Mixed Election Simulation

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Availability

Code: email me pauljohn@ku.edu
Technical Writeup:
modelDescription_2005_06_06.pdf
This Presentation: elections_swarmfest_2005.pdf

Ordinary Political Model

- Voters have "ideal points" on the real number line
- Candidates and/or parties compete by making promises
- Voters choose most desirable (closest) candidate / party

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  - Voters select among candidates within "single member district"
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Research Problem

- Mixed Electoral System
  - Some seats allocated by proportional representation
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- Are these systems the
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- Create districts with ideological tendencies (parameter=mode & diversity).
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Voter Behavior Types

- Choose Party, Vote for its candidate
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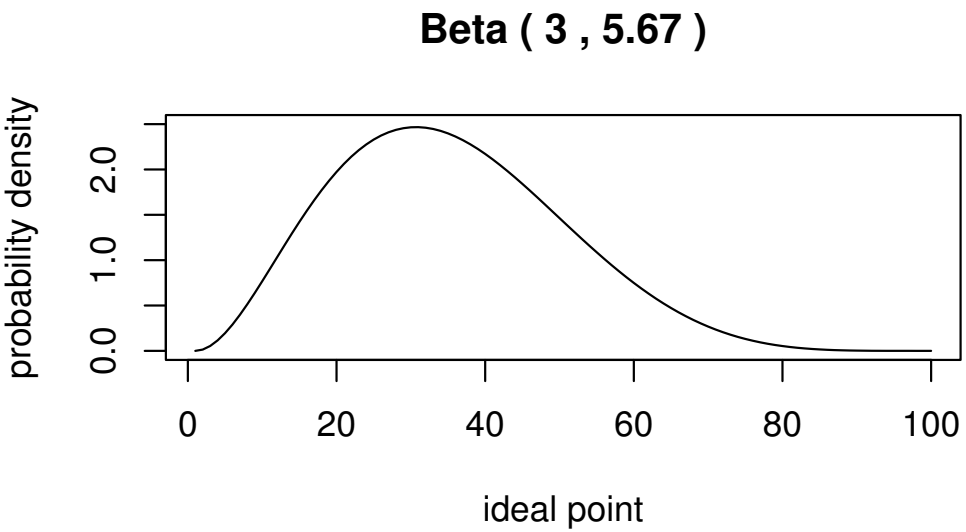
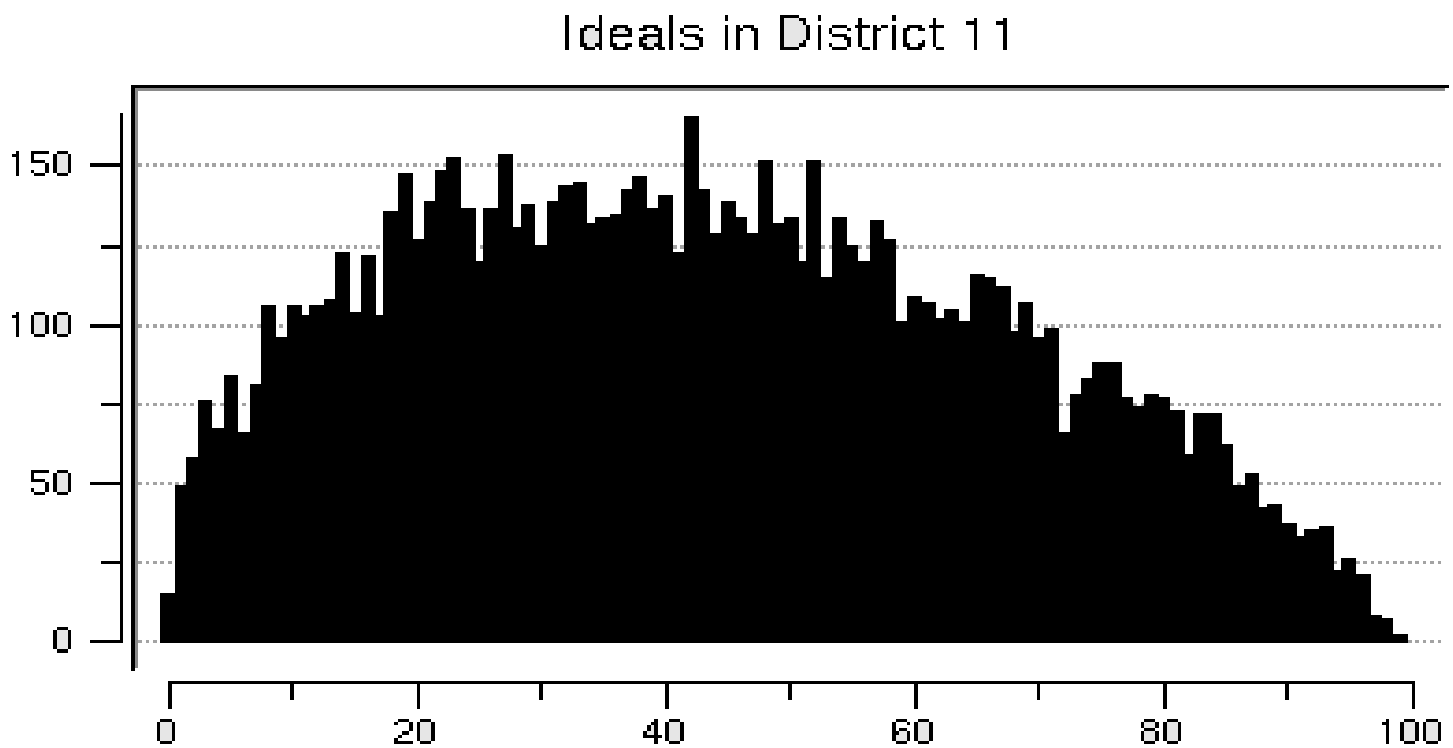
Example District



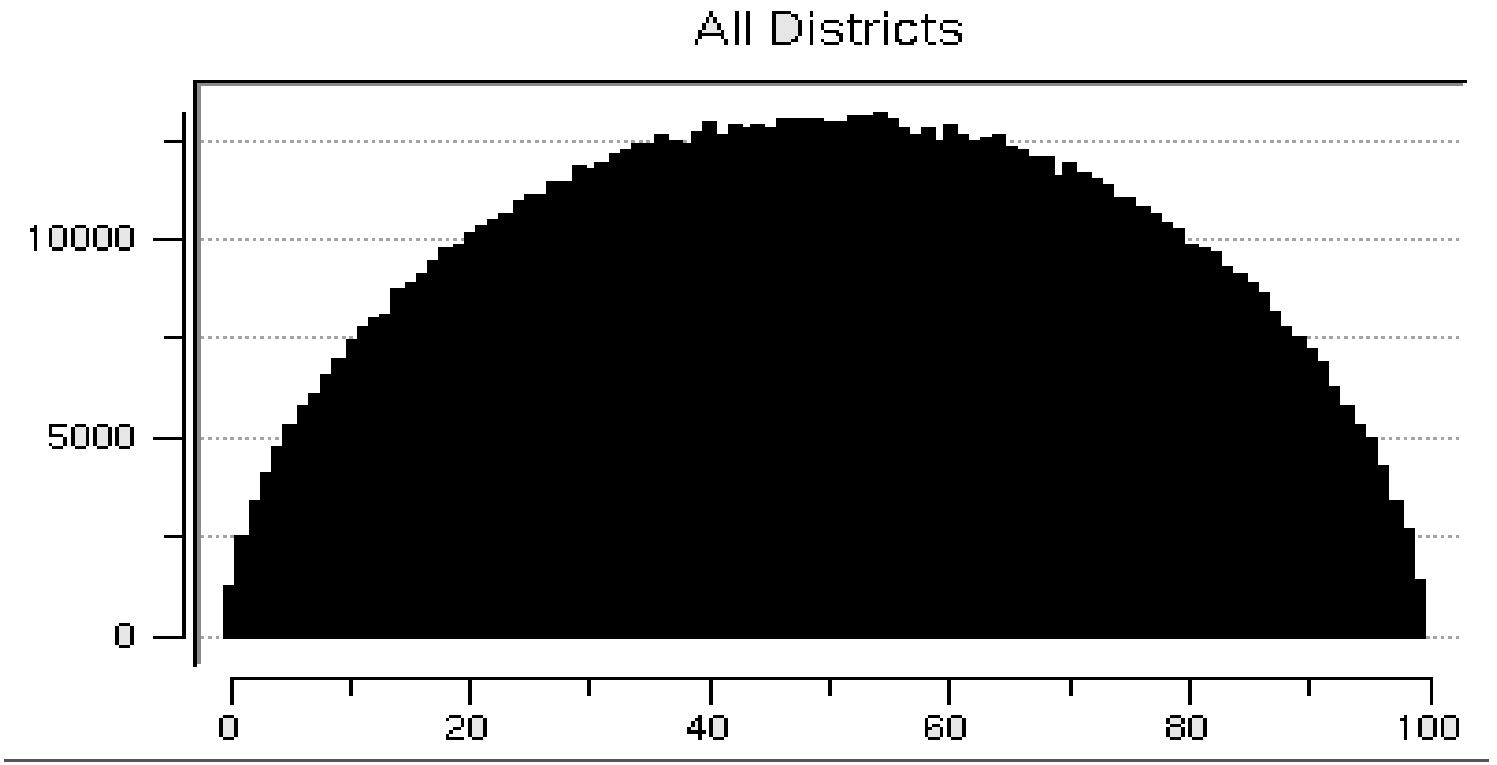
- Beta probability distribution parameterized by the mode & diversity

Realization



National electorate

District Modes Uniform on (30,70)



Bootstrapping a Political System

- Draw "**party founders**" from national electorate
- District level "**electioneers**" register party members within districts
- Parties choose SMD candidates as median of members within district

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- If Yes: Simple
- If No: Need algorithm to allocate SMD candidates
- We chose
  - Resource constraint model (membership = scarce resource)
  - Parties allocate SMD candidates to states where they have the most members

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Rubber Meets The Road

- Voters cast votes for both PR and SMD contests
- Electioneers report PR totals and SMD winners to Parliament
- **Parliament** allocates PR seats
  - LR-Hare and Compensated
  - Threshold 0 5 10

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Jargon

1. **Run**: start the model, repeatedly hold elections
2. **Timestep**=one election
3. Between elections:
   - 3.1 Voter ideals can be "re-randomized"
   - 3.2 Party positions can be "re-randomized"
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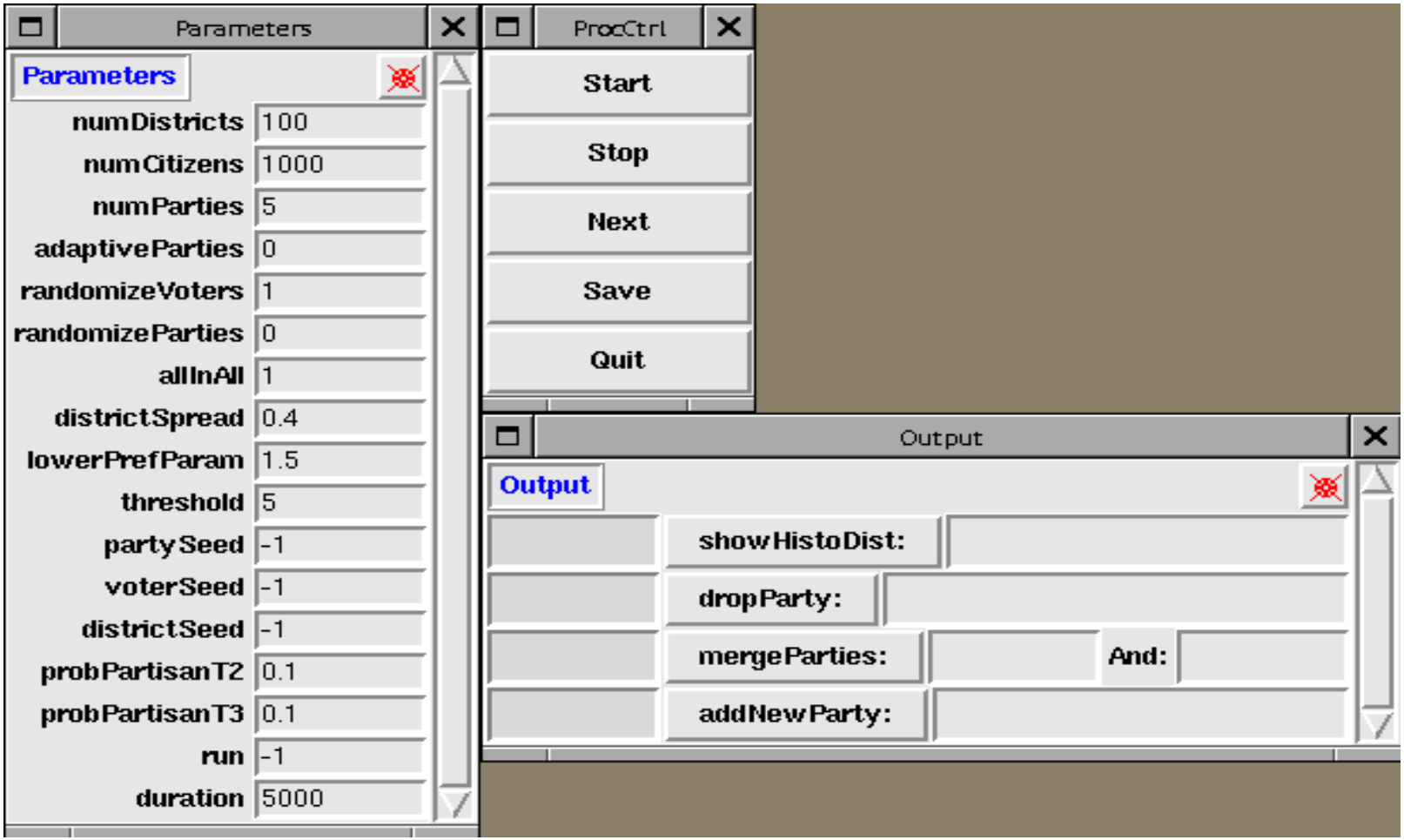
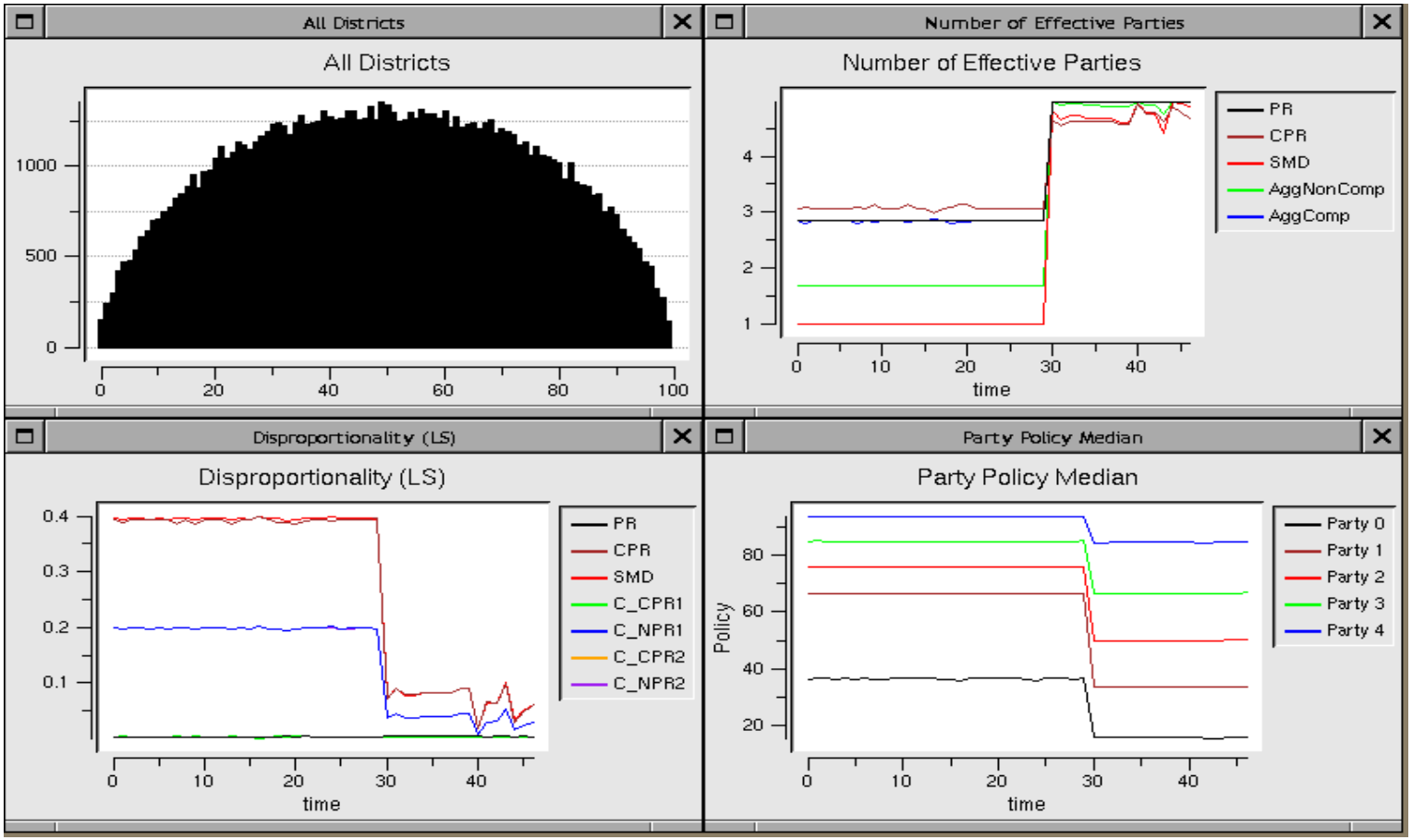
Batch Or Graphical Interface

- Histogram of ideal points
- Median of party SMD candidates
- Party seats
- Indicators of representation

Control Panel



Graphs


All Districts
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1000
500
0
0
20
40
60
80
100
Number of Effective Parties
Number of Effective Parties
4
3
2
1
0
10
20
30
40
time
PR
CPR
SMD
AggNonComp
AggComp
Disproportionality (LS)
Disproportionality (LS)
0.4
0.3
0.2
0.1
0
10
20
30
40
time
PR
CPR
SMD
C_CPR1
C_NPR1
C_CPR2
C_NPR2
Party Policy Median
Party Policy Median
Policy
80
60
40
20
0
10
20
30
40
time
Party 0
Party 1
Party 2
Party 3
Party 4

Batch Design

100 runs with each of

- Number of Parties = 5 , 10, 15
- Voter Type Distributions
  $(1, 0, 0), (0, 1, 0), (0, 0, 1), (1/3, 1/3, 1/3)$
- PR thresholds 0, 5, 10
- All Parties Run SMD in All Districts 0, 1

Condition Sequence of Batch Simulation

- 30 steps: Randomly chosen party founders "stuck" in position between elections
  - Voter ideal points re-drawn
- ?? steps: Parties adapt dynamically, founder stands at "median of candidate positions" from previous election
  - Voter ideal points are a "fixed target"
- 30 steps (after equilibration): Parties adapt dynamically with randomly re-draw voters
- 100 steps: Fix voters, Randomly Choose party founders.

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Actual demonstration!

No extra charge!

Interesting Bug Invented

- Caution about "local variables" and references
- OK to do

```
- someMethod {
    id anAgent = [AClass create: self];
    [otherClass setAgent: anAgent]; }
```

- **anAgent** is a LOCAL VARIABLE.
- Is it safe to allow otherClass to "use" that agent after code exits this method?
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- Suppose instead you try

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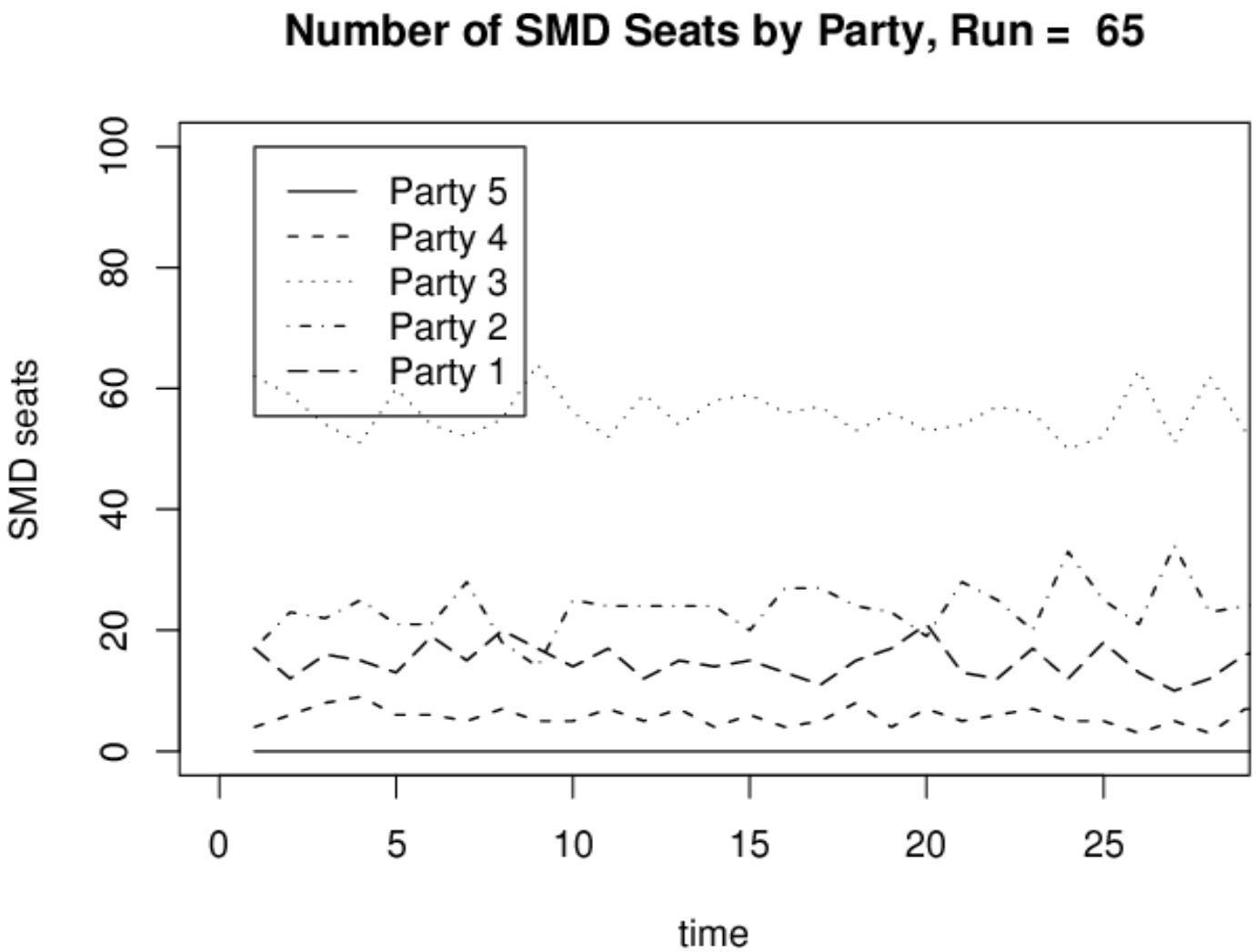
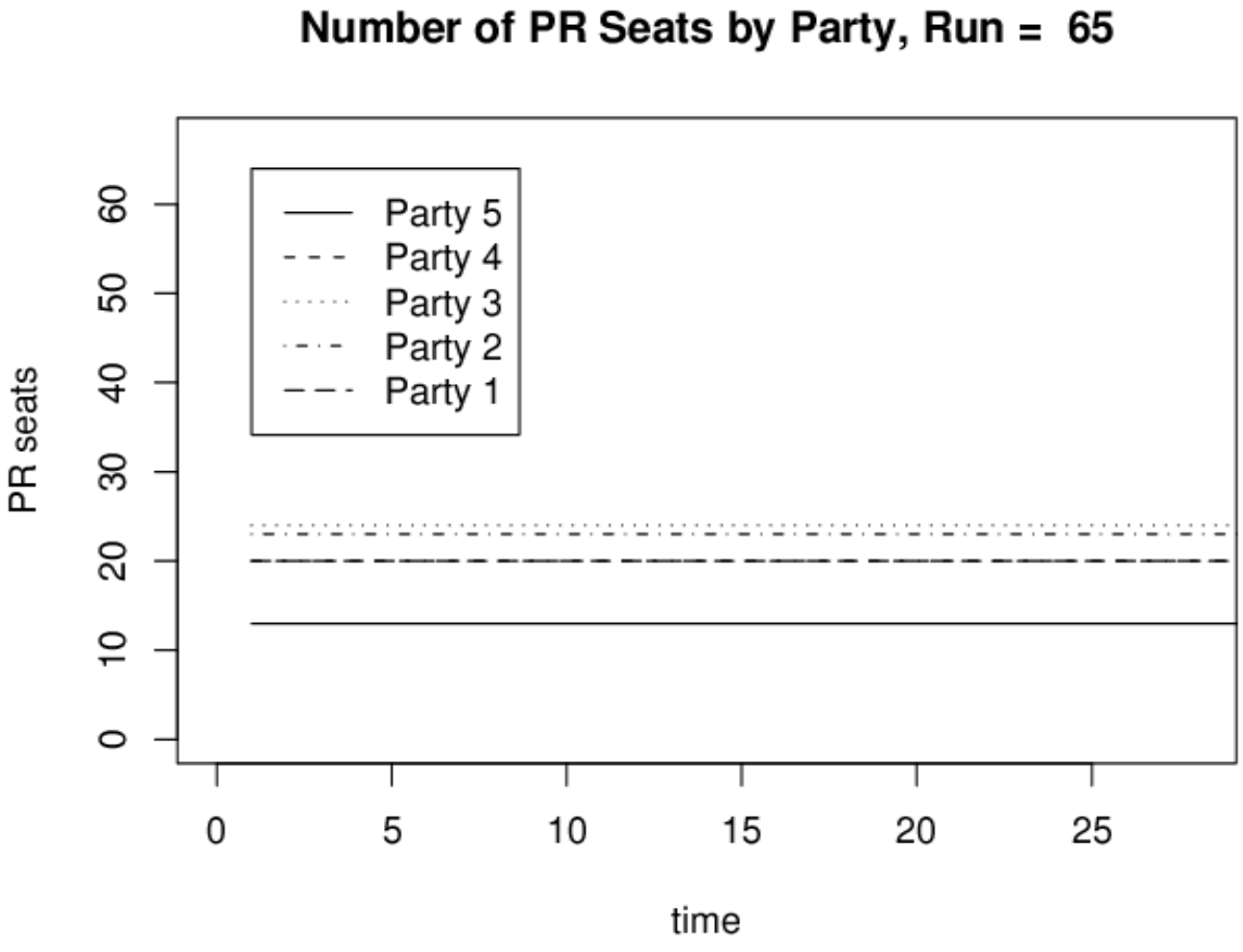
What do we find out?

SMD is a lot more exciting than PR



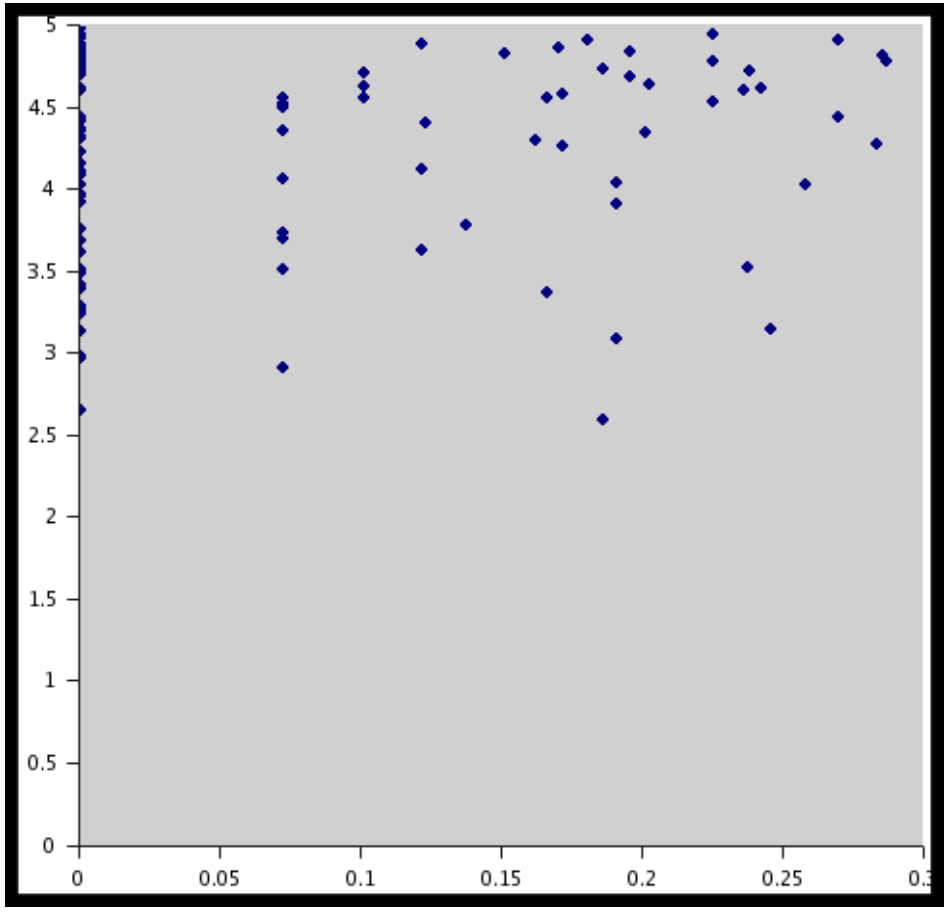
But With PR


Number of PR Seats by Party, Run = 65
Party 5
Party 4
Party 3
Party 2
Party 1
PR seats
0
10
20
30
40
50
60
0
5
10
15
20
25
time

Instability Index

Calculate standard deviation in Number of Seats for each party
Instability Index=Average of those standard deviations

PR



Vert=#N of Effective Parties Horiz=Instability index

But SMD is quite different