Uncovering Vote Trading Through Networks and Computation

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Anecdotal evidence & qualitative studies

“This will be sort of a buddy vote. I know cigarettes are harmful and I wouldn't touch them myself. But a lot of my friends are concerned about this, because tobacco means a lot to the economy of their areas. They do things for me when I need it, and I'll do this for them. Frankly, it's just a matter of helping out your friends.”

(Anonymous Member of Congress on vote trading in the context of a bill deregulating cigarette advertisement; Kingdon 1989:100)
A simple theory of vote trading
Theoretical key points

- Incentives to trade votes are stronger if the outcome of the vote is expected to be narrow.

- A traded vote is a deviation from a legislator’s ‘preferred’ policy position.
Literature and existing evidence
Literature

• Large theoretical literature in political economics and political science (e.g., Buchanan and Tullock 1962, Tullock 1970, Bernholz 1973).

• Very few empirical studies with a reasonable test to identify logrolling. (Stratmann 1992, Stratmann 1995, Cohen and Malloy 2014)

• A lot of open questions:
  • How prevalent is vote trading?
  • How does it evolve?
  • How stable is it?
  • What are it’s driving factors?
Previous econometric approaches

“To test for the presence of logrolling using [this method], one must be able to identify the particular issues on which trading takes place.”

“Thousands of votes are taken during a session of Congress, many of which involve no logrolling. Moreover, the potential patterns of trades are limitless.”

(Stratmann 1992:1164; AER)
A novel approach to detect vote trading
Consistence with theory

1. Incentives to trade are higher the narrower vote outcomes are (perceived to be).

2. A traded vote is a deviation from the legislator’s ‘preferred’ policy position.

3. Such a deviation must be in favor of another legislator’s preferences towards the bill.

4. These deviations in favor of other legislators are reciprocal.
Three ingredients

i. How did legislators vote on various bills?
   → Roll call matrix
   \( \nabla \)

ii. Information on legislators and bills.
    → X

iii. Who has strong preferences for which bill?
     → ‘Signaling’ matrix
     \( \mathcal{S} \)
1) Detect deviations from ‘usual voting behavior’

a. Estimate a simple econometric model that aims to explain voting decisions in \( \nabla \).

b. Use the estimated model to predict the legislators’ propensity to vote Yes in votes with narrow outcomes.
1) Detect deviations from ‘preferred’ positions

$$V_{ik} = 1 \text{ and } Q_{ik} \leq \tau$$

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2) Draw the directed deviation network (DDN)
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3) Reciprocity in directed weighted networks

\[ w_{ij} = \min \left[ W_{ij}, W_{ji} \right] = w_{ji} \]

\[ f_i(W) = \begin{cases} 
1 & \text{if } \sum_{j \neq i}^{N} w_{ij} > 0 \\
0 & \text{otherwise} 
\end{cases} \]

\[ R = \sum_{i}^{N} f_i(W) \]

\[ W = \sum_{i}^{N} \sum_{j \neq i}^{N} W_{ij} \]

\[ t = \frac{2R}{W} \]
4) Null hypothesis, logrolling index, VTN

a. Compare $t$ with the expected value of $t$ under the null hypothesis.
   - Null network has same properties as the DDN based on real data.
   - Legislators’ deviations, however, are drawn randomly.

\[ \ell = \frac{t - \bar{t}_0}{1 - \bar{t}_0} \]  
(Squartini et al. 2013, *Sci. Rep.*)

b. Compute jackknife standard errors by removing edges  

c. Extract the Vote Trading Network (VTN)
A first application

The anatomy of vote trading in the U.S. Congress
Conclusions

- Limitations
  - Other forms of logrolling
  - Limits of validation
  - Small samples

- Potential
  - *Scalable* (different legislatures, different time frames, …)
  - It is *flexible* (specification of matrix S, deviation detection, …)
  - Combination with qualitative research and previous econometric approaches
Questions?
Thank you!

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http://umatter.github.io

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