

Instructions for Batch Book Model v1.0  
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*Input file (sets parameter ranges for runs):*

Each line in the file IBMInput.txt, which accompanies this document, contains the range of variation for a single parameter of the model. There are 43 such lines, though of course not all can or should be varied at once. The order in the input file **must** be kept the same; change only the numerical values. The first fifteen lines of the file contain one integer each, corresponding to program settings that are not varied in the running of the program.

1. Voter distribution

- A. 1 = "Evenly placed in 1-D";
- B. 2 = "Evenly placed in 2-D";
- C. 3 = "Uniform in 1-D";
- D. 4 = "Uniform in 2-D";
- E. 5 = "Normal in 1-D, One Maximum";
- F. 6 = "Normal in 2-D, One Maximum";
- G. 7 = "Normal, 5 Maxima";
- H. 8 = "Bimodal in 1-D";
- I. 9 = "Left, Middle, Right in 1-D";
- J. 10 = "Triangle";

2. Propensity adjustment

- A. 0 = "No Adjustment--Downsian Voters";
- B. 1 = "Symmetric Bush-Mosteller (lambda)";
- C. 2 = "Symmetric Equal Adjustment (lambda)";
- D. 4 = "No Adjustment--Stick with Initial Values";

3. Party search rules

- A. 0 = "No Search";
- B. 1 = "Local (Incremental) Uniform Search";
- C. 2 = "Global Uniform Search";
- D. 3 = "Local (Incremental) Normal Search";
- E. 4 = "Global Normal Search";

4. Turnout adjustment

- A. 0 = "Full Turnout"
- B. 1 = "Symmetric Bush-Mosteller (lambda)"
- C. 2 = "Symmetric Equal Adjustment (lambda)";
- D. 4 = "No Adjustment--Stick with Initial Values"

5. Party distributions

- A. 0 = "Two Party Competition";
- B. 1 = "Evenly placed in 1-D";
- C. 2 = "Evenly placed in 2-D";
- D. 3 = "Uniform in 1-D";
- E. 4 = "Uniform in 2-D";
- F. 5 = "Normal in 1-D, One Maximum";
- G. 6 = "Normal in 2-D, One Maximum";
- H. 7 = "Citizen Candidates";
- I. 8 = "Nader, Gore, Bush";
- J. 9 = "Triangle";

6. Initial Distribution of Vote Propensities

- A. 1 = "Distributed Normally with given Parameters";
- B. 2 = "Distributed Uniformly";

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- C. 3 = "All Republican (party 0)";
- D. 4 = "All Democratic (party 1)";
- 7. Initial Distribution of Turnout Propensities
  - A. 1 = "Distributed Normally with given Parameters";
  - B. 2 = "Distributed Uniformly";
  - C. 3 = "Everyone Votes";
  - D. 4 = "No One Votes";
  - E. 5 = "Extremists Vote More";
  - F. 6 = "Moderates Vote More";
- 8. Initial Distribution of Aspirations
  - A. 0 = "Default (Near Center of Payoff Dist)";
  - B. 1 = "Distributed Normally with given Parameters";
  - C. 2 = "Distributed Uniformly with given Parameters";
  - D. 3 = "Very High (100)";
  - E. 4 = "Very Low (-100)";
  - F. 5 = "Extremists Higher";
  - G. 6 = "Moderates Higher";
- 9. Strategy Adjustment
  - A. 0 = "Update on Incumbent Performance Only"
  - B. 1 = "Update on Incumbent Performance and Last Vote"
  - C. 2 = "Update on Last Vote Only"
- 10. Uniform Shock
  - A. 0 = Shock is Normally Distributed
  - B. 1 = Shock is Uniformly Distributed
- 11. Voter Utility
  - A. 1 = "Quadratic Loss";
  - B. 2 = "Piecewise Linear (Abs Value) Loss";

The next two lines also do not vary: they set the number of times each set of parameter values is run to yield average values of the simulation data (12), and the number of elections that occur in each run (13).

- 12. Runs (An integer > 0)
- 13. Elections (An integer > 0)
- 14. dumpAllData (0 or 1)
- 15. dumpEveryNElections (An integer > 0)

The last two lines in this section determine whether or not data on each run is recorded. If line 14 is 0, only the mean and the standard deviations of variables across runs are recorded. If line 14 is 1, then in addition one or more output files containing data on every run will be written. Line 15 determines the frequency in electoral cycles that these per-run data are to be taken. For example, if this parameter is set to 10, then all runs are recorded for every tenth election.

The last 27 lines are of the following form: {initial numerical value *whitespace* final numerical value *whitespace* increment to be increased in each step}. Thus each line should have the format: 5 10 1. If the initial and final values are the same, then no loop on that parameter occurs, and the parameter is merely set to the initial numerical value provided. Thus, using 5 5 1 for the parameter N sets N to five for all simulations being run. The number of values taken on by each parameter is (final-initial)/increment + 1. One note of caution: the time spent in each loop is multiplicative, so asking it to do 1000 runs each of 3 parameters that each take on 100 values equates to  $10^9$  iterations, each containing a potentially large number of elections.

- 1. inertia
- 2. N
- 3. bliss1mean
- 4. bliss1stdev
- 5. bliss2mean
- 6. bliss2stdev
- 7. nu

8. lambda
9. votingCost
10. shockmean
11. shockstdev
12. numParties
13. partyPosition0a
14. partyPosition0b
15. partyPosition1a
16. partyPosition1b
17. partySearchMean1
18. partySearchStdev1
19. partySearchMean2
20. partySearchStdev2
21. partySophisticationLevel
22. propinitmean
23. propinitstdev
24. turninitmean
25. turninitstdev
26. aspinitmean
27. aspinitstdev

*Output file(s):*

The batch book model writes by default to the output file “[ibm-batch-out.csv](#)”. If such a file exists, it tries “[ibm-batch-out-1.csv](#)” and so on until an open file name is found. (So the newest file will always be the one with the largest number at the end—this is different from the GUI model’s output.) This is a text file with comma separated values, which you should be able to double-click to open directly in your spreadsheet program of choice or read directly into common statistical packages. Lines one and two of this file are parameter names and associated parameter values, respectively, for the first fifteen parameters, listed above. After these two lines, plus one blank one, follows a block containing the names and values of the twenty-seven looped input parameters, and the output names and data. Each line after the first in this block consists of summary statistics of the model’s behavior for that election period, taken across the model’s runs. Thus the model aggregates across runs, but not across periods (elections) within each run. The data taken are as follows:

- “Election”: Election/Period number
- “Mean Incumbent”: Mean value of incumbents’ party identification numbers (makes the most sense for two-party competition, where 0 = Republican and 1 = Democrat).
- “StDev Incumbent”: Standard deviation of incumbents’ party identification numbers (most useful under multi-party competition as measure of dispersion of winners in each period).
- “Mean and StDev of X- and Y-Coordinates of Incumbent”
- “Mean X- and Y-Coordinates”: the mean party locations in order of party ID number
- “StDev X- and Y-Coordinates”: the standard deviations of party locations in order of party ID number
- “Mean Vote Share”: The mean vote shares for each party.
- “StDev Vote Share”: The mean vote shares for each party.
- “Mean Number Times Winner”: The mean number of times each party has won an election, cumulative to that election.
- “StDev Number Times Winner”: The standard deviation of the number of times each party has won an election, cumulative to that election.
- “Mean Effective Number of Parties”: The mean effective number of parties as per the Laakso-Taagepera (1979) measure.
- “StDev Effective Number of Parties”
- “Mean Aspiration Level”
- “StDev Aspiration Level”
- “Mean Payoff”
- “StDev Payoff”

The following appear only if not Full Turnout:

- "Mean Turnout": Mean turnout proportion in that period.
- "Standard Deviation Turnout": Standard deviation of the turnout proportion in that period.
- "Mean Correlation of Turnout with Interests": The mean point biserial correlation coefficient of realized turnout (the dichotomous variable) to voter extremism.
- "Standard Deviation Correlation of Turnout with Interests": The standard deviation of the point biserial correlation coefficient of realized turnout (the dichotomous variable) to voter extremism.
- "0-10%", "10-20%", "20-30%", "30-40%", "40-50%", "50-60%", "60-70%", "70-80%", "80-90%", "90-100%": Mean number of voters in each decile of turnout.

The following appear only if voting is not Downsian under two-party competition:

- "Mean Propensity": Mean value of the propensity to vote D that period
- "StDev Propensity": Standard deviation of the propensity to vote D that period.
- "Mean Correct Voting Percent": Mean number of individuals who voted "correctly" in a Downsian sense; this is, for the party whose platform was closest to their bliss points.
- "StDev Correct Voting Percent": Standard deviation of the number of individuals who voted "correctly" in a Downsian sense; this is, for the party whose platform was closest to their bliss points.
- "Mean Correlation of Correct Voting with Interests": The mean point biserial correlation coefficient of realized correct voting totals (the dichotomous variable) to voter extremism.
- "StDev Correlation of Correct Voting with Interests": The standard deviation of the point biserial correlation coefficient of realized correct voting totals (the dichotomous variable) to voter extremism. Note that this includes all individuals, whether or not they voted in the last period. As long as one's last vote was correct, one is considered to have voted correctly, even if one did not vote at all. Those who have never voted are never considered to have voted correctly.
- "0-10%", "10-20%", "20-30%", "30-40%", "40-50%", "50-60%", "60-70%", "70-80%", "80-90%", "90-100%": Mean number of voters in each decile of Democratic-vote-propensity.

If the parameter *dumpAllData* is set to 1, additional files are written. The base file name is "[ibm-batch-out-dump.csv](#)" and additional files are numbered as above. One file is written for each set of parameter values. The first two lines in each file list the values of all parameters. After a space, the rest of the file contains a block of simulation data in the following format. For every election that the parameter *dumpEveryNElections* indicates, the per-run values of each of the variables included in the above description of the main output file are written. Be aware that files can grow very large if many runs and many elections are recorded.