The Congressmen

Finn Mokrzycki, Joseph Hudson, Brandon Escobar–Campos, Surya Venkatraman

9 May 2024

Content

01

Background

Initial Question and Motivation

Introduction

Our project deals with how congressmen's votes on bills is influenced by the contributions these congressmen receive as apart of their campaign financing, as well as other factors including the political cycle, the gender of the congressman, how well the congressman did in terms of the popular vote percentage for their last election and others. The project focuses on only elected congressmen and their votes on bills between the years 2006–2012. Another aspect of this project is looking at how these factors affecting the vote of congressmen differ based on what political sector the bills are apart of.

How do **company donations** influence **how a Congressman will vote** on a bill or resolution?

— **Our Original Question**

How do donations **by company sector** influence whether a Congressman will vote **against the majority of his political party**?

— **Our Current Question**

Industry and Voting

Factors for Political Contributions:

- Company Board of Directors' Donations
- Aligning Company and Bill Topic Areas
- Time Period (2006–2012)
- Federal Level Votes
- Bills and Joint Resolutions

Not Used:

- Committee Information (Fowler et al. 2020)

Motivation

The modern world of American politics is heavily affected by the donations given to politicians by large companies and political action committees. But just how much does these donations really matter when it comes to the decisions? The hope of this project is to give an idea of how much donations to congressmen meaningfully change how these congressmen cast their votes on bills. This information, if significant, could point to the idea that for large companies and other organizations they can influence American politics in a real way if they are willing to contribute what is required. Also, we can explore what other factors relate to how congressmen vote and gain a better perspective of the relationships that exist in the American political world.

02 Data

Sources and Dictionary

Data Collection

Company Info

Recipients

Donors

Voting Record

4 Areas of Data
3 Databases

Database Sources

- **Stanford DIME**
  Database on Ideology, Money in Politics, and Elections

- **Stanford DIME+**
  Appended Data on Voting Records

- **Stanford BOD Fortune 500 Data**
  Board of Directors Donations from Top Companies

Company Info

Variable	Description	Example
company	Company name	Baxter International Inc.
ticker	Stock ticker	BAX
sector	**Sector of the company based on ticker**	**Healthcare**
industry	Area of focus within sector	Healthcare Facilities
democrat_republican_ratio	**Total Democrat Donations / Total Republican Donations of the company**	**1.57585566**

Donors

Variable	Description	Example
ticker	Stock Ticker	BAX
cycle	**The year of the general election**	**2006 [Donations from 2005 – 2006 for year 2006]**
amount	**Donation amount from transaction**	**2000**
bonica.rid	Candidate ID	cand382

Recipients

Variable	Description	Example
name	Recipient's full name	Hatch, Orrin Grant
seat	Whether the recipient is in the House of Representative or Senate	1 (1 = Senate, 0 = HoR)
party	Recipient's political party	Republican
gender	Recipient's gender	Male
cycle	The year of the general election	2006 [Donations from 2005 – 2006 for year 2006]

Recipients Cont.

Variable	Description	Example
ico.status	Incumbency Status	I (O = Open Seat Candidate, I = Incumbent, C = Challenger)
bonica.rid	Recipient ID	cand280
n.givers	Number of distinct donors that gave to the recipient during an election cycle	16179
general.percent	FEC reported vote share in general	.6236

Voting

Variable	Description	Example
bill.id	Bill ID	110_hr6331
bill.year	The year the bill was voted on	2008
Sponsor.Cosponsor	An indicator variable that determines if the recipient was either a sponsor or cosponsor of a bill, or neither	0
Topic weights	Topic numeric weight	tw.healthcare: .3142085
Vote	Recipient's Vote Choice	0 (1 = Yes, 0 = No)

Final Merged Data

Variable	Description	Example
Vote.Against.Majority	Whether the recipient voted against their party's majority vote on a bill	1 (Yes = 1, No = 0)
top_topic	The main topic of the bill.	tw.healthcare
bill.year	The year the bill was voted on	2008
TD	Total donations, of the previous election cycle, from a sector	10600
sector	The sector of the grouped company donations	Healthcare
party	The political party of the recipient	Republican

Final Merged Data Cont.

Variable	Description	Example
seat	Whether the recipient is in the House of Representative or Senate	1 (1 = Senate, 0 = HoR)
cycle	The year of the general election	2006
gender	The gender of the recipient	Male
ico.status	The incumbency status of the recipient	I (O = Open Seat Candidate, I = Incumbent, C = Challenger)
n.givers	Number of distinct donors that gave to the recipient during an election cycle.	16179
general.percent	FEC reported vote share in the general election	.6236

Final Merged Data Cont.

Variable	Description	Example
sponsor.cosponsor	An indicator variable that determines if the recipient was either a sponsor or cosponsor of a bill, or neither	0
mean_democrat_republican_ratio	Avg Total Democrat Donations / Avg Total Republican Donations of the companies in a sector during a cycle	1.130303
Vote	Whether the candidate voted yes (1) or no (0)	1

# 03 Initial Analysis

Donations, Bill Topics, and Votes

Topic Breakdown

Number of Bills
Earliest Donation Year
Latest Donation Year

	Top_Topic	n()	min(cycle)	max(cycle)
	<chr>	<int>	<int>	<int>
1	tw.banking.and.finance	17	2006	2010
2	tw.economy	9	2006	2010
3	tw.energy	17	2006	2010
4	tw.environment	10	2006	2010
5	tw.healthcare	14	2006	2010
6	tw.labor	2	2006	2010
7	tw.transportation	12	2006	2010

Votes Against Majority Breakdown

Votes Against Majority by Topic

Energy   Healthcare   Transportation   Financial   Environment
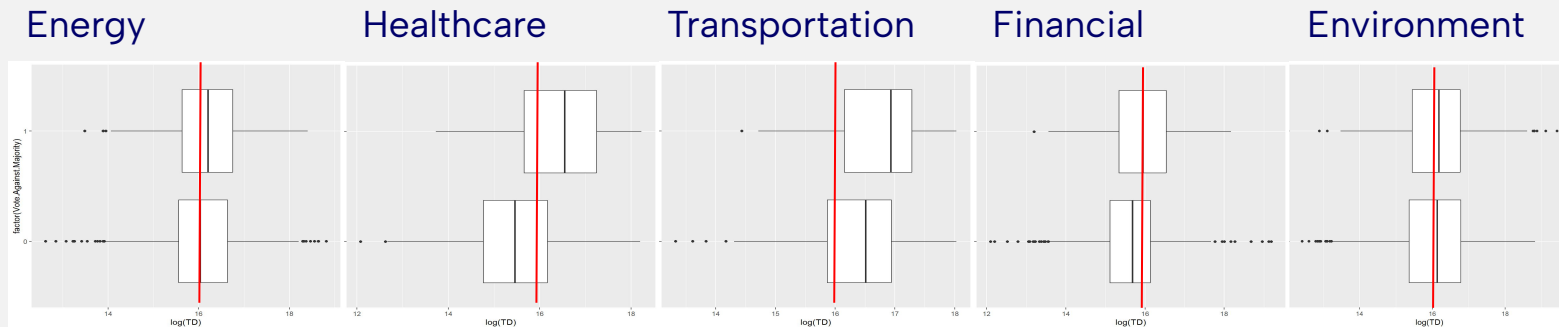
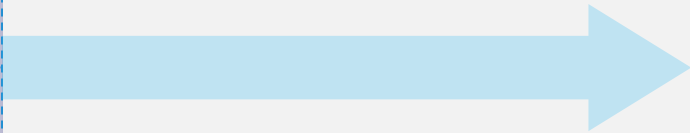Top Row: Vote Against Majority | Log(**TD**) = 16   **TD** = $8,886,111

04-05

Results

Linear and Non–linear Modeling, Interpretations

Modeling

Lasso Regression
Linear Model, Variable Selection

Logistic Regression
Linear Model, (Log) Odds Ratios and Predicted Probabilities

Decision Trees
Non–Linear Relationships in Data
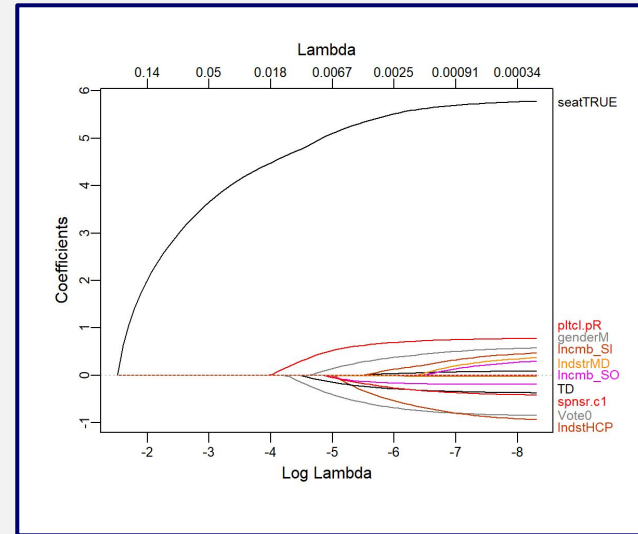
Lasso Regression

Question of Interest:
How does the variable **Total Donations** compare to other variables in importance?

Method:
Coefficient Analysis
Lambda Plotting

Example Lambda Plot

Lasso Regression

Primary Finding: **Total Donations** Coefficient Never 0

Topic	TD Coefficient	N Coefficients Where $|\beta| > |\beta_{TD}(\text{Median}_{TD})|$
Energy	0.183	1 of 13 (Senator)
Healthcare	–0.367	1 of 15 (Senator)
Transportation	0.104	2 of 16 (Trucking Industry, Senator)
Financial	–0.192	1 of 23 (Senator)
Environment	–0.066	1 of 14 (Senator)

λ = 0.00034 (minimum lambda from plots)
Note: All non–TD coefficients listed are positive predictors

Logistic Regression

Question of Interest:
With the variable **Total Donations** alone, what are the (log) odds ratios and predicted probabilities?

Method:
Assess Coefficients
Review Donations at Different Probabilities

Topic	Donation Amount Where π = 0.5	Max Donation Amount from Data
Energy	$6.4424841e+12	$148,573,161
Healthcare	$61,629,432.30	$82,308,219
Transportation	$164,099,853.46	$67,466,017
Financial	$623,366,889.50	$215,411,835
Environment	$1.9840261e+12	$272,164,250

TD Required at p=0.5 vs Max TD

Logistic Regression

Topic	Alpha	Coefficient
Energy	-4.3769	0.1484
Healthcare	-18.74362	1.04499
Transportation	-13.1939	0.6975
Financial	-8.54476	0.42195
Environment	-4.59741	0.16236

Logistic Regression Coefficients

a.k.a. **Log Odds** or **Logit**

Intercept

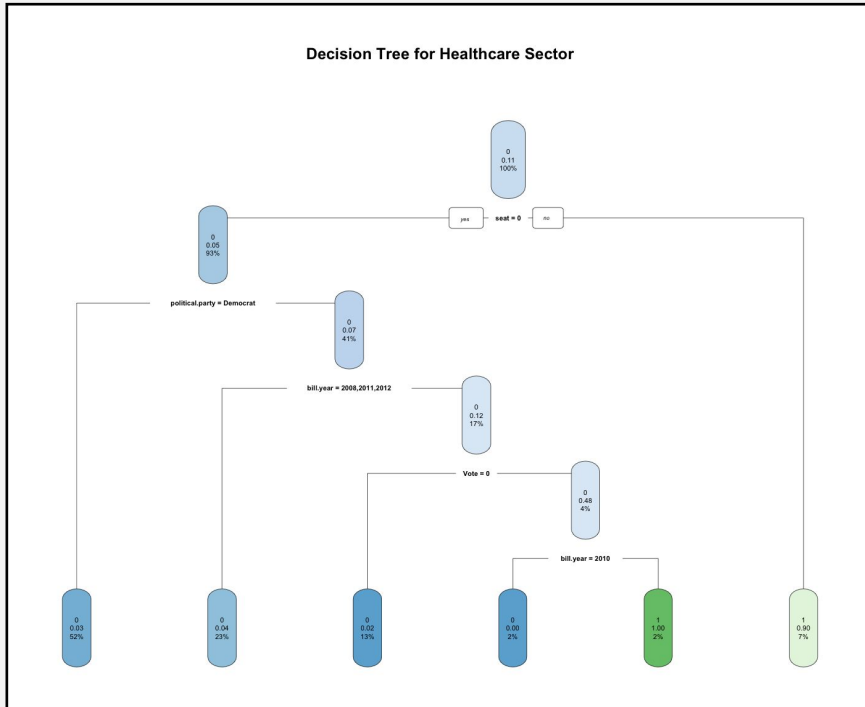$$\log\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X$$

Logit Equation

Logistic Regression

Topic	Coefficient	Odds Increase per log(TD)
Energy	0.1484	16.00%
Healthcare	1.04499	184.34%
Transportation	0.6975	100.87%
Financial	0.42195	52.49%
Environment	0.16236	17.63%

Logistic Regression Coefficients

Decision Trees

Decision Tree for Healthcare Sector

- Flexible modeling approach for capturing complex non–linear relationships
- Key variables: Seat (Senate vs. House), Bill Year, General Election Vote Percentage.
- Total Donations not significantly present
- Conflicting insights from linear models present.

What is the main takeaway?

Decision Trees

Decision Tree for Environment Sector

Decision Tree for Financial Sector
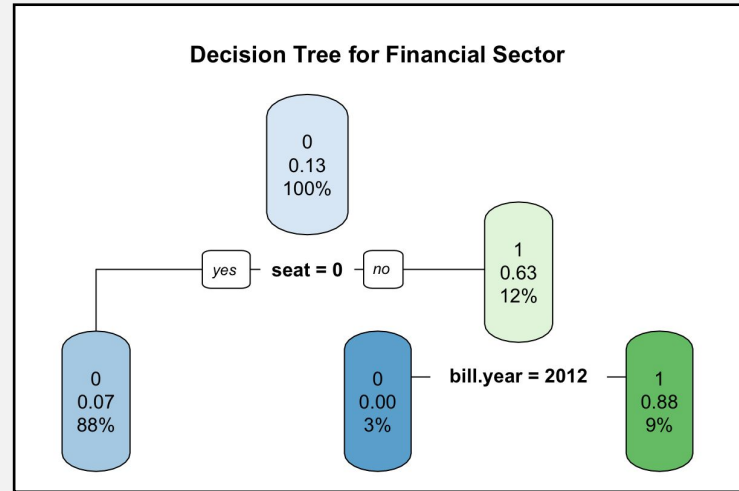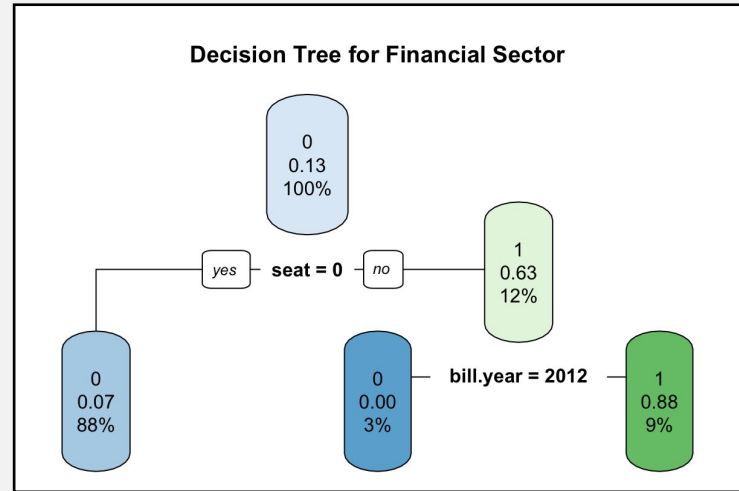
06

Appendices

Code and Citations

Work Cited

Fowler, Anthony, et al. "Quid pro quo? Corporate returns to campaign contributions." *The*

Journal of Politics, vol. 82, no. 3, July 2020, pp. 844-858,

https://doi.org/10.1086/707307