



Dynamics of Political Elections

A "Satisficing" Model and Empirical Evidence

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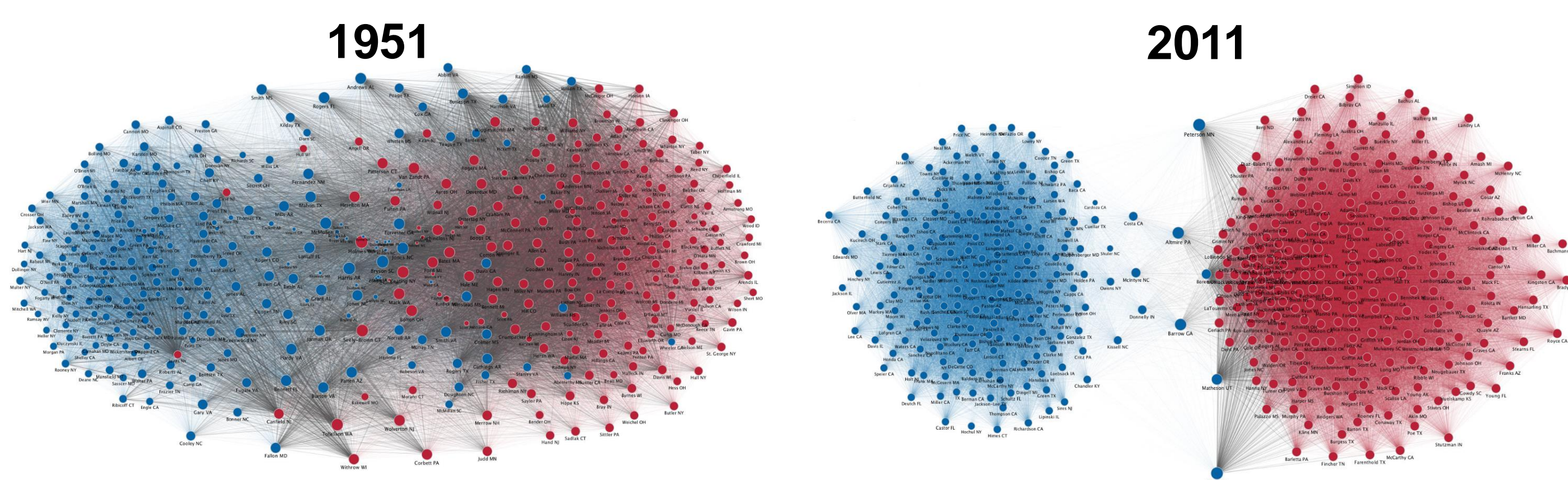


Abstract

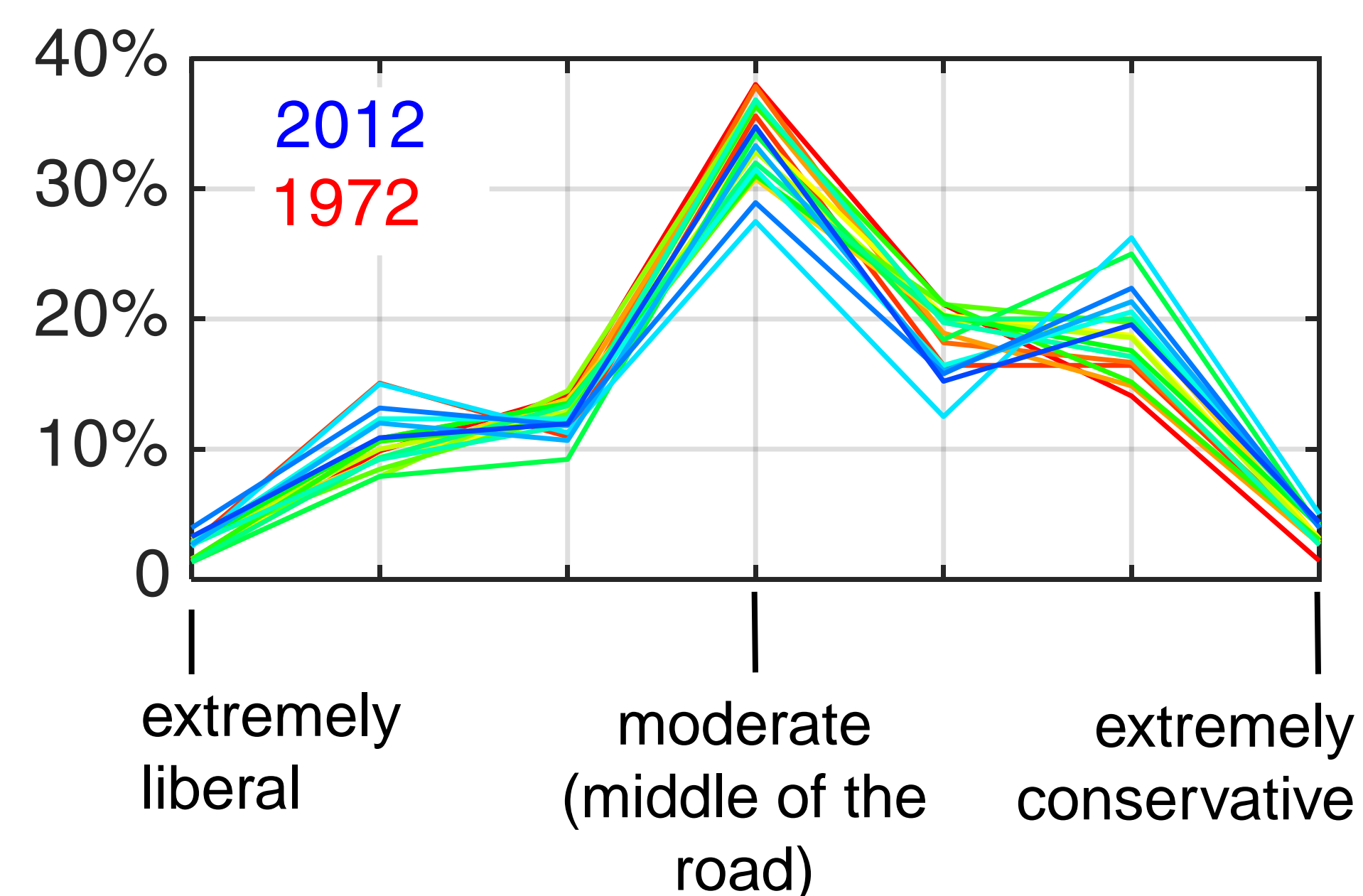
Many studies have confirmed that the US congress has been polarizing since the 1950's [1,2]. In comparison, the ideology of the US public changed little during the same period [3]. Here, we would like to address the origin of this discrepancy in polarization by proposing a dynamical model for party positions in elections. We are motivated by psychological studies in decision making, and assume that voters satisfy: they accept a party that is "good enough", and do not obsess over other options. The model suggests that even with a stationary voter ideology distribution, polarization in political parties can be explained by parties appealing to a narrower range of ideology. We use a dataset of the ideological positions of US congress members to validate the model's predictions and we find strong support.

Introduction

US House [1]



US Public



US parties: evident polarization
US public: no obvious polarization

How can the US have polarized parties without a polarized population?

Model

most other models



maximizers

exhaustively seek the best

this model

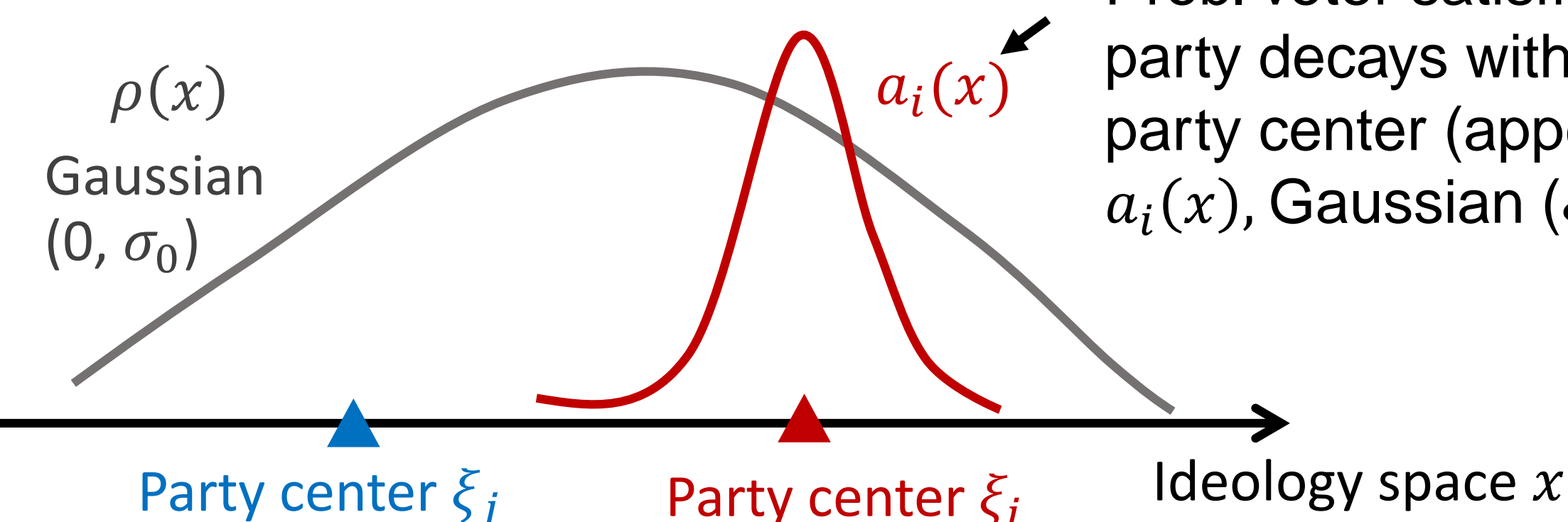


satisficers

accept good enough don't obsess over other options

Showing 1-D ideology space, 2 parties. Can be generalized to higher dimensions and more parties.

Parties: Maximize vote share



Prob. voter satisfied with a party decays with distance to party center (appeal function) $a_i(x)$, Gaussian (ξ_i, σ_i)

Voter at position x

- 1) satisfied with party i but not with j → vote for i
- 2) satisfied with neither → don't vote
- 3) satisfied with both → vote for one of the two with prob = 1/2

Probability of a voter at x voting for party i:

$$p_{i(x; \xi_i, \xi_j)} = \underbrace{a_i(x)(1 - a_j(x))}_{\text{Satisfied with } i \text{ only}} + \frac{1}{2} a_i(x)a_j(x)_{\text{Satisfied with both}}$$

Votes party i receives:

$$y_i(\xi_i, \xi_j) = \int_{-\infty}^{\infty} p(x; \xi_i, \xi_j) \rho(x) dx$$

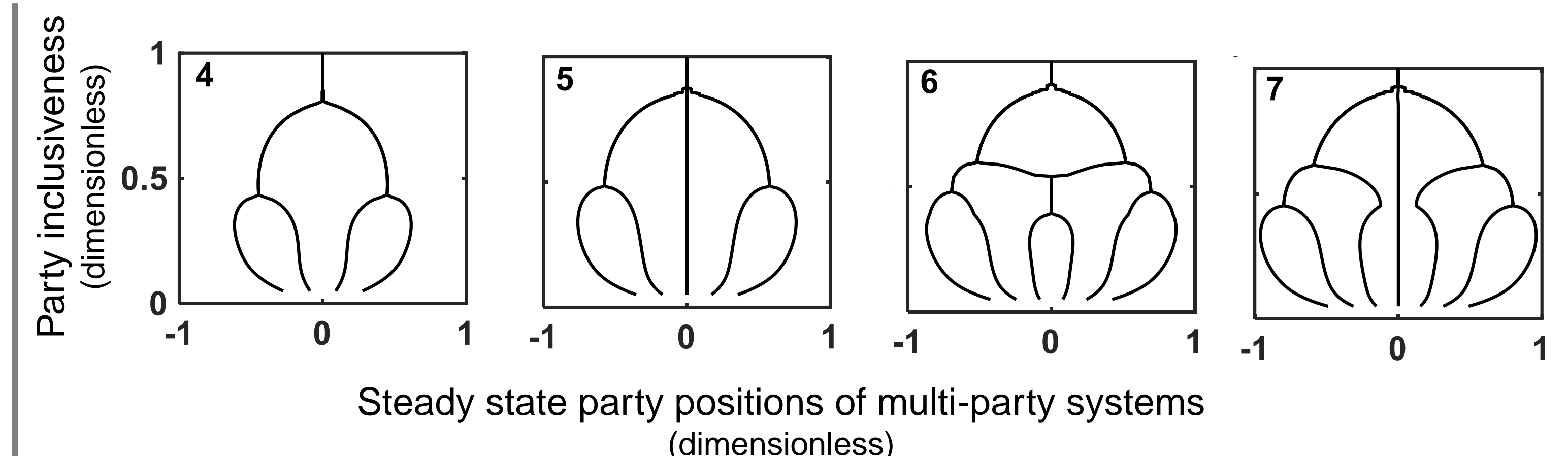
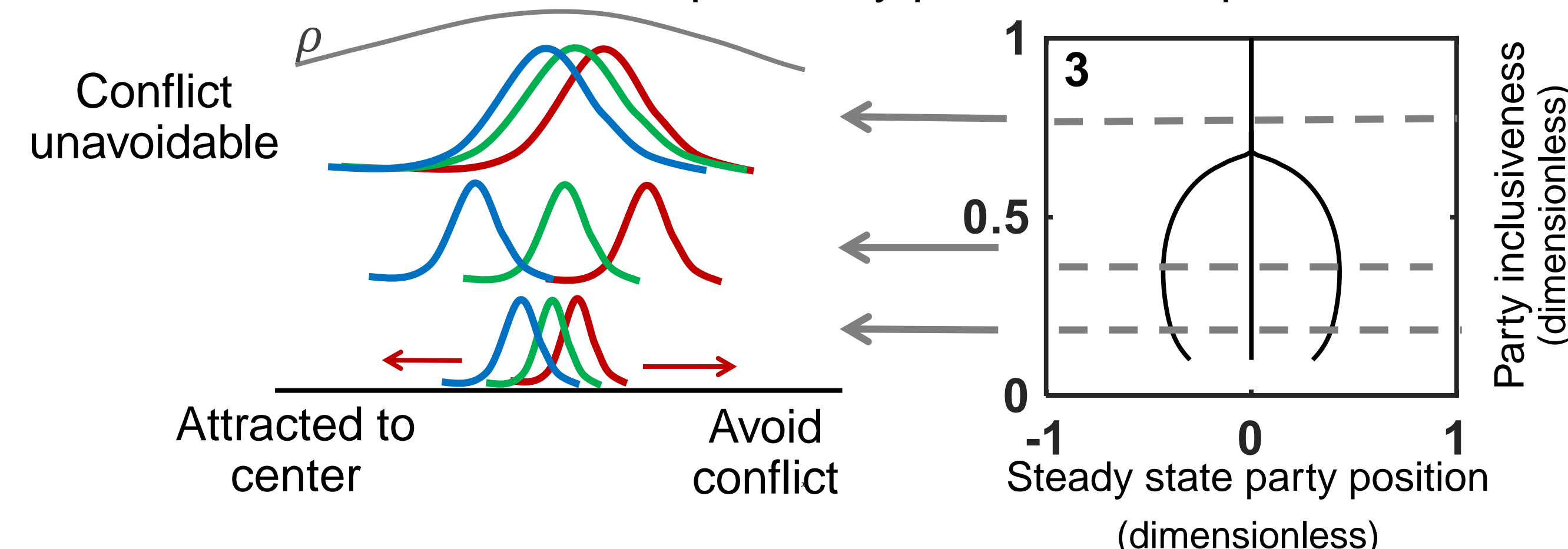
Vote share:

$$z_i(\xi_i, \xi_j) = \frac{y_i}{y_i + y_j}$$

$$\text{party position changes} \rightarrow \frac{\partial \xi_i}{\partial t} = k \frac{\partial z_i}{\partial \xi_i} \leftarrow \text{towards the direction that increases vote share}$$

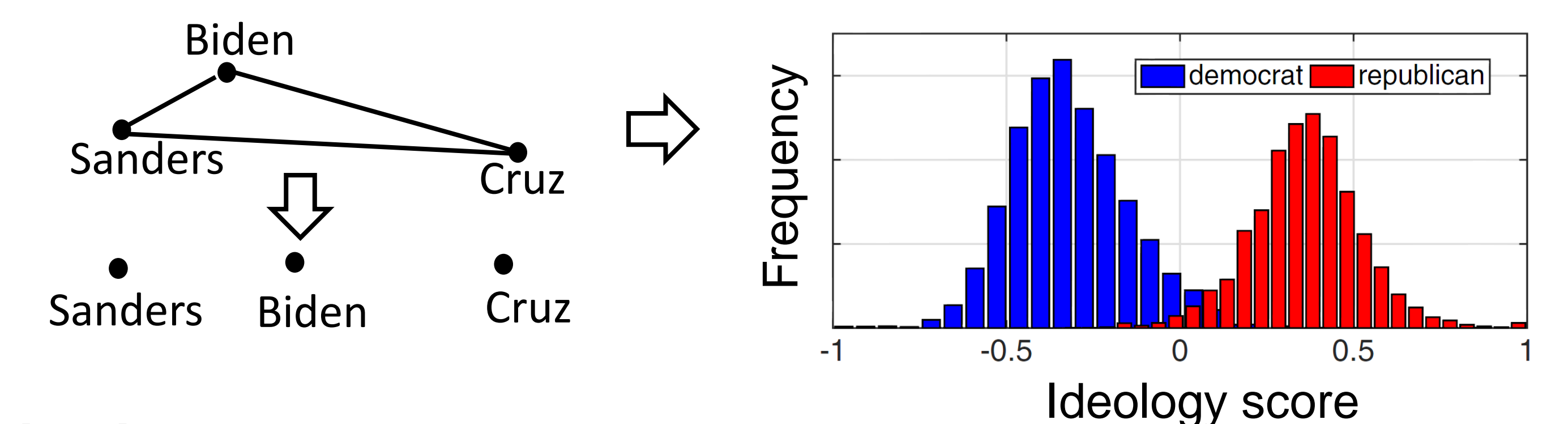
Results & Empirical Evidence

Strictly two party system structurally unstable. Parties would sacrifice its own votes, which can be captured by potential new parties.



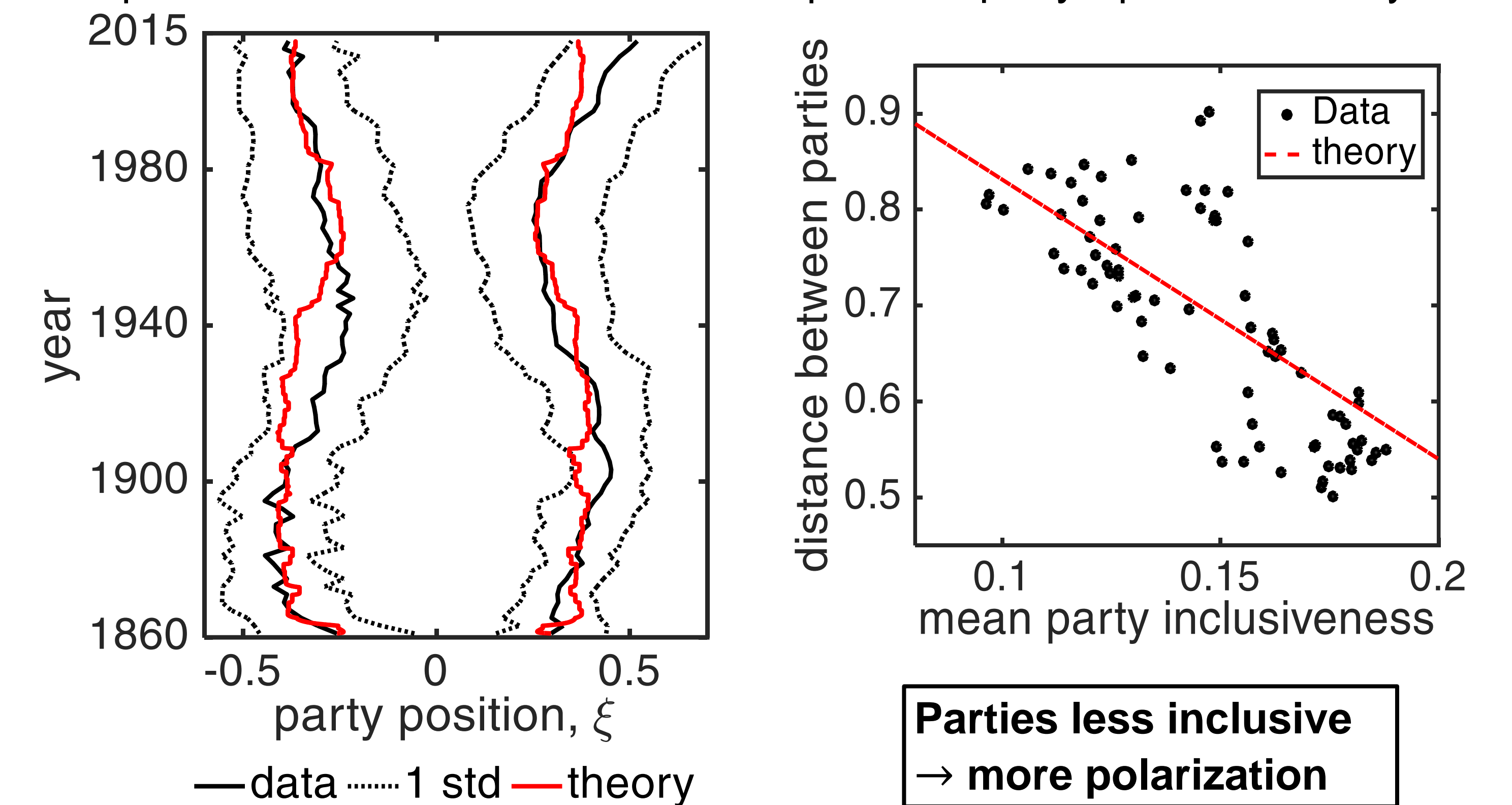
Data

Congress voting records give ideology positions (DW-NOMINATE method) [4]



Validation

Compare model with the Democrat & Republican party's position history



Conclusions

- Developed a dynamical model based on "satisficing" voters
- Validated model with data on US parties

It is possible for polarization between parties to occur even if the voter population remain stationary in ideology. Party polarization can be a result of parties targeting a narrow audience.

References

[1] Andris C et al. (2015) The rise of partisanship and super-cooperators in the US House of Representatives. *PLoS One*.
[2] Pool KT, Rosenthal HL (1984) Polarization of American Politics. *The Journal of Politics*.
[3] Hill SJ, Tausanovitch C (2015) A disconnect in representation? Comparison of trends in congressional and public polarization. *The Journal of Politics*.
[4] Poole KT & Rosenthal HL (2011), *Ideology & Congress*, Transaction Publishers.