MMP review submission

Michael Fowlie [1] Mark C. Wilson [1]

[1]Department of Computer Science
University of Auckland
www.cs.auckland.ac.nz/~mcw/blog/

CMSS Seminar, 2011-09-25

2012 MMP review

- The Electoral Commission of New Zealand solicited submissions on several aspects of the MMP electoral system, as discussed at Arkadii Slinko's talk in Semester 1.e

2012 MMP review

- The Electoral Commission of New Zealand solicited submissions on several aspects of the MMP electoral system, as discussed at Arkadii Slinko's talk in Semester 1.e
- After over 4000 initial submissions, they produced a Proposal Paper that proposed only the following changes: reduce party vote threshold to 4%; remove one electorate seat threshold; remove the "overhang" seats.

2012 MMP review

- The Electoral Commission of New Zealand solicited submissions on several aspects of the MMP electoral system, as discussed at Arkadii Slinko's talk in Semester 1.e
- After over 4000 initial submissions, they produced a Proposal Paper that proposed only the following changes: reduce party vote threshold to 4%; remove one electorate seat threshold; remove the "overhang" seats.
- `http://mmpreview.org.nz/` contains much information on the process.

Our submission

- We focus on the value of the party vote threshold, assuming the other proposals are adopted.

Our submission

- We focus on the value of the party vote threshold, assuming the other proposals are adopted.
- We were not convinced by the Commission's arguments for the optimality of this value.

Our submission

- We focus on the value of the party vote threshold, assuming the other proposals are adopted.
- We were not convinced by the Commission's arguments for the optimality of this value.
- We aimed to compute measures of overall system quality under various assumptions on voter preferences.

Our submission

- We focus on the value of the party vote threshold, assuming the other proposals are adopted.
- We were not convinced by the Commission's arguments for the optimality of this value.
- We aimed to compute measures of overall system quality under various assumptions on voter preferences.
- We investigated values of threshold from 0 to 8%, and interpret our results as showing that 4% is considerably too high.

Measures of system quality: proportionality

- We focus on the concepts of proportionality and governability, which are widely believed to be inversely related in some way.

Measures of system quality: proportionality

- We focus on the concepts of proportionality and governability, which are widely believed to be inversely related in some way.
- There are many disproportionality indices in the literature. Many relate strongly to an apportionment method. Each is computed using the vote fraction v_i and seat fraction s_i awarded to each party, i.

Measures of system quality: proportionality

- We focus on the concepts of proportionality and governability, which are widely believed to be inversely related in some way.
- There are many disproportionality indices in the literature. Many relate strongly to an apportionment method. Each is computed using the vote fraction v_i and seat fraction s_i awarded to each party, i.
- We use the Loosemore-Hanby index (related to Hamilton's method),

$$L = \frac{1}{2} \sum_i |v_i - s_i|$$

and the Gallagher index,

$$G = \left(\frac{1}{2} \sum_i (v_i - s_i)^2 \right)^{1/2}.$$

Measures of system quality: governability

- Governability is less well-defined. The intuition is that fragmentation in to many small parties in Parliament make it harder to form a government than a few (ideally one or two) larger ones.

Measures of system quality: governability

- Governability is less well-defined. The intuition is that fragmentation in to many small parties in Parliament make it harder to form a government than a few (ideally one or two) larger ones.
- The most commonly used measure is the effective number of parties of Laakso and Taagepara,

$$N = \frac{1}{\sum_i s_i^2}.$$

Measures of system quality: governability

- Governability is less well-defined. The intuition is that fragmentation in to many small parties in Parliament make it harder to form a government than a few (ideally one or two) larger ones.
- The most commonly used measure is the effective number of parties of Laakso and Taagepara,

$$N = \frac{1}{\sum_i s_i^2}.$$

- It makes sense to us to use a modified version that takes into account power, rather than just presence in Parliament. We replace the fraction s_i above by the Shapley-Shubik power index σ_i. This index has an interpretation in terms of a noncooperative bargaining model.

Generating hypothetical elections

- We started with the voting data from MMP elections since 2002.

Generating hypothetical elections

- We started with the voting data from MMP elections since 2002.
- For each real election we generated a cluster of neighbouring hypothetical elections, using the above assumptions and a simple model of preference change.

Generating hypothetical elections

- We started with the voting data from MMP elections since 2002.
- For each real election we generated a cluster of neighbouring hypothetical elections, using the above assumptions and a simple model of preference change.
- We assume that each voter moves its 2nd preference to its 1st, or its 3rd to its 1st, with probabilities determined by reported probabilities from the NZ Election Surveys of the relevant years.

Generating hypothetical elections

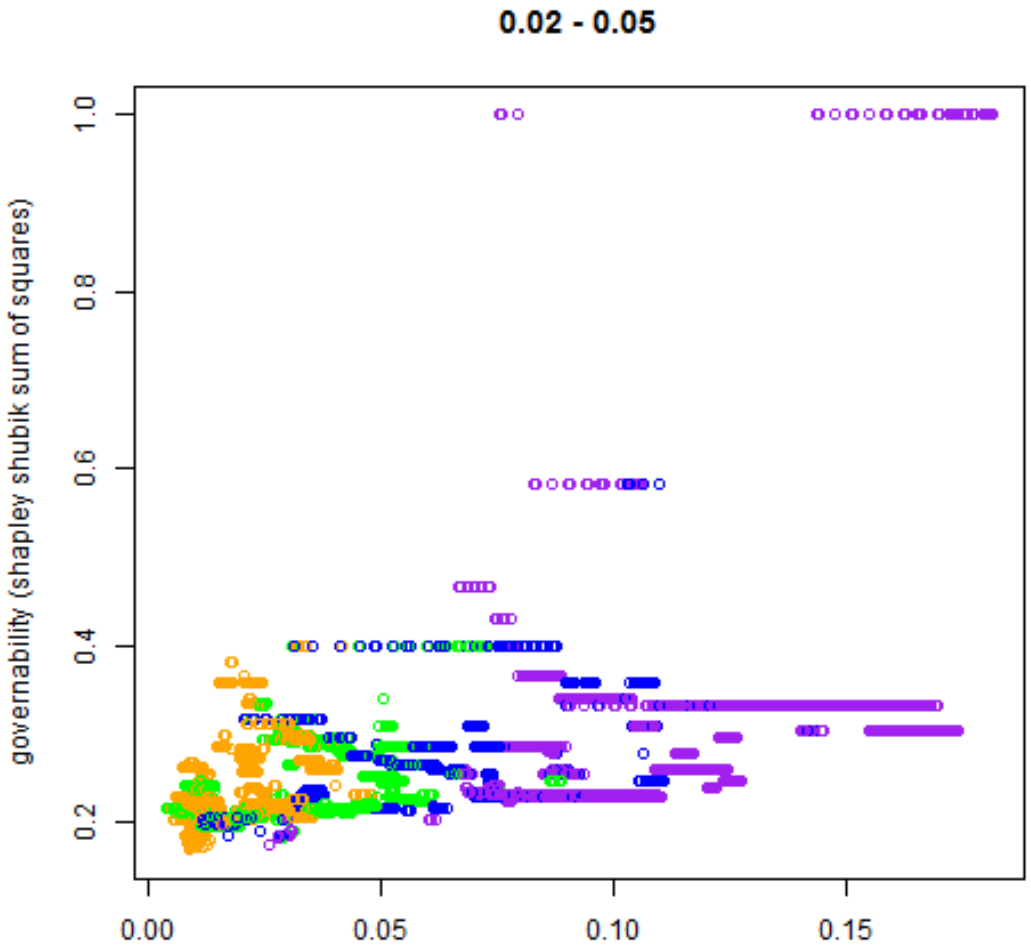
- We started with the voting data from MMP elections since 2002.
- For each real election we generated a cluster of neighbouring hypothetical elections, using the above assumptions and a simple model of preference change.
- We assume that each voter moves its 2nd preference to its 1st, or its 3rd to its 1st, with probabilities determined by reported probabilities from the NZ Election Surveys of the relevant years.
- This is done at the national level, then disaggregated to electorates using the same method as in the referendum simulator.

Generating hypothetical elections

- We started with the voting data from MMP elections since 2002.
- For each real election we generated a cluster of neighbouring hypothetical elections, using the above assumptions and a simple model of preference change.
- We assume that each voter moves its 2nd preference to its 1st, or its 3rd to its 1st, with probabilities determined by reported probabilities from the NZ Election Surveys of the relevant years.
- This is done at the national level, then disaggregated to electorates using the same method as in the referendum simulator.
- We assume no difference in strategic voter behaviour, or party behaviour.

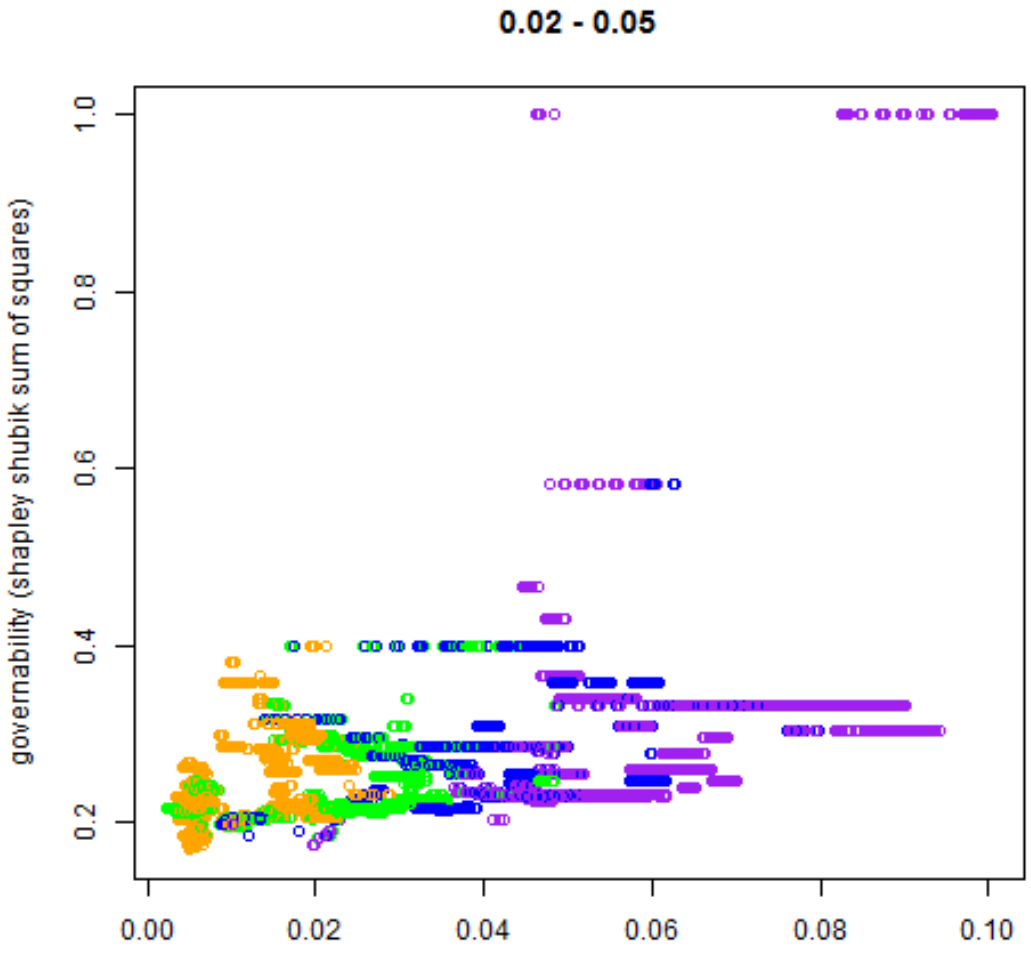
Results: Loosemore-Hanby/Shapley-Shubik

Figure: 2% (orange), 3% (green), 4% (blue), 5% (purple)



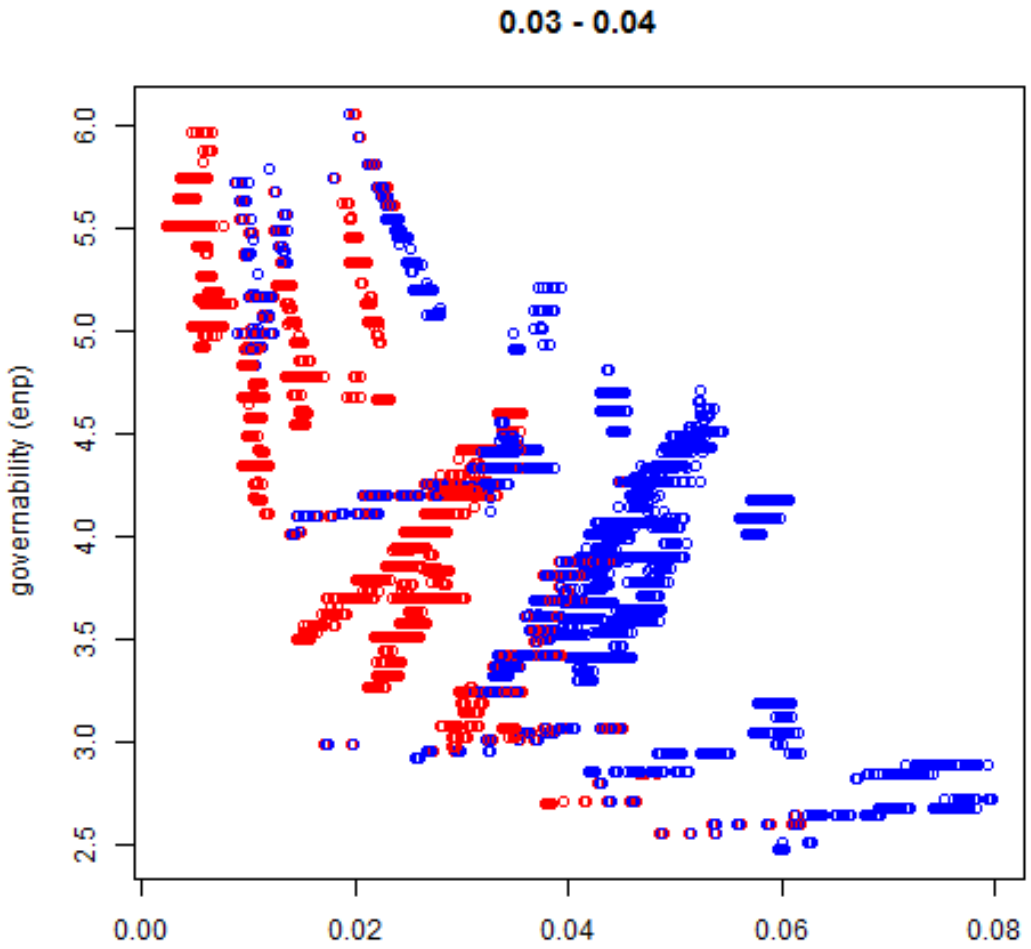
Results: Gallagher/Shapley-Shubik

Figure: 2% (orange), 3% (green), 4% (blue), 5% (purple)



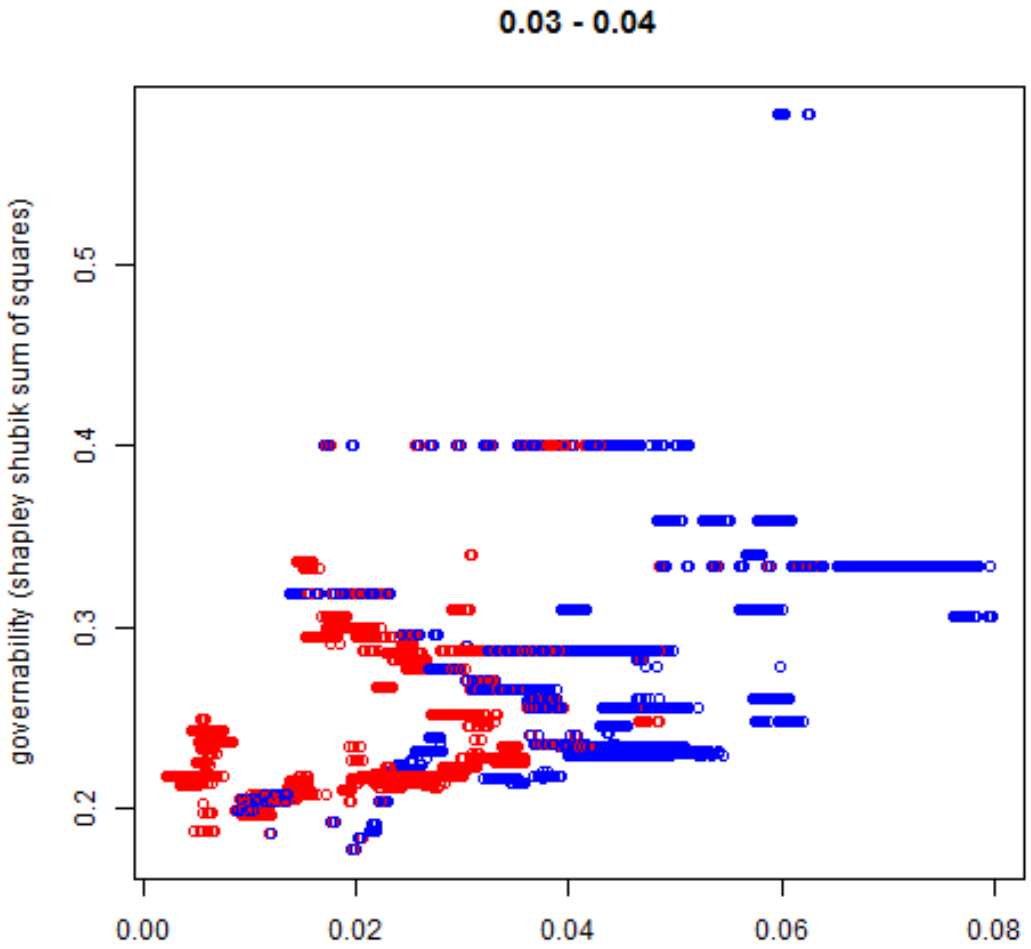
Results: Gallagher/Laakso-Taagepara

Figure: 3% (red) versus 4% (blue)



Results: Gallagher/Shapley-Shubik

Figure: 3% (red) versus 4% (blue)



Research questions

- What does it mean to generate "realistic" hypothetical elections?

Research questions

- What does it mean to generate "realistic" hypothetical elections?
- Which formal measures of robustness of results should we use, if any?