Data Analysis for Motor insurance Data
"GLM model using R software"

Ahmed Sabeel

sabeel2010@gmail.com

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```
## Warning:  package 'xtable' was built under R version 3.6.3
## Warning:  package 'car' was built under R version 3.6.3
## Loading required package:  carData
## Warning:  package 'carData' was built under R version 3.6.1
##
## Please cite as:
##  Hlavac, Marek (2018).  stargazer:  Well-Formatted Regression and Summary
Statistics Tables.
##  R package version 5.2.2.  https://CRAN.R-project.org/package=stargazer
## Warning:  package 'ggplot2' was built under R version 3.6.3
## Installing package into 'C:/Users/USER/Documents/R/win-library/3.6'
## (as 'lib' is unspecified)
## Error in contrib.url(repos, "source"):  trying to use CRAN without setting
a mirror
## Warning:  package 'writexl' was built under R version 3.6.3
```

Descritive Statistics

Read the data from the motor insurance data into R file from Excel and SPSS data files

```
## re-encoding from CP1252

##                       25%
## Mean              0.4511
## Standard Deviation 0.7784
## Minimum            0.0000
## First Quantile     0.0000
## Median             0.0000
## Third Quantile     1.0000
```

```
## 90% Quantile        1.0000
## 95% Quantile        2.0000
## 99% Quantile        3.0000
## Maximum             8.0000
##                          25%
## Mean                 3439.958
## Standard Deviation  14766.744
## Minimum                0.000
## First Quantile          0.000
## Median                  0.000
## Third Quantile        934.000
## 90% Quantile         8668.000
## 95% Quantile        16050.800
## 99% Quantile        52610.341
## Maximum            450000.000
```

Frequency model of vehicle data

Performing GLM Calcs Using Poisson, negative Binomail and Quasi Poison Distributions

```
##
## Call:
## glm(formula = q11 ~ q1 + q2 + q3 + q4 + q5 + q6 + q7 + q8 + q9 +
##     q10 + offset(log(q13)), family = poisson(link = log), data = df)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.4013  -0.9830  -0.8757   0.6023   5.3780
##
## Coefficients: (1 not defined because of singularities)
##                            Estimate Std. Error z value Pr(>|z|)
## (Intercept)               -1.197157   0.101940 -11.744  < 2e-16 ***
## q1female                   0.090040   0.033919   2.655  0.00794 **
## q225-30                    0.241126   0.073335   3.288  0.00101 **
## q231-60                    0.333047   0.072492   4.594 4.34e-06 ***
## q260 and above             0.540629   0.079775   6.777 1.23e-11 ***
## q3engineer and programmer  0.094992   0.036043   2.636  0.00840 **
## q3medical professional    -0.106060   0.052852  -2.007  0.04478 *
## q3business man/woman       -0.033418   0.064195  -0.521  0.60267
## q3student                  0.124732   0.075541   1.651  0.09870 .
## q4khartoum north           0.066454   0.030845   2.154  0.03121 *
```

```
## q4om durman                -0.036385   0.030543   -1.191   0.23355
## q53-5                        0.172905   0.042750    4.045  5.24e-05 ***
## q56-10                       0.143069   0.045779    3.125   0.00178 **
## q510 and above               0.062685   0.044455    1.410   0.15852
## q6Sudan                      0.006016   0.049855    0.121   0.90395
## q6Japan                     -0.131086   0.093352   -1.404   0.16026
## q6Germany                   -0.121588   0.174106   -0.698   0.48496
## q6Czech                      0.263176   0.170955    1.539   0.12370
## q7Toyota                     0.093107   0.116587    0.799   0.42452
## q7Giad                             NA         NA       NA        NA
## q7Kia                        0.016951   0.054263    0.312   0.75475
## q7Skoda                     -0.329004   0.234369   -1.404   0.16038
## q7Mitsubishi                -0.114383   0.163030   -0.702   0.48293
## q7Merceds                   -0.029427   0.134577   -0.219   0.82691
## q8Tuson                     -0.036117   0.105467   -0.342   0.73202
## q8Visto                     -0.146839   0.086363   -1.700   0.08908 .
## q8Click                     -0.085358   0.051891   -1.645   0.09998 .
## q8Fabia                      0.235755   0.147415    1.599   0.10976
## q8Lancer                     0.200626   0.163176    1.230   0.21888
## q8Corolla                    0.117864   0.083820    1.406   0.15968
## q8Merceds                   -0.135766   0.145252   -0.935   0.34995
## q8Hilux                      0.049825   0.127754    0.390   0.69653
## q8Land cruiser               0.014788   0.128780    0.115   0.90858
## q96-10                      -0.058141   0.031668   -1.836   0.06636 .
## q911-20                     -0.262621   0.036207   -7.253  4.07e-13 ***
## q921 and above              -0.683216   0.099182   -6.888  5.64e-12 ***
## q10Medium                    0.110389   0.068099    1.621   0.10502
## q10Large                     0.018442   0.123722    0.149   0.88150
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 15672  on 13887  degrees of freedom
## Residual deviance: 15356  on 13851  degrees of freedom
##   (797 observations deleted due to missingness)
## AIC: 25460
##
## Number of Fisher Scoring iterations: 6
## Analysis of Deviance Table
##
## Model: poisson, link: log
```

```
##
## Response: q11
##
## Terms added sequentially (first to last)
##
##
##       Df Deviance Resid. Df Resid. Dev  Pr(>Chi)
## NULL                  13887     15672
## q1    1    5.575     13886     15667 0.0182203 *
## q2    3   75.429     13883     15592 2.932e-16 ***
## q3    4   19.951     13879     15572 0.0005106 ***
## q4    2    8.870     13877     15563 0.0118532 *
## q5    3   22.810     13874     15540 4.423e-05 ***
## q6    4   16.264     13870     15524 0.0026846 **
## q7    5    7.548     13865     15516 0.1829537
## q8    9   56.384     13856     15460 6.628e-09 ***
## q9    3  100.381     13853     15359 < 2.2e-16 ***
## q10   2    3.471     13851     15356 0.1763213
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Call:
## glm.nb(formula = q11 ~ q1 + q2 + q3 + q4 + q5 + q6 + q7 + q8 +
##     q9 + q10, data = df, init.theta = 1.491152932, link = log)
##
## Deviance Residuals:
##    Min      1Q  Median      3Q     Max
## -1.2349 -0.9139 -0.8250  0.5037  3.9798
##
## Coefficients: (1 not defined because of singularities)
##                          Estimate Std. Error z value Pr(>|z|)
## (Intercept)              -1.19918    0.11461 -10.463  < 2e-16 ***
## q1female                  0.09546    0.03915   2.439 0.014745 *
## q225-30                   0.23337    0.08189   2.850 0.004377 **
## q231-60                   0.32805    0.08076   4.062 4.86e-05 ***
## q260 and above            0.54006    0.08964   6.025 1.69e-09 ***
## q3engineer and programmer 0.09302    0.04179   2.226 0.026003 *
## q3medical professional   -0.11008    0.06016  -1.830 0.067286 .
## q3business man/woman      -0.03383    0.07360  -0.460 0.645771
## q3student                 0.10605    0.08601   1.233 0.217576
## q4khartoum north          0.06813    0.03556   1.916 0.055356 .
## q4om durman              -0.03453    0.03493  -0.989 0.322882
```

```
## q53-5                         0.17259    0.04857   3.553 0.000381 ***
## q56-10                        0.14070    0.05213   2.699 0.006947 **
## q510 and above                0.05890    0.05050   1.166 0.243523
## q6Sudan                       0.01212    0.05753   0.211 0.833121
## q6Japan                      -0.13506    0.10675  -1.265 0.205834
## q6Germany                    -0.12199    0.19848  -0.615 0.538804
## q6Czech                       0.29051    0.20213   1.437 0.150644
## q7Toyota                      0.09961    0.13379   0.745 0.456551
## q7Giad                            NA         NA      NA       NA
## q7Kia                         0.01754    0.06221   0.282 0.778041
## q7Skoda                      -0.35624    0.27382  -1.301 0.193268
## q7Mitsubishi                 -0.11212    0.18462  -0.607 0.543644
## q7Merceds                    -0.03358    0.15426  -0.218 0.827692
## q8Tuson                      -0.03518    0.12087  -0.291 0.770990
## q8Visto                      -0.14062    0.09755  -1.442 0.149408
## q8Click                      -0.07634    0.05905  -1.293 0.196065
## q8Fabia                       0.24298    0.16882   1.439 0.150070
## q8Lancer                      0.20584    0.18477   1.114 0.265281
## q8Corolla                     0.12023    0.09641   1.247 0.212395
## q8Merceds                    -0.11173    0.16277  -0.686 0.492454
## q8Hilux                       0.04320    0.14706   0.294 0.768958
## q8Land cruiser                0.01397    0.14785   0.094 0.924714
## q96-10                       -0.05959    0.03661  -1.628 0.103568
## q911-20                      -0.26560    0.04137  -6.420 1.37e-10 ***
## q921 and above               -0.67875    0.10807  -6.280 3.38e-10 ***
## q10Medium                     0.11610    0.07716   1.505 0.132438
## q10Large                      0.02540    0.14130   0.180 0.857328
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Negative Binomial(1.4912) family taken to be 1)
##
##     Null deviance: 12025  on 13900  degrees of freedom
## Residual deviance: 11780  on 13864  degrees of freedom
##   (784 observations deleted due to missingness)
## AIC: 25003
##
## Number of Fisher Scoring iterations: 1
##
##
##               Theta:  1.4912
##           Std. Err.:  0.0930
```

```
## 
##  2 x log-likelihood:  -24927.0240

## Warning in anova.negbin(model1, test = "Chisq"):  tests made without re-estimating
'theta'

## Analysis of Deviance Table
## 
## Model: Negative Binomial(1.4912), link: log
## 
## Response: q11
## 
## Terms added sequentially (first to last)
## 
## 
##      Df Deviance Resid. Df Resid. Dev  Pr(>Chi)
## NULL                13900      12025
## q1    1    4.350     13899      12021  0.037017 *
## q2    3   57.985     13896      11963 1.583e-12 ***
## q3    4   15.236     13892      11948  0.004236 **
## q4    2    6.479     13890      11941  0.039180 *
## q5    3   17.668     13887      11924  0.000515 ***
## q6    4   12.916     13883      11911  0.011695 *
## q7    5    6.177     13878      11904  0.289414
## q8    9   43.476     13869      11861 1.763e-06 ***
## q9    3   77.650     13866      11783 < 2.2e-16 ***
## q10   2    2.868     13864      11780  0.238362
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##                          summary.model1..coef.summary.model1..coef...4.....0.1..4.
## (Intercept)                                                       1.274549e-25
## q1female                                                          1.474478e-02
## q225-30                                                           4.376668e-03
## q231-60                                                           4.861102e-05
## q260 and above                                                    1.691923e-09
## q3engineer and programmer                                         2.600313e-02
## q3medical professional                                            6.728634e-02
## q4khartoum north                                                  5.535561e-02
## q53-5                                                             3.807002e-04
## q56-10                                                            6.947236e-03
## q911-20                                                           1.366571e-10
## q921 and above                                                    3.375561e-10
## 
```

```
## Call:
## glm(formula = q11 ~ q1 + q2 + q3 + q4 + q5 + q6 + q7 + q8 + q9 +
##     q10, family = "quasipoisson", data = df)
##
## Deviance Residuals:
##     Min      1Q   Median      3Q      Max
## -1.4031  -0.9828  -0.8755   0.6040   5.3766
##
## Coefficients: (1 not defined because of singularities)
##                            Estimate Std. Error t value Pr(>|t|)
## (Intercept)                -1.19557    0.11760 -10.166  < 2e-16 ***
## q1female                    0.09119    0.03914   2.330 0.019808 *
## q225-30                     0.23977    0.08460   2.834 0.004602 **
## q231-60                     0.33298    0.08363   3.982 6.88e-05 ***
## q260 and above              0.54005    0.09203   5.868 4.51e-09 ***
## q3engineer and programmer   0.09464    0.04159   2.276 0.022882 *
## q3medical professional     -0.10906    0.06098  -1.789 0.073691 .
## q3business man/woman       -0.03301    0.07407  -0.446 0.655811
## q3student                   0.12240    0.08715   1.405 0.160173
## q4khartoum north            0.06489    0.03558   1.824 0.068201 .
## q4om durman                -0.03660    0.03524  -1.039 0.298980
## q53-5                       0.17168    0.04931   3.482 0.000499 ***
## q56-10                      0.14023    0.05280   2.656 0.007926 **
## q510 and above              0.06110    0.05127   1.192 0.233419
## q6Sudan                     0.00615    0.05752   0.107 0.914855
## q6Japan                    -0.12915    0.10771  -1.199 0.230541
## q6Germany                  -0.12846    0.20085  -0.640 0.522470
## q6Czech                     0.26304    0.19725   1.334 0.182374
## q7Toyota                    0.09639    0.13445   0.717 0.473432
## q7Giad                           NA         NA      NA       NA
## q7Kia                       0.01664    0.06260   0.266 0.790460
## q7Skoda                    -0.33095    0.27053  -1.223 0.221230
## q7Mitsubishi               -0.11802    0.18807  -0.628 0.530332
## q7Merceds                  -0.02907    0.15525  -0.187 0.851457
## q8Tuson                    -0.03350    0.12175  -0.275 0.783202
## q8Visto                    -0.14534    0.09964  -1.459 0.144709
## q8Click                    -0.08378    0.05987  -1.399 0.161742
## q8Fabia                     0.23980    0.17020   1.409 0.158889
## q8Lancer                    0.20418    0.18824   1.085 0.278072
## q8Corolla                   0.11357    0.09662   1.175 0.239837
## q8Merceds                  -0.11935    0.16661  -0.716 0.473784
## q8Hilux                     0.04874    0.14747   0.331 0.741015
```

```
## q8Land cruiser              0.01474    0.14862   0.099 0.921007
## q96-10                      -0.05943    0.03653  -1.627 0.103846
## q911-20                     -0.26334    0.04178  -6.304 3.00e-10 ***
## q921 and above              -0.67992    0.11401  -5.964 2.53e-09 ***
## q10Medium                    0.11030    0.07858   1.404 0.160424
## q10Large                     0.01532    0.14280   0.107 0.914596
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for quasipoisson family taken to be 1.331282)
##
##     Null deviance: 15684  on 13900  degrees of freedom
## Residual deviance: 15369  on 13864  degrees of freedom
##   (784 observations deleted due to missingness)
## AIC: NA
##
## Number of Fisher Scoring iterations: 6
## Analysis of Deviance Table
##
## Model: quasipoisson, link: log
##
## Response: q11
##
## Terms added sequentially (first to last)
##
##
##       Df Deviance Resid. Df Resid. Dev  Pr(>Chi)
## NULL                 13900      15684
## q1     1    5.707    13899      15678 0.0384131 *
## q2     3   75.286    13896      15603 3.203e-12 ***
## q3     4   19.976    13892      15583 0.0046914 **
## q4     2    8.594    13890      15574 0.0396513 *
## q5     3   22.524    13887      15552 0.0007342 ***
## q6     4   16.360    13883      15536 0.0153289 *
## q7     5    7.622    13878      15528 0.3338633
## q8     9   55.541    13869      15472 3.698e-06 ***
## q9     3  100.125    13866      15372 3.267e-16 ***
## q10    2    3.520    13864      15369 0.2666134
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Combine results of the three Distributions

```
## 
## =================================================================
##                                  Dependent variable:
##                          ---------------------------------------
##                                          q11
##                          Poisson      negative    glm: quasipoisson
##                                       binomial        link = log
##                            (1)          (2)             (3)
## -----------------------------------------------------------------
## q1female                  0.09**       0.10*           0.09*
##                           (0.03)       (0.04)          (0.04)
## q225-30                   0.24**       0.23**          0.24**
##                           (0.07)       (0.08)          (0.08)
## q231-60                   0.33***      0.33***         0.33***
##                           (0.07)       (0.08)          (0.08)
## q260 and above            0.54***      0.54***         0.54***
##                           (0.08)       (0.09)          (0.09)
## q3engineer and programmer 0.09**       0.09*           0.09*
##                           (0.04)       (0.04)          (0.04)
## q3medical professional    -0.11*       -0.11           -0.11
##                           (0.05)       (0.06)          (0.06)
## q3business man/woman      -0.03        -0.03           -0.03
##                           (0.06)       (0.07)          (0.07)
## q3student                 0.12         0.11            0.12
##                           (0.08)       (0.09)          (0.09)
## q4khartoum north          0.07*        0.07            0.06
##                           (0.03)       (0.04)          (0.04)
## q4om durman               -0.04        -0.03           -0.04
##                           (0.03)       (0.03)          (0.04)
## q53-5                     0.17***      0.17***         0.17***
##                           (0.04)       (0.05)          (0.05)
## q56-10                    0.14**       0.14**          0.14**
##                           (0.05)       (0.05)          (0.05)
## q510 and above            0.06         0.06            0.06
##                           (0.04)       (0.05)          (0.05)
## q6Sudan                   0.01         0.01            0.01
##                           (0.05)       (0.06)          (0.06)
## q6Japan                   -0.13        -0.14           -0.13
##                           (0.09)       (0.11)          (0.11)
## q6Germany                 -0.12        -0.12           -0.13
```

```
##                               (0.17)        (0.20)        (0.20)
## q6Czech                        0.26          0.29          0.26
##                               (0.17)        (0.20)        (0.20)
## q7Toyota                       0.09          0.10          0.10
##                               (0.12)        (0.13)        (0.13)
## q7Giad
##
## q7Kia                          0.02          0.02          0.02
##                               (0.05)        (0.06)        (0.06)
## q7Skoda                       -0.33         -0.36         -0.33
##                               (0.23)        (0.27)        (0.27)
## q7Mitsubishi                  -0.11         -0.11         -0.12
##                               (0.16)        (0.18)        (0.19)
## q7Merceds                     -0.03         -0.03         -0.03
##                               (0.13)        (0.15)        (0.16)
## q8Tuson                       -0.04         -0.04         -0.03
##                               (0.11)        (0.12)        (0.12)
## q8Visto                       -0.15         -0.14         -0.15
##                               (0.09)        (0.10)        (0.10)
## q8Click                       -0.09         -0.08         -0.08
##                               (0.05)        (0.06)        (0.06)
## q8Fabia                        0.24          0.24          0.24
##                               (0.15)        (0.17)        (0.17)
## q8Lancer                       0.20          0.21          0.20
##                               (0.16)        (0.18)        (0.19)
## q8Corolla                      0.12          0.12          0.11
##                               (0.08)        (0.10)        (0.10)
## q8Merceds                     -0.14         -0.11         -0.12
##                               (0.15)        (0.16)        (0.17)
## q8Hilux                        0.05          0.04          0.05
##                               (0.13)        (0.15)        (0.15)
## q8Land cruiser                 0.01          0.01          0.01
##                               (0.13)        (0.15)        (0.15)
## q96-10                        -0.06         -0.06         -0.06
##                               (0.03)        (0.04)        (0.04)
## q911-20                       -0.26***      -0.27***      -0.26***
##                               (0.04)        (0.04)        (0.04)
## q921 and above                -0.68***      -0.68***      -0.68***
##                               (0.10)        (0.11)        (0.11)
## q10Medium                      0.11          0.12          0.11
##                               (0.07)        (0.08)        (0.08)
## q10Large                       0.02          0.03          0.02
```

```
##                             (0.12)         (0.14)             (0.14)
## Constant                  -1.20***       -1.20***           -1.20***
##                             (0.10)         (0.11)             (0.12)
## -------------------------------------------------------------------
## Observations               13,888         13,901             13,901
## Log Likelihood         -12,693.21     -12,464.51
## theta                               1.49*** (0.09)
## Akaike Inf. Crit.       25,460.41      25,003.02
## ===================================================================
## Note:                              *p<0.05; **p<0.01; ***p<0.001
```

Plotting and comparing frequency models

```
## 
## Call:
## lm(formula = frequency ~ claim, data = reported)
## 
## Residuals:
##     Min      1Q  Median      3Q     Max
## -67.970 -26.810  -4.563  30.720  65.243
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  184.682     25.039   7.376 2.38e-05 ***
## claim         22.486      2.287   9.832 1.86e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 40.48 on 10 degrees of freedom
## Multiple R-squared:  0.9063,Adjusted R-squared:  0.8969
## F-statistic: 96.67 on 1 and 10 DF,  p-value: 1.856e-06
```

Number of Claim Reported
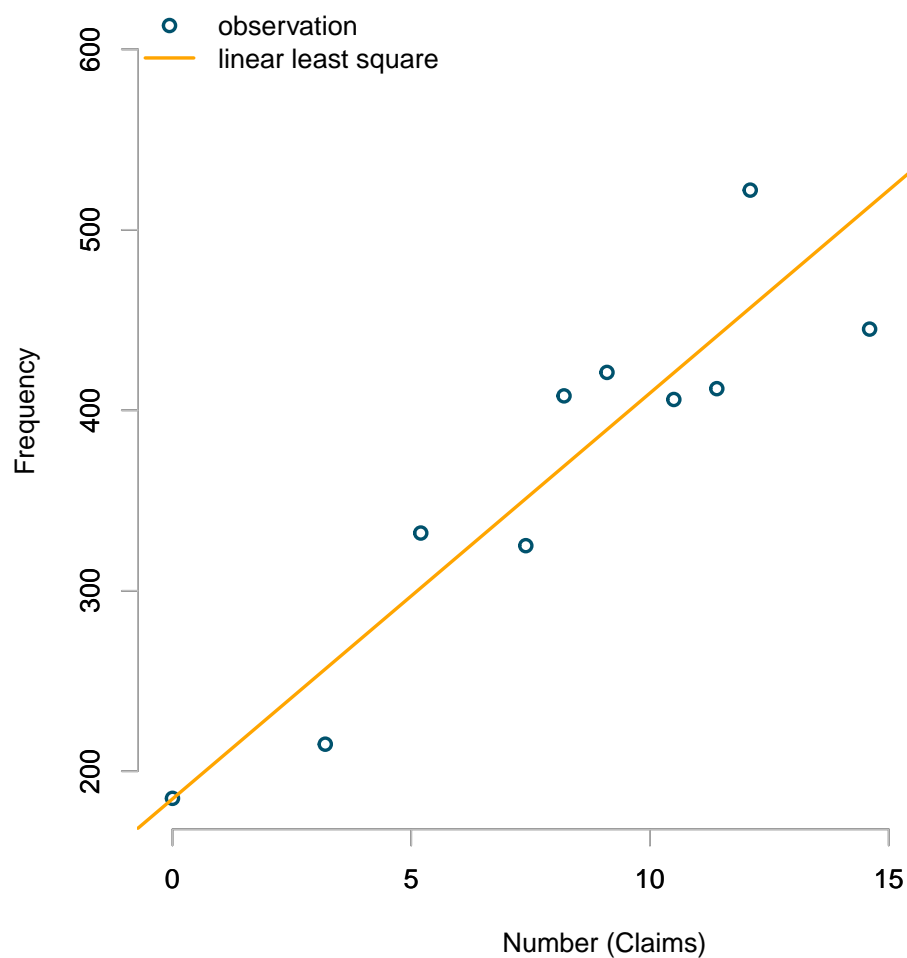

```
## 
## Call:
## glm(formula = frequency ~ claim, family = poisson(link = "log"),
##     data = reported)
## 
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -3.1870  -1.3855  -0.5965   2.0769   3.6313
## 
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept) 5.395581   0.035643  151.38   <2e-16 ***
## claim       0.057754   0.002927   19.73   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
```

```
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 460.137  on 11  degrees of freedom
## Residual deviance:  58.557  on 10  degrees of freedom
## AIC: 155.95
##
## Number of Fisher Scoring iterations: 4
```

Number of Claim Reported
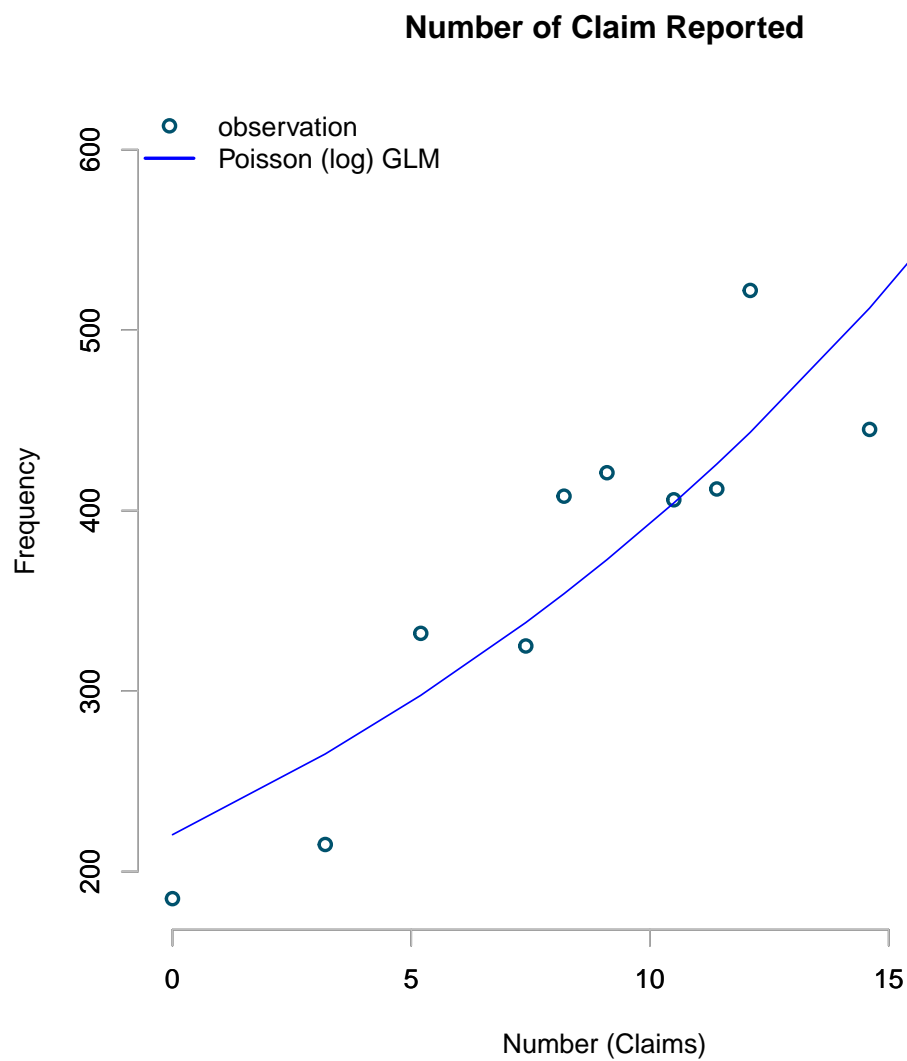

```
##
## Call:
## glm(formula = cbind(frequency, opportunity) ~ claim, family = binomial(link = "logit")
##     data = reported)
##
## Deviance Residuals:
##     Min      1Q   Median      3Q      Max
## -5.2276  -1.7614  -0.7076   2.3871   4.4963
```

```
## 
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.153631   0.047975  -24.05   <2e-16 ***
## claim        0.120225   0.004419   27.20   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## (Dispersion parameter for binomial family taken to be 1)
## 
##     Null deviance: 909.399  on 11  degrees of freedom
## Residual deviance:  91.051  on 10  degrees of freedom
## AIC: 179.46
## 
## Number of Fisher Scoring iterations: 3
```

Number of Claim Reported
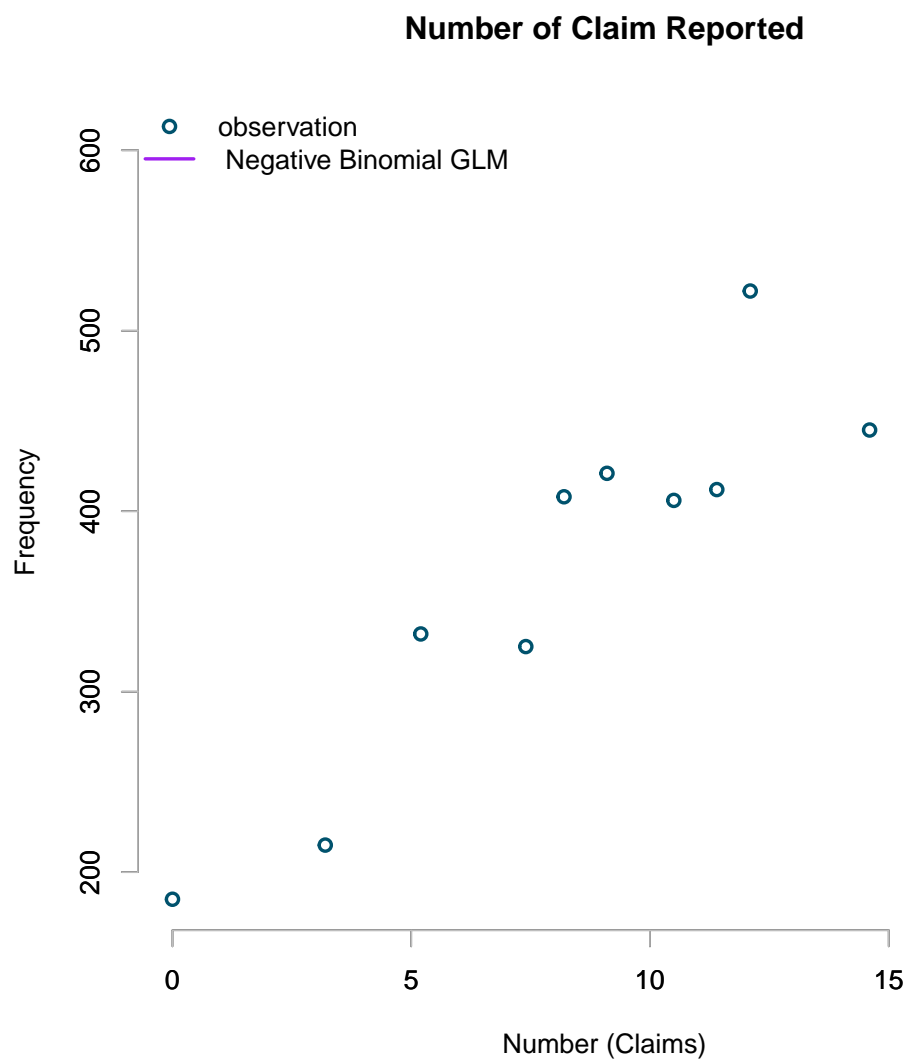
```
##
## Call:
## glm(formula = log(frequency) ~ claim, family = gaussian(link = "identity"),
##     data = reported)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -0.16742   -0.07946  -0.02447   0.13633   0.16145
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 5.337369   0.079241  67.356 1.27e-14 ***
## claim       0.062715   0.007238   8.665 5.81e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.01640839)
##
##     Null deviance: 1.39610  on 11  degrees of freedom
## Residual deviance: 0.16408  on 10  degrees of freedom
## AIC: -11.453
##
## Number of Fisher Scoring iterations: 2
```

Number of Claim Reported

Number of Claim Reported
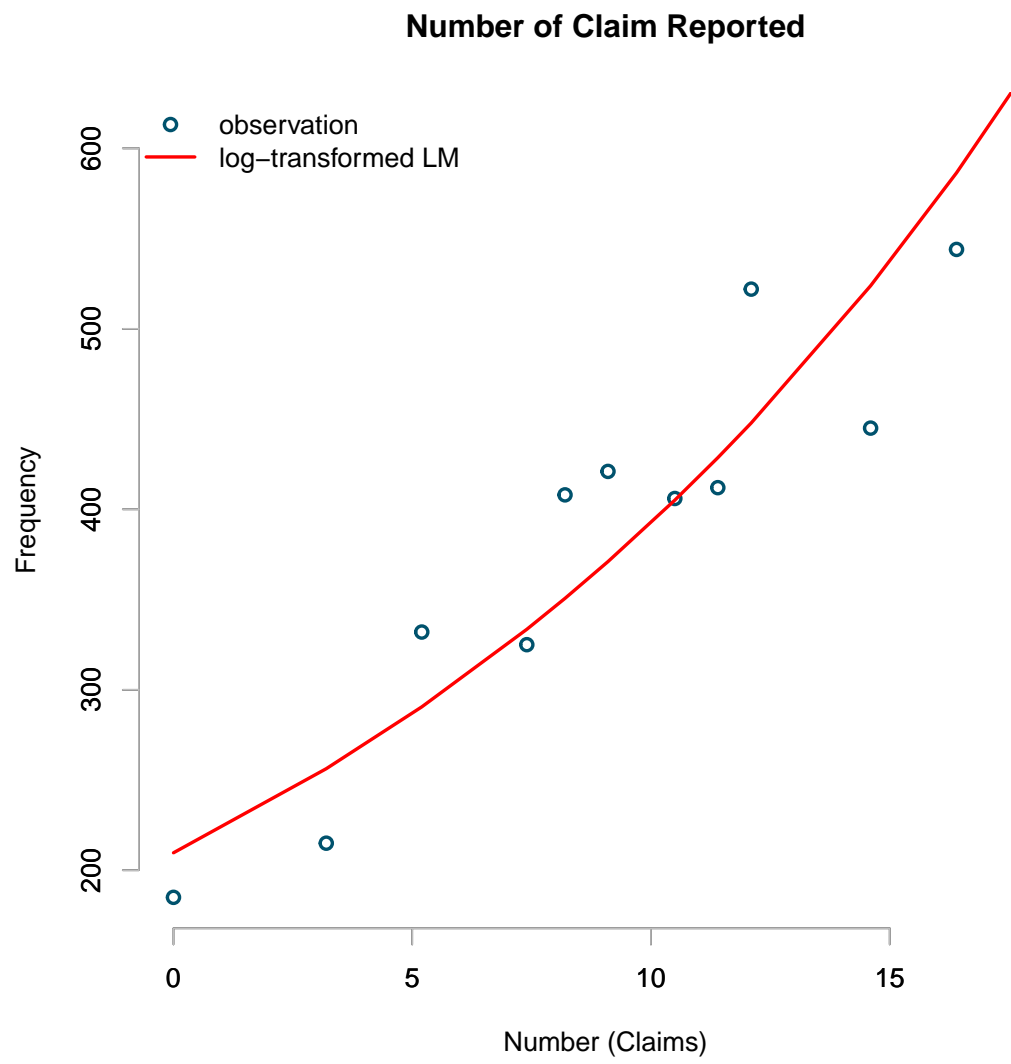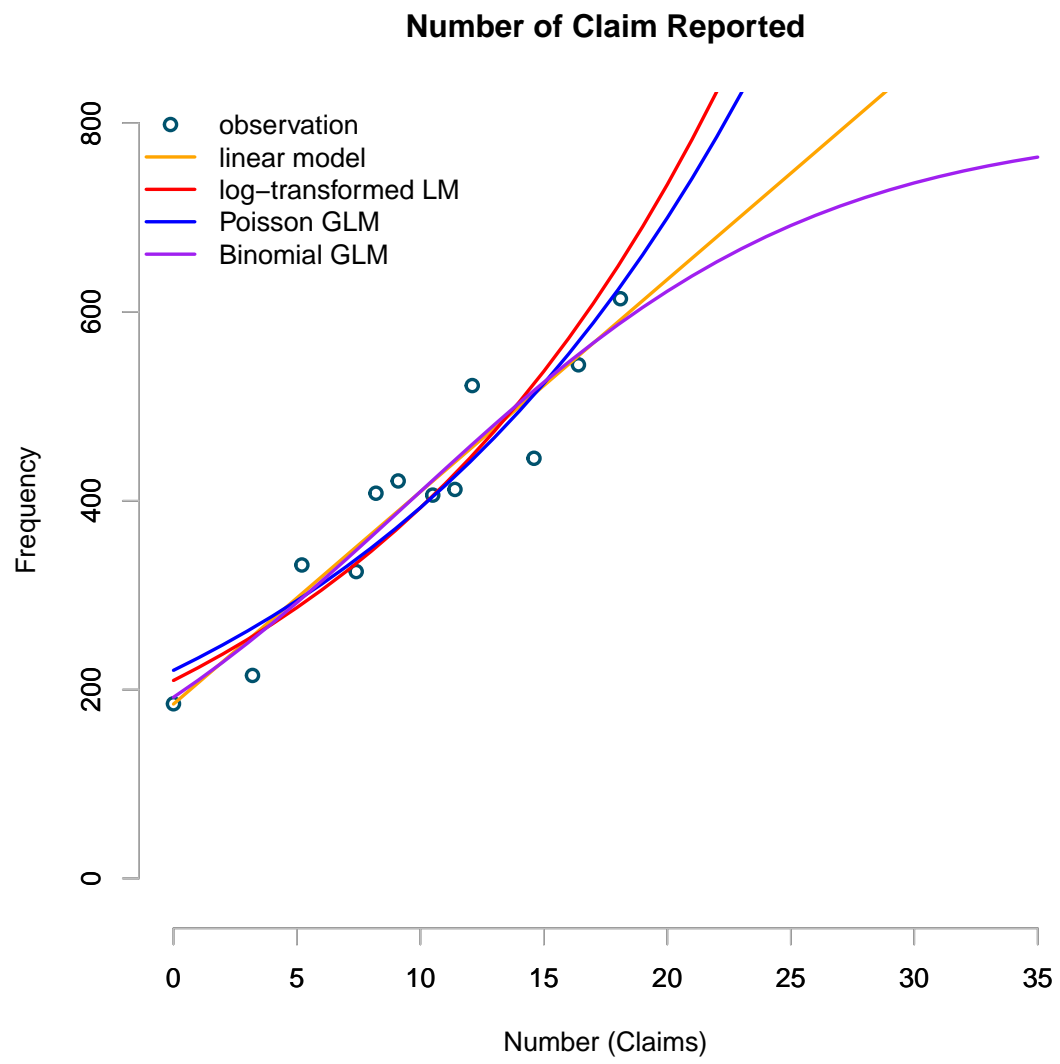
For Claim Severity Estimations

Perform serverity distribution for GLM using Gamma and log Normal Distributions

```
## Error in glm.fit(x = structure(c(1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, :
NA/NaN/Inf in 'y'
## Error in summary(model2):  object 'model2' not found
## Error in anova(model2, test = "Chisq"):  object 'model2' not found
## Error in eval(family$initialize):  non-positive values not allowed for the
'gamma' family
## Error in summary(model3):  object 'model3' not found
## Error in summary.glm(model2):  object 'model2' not found
## Error in is.data.frame(x):  object 'freq_results_model2' not found
```

Combine results of the three Distributions

```
## Error in .stargazer.wrap(..., type = type, title = title, style = style,
:  object 'model2' not found
```