Lobbying and Legislative Uncertainty

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Note the working title I came up with when I threw the draft together earlier this month is "Lobbying and Legislative Uncertainty." I'm sure we can come up with something better...

Initial modeling thoughts, starting at the level of individual legislators.

- I wanted to ground this in the Optimal Classification methodology, so I went back to Clinton, Jackman & Rivers (2004)—hereafter CJR.
- Their setup:
  - Roll call votes are numbered $j = 1, \ldots, m$
  - Legislators are numbered $i = 1, \ldots, n$
  - "Yea" position on bill j is denoted ζ_j
  - "Nay" position on bill j is denoted φ_j
    * ζ_j and φ_j are assumed to have d dimensions; I will take $d = 1$ for simplicity for now
  - $y_{ij} = 1$ if legislator i votes "Yea" on bill j; $y_{ij} = 0$ if she votes "Nay" on bill j
  - Utility functions are quadratic:
    * $U_i(\zeta_j) = -(x_i - \zeta_j)^2 + \eta_{ij}$
    * $U_i(\varphi_j) = -(x_i - \varphi_j)^2 + \nu_{ij}$

      where x_i is the ideal point of legislator i and η_{ij} and ν_{ij} are the errors or stochastic elements of utility
  - Utility maximization implies $y_{ij} = 1$ if

$$U_i(\zeta_j) > U_i(\varphi_j), \tag{1}$$

    0 otherwise
  - CJR assume are jointly normal with equal means and var$(\nu_{ij} - \varphi_{ij}) = \sigma_j^2$

One simple way to take account of lobbying effort

- Let e_i be lobbying effort exerted on legislator i. If we want it to be specific to bill j, then change notation to e_{ij}
- Without lobbying effort, legislator i votes in favor of bill j if (according to Expression 1)

$$-\left(x_i - \zeta_j\right)^2 + \eta_{ij} > -\left(x_i - \varphi_j\right)^2 + \nu_{ij}$$

- Now add the lobby. If the lobby is in favor of bill j (this notation doesn't work if lobby is against bill j—e_i would need to be negative, or we would need to switch ideal points around):
  - just let lobbying effort shift the ideal point:

$$-\left(x_i + e_i - \zeta_j\right)^2 + \eta_{ij} > -\left(x_i + e_i - \varphi_j\right)^2 + \nu_{ij}$$

  Then the probability that legislator i votes yes on bill j is given by

$$P\left(y_{ij} = 1\right) = P\left(U_i(\zeta_j) > U_i(\varphi_j)\right) = P\left(\nu_{ij} - \eta_{ij} < \left(x_i + e_i - \varphi_j\right)^2 - \left(x_i + e_i - \zeta_j\right)^2\right) \quad (2)$$

Expression 2 is what the lobby targets to change behavior.

- We don't know exactly what their rule is. But they must want to increase enough individual $P(y_{ij} = 1)$'s so that $\sum_i y_{ij} > 218$ (in the U.S. House).
- We also don't know exactly what the benefit of bill passage is. May have to set a dummy value.
  - If errors are normally distributed as we assume, this can't be achieved with certainty
  - Maybe they target something like two standard deviations?
  - Is it equivalent to model them as just targeting the total expected number of votes (as if votes were divisible)?
  - Will there be some kind of marginal condition—extra increase in probability of voting "yea" should be the same for all legislators? Or no because these votes are actually indivisible? Maybe something more like expected probability of voting "yea" should be the same for all legislators the lobby engages with
- Of course, they want to do this at minimal cost
- They may also want a sufficient margin — lobbies might have different risk preferences
- Let's abstract from opposing lobbies for now

Going back to Expression 2,

- We estimate the x_i's
- If we assume the errors are normally distributed and mean zero, we also estimate the variance of $\nu_{ij} - \eta_{ij}$ for each i—or something like it; it's actually a cross-interest-group measure;
  - Need to figure out exactly how this standard deviation measure we create is connected to the theoretical underpinnings
  - I think what we need to assume is that the ν_{ij} and η_{ij} are iid within interest group votes (as well as that the ideal point doesn't vary for bills within interest groupings)
- We will have to make assumptions about the locations of ζ_j and φ_j

For commercial banks, I tried looking at some of the voting records to see if I could get some intuition for the pattern of ideal points and standard deviations. It's not too hard to pull the votes out and match the legislator code in the results file to the voting record. The problem I ran into was that in my list of banking votes, I only came up with 46 from the 112th Congress, whereas your output says there were 65 votes.

- I want to figure out what's going on here, especially because one of the things I'm looking at is two legislators with the same ideal point but drastically different standard deviations (Crenshaw and Adams both have ideal points for Commercial Banks of 1.32, but Crenshaw's std.dev. is double that of Adams). Their voting records are identical across the 46 bills I'm looking at except they took opposite positions on one amendment. I'm not sure if I need to make sense of that, or if I need to find 19 missing bills.

Conversation on May 9, 2014

- Clinton has another paper that may be helpful for me to look at
- I need to read about hyper-prior more carefully (Bafumi et al paper)
- Sebastian's brainstorm: take the utility function I have above

  $$-\left(x_i + e_i - \zeta_j\right)^2 + \eta_{ij}$$

  and morph it into the discrimination parameter form:

  $$\gamma_k \left(x_i + e_i - \zeta_k\right) + \eta_{ik}$$

  Does this make sense?
- He found that running a lot more simulations doesn't bring down the standard errors
  - Okay empirically; my question is: what about theoretically?
- In Bafumi's terminology, outliers are those who are misclasified
- We can look at the 20 guys around the cut-point (instead of median as we did before). This is going to depend on γ_k, so subject to all our discussions about γ_k changing depending on sample of bills
- What does it mean to use whether you were lobbied or not as a prior?
- Correlate lobbying *by bill* with γ_k (this is the discrimination parameter, not my γ) — not across bills, across industry, within bill

Conversation on June 4, 2014

- What we really have is an n-dimensional policy space, but it's not clear what we should set the "dimension" variable in the Jackman code to (or if we can use the Jackman code)
  - I need to dig into the Gelman and Hill book
- I still need to look at James Lakes' data
- We will need to decide list of interest groups
  - Either I need to compile number of bills per catcode, or instruct Yusuf to do it
- Rjags is the package Sebastian uses. He sent me master code in an email today at 5:29pm (response to my "Gelman and Hill Book" email)
  - In an earlier email, he sent three files: a BUGS program, an R program, and a PDF file that is Jackman's documentation for the R code

Work on 6/9/14

- Crespin $\&$ Rohde: divide votes into each appropriation category and run separate W-NOMINATE procedures on each (just like we were going to do)
- Clinton et al: Ex. 4 on page 9-12, party inducements.

$$y_{ij}^* = x_i\beta_j - \alpha_j + \delta_j D_i + \varepsilon_{ij}$$

  legislators are i, bills are j

Possible modeling elements

- Roll call votes are numbered $k = 1, \ldots, K$
  - Which groups g take a position on it
- Legislators are numbered $j = 1, \ldots, J$. Each is identified by
  - State
  - District
  - Party

- Whether he/she is lobbied by a group g
- Committee assignments

- Interest groups are numbered $g = 1, \ldots, G$

Want to model

- How j votes
- How vote total on k is determined
- How lobby group g's political uncertainty is determined
  - Overall success rate?
  - As function of lobbying effort?
  - Economic distribution across districts?
  - Committee chairs?