (smaller is better) | | 2666.3195 | |
| BIC (smaller is better) | | 2751.6921 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 5.9043 | 0.1616 | 5.5875 | 6.2211 | 1334.68 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6781 | 0.1253 | 1.4325 | 1.9237 | 179.35 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0972 | 0.0163 | 0.0652 | 0.1292 | 35.49 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0213 | 0.1315 | -0.2365 | 0.2790 | 0.03 | 0.8716 |
| OCCUPATION | Doctor | 1 | -0.8856 | 0.2859 | -1.4460 | -0.3252 | 9.59 | 0.0020 |
| OCCUPATION | Home Maker | 1 | -0.1249 | 0.1678 | -0.4538 | 0.2040 | 0.55 | 0.4566 |
| OCCUPATION | Lawyer | 1 | -0.3120 | 0.1641 | -0.6335 | 0.0096 | 3.62 | 0.0572 |
| OCCUPATION | Manager | 1 | -0.9565 | 0.1563 | -1.2628 | -0.6502 | 37.47 | <.0001 |
| OCCUPATION | Professional | 1 | -0.0310 | 0.1317 | -0.2892 | 0.2272 | 0.06 | 0.8141 |
| OCCUPATION | Student | 1 | -0.1829 | 0.1482 | -0.4733 | 0.1076 | 1.52 | 0.2172 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4709 | 0.0968 | 0.2812 | 0.6605 | 23.68 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 43.51 | <.0001 |
| Scale | | 0 | 22.0152 | 0.0000 | 22.0152 | 22.0152 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9099 | 185.27 | <.0001 | 185.27 | <.0001 |
| MVR_PTS | 1 | 9099 | 35.62 | <.0001 | 35.62 | <.0001 |
| OCCUPATION | 7 | 9099 | 7.77 | <.0001 | 54.39 | <.0001 |
| CAR_USE | 1 | 9099 | 23.71 | <.0001 | 23.71 | <.0001 |
| HOME_VAL | 1 | 9099 | 43.58 | <.0001 | 43.58 | <.0001 |

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9111 |
| Missing Values | 1191 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9098 | 1271436.3868 | 139.7490 |
| Scaled Deviance | 9098 | 2537.8085 | 0.2789 |
| Pearson Chi-Square | 9098 | 4558077.5850 | 500.9978 |
| Scaled Pearson X2 | 9098 | 9098.0000 | 1.0000 |
| Log Likelihood | | -1268.9043 | |
| Full Log Likelihood | | -1268.9043 | |
| AIC (smaller is better) | | 2563.8085 | |
| AICC (smaller is better) | | 2563.8486 | |
| BIC (smaller is better) | | 2656.3326 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.2226 | 0.1805 | 5.8689 | 6.5764 | 1188.41 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6776 | 0.1274 | 1.4278 | 1.9274 | 173.26 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0938 | 0.0166 | 0.0611 | 0.1264 | 31.73 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0174 | 0.1339 | -0.2449 | 0.2798 | 0.02 | 0.8963 |
| OCCUPATION | Doctor | 1 | -0.9029 | 0.2929 | -1.4769 | -0.3289 | 9.51 | 0.0020 |
| OCCUPATION | Home Maker | 1 | -0.0906 | 0.1711 | -0.4259 | 0.2448 | 0.28 | 0.5966 |
| OCCUPATION | Lawyer | 1 | -0.3145 | 0.1674 | -0.6426 | 0.0135 | 3.53 | 0.0602 |
| OCCUPATION | Manager | 1 | -0.9720 | 0.1595 | -1.2847 | -0.6594 | 37.13 | <.0001 |
| OCCUPATION | Professional | 1 | -0.0391 | 0.1342 | -0.3021 | 0.2240 | 0.08 | 0.7708 |
| OCCUPATION | Student | 1 | -0.1332 | 0.1509 | -0.4290 | 0.1625 | 0.78 | 0.3773 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4720 | 0.0986 | 0.2789 | 0.6652 | 22.93 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 25.44 | <.0001 |
| PARENT1 | No | 1 | -0.4569 | 0.1068 | -0.6661 | -0.2476 | 18.31 | <.0001 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 22.3830 | 0.0000 | 22.3830 | 22.3830 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9098 | 178.96 | <.0001 | 178.96 | <.0001 |
| MVR_PTS | 1 | 9098 | 31.84 | <.0001 | 31.84 | <.0001 |
| OCCUPATION | 7 | 9098 | 7.61 | <.0001 | 53.24 | <.0001 |
| CAR_USE | 1 | 9098 | 22.97 | <.0001 | 22.97 | <.0001 |
| HOME_VAL | 1 | 9098 | 25.46 | <.0001 | 25.46 | <.0001 |
| PARENT1 | 1 | 9098 | 18.36 | <.0001 | 18.36 | <.0001 |

# Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9111 |
| Missing Values | 1191 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9097 | 1269212.8983 | 139.5199 |
| Scaled Deviance | 9097 | 2575.3461 | 0.2831 |
| Pearson Chi-Square | 9097 | 4483292.5344 | 492.8320 |
| Scaled Pearson X2 | 9097 | 9097.0000 | 1.0000 |
| Log Likelihood | | -1287.6730 | |
| Full Log Likelihood | | -1287.6730 | |
| AIC (smaller is better) | | 2603.3461 | |
| AICC (smaller is better) | | 2603.3922 | |
| BIC (smaller is better) | | 2702.9874 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.1796 | 0.1805 | 5.8259 | 6.5333 | 1172.63 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6891 | 0.1268 | 1.4406 | 1.9376 | 177.46 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0942 | 0.0165 | 0.0618 | 0.1265 | 32.51 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0426 | 0.1333 | -0.2188 | 0.3039 | 0.10 | 0.7495 |
| OCCUPATION | Doctor | 1 | -0.9802 | 0.2932 | -1.5548 | -0.4055 | 11.18 | 0.0008 |
| OCCUPATION | Home Maker | 1 | -0.0637 | 0.1703 | -0.3974 | 0.2700 | 0.14 | 0.7084 |
| OCCUPATION | Lawyer | 1 | -0.3462 | 0.1667 | -0.6730 | -0.0195 | 4.31 | 0.0378 |
| OCCUPATION | Manager | 1 | -0.9954 | 0.1587 | -1.3065 | -0.6844 | 39.35 | <.0001 |
| OCCUPATION | Professional | 1 | -0.0518 | 0.1333 | -0.3130 | 0.2094 | 0.15 | 0.6976 |
| OCCUPATION | Student | 1 | -0.0526 | 0.1544 | -0.3551 | 0.2500 | 0.12 | 0.7334 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4581 | 0.0980 | 0.2661 | 0.6502 | 21.87 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 11.70 | 0.0006 |
| PARENT1 | No | 1 | -0.3444 | 0.1184 | -0.5765 | -0.1123 | 8.46 | 0.0036 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2221 | 0.1046 | -0.4271 | -0.0171 | 4.51 | 0.0337 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 22.1998 | 0.0000 | 22.1998 | 22.1998 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9097 | 183.54 | <.0001 | 183.54 | <.0001 |
| MVR_PTS | 1 | 9097 | 32.62 | <.0001 | 32.62 | <.0001 |
| OCCUPATION | 7 | 9097 | 8.21 | <.0001 | 57.48 | <.0001 |
| CAR_USE | 1 | 9097 | 21.90 | <.0001 | 21.90 | <.0001 |
| HOME_VAL | 1 | 9097 | 11.70 | 0.0006 | 11.70 | 0.0006 |
| PARENT1 | 1 | 9097 | 8.47 | 0.0036 | 8.47 | 0.0036 |
| MSTATUS | 1 | 9097 | 4.51 | 0.0337 | 4.51 | 0.0337 |

## Step 8

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 9111 |
| Missing Values | 1191 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 9092 | 1250647.9003 | 137.5548 |
| Scaled Deviance | 9092 | 2755.6968 | 0.3031 |
| Pearson Chi-Square | 9092 | 4126321.4719 | 453.8409 |
| Scaled Pearson X2 | 9092 | 9092.0000 | 1.0000 |
| Log Likelihood | | -1377.8484 | |
| Full Log Likelihood | | -1377.8484 | |
| AIC (smaller is better) | | 2793.6968 | |
| AICC (smaller is better) | | 2793.7804 | |
| BIC (smaller is better) | | 2928.9243 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.3385 | 0.1820 | 5.9817 | 6.6952 | 1212.83 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7214 | 0.1227 | 1.4809 | 1.9620 | 196.68 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0881 | 0.0159 | 0.0569 | 0.1194 | 30.60 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0219 | 0.1314 | -0.2357 | 0.2795 | 0.03 | 0.8676 |
| OCCUPATION | Doctor | 1 | -1.0450 | 0.2865 | -1.6064 | -0.4835 | 13.31 | 0.0003 |
| OCCUPATION | Home Maker | 1 | -0.1978 | 0.1664 | -0.5240 | 0.1284 | 1.41 | 0.2346 |
| OCCUPATION | Lawyer | 1 | -0.3595 | 0.1626 | -0.6782 | -0.0408 | 4.89 | 0.0271 |
| OCCUPATION | Manager | 1 | -1.0248 | 0.1570 | -1.3325 | -0.7172 | 42.62 | <.0001 |
| OCCUPATION | Professional | 1 | -0.0960 | 0.1339 | -0.3584 | 0.1663 | 0.51 | 0.4732 |
| OCCUPATION | Student | 1 | -0.0452 | 0.1483 | -0.3360 | 0.2455 | 0.09 | 0.7603 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4213 | 0.1113 | 0.2033 | 0.6394 | 14.34 | 0.0002 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 13.24 | 0.0003 |
| PARENT1 | No | 1 | -0.3567 | 0.1144 | -0.5809 | -0.1326 | 9.73 | 0.0018 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2109 | 0.1013 | -0.4093 | -0.0124 | 4.34 | 0.0373 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5472 | 0.1066 | -0.7561 | -0.3383 | 26.36 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0185 | 0.1829 | -0.3769 | 0.3399 | 0.01 | 0.9195 |
| CAR_TYPE | Pickup | 1 | -0.1834 | 0.1207 | -0.4199 | 0.0531 | 2.31 | 0.1286 |
| CAR_TYPE | Sports Car | 1 | 0.1396 | 0.1222 | -0.1000 | 0.3792 | 1.30 | 0.2534 |
| CAR_TYPE | Van | 1 | 0.1037 | 0.1505 | -0.1913 | 0.3986 | 0.47 | 0.4910 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 21.3035 | 0.0000 | 21.3035 | 21.3035 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 9092 | 204.09 | <.0001 | 204.09 | <.0001 |
| MVR_PTS | 1 | 9092 | 30.68 | <.0001 | 30.68 | <.0001 |
| OCCUPATION | 7 | 9092 | 8.90 | <.0001 | 62.30 | <.0001 |
| CAR_USE | 1 | 9092 | 14.36 | 0.0002 | 14.36 | 0.0002 |
| HOME_VAL | 1 | 9092 | 13.25 | 0.0003 | 13.25 | 0.0003 |
| PARENT1 | 1 | 9092 | 9.74 | 0.0018 | 9.74 | 0.0018 |
| MSTATUS | 1 | 9092 | 4.34 | 0.0373 | 4.34 | 0.0373 |
| CAR_TYPE | 5 | 9092 | 8.18 | <.0001 | 40.91 | <.0001 |

## Step 9

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8540 | 1171380.0237 | 137.1639 |
| Scaled Deviance | 8540 | 2723.1087 | 0.3189 |
| Pearson Chi-Square | 8540 | 3673590.1903 | 430.1628 |
| Scaled Pearson X2 | 8540 | 8540.0000 | 1.0000 |
| Log Likelihood | | -1361.5543 | |
| Full Log Likelihood | | -1361.5543 | |
| AIC (smaller is better) | | 2763.1087 | |
| AICC (smaller is better) | | 2763.2071 | |
| BIC (smaller is better) | | 2904.2058 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.4537 | 0.1865 | 6.0882 6.8191 | 1198.00 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7273 | 0.1232 | 1.4857 1.9688 | 196.41 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0854 | 0.0160 | 0.0541 0.1168 | 28.53 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0546 | 0.1313 | -0.2028 0.3121 | 0.17 | 0.6775 |
| OCCUPATION | Doctor | 1 | -0.8272 | 0.2997 | -1.4146 -0.2398 | 7.62 | 0.0058 |
| OCCUPATION | Home Maker | 1 | -0.0914 | 0.1698 | -0.4242 0.2414 | 0.29 | 0.5904 |
| OCCUPATION | Lawyer | 1 | -0.1452 | 0.1824 | -0.5027 0.2123 | 0.63 | 0.4260 |
| OCCUPATION | Manager | 1 | -0.9272 | 0.1656 | -1.2518 -0.6026 | 31.34 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0151 | 0.1368 | -0.2530 0.2832 | 0.01 | 0.9118 |
| OCCUPATION | Student | 1 | -0.0540 | 0.1502 | -0.3483 0.2404 | 0.13 | 0.7194 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4552 | 0.1121 | 0.2356 0.6748 | 16.50 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 -0.0000 | 13.05 | 0.0003 |
| PARENT1 | No | 1 | -0.3611 | 0.1152 | -0.5870 -0.1353 | 9.82 | 0.0017 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2016 | 0.1026 | -0.4027 -0.0005 | 3.86 | 0.0494 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5567 | 0.1072 | -0.7668 -0.3466 | 26.97 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0016 | 0.1833 | -0.3576 0.3608 | 0.00 | 0.9930 |
| CAR_TYPE | Pickup | 1 | -0.2320 | 0.1217 | -0.4705 0.0064 | 3.64 | 0.0565 |
| CAR_TYPE | Sports Car | 1 | 0.1175 | 0.1230 | -0.1236 0.3585 | 0.91 | 0.3394 |
| CAR_TYPE | Van | 1 | 0.0967 | 0.1513 | -0.1999 0.3933 | 0.41 | 0.5229 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0254 | 0.0084 | -0.0419 -0.0089 | 9.14 | 0.0025 |
| Scale | | 0 | 20.7404 | 0.0000 | 20.7404 20.7404 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8540 | 203.81 | <.0001 | 203.81 | <.0001 |
| MVR_PTS | 1 | 8540 | 28.61 | <.0001 | 28.61 | <.0001 |
| OCCUPATION | 7 | 8540 | 6.94 | <.0001 | 48.59 | <.0001 |
| CAR_USE | 1 | 8540 | 16.52 | <.0001 | 16.52 | <.0001 |
| HOME_VAL | 1 | 8540 | 13.06 | 0.0003 | 13.06 | 0.0003 |
| PARENT1 | 1 | 8540 | 9.83 | 0.0017 | 9.83 | 0.0017 |
| MSTATUS | 1 | 8540 | 3.86 | 0.0494 | 3.86 | 0.0493 |
| CAR_TYPE | 5 | 8540 | 8.28 | <.0001 | 41.39 | <.0001 |
| CAR_AGE | 1 | 8540 | 9.15 | 0.0025 | 9.15 | 0.0025 |

## Step 10

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8539 | 1169859.5143 | 137.0019 |
| Scaled Deviance | 8539 | 2700.5465 | 0.3163 |
| Pearson Chi-Square | 8539 | 3699040.3866 | 433.1936 |
| Scaled Pearson X2 | 8539 | 8539.0000 | 1.0000 |
| Log Likelihood | | -1350.2732 | |
| Full Log Likelihood | | -1350.2732 | |
| AIC (smaller is better) | | 2742.5465 | |
| AICC (smaller is better) | | 2742.6547 | |
| BIC (smaller is better) | | 2890.6984 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.2966 | 0.2050 | 5.8949 | 6.6983 | 943.71 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7266 | 0.1236 | 1.4843 | 1.9689 | 195.05 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0846 | 0.0161 | 0.0531 | 0.1160 | 27.76 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0454 | 0.1318 | -0.2130 | 0.3038 | 0.12 | 0.7308 |
| OCCUPATION | Doctor | 1 | -0.8156 | 0.3011 | -1.4058 | -0.2254 | 7.34 | 0.0068 |
| OCCUPATION | Home Maker | 1 | -0.0936 | 0.1705 | -0.4278 | 0.2406 | 0.30 | 0.5830 |
| OCCUPATION | Lawyer | 1 | -0.1325 | 0.1833 | -0.4918 | 0.2267 | 0.52 | 0.4697 |
| OCCUPATION | Manager | 1 | -0.9194 | 0.1664 | -1.2456 | -0.5933 | 30.52 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0255 | 0.1374 | -0.2437 | 0.2948 | 0.03 | 0.8526 |
| OCCUPATION | Student | 1 | -0.0709 | 0.1509 | -0.3667 | 0.2248 | 0.22 | 0.6384 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4570 | 0.1124 | 0.2367 | 0.6773 | 16.53 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.33 | 0.0004 |
| PARENT1 | No | 1 | -0.2159 | 0.1392 | -0.4887 | 0.0570 | 2.40 | 0.1210 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2725 | 0.1097 | -0.4876 | -0.0575 | 6.17 | 0.0130 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5493 | 0.1077 | -0.7604 | -0.3383 | 26.02 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0077 | 0.1842 | -0.3533 | 0.3687 | 0.00 | 0.9665 |
| CAR_TYPE | Pickup | 1 | -0.2194 | 0.1223 | -0.4591 | 0.0203 | 3.22 | 0.0728 |
| CAR_TYPE | Sports Car | 1 | 0.1250 | 0.1235 | -0.1170 | 0.3670 | 1.02 | 0.3114 |
| CAR_TYPE | Van | 1 | 0.1101 | 0.1520 | -0.1879 | 0.4080 | 0.52 | 0.4691 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0251 | 0.0085 | -0.0417 | -0.0086 | 8.85 | 0.0029 |
| HOMEKIDS | | 1 | 0.0761 | 0.0406 | -0.0035 | 0.1556 | 3.51 | 0.0609 |
| Scale | | 0 | 20.8133 | 0.0000 | 20.8133 | 20.8133 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8539 | 202.38 | <.0001 | 202.38 | <.0001 |
| MVR_PTS | 1 | 8539 | 27.84 | <.0001 | 27.84 | <.0001 |
| OCCUPATION | 7 | 8539 | 6.80 | <.0001 | 47.58 | <.0001 |
| CAR_USE | 1 | 8539 | 16.55 | <.0001 | 16.55 | <.0001 |
| HOME_VAL | 1 | 8539 | 12.33 | 0.0004 | 12.33 | 0.0004 |
| PARENT1 | 1 | 8539 | 2.41 | 0.1209 | 2.41 | 0.1209 |
| MSTATUS | 1 | 8539 | 6.17 | 0.0130 | 6.17 | 0.0130 |
| CAR_TYPE | 5 | 8539 | 8.14 | <.0001 | 40.69 | <.0001 |
| CAR_AGE | 1 | 8539 | 8.86 | 0.0029 | 8.86 | 0.0029 |
| HOMEKIDS | 1 | 8539 | 3.51 | 0.0610 | 3.51 | 0.0610 |

## Step 11

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8539 | 1167908.8323 | 136.7735 |
| Scaled Deviance | 8539 | 2675.7033 | 0.3134 |
| Pearson Chi-Square | 8539 | 3727159.6595 | 436.4867 |
| Scaled Pearson X2 | 8539 | 8539.0000 | 1.0000 |
| Log Likelihood | | -1337.8517 | |
| Full Log Likelihood | | -1337.8517 | |
| AIC (smaller is better) | | 2717.7033 | |
| AICC (smaller is better) | | 2717.8116 | |
| BIC (smaller is better) | | 2865.8553 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.7029 | 0.2077 | 6.2957 | 7.1100 | 1041.07 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7095 | 0.1246 | 1.4652 | 1.9538 | 188.11 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0851 | 0.0161 | 0.0535 | 0.1167 | 27.83 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0483 | 0.1325 | -0.2114 | 0.3080 | 0.13 | 0.7154 |
| OCCUPATION | Doctor | 1 | -0.8229 | 0.3024 | -1.4156 | -0.2303 | 7.41 | 0.0065 |
| OCCUPATION | Home Maker | 1 | -0.0854 | 0.1712 | -0.4210 | 0.2502 | 0.25 | 0.6178 |
| OCCUPATION | Lawyer | 1 | -0.1540 | 0.1839 | -0.5145 | 0.2065 | 0.70 | 0.4025 |
| OCCUPATION | Manager | 1 | -0.9159 | 0.1669 | -1.2431 | -0.5887 | 30.11 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0136 | 0.1378 | -0.2565 | 0.2836 | 0.01 | 0.9215 |
| OCCUPATION | Student | 1 | -0.0603 | 0.1515 | -0.3572 | 0.2366 | 0.16 | 0.6907 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4478 | 0.1130 | 0.2263 | 0.6693 | 15.70 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.37 | 0.0004 |
| PARENT1 | No | 1 | -0.3493 | 0.1162 | -0.5770 | -0.1216 | 9.04 | 0.0026 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2048 | 0.1034 | -0.4075 | -0.0022 | 3.92 | 0.0476 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5433 | 0.1081 | -0.7552 | -0.3314 | 25.26 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0114 | 0.1850 | -0.3512 | 0.3740 | 0.00 | 0.9507 |
| CAR_TYPE | Pickup | 1 | -0.2316 | 0.1227 | -0.4721 | 0.0089 | 3.56 | 0.0591 |
| CAR_TYPE | Sports Car | 1 | 0.1158 | 0.1241 | -0.1273 | 0.3590 | 0.87 | 0.3505 |
| CAR_TYPE | Van | 1 | 0.1128 | 0.1525 | -0.1860 | 0.4116 | 0.55 | 0.4594 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0249 | 0.0085 | -0.0416 | -0.0083 | 8.62 | 0.0033 |
| REVOKED | No | 1 | -0.2959 | 0.1050 | -0.5017 | -0.0902 | 7.95 | 0.0048 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 20.8923 | 0.0000 | 20.8923 | 20.8923 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8539 | 194.81 | <.0001 | 194.81 | <.0001 |
| MVR_PTS | 1 | 8539 | 27.91 | <.0001 | 27.91 | <.0001 |
| OCCUPATION | 7 | 8539 | 6.63 | <.0001 | 46.43 | <.0001 |
| CAR_USE | 1 | 8539 | 15.72 | <.0001 | 15.72 | <.0001 |
| HOME_VAL | 1 | 8539 | 12.38 | 0.0004 | 12.38 | 0.0004 |
| PARENT1 | 1 | 8539 | 9.05 | 0.0026 | 9.05 | 0.0026 |
| MSTATUS | 1 | 8539 | 3.93 | 0.0476 | 3.93 | 0.0475 |
| CAR_TYPE | 5 | 8539 | 7.92 | <.0001 | 39.62 | <.0001 |
| CAR_AGE | 1 | 8539 | 8.64 | 0.0033 | 8.64 | 0.0033 |
| REVOKED | 1 | 8539 | 7.95 | 0.0048 | 7.95 | 0.0048 |

## Step 12

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8538 | 1161980.0008 | 136.0951 |
| Scaled Deviance | 8538 | 2657.3695 | 0.3112 |
| Pearson Chi-Square | 8538 | 3733385.6205 | 437.2670 |
| Scaled Pearson X2 | 8538 | 8538.0000 | 1.0000 |
| Log Likelihood | | -1328.6848 | |
| Full Log Likelihood | | -1328.6848 | |
| AIC (smaller is better) | | 2701.3695 | |
| AICC (smaller is better) | | 2701.4881 | |
| BIC (smaller is better) | | 2856.5764 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.5659 | 0.2112 | 6.1520 | 6.9799 | 966.37 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7115 | 0.1244 | 1.4676 | 1.9554 | 189.15 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0827 | 0.0162 | 0.0510 | 0.1144 | 26.21 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0681 | 0.1326 | -0.1917 | 0.3280 | 0.26 | 0.6074 |
| OCCUPATION | Doctor | 1 | -0.8034 | 0.3040 | -1.3993 | -0.2076 | 6.98 | 0.0082 |
| OCCUPATION | Home Maker | 1 | -0.0638 | 0.1714 | -0.3997 | 0.2721 | 0.14 | 0.7097 |
| OCCUPATION | Lawyer | 1 | -0.1362 | 0.1845 | -0.4978 | 0.2254 | 0.55 | 0.4602 |
| OCCUPATION | Manager | 1 | -0.9326 | 0.1681 | -1.2620 | -0.6032 | 30.79 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0195 | 0.1382 | -0.2513 | 0.2903 | 0.02 | 0.8879 |
| OCCUPATION | Student | 1 | -0.0432 | 0.1517 | -0.3405 | 0.2541 | 0.08 | 0.7757 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4716 | 0.1133 | 0.2496 | 0.6937 | 17.32 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.63 | 0.0004 |
| PARENT1 | No | 1 | -0.2336 | 0.1205 | -0.4699 | 0.0026 | 3.76 | 0.0525 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2656 | 0.1049 | -0.4711 | -0.0601 | 6.42 | 0.0113 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5518 | 0.1085 | -0.7644 | -0.3391 | 25.86 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0041 | 0.1854 | -0.3593 | 0.3675 | 0.00 | 0.9825 |
| CAR_TYPE | Pickup | 1 | -0.2322 | 0.1229 | -0.4730 | 0.0086 | 3.57 | 0.0588 |
| CAR_TYPE | Sports Car | 1 | 0.1285 | 0.1243 | -0.1151 | 0.3721 | 1.07 | 0.3012 |
| CAR_TYPE | Van | 1 | 0.1253 | 0.1527 | -0.1739 | 0.4246 | 0.67 | 0.4117 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0253 | 0.0085 | -0.0420 | -0.0086 | 8.81 | 0.0030 |
| REVOKED | No | 1 | -0.2855 | 0.1052 | -0.4917 | -0.0793 | 7.37 | 0.0066 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2562 | 0.0696 | 0.1198 | 0.3925 | 13.56 | 0.0002 |
| Scale | | 0 | 20.9109 | 0.0000 | 20.9109 | 20.9109 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8538 | 195.78 | <.0001 | 195.78 | <.0001 |
| MVR_PTS | 1 | 8538 | 26.28 | <.0001 | 26.28 | <.0001 |
| OCCUPATION | 7 | 8538 | 6.84 | <.0001 | 47.90 | <.0001 |
| CAR_USE | 1 | 8538 | 17.35 | <.0001 | 17.35 | <.0001 |
| HOME_VAL | 1 | 8538 | 12.64 | 0.0004 | 12.64 | 0.0004 |
| PARENT1 | 1 | 8538 | 3.76 | 0.0525 | 3.76 | 0.0525 |
| MSTATUS | 1 | 8538 | 6.42 | 0.0113 | 6.42 | 0.0113 |
| CAR_TYPE | 5 | 8538 | 8.25 | <.0001 | 41.23 | <.0001 |
| CAR_AGE | 1 | 8538 | 8.83 | 0.0030 | 8.83 | 0.0030 |
| REVOKED | 1 | 8538 | 7.37 | 0.0066 | 7.37 | 0.0066 |
| KIDSDRIV | 1 | 8538 | 13.56 | 0.0002 | 13.56 | 0.0002 |

## Step 13

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |
| EDUCATION | 5 | <High School Bachelors Masters PhD z_High School |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8534 | 1160175.7862 | 135.9475 |
| Scaled Deviance | 8534 | 2630.2339 | 0.3082 |
| Pearson Chi-Square | 8534 | 3764281.3201 | 441.0923 |
| Scaled Pearson X2 | 8534 | 8534.0000 | 1.0000 |
| Log Likelihood | | -1315.1169 | |
| Full Log Likelihood | | -1315.1169 | |
| AIC (smaller is better) | | 2682.2339 | |
| AICC (smaller is better) | | 2682.3984 | |
| BIC (smaller is better) | | 2865.6601 | |

Algorithm converged.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Intercept | | 1 | 6.5511 | 0.2217 | 6.1166 | 6.9856 | 873.30 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7073 | 0.1250 | 1.4623 | 1.9523 | 186.58 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0828 | 0.0162 | 0.0510 | 0.1147 | 26.00 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0671 | 0.1336 | -0.1947 | 0.3290 | 0.25 | 0.6153 |
| OCCUPATION | Doctor | 1 | -1.1161 | 0.3844 | -1.8696 | -0.3626 | 8.43 | 0.0037 |
| OCCUPATION | Home Maker | 1 | -0.0701 | 0.1797 | -0.4222 | 0.2821 | 0.15 | 0.6965 |
| OCCUPATION | Lawyer | 1 | -0.1409 | 0.2475 | -0.6260 | 0.3442 | 0.32 | 0.5692 |
| OCCUPATION | Manager | 1 | -0.9313 | 0.1891 | -1.3018 | -0.5607 | 24.26 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0838 | 0.1517 | -0.2135 | 0.3812 | 0.31 | 0.5806 |
| OCCUPATION | Student | 1 | -0.0534 | 0.1528 | -0.3529 | 0.2462 | 0.12 | 0.7270 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.5065 | 0.1196 | 0.2721 | 0.7409 | 17.93 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.47 | 0.0004 |
| PARENT1 | No | 1 | -0.2390 | 0.1213 | -0.4767 | -0.0012 | 3.88 | 0.0489 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2652 | 0.1062 | -0.4733 | -0.0571 | 6.24 | 0.0125 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5530 | 0.1092 | -0.7670 | -0.3391 | 25.67 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0403 | 0.1892 | -0.4110 | 0.3305 | 0.05 | 0.8315 |
| CAR_TYPE | Pickup | 1 | -0.2497 | 0.1244 | -0.4935 | -0.0058 | 4.03 | 0.0448 |
| CAR_TYPE | Sports Car | 1 | 0.1226 | 0.1250 | -0.1225 | 0.3676 | 0.96 | 0.3268 |
| CAR_TYPE | Van | 1 | 0.1223 | 0.1540 | -0.1794 | 0.4241 | 0.63 | 0.4269 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0240 | 0.0101 | -0.0437 | -0.0043 | 5.68 | 0.0171 |
| REVOKED | No | 1 | -0.2857 | 0.1057 | -0.4930 | -0.0785 | 7.30 | 0.0069 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2550 | 0.0699 | 0.1179 | 0.3920 | 13.29 | 0.0003 |
| EDUCATION | <High School | 1 | 0.0873 | 0.1192 | -0.1463 | 0.3210 | 0.54 | 0.4639 |
| EDUCATION | Bachelors | 1 | -0.0769 | 0.1154 | -0.3030 | 0.1492 | 0.44 | 0.5048 |
| EDUCATION | Masters | 1 | -0.0261 | 0.2172 | -0.4518 | 0.3996 | 0.01 | 0.9042 |
| EDUCATION | PhD | 1 | 0.3263 | 0.2708 | -0.2043 | 0.8570 | 1.45 | 0.2281 |
| EDUCATION | z_High School | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| Scale | | 0 | 21.0022 | 0.0000 | 21.0022 | 21.0022 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8534 | 193.19 | <.0001 | 193.19 | <.0001 |
| MVR_PTS | 1 | 8534 | 26.07 | <.0001 | 26.07 | <.0001 |
| OCCUPATION | 7 | 8534 | 6.61 | <.0001 | 46.25 | <.0001 |
| CAR_USE | 1 | 8534 | 17.96 | <.0001 | 17.96 | <.0001 |
| HOME_VAL | 1 | 8534 | 12.48 | 0.0004 | 12.48 | 0.0004 |
| PARENT1 | 1 | 8534 | 3.88 | 0.0489 | 3.88 | 0.0488 |
| MSTATUS | 1 | 8534 | 6.24 | 0.0125 | 6.24 | 0.0125 |
| CAR_TYPE | 5 | 8534 | 8.12 | <.0001 | 40.58 | <.0001 |
| CAR_AGE | 1 | 8534 | 5.69 | 0.0171 | 5.69 | 0.0171 |
| REVOKED | 1 | 8534 | 7.31 | 0.0069 | 7.31 | 0.0069 |
| KIDSDRIV | 1 | 8534 | 13.28 | 0.0003 | 13.28 | 0.0003 |
| EDUCATION | 4 | 8534 | 1.02 | 0.3940 | 4.09 | 0.3939 |

## Step 14

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8096 |
| Missing Values | 2206 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8073 | 1098510.1625 | 136.0721 |
| Scaled Deviance | 8073 | 2544.3107 | 0.3152 |
| Pearson Chi-Square | 8073 | 3485530.5188 | 431.7516 |
| Scaled Pearson X2 | 8073 | 8073.0000 | 1.0000 |
| Log Likelihood | | -1272.1553 | |
| Full Log Likelihood | | -1272.1553 | |
| AIC (smaller is better) | | 2590.3107 | |
| AICC (smaller is better) | | 2590.4475 | |
| BIC (smaller is better) | | 2751.2906 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.7365 | 0.2225 | 6.3004 | 7.1727 | 916.41 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.6651 | 0.1268 | 1.4166 | 1.9136 | 172.42 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0818 | 0.0163 | 0.0497 | 0.1138 | 25.03 | <.0001 |
| OCCUPATION | Clerical | 1 | -0.0024 | 0.1378 | -0.2725 | 0.2677 | 0.00 | 0.9859 |
| OCCUPATION | Doctor | 1 | -0.6459 | 0.3174 | -1.2679 | -0.0238 | 4.14 | 0.0418 |
| OCCUPATION | Home Maker | 1 | -0.1417 | 0.1825 | -0.4993 | 0.2159 | 0.60 | 0.4375 |
| OCCUPATION | Lawyer | 1 | -0.0730 | 0.1907 | -0.4468 | 0.3008 | 0.15 | 0.7019 |
| OCCUPATION | Manager | 1 | -0.8442 | 0.1739 | -1.1850 | -0.5034 | 23.58 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0649 | 0.1425 | -0.2144 | 0.3442 | 0.21 | 0.6488 |
| OCCUPATION | Student | 1 | -0.1429 | 0.1623 | -0.4610 | 0.1751 | 0.78 | 0.3784 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4766 | 0.1160 | 0.2491 | 0.7040 | 16.87 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 6.16 | 0.0130 |
| PARENT1 | No | 1 | -0.2237 | 0.1221 | -0.4630 | 0.0155 | 3.36 | 0.0669 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.3308 | 0.1107 | -0.5477 | -0.1139 | 8.94 | 0.0028 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.6157 | 0.1112 | -0.8337 | -0.3978 | 30.65 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0168 | 0.1880 | -0.3517 | 0.3852 | 0.01 | 0.9289 |
| CAR_TYPE | Pickup | 1 | -0.2371 | 0.1249 | -0.4820 | 0.0077 | 3.60 | 0.0577 |
| CAR_TYPE | Sports Car | 1 | 0.1139 | 0.1266 | -0.1342 | 0.3621 | 0.81 | 0.3682 |
| CAR_TYPE | Van | 1 | 0.0991 | 0.1572 | -0.2091 | 0.4073 | 0.40 | 0.5285 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0240 | 0.0088 | -0.0413 | -0.0068 | 7.46 | 0.0063 |
| REVOKED | No | 1 | -0.2940 | 0.1070 | -0.5037 | -0.0844 | 7.56 | 0.0060 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2652 | 0.0709 | 0.1263 | 0.4042 | 13.99 | 0.0002 |
| INCOME | | 1 | -0.0000 | 0.0000 | -0.0000 | 0.0000 | 2.12 | 0.1457 |
| Scale | | 0 | 20.7786 | 0.0000 | 20.7786 | 20.7786 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8073 | 178.08 | <.0001 | 178.08 | <.0001 |
| MVR_PTS | 1 | 8073 | 25.10 | <.0001 | 25.10 | <.0001 |
| OCCUPATION | 7 | 8073 | 5.47 | <.0001 | 38.28 | <.0001 |
| CAR_USE | 1 | 8073 | 16.89 | <.0001 | 16.89 | <.0001 |
| HOME_VAL | 1 | 8073 | 6.16 | 0.0131 | 6.16 | 0.0131 |
| PARENT1 | 1 | 8073 | 3.36 | 0.0668 | 3.36 | 0.0668 |
| MSTATUS | 1 | 8073 | 8.94 | 0.0028 | 8.94 | 0.0028 |
| CAR_TYPE | 5 | 8073 | 9.14 | <.0001 | 45.69 | <.0001 |
| CAR_AGE | 1 | 8073 | 7.48 | 0.0063 | 7.48 | 0.0063 |
| REVOKED | 1 | 8073 | 7.56 | 0.0060 | 7.56 | 0.0060 |
| KIDSDRIV | 1 | 8073 | 13.98 | 0.0002 | 13.98 | 0.0002 |
| INCOME | 1 | 8073 | 2.12 | 0.1454 | 2.12 | 0.1454 |

## Step 15

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8537 | 1154589.3607 | 135.2453 |
| Scaled Deviance | 8537 | 2503.3500 | 0.2932 |
| Pearson Chi-Square | 8537 | 3937415.5458 | 461.2177 |
| Scaled Pearson X2 | 8537 | 8537.0000 | 1.0000 |
| Log Likelihood | | -1251.6750 | |
| Full Log Likelihood | | -1251.6750 | |
| AIC (smaller is better) | | 2549.3500 | |
| AICC (smaller is better) | | 2549.4794 | |
| BIC (smaller is better) | | 2711.6117 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.7516 | 0.2219 | 6.3166 | 7.1865 | 925.60 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7166 | 0.1280 | 1.4658 | 1.9674 | 179.93 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0788 | 0.0167 | 0.0462 | 0.1115 | 22.40 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0842 | 0.1363 | -0.1830 | 0.3514 | 0.38 | 0.5367 |
| OCCUPATION | Doctor | 1 | -0.8269 | 0.3131 | -1.4405 | -0.2132 | 6.97 | 0.0083 |
| OCCUPATION | Home Maker | 1 | -0.0699 | 0.1763 | -0.4153 | 0.2756 | 0.16 | 0.6917 |
| OCCUPATION | Lawyer | 1 | -0.1385 | 0.1899 | -0.5108 | 0.2337 | 0.53 | 0.4658 |
| OCCUPATION | Manager | 1 | -0.9409 | 0.1732 | -1.2804 | -0.6015 | 29.52 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0256 | 0.1422 | -0.2531 | 0.3043 | 0.03 | 0.8572 |
| OCCUPATION | Student | 1 | -0.0386 | 0.1558 | -0.3440 | 0.2667 | 0.06 | 0.8042 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4885 | 0.1165 | 0.2601 | 0.7168 | 17.57 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.13 | 0.0005 |
| PARENT1 | No | 1 | -0.2313 | 0.1239 | -0.4742 | 0.0116 | 3.48 | 0.0620 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2699 | 0.1079 | -0.4814 | -0.0584 | 6.26 | 0.0124 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5568 | 0.1117 | -0.7757 | -0.3379 | 24.85 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0046 | 0.1907 | -0.3783 | 0.3691 | 0.00 | 0.9807 |
| CAR_TYPE | Pickup | 1 | -0.2418 | 0.1265 | -0.4898 | 0.0062 | 3.65 | 0.0560 |
| CAR_TYPE | Sports Car | 1 | 0.1295 | 0.1278 | -0.1209 | 0.3800 | 1.03 | 0.3107 |
| CAR_TYPE | Van | 1 | 0.1241 | 0.1571 | -0.1839 | 0.4321 | 0.62 | 0.4296 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0246 | 0.0088 | -0.0418 | -0.0074 | 7.85 | 0.0051 |
| REVOKED | No | 1 | -0.2757 | 0.1081 | -0.4876 | -0.0638 | 6.50 | 0.0108 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2544 | 0.0714 | 0.1145 | 0.3943 | 12.70 | 0.0004 |
| TIF | | 1 | -0.0397 | 0.0099 | -0.0592 | -0.0203 | 15.98 | <.0001 |
| Scale | | 0 | 21.4760 | 0.0000 | 21.4760 | 21.4760 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8537 | 186.36 | <.0001 | 186.36 | <.0001 |
| MVR_PTS | 1 | 8537 | 22.46 | <.0001 | 22.46 | <.0001 |
| OCCUPATION | 7 | 8537 | 6.68 | <.0001 | 46.74 | <.0001 |
| CAR_USE | 1 | 8537 | 17.60 | <.0001 | 17.60 | <.0001 |
| HOME_VAL | 1 | 8537 | 12.14 | 0.0005 | 12.14 | 0.0005 |
| PARENT1 | 1 | 8537 | 3.49 | 0.0619 | 3.49 | 0.0619 |
| MSTATUS | 1 | 8537 | 6.26 | 0.0124 | 6.26 | 0.0123 |
| CAR_TYPE | 5 | 8537 | 7.94 | <.0001 | 39.69 | <.0001 |
| CAR_AGE | 1 | 8537 | 7.87 | 0.0050 | 7.87 | 0.0050 |
| REVOKED | 1 | 8537 | 6.51 | 0.0108 | 6.51 | 0.0107 |
| KIDSDRIV | 1 | 8537 | 12.70 | 0.0004 | 12.70 | 0.0004 |
| TIF | 1 | 8537 | 16.02 | <.0001 | 16.02 | <.0001 |

## Step 16

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8555 |
| Missing Values | 1747 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8531 | 1154523.1977 | 135.3327 |
| Scaled Deviance | 8531 | 2505.8006 | 0.2937 |
| Pearson Chi-Square | 8531 | 3930575.1434 | 460.7403 |
| Scaled Pearson X2 | 8531 | 8531.0000 | 1.0000 |
| Log Likelihood | | -1252.9003 | |
| Full Log Likelihood | | -1252.9003 | |
| AIC (smaller is better) | | 2553.8006 | |
| AICC (smaller is better) | | 2553.9412 | |
| BIC (smaller is better) | | 2723.1031 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.7190 | 0.2846 | 6.1612 | 7.2768 | 557.42 | <.0001 |
| URBANICITY | Highly Urban/Urban | 1 | 1.7176 | 0.1282 | 1.4662 | 1.9689 | 179.37 | <.0001 |
| URBANICITY | z_Highly Rural/Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0789 | 0.0167 | 0.0463 | 0.1116 | 22.44 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0845 | 0.1366 | -0.1833 | 0.3523 | 0.38 | 0.5363 |
| OCCUPATION | Doctor | 1 | -0.8323 | 0.3144 | -1.4485 | -0.2161 | 7.01 | 0.0081 |
| OCCUPATION | Home Maker | 1 | -0.0711 | 0.1764 | -0.4169 | 0.2748 | 0.16 | 0.6872 |
| OCCUPATION | Lawyer | 1 | -0.1429 | 0.1913 | -0.5179 | 0.2321 | 0.56 | 0.4552 |
| OCCUPATION | Manager | 1 | -0.9425 | 0.1733 | -1.2821 | -0.6029 | 29.58 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0241 | 0.1424 | -0.2549 | 0.3031 | 0.03 | 0.8656 |
| OCCUPATION | Student | 1 | -0.0380 | 0.1559 | -0.3435 | 0.2675 | 0.06 | 0.8073 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4885 | 0.1165 | 0.2602 | 0.7168 | 17.59 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 12.12 | 0.0005 |
| PARENT1 | No | 1 | -0.2380 | 0.1299 | -0.4925 | 0.0165 | 3.36 | 0.0668 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2675 | 0.1084 | -0.4799 | -0.0550 | 6.09 | 0.0136 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5561 | 0.1117 | -0.7750 | -0.3371 | 24.77 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0047 | 0.1906 | -0.3782 | 0.3688 | 0.00 | 0.9804 |
| CAR_TYPE | Pickup | 1 | -0.2408 | 0.1266 | -0.4888 | 0.0073 | 3.62 | 0.0571 |
| CAR_TYPE | Sports Car | 1 | 0.1272 | 0.1280 | -0.1236 | 0.3780 | 0.99 | 0.3202 |
| CAR_TYPE | Van | 1 | 0.1244 | 0.1571 | -0.1834 | 0.4323 | 0.63 | 0.4282 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0246 | 0.0088 | -0.0418 | -0.0074 | 7.87 | 0.0050 |
| REVOKED | No | 1 | -0.2762 | 0.1081 | -0.4882 | -0.0643 | 6.53 | 0.0106 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2538 | 0.0715 | 0.1137 | 0.3939 | 12.61 | 0.0004 |
| TIF | | 1 | -0.0398 | 0.0099 | -0.0592 | -0.0203 | 16.00 | <.0001 |
| AGE | | 1 | 0.0009 | 0.0047 | -0.0083 | 0.0100 | 0.03 | 0.8535 |
| Scale | | 0 | 21.4649 | 0.0000 | 21.4649 | 21.4649 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8531 | 185.96 | <.0001 | 185.96 | <.0001 |
| MVR_PTS | 1 | 8531 | 22.50 | <.0001 | 22.50 | <.0001 |
| OCCUPATION | 7 | 8531 | 6.67 | <.0001 | 46.68 | <.0001 |
| CAR_USE | 1 | 8531 | 17.61 | <.0001 | 17.61 | <.0001 |
| HOME_VAL | 1 | 8531 | 12.14 | 0.0005 | 12.14 | 0.0005 |
| PARENT1 | 1 | 8531 | 3.36 | 0.0668 | 3.36 | 0.0668 |
| MSTATUS | 1 | 8531 | 6.10 | 0.0136 | 6.10 | 0.0136 |
| CAR_TYPE | 5 | 8531 | 7.88 | <.0001 | 39.41 | <.0001 |
| CAR_AGE | 1 | 8531 | 7.88 | 0.0050 | 7.88 | 0.0050 |
| REVOKED | 1 | 8531 | 6.53 | 0.0106 | 6.53 | 0.0106 |
| KIDSDRIV | 1 | 8531 | 12.61 | 0.0004 | 12.61 | 0.0004 |
| TIF | 1 | 8531 | 16.04 | <.0001 | 16.04 | <.0001 |
| AGE | 1 | 8531 | 0.03 | 0.8535 | 0.03 | 0.8535 |

## Step 17

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8536 | 1154560.2141 | 135.2578 |
| Scaled Deviance | 8536 | 2508.9856 | 0.2939 |
| Pearson Chi-Square | 8536 | 3928012.1057 | 460.1701 |
| Scaled Pearson X2 | 8536 | 8536.0000 | 1.0000 |
| Log Likelihood | | -1254.4928 | |
| Full Log Likelihood | | -1254.4928 | |
| AIC (smaller is better) | | 2556.9856 | |
| AICC (smaller is better) | | 2557.1262 | |
| BIC (smaller is better) | | 2726.3022 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.7531 | 0.2218 | 6.3184 7.1877 | 927.34 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7189 | 0.1282 | 1.4677 1.9701 | 179.85 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0789 | 0.0166 | 0.0463 0.1115 | 22.49 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0866 | 0.1365 | -0.1809 0.3541 | 0.40 | 0.5255 |
| OCCUPATION | Doctor | 1 | -0.8343 | 0.3142 | -1.4501 -0.2185 | 7.05 | 0.0079 |
| OCCUPATION | Home Maker | 1 | -0.0711 | 0.1761 | -0.4162 0.2741 | 0.16 | 0.6865 |
| OCCUPATION | Lawyer | 1 | -0.1445 | 0.1912 | -0.5193 0.2303 | 0.57 | 0.4499 |
| OCCUPATION | Manager | 1 | -0.9431 | 0.1732 | -1.2824 -0.6037 | 29.66 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0236 | 0.1423 | -0.2553 0.3024 | 0.03 | 0.8685 |
| OCCUPATION | Student | 1 | -0.0380 | 0.1556 | -0.3430 0.2671 | 0.06 | 0.8073 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4882 | 0.1164 | 0.2600 0.7163 | 17.59 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 -0.0000 | 12.21 | 0.0005 |
| PARENT1 | No | 1 | -0.2410 | 0.1296 | -0.4949 0.0130 | 3.46 | 0.0630 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2673 | 0.1083 | -0.4795 -0.0551 | 6.09 | 0.0136 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5560 | 0.1116 | -0.7747 -0.3372 | 24.81 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0045 | 0.1904 | -0.3777 0.3688 | 0.00 | 0.9813 |
| CAR_TYPE | Pickup | 1 | -0.2405 | 0.1265 | -0.4884 0.0074 | 3.62 | 0.0572 |
| CAR_TYPE | Sports Car | 1 | 0.1293 | 0.1276 | -0.1209 0.3794 | 1.03 | 0.3111 |
| CAR_TYPE | Van | 1 | 0.1247 | 0.1570 | -0.1830 0.4323 | 0.63 | 0.4271 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0246 | 0.0088 | -0.0418 -0.0075 | 7.91 | 0.0049 |
| REVOKED | No | 1 | -0.2758 | 0.1080 | -0.4875 -0.0642 | 6.52 | 0.0106 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2533 | 0.0714 | 0.1133 0.3933 | 12.58 | 0.0004 |
| TIF | | 1 | -0.0397 | 0.0099 | -0.0591 -0.0202 | 15.97 | <.0001 |
| BIRTH | | 1 | -0.0000 | 0.0000 | -0.0000 0.0000 | 0.06 | 0.8013 |
| Scale | | 0 | 21.4516 | 0.0000 | 21.4516 21.4516 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8536 | 186.48 | <.0001 | 186.48 | <.0001 |
| MVR_PTS | 1 | 8536 | 22.54 | <.0001 | 22.54 | <.0001 |
| OCCUPATION | 7 | 8536 | 6.69 | <.0001 | 46.86 | <.0001 |
| CAR_USE | 1 | 8536 | 17.62 | <.0001 | 17.62 | <.0001 |
| HOME_VAL | 1 | 8536 | 12.22 | 0.0005 | 12.22 | 0.0005 |
| PARENT1 | 1 | 8536 | 3.46 | 0.0630 | 3.46 | 0.0629 |
| MSTATUS | 1 | 8536 | 6.10 | 0.0135 | 6.10 | 0.0135 |
| CAR_TYPE | 5 | 8536 | 7.92 | <.0001 | 39.61 | <.0001 |
| CAR_AGE | 1 | 8536 | 7.92 | 0.0049 | 7.92 | 0.0049 |
| REVOKED | 1 | 8536 | 6.53 | 0.0106 | 6.53 | 0.0106 |
| KIDSDRIV | 1 | 8536 | 12.58 | 0.0004 | 12.58 | 0.0004 |
| TIF | 1 | 8536 | 16.01 | <.0001 | 16.01 | <.0001 |
| BIRTH | 1 | 8536 | 0.06 | 0.8013 | 0.06 | 0.8013 |

## Step 18

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8560 |
| Missing Values | 1742 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8536 | 1148548.8446 | 134.5535 |
| Scaled Deviance | 8536 | 2386.8479 | 0.2796 |
| Pearson Chi-Square | 8536 | 4107514.7360 | 481.1990 |
| Scaled Pearson X2 | 8536 | 8536.0000 | 1.0000 |
| Log Likelihood | | -1193.4240 | |
| Full Log Likelihood | | -1193.4240 | |
| AIC (smaller is better) | | 2434.8479 | |
| AICC (smaller is better) | | 2434.9885 | |
| BIC (smaller is better) | | 2604.1644 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.4045 | 0.2471 | 5.9202 | 6.8888 | 671.82 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7540 | 0.1308 | 1.4976 | 2.0104 | 179.72 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0772 | 0.0170 | 0.0438 | 0.1106 | 20.54 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0891 | 0.1394 | -0.1842 | 0.3623 | 0.41 | 0.5229 |
| OCCUPATION | Doctor | 1 | -0.8125 | 0.3207 | -1.4411 | -0.1838 | 6.42 | 0.0113 |
| OCCUPATION | Home Maker | 1 | -0.0674 | 0.1802 | -0.4205 | 0.2858 | 0.14 | 0.7084 |
| OCCUPATION | Lawyer | 1 | -0.1269 | 0.1946 | -0.5083 | 0.2544 | 0.43 | 0.5141 |
| OCCUPATION | Manager | 1 | -0.9244 | 0.1776 | -1.2725 | -0.5763 | 27.09 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0286 | 0.1457 | -0.2569 | 0.3141 | 0.04 | 0.8442 |
| OCCUPATION | Student | 1 | -0.0098 | 0.1591 | -0.3216 | 0.3021 | 0.00 | 0.9511 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.5033 | 0.1192 | 0.2696 | 0.7370 | 17.82 | <.0001 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 11.47 | 0.0007 |
| PARENT1 | No | 1 | -0.2521 | 0.1268 | -0.5007 | -0.0035 | 3.95 | 0.0468 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2618 | 0.1105 | -0.4783 | -0.0453 | 5.62 | 0.0178 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5535 | 0.1143 | -0.7776 | -0.3295 | 23.45 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | -0.0092 | 0.1949 | -0.3913 | 0.3729 | 0.00 | 0.9623 |
| CAR_TYPE | Pickup | 1 | -0.2393 | 0.1293 | -0.4927 | 0.0141 | 3.42 | 0.0642 |
| CAR_TYPE | Sports Car | 1 | 0.1262 | 0.1307 | -0.1300 | 0.3825 | 0.93 | 0.3343 |
| CAR_TYPE | Van | 1 | 0.1350 | 0.1606 | -0.1798 | 0.4499 | 0.71 | 0.4006 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0255 | 0.0090 | -0.0431 | -0.0079 | 8.08 | 0.0045 |
| REVOKED | No | 1 | -0.2756 | 0.1105 | -0.4922 | -0.0590 | 6.22 | 0.0126 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2566 | 0.0729 | 0.1139 | 0.3994 | 12.41 | 0.0004 |
| TIF | | 1 | -0.0385 | 0.0102 | -0.0584 | -0.0185 | 14.33 | 0.0002 |
| TRAVTIME | | 1 | 0.0092 | 0.0026 | 0.0041 | 0.0142 | 12.56 | 0.0004 |
| Scale | | 0 | 21.9362 | 0.0000 | 21.9362 | 21.9362 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8536 | 185.87 | <.0001 | 185.87 | <.0001 |
| MVR_PTS | 1 | 8536 | 20.59 | <.0001 | 20.59 | <.0001 |
| OCCUPATION | 7 | 8536 | 6.16 | <.0001 | 43.14 | <.0001 |
| CAR_USE | 1 | 8536 | 17.85 | <.0001 | 17.85 | <.0001 |
| HOME_VAL | 1 | 8536 | 11.48 | 0.0007 | 11.48 | 0.0007 |
| PARENT1 | 1 | 8536 | 3.95 | 0.0468 | 3.95 | 0.0468 |
| MSTATUS | 1 | 8536 | 5.62 | 0.0178 | 5.62 | 0.0177 |
| CAR_TYPE | 5 | 8536 | 7.53 | <.0001 | 37.63 | <.0001 |
| CAR_AGE | 1 | 8536 | 8.10 | 0.0044 | 8.10 | 0.0044 |
| REVOKED | 1 | 8536 | 6.22 | 0.0126 | 6.22 | 0.0126 |
| KIDSDRIV | 1 | 8536 | 12.40 | 0.0004 | 12.40 | 0.0004 |
| TIF | 1 | 8536 | 14.36 | 0.0002 | 14.36 | 0.0002 |
| TRAVTIME | 1 | 8536 | 12.55 | 0.0004 | 12.55 | 0.0004 |

## Step 19

## Elegibles (aggregated model threshold = 0.05)

## The GENMOD Procedure

| Model Information | |
|---|---|
| Data Set | GRIDWORK.CLAIM_HISTORY |
| Distribution | User |
| Link Function | Log |
| Dependent Variable | CLM_AMT |

| | |
|---|---|
| Number of Observations Read | 10302 |
| Number of Observations Used | 8099 |
| Missing Values | 2203 |

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| URBANICITY | 2 | Highly Urban/ Urban z_Highly Rural/ Rural |
| OCCUPATION | 8 | Clerical Doctor Home Maker Lawyer Manager Professional Student z_Blue Collar |
| CAR_USE | 2 | Commercial Private |
| PARENT1 | 2 | No Yes |
| MSTATUS | 2 | Yes z_No |
| CAR_TYPE | 6 | Minivan Panel Truck Pickup Sports Car Van z_SUV |
| REVOKED | 2 | No Yes |

| Criteria For Assessing Goodness Of Fit | | | |
|---|---|---|---|
| Criterion | DF | Value | Value/DF |
| Deviance | 8074 | 1077773.8792 | 133.4870 |
| Scaled Deviance | 8074 | 2218.6305 | 0.2748 |
| Pearson Chi-Square | 8074 | 3922215.1536 | 485.7834 |
| Scaled Pearson X2 | 8074 | 8074.0000 | 1.0000 |
| Log Likelihood | | -1109.3153 | |
| Full Log Likelihood | | -1109.3153 | |
| AIC (smaller is better) | | 2268.6305 | |
| AICC (smaller is better) | | 2268.7916 | |
| BIC (smaller is better) | | 2443.6179 | |

Algorithm converged.

| Analysis Of Maximum Likelihood Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | | DF | Estimate | Standard Error | Wald 95% Confidence Limits | | Wald Chi-Square | Pr > ChiSq |
| Intercept | | 1 | 6.4564 | 0.2911 | 5.8859 | 7.0269 | 492.00 | <.0001 |
| URBANICITY | Highly Urban/ Urban | 1 | 1.7395 | 0.1353 | 1.4743 | 2.0046 | 165.28 | <.0001 |
| URBANICITY | z_Highly Rural/ Rural | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MVR_PTS | | 1 | 0.0765 | 0.0176 | 0.0419 | 0.1111 | 18.80 | <.0001 |
| OCCUPATION | Clerical | 1 | 0.0203 | 0.1454 | -0.2647 | 0.3054 | 0.02 | 0.8889 |
| OCCUPATION | Doctor | 1 | -0.8012 | 0.3279 | -1.4438 | -0.1585 | 5.97 | 0.0146 |
| OCCUPATION | Home Maker | 1 | -0.0964 | 0.1977 | -0.4840 | 0.2911 | 0.24 | 0.6259 |
| OCCUPATION | Lawyer | 1 | -0.1483 | 0.2022 | -0.5446 | 0.2480 | 0.54 | 0.4634 |
| OCCUPATION | Manager | 1 | -0.9877 | 0.1849 | -1.3501 | -0.6253 | 28.53 | <.0001 |
| OCCUPATION | Professional | 1 | 0.0180 | 0.1519 | -0.2796 | 0.3157 | 0.01 | 0.9055 |
| OCCUPATION | Student | 1 | -0.0028 | 0.1779 | -0.3515 | 0.3459 | 0.00 | 0.9873 |
| OCCUPATION | z_Blue Collar | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_USE | Commercial | 1 | 0.4645 | 0.1240 | 0.2214 | 0.7076 | 14.03 | 0.0002 |
| CAR_USE | Private | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| HOME_VAL | | 1 | -0.0000 | 0.0000 | -0.0000 | -0.0000 | 9.41 | 0.0022 |
| PARENT1 | No | 1 | -0.2367 | 0.1315 | -0.4943 | 0.0210 | 3.24 | 0.0718 |
| PARENT1 | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| MSTATUS | Yes | 1 | -0.2899 | 0.1145 | -0.5144 | -0.0654 | 6.41 | 0.0114 |
| MSTATUS | z_No | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_TYPE | Minivan | 1 | -0.5911 | 0.1185 | -0.8233 | -0.3589 | 24.89 | <.0001 |
| CAR_TYPE | Panel Truck | 1 | 0.0186 | 0.2014 | -0.3763 | 0.4134 | 0.01 | 0.9266 |
| CAR_TYPE | Pickup | 1 | -0.2440 | 0.1332 | -0.5051 | 0.0171 | 3.35 | 0.0671 |
| CAR_TYPE | Sports Car | 1 | 0.1458 | 0.1346 | -0.1180 | 0.4095 | 1.17 | 0.2788 |
| CAR_TYPE | Van | 1 | 0.0653 | 0.1678 | -0.2636 | 0.3943 | 0.15 | 0.6971 |
| CAR_TYPE | z_SUV | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| CAR_AGE | | 1 | -0.0291 | 0.0093 | -0.0474 | -0.0109 | 9.85 | 0.0017 |
| REVOKED | No | 1 | -0.2934 | 0.1141 | -0.5169 | -0.0698 | 6.61 | 0.0101 |
| REVOKED | Yes | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | . | . |
| KIDSDRIV | | 1 | 0.2478 | 0.0758 | 0.0991 | 0.3964 | 10.67 | 0.0011 |
| TIF | | 1 | -0.0360 | 0.0105 | -0.0565 | -0.0154 | 11.74 | 0.0006 |
| TRAVTIME | | 1 | 0.0094 | 0.0027 | 0.0041 | 0.0146 | 12.25 | 0.0005 |
| YOJ | | 1 | 0.0014 | 0.0118 | -0.0216 | 0.0245 | 0.01 | 0.9034 |
| Scale | | 0 | 22.0405 | 0.0000 | 22.0405 | 22.0405 | | |

| LR Statistics For Type 3 Analysis | | | | | | |
|---|---|---|---|---|---|---|
| Source | Num DF | Den DF | F Value | Pr > F | Chi-Square | Pr > ChiSq |
| URBANICITY | 1 | 8074 | 170.93 | <.0001 | 170.93 | <.0001 |
| MVR_PTS | 1 | 8074 | 18.84 | <.0001 | 18.84 | <.0001 |
| OCCUPATION | 7 | 8074 | 6.00 | <.0001 | 41.99 | <.0001 |
| CAR_USE | 1 | 8074 | 14.04 | 0.0002 | 14.04 | 0.0002 |
| HOME_VAL | 1 | 8074 | 9.41 | 0.0022 | 9.41 | 0.0022 |
| PARENT1 | 1 | 8074 | 3.24 | 0.0717 | 3.24 | 0.0717 |
| MSTATUS | 1 | 8074 | 6.41 | 0.0114 | 6.41 | 0.0114 |
| CAR_TYPE | 5 | 8074 | 7.69 | <.0001 | 38.45 | <.0001 |
| CAR_AGE | 1 | 8074 | 9.87 | 0.0017 | 9.87 | 0.0017 |
| REVOKED | 1 | 8074 | 6.62 | 0.0101 | 6.62 | 0.0101 |
| KIDSDRIV | 1 | 8074 | 10.68 | 0.0011 | 10.68 | 0.0011 |
| TIF | 1 | 8074 | 11.76 | 0.0006 | 11.76 | 0.0006 |
| TRAVTIME | 1 | 8074 | 12.24 | 0.0005 | 12.24 | 0.0005 |
| YOJ | 1 | 8074 | 0.01 | 0.9034 | 0.01 | 0.9034 |

**Selected Variables**

| Obs | Source | NumDF | DenDF | FValue | ProbF | ChiSq | ProbChiSq | Method |
|---|---|---|---|---|---|---|---|---|
| 1 | URBANICITY | 1 | 8074 | 170.93 | <.0001 | 170.93 | <.0001 | LR |
| 2 | MVR_PTS | 1 | 8074 | 18.84 | <.0001 | 18.84 | <.0001 | LR |
| 3 | OCCUPATION | 7 | 8074 | 6.00 | <.0001 | 41.99 | <.0001 | LR |
| 4 | CAR_USE | 1 | 8074 | 14.04 | 0.0002 | 14.04 | 0.0002 | LR |
| 5 | HOME_VAL | 1 | 8074 | 9.41 | 0.0022 | 9.41 | 0.0022 | LR |
| 6 | PARENT1 | 1 | 8074 | 3.24 | 0.0717 | 3.24 | 0.0717 | LR |
| 7 | MSTATUS | 1 | 8074 | 6.41 | 0.0114 | 6.41 | 0.0114 | LR |
| 8 | CAR_TYPE | 5 | 8074 | 7.69 | <.0001 | 38.45 | <.0001 | LR |
| 9 | CAR_AGE | 1 | 8074 | 9.87 | 0.0017 | 9.87 | 0.0017 | LR |
| 10 | REVOKED | 1 | 8074 | 6.62 | 0.0101 | 6.62 | 0.0101 | LR |
| 11 | KIDSDRIV | 1 | 8074 | 10.68 | 0.0011 | 10.68 | 0.0011 | LR |
| 12 | TIF | 1 | 8074 | 11.76 | 0.0006 | 11.76 | 0.0006 | LR |
| 13 | TRAVTIME | 1 | 8074 | 12.24 | 0.0005 | 12.24 | 0.0005 | LR |

**Conclusion:**

The above lines show how the variable selection algorithm selects only 11 of the 22 original potential variables.

The SAS macros:

- Performs a stepwise selection variable based mainly on a forward selection process
- The penultimate step in the selection process shows the selected model and after the last step a summary table of the selection process is showed too
- The macro needs around 50 minutes to get results with a dataset of one million observations and around 13 variables
- The selection criteria is based on the p-values of the type 3 analysis
- With small changes the macro is useful in a context with a GENMOD procedure under Gamma, Inverse Gaussian, Log-Normal, Binomial, Gaussian, Poisson, Negative Binomial, Zero Inflated Poisson and Zero inflated Negative Binomial error functions
- In case of one or several model doesn't converge use the NODMSSYNCHK option in the SAS code to avoid any stop in the execution
- The specification of the model is the same that the Tweedie macro used in the NAR project
- This macro only admits main factors. So, it is not possible to include interactions in the model statement of the GENMODE procedure. To include interactions it is needed create a new variable with the interaction

**References:**


PharmaSUG 2012 - SP09 Automated forward selection for Generalized Linear Models with Categorical and Numerical Variables using PROC GENMOD Manuel Sandoval, Pharmanet-i3, Mexico City, Mexico

Paper 327-2013 1 An Overview of Syntax Check Mode and Why it is Important Thomas E. Billings, Union Bank, San Francisco, California