# Predicting FPP elections

Mark C. Wilson
CMSS seminar October 6, 2015

# FPP

- First past the post (FPP) is the electoral system in which members of parliament are elected directly in single-member districts, using the plurality rule.

# FPP

- First past the post (FPP) is the electoral system in which members of parliament are elected directly in single-member districts, using the plurality rule.
- Each voter chooses a single candidate and the winner is the candidate with the most total votes (we ignore tiebreaking).

# FPP

- **First past the post** (FPP) is the electoral system in which members of parliament are elected directly in single-member districts, using the **plurality** rule.
- Each voter chooses a single candidate and the winner is the candidate with the most total votes (we ignore tiebreaking).
- In order to win a seat in a contest between $m$ candidates, a candidate must receive at least $1/m$ vote share in that district.

# FPP

- First past the post (FPP) is the electoral system in which members of parliament are elected directly in single-member districts, using the plurality rule.
- Each voter chooses a single candidate and the winner is the candidate with the most total votes (we ignore tiebreaking).
- In order to win a seat in a contest between $m$ candidates, a candidate must receive at least $1/m$ vote share in that district.
- FPP is known to lead to very disproportional outcomes, where the seat share of a party can vary hugely from its overall national vote share.

# FPP

- First past the post (FPP) is the electoral system in which members of parliament are elected directly in single-member districts, using the plurality rule.
- Each voter chooses a single candidate and the winner is the candidate with the most total votes (we ignore tiebreaking).
- In order to win a seat in a contest between $m$ candidates, a candidate must receive at least $1/m$ vote share in that district.
- FPP is known to lead to very disproportional outcomes, where the seat share of a party can vary hugely from its overall national vote share.
- This system is strongly associated with British colonization. Used in UK, Canada, USA, India (was used in NZ until 1993).

## Other countries using FPP for parliamentary elections

- Antigua and Barbuda, Bahamas, Bangladesh, Barbados, Belize, Bermuda, Bhutan, Botswana, Burma, Dominica, Ghana, Grenada, Jamaica, Kenya, Malawi, Malaysia, Nigeria, Pakistan, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Uganda, Zambia.

## Other countries using FPP for parliamentary elections

- ▶ Antigua and Barbuda, Bahamas, Bangladesh, Barbados, Belize, Bermuda, Bhutan, Botswana, Burma, Dominica, Ghana, Grenada, Jamaica, Kenya, Malawi, Malaysia, Nigeria, Pakistan, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Uganda, Zambia.

- ▶ Azerbaijan, Ethiopia, Gambia, Ivory Coast, Liberia, Maldives, Federated States of Micronesia, Palau, Sierra Leone, Solomon Islands, Tanzania, Yemen.

# Plurality ballots - no further preferences can be expressed

**Choose ONE candidate to EXECUTE**
**by placing an X next to his name.**

| | | |
|---|---|---|
| | SIMON COWELL | |
| | SEPP BLATTER | |
| | GEORGE OSBORNE | |
| | GORDON RAMSAY | |
| | RUPERT MURDOCH | |

# FPP often distorts the vote-seat ratio

## Effect on parties and voters

▶ Duverger (1954) stated that FPP tends to lead to a two-party system (there may be other parties, but they have little representation).

# Effect on parties and voters

- Duverger (1954) stated that FPP tends to lead to a two-party system (there may be other parties, but they have little representation).

- There are two main justifications: the mechanical effect means that smaller parties cannot win a seat unless they have very strong concentration in a particular district. The psychological effect leads voters to give up on smaller parties, or candidates for those parties to give up.

# Effect on parties and voters

- Duverger (1954) stated that FPP tends to lead to a two-party system (there may be other parties, but they have little representation).

- There are two main justifications: the mechanical effect means that smaller parties cannot win a seat unless they have very strong concentration in a particular district. The psychological effect leads voters to give up on smaller parties, or candidates for those parties to give up.

- This is said to be the closest thing to a scientific law in political science. There are exceptions.

# Effect on parties and voters

- Duverger (1954) stated that FPP tends to lead to a two-party system (there may be other parties, but they have little representation).

- There are two main justifications: the mechanical effect means that smaller parties cannot win a seat unless they have very strong concentration in a particular district. The psychological effect leads voters to give up on smaller parties, or candidates for those parties to give up.

- This is said to be the closest thing to a scientific law in political science. There are exceptions.

- Strategic voting is very common in FPP elections — "voting for a loser is a wasted vote".

## Why predict results?

- ▶ Prediction is becoming a big industry. The UK2015 election had at least 10 academic and media teams delivering predictions many times before the election.

## Why predict results?

- ▶ Prediction is becoming a big industry. The UK2015 election had at least 10 academic and media teams delivering predictions many times before the election.
- ▶ There is a huge demand for polling by news media.

## Why predict results?

- ▶ Prediction is becoming a big industry. The UK2015 election had at least 10 academic and media teams delivering predictions many times before the election.
- ▶ There is a huge demand for polling by news media.
- ▶ Poll information is often used to determine candidate and party viability and has impact on fundraising. Polls can be self-reinforcing.

## Why predict results?

- ▶ Prediction is becoming a big industry. The UK2015 election had at least 10 academic and media teams delivering predictions many times before the election.
- ▶ There is a huge demand for polling by news media.
- ▶ Poll information is often used to determine candidate and party viability and has impact on fundraising. Polls can be self-reinforcing.
- ▶ For political scientists, predictions serve to help refine their models of voter preferences. This is more important than just getting the right answer.

## Methodological issues

▶ There is no agreed measure of format of prediction.

## Methodological issues

- ▶ There is no agreed measure of format of prediction.
- ▶ There is no agreed measure of prediction accuracy.

## Methodological issues

- ► There is no agreed measure of format of prediction.
- ► There is no agreed measure of prediction accuracy.
- ► All predictions involve uncertainty, but how to estimate it, and convey this to the public?

## Types of prediction

► Which party or parties will form the government?

## Types of prediction

- ▶ Which party or parties will form the government?
- ▶ How many seats will each party win?

# Types of prediction

- ▶ Which party or parties will form the government?
- ▶ How many seats will each party win?
- ▶ Which party will win each seat?

# Types of prediction

- ▶ Which party or parties will form the government?
- ▶ How many seats will each party win?
- ▶ Which party will win each seat?
- ▶ Predictions can be point estimates or probability distributions.

## Prediction is sometimes difficult

- ▶ UK 2015: all academic and commercial predictions (including prediction star Nate Silver) failed to predict a Conservative majority.

## Prediction is sometimes difficult

▶ UK 2015: all academic and commercial predictions (including prediction star Nate Silver) failed to predict a Conservative majority.

▶ "...eleven election forecasting teams gathered today (27th March) at a major conference at the LSE on the eve of the 2015 general election campaign. The different teams are all agreed that Britain is heading for a hung parliament on May 7th." (LSE blog)

## Prediction is sometimes difficult

- ▶ UK 2015: all academic and commercial predictions (including prediction star Nate Silver) failed to predict a Conservative majority.
- ▶ ". . . eleven election forecasting teams gathered today (27th March) at a major conference at the LSE on the eve of the 2015 general election campaign. The different teams are all agreed that Britain is heading for a hung parliament on May 7th." (LSE blog)
- ▶ In reality Conservatives obtained an absolute majority of seats.

# US Presidential election 1948
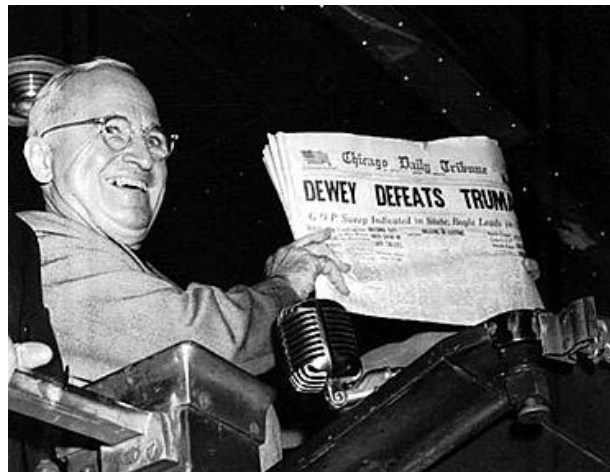
# US Presidential election 2012

# Reasons for difficulty in prediction

- ▶ Accurate polling is increasingly difficult (fewer landline phones).

## Reasons for difficulty in prediction

- ▶ Accurate polling is increasingly difficult (fewer landline phones).
- ▶ Herding of pollsters seems to occur - lack of independence. There is a formal enquiry in UK about how badly the polls predicted the popular vote at the election.

## Reasons for difficulty in prediction

- ▶ Accurate polling is increasingly difficult (fewer landline phones).
- ▶ Herding of pollsters seems to occur - lack of independence. There is a formal enquiry in UK about how badly the polls predicted the popular vote at the election.
- ▶ FPP itself magnifies small differences in party support.

## Reasons for difficulty in prediction

- ▶ Accurate polling is increasingly difficult (fewer landline phones).
- ▶ Herding of pollsters seems to occur - lack of independence. There is a formal enquiry in UK about how badly the polls predicted the popular vote at the election.
- ▶ FPP itself magnifies small differences in party support.
- ▶ The US system has an extra level (Electoral College) which amplifies small differences even more.

# Reasons for difficulty in prediction

- ▶ Accurate polling is increasingly difficult (fewer landline phones).
- ▶ Herding of pollsters seems to occur - lack of independence. There is a formal enquiry in UK about how badly the polls predicted the popular vote at the election.
- ▶ FPP itself magnifies small differences in party support.
- ▶ The US system has an extra level (Electoral College) which amplifies small differences even more.
- ▶ There are not many data points for statistical techniques to work on, yet it is very complicated to model voter behaviour very accurately.

# Possible input variables other than voting intention polls

- ▶ Margin of victory of main party leader in leadership election.

## Possible input variables other than voting intention polls

- ▶ Margin of victory of main party leader in leadership election.
- ▶ Approval ratings of party leaders.

## Possible input variables other than voting intention polls

- ▶ Margin of victory of main party leader in leadership election.
- ▶ Approval ratings of party leaders.
- ▶ Economic indicators.

# Difficulties in prediction of FPP elections using polls

▶ Ideally we could sample voters in each district.

## Difficulties in prediction of FPP elections using polls

- ▶ Ideally we could sample voters in each district.
- ▶ Resource constraints usually mean that polls are conducted nationally.

## Difficulties in prediction of FPP elections using polls

- ▶ Ideally we could sample voters in each district.
- ▶ Resource constraints usually mean that polls are conducted nationally.
- ▶ Disaggregating results to districts usually results in sample sizes that are too small in each district for statistically meaningful estimation.

## Difficulties in prediction of FPP elections using polls

- ▶ Ideally we could sample voters in each district.
- ▶ Resource constraints usually mean that polls are conducted nationally.
- ▶ Disaggregating results to districts usually results in sample sizes that are too small in each district for statistically meaningful estimation.
- ▶ District-level polls are usually restricted to districts in which the result is expected to be close.

## Difficulties in prediction of FPP elections using polls

- ▶ Ideally we could sample voters in each district.
- ▶ Resource constraints usually mean that polls are conducted nationally.
- ▶ Disaggregating results to districts usually results in sample sizes that are too small in each district for statistically meaningful estimation.
- ▶ District-level polls are usually restricted to districts in which the result is expected to be close.
- ▶ Even if national opinion polls (random sampling of voting intentions) give a completely accurate result, we don't know what is happening in each district.

## Using voting intention polls

▶ The basic idea is to assume that observed poll changes at the
national level are mirrored uniformly in each district.

## Using voting intention polls

- ▶ The basic idea is to assume that observed poll changes at the national level are mirrored uniformly in each district.
- ▶ There are two commonly used hypotheses. For party $X$, let $x_i$ denote its vote share in district $i$ and $x$ its overall vote share.

## Using voting intention polls

- ▶ The basic idea is to assume that observed poll changes at the national level are mirrored uniformly in each district.
- ▶ There are two commonly used hypotheses. For party $X$, let $x_i$ denote its vote share in district $i$ and $x$ its overall vote share.
  - ▶ Additive Swing (usually called "Uniform National Swing"): if $x$ changes to $x + c$, then $x_i$ changes to $x_i + c$ for all $i$;

# Using voting intention polls

- The basic idea is to assume that observed poll changes at the national level are mirrored uniformly in each district.
- There are two commonly used hypotheses. For party $X$, let $x_i$ denote its vote share in district $i$ and $x$ its overall vote share.
  - Additive Swing (usually called "Uniform National Swing"): if $x$ changes to $x + c$, then $x_i$ changes to $x_i + c$ for all $i$;
  - Multiplicative Swing ("Proportional Loss"): if $x$ changes to $\alpha x$ nationally, then $x_i$ changes to $\alpha x_i$ for all $i$.

## Using voting intention polls

- ▶ The basic idea is to assume that observed poll changes at the national level are mirrored uniformly in each district.
- ▶ There are two commonly used hypotheses. For party $X$, let $x_i$ denote its vote share in district $i$ and $x$ its overall vote share.
  - ▶ Additive Swing (usually called "Uniform National Swing"): if $x$ changes to $x + c$, then $x_i$ changes to $x_i + c$ for all $i$;
  - ▶ Multiplicative Swing ("Proportional Loss"): if $x$ changes to $\alpha x$ nationally, then $x_i$ changes to $\alpha x_i$ for all $i$.
- ▶ The most basic predictions simply compute each seat result based on the votes from last election and the district-level votes imputed by using the swing hypothesis and poll data.

# Using voting intention polls

- ▶ The basic idea is to assume that observed poll changes at the national level are mirrored uniformly in each district.
- ▶ There are two commonly used hypotheses. For party $X$, let $x_i$ denote its vote share in district $i$ and $x$ its overall vote share.
  - ▶ Additive Swing (usually called "Uniform National Swing"): if $x$ changes to $x + c$, then $x_i$ changes to $x_i + c$ for all $i$;
  - ▶ Multiplicative Swing ("Proportional Loss"): if $x$ changes to $\alpha x$ nationally, then $x_i$ changes to $\alpha x_i$ for all $i$.
- ▶ The most basic predictions simply compute each seat result based on the votes from last election and the district-level votes imputed by using the swing hypothesis and poll data.
- ▶ We call this the default model. Any more complicated model based on voting intention polls should do at least as well as this in order to be credible.

## Models behind the two hypotheses

- AS is based on the idea of voter flows between parties. If $1\%$ of eligible voters switch from $X$ to $Y$ then this happens in each district.

## Models behind the two hypotheses

- AS is based on the idea of voter flows between parties. If $1\%$ of eligible voters switch from $X$ to $Y$ then this happens in each district.
- MS is based on the idea of spatial distribution of voters. If $1\%$ of $X$'s national vote comes from district $i$, this doesn't change.

## Models behind the two hypotheses

- AS is based on the idea of voter flows between parties. If $1\%$ of eligible voters switch from $X$ to $Y$ then this happens in each district.
- MS is based on the idea of spatial distribution of voters. If $1\%$ of $X$'s national vote comes from district $i$, this doesn't change.
- MS requires changes in the total numbers of voters (so can account for turnout changes?) but AS does not.

## Example

- ▶ Consider two parties $X, Y$ and $k$ districts of equal size, such that $X$ and $Y$ each have overall national support $x = y = 0.5$.

## Example

- ▶ Consider two parties $X, Y$ and $k$ districts of equal size, such that $X$ and $Y$ each have overall national support $x = y = 0.5$.
- ▶ Suppose that $x$ changes to $x' = (1 + \varepsilon)/2$, and denote by $A(x_i, \varepsilon), M(x_i, \varepsilon)$ the predictions in district $i$ under AS and MS respectively.

## Example

- ▶ Consider two parties $X, Y$ and $k$ districts of equal size, such that $X$ and $Y$ each have overall national support $x = y = 0.5$.
- ▶ Suppose that $x$ changes to $x' = (1 + \varepsilon)/2$, and denote by $A(x_i, \varepsilon), M(x_i, \varepsilon)$ the predictions in district $i$ under AS and MS respectively.
- ▶ We have

$$A(x_i, \varepsilon) = x_i + \varepsilon/2$$
$$M(x_i, \varepsilon) = \frac{x_i(1 + \varepsilon)}{1 + \varepsilon(2x_i - 1)}.$$

## Example continued

| $\varepsilon$ | $x_i$ | $A(x_i, \varepsilon)$ | $M(x_i, \varepsilon)$ |
|---|---|---|---|
| -1 | 0.3 | -0.2 | 0 |
| -0.1 | 0.3 | 0.25 | 0.2596 |
| 0.1 | 0.3 | 0.35 | 0.3438 |
| 1 | 0.3 | 0.8 | 1 |
| $\varepsilon$ | 0.5 | $(1+\varepsilon)/2$ | $(1+\varepsilon)/2$ |
| -0.2 | 0.6 | 0.5 | 0.5 |
| 0.2 | 0.6 | 0.7 | 0.6923 |
| 0.5 | 0.6 | 0.9 | 0.8682 |

▶ $A(x_i, \varepsilon) - M(x_i, \varepsilon)$ has degree 4 Taylor expansion about $(1/2, 0)$ equal to $\varepsilon^2(x - 1/2) + 2\varepsilon(x - 1/2)^2$.

▶ $A(x_i, \varepsilon) - M(x_i, \varepsilon)$ has maximum value $0.5$, minimum $-0.5$.

## Comments

- If $x_i$ is small and $X$ loses support nationally, AS may predict a negative vote share in district $i$. If $X$ gains support, AS may predict huge relative changes in $x_i$.

## Comments

- If $x_i$ is small and $X$ loses support nationally, AS may predict a negative vote share in district $i$. If $X$ gains support, AS may predict huge relative changes in $x_i$.

- If $x_i = 0$ then MS predicts that this will never change.

## Comments

- If $x_i$ is small and $X$ loses support nationally, AS may predict a negative vote share in district $i$. If $X$ gains support, AS may predict huge relative changes in $x_i$.
- If $x_i = 0$ then MS predicts that this will never change.
- AS seems to be much more popular in the UK prediction community, but I don't really understand why.

## Comments

- ▶ If $x_i$ is small and $X$ loses support nationally, AS may predict a negative vote share in district $i$. If $X$ gains support, AS may predict huge relative changes in $x_i$.

- ▶ If $x_i = 0$ then MS predicts that this will never change.

- ▶ AS seems to be much more popular in the UK prediction community, but I don't really understand why.

- ▶ Many models use one of these as a base, but do a lot of possibly ad hoc work in order to make use of extra information (which is often biased or has large error). This includes models of poll bias and voter dishonesty, district-level polls.

## Obvious research questions

- ▶ Which of the two swing hypotheses explains the data better?

## Obvious research questions

- ▶ Which of the two swing hypotheses explains the data better?
- ▶ How to settle this question statistically?

## Obvious research questions

- ▶ Which of the two swing hypotheses explains the data better?
- ▶ How to settle this question statistically?
- ▶ We can predict election $i + 1$ using the default model based on election $i$, and the actual national turnout for election $i + 1$.

## Obvious research questions

- ▶ Which of the two swing hypotheses explains the data better?
- ▶ How to settle this question statistically?
- ▶ We can predict election $i + 1$ using the default model based on election $i$, and the actual national turnout for election $i + 1$.
- ▶ I have "predicted" past NZ elections all the way back to 1935, with remarkable accuracy, using this basic method. Why does it work so well?

## Obvious research questions

- ▶ Which of the two swing hypotheses explains the data better?
- ▶ How to settle this question statistically?
- ▶ We can predict election $i + 1$ using the default model based on election $i$, and the actual national turnout for election $i + 1$.
- ▶ I have "predicted" past NZ elections all the way back to 1935, with remarkable accuracy, using this basic method. Why does it work so well?
- ▶ We can predict election $i + 1$ using the default model based on election $i$, and opinion polls (averaged somehow, which is a big issue). We can then try to optimize the poll date relative to the election - there is some evidence that it should not be the latest possible.

## Measuring accuracy of predictions

- ▶ A point prediction of seats for all parties is equivalent to
  specifying a probability distribution.

# Measuring accuracy of predictions

- A point prediction of seats for all parties is equivalent to specifying a probability distribution.
- There are many distances on probability distributions, for example the total variation metric. If we can measure distance between parties then a Wasserstein distance is appropriate.

# Measuring accuracy of predictions

- A point prediction of seats for all parties is equivalent to specifying a probability distribution.
- There are many distances on probability distributions, for example the total variation metric. If we can measure distance between parties then a Wasserstein distance is appropriate.
- Another measure is the number of seats whose result was correctly predicted (for those models that give this detail).

## Measuring accuracy of predictions

- ▶ A point prediction of seats for all parties is equivalent to specifying a probability distribution.
- ▶ There are many distances on probability distributions, for example the total variation metric. If we can measure distance between parties then a Wasserstein distance is appropriate.
- ▶ Another measure is the number of seats whose result was correctly predicted (for those models that give this detail).
- ▶ I have not yet analysed the UK2015 predictions to see whether they outperformed the default model. Note that the default model was not run separately on regions (Scotland, Wales).

# Point predictions for the UK 2015 election (632 GB seats)

| Predictor | date | CON | LAB | LIB | UKIP | GREEN | SNP |
|-----------|------|-----|-----|-----|------|-------|-----|
| previous | 20100506 | 306 | 258 | 57 | 0 | 1 | 6 |
| real | 20150507 | 330 | 232 | 8 | 1 | 1 | 56 |
| Hanretty | 20150507 | 278 | 267 | 27 | 1 | 1 | 53 |
| Fisher | 20150507 | 285 | 262 | 25 | 0 | 1 | 53 |
| default (AS) | 20150508 | 328 | 277 | 15 | 0 | 1 | 7 |
| default (MS) | 20150508 | 332 | 258 | 0 | 0 | 3 | 34 |

# Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.

## Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.
- ▶ We simply do the computation as though nothing has changed in the districts, and then scale.

## Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.
- ▶ We simply do the computation as though nothing has changed in the districts, and then scale.
- ▶ Perhaps surprisingly, this procedure seems to work quite well.

# Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.
- ▶ We simply do the computation as though nothing has changed in the districts, and then scale.
- ▶ Perhaps surprisingly, this procedure seems to work quite well.
- ▶ Based on CBC/ThreeHundrdEight.com PollTracker 1 October 2015, we predict the point estimates:

# Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.
- ▶ We simply do the computation as though nothing has changed in the districts, and then scale.
- ▶ Perhaps surprisingly, this procedure seems to work quite well.
- ▶ Based on CBC/ThreeHundrdEight.com PollTracker 1 October 2015, we predict the point estimates:
  - ▶ (AS): CON 126, NDP 108, LIB 103, BQ 0, GRE 1

# Canadian election 2015 – last week

- ▶ The parliament size has increased from 308 to 338 since last election.
- ▶ We simply do the computation as though nothing has changed in the districts, and then scale.
- ▶ Perhaps surprisingly, this procedure seems to work quite well.
- ▶ Based on CBC/ThreeHundrdEight.com PollTracker 1 October 2015, we predict the point estimates:
  - ▶ (AS): CON 126, NDP 108, LIB 103, BQ 0, GRE 1
  - ▶ (MS): CON 135, NDP 108, LIB 92, BQ 2, GRE 1

# Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.

# Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives

## Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives
  - ▶ (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1

## Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives
  - ▶ (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1
  - ▶ (MS): CON 142, NDP 86, LIB 105, BQ 4, GRE 1

# Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives
  - ▶ (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1
  - ▶ (MS): CON 142, NDP 86, LIB 105, BQ 4, GRE 1
- ▶ Using the CBC/ThreeHundredEight.com from yesterday gives

## Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives
  - ▶ (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1
  - ▶ (MS): CON 142, NDP 86, LIB 105, BQ 4, GRE 1
- ▶ Using the CBC/ThreeHundredEight.com from yesterday gives
  - ▶ (AS): CON 135, NDP 102, LIB 96, BQ 4, GRE 1

# Canadian election 2015 – this week

- ► Relatively small changes in projected vote shares make a big difference in seat projections.
- ► Using Vox Pop/thestar.com poll average today gives
  - ► (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1
  - ► (MS): CON 142, NDP 86, LIB 105, BQ 4, GRE 1
- ► Using the CBC/ThreeHundredEight.com from yesterday gives
  - ► (AS): CON 135, NDP 102, LIB 96, BQ 4, GRE 1
  - ► (MS): CON 126, NDP 96, LIB 113, BQ 2, GRE 1

# Canadian election 2015 – this week

- ▶ Relatively small changes in projected vote shares make a big difference in seat projections.
- ▶ Using Vox Pop/thestar.com poll average today gives
  - ▶ (AS): CON 147, NDP 95, LIB 91, BQ 4, GRE 1
  - ▶ (MS): CON 142, NDP 86, LIB 105, BQ 4, GRE 1
- ▶ Using the CBC/ThreeHundredEight.com from yesterday gives
  - ▶ (AS): CON 135, NDP 102, LIB 96, BQ 4, GRE 1
  - ▶ (MS): CON 126, NDP 96, LIB 113, BQ 2, GRE 1
- ▶ It seems likely that CON will be the biggest party, no party will have a majority, and BQ will have very few seats. All forecasters are predicting the same thing, to my knowledge.

## Proportionality

- ▶ If there was no change in voting behaviour, a switch to
  proportional representation would benefit BQ and Green the
  most, be very good for LIB, not much different for NDP, very
  bad for CON.

## Proportionality

- ▶ If there was no change in voting behaviour, a switch to proportional representation would benefit BQ and Green the most, be very good for LIB, not much different for NDP, very bad for CON.

- ▶ The current seat allocations are: CON 166, NDP 103, LIB 34, BQ 4, GRE 1. Scaled up to the current Parliament size this is: CON 182, NDP 113, LIB 37, BQ 5, GRE 1.

# Proportionality

- ▶ If there was no change in voting behaviour, a switch to proportional representation would benefit BQ and Green the most, be very good for LIB, not much different for NDP, very bad for CON.

- ▶ The current seat allocations are: CON 166, NDP 103, LIB 34, BQ 4, GRE 1. Scaled up to the current Parliament size this is: CON 182, NDP 113, LIB 37, BQ 5, GRE 1.

- ▶ Under proportional allocation we would have: CON 134, NDP 104, LIB 64, BQ 20, GRE 13, OTHER 3.

## Proportionality

- ▶ If there was no change in voting behaviour, a switch to proportional representation would benefit BQ and Green the most, be very good for LIB, not much different for NDP, very bad for CON.

- ▶ The current seat allocations are: CON 166, NDP 103, LIB 34, BQ 4, GRE 1. Scaled up to the current Parliament size this is: CON 182, NDP 113, LIB 37, BQ 5, GRE 1.

- ▶ Under proportional allocation we would have: CON 134, NDP 104, LIB 64, BQ 20, GRE 13, OTHER 3.

- ▶ It is easy to predict who will (not) be advocating PR after this election. CON seem to be better at winning seats by small margins than other parties.