Lobbying and Legislative Uncertainty

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The Questions

1. How does uncertainty about legislators' preferences impact
   - lobbying strategies (e.g. who to lobby, how much to 'pay')
   - probability a bill passes
2. Can we distentangle fundamental uncertainty about preferences from equilibrium and modeling uncertainty?
   $\Rightarrow$ build a structural model to take to U.S. House data
3. Ultimately, want to identify cross-industry measures of legislative uncertainty
   - but for today, unidimensional model

Literature

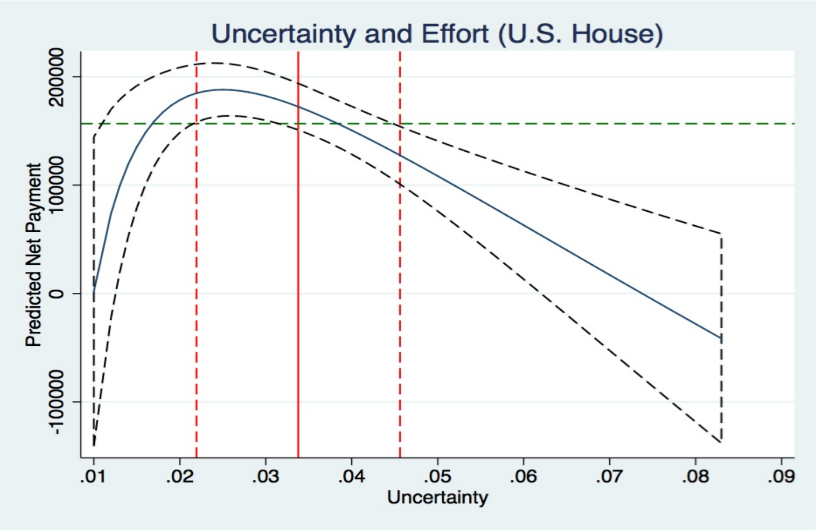
- **Probabilistic Voting with Policy Motivation**: Roemer 1994, 1997, Duggan & Fey 2011
- **Lobbying with Uncertainty**: Coates & Ludema 2001, Le Breton & Salanie 2003, Le Breton & Zaphorozhets 2007
- **Vote Buying in Legislatures**: Groseclose & Snyder 1996, Banks 2000, Dal Bo 2007
- **Influence w/out Vote Buying**: Fox & Rothenberg 2011

Some Stylized Facts

1. In the U.S., about $4 billion / yr spent on lobbying and campaign contributions
2. There is usually lobbying on both sides of a given issue
3. Moderate legislators receive more contributions than those who are ideologically extreme
4. Legislators about whom there is a moderate level of uncertainty are lobbied the most

Adding uncertainty to standard model captures (2) — (4)

Overview


Uncertainty and Effort (U.S. House)
Predicted Net Payment
200000
100000
0
-100000
.01
.02
.03
.04
.05
.06
.07
.08
.09
Uncertainty

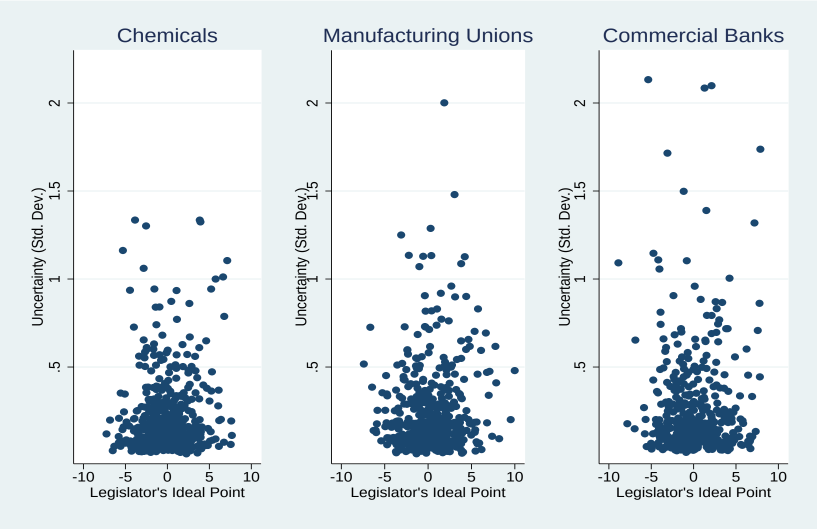
Context

U.S. House of Representative

- All roll call votes, 2005 through present
- Interest group lobbying on each vote
- PAC contributions, LDA lobbying data

Goal: use multi-dimensional ideal-point estimation to identify measures of uncertainty

Overview



Chemicals
Manufacturing Unions
Commercial Banks
Uncertainty (Std. Dev.)
.5
1
1.5
2
-10
-5
0
5
10
Legislator's Ideal Point

Policy and Politics

Two vote buyers, A and B

- A prefers x, B prefers s

Three legislators

- Each will vote for status quo s or new proposal x
- Decision made by majority vote
- Identified by location in linear preference space: $i \in \{-0.5, 0, 0.5\}$
  - Take ideal point to be linear: $\alpha - \beta i$

Timeline

1. **Vote Buyer A**
   i. Chooses bribes $\underline{a} = (a_{-.5}, a_0, a_{.5})$
2. **Vote Buyer B**
   i. Observes $\underline{a}$ (in sequential model)
   ii. Chooses bribes $\underline{b} = (b_{-.5}, b_0, b_{.5})$
3. **Legislature**
   i. All legislators observe $\underline{a}, \underline{b}$
   ii. Uncertainty about preferences realized: $\underline{\theta} = (\theta_{-.5}, \theta_0, \theta_{.5})$
   iii. Each legislator votes for her preferred policy

Legislators

Leg i votes for s if $v(i) = \alpha - \beta i + \theta_i + a_i - b_i \leqslant 0$

- Probability i votes for s is

$$\Pr\left[\alpha - \beta i + \theta_i + a_i - b_i \leqslant 0\right]$$

$$= \Pr\left[\theta_i \leqslant \beta i - \alpha - a_i + b_i\right]$$

- Assuming θ_i i.i.d. $\sim$ Logistic $(0, 1) := \frac{1}{1+e^{-(\beta i - \alpha - a_i + b_i)}}$

Vote Buyer B

Assume vote buyers maximize expected value of winning net of bribes paid

- Assume bribes must be non-negative
- Vote buyer won't spend more than his willingness to pay, W_B
- In three-seat legislature, maximize [probability $\geqslant 2$ legislators vote for s] $\times W_B -$ bribes

Vote Buyer B's Objective Function

Let $S(i) = 1$ denote legislator i votes for the status quo

$$\max_{b_{-.5},b_0,b_{.5}} W_B \Big[\Pr\left(S\left(-.5\right)=1\right)\Pr\left(S\left(0\right)=1\right)\left(S\left(.5\right)=0\right)+$$
$$\Pr\left(S\left(-.5\right)=1\right)\Pr\left(S\left(0\right)=0\right)\Pr\left(S\left(.5\right)=1\right)+$$
$$\Pr\left(S\left(-.5\right)=0\right)\Pr\left(S\left(0\right)=1\right)\Pr\left(S\left(.5\right)=1\right)+$$
$$\Pr\left(S\left(-.5\right)=1\right)\Pr\left(S\left(0\right)=1\right)\Pr\left(S\left(.5\right)=1\right)\Big] - \sum_{j\in\{-.5,0,.5\}} b_j$$

Vote Buyer B's Full Program

Let X, Y, Z be the gross positions of the legislators

$$\left[\frac{e^{-Z}+e^{-Y}}{\left(1+e^{-Z}\right)\left(1+e^{-Y}\right)}\right]\frac{e^{-X}}{\left(1+e^{-X}\right)^2}=\frac{1-\lambda_X}{W_B} \quad (1)$$

$$\left[\frac{e^{-X}+e^{-Z}}{\left(1+e^{-X}\right)\left(1+e^{-Z}\right)}\right]\frac{e^{-Y}}{\left(1+e^{-Y}\right)^2}=\frac{1-\lambda_Y}{W_B} \quad (2)$$

$$\left[\frac{e^{-X}+e^{-Y}}{\left(1+e^{-X}\right)\left(1+e^{-Y}\right)}\right]\frac{e^{-Z}}{\left(1+e^{-Z}\right)^2}=\frac{1-\lambda_Z}{W_B} \quad (3)$$

$$b(0)\geqslant 0 \quad b(-.5)\geqslant 0 \quad b(.5)\geqslant 0$$

$$\lambda_X\geqslant 0 \quad \lambda_Y\geqslant 0 \quad \lambda_Z\geqslant 0$$

$$\lambda_X\cdot b(0)=0 \quad \lambda_Y\cdot b(-.5)=0 \quad \lambda_Z\cdot b(.5)=0$$

Vote Buyer A

Vote Buyer A is just like Vote Buyer B *except*

- She gets to move first (in sequential model)
- Willingness-to-pay parameter W_A
- She wants x to win instead of s
  - Leg i votes for x w/probability

$$1 - \frac{1}{1 + e^{-(\beta i - \alpha - a_i + b_i)}} = \frac{e^{-(\beta i - \alpha - a_i + b_i)}}{1 + e^{-(\beta i - \alpha - a_i + b_i)}}$$

Two Non-Negative Bribes

The FOCs are

$$\frac{e^{-Y}+e^{-Z}}{\left(1+e^{-Y}\right)\left(1+e^{-Z}\right)}\frac{e^{-X}}{\left(1+e^{-X}\right)^2}=\frac{1}{W_B} \tag{4}$$

$$\frac{e^{-X}+e^{-Z}}{\left(1+e^{-X}\right)\left(1+e^{-Z}\right)}\frac{e^{-Y}}{\left(1+e^{-Y}\right)^2}=\frac{1}{W_B} \tag{5}$$

Two non-negative bribes

When Vote Buyer B pays bribes to exactly two legislators, the bribes are such that the two bribed legislators' ideal points gross of bribes are equalized. Which two legislators are bribed depends on the bias parameter α.

Three Non-Negative Bribes

Similar intuition for the case where all three legislators are bribed:

Three Non-Negative Bribes

When Vote Buyer B pays bribes to all three legislators, the bribes are such that the legislators' ideal points gross of bribes are equalized.

The Rest of the Story...

One Non-Negative Bribe

When Vote Buyer B pays bribes to exactly one legislator, it may be any one of the three legislators depending on the bias parameter α.

No Non-Negative Bribes

When Vote Buyer B has a low willingness to pay, he does not bribe any legislator.

Varying Uncertainty Across Legislators

Now let the scale of uncertainty differ across legislators

- To be precise: the scale parameters in the three logit distributions are not equal

Conjecture

When there is no bias in the positions of the legislators ($\alpha = 0$), the bribes of legislators whose ideal points are at the median in terms of uncertainty receive the highest relative bribes.

Some Possibilities...

No Bribes

It is possible that neither vote buyer bribes any legislator on a given vote. This occurs when both vote buyers' willingness-to-pay parameters are small.

Both Vote Buyers Bribe

It is possible for both vote buyers to bribe legislators on the same vote.

What I know...

FOC look the same for Vote Buyer B, e.g. for $b(0)$:

$$\frac{e^{-Y}+e^{-Z}}{(1+e^{-Y})(1+e^{-Z})}\frac{e^{-X}}{(1+e^{-X})^2}=\frac{1}{W_B}$$

- Either one root at zero, or
- Two roots and only larger one (at $X>0$?) satisfies SOC

For Vote Buyer A, FOC for $a(0)$:

$$\frac{e^{-Y}+e^{-Z}}{(1+e^{-Y})(1+e^{-Z})}\frac{e^{-X}}{(1+e^{-X})^2}=\frac{1}{W_A}$$

- Similar to B, except only smaller root satisfies SOC

Next Steps

- Modify model so that both vote buyers can lobby the *same* legislator in equilibrium
- Derive tight identification of empirical estimates from structural model
- Provide micro-founded explanations for the variation in uncertainty that lobbies face

Conclusion

Taking into account uncertainty about the preferences of legislators brings vote buying models closer to capturing important stylized facts

- helps in understanding lobbying strategies
- may shed light on why some lobbies are more successful than others
- will help in the identification of measures of uncertainty that can be used in many applications