Logistic Regression Tweaked

Model with Default and Duration:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.3549 -0.8535 -0.7429 1.3376 1.7737

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -1.53490 0.17212 -8.918 < 2e-16 \*\*\*

DURATION 0.03238 0.00687 4.714 0.00000243 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 832.70 on 698 degrees of freedom

AIC: 836.7

Number of Fisher Scoring iterations: 4

Log likelihood: -416.352 (2 df)

Null/Residual deviance difference: 22.506 (1 df)

Chi-square p-value: 0.00000109

Pseudo R-Square (optimistic): 0.18050326

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

DURATION 1 22.506 698 832.70 0.000002095 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.96 secs

Rattle timestamp: 2020-10-19 09:06:14 glopi

LM Default and Checking Account

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.1474 -1.0090 -0.4899 1.2078 2.0879

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.0711 0.1426 -0.499 0.6180

TFC\_CHK\_ACCT(0,1] -0.3389 0.2077 -1.632 0.1026

TFC\_CHK\_ACCT(1,2] -0.9222 0.3967 -2.325 0.0201 \*

TFC\_CHK\_ACCT(2,3] -1.9886 0.2357 -8.436 <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: 855.21 on 699 degrees of freedom

Residual deviance: 761.93 on 696 degrees of freedom

AIC: 769.93

Number of Fisher Scoring iterations: 4

Log likelihood: -380.965 (4 df)

Null/Residual deviance difference: 93.280 (3 df)

Chi-square p-value: 0.00000000

Pseudo R-Square (optimistic): 0.35238235

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_CHK\_ACCT 3 93.28 696 761.93 < 2.2e-16 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:08:11 glopi

Default and History

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.4592 -0.8779 -0.6181 1.0842 1.8704

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) 0.6419 0.3907 1.643 0.100401

TFC\_HISTORY(0,1] -0.4187 0.5149 -0.813 0.416119

TFC\_HISTORY(1,2] -1.3966 0.4063 -3.437 0.000588 \*\*\*

TFC\_HISTORY(2,3] -1.5463 0.4850 -3.188 0.001433 \*\*

TFC\_HISTORY(3,4] -2.2000 0.4316 -5.098 0.000000344 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 811.47 on 695 degrees of freedom

AIC: 821.47

Number of Fisher Scoring iterations: 4

Log likelihood: -405.736 (5 df)

Null/Residual deviance difference: 43.738 (4 df)

Chi-square p-value: 0.00000000

Pseudo R-Square (optimistic): 0.25358624

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_HISTORY 4 43.738 695 811.47 0.000000007273 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:09:25 glopi

Default and New Car

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.0302 -0.7912 -0.7912 1.3321 1.6211

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -1.00103 0.09645 -10.379 < 2e-16 \*\*\*

TFC\_NEW\_CAR(0,1] 0.64436 0.19049 3.383 0.000718 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 844.02 on 698 degrees of freedom

AIC: 848.02

Number of Fisher Scoring iterations: 4

Log likelihood: -422.011 (2 df)

Null/Residual deviance difference: 11.189 (1 df)

Chi-square p-value: 0.00044356

Pseudo R-Square (optimistic): 0.12898734

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_NEW\_CAR 1 11.189 698 844.02 0.000823 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.10 secs

Rattle timestamp: 2020-10-19 09:10:14 glopi

Default and Used Car

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.879 -0.879 -0.879 1.509 1.986

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.75170 0.08599 -8.741 < 2e-16 \*\*\*

TFC\_USED\_CAR(0,1] -1.06991 0.33617 -3.183 0.00146 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 842.76 on 698 degrees of freedom

AIC: 846.76

Number of Fisher Scoring iterations: 4

Log likelihood: -421.380 (2 df)

Null/Residual deviance difference: 12.451 (1 df)

Chi-square p-value: 0.00022372

Pseudo R-Square (optimistic): 0.12512230

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_USED\_CAR 1 12.451 698 842.76 0.0004179 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.10 secs

Rattle timestamp: 2020-10-19 09:11:17 glopi

Default and Radio/TV

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8927 -0.8927 -0.7209 1.4918 1.7174

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.7143 0.0953 -7.495 6.65e-14 \*\*\*

TFC\_RADIO.TV(0,1] -0.5005 0.1931 -2.593 0.00953 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 848.19 on 698 degrees of freedom

AIC: 852.19

Number of Fisher Scoring iterations: 4

Log likelihood: -424.095 (2 df)

Null/Residual deviance difference: 7.021 (1 df)

Chi-square p-value: 0.00449902

Pseudo R-Square (optimistic): 0.09853218

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_RADIO.TV 1 7.021 698 848.19 0.008056 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:13:45 glopi

Default and Furniture:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8788 -0.8369 -0.8369 1.5090 1.5616

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.86904 0.09164 -9.483 <2e-16 \*\*\*

TFC\_FURNITURE(0,1] 0.11670 0.21044 0.555 0.579

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 854.91 on 698 degrees of freedom

AIC: 858.91

Number of Fisher Scoring iterations: 4

Log likelihood: -427.453 (2 df)

Null/Residual deviance difference: 0.305 (1 df)

Chi-square p-value: 0.62042896

Pseudo R-Square (optimistic): 0.02096818

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_FURNITURE 1 0.30483 698 854.91 0.5809

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:14:35 glopi

Default and Education:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9925 -0.8364 -0.8364 1.5622 1.5622

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.87035 0.08508 -10.230 <2e-16 \*\*\*

TFC\_EDUCATION(0,1] 0.41837 0.35231 1.188 0.235

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 853.85 on 698 degrees of freedom

AIC: 857.85

Number of Fisher Scoring iterations: 4

Log likelihood: -426.923 (2 df)

Null/Residual deviance difference: 1.365 (1 df)

Chi-square p-value: 0.17260251

Pseudo R-Square (optimistic): 0.04516531

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_EDUCATION 1 1.3647 698 853.85 0.2427

Time taken: 0.07 secs

Rattle timestamp: 2020-10-19 09:15:21 glopi

Default and Retraining:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9178 -0.8371 -0.8371 1.5613 1.5613

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.8683 0.0869 -9.993 <2e-16 \*\*\*

TFC\_RETRAINING(0,1] 0.2217 0.2772 0.800 0.424

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 854.58 on 698 degrees of freedom

AIC: 858.58

Number of Fisher Scoring iterations: 4

Log likelihood: -427.291 (2 df)

Null/Residual deviance difference: 0.627 (1 df)

Chi-square p-value: 0.36802205

Pseudo R-Square (optimistic): 0.03028516

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_RETRAINING 1 0.62745 698 854.58 0.4283

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:16:08 glopi

Default and Savings Account:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9282 -0.9282 -0.6501 1.4490 2.0237

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.61904 0.09995 -6.193 5.88e-10 \*\*\*

TFC\_SAV\_ACCT(0,1] -0.03155 0.27092 -0.116 0.907296

TFC\_SAV\_ACCT(1,2] -0.82788 0.40546 -2.042 0.041171 \*

TFC\_SAV\_ACCT(2,3] -1.29050 0.54500 -2.368 0.017890 \*

TFC\_SAV\_ACCT(3,4] -0.95994 0.26514 -3.620 0.000294 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 831.53 on 695 degrees of freedom

AIC: 841.53

Number of Fisher Scoring iterations: 4

Log likelihood: -415.764 (5 df)

Null/Residual deviance difference: 23.681 (4 df)

Chi-square p-value: 0.00004266

Pseudo R-Square (optimistic): 0.17665281

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_SAV\_ACCT 4 23.681 695 831.53 0.00009252 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.11 secs

Rattle timestamp: 2020-10-19 09:18:20 glopi

Default and Employment:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.0701 -0.8489 -0.7611 1.2887 1.7597

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.5680 0.3036 -1.871 0.0613 .

TFC\_EMPLOYMENT(0,1] 0.3102 0.3563 0.871 0.3840

TFC\_EMPLOYMENT(1,2] -0.2673 0.3348 -0.799 0.4245

TFC\_EMPLOYMENT(2,3] -0.7413 0.3731 -1.987 0.0469 \*

TFC\_EMPLOYMENT(3,4] -0.5228 0.3510 -1.489 0.1364

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 837.84 on 695 degrees of freedom

AIC: 847.84

Number of Fisher Scoring iterations: 4

Log likelihood: -418.921 (5 df)

Null/Residual deviance difference: 17.368 (4 df)

Chi-square p-value: 0.00073500

Pseudo R-Square (optimistic): 0.15895580

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_EMPLOYMENT 4 17.368 695 837.84 0.001639 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.07 secs

Rattle timestamp: 2020-10-19 09:19:11 glopi

Default and Co-Applicant

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9695 -0.8401 -0.8401 1.5575 1.5575

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.86001 0.08414 -10.221 <2e-16 \*\*\*

TFC\_CO.APPLICANT(0,1] 0.34918 0.42995 0.812 0.417

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 854.57 on 698 degrees of freedom

AIC: 858.57

Number of Fisher Scoring iterations: 4

Log likelihood: -427.285 (2 df)

Null/Residual deviance difference: 0.640 (1 df)

Chi-square p-value: 0.36230684

Pseudo R-Square (optimistic): 0.03083784

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_CO.APPLICANT 1 0.63959 698 854.57 0.4239

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:20:06 glopi

Default and Guarantor

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8609 -0.8609 -0.8609 1.5312 2.0140

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.80167 0.08406 -9.537 <2e-16 \*\*\*

TFC\_GUARANTOR(0,1] -1.08540 0.48720 -2.228 0.0259 \*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 848.93 on 698 degrees of freedom

AIC: 852.93

Number of Fisher Scoring iterations: 4

Log likelihood: -424.465 (2 df)

Null/Residual deviance difference: 6.280 (1 df)

Chi-square p-value: 0.00688855

Pseudo R-Square (optimistic): 0.08805409

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_GUARANTOR 1 6.2805 698 848.93 0.01221 \*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:21:10 glopi

Default and Present Resident:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9005 -0.8300 -0.8203 1.4823 1.6364

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.91629 0.23205 -3.949 0.0000786 \*\*\*

TFC\_PRESENT\_RESIDENT(1,2] 0.22314 0.27126 0.823 0.411

TFC\_PRESENT\_RESIDENT(2,3] -0.11861 0.32255 -0.368 0.713

TFC\_PRESENT\_RESIDENT(3,4] 0.02754 0.26696 0.103 0.918

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 853.12 on 696 degrees of freedom

AIC: 861.12

Number of Fisher Scoring iterations: 4

Log likelihood: -426.559 (4 df)

Null/Residual deviance difference: 2.093 (3 df)

Chi-square p-value: 0.20269458

Pseudo R-Square (optimistic): 0.05472840

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_PRESENT\_RESIDENT 3 2.0927 696 853.12 0.5534

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:22:04 glopi

Default and Real Estate

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9028 -0.9028 -0.6971 1.4796 1.7515

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.68710 0.09515 -7.221 5.16e-13 \*\*\*

TFC\_REAL\_ESTATE(0,1] -0.60388 0.19502 -3.097 0.00196 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 845.07 on 698 degrees of freedom

AIC: 849.07

Number of Fisher Scoring iterations: 4

Log likelihood: -422.535 (2 df)

Null/Residual deviance difference: 10.139 (1 df)

Chi-square p-value: 0.00078745

Pseudo R-Square (optimistic): 0.11799480

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_REAL\_ESTATE 1 10.139 698 845.07 0.001452 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.07 secs

Rattle timestamp: 2020-10-19 09:23:33 glopi

Default and Property Unknown

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.0717 -0.8044 -0.8044 1.2869 1.6037

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.96248 0.09152 -10.52 < 2e-16 \*\*\*

TFC\_PROP\_UNKN\_NONE(0,1] 0.70870 0.21872 3.24 0.00119 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 845.01 on 698 degrees of freedom

AIC: 849.01

Number of Fisher Scoring iterations: 4

Log likelihood: -422.505 (2 df)

Null/Residual deviance difference: 10.200 (1 df)

Chi-square p-value: 0.00076176

Pseudo R-Square (optimistic): 0.12408054

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_PROP\_UNKN\_NONE 1 10.2 698 845.01 0.001405 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:24:25 glopi

Default and Other Installment Loans

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.0560 -0.7978 -0.7978 1.3038 1.6124

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.98163 0.09357 -10.490 < 2e-16 \*\*\*

TFC\_OTHER\_INSTALL(0,1] 0.68924 0.20423 3.375 0.000739 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 844.12 on 698 degrees of freedom

AIC: 848.12

Number of Fisher Scoring iterations: 4

Log likelihood: -422.059 (2 df)

Null/Residual deviance difference: 11.093 (1 df)

Chi-square p-value: 0.00046736

Pseudo R-Square (optimistic): 0.12901059

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_OTHER\_INSTALL 1 11.093 698 844.12 0.0008667 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:25:18 glopi

Default and Rent (Rent highly correlated with Own)

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9931 -0.8096 -0.8096 1.3736 1.5969

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.94725 0.09343 -10.14 <2e-16 \*\*\*

TFC\_RENT(0,1] 0.49705 0.20208 2.46 0.0139 \*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 849.31 on 698 degrees of freedom

AIC: 853.31

Number of Fisher Scoring iterations: 4

Log likelihood: -424.653 (2 df)

Null/Residual deviance difference: 5.903 (1 df)

Chi-square p-value: 0.00857994

Pseudo R-Square (optimistic): 0.09351568

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_RENT 1 5.9033 698 849.31 0.01511 \*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:26:09 glopi

Default and Own

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.9993 -0.7804 -0.7804 1.3666 1.6355

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.4346 0.1444 -3.009 0.002619 \*\*

TFC\_OWN\_RES(0,1] -0.5983 0.1767 -3.387 0.000707 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 843.90 on 698 degrees of freedom

AIC: 847.9

Number of Fisher Scoring iterations: 4

Log likelihood: -421.952 (2 df)

Null/Residual deviance difference: 11.305 (1 df)

Chi-square p-value: 0.00041627

Pseudo R-Square (optimistic): 0.12884977

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_OWN\_RES 1 11.305 698 843.90 0.0007729 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.05 secs

Rattle timestamp: 2020-10-19 09:26:56 glopi

Default and Telephone

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8466 -0.8466 -0.8415 1.5492 1.5557

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.84170 0.10573 -7.961 1.71e-15 \*\*\*

TFC\_TELEPHONE(0,1] -0.01427 0.16899 -0.084 0.933

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 855.20 on 698 degrees of freedom

AIC: 859.2

Number of Fisher Scoring iterations: 4

Log likelihood: -427.601 (2 df)

Null/Residual deviance difference: 0.007 (1 df)

Chi-square p-value: 4.70677400

Pseudo R-Square (optimistic): 0.00319153

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

TFC\_TELEPHONE 1 0.0071331 698 855.20 0.9327

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:27:44 glopi

Default and Duration

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.3549 -0.8535 -0.7429 1.3376 1.7737

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -1.53490 0.17212 -8.918 < 2e-16 \*\*\*

DURATION 0.03238 0.00687 4.714 0.00000243 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 832.70 on 698 degrees of freedom

AIC: 836.7

Number of Fisher Scoring iterations: 4

Log likelihood: -416.352 (2 df)

Null/Residual deviance difference: 22.506 (1 df)

Chi-square p-value: 0.00000109

Pseudo R-Square (optimistic): 0.18050326

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

DURATION 1 22.506 698 832.70 0.000002095 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:28:49 glopi

Default and Amount:

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-1.3437 -0.8283 -0.7802 1.4024 1.6795

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -1.17314011 0.12621624 -9.295 < 2e-16 \*\*\*

AMOUNT 0.00009812 0.00002779 3.531 0.000414 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 842.79 on 698 degrees of freedom

AIC: 846.79

Number of Fisher Scoring iterations: 4

Log likelihood: -421.393 (2 df)

Null/Residual deviance difference: 12.423 (1 df)

Chi-square p-value: 0.00022704

Pseudo R-Square (optimistic): 0.14094581

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

AMOUNT 1 12.423 698 842.79 0.000424 \*\*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.09 secs

Rattle timestamp: 2020-10-19 09:29:59 glopi

Default and Installment Rate

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8770 -0.8770 -0.8122 1.5111 1.6346

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -1.12215 0.24448 -4.590 0.00000444 \*\*\*

INSTALL\_RATE 0.09124 0.07582 1.203 0.229

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 853.75 on 698 degrees of freedom

AIC: 857.75

Number of Fisher Scoring iterations: 4

Log likelihood: -426.874 (2 df)

Null/Residual deviance difference: 1.462 (1 df)

Chi-square p-value: 0.15879628

Pseudo R-Square (optimistic): 0.04555622

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

INSTALL\_RATE 1 1.4624 698 853.75 0.2266

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:42:30 glopi

Default and Number of Credits

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8785 -0.8785 -0.7935 1.5093 1.8343

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.5120 0.2199 -2.329 0.0199 \*

NUM\_CREDITS -0.2412 0.1484 -1.625 0.1041

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 852.48 on 698 degrees of freedom

AIC: 856.48

Number of Fisher Scoring iterations: 4

Log likelihood: -426.239 (2 df)

Null/Residual deviance difference: 2.731 (1 df)

Chi-square p-value: 0.06160951

Pseudo R-Square (optimistic): 0.06225742

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

NUM\_CREDITS 1 2.7312 698 852.48 0.0984 .

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.08 secs

Rattle timestamp: 2020-10-19 09:43:57 glopi

Default and Number of Dependents

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-0.8463 -0.8463 -0.8463 1.5496 1.5633

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) -0.8119 0.2744 -2.959 0.00309 \*\*

NUM\_DEPENDENTS -0.0305 0.2259 -0.135 0.89262

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 855.19 on 698 degrees of freedom

AIC: 859.19

Number of Fisher Scoring iterations: 4

Log likelihood: -427.596 (2 df)

Null/Residual deviance difference: 0.018 (1 df)

Chi-square p-value: 2.92445411

Pseudo R-Square (optimistic): 0.00510204

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

NUM\_DEPENDENTS 1 0.018272 698 855.19 0.8925

Time taken: 0.83 secs

Rattle timestamp: 2020-10-19 09:45:00 glopi

**LOGISTIC REGRESSION**

**Variables:**

Checking, history, new car, used car, radio/tv, savings, employment, guarantor, real estate, property unknown, other installment, duration, amount

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-2.0796 -0.7339 -0.3953 0.7903 2.5046

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) 0.02151263 0.64043375 0.034 0.97320

DURATION 0.03375664 0.01034346 3.264 0.00110 \*\*

AMOUNT 0.00003829 0.00004533 0.845 0.39824

TFC\_CHK\_ACCT(0,1] -0.32177664 0.24217065 -1.329 0.18394

TFC\_CHK\_ACCT(1,2] -1.08113383 0.42849307 -2.523 0.01163 \*

TFC\_CHK\_ACCT(2,3] -1.80796811 0.27018276 -6.692 2.21e-11 \*\*\*

TFC\_HISTORY(0,1] -0.48018197 0.60132517 -0.799 0.42456

TFC\_HISTORY(1,2] -0.83867472 0.46616418 -1.799 0.07200 .

TFC\_HISTORY(2,3] -1.01263646 0.54950345 -1.843 0.06536 .

TFC\_HISTORY(3,4] -1.43806598 0.49470345 -2.907 0.00365 \*\*

TFC\_NEW\_CAR(0,1] 0.68864248 0.24904257 2.765 0.00569 \*\*

TFC\_USED\_CAR(0,1] -1.14617787 0.41513524 -2.761 0.00576 \*\*

TFC\_RADIO.TV(0,1] -0.10030263 0.25266361 -0.397 0.69138

TFC\_SAV\_ACCT(0,1] 0.02203566 0.33088516 0.067 0.94690

TFC\_SAV\_ACCT(1,2] -0.37518109 0.46100438 -0.814 0.41574

TFC\_SAV\_ACCT(2,3] -0.72482786 0.60257867 -1.203 0.22902

TFC\_SAV\_ACCT(3,4] -0.82469322 0.32143850 -2.566 0.01030 \*

TFC\_EMPLOYMENT(0,1] 0.43472036 0.42513873 1.023 0.30653

TFC\_EMPLOYMENT(1,2] 0.12687595 0.40442270 0.314 0.75373

TFC\_EMPLOYMENT(2,3] -0.53048750 0.44535283 -1.191 0.23359

TFC\_EMPLOYMENT(3,4] -0.05343526 0.41412594 -0.129 0.89733

TFC\_GUARANTOR(0,1] -1.55173733 0.53439696 -2.904 0.00369 \*\*

TFC\_REAL\_ESTATE(0,1] -0.26329664 0.24057708 -1.094 0.27376

TFC\_PROP\_UNKN\_NONE(0,1] 0.31885288 0.28368398 1.124 0.26102

TFC\_OTHER\_INSTALL(0,1] 0.67516637 0.25228352 2.676 0.00745 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 654.03 on 675 degrees of freedom

AIC: 704.03

Number of Fisher Scoring iterations: 5

Log likelihood: -327.017 (25 df)

Null/Residual deviance difference: 201.176 (24 df)

Chi-square p-value: 0.00000000

Pseudo R-Square (optimistic): 0.51505554

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

DURATION 1 22.506 698 832.70 0.000002095 \*\*\*

AMOUNT 1 0.507 697 832.20 0.4766566

TFC\_CHK\_ACCT 3 92.130 694 740.07 < 2.2e-16 \*\*\*

TFC\_HISTORY 4 20.635 690 719.43 0.0003741 \*\*\*

TFC\_NEW\_CAR 1 12.724 689 706.71 0.0003609 \*\*\*

TFC\_USED\_CAR 1 9.580 688 697.13 0.0019667 \*\*

TFC\_RADIO.TV 1 0.588 687 696.54 0.4430976

TFC\_SAV\_ACCT 4 8.226 683 688.31 0.0836474 .

TFC\_EMPLOYMENT 4 11.941 679 676.37 0.0177990 \*

TFC\_GUARANTOR 1 11.430 678 664.94 0.0007227 \*\*\*

TFC\_REAL\_ESTATE 1 2.191 677 662.75 0.1388288

TFC\_PROP\_UNKN\_NONE 1 1.626 676 661.13 0.2022158

TFC\_OTHER\_INSTALL 1 7.092 675 654.03 0.0077424 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.23 secs

Rattle timestamp: 2020-10-19 10:02:22 glopi

**LOGISTIC REGRESSION TWO**

**Variables:**

Duration, amount, checking, history, new car, used car, savings, guarantor, other installment

Summary of the Logistic Regression model (built using glm):

Call:

glm(formula = DEFAULT ~ ., family = binomial(link = "logit"),

data = crs$dataset[crs$train, c(crs$input, crs$target)])

Deviance Residuals:

Min 1Q Median 3Q Max

-2.0180 -0.7616 -0.4180 0.8408 2.5402

Coefficients:

Estimate Std. Error z value Pr(>|z|)

(Intercept) 0.14162265 0.50313306 0.281 0.77834

DURATION 0.03170668 0.01008752 3.143 0.00167 \*\*

AMOUNT 0.00004906 0.00004379 1.121 0.26248

TFC\_CHK\_ACCT(0,1] -0.32491649 0.23715033 -1.370 0.17066

TFC\_CHK\_ACCT(1,2] -1.05373698 0.42178311 -2.498 0.01248 \*

TFC\_CHK\_ACCT(2,3] -1.85118418 0.26573742 -6.966 3.26e-12 \*\*\*

TFC\_HISTORY(0,1] -0.50424231 0.59085406 -0.853 0.39343

TFC\_HISTORY(1,2] -0.95995566 0.45767942 -2.097 0.03595 \*

TFC\_HISTORY(2,3] -1.19212173 0.54161050 -2.201 0.02773 \*

TFC\_HISTORY(3,4] -1.58827884 0.48369430 -3.284 0.00102 \*\*

TFC\_NEW\_CAR(0,1] 0.69828940 0.22779880 3.065 0.00217 \*\*

TFC\_USED\_CAR(0,1] -1.02880933 0.40005178 -2.572 0.01012 \*

TFC\_SAV\_ACCT(0,1] -0.01115719 0.32148712 -0.035 0.97232

TFC\_SAV\_ACCT(1,2] -0.39271565 0.45386127 -0.865 0.38689

TFC\_SAV\_ACCT(2,3] -0.74098547 0.58867433 -1.259 0.20813

TFC\_SAV\_ACCT(3,4] -0.87876911 0.31401342 -2.799 0.00513 \*\*

TFC\_GUARANTOR(0,1] -1.71833364 0.52291994 -3.286 0.00102 \*\*

TFC\_OTHER\_INSTALL(0,1] 0.74381646 0.24896091 2.988 0.00281 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 855.21 on 699 degrees of freedom

Residual deviance: 666.79 on 682 degrees of freedom

AIC: 702.79

Number of Fisher Scoring iterations: 5

Log likelihood: -333.396 (18 df)

Null/Residual deviance difference: 188.417 (17 df)

Chi-square p-value: 0.00000000

Pseudo R-Square (optimistic): 0.49963175

==== ANOVA ====

Analysis of Deviance Table

Model: binomial, link: logit

Response: DEFAULT

Terms added sequentially (first to last)

Df Deviance Resid. Df Resid. Dev Pr(>Chi)

NULL 699 855.21

DURATION 1 22.506 698 832.70 0.000002095 \*\*\*

AMOUNT 1 0.507 697 832.20 0.4766566

TFC\_CHK\_ACCT 3 92.130 694 740.07 < 2.2e-16 \*\*\*

TFC\_HISTORY 4 20.635 690 719.43 0.0003741 \*\*\*

TFC\_NEW\_CAR 1 12.724 689 706.71 0.0003609 \*\*\*

TFC\_USED\_CAR 1 9.580 688 697.13 0.0019667 \*\*

TFC\_SAV\_ACCT 4 7.997 684 689.13 0.0917000 .

TFC\_GUARANTOR 1 13.501 683 675.63 0.0002385 \*\*\*

TFC\_OTHER\_INSTALL 1 8.838 682 666.79 0.0029495 \*\*

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Time taken: 0.20 secs

Rattle timestamp: 2020-10-19 10:34:31 glopi

**ERROR MATRIX:**

Error matrix for the Linear model on Credit Data.csv [validate] (counts):

Predicted

Actual 0 1 Error

0 94 16 14.5

1 23 17 57.5

Error matrix for the Linear model on Credit Data.csv [validate] (proportions):

Predicted

Actual 0 1 Error

0 62.7 10.7 14.5

1 15.3 11.3 57.5

Overall error: 26%, Averaged class error: 36%

Rattle timestamp: 2020-10-19 10:37:38 glopi

**RISK CHART:**

Summary Linear model (built using glm) on Credit Data.csv [validate] by probability cutoffs.

The sequence has been truncated to just 100 from 151.

Recall Caseload Precision

0.0245601785604 1.000 1.00000000 0.2666667

0.0279242253805 1.000 0.98666667 0.2702703

0.0348542644211 1.000 0.98000000 0.2721088

0.042114514598 1.000 0.96666667 0.2758621

0.0448705237105 1.000 0.96000000 0.2777778

0.047686897005 1.000 0.94666667 0.2816901

0.0510611489871 1.000 0.94000000 0.2836879

0.054390601551 1.000 0.92666667 0.2877698

0.0551378693328 1.000 0.92000000 0.2898551

0.0600828309161 0.975 0.90666667 0.2867647

0.0613754823996 0.975 0.90000000 0.2888889

0.067442573365 0.975 0.88666667 0.2932331

0.0721593356217 0.950 0.88000000 0.2878788

0.0749377510846 0.950 0.86666667 0.2923077

0.0780036781782 0.950 0.86000000 0.2945736

0.0801184335409 0.950 0.84666667 0.2992126

0.0829665031621 0.950 0.84000000 0.3015873

0.0873592253768 0.950 0.82666667 0.3064516

0.0876598963268 0.950 0.82000000 0.3089431

0.0891941363445 0.950 0.80666667 0.3140496

0.0899031323227 0.950 0.80000000 0.3166667

0.0922870769746 0.950 0.78666667 0.3220339

0.0949932114549 0.950 0.78000000 0.3247863

0.0955666695713 0.950 0.76666667 0.3304348

0.0994284063253 0.925 0.76000000 0.3245614

0.1031987760755 0.925 0.74666667 0.3303571

0.1036328247742 0.925 0.74000000 0.3333333

0.109159909412 0.925 0.72666667 0.3394495

0.1103372885843 0.925 0.72000000 0.3425926

0.1164458443011 0.900 0.70666667 0.3396226

0.1166074765156 0.900 0.70000000 0.3428571

0.1214896966382 0.900 0.68666667 0.3495146

0.1218098388023 0.900 0.68000000 0.3529412

0.1401887547922 0.900 0.66666667 0.3600000

0.1482974905128 0.875 0.65333333 0.3571429

0.1536024008665 0.875 0.64666667 0.3608247

0.164224079121 0.875 0.63333333 0.3684211

0.1685770096178 0.875 0.62666667 0.3723404

0.1761545147184 0.875 0.61333333 0.3804348

0.1763504405448 0.875 0.60666667 0.3846154

0.183187358378 0.825 0.59333333 0.3707865

0.1860973893302 0.825 0.58666667 0.3750000

0.1955983407804 0.825 0.57333333 0.3837209

0.1961338156161 0.825 0.56666667 0.3882353

0.2008247370944 0.825 0.55333333 0.3975904

0.2014531387087 0.825 0.54666667 0.4024390

0.2106143964618 0.825 0.53333333 0.4125000

0.2112784624838 0.825 0.52666667 0.4177215

0.2171591662876 0.825 0.51333333 0.4285714

0.2304961218595 0.800 0.50666667 0.4210526

0.2385162041924 0.800 0.49333333 0.4324324

0.2388588844282 0.775 0.48666667 0.4246575

0.2485692007582 0.750 0.47333333 0.4225352

0.252224133295 0.725 0.46666667 0.4142857

0.2643199968341 0.700 0.45333333 0.4117647

0.2644644637909 0.700 0.44666667 0.4179104

0.2928440661629 0.675 0.43333333 0.4153846

0.2999490725676 0.675 0.42666667 0.4218750

0.3072837232495 0.675 0.41333333 0.4354839

0.311619309718 0.650 0.40666667 0.4262295

0.3256236964229 0.650 0.39333333 0.4406780

0.3321393344638 0.650 0.38666667 0.4482759

0.3445860181602 0.650 0.37333333 0.4642857

0.346935521571 0.625 0.36666667 0.4545455

0.3582402446424 0.625 0.35333333 0.4716981

0.3732684842835 0.600 0.34666667 0.4615385

0.3881627229959 0.600 0.33333333 0.4800000

0.3940284861733 0.600 0.32000000 0.5000000

0.3953469006256 0.600 0.31333333 0.5106383

0.4060371820228 0.575 0.30000000 0.5111111

0.4172716476383 0.575 0.29333333 0.5227273

0.4247784448504 0.550 0.28000000 0.5238095

0.4374892244781 0.550 0.27333333 0.5365854

0.45211673179 0.550 0.26000000 0.5641026

0.4564095236501 0.525 0.25333333 0.5526316

0.4966402024268 0.475 0.24000000 0.5277778

0.4990183415096 0.450 0.23333333 0.5142857

0.5094270193877 0.425 0.22000000 0.5151515

0.5128836947809 0.400 0.21333333 0.5000000

0.5508951151099 0.400 0.20000000 0.5333333

0.5514464158203 0.400 0.19333333 0.5517241

0.5738742532776 0.375 0.18000000 0.5555556

0.5910074838467 0.350 0.17333333 0.5384615

0.5992665372652 0.350 0.16000000 0.5833333

0.6077875016504 0.350 0.15333333 0.6086957

0.6265279489565 0.325 0.14000000 0.6190476

0.6441854803534 0.325 0.13333333 0.6500000

0.6564897877541 0.325 0.12000000 0.7222222

0.6580053453667 0.300 0.11333333 0.7058824

0.7041928332196 0.300 0.10000000 0.8000000

0.7062532748921 0.275 0.09333333 0.7857143

0.714897025023 0.225 0.08000000 0.7500000

0.7260115220847 0.200 0.07333333 0.7272727

0.7415361041112 0.200 0.06000000 0.8888889

0.7636252636385 0.175 0.05333333 0.8750000

0.7662578944548 0.125 0.04000000 0.8333333

0.7885873009781 0.100 0.03333333 0.8000000

0.8593312419684 0.050 0.02000000 0.6666667

0.8863787708353 0.025 0.01333333 0.5000000

1.0 0.000 0.00000000 1.0000000

Rattle timestamp: 2020-10-19 10:39:24 glopi

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The area under the Risk and Recall curves for Linear model

Area under the Recall (green) curve: 80% (0.797)

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**TESTING DATASET:**

**ERROR MATRIX:**

Error matrix for the Linear model on Credit Data.csv [test] (counts):

Predicted

Actual 0 1 Error

0 85 15 15

1 26 24 52

Error matrix for the Linear model on Credit Data.csv [test] (proportions):

Predicted

Actual 0 1 Error

0 56.7 10 15

1 17.3 16 52

Overall error: 27.3%, Averaged class error: 33.5%

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**Risk Performance:**

**Summary Linear model (built using glm) on Credit Data.csv [test] by probability cutoffs.**

**The sequence has been truncated to just 100 from 151.**

**Recall Caseload Precision**

**0.0149638729081 1.00 1.00000000 0.3333333**

**0.0193321794225 0.98 0.98666667 0.3310811**

**0.0233367410312 0.98 0.98000000 0.3333333**

**0.0289864635349 0.98 0.96666667 0.3379310**

**0.0345386229493 0.98 0.96000000 0.3402778**

**0.0410369528421 0.98 0.94666667 0.3450704**

**0.0422910887002 0.98 0.94000000 0.3475177**

**0.046097422391 0.98 0.92666667 0.3525180**

**0.0494238591758 0.98 0.92000000 0.3550725**

**0.0530020353651 0.98 0.90666667 0.3602941**

**0.053154307427 0.98 0.90000000 0.3629630**

**0.0535958285166 0.98 0.88666667 0.3684211**

**0.0585582993249 0.98 0.88000000 0.3712121**

**0.0740988622682 0.98 0.86666667 0.3769231**

**0.0754746127059 0.98 0.86000000 0.3798450**

**0.0803664046704 0.98 0.84666667 0.3858268**

**0.0804752571013 0.98 0.84000000 0.3888889**

**0.0810976752024 0.98 0.82666667 0.3951613**

**0.0813390112673 0.98 0.82000000 0.3983740**

**0.0818920870469 0.96 0.80666667 0.3966942**

**0.0851778272426 0.96 0.80000000 0.4000000**

**0.0924397744224 0.96 0.78666667 0.4067797**

**0.0978260337433 0.96 0.78000000 0.4102564**

**0.1001869504824 0.96 0.76666667 0.4173913**

**0.1042340967737 0.96 0.76000000 0.4210526**

**0.1110267013881 0.96 0.74666667 0.4285714**

**0.111293913515 0.96 0.74000000 0.4324324**

**0.1138943303015 0.94 0.72666667 0.4311927**

**0.1151974381146 0.94 0.72000000 0.4351852**

**0.1244236252324 0.94 0.70666667 0.4433962**

**0.1296840800179 0.94 0.70000000 0.4476190**

**0.1344021179103 0.94 0.68666667 0.4563107**

**0.1352410937496 0.94 0.68000000 0.4607843**

**0.1438958776162 0.94 0.66666667 0.4700000**

**0.1526874903252 0.92 0.65333333 0.4693878**

**0.1673474171381 0.92 0.64666667 0.4742268**

**0.1710773052143 0.92 0.63333333 0.4842105**

**0.175356504569 0.92 0.62666667 0.4893617**

**0.1882031928441 0.92 0.61333333 0.5000000**

**0.2032208755395 0.92 0.60666667 0.5054945**

**0.2157502315398 0.90 0.59333333 0.5056180**

**0.2167562156535 0.88 0.58666667 0.5000000**

**0.2325951807111 0.88 0.57333333 0.5116279**

**0.23423190148 0.88 0.56666667 0.5176471**

**0.2406968556696 0.86 0.55333333 0.5180723**

**0.2487179341857 0.84 0.54666667 0.5121951**

**0.2543186793366 0.82 0.53333333 0.5125000**

**0.2666631263667 0.82 0.52666667 0.5189873**

**0.2730717387299 0.82 0.51333333 0.5324675**

**0.2749932683896 0.80 0.50666667 0.5263158**

**0.276404015243 0.80 0.49333333 0.5405405**

**0.2802126613582 0.80 0.48666667 0.5479452**

**0.2879198818938 0.80 0.47333333 0.5633803**

**0.2893506186754 0.80 0.46666667 0.5714286**

**0.3062326013221 0.80 0.45333333 0.5882353**

**0.3113259407063 0.80 0.44666667 0.5970149**

**0.3161060957333 0.76 0.43333333 0.5846154**

**0.3313944985285 0.74 0.42666667 0.5781250**

**0.3463906759375 0.70 0.41333333 0.5645161**

**0.3481098315941 0.70 0.40666667 0.5737705**

**0.3529465121529 0.70 0.39333333 0.5932203**

**0.3659293299104 0.68 0.38666667 0.5862069**

**0.3738039534332 0.66 0.37333333 0.5892857**

**0.3774644807214 0.66 0.36666667 0.6000000**

**0.3928085544861 0.64 0.35333333 0.6037736**

**0.3930885605677 0.62 0.34666667 0.5961538**

**0.4052735077311 0.58 0.33333333 0.5800000**

**0.4192926764557 0.58 0.32000000 0.6041667**

**0.4344362764439 0.58 0.31333333 0.6170213**

**0.4474905610653 0.56 0.30000000 0.6222222**

**0.4607846720186 0.54 0.29333333 0.6136364**

**0.4890388313327 0.54 0.28000000 0.6428571**

**0.491393160144 0.52 0.27333333 0.6341463**

**0.5030424142441 0.48 0.26000000 0.6153846**

**0.5037611071659 0.48 0.25333333 0.6315789**

**0.5256466144636 0.48 0.24000000 0.6666667**

**0.5370741341967 0.48 0.23333333 0.6857143**

**0.5491913865224 0.46 0.22000000 0.6969697**

**0.5511574994219 0.44 0.21333333 0.6875000**

**0.579491582178 0.44 0.20000000 0.7333333**

**0.6059391480804 0.42 0.19333333 0.7241379**

**0.6121438102402 0.40 0.18000000 0.7407407**

**0.6183255014529 0.40 0.17333333 0.7692308**

**0.6241845757385 0.38 0.16000000 0.7916667**

**0.6430303961495 0.38 0.15333333 0.8260870**

**0.6699335823709 0.34 0.14000000 0.8095238**

**0.6702235910168 0.32 0.13333333 0.8000000**

**0.673246394886 0.28 0.12000000 0.7777778**

**0.6815178658474 0.26 0.11333333 0.7647059**

**0.6923825845783 0.22 0.10000000 0.7333333**

**0.7124617730402 0.20 0.09333333 0.7142857**

**0.7441522558647 0.16 0.08000000 0.6666667**

**0.754164874204 0.14 0.07333333 0.6363636**

**0.7887316889847 0.10 0.06000000 0.5555556**

**0.7947683997473 0.08 0.05333333 0.5000000**

**0.8087772843907 0.06 0.04000000 0.5000000**

**0.819959046079 0.04 0.03333333 0.4000000**

**0.8726528416378 0.02 0.02000000 0.3333333**

**0.8747210488779 0.02 0.01333333 0.5000000**

**1.0 0.00 0.00000000 1.0000000**

**Rattle timestamp: 2020-10-19 10:50:29 glopi**

**======================================================================**

**The area under the Risk and Recall curves for Linear model**

**Area under the Recall (green) curve: 84% (0.842)**

**Rattle timestamp: 2020-10-19 10:50:29 glopi**

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