Governance parliamentary democracies:

computational models and empirics

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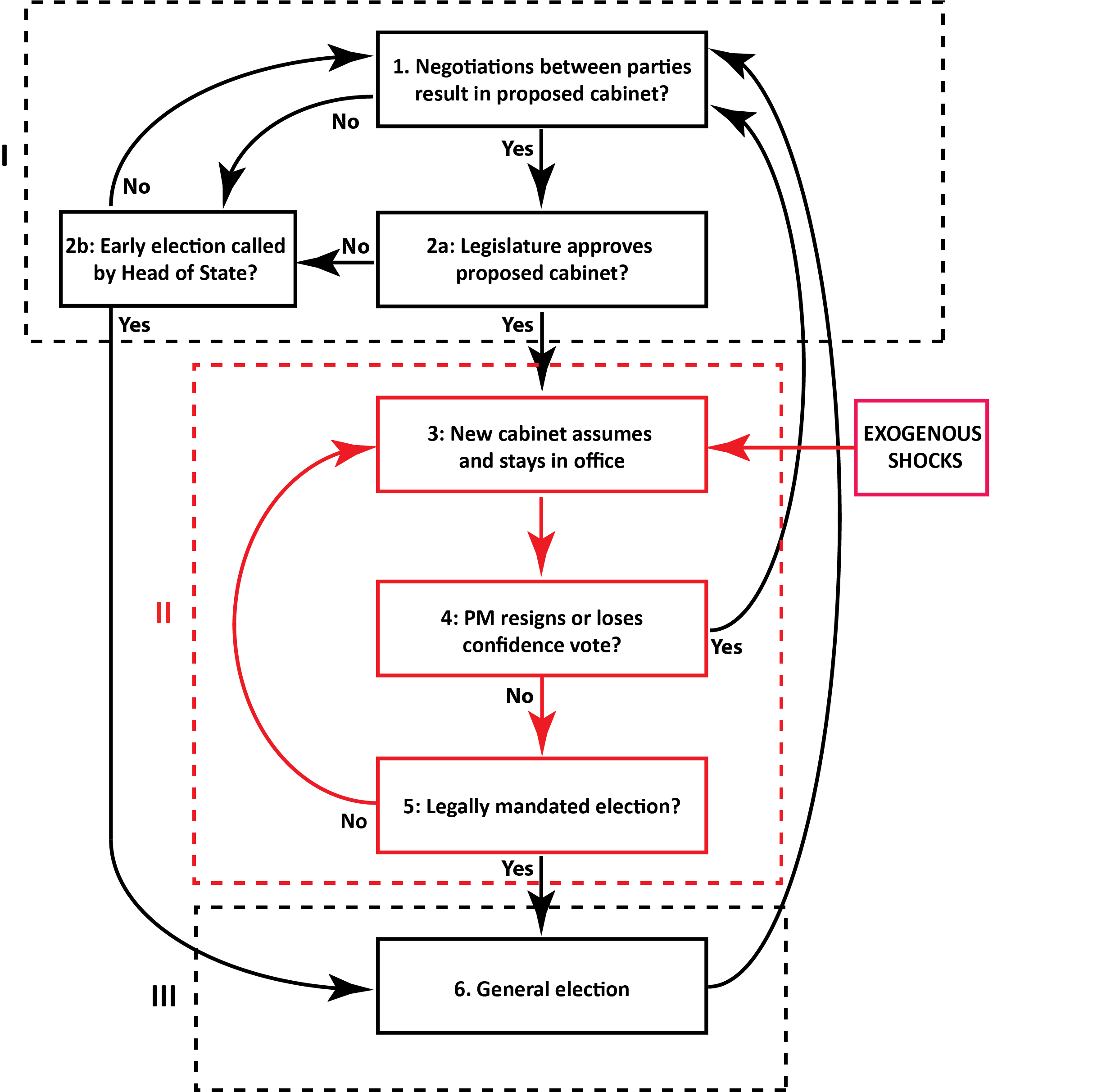
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   * + 1. Overview

Three components of governance are widely seen as crucial in the parliamentary systems which characterize many of the world’s democracies: government formation; government stability and duration; elections and party competition.

There is a big literature on each component and wide recognition they are intimately interconnected. But, for understandable reasons, there has been little sustained effort to model all three components as part of a single complex system of governance. This system, sketched in Figure 1.1, is not only complex but complicated, making it hard to model in anything close to a rigorous way. This is the challenge we take on in this book.

We do this by building on existing literatures, first breaking the governance system into three more tractable but still complex subsystems. We go beyond existing work by harnessing modern methods of computational analysis. Anticipating a larger computational model of the entire complex system, we take care to ensure that our models of government formation, government stability, and elections can all talk to each other. This allows us to chain these three subsystems together into the single unified model of democratic governance in parliamentary democracies sketched in Figure 1.1.

While this is an ambitious project, our use of computational rather that purely analytical modeling makes it feasible. To make the exposition of our argument clearer, we discuss the three subsystems in Figure 1.1 in reverse order, since we assume agents anticipate outcomes from each when making decisions in “earlier” subsystems. Before doing any of this, however, we fix some assumptions and notation, and discuss overall modeling strategy.

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*Figure 1.1: A “big model” of governance in parliamentary democacies*

**Assumptions**

1. *Agents.* We begin by assuming, as is conventional in this literature, that parliamentary parties can be treated “as if” they are unitary actors, whatever their internal preference diversity and politics. We move on to consider more realistic assumptions about intraparty politics in Chapter 6 but, to get the ball rolling, we assume decisive agents to be leaders of perfectly disciplined and exogenously defined parliamentary parties.
2. *Agent preferences.* Two sparsely connected sub-literatures have modeled politicians as motivated by: dividing a constant-sum set of the “perks” of office; setting an agreed government policy position, given diverse policy-preferences. Here, we assume that politicians are motivated by a convex combination of perks and policy payoffs, with a utility function of agent *j* taking the general form: *Uj* = *αj* **·** perks – (1–*αj*) **·** policy. Agent *j*’s personal tradeoff between perks and policy payoffs is measured by *αj*.
3. *Dimensionality.* Most work modeling government formation as reconciling diverging agent policy preferences describes these preferences in terms of *low-dimensional latent real policy or ideology spaces*. Here, however, we follow deM&L (forthcoming) in considering it far more realistic, behaviorally, to describe agents’ policy preferences in terms of *high-dimensional discrete issue spaces*.
4. *Agent “rationality”.* The big model of democratic governance sketched in Figure 1.1 involves complex recursive interactions, iterating continuously. We think it is unrealistic to assume that agents with the type of utility function set out above, and confronting complex recursive processes, deploy hyper-rational strategic analysis when making decisions in high-dimensional issue spaces. Rather, we assume they use decision-making rules of thumb, which may well differ from agent to agent in the same setting. In other words, ours is an agent-based model (ABM).

**An agent-based model?**

Or is it? The deM&L model is computational; it assumes non-strategic agents using a rule of thumb; but it is not an ABM. This is not bad in itself. deM&L essentially do “computational social choice theory”, using their model to generate probability distributions across the state space of possible cabinets and associated issue vectors. There is no autonomous agent. The Game Overall Director (GOD) imposes a logrolling algorithm from the top down. Given a high-dimensional issue space, an issue agenda, agents’ weights and issue preferences (all exogenous) the algorithm is completely deterministic. The deM&L model is in no sense bottom-up. Is this how we want to move forward?

This is not my preference – not only because I much prefer bottom-up ABMs, but also because we need to explore and compare alternative logrolling algorithms. We don’t want to write an entire book about a single algorithm which nobody much likes, but to specify a *general theoretical framework for thinking about government formation as logrolling*, into which others can insert their algorithms of choice.

The deM&L logrolling algorithm can be ABM-ized, but to do this we need to modify it into a program for agents, which gives them actual *agency* in seeking, then negotiating with, potential coalition partners. We skirted around this when thinking of ways to address cycling (incumbent PM seeks out and negotiates with largest opposition party, etc.), but always passed. We should now deal with the problem directly as part of a larger book project. Following (at least my) advice to students in ABM classes, we need to think hard about how to program each agent’s artificial brain. Given agent preferences and utility functions described below, this involves programming:

1. *How agents are sequenced to act.* (This is a feature of the environment not of agents.) The **baseline assumption is random sequencing** with flat probabilities. Refinements might condition sequencing probabilities on features of each agent and the environment, including interactions between these features. What are these features and how do they interact? Obviously, we start very simple.
   1. BF-style models *sequence agent moves by weight*, typically in strict weight order but potentially sampling agents with probabilities proportional to relative weights.
   2. We modeled, but did not report, *sequencing incumbent PM first, then leader of largest opposition party*.
2. *How agent A picks potential partner P.* **The baseline assumption is random selection of *P*** with flat probabilities. Refinements condition selection probabilities on features of *A*, *P* and the environment, including interactions between these features. What are these features and how do they interact? Obviously, we start very simple. Obvious possibilities:
   1. Pick your *current or recent coalition partners*.
   2. Pick your *closest agent* (on some measure) in the low-dimensional policy space (treating this as a “roadmap” of the high-dimensional issue space).
   3. Pick *smallest agent* who gives you a legislative majority (maximizing your expected perks benefits.)
   4. Pick an agent with a *different alpha* (if this is common knowledge) since this enhances potential gains from trade.
   5. Pick an agent with a *different (public) issue salience vector* since this enhances potential gains from trade.
3. *Having chosen P, what can A do (essentially, offer)?* This is simple within our framework. **The obvious offer comprises the proposed cabinet issue and perks vectors.** (Not clear what else, unless we assume a numeraire endowment for each agent, allowing side payments … but perks already provide a constant sum component in agent utility.)
4. *What perks proposal does A make to P?* In our thus-far unpublished excursions into this, we assumed Gamson’s Law is common knowledge, with agents always proposing a Gamsonian division of perks. **We can take Gamson as the baseline.** Note that this does not interact the perks proposal with the issue proposal, which is obviously a possibility. I don’t have an intelligent suggestion on this.
5. *What issue proposal does A make to P?* This is obviously at the heart of a logrolling ABM. Given the giant space of possible decision rules, we can rely for now on ABM-izing the deM&L logrolling algorithm into a behavioral rule for agents. **I have a radical new proposal** for a deM&L-ish rule, driven by the twin desires to: specify a simple rule of thumb which we can claim with a straight face actual agents might use; get away from the unrealistic assumption that high-definition information about every agent’s private salience vector is common knowledge. In top-down deM&L, GOD knows and uses high precision real salience scores for everyone, but no actual person has this information. NB: this proposal relies on the fact that private issue saliences sum to unity for each agent.
   1. Generate a “public” issue salience vector for each agent, which ranks private agent saliences in quartiles (or quintiles, deciles or whatever). *It is this coarse information about saliences we assume to be common knowledge.*
   2. Agent A compares its issue *position* vector to that of agent P and *puts all uncontested* issue positions (a la deM&L) into its proposal.
   3. Agent A compares its public issue *salience* vector to that of agent P and:
      1. Proposes *tabling all contested issues that are in the same salience quartile* *for both A and P* (expecting no gains from trade on these).
      2. All remaining issues *must be both contested and in different salience quartiles* for A and P. The set of these therefore offers gains from trade.
      3. For each issue in a different salience quartile for A and P, agent A proposes *the issue position of whichever of A or P has the higher quartile ranking.*
      4. As far as I can see, putting the saliences into quartiles means that P will gain an issue for every issue it loses. This gets away, as if by magic, from the need to find explicit “swaps”, which JoP referees did not like. Maybe I have made a horrible mistake, however, because this seems so simple.
      5. The rule parameter here is *x* for the *x*-tile (4 for the quartile). We can vary this (from agent to agent) to model the coarseness of the information environment. Call the rule “x-tile logrolling”.
6. *Having received an offer from A, what can P do?* There are two logical options:
   1. ***Accept or reject.* These are the baseline options**.
   2. *Make counter-offer.* This refinement adds considerable complication in deciding how the counteroffer is conditioned on the original offer.
7. *Once a proposed cabinet is on the agenda for a vote in the legislature (following a procedure specified in the model’s environment) does A vote yes, no or abstain?*
   1. ***The baseline is a naïve/greedy algorithm.*** Vote yes if the proposal gives you more utility than the incumbent, else no.
   2. Anything ease depends on *anticipating other potential proposals and the likely voting behavior of other agents on these.* This is game theory and likely gets messy very quickly.
8. *Once an incumbent cabinet has been installed, and new information has been received, (eg about potential legislative weights following a new election, generated by a procedure specified in the model’s environment), what actions are open to A?*
   1. The baseline action if A is *not* a member of the cabinet is: do nothing.
   2. The **baseline action if A *is* a cabinet member** is: withdraw from the cabinet and provoke a new election.A naïve/greedy algorithm would do this whenever A expects a new election would make it pivotal in more winning coalitions. This leans on DeML&V’s shocked Shapley paper.

**All of the above gives a baseline model as follows.**

*Sequencing (S):* random

*A’s partner selection (P):* random

*A’s perks offer (Op):* Gamsonian

*A’s issue offer (Oi):* “quartile logroll”

*P’s acceptance (A):* yes if more utility than incumbent, else no

*A’s vote on proposal (V):* yes if more utility than incumbent, else no

*A withdraws from cabinet? (W):* yes if expects election to increase pivotality.

This baseline can be refined in ways, some suggested above, that may be easy to say but sometimes hard to do. But we should get the baseline model working first!

**“Decision rule DNA”**

We just listed six features of an agent’s decision rule: partner selection (P); perks offer (Op); issue offer (Oi); offer acceptance (A); vote on proposal (V); withdrawal from cabinet (W).

We can think of these as occupying six locations on a rule’s evolutionary “DNA”, with each location taking two positions. The first position holds a letter indicating “rule species” (eg x-tile logrolling … T for tile); the second position holdsa rule parameter, if relevant (eg 4 for quartile-logrolling).

The following is the genetic code for our baseline algorithm: RxGxT4YxGxGx

The holds the information:

**R**andom partner selection; no relevant parameter

**G**amsonian perks offer; no relevant parameter

x-**T**ile issue offer; parameter 4 for quartile

**Y**es/no offer acceptance; no relevant parameter

**G**reedy vote on offer; no relevant parameter

**G**reedy withdrawal from cabinet; no relevant parameter

We can think of a cute name for it instead of RxGxT4YxGxGx. (Nancy? Chuck?).

Explicit rule parameterization is good in itself, protecting us from inadvertently hiding important rule parameters in an ad hoc way in the code. It highlights the fact that there are “species” of decision rule (other species are suggested below) that share the same core logic but are parameterized differently. It allows us to specify computational experiments in which we systematically vary rule features and parameters.

This also sets things up for a simple replicator-mutator evolutionary environment. The more successful agents have higher replication probabilities. They clone themselves on replication, subject to a small probability (a model parameter), of a random mutation, a gamma ray which randomly flips a value at some random point in the cloned agent’s rule DNA. What we mean by “more successful” in an evolutionary setting will need careful thought. Simply using utility income without taking account of issue positions might be problematic.

This goes way beyond most published ABM work in the social sciences. When a single rule drives out all others, that’s like a game theory result. However, we can also see the evolution of a symbiotic system of different mutually dependent rules. This happened in Laver-Sergenti.

**Other possible issue offer rule features**

In addition to the “x-**T**ile issue offer” rule feature, it’s easy to think of others. For example:

**R**andom (R): Offer a random position on each issue. (A baseline.)

x-**S**elfish (S)

Rank your issue positions by salience. Offer your own ideal positions on the top x percent of these issues; offer your partner’s positions on the remaining issues. Thus a 100-Selfish rule is perfectly (and myopically) selfish. A 000-Selfish rule is perfectly altruistic.

**M**edian (M)

Offer the median issue position across the set of all legislators. (Good for winning votes?).

**Hybrids**

Its easy to imagine many hybrids between the rule species we already specified.

An “x-Selfish/Median” rule (S/M) might offer A’s preference for its top x percent of issues, then the legislative median for remaining issues. (M/S would do the reverse, offering the legislative median for the top x percent of A’s issues, then A’s ideal position for the rest.)

An x-Selfish/x-Tile rule (S/T) might offer A’s preference for its top x percent of issues, then use the x-Tile rule for remaining issues. (T/S would do the reverse).

Not to mention R/T, T/R, R/S, S/R, R/M, M/R. Or hybrids of three or more rule features

Having quickly spun up 14 different rule species, some with a wide range of different parameterizations, the bottom line here is that the rule space is enormous.

**Notation**

* + The political environment has *d* issue dimensions, *i1 … ij … id*.
  + Each legislature has *n* perfectly-disciplined legislative parties, *p1, p2 …. pi …. pn*
  + Party *i* has a raw weight *wi*, equal the proportion of all legislators who belong to it. The realized part weight vector after election *t* is **W***t.* ∑*iwit* = 1.
  + Party *i* has an ideal position *bij* in the issue space. This gives an *n* • *d* ideal issue position matrix for any legislature.
  + Party *i* also attaches a “salience”, or importance, weight *sij* to each issue dimension. This gives an *n* • *d* issue salience matrix for any legislature.
  + There is an status quo cabinet *c\** specified by:
    - * A vector, *bc\*j*, of agreed cabinet positions on each issue dimension.
      * A vector, *ac\*i*, allocating a fixed set of perks between parties. ∑*i ac\*i* = 1.
      * Included among, but not exhausting, the set of government perks are “cabinet portfolios”, which are seats at the cabinet table associated with a particular bundle of issues. The “partisan composition” of the cabinet is the set of parties whose members get a non-zero share of cabinet portfolios.
      * Perks may however extend beyond cabinet portfolios and may be allocated to legislators who are not members of government parties.
  + There is a set **C** of potential alternative cabinets to *c\** which can be proposed as part of a government formation process (*c\** ∈ **C**). Each element *cq* ∈ **C** is specified, in a manner analogous to the specification of *c\**above**,** by an issue vector *bCqj* and a perks vector *aCqi*. There are thus many potential cabinets with the same partisan composition. The state space is huge.
  + The expected utility *Uci* of party *i* for *c\** or any cabinet in **C** has two components. One arises from the allocation of perks, and one from the cabinet’s issue position. There is a trade-off parameter *αi* specifying the relative importance to *pi*of these two components. Thus:

*Uci =*  *αi* • *aci* – (1 – *αi*) • Σ*j*(*sij* •│*bij – cij*│)

In words, we assume the “policy loss” component of agent utility is the weighted Hamming distance between the party ideal point and the agreed cabinet issue vector.

* + - 1. Elections

There is a substantial empiricist literature on “retrospective voting” that models the effects of past government actions on future election results. Most formal models of elections, however, treat these as stand-alone processes.

While DeML&V look, in their paper on “shocked reversion points”, at the effect of anticipated future elections on current government formation, they do not reverse the causal arrow and consider the impact of past government outputs on future elections. Elections *per se* are essentially *tabla rasa* in the government formation project. Matters arising include:

* Modeling voter behavior at elections is the subject of huge literature, but is not our core concern. Laver-Sergenti, for example, was all about elections but still didn’t model voting behavior. They modeled voters, not as autonomous agents, but as parameterized voter densities in the policy space.
* It is not our ambition or comparative advantage to model voting behavior from scratch. We therefore use a sparse and stylized model of elections which builds on DeML&V. This treats elections as parameterized (possibly biased) exogenous shocks, which perturb the legislature’s seat share vector.
* We do not attempt to endogenize these perturbations, which we assume to be Gaussian noise. We do however take account of potential common knowledge information about the expected bias, *µ*, and amplitude, *σ2*, of this noise. We can think of agents as informed about these parameters by common knowledge signals from, for example, published opinion polls.

This gives the following stylized model of elections, insofar as these influence our big model of governance:

* *Inputs.* Realized seat share vector, **W***t-1,* from the previous election. Mean, *µt*and variance *σ2t* of Gaussian shocks to **W***t-1* in the current election. A number of trials, *re*, for the election module.
* *Model.* Apply parameterized Gaussian shocks to each element in the original seat share vector, **W***t-1*. Renormalize seat shares to sum to unity. Repeat *re* times.
* *Output*. An *re • n* matrix holding the *r* shocked seat share vectors which are possible outcomes of the current election.
* The new realized seat share vector, **W***t* is a row sampled from this matrix.
  + - 1. Government durability and durations

The substantial literature on government stability and duration in parliamentary democracies is for the most part empirical, based on survival analyses of the effects on observed government durations of a menu of independent variables and controls culled from literature reviews. There are few *formal models* of government durability. Exceptions include Lupia-Strom (1995) and Laver-Shepsle (1998). These papers both model effects of parameterized shocks to cabinet equilibria. Lupia-Strom model this analytically, Laver-Shepsle use computational simulations. DeML&V’s shocked reversion point paper extends this latter approach.

*Inputs* to the model of stability and duration are:

* All inputs from the model of government formation (see below).
  + The issue, *bc\*j*, and perks, *ac\*i*, vectors for the status quo cabinet, *c\*,* output from the formation model
  + [ML: BIG NB! We thus far set aside how to select a particular *c\** from the output of the formation model, which currently a probability distribution over the set of possible outcomes. One attractive option (see below) is *not* to predict the membership of *c\**, but to input model-generated issue and perks vectors for the *empirically observed incumbent coalition*.]
* A number of simulation trials, *rs* , for the stability module;

*The model.* This builds on DeML&V:

* + Apply parameterized shocks to the seat share vector, as in the election module, repeating *rs* times. This generates an *rs • n* matrix holding the *rs* shocked seat share vectors, the expected outcomes of an election in the event the incumbent fails
  + [ML: Potentially, following Laver-Shepsle 1998, we could also apply shocks to issue positions and saliences, *but not yet.*]
  + NB: for an exogenously fixed set of parties, the set **C** of possible coalitions is fixed. Shocking the weight vector, **W***t*, does *not* change **C**, just the aggregate weight of each coalition in **C;**
  + NB: the logrolling rule specified in DeM&L (and its ABM-ized version suggested above) is deterministic for given realization of the issue space, issue position and salience matrices. Shocking **W***t* does *not* change the forecast issue or perks vectors for any given coalition, output by the formation module for any coalition in **C**;
  + Shocking **W***t* *does* however change the outcome of the majority rule tournament generated by the formation module.
  + [ML: Endogenizing the set of parties, or adding stochastic components to agent decision rules, will complicate this and add a lot of computational load, changing both **C** and the perks and issue vectors associated with each element of **C**.]
  + Rerun the logrolling model and the resulting majority rule tournament for each of the *rs* shocked seat vectors, to generate new summary win matrices and vectors (see below). These are the expected outcomes of the incumbent failing and being replaced with an alternative. [ML: this will be a *monster* computationally!! Any alternative??];
  + [ML: An issue here is whether we add “friction” to the model here, arising from some deadweight cost of replacing the incumbent. This seems plausible]

*Outputs* from the model are:

* + Shocked summary win matrices and vectors.
  + The entry of the incumbent cabinet, *c\**, in the shocked summary win vector (the mean proportion of times *c\** wins contests against alternatives in **C**) is a measure of cabinet durability. Incumbents with lower mean win proportions are “less stable”. We could run this empirically against observed durations.
  + The summary shocked win matrix shows which alternative coalitions pose the greatest threat to *c\**, the coalitions to which it most frequency loses in the shocked majority rule tournament. We could run this empirically against observed replacements.
  + This keeps us away from case-based point predictions such as “SQ will be replaced by challenger C.” It opens us up to cycles, however.

An interesting question for when modules I and II are eventually chained together is ***whether* *the* *predicted stability of a proposed cabinet enters into agents’ calculations about its formation*.** Ceteris paribus, do agents prefer cabinets they expect to be more stable? This seems plausible. If so, we may need to consider agents’ risk and time preferences.

* + - 1. Government formation

While we considered modules in “reverse” order for didactic reasons, we now turn to the government formation module. This, as noted, is logically and computationally antecedent to the stability and election modules, passing outputs to these as inputs.

*Model.* Our model of government formation model is based on deM&L (forthcoming), with the following extensions and improvements.

* + We assume the *perks-policy agent utility function* with agent-specific alphas.
  + We (possibly) *refine the algorithm for generating a distribution of possible high-dimensional issue spaces* from low-dimensional summaries of these.
  + As an alternative to *simulating* high-dimensional binary issue spaces, we explore using *raw high-dimensional input data* on issue positions and saliences, eg from reprocessing manifesto data.
  + We (will eventually) assume a *portfolio of possible agent decision rules*, given the perks-policy utility function, including search algorithms for finding potential coalition partners. For now we have one rule species, the ABM-ized version of deM&L set out above. This species is parameterized by *x* for issue salience *x*-tile, noting that higher-*x* rules use a finer information environment and will propose tabling fewer issues.
  + Taking account of the argument in DeML&V about the “shocked” reversion point of a new election, *we use a distribution of anticipated shocked seat shared vectors rather than the actual historical vector*. [ML: Ambitious and computationally very expensive, but necessary if we plan to add anticipated elections a la DeML&V to the model.]
  + There is (as far as we know) no model of the behavior of the (likely partisan) Head of State (HoS) as an agent who decides whether or not to call and election in the event of bargaining failure in the legislature. We consider this a relatively minor issue and assume that HoS agrees to call an election whenever asked by PM.

*Inputs*

* The observed seat share vector, **W***t,* from the current election
* Estimates of the mean, *µ*, and variance, *σ2*, of Gaussian shocks to the seat vector.
* An *n* • *d* matrix of binary party issue positions;
* An *n* • *d* matrix of real party relative issue saliences;
* A vector of *n* party alphas, measuring each party’s works-policy tradeoff. (Laver-Hunt 1992 has an ancient expert survey estimate of these.)
* A number of simulation trials, *rf* , for the formation module;
* [ML: We set aside parties’ risk and time preferences for now.]

*Outputs*

* an *rf • d* matrix holding a distribution of agreed government issue positions;
* an *rf • n* matrix holding a distribution of agreed perks payoffs, where a zero element in any position means the corresponding party is not a cabinet member.
* For each of the *rf* trials, a “win” matrix holding the outcome of the majority rule tournament involving every possible pairwise comparison between the 2n – 1 possible non-null cabinets in **C**. Each element records whether the row coalition wins (1) or loses (0) against the column coalition.
* For each of the *rf* trials, a “win” vector holding the proportion of pairwise contests in the tournament won by each coalition in **C.** An entry of 1 identifies a Condorcet winning cabinet.
* Across the whole set of *rf* trials, a summary “win” matrix holding the mean proportion of wins by each coalition in C in each of its pairwise contests. Each element records the proportion of contests in which row coalition beats column coalition.
* Across the set of *rf* trials, a summary “win” vector holding the mean proportion of pairwise contests in the tournament won by each coalition in **C**.
* Across the set of *rf* trials, a summary “Condorcet win” vector holding the mean proportion of trials in which each coalition in **C** was a Condorcet winner.

How we turn these summary outputs, which we reported in the JoP paper, into *the incumbent coalition c\* which is input to the stability module* is a matter for discussion. We tried to do this by adding some minimal structure to the formation process, but did not really succeed. I am not optimistic about this route. One reason arises from all the feedback in the complex system, which might well mean that once we veer off track we go wildly off.

This suggests a radically different alternative, which is *not* to feed output from the formation module into the stability module, but instead to insert a reality check by *inputting the observed incumbent cabinet into the stability module*. (Why, after all, would we input a *c\** we knew to be false?). This is easy to justify with the argument that the incumbent formed for some reason outside the model but, once formed, is subject to the exigencies we model. The more I think about this, the more I think it is the right thing to do. It is directly analogous to the reality check of inputting the actual observed results of each election rather than some model prediction of these.

* + - * 1. Interaction of government formation, stability & elections

When we combine all three modules into a single process, there will be many decisions to make. For example:

* Time horizon: when are we inputting to and outputting from the process?
* Obvious empirical input points are:
  + new observed election results;
  + new observed cabinet compositions.
* Obvious outputs than can be checked empirically are:
  + partisan membership and perks allocation of cabinet; predicted by formation module using empirical inputs on party weights, issue positions/saliences/alphas from preceding election;
  + duration of incumbent cabinet and identity of cabinet most likely to replace incumbent; predicted by stability module using impact of electoral shocks on observed incumbent cabinet.
* Notwithstanding Figure 1.1, therefore, we’re not going to iterate the process forever, but rather run it though one cycle that begins with the input of a new empirically observed election result and ends with the empirically observed replacement of an incumbent.
* Time and risk preference: given empirical recalibration at each model iteration, we may be able to get away with not specifying these, otherwise we introduce many new (deeply latent) parameters.
* However, it does seem plausible to assume politicians prefer cabinets they expect to be more stable! Maybe we can do this by bald assumption, without endogenizing it by modeling time and risk preferences.
* ….

6. Endogeneity of parties (and factions)

There are many things to think about here, but none need be resolved before getting the baseline model working on a “party as unitary actor” basis. Endogenizing parties is a nice refinement that shows the clever things we can do once we have a working bottom-up ABM. But it is not mission critical. Much of what follows is therefore half-baked.

The process sketched in Figure 1.1 is recursive, creating a chicken and egg problem in identifying pivotal agents. We can’t identify pivotal agents without specifying the game that structures their incentives; we can’t specify the game without identifying the agents.

* We have to start somewhere, so start in a State of Nature with a universe of *m* individual legislators, which evolves to converge on a stochastic steady state with *n* legislative parties, with party *pi* having *fpi*  internal factions.
* There are *ceteris paribus* incentives for both synergistic fissions and fusions of both parties and factions. The general argument on this, using Shapley, is in Laver and Underhill (1982). More substantive discussions are in: Laver and Kato (2001), on Japan; Giannetti and Laver (2008) on Italy. A few examples illustrate some of the issues, in a 99-seat legislature.
  + - (49, 25, 25) -> (49, 50). Synergistic fusion. Each party has an initial expectation of 1/3. Any two parties can increase their aggregate expectation to 1 by fusing. Why do they not do this? Electoral constraints?
    - (49, 25, 25) -> (25, 24, 25, 25). Why does a majority faction of the largest not break away from, or expel, the minority faction? They would share the same expected payoff between fewer legislators. To answer this we need to know about how resources are distributed *within* parties and party rules, eg about expelling members.
    - Combine i and ii. (49, 25, 25) -> (50, 25, 24). The majority in the largest faction breaks away AND fuses with one of the other parties.
    - (49, 18, 17, 16) -> (49, 18, 17, 8, 8). Synergistic fission. Before fission of the smallest party, the Shapley vector is (1/2, 1/6, 1/6, 1/6) – the largest party is always pivotal in the second and third of the four positions in the ordering, the other three parties share the rest. After fission, the Shapley vector is (3/5, 1/10, 1/10, 1/10, 1/10). The fission increases the aggregate expectation of legislators in the smallest party from 1/6 to 1/5. Why does this not happen?
* Intra-party factions, treated “as if” exogenously defined, are included in a model of government formation in *Making and Breaking Governments*, Ch 12. There is little or no serious modeling of the *endogeneity* of factions.
  + - Assuming the intra-party political environment and rules of the game are directly analogous to those of the entire country, the logic is essentially the same as for the endogenous evolution of parties. Model each party and its factions as mini-clones of the political system and its parties.
    - This assumption is patently false, but to move beyond it we need to model both the intra-party rules of the game and incentives of intra-party agents. The late Greg Luebbert (1986) is widely cited on this, but this project has seen little traction. Obvious possibilities on *diverging* *intraparty* incentives, to take just three are:
    - party and faction leaders want to stay/become party leaders (even losing elections if this helps their cause?); this is a Luebbert point;
    - ministers want to stay ministers (and therefore don’t like to lose elections);
    - rank-and-file MPs want to be re-elected (possibly preferring losing national elections and keeping their seats, to winning national elections and losing tFor example:heir seats).
    - Not to mention diverging policy preferences …

The first half of Kato and Laver (*Electoral Studies* 2001) develops a general argument, given the ubiquitous potential for synergistic fissions and fusions, which is analogous to the chaos results. This is that decisive structures in dynamic weighted majority voting games with endogenous parties are “generically unstable” unless “something is done about it.” This suggests that we will need the big game, including the electoral module, to impose some order on the chaos arising from synergistic fission and fusion once we endogenize the set of parties. Electoral incentives are likely why legislative parties don’t endlessly split and fuse.

So what are sensible stopping points on the road from *m* legislators to *n* parties?

* The traditional assumption of exogenously defined and disciplined parties behaving “as if” unitary actors. This leads to an identification of the key agents as the *n* party leaders, each with a “raw” weight equal to the number of party legislators. There is lots of work in this tradition because it allows for tractable models in which the set of key decision makers does not evolve endogenously.
* As above but with party *pi* having *fpi* *exogenously* defined factions, each with clearly identified leaders who are pivotal agents. This is the approach in *Multiparty Government*, Ch 12. It is harder but still tractable in the sense there is still an exogenously specified set of key agents. Party actions are determined by intra-party inter-factional politics.
* As above but allow factions to *switch between parties endogenously.* This is the approach in Laver and Kato 2001 and Giannetti and Laver 2008. It is no accident that work on this has mainly concerned Italy and Japan, where intra-party factions and their leaders are the most sharply defined. This remains a model with *f* exogenously determined factions treated “as if” unitary actors, but with endogenous party affiliation.
* As above but allow legislators endogenously to *switch factions within parties*. This crosses a bright theoretical line because it assumes every legislator is an autonomous agent. The key here is to model the endogenous evolution of intra-party factions and the interactions of this with inter-party politics. This is a super-hard problem.
* Endogenize both intra-party factions and the parties themselves. Harder than the super-hard option above.
* Assume simply that there are *m* individual legislators with no party discipline. Paradoxically, this is probably not hard at all. Essentially, however, it is uninteresting because so unrealistic.

Having started with the assumption of parties as exogenously defined unitary actors, the logical next step is to model parties as coalitions of exogenously defined factions with clearly identified leaders. This does make very direct sense for us, since the politics of government formation and maintenance is an obvious source of incentives for party fission and fusion. Our model should throw light on this.

In effect we model a two-stage coalition formation process under which a set of exogenously defined factions first coalesce into a set of legislative parties, which then form coalition cabinets.

A reasonably tractable way to do this within our general approach would be to run the formation model with unitary actors, then check whether each of the parties is in equilibrium in the sense no faction has an incentive to defect and join another party.

We will need to make some assumptions about intra-party inter-factional resource allocation, so this will be non-trivial.

* For example, how are party perks shared internally? In proportion to the number of members/faction? (My intuition is that this will get us to Gamson).
* How are party issue vectors set by intra-party politics? By logrolling as in the larger game?