README File for "Replication data for: Endogenous Jurisprudential Regimes"

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The replication archive includes four replication datasets and the R code for estimating the multivariate change-point model and for approximating the Bayes factor. This file documents the R code and datasets and explains how to reproduce our results and fit the changepoint model.

1. **Replication R Code**

   The replication archive includes three .R files, namely, ChgPtProbitMCMC.R, ChgPtProbitMarginalLikelihood.R, and ChgPtProbitReducedMCMC.R.

   ChgPtProbitMCMC.R: the file includes one major function Probit.ChangingPoint for estimating the multivariate change-point model using markov chain Monte Carlo and several supporting functions called in Probit.ChangingPoint. The user can either copy and past the whole file into the R console or simply use the function source("ChgPtProbitMCMC.R") to call all these functions. Then, the following function is ready to be called to fit the multivariate change-point model:

   ```
   Probit.ChangingPoint<-function(y, X, TimeIndex, M, B0, beta0, a00, b00,
   beta.start, S.start, P.start, m=10000, ...)
   ```

   Arguments

y	dichotomous response variable (vector)
X	explanatory variables (a matrix with the first column as unit)
TimeIndex	decision time index (vector)
beta0, B0	mean and variance-covariance matrix of a multivariate normal distribution as the prior of the coefficients β associated with X
M	number of regimes ($M-1$ is the number of change-points)
a00, b00	two shape parameters of a Beta distribution used as the prior distribution of the transition probability P (scalar)
beta.start	starting values of β (vector)
S.start	starting values of the state index (vector, the elements should start with 1 and end with M)
P.start	starting value of the transition probability (scalar)
m	number of MCMC iterations to be returned

burnin	number of initial iterations to be discarded
tracking	to return a message when the simulation process finishes every tracking iterations
thin	chain thinning, storing the last iteration of every thin iterations
Marginal.likelihood	to choose whether to calculate and return the log marginal likelihood (TRUE or FALSE)
reduced.n	only when the argument Marginal.likelihood takes TRUE, the argument needs to be specified. How many iterations to be returned in reduced runs.
reduced.turnin	only when the argument Marginal.likelihood takes TRUE, the argument needs to be specified. How many initial iterations to be discarded in reduced runs.

Value

Probit.ChangingPoint returns the MCMC draws from the posterior distributions of the coefficients (β), the transition probability (P) and the state indicator (S) as a list. The user can use the functions in the R package coda to summarize the posteriors and conduct convergence diagnostics. If the user specifies the argument marginal.likelihood as TRUE, the function will also return the estimate of the log marginal likelihood.

ChgPtProbitMarginalLikelihood.R : the file contains R code for approximating the log marginal likelihood of the specified model. It can be called in the function Probit.ChangingPoint or be applied separately. If the function is called in Probit.ChangingPoint, make sure all the three R files are in the same directory. To approximate the marginal likelihood, the following function in the file is used:

```
Marginal.likelihood <- function(y, X, MCMCoutput,TimeIndex, beta0, B0,
M, a00, b00, iteration, burninstage)
```

Arguments

Except MCMCoutput, all the arguments are the same as in Probit.ChangingPoint. The argument MCMCoutput takes the output of the function MCMCoutput, which is a list of the MCMC draws. Note that the priors should be the same as those used in the MCMC simulation.

Values

Marginal.likelihood returns the final estimate of the log marginal likelihood as well as the value of each ordinate on the log scale as a list.

ChgPtProbitReducedMCMC.R: the file includes an R function for conducting reduced runs to approximate the marginal likelihood. The function has to be called in Marginal.likelihood. Make sure the file is in the same directory as ChgPtProbitMarginalLikelihood.R. Because the function cannot be used by its own, the user need not go into the details about the function.

2. Replication Data

In the paper we applied the multivariate change-point model to test the hypothesis of "jurisprudential regimes" in four areas of law: freedom of expression, the Establishment Clause, search and seizure, and administrative law, using replication data that Bert Kritzer, Mark Richards, and Jeff Segal generously shared with us.

Freedom of Expression

To replicate the results in Section 4.1, please use the replication dataset `SpeechFinalSub.RData` in our replication archive. This dataset is a subset of the dataset used in Richards and Kritzer (2002). The variable labels in Figure 2 have their corresponding variables names in `SpeechFinalSub.RData` as following:

Decision Time: `casekey`
Decision: `voting`
Ideology: `ideology`
Threshold Not Meet: `jusri. threshold. not`
Content Based: `juris. content. based`
Content Neutral: `juris. content. neutral`
Crimial: `action.crimial`
Deny Expression: `action.deny.expression`
Deny Benefit: `action.deny.benefit`
Disciplinary: `action.disciplinary`
Loss Employment: `action.lose.employment`
Regulation:`action.regulation`
Other: `government.other`
Private: `government.private`
Education: `government.education`
Local: `government. local`
Federal: `government.federal`
Politician: `identity.politician`
Racial Minority: `identity.racial.minority`
Alleged Communist: `identity.alleged.communist`
Minitary Protester: `identity.minitary.protester`
Business: `identity.business`
Religious: `identity.religious`
Print Media: `identity.print.media`
Broadcast Media: `identity.broadcast.media`

When fitting the model, the variable `voting` is the response variable and should be specified as `y` in the `R` functions for MCMC simulation or marginal likelihood approximation; `casekey` is the index of decision time, used for specifying the argument `TimeIndex`; and the rest of the variables should be specified as the `X` argument in those `R` functions.

Establishment Clause

To replicate the results in Section 4.2, please use the replication dataset `estab.RData` in our replication archive. This dataset is a subset of the data used in Kritzer and Richards (2003). The variable labels in Figure 4 have their corresponding variables names in `estab.RData` as following:

Decision Time: `Index`
Decision: `vote`
No Secular Purpose:`purpose`
General Government Service: `gengov`
Neutral: `neutral`
Colleges/Universities:`level`
Historical Practice: `history`
Government Monitoring: `surveill`
Attitude: `attitude`

When fitting the model, the variable `vote` is the response variable and should be specified as `y` in the `R` functions for MCMC simulation or marginal likelihood approximation; `Index` is the index of decision time, used for specifying the argument `TimeIndex`; and the rest of the variables should be specified as the `X` argument in those `R` functions.

Search and Seizure

To replicate the results in Section 4.3, please use the replication dataset `SearchVote.RData` in our replication archive. This dataset is a subset of the data used in Kritzer and Richards (2005). The variable labels in Figure 6 have their corresponding variables names in `SearchVote.RData` as following:

Decision Time: `casekey`
Decision: `vote`
House: `house`
Business: `business`
Person: `person`
Car: `car`
Full Search: `search`
Warrant: `warrant`
Probable Cause: `lctpc`
Incident to Arrest: `lctinc`
After Arrest: `lctaft`
After Unlawful:`lctunl`
Exceptions: `except`
Attitude: `segcov`

When fitting the model, the variable `vote` is the response variable and should be specified as `y` in the `R` functions for MCMC simulation or marginal likelihood approximation; `casekey` is the index of decision time, used for specifying the argument `TimeIndex`; and the rest of the variables should be specified as the `X` argument in those `R` functions.

Administrative Law

To replicate the results in Section 4.4, please use the replication dataset `admin.RData` in our replication archive. This dataset is a subset of the data used in Richards et al. (2006). The variable labels in Figure 8 have their corresponding the variables names in `admin.RData` as following:

Decision Time: `Index`
Decision: `votedef`
Attitude: `attitude`
Agency Policy Direction: `agncydir`
APD*Attitude: agndiratti
Amici to Reverse:`rev.amici`
Amici to Defer: `def.amic`
Amici Unclear: `amicus.u`
Opposing: `party`[1]
Advocating: `dparty`[2]
President Can Fire Agency Head: `agencyhd`
Rulemaking: `rulemake`
Statute Length: `columncm`

1 The variable `party` is a factor with four levels, and `agovt` is the baseline. The paper reported the estimates of the coefficients associated with the other three levels with labels in Figure 8 as Corporation Opposing, Individual Opposing and Non-Corporate Interest Group Opposing.
2 The variable `dparty` is a factor with two levels, and `aanonag` is the baseline. The paper reported the estimates of the coefficients associated with the other three levels with labels in Figure 8 as Agency Advocating and Agency with Co-party Advocating.

When fitting the model, the variable `votedef` is the response variable and should be specified as `y` in the `R` functions for MCMC simulation or marginal likelihood approximation; `Index` is the index of decision time, used for specifying the argument `TimeIndex`; and the rest of the variables should be specified as the `X` argument in those `R` functions.

References

Kritzer, H. M. and M. J. Richards (2003). Jurisprudential regimes and supreme court decisionmaking: The lemon regime and establishment clause cases. *Law & Society Review 37*, 827–840.

Kritzer, H. M. and M. J. Richards (2005). The influence of law in the supreme court's search-and-seizure jurisprudence. *American Politics Research 33*, 33–55.

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Richards, M. J., J. L. Smith, and H. M. Kritzer (2006). Does chevron matter? *Law & Policy 28*, 444–469.