Replication of Father Founders: Did Child Gender Affect Voting at the Constitutional Convention?

Prepared for POLI 271: Advanced Statistical Applications

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Abstract

FINISH THIS

Introduction

This article is a replication of Jeremy C. Pope and Soren J. Schmidt's 2021 piece "Father Founders: Did Child Gender Affect Voting at the Constitutional Convention?". In it, they test the hypothesis that the delegates with sons would tend to vote for a stronger national government because they foresaw such a government providing greater opportunities for their sons–for which they find evidence. I begin by replicating their primary model, a Poisson regression on a vote index, and their probit models of individual votes. I then examine the distributions of underlying data to ensure their models are appropriate. I then use the dataset from which their paper's dataset was derived to assess missingness and imputation in the authors' work. Finally, I assess the differences in standard errors for their model covariates comparing their `STATA` robust standard errors with `R`'s `glm()` standard errors and boostrapped standard errors.

Data

The replication data used is provided by Pope and Schmidt (2021). I also employ Dougherty and Heckelman's (2009) dataset which provides delegate vote data without the imputation done in Pope and Schmidt's replication data. All code for this project is available at https://github.com/zaynesember/PopeSchmidtReplication.

Results

Model Replication

Pope and Schmidt (2021) present 9 models of interest here, all of which share the same covariates (with the exception of two cases of multicollinearity). Their primary model is a Poisson regression on a "preferred index" of the eight votes evaluated in each of the additional probit models. The preferred index is calculated by summing the number of "yea" votes for expanding the national government and "nay" votes on limiting the government. Appendix A provides the table of all independent and dependent variables. Dependent variables labeled "vote" indicate a vote where a "yea" expands the government and those labeled "anti" denote a vote limiting government.

Table 1 presents the replication of these eight models. All coefficients agree with those presented by Pope and Schmidt, although some standard errors on the probit models differ very slightly. This is due to the original analysis being done in `STATA` with the `robust` command; the similar robust errors reported here were calculated in `R` using the `sandwich` library's `vcovCL` function.

FIX SEPARATION ISSUES WITH PROBIT MODELS, THEN TALK ABOUT COEFFICIENTS

Table 1: Replication of Pope and Schmidt (2021) Table 2.

	Preferred Index	National Veto	Debtor Legislators	Cong. Quorum	National Exports	Militia Control	State Credit	Navigation Acts	Military Responsibility
Constant	1.576*	-0.843	5.287	-0.145	1.176	3.558	3.386	-0.538	-0.288
	(0.626)	(2.472)	(5.932)	(2.865)	(2.392)	(4.028)	(4.926)	(2.787)	(2.824)
Number of sons	0.147**	0.134	1.022**	0.277	-0.243	0.460*	0.718**	0.494**	0.554**
	(0.037)	(0.170)	(0.394)	(0.202)	(0.186)	(0.196)	(0.245)	(0.164)	(0.193)
Number of daughters	-0.124**	-0.178	-0.210	-0.501**	0.150	-0.337	-0.441*	-0.129	-0.556**
	(0.039)	(0.158)	(0.343)	(0.247)	(0.183)	(0.165)	(0.232)	(0.172)	(0.219)
Age	-0.002	-0.021	-0.184	0.050	-0.046	-0.087	-0.154	-0.001	0.022
	(0.025)	(0.102)	(0.292)	(0.116)	(0.092)	(0.155)	(0.220)	(0.113)	(0.117)
Age squared	0.000	0.000	0.002	0.000	0.001	0.001	0.002	0.000	0.000
	(0.000)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Revolutionary war officer	0.273**	0.067	1.531**	1.154**	0.325	0.789	0.640	0.888*	0.694
	(0.110)	(0.393)	(0.607)	(0.560)	(0.404)	(0.551)	(0.533)	(0.528)	(0.496)
Logged number of slaves	-0.003**	-0.006	-0.013*	-0.004	-0.014**	-0.006	-0.002	-0.009*	-0.007
	(0.001)	(0.004)	(0.005)	(0.003)	(0.006)	(0.003)	(0.004)	(0.004)	(0.004)
Distance to navigable coastline	-0.003**	0.003	-0.018**	-0.004	0.001	-0.008*	-0.007	-0.009*	-0.009*
	(0.001)	(0.005)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Public securities (1000s, 1787 dollars)	0.008	0.184*	-0.069	-0.210*	-0.096	-0.049	0.204	0.176	-0.032
	(0.032)	(0.109)	(0.226)	(0.096)	(0.098)	(0.119)	(0.113)	(0.120)	(0.113)
Private securities (1000s, 1787 dollars)	0.000	0.043	-0.067	-0.006	0.064	0.009		0.003	0.006
	(0.004)	(0.032)	(0.049)	(0.022)	(0.029)	(0.026)		(0.035)	(0.040)
Debtor (dummy)	-0.721**	-0.313	-2.513	0.341		-2.293*	-1.380	-1.068	-0.852
	(0.131)	(1.008)	(0.723)	(0.760)		(0.890)	(0.582)	(0.533)	(0.520)
Politician	0.107	0.898	-0.965	-0.227	0.070	0.307	0.021	0.725	0.798
	(0.145)	(0.504)	(0.640)	(0.522)	(0.535)	(0.595)	(0.588)	(0.595)	(0.496)
Lawyer	0.098	1.101*	-0.986	-0.913	-0.061	-0.425	0.890	0.855	0.445
	(0.116)	(0.455)	(0.666)	(0.610)	(0.494)	(0.622)	(0.668)	(0.543)	(0.584)
Num.Obs.	53	53	53	53	53	53	53	53	53
AIC	246.7	87.3	57.2	72.8	84.7	76.6	63.7	70.9	72.2
BIC	272.3	112.9	82.8	98.4	108.3	102.2	87.3	96.6	97.8
Log.Lik.	-110.348	-30.661	-15.606	-23.418	-30.346	-25.302	-19.845	-22.474	-23.079

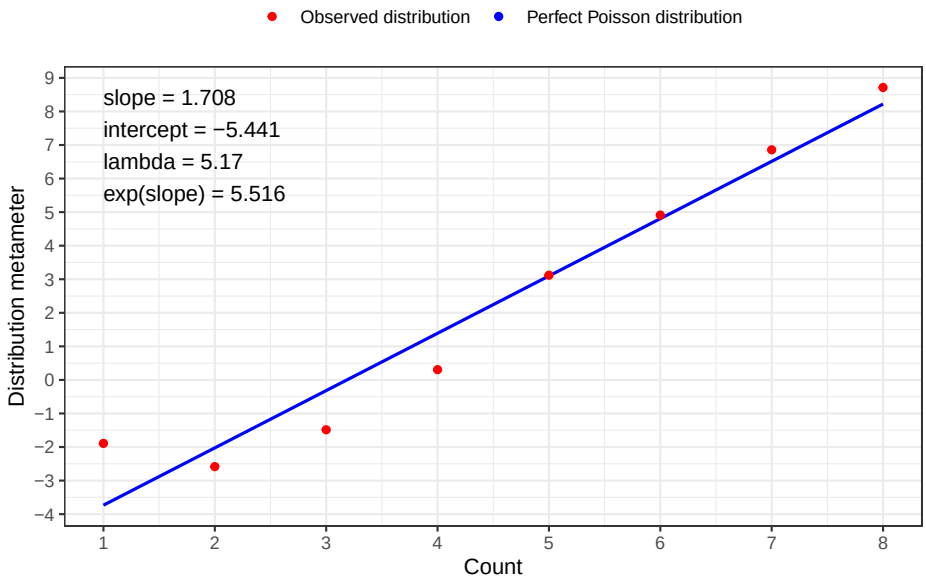
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Blank coefficients omitted due to perfect multicollinearity.

Preferred index model is a Poisson regression, all others are probit. Standard errors are robust.

Distribution of Data

Figure 1: Poissoness Plot of Preferred Index



I next examine the distribution of the primary dependent variable: the preferred index of individual votes. In order for a Poisson regression on this index to be valid, it needs to follow a Poisson distribution with the key assumption that the count data's mean is equal to its variance. A simple check of this on the preferred index yields a mean of 5.17 and variance of 5.34, which falls 0.07 standard deviations away–a very minor violation of this strict assumption. Figure 1 provides a more visual test of the distribution with a Poissoness plot. **INTERPRET POISSONESS PLOT**

Figure 2 and 3 compare the fit of the data to the Poisson and negative binomial distributions with rootograms **INTERPRET ROOTOGRAMS**

Table 2 compares the results of modeling the data as a Poisson distribution and a negative binomial **INTERPRET MODELS**

Figure 2: Poisson Rootogram

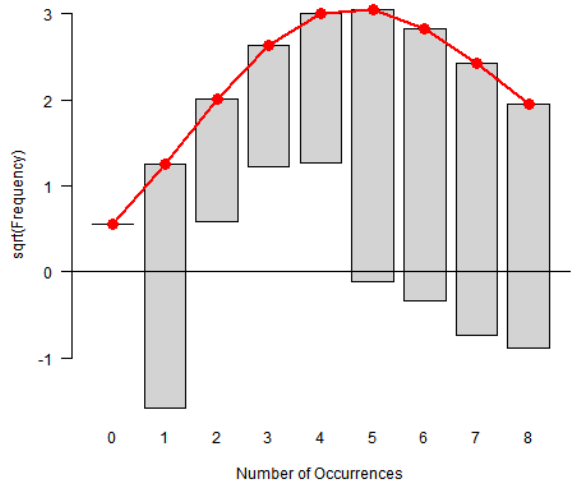
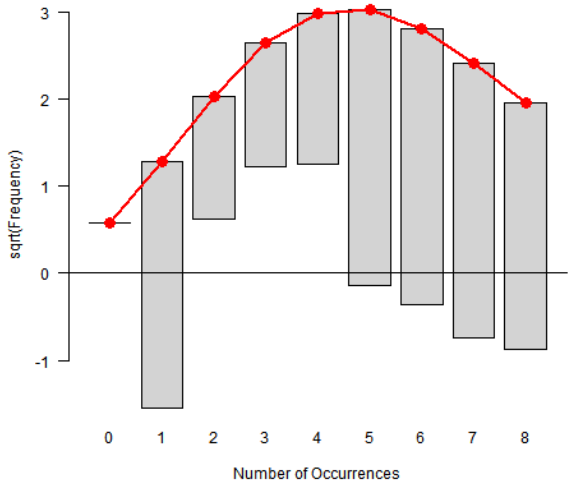


Figure 3: Negative Binomial Rootogram




```
## Warning in theta.ml(Y, mu, sum(w), w, limit = control$maxit, trace =
```

Table 2: Comparison of Poisson and Negative Binomial Models of the Preferred Index

	Poisson	Negative Binomial
Constant	1.5761*	1.5761*
	(0.8627)	(0.8627)
Number of sons	0.1471**	0.1471**
	(0.0602)	(0.0602)
Number of daughters	-0.1237**	-0.1237**
	(0.0600)	(0.0600)
Age	-0.0024	-0.0024
	(0.0342)	(0.0342)
Age squared	0.0001	0.0001
	(0.0003)	(0.0003)
Revolutionary war officer	0.2734**	0.2734**
	(0.1339)	(0.1339)
Logged number of slaves	-0.0030**	-0.0030**
	(0.0012)	(0.0012)
Distance to navigable coastline	-0.0030**	-0.0030**
	(0.0015)	(0.0015)
Public securities (1000s, 1787 dollars)	0.0079	0.0079
	(0.0336)	(0.0336)
Private securities (1000s, 1787 dollars)	-0.0003	-0.0003
	(0.0084)	(0.0084)
Debtor (dummy)	-0.7212**	-0.7212**
	(0.3341)	(0.3341)
Politician	0.1066	0.1066
	(0.1828)	(0.1828)
Lawyer	0.0983	0.0983
	(0.1747)	(0.1747)
Num.Obs.	53	53
AIC	246.7	248.7
BIC	272.3	276.3
Log.Lik.	-110.348	-110.349

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

```
## control$trace > : iteration limit reached

## Warning in theta.ml(Y, mu, sum(w), w, limit = control$maxit, trace =
## control$trace > : iteration limit reached

## Warning in sqrt(diag(solve(-fit$hessian))): NaNs produced
```

Missingness

References

Pope & Schmidt

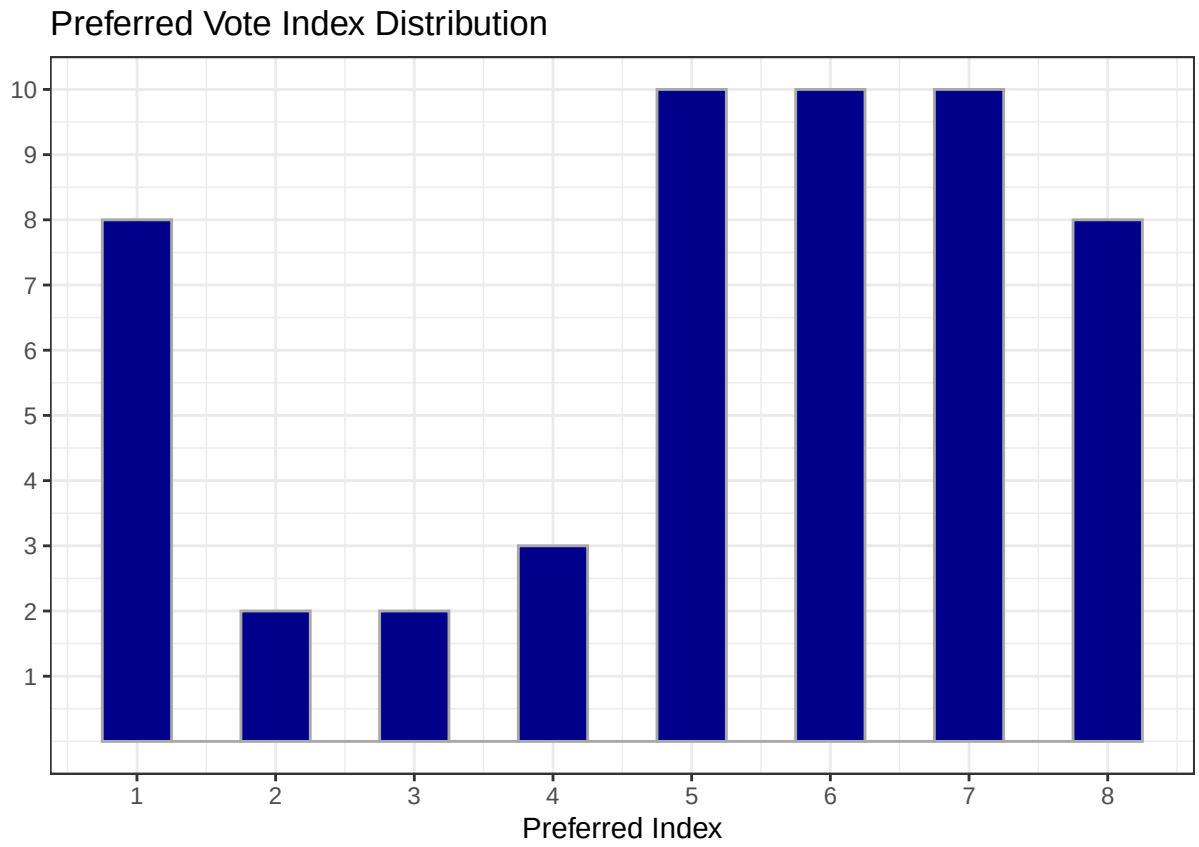
https://www.icpsr.umich.edu/web/ICPSR/studies/24544

Table 3: Variable Key

Variable name	Full name
index1	Preferred Index
vote2	National Veto
anti5	Debtor Legislators
anti6	Cong. Quorum.
anti7	National Exports
vote8	Militia Control
vote9	State Credit
anti14	Navigation Acts
vote15	Military Responsibility
sons	Number of sons
dtrs	Number of daughters
ageco	Age
agecosq	Age squared
revoffco	Revolutionary war officer
nslave	Logged number of slaves
dist2	Distance to navigable coastline
vsecr	Public securities (1000s, 1787 dollars)
vbank	Private securities (1000s, 1787 dollars)
ddebt	Debtor (dummy)
pols	Politician
lawyer	Lawyer

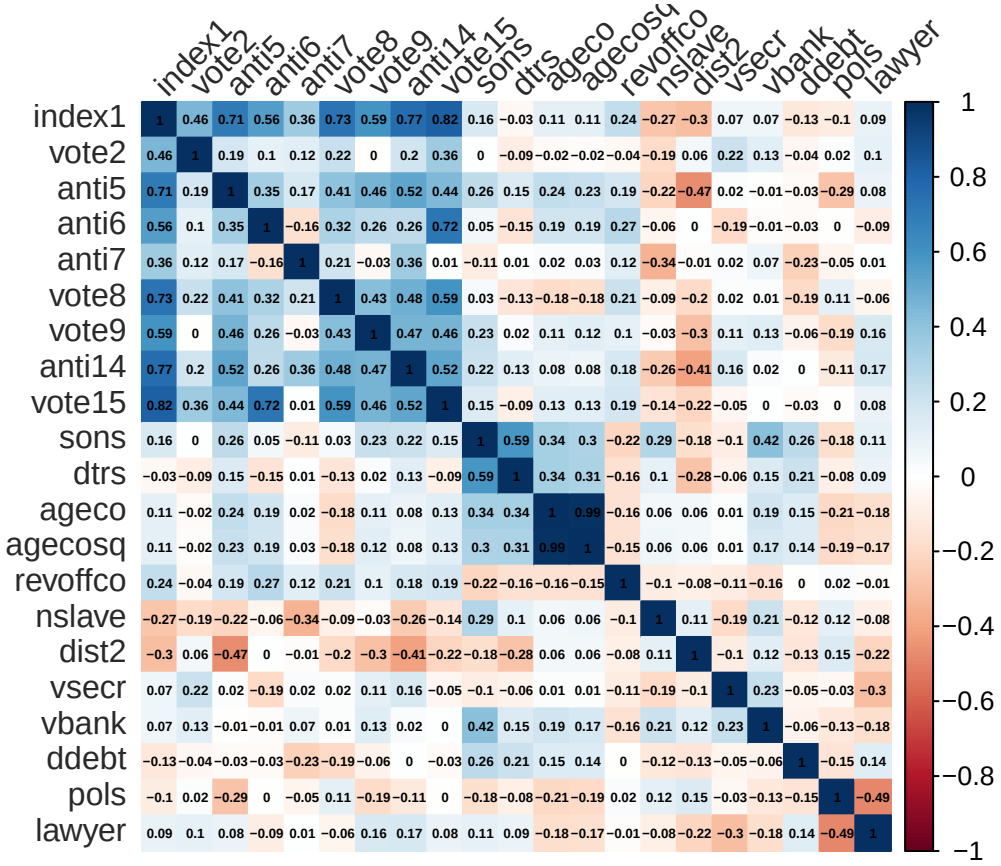
Appendix A

1. A histogram of the dependent variable



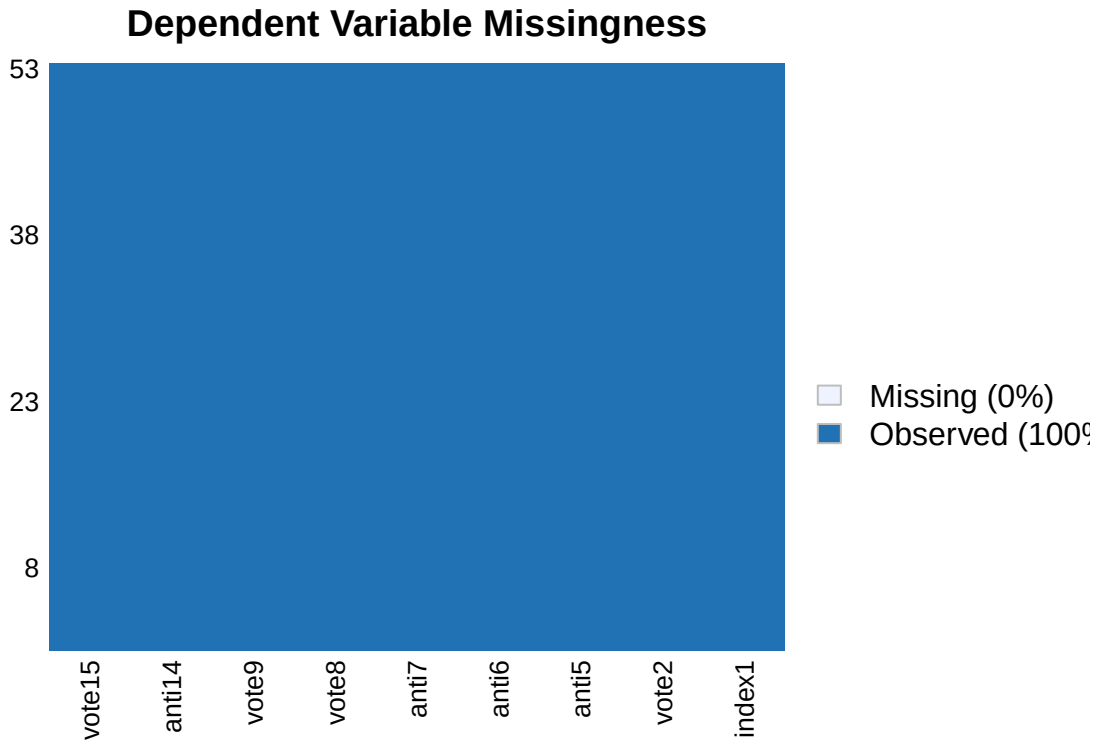
2. A correlation matrix for the DV and IVs that the original authors included in the model you are replicating

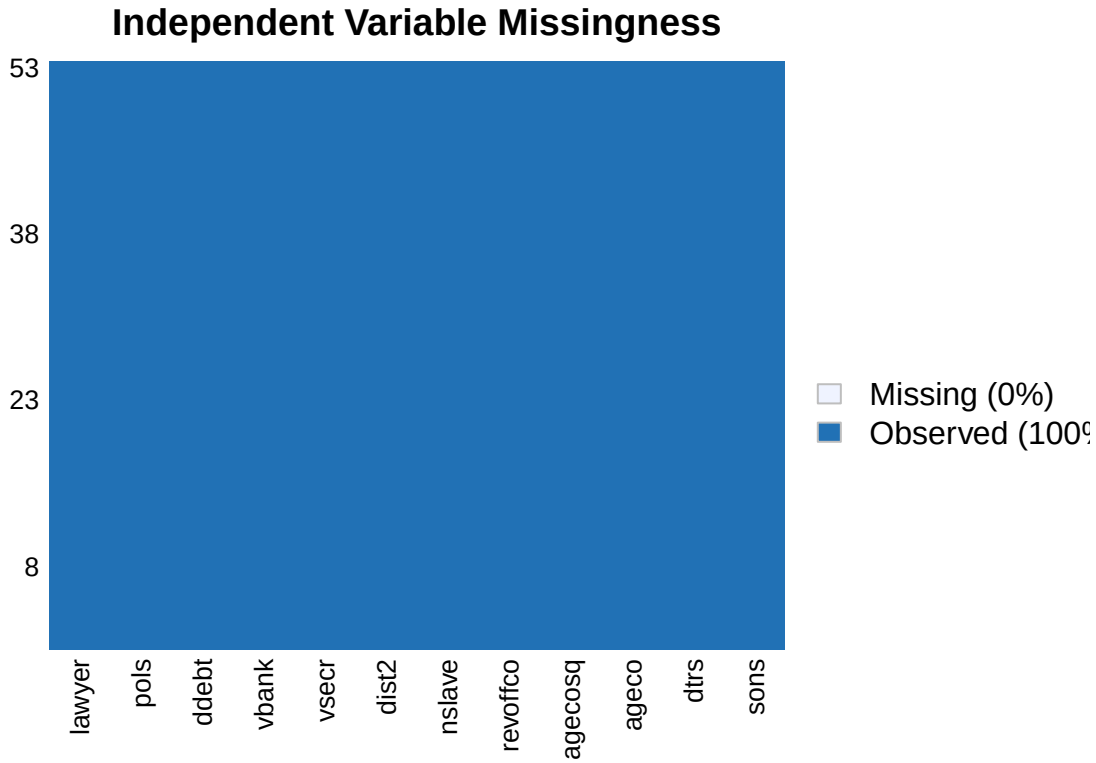
Correlation Matrix of Model Variables



Note: `index`, `anti`, and `vote` variables are dependent in the paper, all others are independent.

3. A visual or tabular depiction of the missingness in the data from part (2); see p. 251-255 of the text.

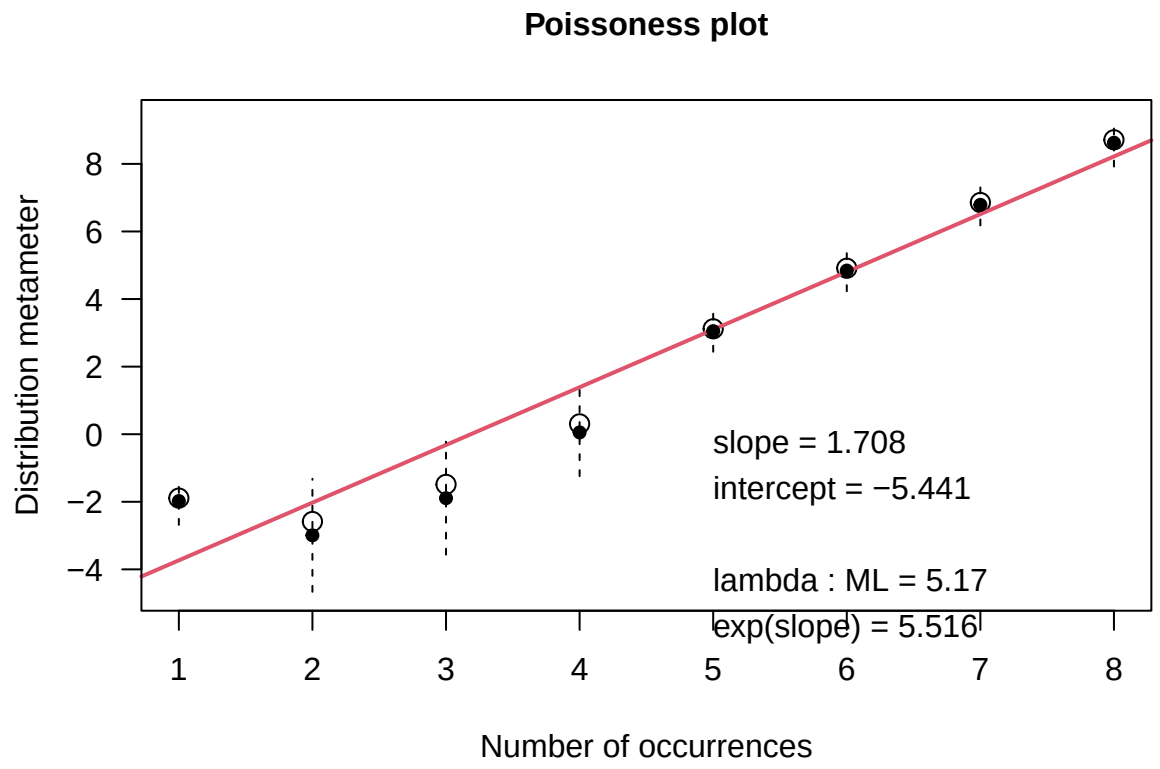


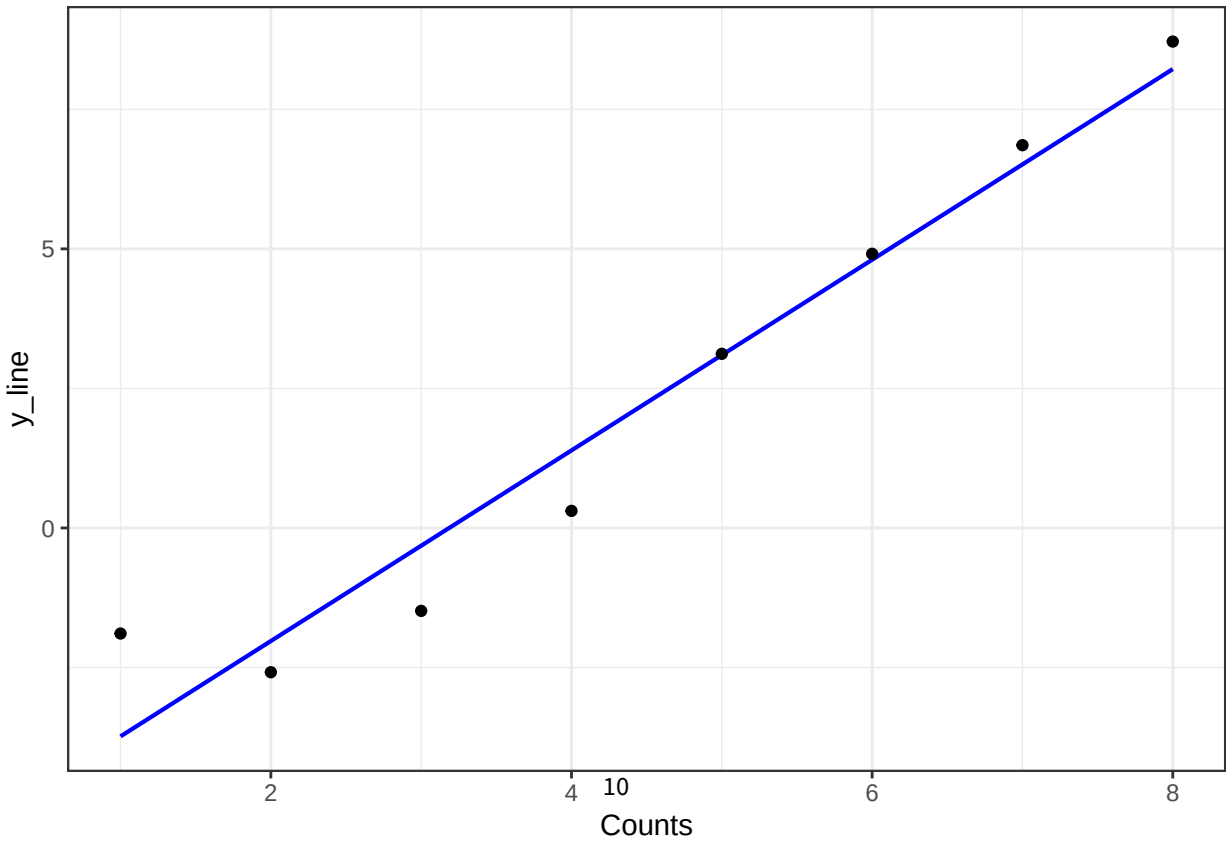


While there is no missingness visible in the replication dataset, the authors do state that “The second reason for McDonald’s selection of the sixteen key votes is that he claimed there is enough information from Farrand’s Records, delegate diaries, and other sources—to estimate how each individual delegate would have voted on this issue” (Pope and Schmidt 2021, 6). This implies that data is missing but was imputed by the authors. A replication extension could be to determine which data points are imputed and do sensitivity testing without those data.

Replication

Model Fit





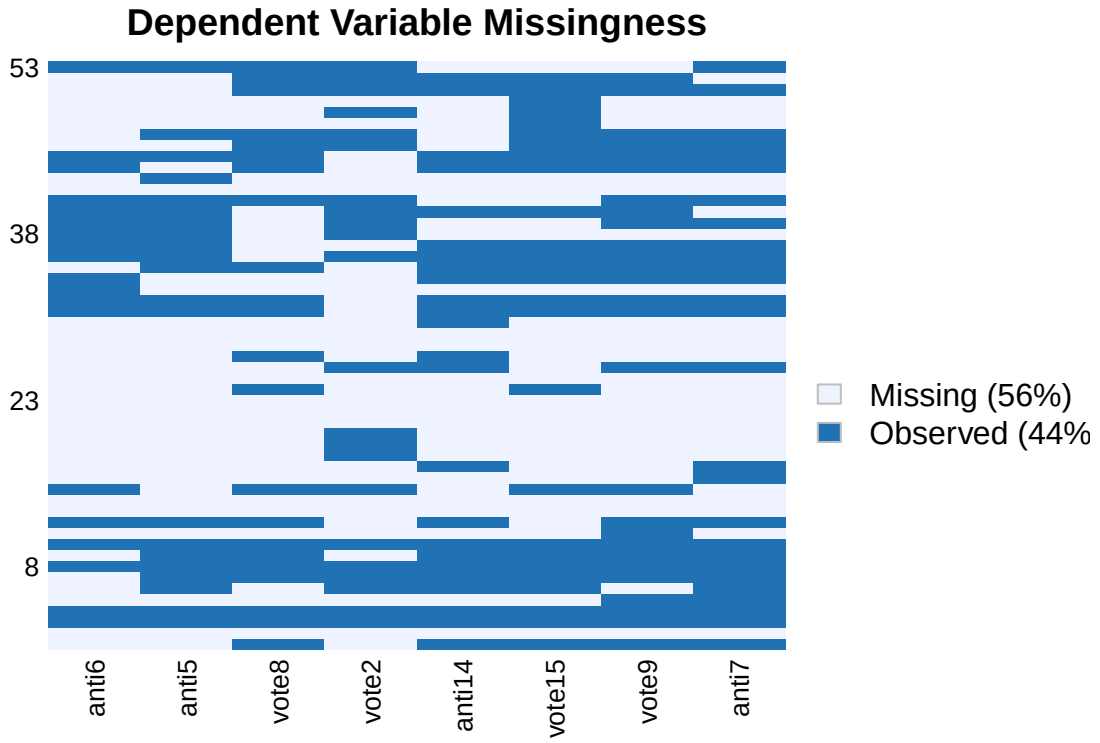
https://stats.stackexchange.com/questions/419304/computing-different-types-of-negative-binomial-regression

Missingness

```
## Warning: Unknown or uninitialised column: `arguments`.
```

```
## Warning: Unknown or uninitialised column: `arguments`.
```

```
## Warning: Unknown or uninitialised column: `imputations`.
```



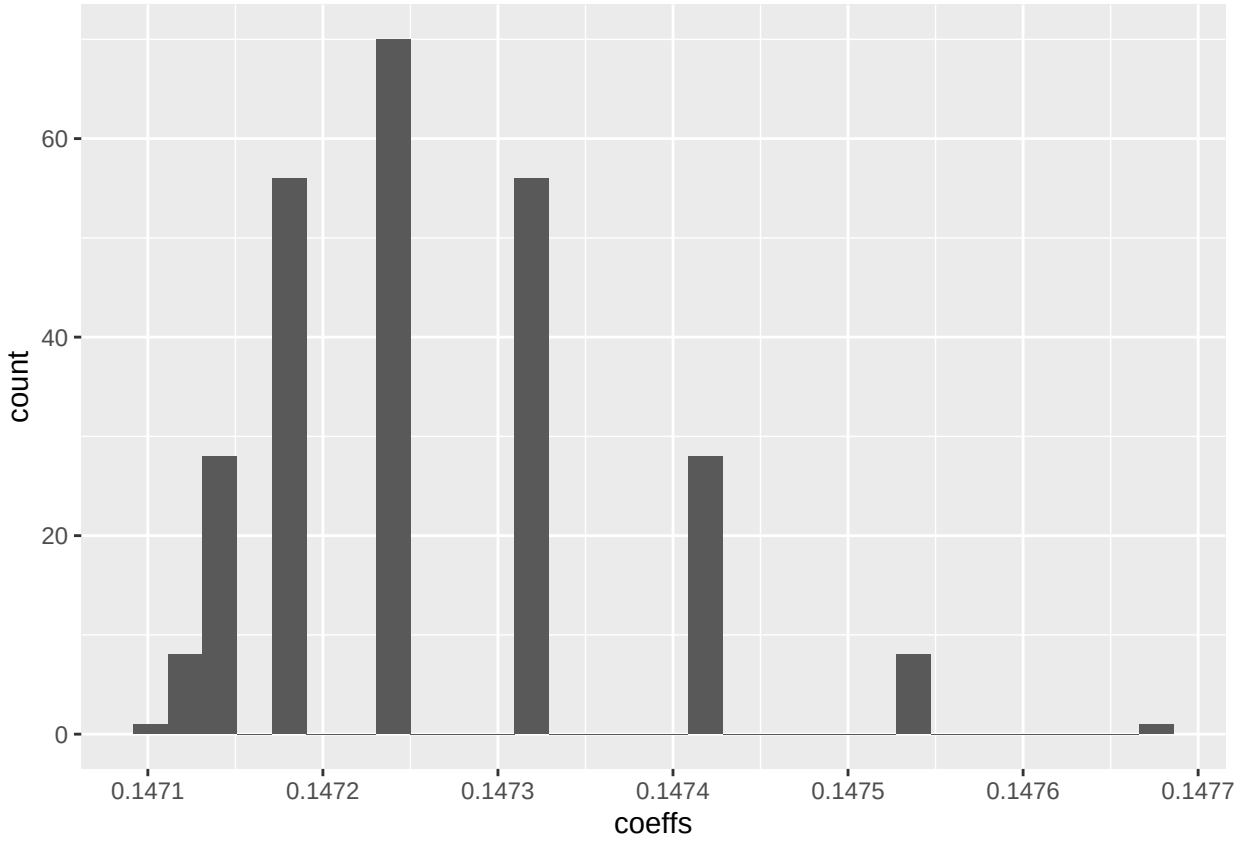

```
## Amelia Error Code:  39
##  Your data has no missing values.  Make sure the code for
##  missing data is set to the code for R, which is NA.
```

```
## NULL
```

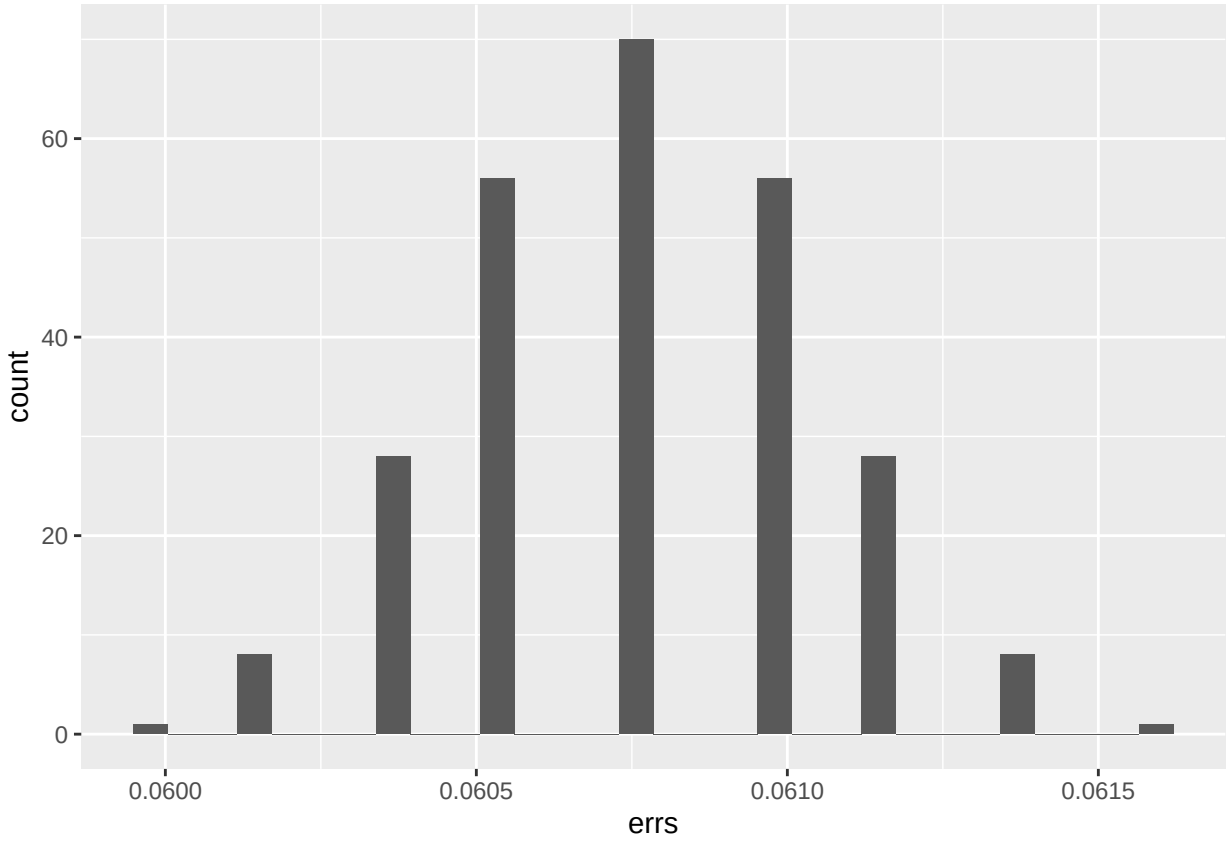
Houston: Only has “yea” vote on anti5 vote, died one week into the convention * 5 children: 2 sons, 3 daughters (https://www.wikitree.com/wiki/Houston-1421#:~:text=William%20Churchill%20and%20Jane%20(Smith,Ann%20Houston%20and%20Mary * https://www.google.com/books/edition/The_Constitutional_Convention_of_1787/oyFpDS8p33sC?hl=en&gbpv=1&dq=william+churchill+houston&pg=PA354&printsec=frontcover didn’t specify genders

Wythe: Has no recorded votes, no children. Did not attend the votes.

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



Bootstrapping

	R SE	Robust SE	Boostrapped SE
Constant	0.863	0.620	1.233
Number of sons	0.060	0.037	0.054
Number of daughters	0.060	0.039	0.059
Age	0.034	0.025	0.054
Age squared	0.000	0.000	0.001
Revolutionary war officer	0.134	0.109	0.144
Logged number of slaves	0.001	0.001	0.001
Distance to navigable coastline	0.001	0.001	0.002
Public securities (1000s, 1787 dollars)	0.034	0.031	0.047
Private securities (1000s, 1787 dollars)	0.008	0.004	0.053
Debtor (dummy)	0.334	0.129	0.284
Politician	0.183	0.143	0.187
Lawyer	0.175	0.115	0.160