This file describes the programs and procedure for replicating the results presented in "Bicameralism and Government Formation," Diermeier, Eraslan and Merlo.

Files needed:

belgiumform.do
summary_statistics.do
estimate.c
init.c
auxil.c
libpset.c
logLikeE.c
logLikeF.c
paramE.c
paramF.c
paramNS.c
ste.c
like.h
paramE.h
paramF.h
pset.h
struct.h
vars.h

Libraries needed:
IMSL
JGLIB (The code and installation instructions available at http://www2.cirano.qc.ca/~bacc/bacc98/index.html. The code is Also included in the zip file.)

Input file needed:
inMax (see below for the format)
(All other input files are obtained by using intermediate outputs as explained below. They are included in the subdirectory INPUT-FILES.)

Data file
belgiumform.dta
sweden.dta
denmark.dta
july01final_econ.txt

The zip file also contains the output files in the folder OUTPUT-FILES.

0-SUMMARY STATISTICS/DATA

The Stata program summary_statistics.do generates Tables 1, 8 and the data columns in Tables 3-6, and the actual columns in Tables 7 and 9.

I--MAXIMIZE THE LIKELIHOOD

A. STATA program for estimating parameters ALPHA0 and ALPHA1
1. Run the Stata program belgiumform.do. This generates the output file belgiumform.out. The estimates of ALPHA0 and ALPHA1 reported in Table 2 (and used as input to fit and fitst programs below) are obtained by this program. The program also generates variance-covariance matrix for these paramaters. The inverse of this matrix is used as an input to fitst program as described below.

The estimates of other parameters, and all other tables in the paper are generated by C programs described below.

2. Edit the file struct.h to specify the location of the datafile in the line
#define DATAFILE path
where path is the Linux path to the data file july01final_econ.txt

3. Generate the executable for maximum likelihood estimation: make the file "lke" executable (by typing chmod 755 lke) and type lke. This creates the executable file est.

4. Run the estimation program by typing
est < inMax > o &

The file inMax is of the form:
```
s t
n
p1
p2
...
pn
outfile
```

s: scale
t: tolerance
(see IMSL documentation
http://gams.nist.gov/serve.cgi/ModuleComponent/4459/Documentation/ITL/dumpol
for scale and tolerance)
n: number of parameters
p1 ... pn : starting parameter vector
outfile: output file

The program writes the maximum likelihood estimates to the output file. The maximum likelihood estimates reported in Table 2 are generated by this program. (For computational reasons, all the programs work with a transformation of RHO and DELTA1. The Excel file QJPS-TABLES-FINAL-VERSIONS.xls has the inverse transformation of the estimates and standard errors of RHO and DELTA1.)

It also generates a file named "inFit" to be edited for use as an input to standard error and goodness-of-fit programs.

II--COMPUTE THE STANDARD ERRORS

5. Generate the executable for computing standard errors: make the file "lks" executable (by typing chmod 755 lks) and type lks. This creates the executable file ste.

6. Edit the file inFit to add the line
12 0
and save it as "inSte" (see below for the format of inSte).

7. Run the standard error program by typing
ste < inSte > oSte &

The file inSte is of the form:

```
n1 t
n
p1
...
pn
```

n1: number of parameters for which the variance covariance matrix is needed
n1 <=n
t: indicates whether BETA and RHO are transformed or not
(if t=1 then BETA is in (0,1) and RHO>0, otherwise, they are real numbers)
n: number of parameters
p1 ... pn : starting parameter vector

The program computes the standard errors at the maximum likelihood estimates and writes into the standard output (oSte in the above example).

The standard errors reported in Table 2 are generated by this program.

8. Edit the file inSte to change the line
12 0
to
12 1
and save it.

9. Run the standard error program again by typing
ste < inSte > o &

This generates a file called "varcov" that contains the inverse of the variance covariance matrix of (a subset of) the parameters.

III--GOODNESS-OF-FIT

10. Edit the file inFit to change 14 (number of parameters estimated in step 2) to 16 (total number of parameters),
and insert the estimated parameters for ALPHA0 and ALPHA1 before
other parameters. (The estimates are
9.767915
2.21743
 and they are produced by Stata).
Insert the line 1 1 in the first line (see description of the format below).

11. Generate the executable for goodness-of-fit program: make the file "lkf" executable (by typing chmod 755 lkf) and type lkf. This creates the executable file fit.

12. Run the fit program by typing
fit < inFit > outFit &

The file inFit is of the form:
   cNum Senate
   n
   p1
   p2
   ...
   pn

cNum: country number (1 for Belgium, 2 for Denmark)
Senate: 1 for dual-responsibility, and 0 for single responsibility
n: number of parameters
p1 ... pn : starting parameter vector

The program writes histogram for the goodness-of-fit test (computed in Excel) to the standard output (oFit in the above example).
Tables 3-6 are generated by the computations in Excel using these histograms.

IV--POLICY EXPERIMENT FOR BELGIUM

13. Copy the file inFit inFitStB

14. Edit the file inFitStB (see format below) to insert
i) 1 1000 0
ii) delete the last two lines
iii) insert
0.076859826   0.138526991 0 0 0 0 0 0 0 0 0 0 0 0

0.138526991   3.276223689 0 0 0 0 0 0 0 0 0 0 0 0
(This is the variance covariance matrix from Stata appended with zeros to
account for zero covariance between
ALPHA0, ALPHA1 and the rest of the parameters).
to the end
iv) insert the file varcov to the end

The file inFitStB is of the form:
   cNum nIter Senate
   n
   p1
   p2
   ...
   pn
varcov-11 varcov-12 ... varcov-1n
..
..
varcov-n1 varcov-n2 ... varcov-nn

where

cNum: country number (1 for Belgium and 2 for Denmark)
Senate: 1 for dual-responsibility, and 0 for single responsibility
nIter: number of iterations
n: number of parameters (other than DELTA0 and DELTA1)
p1 ... pn : starting parameter vector
varcov-ij is the ij-th entry in the inverse of the variance-covariance matrix

15. Generate the executable program "fitst": make the file "lkcst" executable
(by typing chmod 755 lkcst) and type lkcst.

16. Run the program fitst by typing
fitst < inFitStB > outExperiment &

The program computes mean and standard errors for the endogenous variables
for the counterfactual experiment of removing senate in Belgium.

The means and standard errors in Table 7 are obtained from the file
outExperiment.

V--OUT OF SAMPLE PREDICTION FOR DENMARK

17. Edit the file inFitStB to change the first line to
2 1000 0
and save it as inFitStD

18. Run the program fitst by typing

```
fitstD < inFitStD >  outDenmark &
```

(The input file inFitStD is of the same form as the input file inFitSt described above.)

The program computes mean and standard errors for the endogenous variables for the out of sample predictions for Denmark.

Table 9 is generated by this program.