

Correspondence and Congressional Member Reelection

Statistical Analysis of Reelection Rates and Correspondence Priorities

Maggie Nead

7/20/2020

Introduction

Political scientists have long studied factors that affect reelection, including political ideology, campaign platforms, and voting records. Significant improvements have been made to the way in which researchers think about and study reelection, but gaps remain. One of the biggest gaps is what happens outside of public perview, such as constituent service and advocacy on behalf of businesses. Who do members of congress advocate for outside of the spotlight, and what impact does that have on reelection? This research seeks to answer the question: what kinds of constituent service behavior leads to reelection? Constituent service pertains to services that members provide outside of legislation. This might include getting federal agencies to perform action, case work, grants work, and more. Patterns and relationships may exist between constituent service and reelection. By determining what and who a member of congress advocates for and comparing that to whether or not they get reelected the data may show which priorities are associated with reelection.

Theory

In order for a Member of Congress to accomplish their political goals they must first be reelected (Mayhew 1974). This means that first and foremost the goal of any politician is to be reelected. To be reelected a Member of Congress needs two things, money and the support of their constituents. According to the Federal Election Commission to be considered a candidate for House, Senate, or President a person must first raise or spend at least \$5,000 (n.d.). This is a small amount in comparison to how much campaigns actually end up spending. For the House the campaign that spent the least amount of money in 2018 still spent \$231,921 and the average campaign cost for candidates that won their election was \$2,056,494. For the Senate this is even higher. The campaign that spent the least cost \$3,354,107 and the average spending for Senate candidates that won their election was \$15,753,167 (“Election Trends”, 2018). Because campaigns are so expensive most

campaigns are funded by a few large donations instead of a lot of small donations. Even further than this, the majority of donations are made by business contributions. From 2019-2020 businesses (which includes business executives and professionals) donated a total of \$2,710,340,480 (“Business-Labor-Ideology Split in PAC & Individual Donations to Candidates, Parties, Super PACs and Outside Spending Groups”, 2020). For this reason, members seeking reelection may focus on advocating for the interest of corporations with resources like money, advertising power, and audience. Corporations have power that can either lead to a successful reelection or help a political opponent take their own victory.

On the other hand, corporations cannot vote. If a constituent feels that their member of congress listens to them and advocates on their behalf, they may be more likely to vote for that member again. A member is ultimately elected by those they represent and there is evidence to suggest that members will change what they advocate for based on what they hear their constituents want. This is especially true when elections are upcoming. A study done on the role that voter preferences play in how Senators vote found that during election years the effect of constituent opinion doubles (Levitt, 1996). Members of Congress change how much weight they put on constituent opinion during election seasons. This suggests that Members are concerned about how constituent interest may effect reelection. For this reason constituent interest may play a big role in whether or not a member gets reelected. It is also possible that both corporate and constituent interest play a significant role in getting a member reelected. Members who advocate for corporations and constituents at the same time may ultimately be more likely to get reelected.

Data

Data for this research has been collected using the Freedom of Information Act (FOIA). All correspondence from a Member of Congress to a federal agency was requested. So far 383,824 letters have been collected and matched to the member it was sent from. This data was collected by the Correspondence Research project headed by Professor Powell at the University of Wisconsin-Madison. The data spans from the 106th to the 116th congress and was requested from every federal agency. The 383,824 observations we currently have contains the data from the federal agencies that have responded so far. Once collected the data was merged with the open source VoteView data. Voteview collects information on Members of Congress which included but is not limited to; names, congresses in which they served, chamber, state information, and ideology scores.

In order to answer the question of congressional behavior there are two ways this research looks at the data:

- The behavior of members who serve in one congress and the following congress (i.e. in consecutive congresses)
- Behavior trends over time for a count of all the times members have been reelected

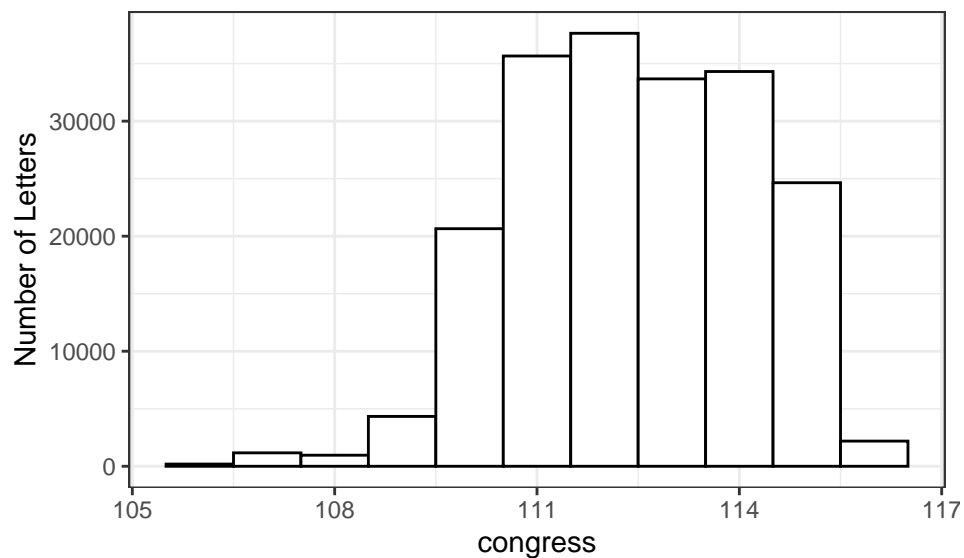
For the purposes of this research reelection will be defined as any member who is in consecutive congresses.

Members who were not reelected shall be defined as any member who is in one congress and not the following congress.

The histogram below shows the total number of letters sent by members of congress in each congress. The 106th congress has less letters as it is the first congress of data requested and for most agencies less is available from this time. The 116th congress also has less letters because it is the current congressional session and as such is ongoing.

```
d %>%
```

```
  ggplot(aes(x= congress)) +  
  geom_histogram(binwidth=1, color="black", fill="white") +  
  ylab("Number of Letters")
```



Variables

From the existing data in VoteView the variable `party_name` is used as a part of the models in this research. This variable is coded as Republican, Democratic or Independent. Along with this four variables were created: `member_reelected`, `corporate`, `constituent`, and `reelections`.

The first, `member_reelected` measures whether or not a member is reelected to the following congress. It is coded as true or false for every member in every congress. For example if a member was elected to the 109th congress and served again in the 110th congress `member_reelected` equals true for the 109th congress. If they did not serve in the 110th congress, `member_reelected` would be false for the 109th congress.

Corporate and constituent are based on letter type codings that are contained within five categories. This includes type 1-personal service, type 2-commercial service (transactional), type 3-government or nonprofit

service (transactional), type 4-commercial service (policy), and type 5-policy work.

Personal Service is categorized by correspondence sent on behalf of an individual constituent about something non-commercial. This includes things like; help with a government form, passport, visa, back pay, military honor, enlistment, criminal case, request for personal information (e.g. one's FBI file), disability application, worker compensation, personal complaint, discrimination case, job application, health insurance, or financial services complaints.

Commercial Service - Transactional contains correspondence that deals with anything related to a specific individual case by a business (including business owners like farmers and consultants). Generally the correspondence contains; help with a grant application, payment, loan or contract (buying anything from or selling anything to a government agency). It might also include; help with an individual case of tax assessment, fine, or regulatory enforcement action. Or it could also be help with public relations on behalf of a business. Examples of this are: allocation of radio spectrum, case against a company, tax dispute, contract for purchase of military surplus, crop insurance distribution, debt settlement, foreclosure assistance, a fine for a law violation.

Government and Nonprofit Service - Transactional This is similar to commercial service, but for municipal or state governments (including cities, counties, etc.) or non-business-oriented non-profit organizations (i.e. NOT ones that represents an industry or trade association).

Commercial Service - Policy is anything applying to a class of commercial activity or businesses (e.g. shipping, airlines, agriculture). This could include legislation, bills, acts, appropriations, or authorizations. Authorization of or appropriation to a government program that is targeted towards a particular industry or industries and regulation of an industry or commercial practice or competition. Examples of this are: milk prices, insurance or loan eligibility criteria, purchasing policies, crop insurance rates, pollution criteria, classification of products for trade or taxation, conservation appropriation, worker visa types, restrictions, or caps.

Policy Work is not in the service of any individual, business, specific industry. This includes lawmaking, oversight, lobbying administrative policy, and political work. Examples of this might be: request for policy-relevant information, committee requesting a report or testimony at a hearing, requesting clarity on an agency rule, agency rulemaking with non-commercial implications, meeting with organized constituent groups, and media requests.

Each type is a category for the subject of a letter written to a federal agency by a member. For this paper, I am only interested in letters that deal with corporations and constituents this includes types 1,2 and 4,

which includes 53,390 observations. The variable `constituent` is a count of type 1 each legislator wrote per congress, and `corporate` is a count of the number of type 2 and 4 letters that each legislator wrote per congress. In the analysis below, each Member of Congress has observation for each congress in which they served. That observation includes the total number of letters they wrote on behalf of constituents and the total number written on behalf of a corporation during that congress.

```
d %>%
  group_by(TYPE) %>%
  tally%>%
  kable() %>%
  kable_styling()
```

TYPE	n
0	116
1	144162
2	12790
3	18855
4	3322
5	15122
6	1065

```
d %<>%
  filter(TYPE == c(1,2,4))

d %<>%
  mutate(interest = ifelse(TYPE %in% c(1), "constituent", NA)) %>%
  mutate(interest = ifelse(TYPE %in% c(2,4), "corporate", interest))# %>%
  #mutate(interest = ifelse(! str_detect(TYPE, "1|2|4"), "neither", interest))

d %>%
  group_by(interest) %>%
```

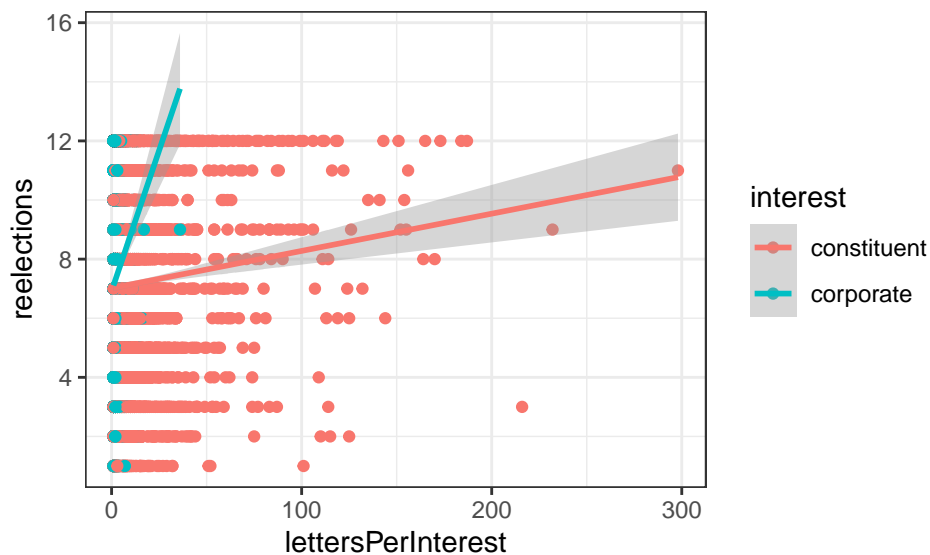
```
tally()%>%
kable() %>%
kable_styling()
```

interest	n
constituent	48056
corporate	5334

COUNTS PER ICPSR PER INTEREST (FOR MEMBERS WHO WROTE AT LEAST ONE LETTER OF THAT TYPE IN THAT CONGRESS)

```
checkCounts <- d %>%
  count(bioname, icpsr, congress, reelections, party_name, interest, member_reelected, name = "lettersPerInterest")
d %<>%
  count(bioname, icpsr, congress, reelections, party_name, member_reelected, interest, name = "lettersPerInterest")

qplot(x = lettersPerInterest, y = reelections, data = d, color = interest) +
  geom_smooth(method = "glm")
```



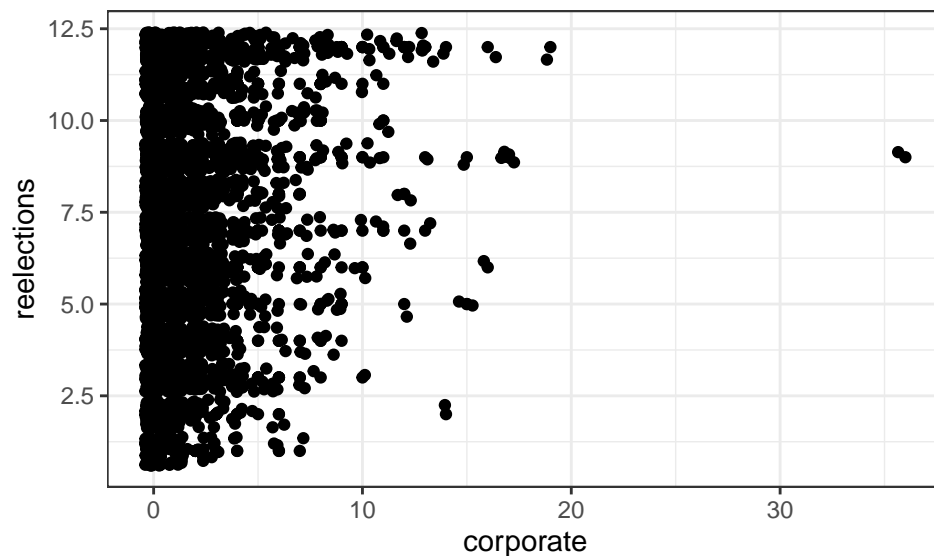
```
d %<>%
  spread(interest, lettersPerInterest)
```

```
d %<>%
```

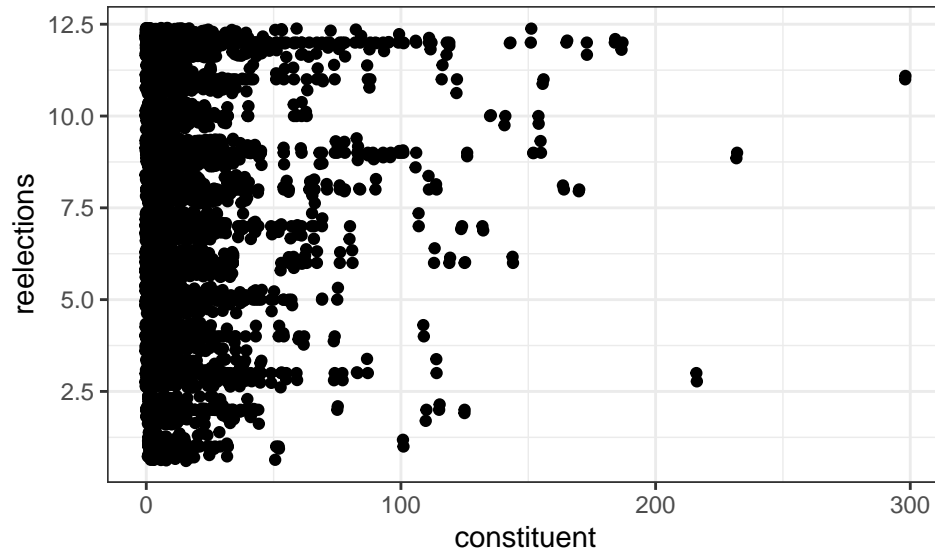
```
mutate(corporate = replace_na(corporate, 0)) %>%
mutate(constituent = replace_na(constituent, 0))
```

This plot shows general trends for the number of letters (corporate and constituent) sent from the 106th to the 116th congress plotted with the number of reelections during that time. This is further split out between both letters on behalf of corporation and letters on behalf of constituents in the plots below.

```
d %>%
  ggplot(aes(x=corporate, y=reelections)) +
  geom_point(outlier.colour="black", outlier.shape=16,
             outlier.size=2, notch=TRUE) +
  geom_jitter()
```



```
d %>%
  ggplot(aes(x=constituent, y=reelections)) +
  geom_point(outlier.colour="black", outlier.shape=16,
             outlier.size=2, notch=TRUE) +
  geom_jitter()
```



Methods

Hypotheses:

Hypothesis #1:

Constituents want to feel that they are listened to and that their member of congress is advocating for their best interest. Voters want to see that the priorities they hold are reflected by the person that represents them. Members that advocate for their constituents the most are more likely to be reelected. For the purpose of this project advocacy on behalf of constituents will be quantified by constituent service correspondence.

H_0 : There is no difference in election outcome between Members that have a lot of constituency service correspondence.

H_a : Members that have more constituent service correspondence are more likely to be reelected.

Hypothesis #2:

The biggest campaign donors tend to be corporations (or the owners of large corporations). Campaign finance plays a large roll in getting a candidate elected. If a candidate has more funding, they have a bigger reach, are more able to advertise, and may be more likely to get elected. Members that do not have corporate donors have a significantly harder time running successful elections. A member that has more correspondence on behalf of large corporations may be more likely to be reelected. Those that have less correspondence on behalf of large corporations may have a hard time getting corporate donors and as a consequence may not

have enough monetary donations to run a campaign.

H_0 : Correspondence on behalf of corporations has no effect on election outcomes.

H_a : The more correspondence from a member on behalf a corporation the more likely that member is to be reelected.

Logistic Regression

$$\ln(P/(1 - P)) = \beta_0 + \beta_1 x_1 + \beta_2 x_2$$

Logistic regression was used to look at the response variable of member__reelected which codes true or false for if a member was reelected or not. This was done to determine if there was a short term relationship between letter interests and reelection.

Poisson Regression

Originally Poisson regression was chosen for the models with reelections as the response variable. This was done because reelections is a count, however, a dispersion test yielded a small p-value $< 2.2e-16$ and has an estimated coefficient of 0.339 (See appendix, dispersion test). This shows that the counts for this data are over-dispersed.

Negative Binomial Regression

Negative Binomial regression is used when the variance of the data is greater than the mean. This tends to be the case when counts are increasing as is seen with the number of times over a ten year period a member is reelected to congress. After the dispersion test, binomial regression models were chosen in order to minimize the effect of over-dispersed data.

Results

Logistic Regression

This logistic regression tests for a relationship between member__reelected and letter interests (corporate or constituent).

Member Reelection and Letter Interest

```

model <- glm(member_reelected ~ corporate + constituent,
             data=d,
             family=binomial(link="logit"))

model %>%
  tbl_regression(estimate_fun = function(x) style_ratio(x, digits = 3)) %>%
  bold_labels()

```

Characteristic	**log(OR)**	**95% CI**	**p-value**
__corporate__	0.015	-0.033, 0.067	0.5
__constituent__	0.001	-0.004, 0.007	0.6

This logit model shows no relationship between corporate or constituent interest correspondence and likelihood of being elected in the following congress. This is not unexpected as this is a simplistic model for a generally complex response variable. It can be difficult to predict the outcome of one election given only the correspondence from the previous congress as it may take many years for a trend to present itself. Using this as a jumping off point the data now lends itself to more complex models.

Negative Binomial Regression

Corporate and Constituent Interest Letters

The most basic negative binomial model checks for a relationship between reelection counts and correspondence interest (corporate and constituent) without confounding variables.

```

interestModel <- glm.nb(reelections ~ corporate + constituent,
                       data = d)

interestModel %>%
  tbl_regression(estimate_fun = function(x) style_ratio(x, digits = 3)) %>%
  bold_labels()

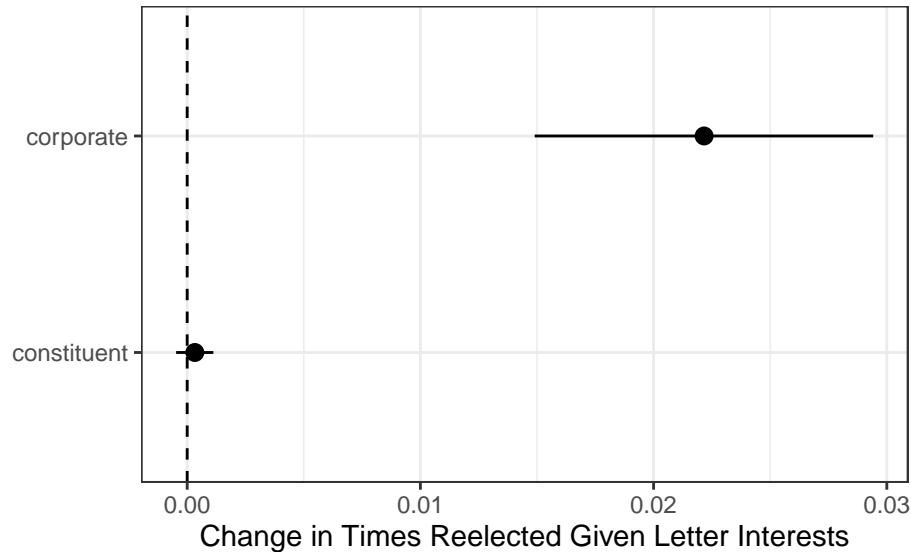
```

Characteristic	**Beta**	**95% CI**	**p-value**
__corporate__	0.022	0.015, 0.029	<0.001
__constituent__	0.000	0.000, 0.001	0.4

Corporate interest correspondence is statistically significant when predicting how many times a member of congress gets reelected. For each corporate letter a member sends, the log count of times a member is reelected is expected to increase by 0.02 over a ten year period as illustrated by the figure below. There is

not enough evidence to conclude that the same is true of constituent correspondence.

```
interestModel %>% mplot()+  
  labs(x="", y="Change in Times Reelected Given Letter Interests")
```



Two possibilities for this are: as stated in hypothesis #2 corporations have the money, resources and audience to help a member that advocates for them get reelected. Or it could also mean that corporations are more likely to try and build relationships with members that are more established. A member who has a position of leadership such as a committee chair or majority/minority leadership position is likely to have been serving for more congresses. Corporations might see this as a relationship that is worth building as those members are more likely to continue being in congress for a long time and have more power to push through policy that could favor the corporation.

Modeling Assumptions

Negative Binomial models are not assumed to have normalized residuals. The normality plot looks like it could have some skew but for the most part looks normal. There are a couple of points that stand out on the leverage plot but none that are beyond cook's distance (for diagnostic plots see appendix model 1).

Party and Reelections

Another variable that could have an effect on reelection is candidate political party. Parties have different priorities and voting members of those parties likely have different interests. For this reason party may play a large role in who gets reelected. For this model independents were dropped as they tend to have a significant amount of variation between them and it can be hard to determine trends in their reelection patterns.

```

noI <- d %>%
  filter(!str_detect(party_name, "Independent"))

partyModel <- glm.nb(reelections ~ party_name,
  data = noI )

partyModel%>%
  tbl_regression(estimate_fun = function(x) style_ratio(x, digits = 3)) %>%
  bold_labels()

```

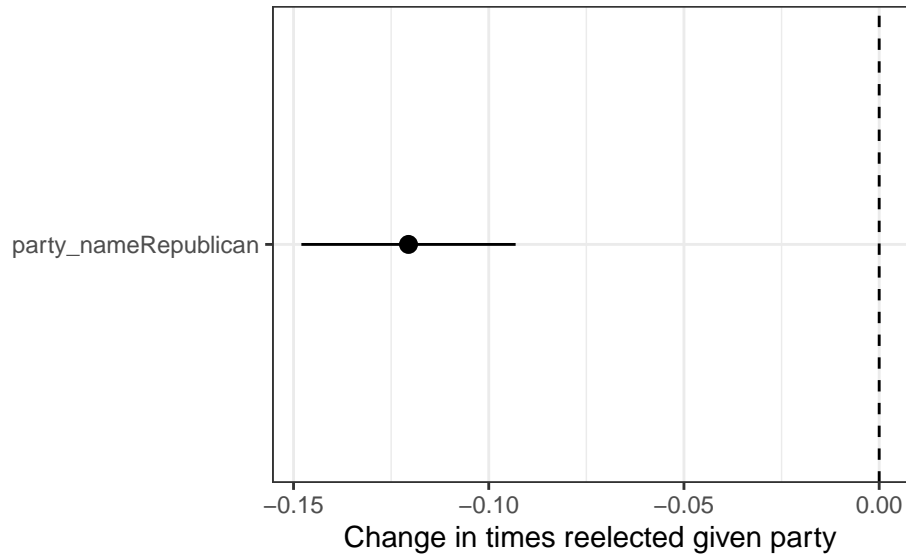
Characteristic	**Beta**	**95% CI**	**p-value**
__party_name__			
Democratic			
Republican	-0.121	-0.148, -0.093	<0.001

Party is a significant predictor of reelection. Looking solely at democrats and republicans, if the member is republican the log count of the number of times they are reelected is expected to be 0.12 less than that of a Democrat from the 106th to the 116th congress. This does not necessarily mean that republicans are less likely to be elected or that there was a seat turn over. It is possible that the member is replaced by someone of the same party. This model also does not account for things like retirement. This just shows that generally republicans do not hang on to their seats for as long as their democrat counterparts over a ten year period. This is visualized in the figure below.

```

partyModel %>%
  mplot()+
  labs(x="", y="Change in times reelected given party")

```



Modeling Assumptions

Negative Binomial models are not assumed to have normalized residuals. The normality plot looks like it could have some skew but for the most part looks normal. There are a couple of points that stand out on the leverage plot but none that are beyond cook's distance (for diagnostic plots see appendix model 2).

Party and Constituent/Corporate Interest Letters

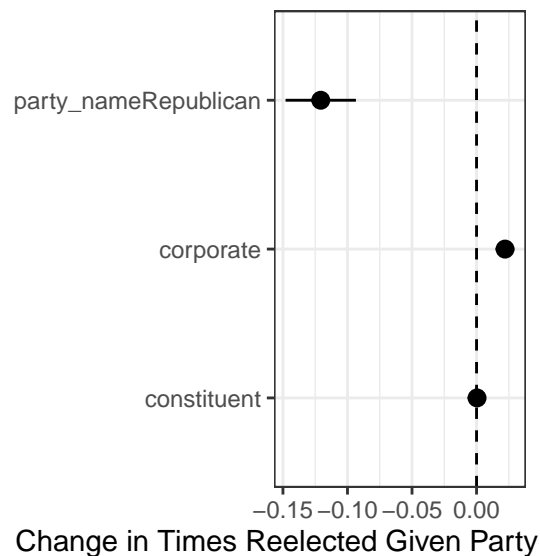
```
partyLetter <- glm.nb(reelections ~ constituent + corporate + party_name,
  data = noI )
```

```
partyLetter%>%
  tbl_regression(estimate_fun = function(x) style_ratio(x, digits = 3)) %>%
  bold_labels()
```

Characteristic	**Beta**	**95% CI**	**p-value**
__constituent__	0.000	0.000, 0.001	0.4
__corporate__	0.022	0.015, 0.029	<0.001
__party_name__			
Democratic			
Republican	-0.121	-0.148, -0.093	<0.001

As shown in the previous models above Party and corporate correspondence continue to be significant predictors of the number of times a member is reelected over a ten year period.

```
partyLetter %>% mplot()+
  labs(x="", y="Change in Times Reelected Given Party and Letter Interest")
```



Modeling Assumptions

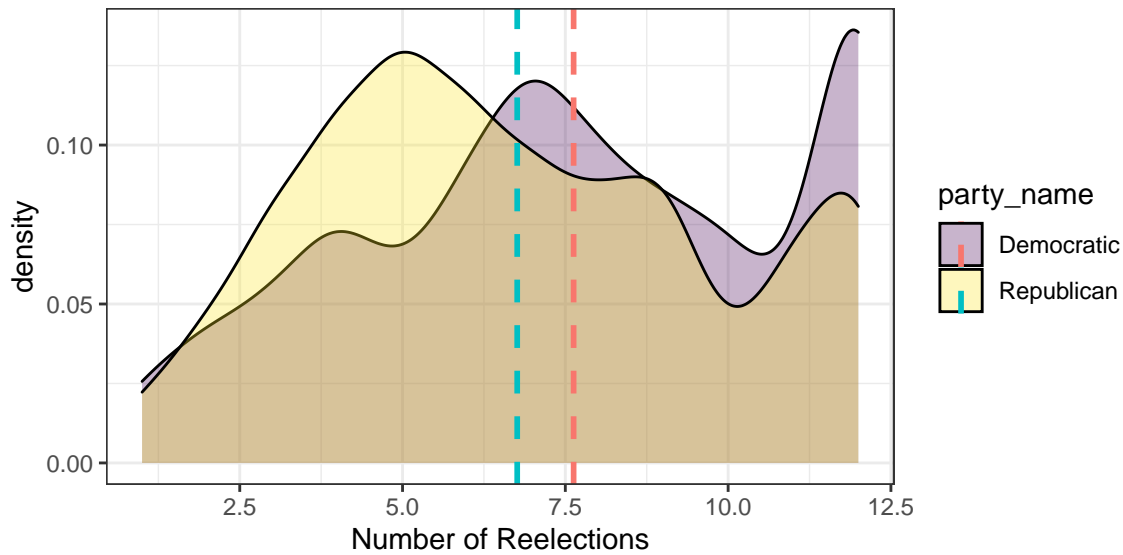
Negative Binomial models are not assumed to have normalized residuals. The normality plot looks like it could have some skew but for the most part looks normal. There are a couple of points that stand out on the leverage plot but none that are beyond cook's distance (for diagnostic plots see appendix model 3).

Final Model

Interaction between Party and Letter Interests As discussed previously republicans generally seem to be reelected less often than democrats over a ten year period. This is illustrated by the distribution plot below.

```
cdata <- noI %>%
  ddply("party_name", summarise, rating.mean=mean(reelections))

ggplot(noI, aes(x=reelections, fill=party_name)) +
  geom_density(alpha=.3) +
  geom_vline(data=cdata, aes(xintercept=rating.mean, colour=party_name), linetype="dashed", size=1) +
  xlab("Number of Reelections")
```

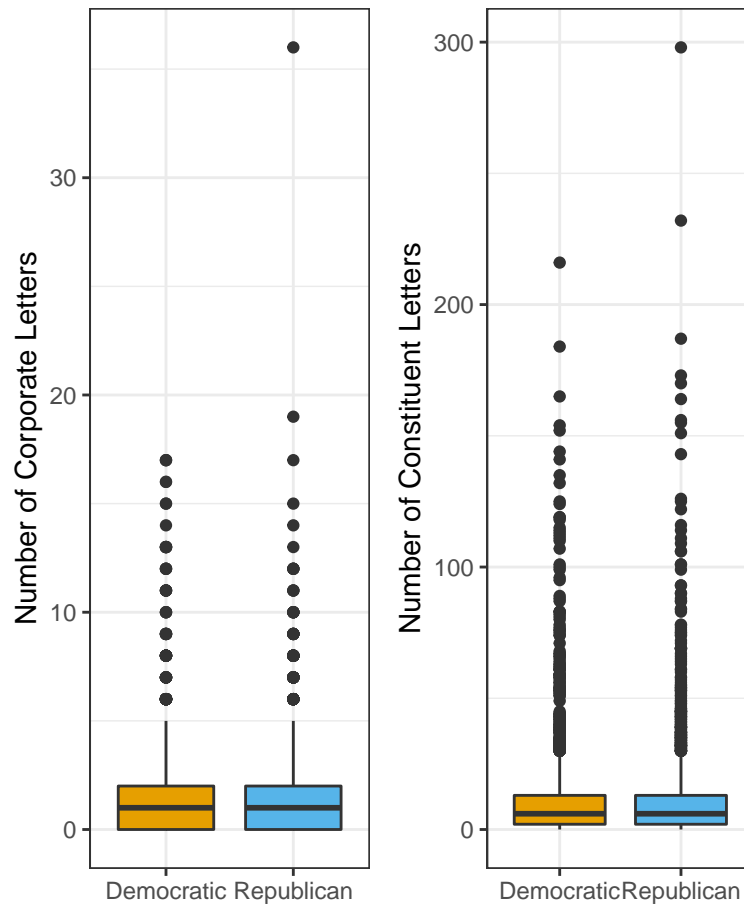


The sand color is the distribution of times republicans were reelected and the purple is democrat. The mean number of reelections is shown by the dashed line, blue for republicans and pink for democrats. The mean for republicans sits right around 6.5 and for democrats it is at 7.5. This plot, however, may not provide the full picture for what is happening. Parties can influence what a member advocates for and to that extent could have a significant impact on who (or what) a member is writing on behalf of. For this reason it is important to check for interaction between party and correspondence interest.

```
boxcorp <- ggplot(noI, aes(x= party_name, y=corporate, fill=party_name)) +
  geom_boxplot() +
  scale_fill_manual(values=c("#E69F00", "#56B4E9")) +
  guides(fill=FALSE) +
  xlab("") +
  ylab("Number of Corporate Letters")

boxcon<-ggplot(noI, aes(x= party_name, y=constituent, fill=party_name)) +
  geom_boxplot() +
  scale_fill_manual(values=c("#E69F00", "#56B4E9")) +
  guides(fill=FALSE) +
  xlab("") +
  ylab("Number of Constituent Letters")

grid.arrange(boxcorp, boxcon, ncol=2)
```



This plot looks at party and correspondence interest. The means for democrats and republicans is similar for corporate interest and constituent interest correspondence and the distributions themselves look very similar. The biggest difference is between corporate and constituent as there are more constituent interest letters.

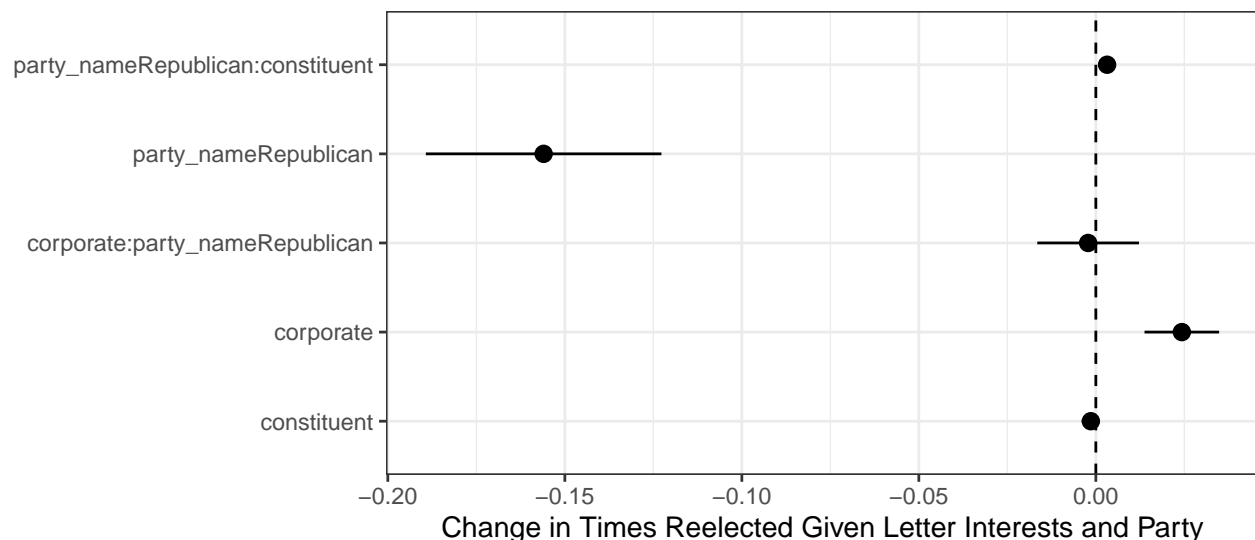
```
interactionparty <- glm.nb(reelections ~ corporate*party_name + constituent*party_name,
  data = noI)
```

```
interactionparty%>%
  tbl_regression(estimate_fun = function(x) style_ratio(x, digits = 3)) %>%
  bold_labels()
```


Characteristic	**Beta**	**95% CI**	**p-value**
__corporate__	0.024	0.014, 0.035	<0.001
__party_name__			
Democratic			
Republican	-0.156	-0.189, -0.123	<0.001
__constituent__	-0.001	-0.003, 0.000	0.023
__corporate * party_name__			
corporate * Republican	-0.002	-0.017, 0.012	0.8
__party_name * constituent__			
Republican * constituent	0.003	0.002, 0.005	<0.001

As shown in the previous model the log of the expected number of times a member is reelected decreases if the member is Republican. What is interesting, however, is that the interaction between Republican and constituent correspondence is statistically significant. This suggests that while compared to democrats, republicans are not as likely to serve as long, the log expected number of times a republican was reelected increases when they send letters on behalf of constituents.

```
interactionparty %>% mplot()+
  labs(x="", y="Change in Times Reelected Given Letter Interests and Party")
```



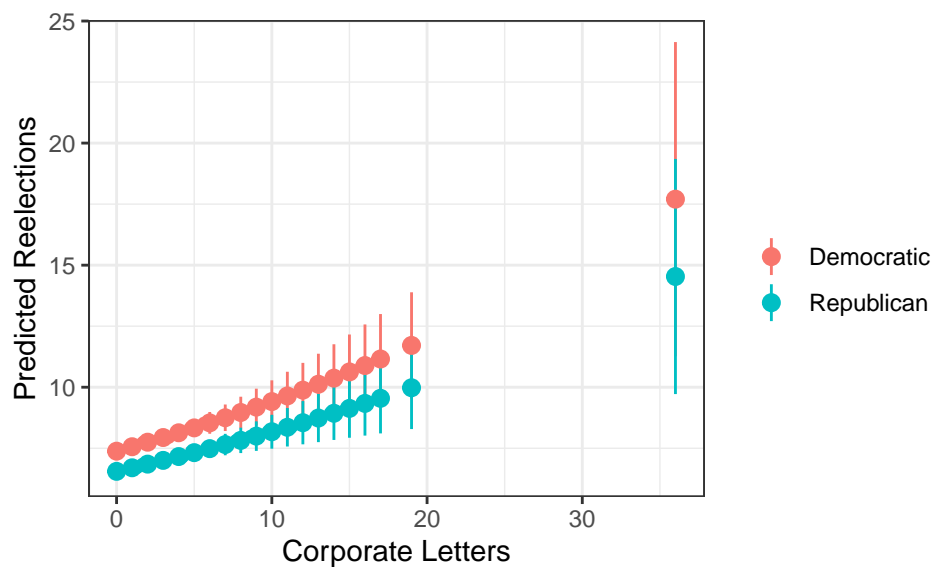
```
values <- noI %>%
  expand(corporate = corporate, constituent = mean(constituent), party_name = party_name)
```

```

predicted <- interactionparty %>%
  augment(type.predict = "response", newdata = values)

predicted %>%
  ggplot(aes(x = corporate, y = .fitted)) +
    geom_point() +
    aes(color = party_name) +
    labs(color = "") +
    xlab("Corporate Letters") +
    ylab("Predicted Reelections") +
    geom_jitter() +
    geom_pointrange(aes(ymin = .fitted - 1.96*.se.fit,
                        ymax = .fitted + 1.96*.se.fit) )

```



Modeled in this plot is the predicted number of reelections for a member based on their party and the number of corporate correspondence they have sent in a congress while holding constituent correspondence at its mean. The lines through each point is the confidence interval for that prediction. There is a clear overlap in the confidence intervals for democrats and republicans at each predicted count. This verifies what is seen in the model that the interaction between corporate correspondence and party is not significant.

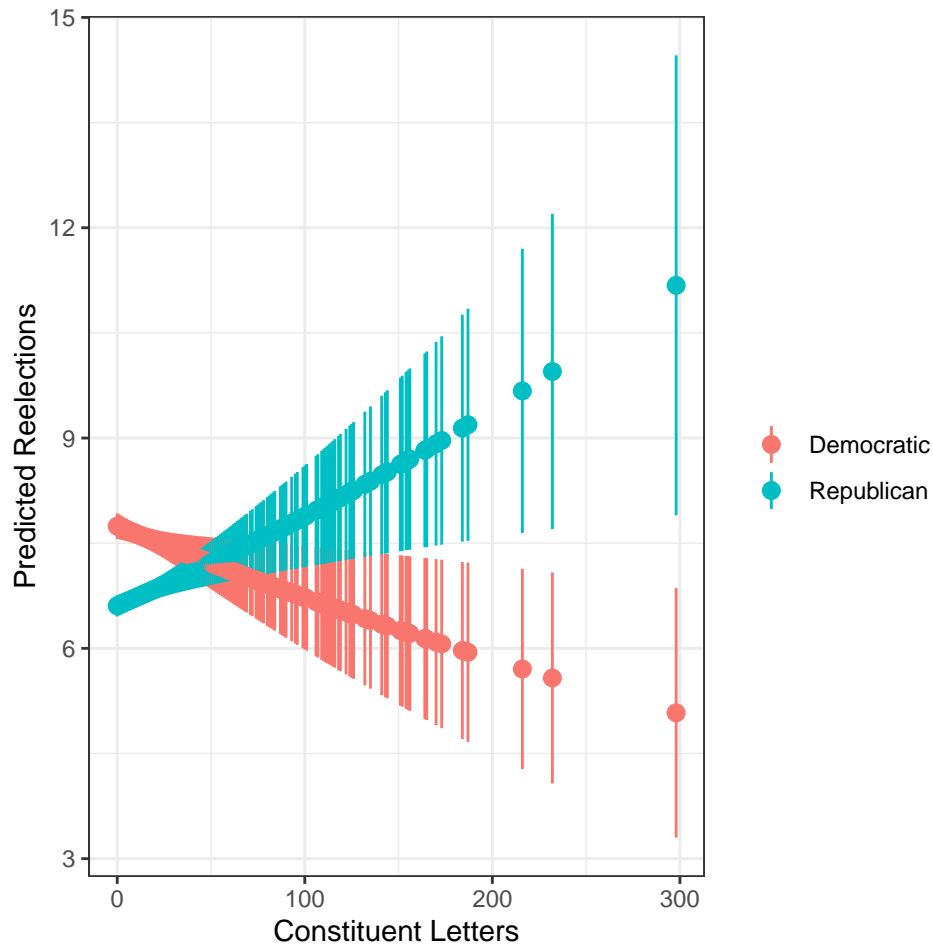
```

values <- noI %>%
  expand(corporate = mean(corporate), constituent = constituent, party_name = party_name)

predicted <- interactionparty %>%
  augment(type.predict = "response", newdata = values)

predicted %>%
  ggplot(aes(x = constituent, y = .fitted)) +
    geom_point() +
    aes(color = party_name) +
    labs(color = "") +
    xlab("Constituent Letters") +
    ylab("Predicted Reelections") +
    geom_jitter() +
    geom_pointrange(aes(ymin = .fitted - 1.96*.se.fit,
                        ymax = .fitted + 1.96*.se.fit) )

```



While there may not be evidence to suggest that constituent correspondence is a significant predictor of the number of times a member will be reelected, the interaction between party and constituent correspondence yields some interesting results. Holding the number of corporate correspondence at its mean, The number of predicted reelections for a republican member increases based on how much constituent correspondence they send where the opposite appears to be true for democrats.

Modeling Assumptions

Negative Binomial models are not assumed to have normalized residuals. The normality plot looks like it could have some skew but for the most part looks normal. There are a couple of points that stand out on the leverage plot but none that are beyond cook's distance (for diagnostic plots see appendix model 4).

Conclusion

There is evidence of a relationship between reelection, letter interest, and party. Members of Congress who write letters to federal agencies on behalf of corporations are more likely to be reelected more times over a ten year period. Breaking this down by party, on average Republican members are reelected less times over a

ten year period than their Democratic counterparts, however this changes when letter interest is factored in. Republican members who write letters on behalf of constituents are more likely to be reelected more times than Democratic members who write the same amount of letters on behalf of constituents. Due to the complexities of predicting reelection it is hard to determine true causality in these models. While it is possible that when constituents feel that Republican members are advocating for their needs constituents are more likely to continue to vote for them, the opposite is also a possibility. In reality it could be that constituents are more likely to reach out for help to Republican members that are more established and have been in congress for a longer amount of time. Whereas constituents with Democratic members may be more likely to reach out to members that have not been in congress very long and end up being replaced fairly quickly. There are also potentially a large number of confounding variables that could have an effect on reelection, party, and letter interest. This could be an area for future studies.

Potential for Further Studies

Further research could be done into how closely correspondence to federal agencies match party platforms. This could then be tested to see if members that follow party lines are more likely to be reelected more times. Along with that ideology scores could also be looked at to determine if members with more extreme views (either left or right) are more likely to be elected more times. Demographic information could also be added to this as well.

References

Appendix

Dispersion Test

```
library(AER)

countModel <- glm(reelections ~ corporate + constituent, data = d, family = poisson)

dispersiontest(countModel,trafo=1)

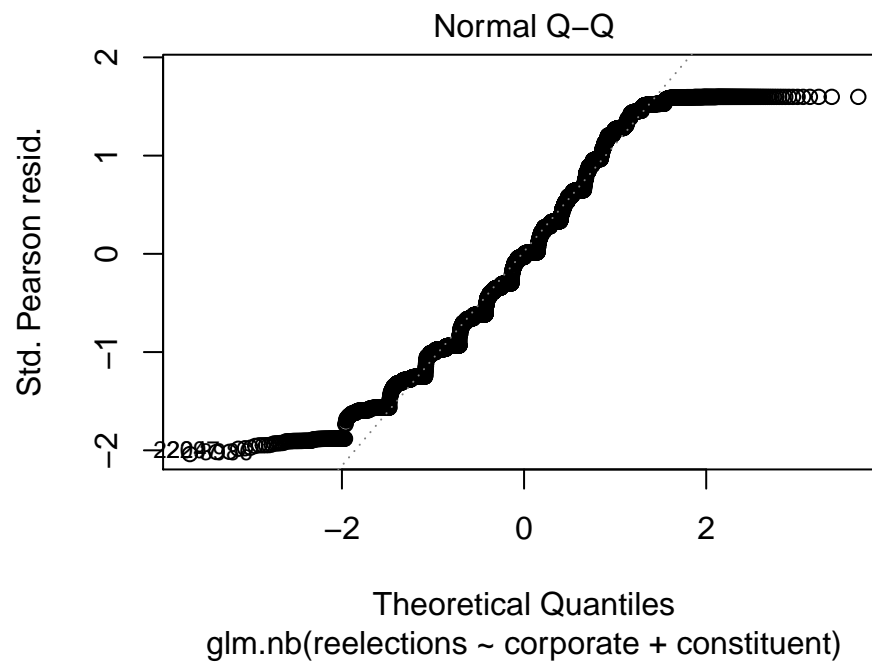
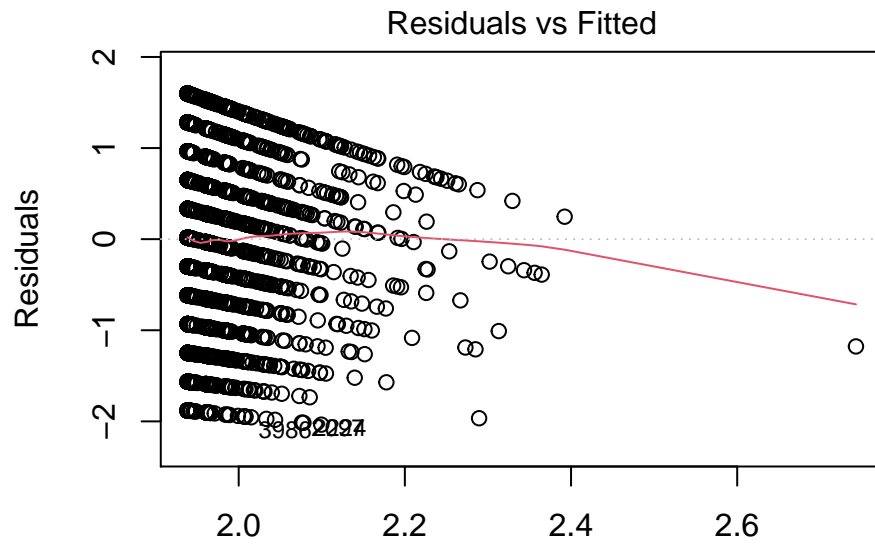
##
## Overdispersion test
##
## data: countModel
## z = 17.542, p-value < 2.2e-16
## alternative hypothesis: true alpha is greater than 0
## sample estimates:
## alpha
## 0.3942762
```

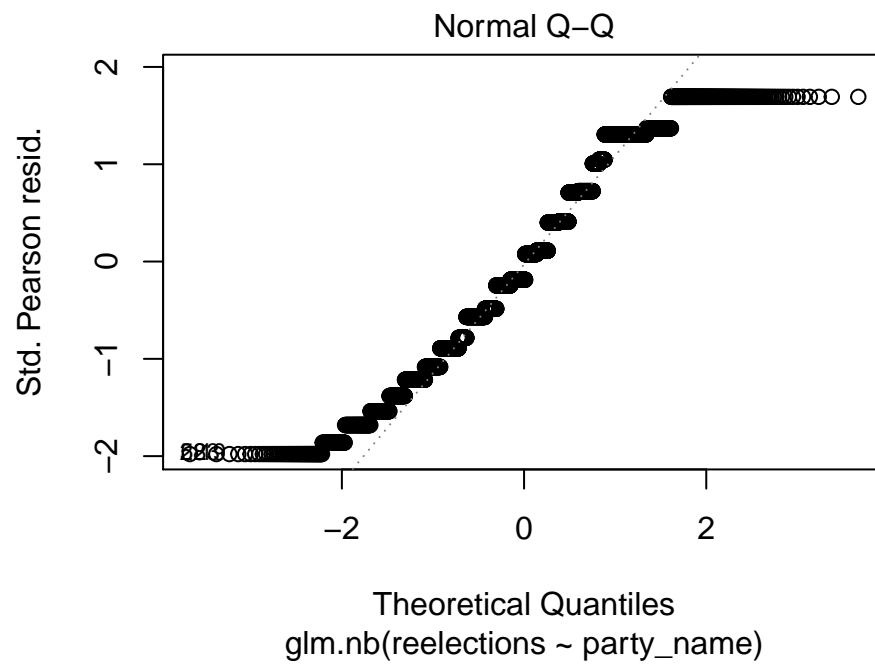
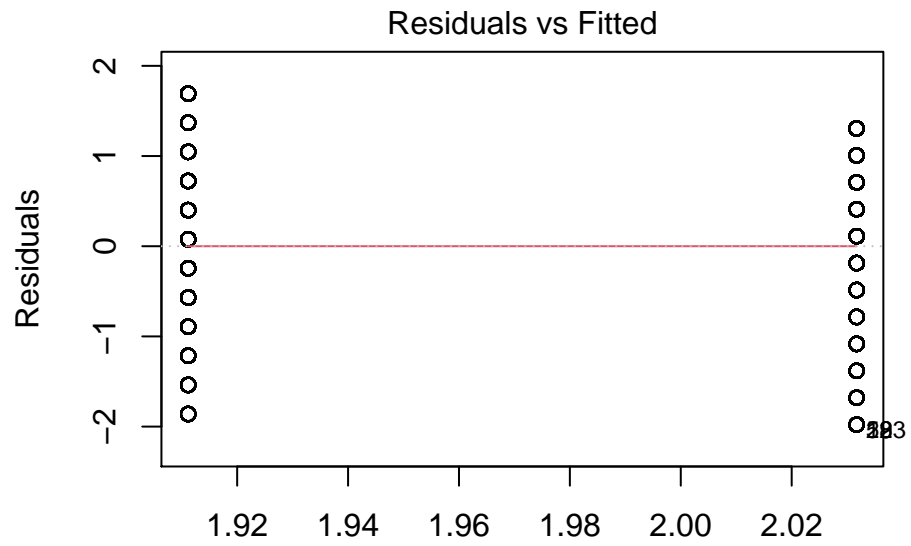
Modeling Assumptions

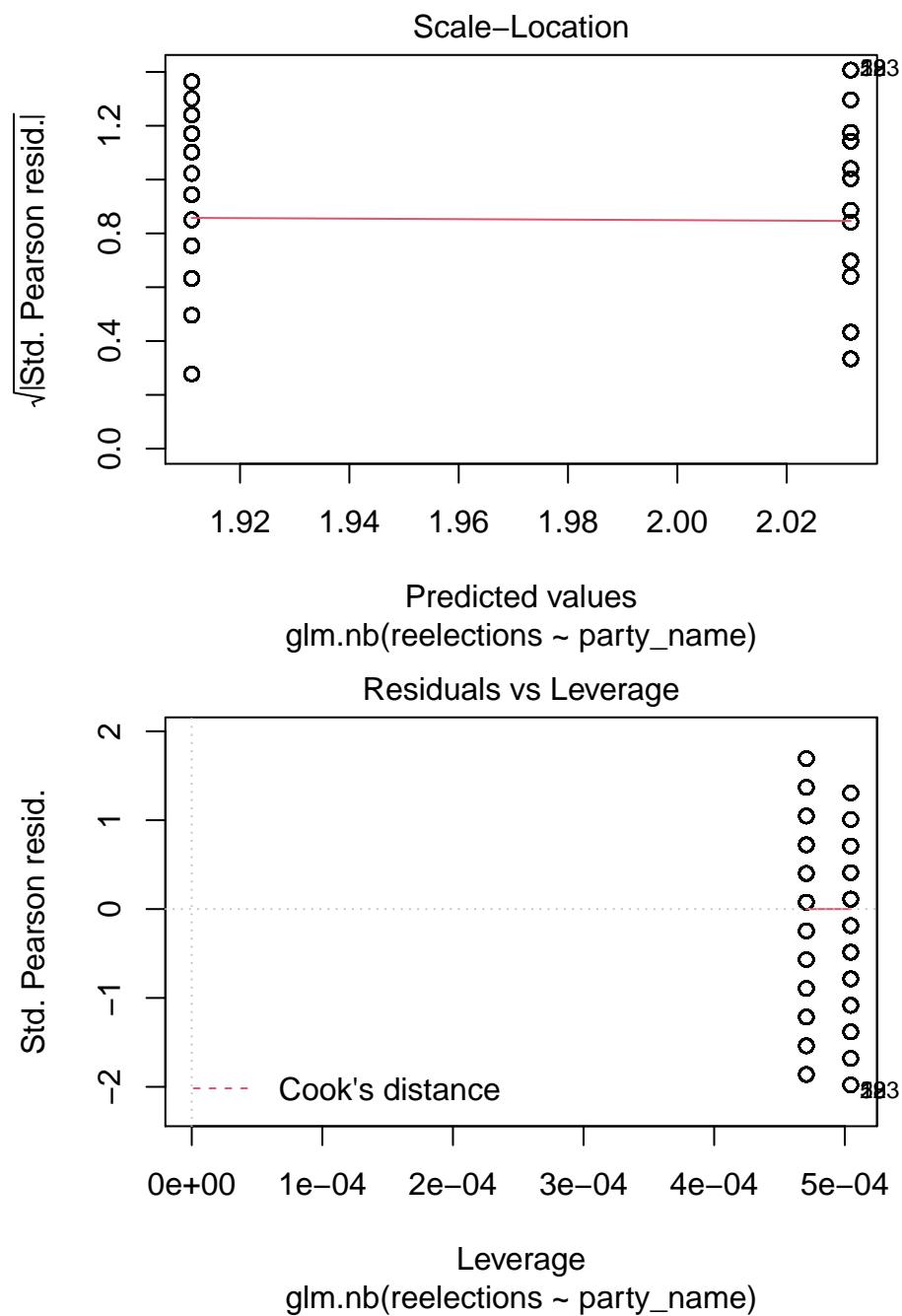
Corporate and Constituent Letters

Model #1

```
plot(interestModel)
```

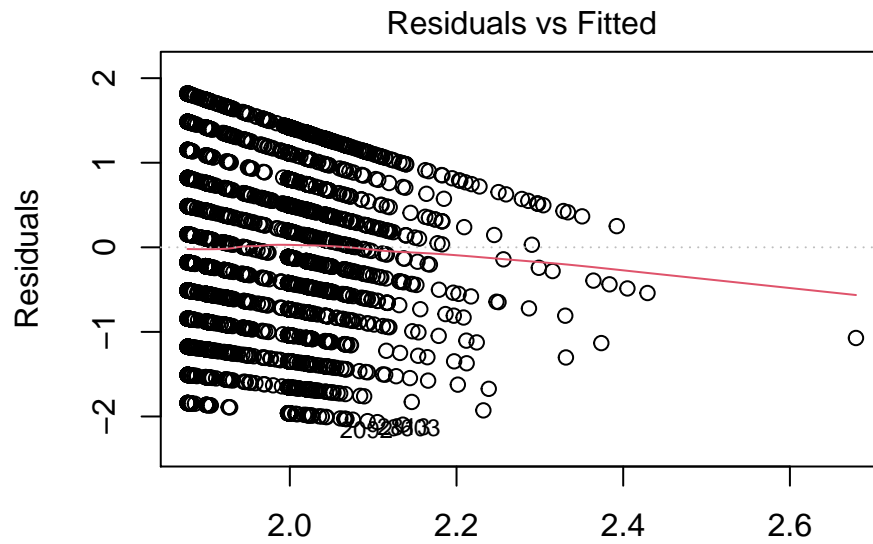




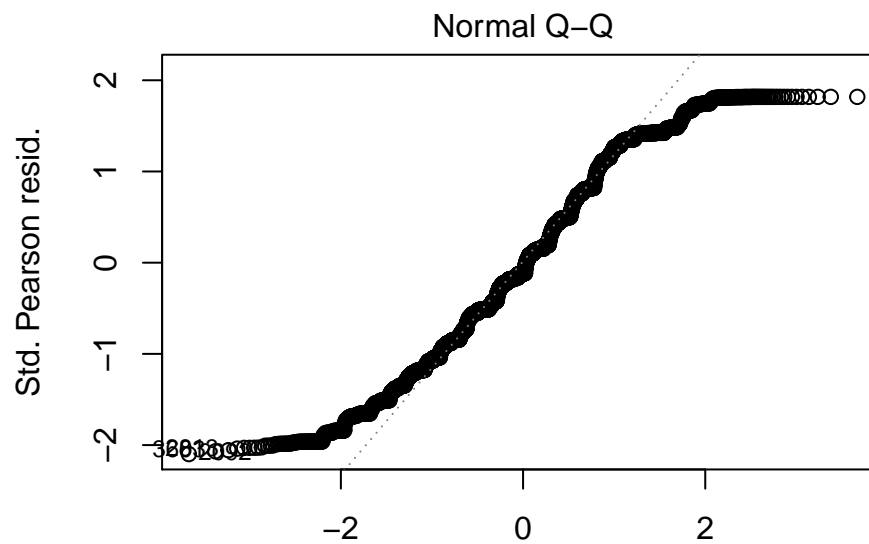


Party and Constituent/Corporate Interest Letters *Model #3*

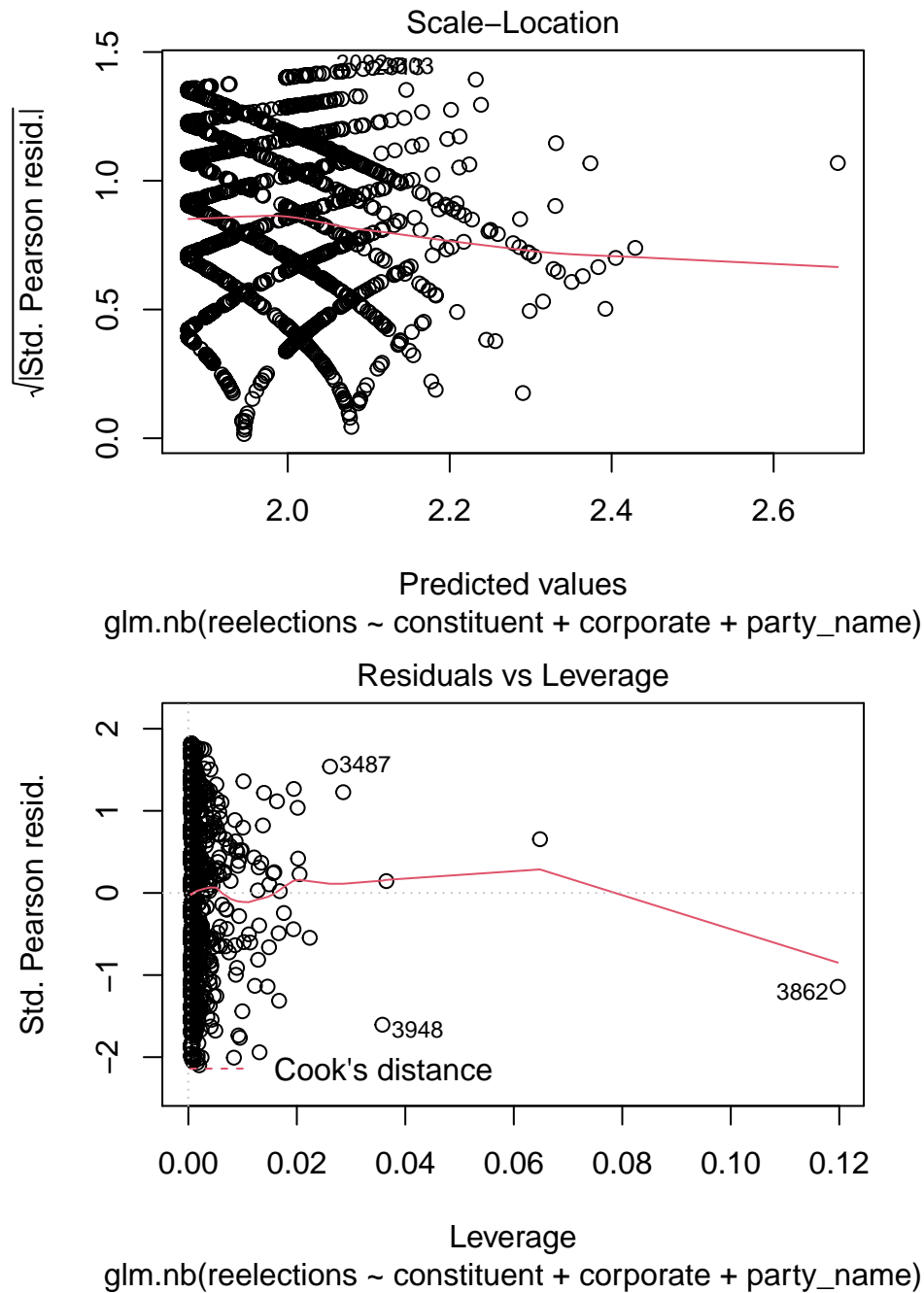
```
plot(partyLetter)
```



glm.nb(reelections ~ constituent + corporate + party_name)

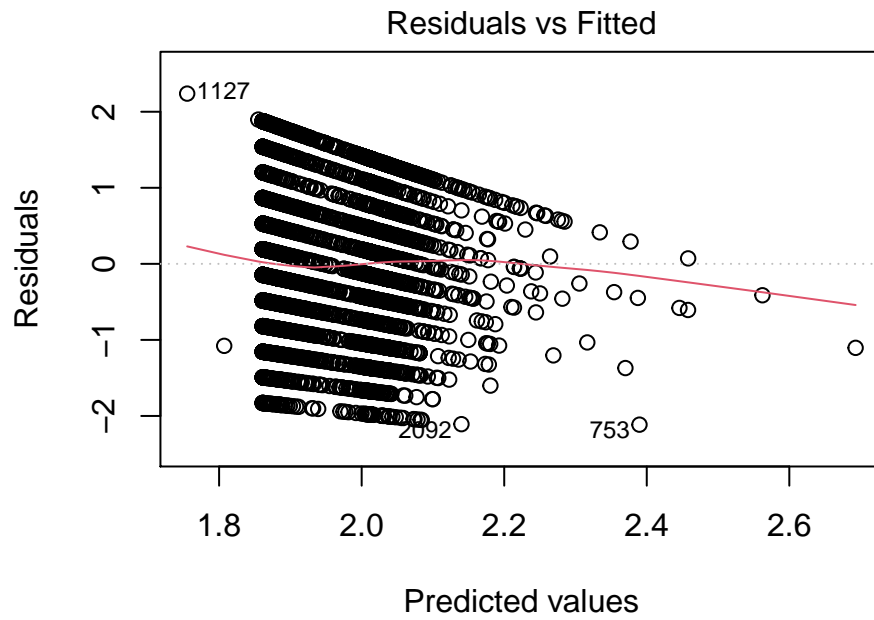


glm.nb(reelections ~ constituent + corporate + party_name)

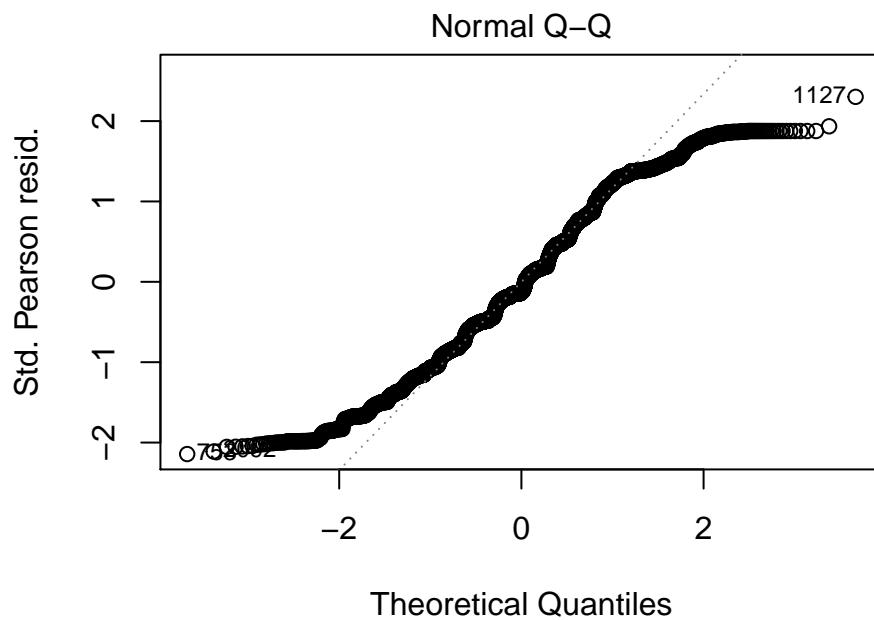


Interaction party and interest letters *Model #4*

```
plot(interactionparty)
```



`glm.nb(reelections ~ corporate * party_name + constituent * party_n`



`glm.nb(reelections ~ corporate * party_name + constituent * party_n`

