THE DYNAMICS OF POLITICAL COMPETITION

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Party competition is a dynamic system

• Most normal people see political competition as a system in continual motion

• Most see this continual motion as normal, not a sign of a system “out of equilibrium”

• Most see political dynamics as endogenous
  – The output of cycle $c$ feeds back as input into cycle $c + 1$
Most models of party competition are static

- A model identifies key inputs into the system and describes interactions between these
- Specify the model, solve for equilibrium . . .
- . . . describing forecast outputs, conditioned on exogenously determined inputs
- But the whole concept of equilibrium goes against most normal people’s instincts about politics

With traditional static models . . .

- Equilibria change only in response to unforeseen shocks
- Politics thus appears to mutate unpredictably, not evolve endogenously
- Associated with this is an assumption of parties as unitary actors – whose identity is given exogenously
- In my view this “equilibriumist” tradition has run out of theoretical steam
Consider this opinion poll series of party support in Ireland

Which traditional model can explain …

• levels and variation in party sizes
• volatility of party sizes over time
• which party loses when another gains
• how parties’ internal rules affect their competitive position
• … while keeping the “shape” of the party system endogenous
It takes a dynamic model to do this

• Traditional game theoretic technology is not (yet?) up to the task …

• … of modelling “massively parallel” dynamic interaction between large numbers of individual decision makers

It works right now using agent-based modelling

• Agents use simple adaptive rules to condition what they do at cycle $c + 1$ on the history of the system up to cycle $c$

• Simple rules applied recursively in massively parallel interactions can build beautiful behaviours

• Of course we are talking simulations here, but do these give any less intuition than 2- or 3-person game theory?
THE MODEL: 1

- Assume the classical spatial representation of voter preferences and party policy positions
- As with the classical spatial model, assume two “breeds” of agent – voters and party leaders
- Voters’ policy preferences are currently taken as primitives; I will later endogenize these

THE MODEL: 2

- Party leaders’ policy positions evolve continuously in response to voter preferences and the positions of rival leaders, in the following way:
  1. Voters (tend to) support the closest party
  2. Leaders adapt party policy positions, given the party support profile of all voters
  3. The system evolves. Go to 1
- This loop runs forever
THE MODEL: 3

• Currently use exogenously determined party leaders and decision rules; I later endogenize these
  – By specifying when agents change breed from voter to party leader (thereby giving birth to new parties)
  – By allowing party leaders to replace less successful decision rules with more successful ones

• Voter support for party leaders deterministic or stochastic

• Initial random-normal distribution of voter ideal points; more complex distributions can easily be designed …
• … or read in from real data

ADAPTIVE DECISION RULES FOR PARTY LEADERS: 1

• STICKER. Never change policy
  – “ideological” party leader

• AGGREGATOR. Set party policy on each policy dimension at the mean preference of all party supporters
  – “democratic” party leader

• i-HUNTER. If last policy move increased support, make same move; else, make a random move in opposite direction
  – “insatiable” Pavlovian vote hunter (NB precludes steady state)
ADAPTIVE DECISION RULES FOR PARTY LEADERS: 2

• s-HUNTER. As i-Hunter except, if last policy move left support stable, stand still
  – “satiably” Pavlovian vote hunter (NB allows steady state)

• PREDATOR. Identify largest party. If this is not you, make policy move towards largest party

THE PROGRAM

• I have programmed various versions of this model using NetLogo 1.3

• For the programs, contact me

• For NetLogo 1.3, download free from:
  – http://ccl.northwestern.edu/netlogo/

• This is a really powerful and friendly system
RESULTS: 1

• The i-HUNTER rule for party leaders is very successful at finding high voter support densities
  
  – Note that this uses very little information about the “geography” of the policy space
  
  – “Win-stick, lose-shift” Pavlovian adaptation (Nowack and Sigmund)

• i-HUNTER beats o-HUNTER
RESULTS: 2

• All-AGGREGATOR systems reach steady state

• Conjecture: the result of the locally “granular” quality of the ideal points of a finite set of agents …

• … as opposed to the “infinite” smooth density maps of the traditional spatial model

• But these steady states are easy to perturb and highly path dependent (cf chaos results)
RESULTS: 3

• Hunters hunt for support in centrist positions but *do not go to the dead centre* of the space

• This is realistic, and solves what is a big problem for the traditional spatial model

• The center is a dangerous place in an all-HUNTER system
  
  – cf Schofield (JTP 2003) and valence competition
RESULTS: 4

• Hunters and lone Predators beat Aggregators

• But 2+ Predators attack each other and don’t necessarily beat Aggregators

• Hunters beat Predators!
  – Unexpected. Simple Pavlovian adaptation very effective against superficially more “rational” predatory behaviour

EXTENSIONS: 1

• “Switching horizon” below which voters do not see – or react to – small differences in party distances
  – Damps “excessive” support switching

• Stochastic voter support. Voters switch party affiliation with a probability that is a function of:
  – “distance gain” from switching, \( d \), (ideal point to closest party distance minus ideal point to current party distance);
  – “switching horizon”, \( h \), reflecting the agent’s ability to “see” a given distance gain
  – “switching sensitivity”, \( s \), reflecting the agent’s willingness to switch given a particular “seen” distance gain
EXTENSIONS: 2

• THE BIRTH OF NEW PARTIES
  – If some voter finds no party leader “close enough” in some parameterised sense, s/he changes breed to become a new party leader
  – Note there is no concept of “entry” in a fully endogenous dynamic model
  – All agents are already in the system, they just change breed
  – The concept of party system entry is an old-fashioned “equilibriumist” notion!
  – And in the real world new parties are never formed by politicians who “enter” the system from a parallel universe – or even from another country!

THE MODEL & THE “REAL” WORLD

• “Statistical signatures” (Scott Moss 2001). Model outputs should have the same statistical distributions as those of the “target” system in the real world

• In this case, e.g. . . .
  – cross-sectional variation in party sizes and N of parties
  – time series variation in party sizes and N of parties
  – size of largest/smallest party
  – Etc.

• So let’s model a real party system time series
  – Though what is “really” real?
Ireland 1986-97: raw opinion poll data

- These poll data subject to both random error and systematic bias

Ireland 1986-97: smoothed poll data

- Simulate removal of random error with moving average smoother
Ireland 1986-97: poll data & real voting

- Broken lines = poll data; solid lines = real voting (FF green, FG blue)
- Clear evidence of pro-FF and anti-FG bias

Ireland 1986-97: simulated time series

- Assumes FF and FG are i-Hunters;
- and PD, Lab, DL are Stickers
Comparing statistical signatures

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Summaries

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Generic 5-Hunter system

- Statistical signature completely different
ONWARD AND UPWARD

• Explore the birth and death of parties

• Enable endogenous choice of decision rules

• “Grow” new decision rules using genetic algorithm
  – Sexual reproduction of the fittest rules plus random mutation

• Enable endogenous evolution of voter preferences
  – Or reading in of real preference data

• Refine ideas on statistical signatures