Moments in Time: Temporal Patterns in the Effect of Democracy and Trade on Conflict

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Online Appendix. Comparing Change-point Models

I estimate ten models and employ a Bayes Factor comparison in order to determine the appropriate number of change-points to include in the main analysis. Ten endogenous MCMC Poisson change-point models were estimated, each titled "M" and given a subscript with the number of change-points assigned to the model. In each of the models tested, I run 50,000 MCMC chains after discarding the first 20,000 draws and use non-informative, uniform priors for both the parameter estimates and the probability of when structural breaks occur. The model fit is assessed using a Bayes Factor comparison of the marginal likelihood of two models.[1]

Table 1 presents the results of logged Bayes Factor comparisons of the models where the numerator is the column (baseline model) and the denominator is the row (alternative model). Because the results are logged, negative values are evidence against the baseline and positive values are evidence in favor of the baseline (Gill 2009, 209). Applying Jeffrey's (1961) scale to the values in Table 1, has decisive support as the best model fit. This suggests

[1]The Bayes Factor is used to compare models with one model operating as the baseline model. $BF_{ij} = \frac{m(y|M_i)}{m(y|M_j)}$ where BF_{ij} is the Bayes Factor comparing model M_i to model M_j, $m\left(y|M_i\right)$ is the marginal likelihood under model M_i, and $m\left(y|M_j\right)$ is the marginal likelihood under model M_j.

that the data best fits a model with two time regimes or M_1; therefore, I focus on the results from this model in the primary analyses.

Table 1: Bayes Factor Comparison of Poisson Change-point Models of European MIDs.

Logged BF	M_1	M_2	M_3	M_4	M_5	M_6	M_7	M_8	M_9	M_{10}
M_1	—	-24.5	-42.45	-46.82	-48.47	-51.68	-54.43	-35.06	-41.33	-60.13
M_2	24.5	—	-17.93	-22.30	-23.95	-27.16	-29.91	-10.54	-16.81	-35.61
M_3	42.4	17.9	—	-4.37	-6.02	-9.23	-11.98	7.39	1.12	-17.68
M_4	46.8	22.3	4.37	—	-1.65	-4.86	-7.61	11.76	5.49	-13.31
M_5	48.5	23.9	6.02	1.65	—	-3.21	-5.96	13.40	7.14	-11.66
M_6	51.7	27.2	9.23	4.86	3.21	—	-2.75	16.61	10.35	-8.45
M_7	54.4	29.9	11.98	7.61	5.96	2.75	—	19.36	13.10	-5.70
M_8	35.1	10.5	-7.39	-11.76	-13.40	-16.61	-19.36	—	-6.27	-25.07
M_9	41.3	16.8	-1.12	-5.49	-7.14	-10.35	-13.10	6.27	—	-18.80
M_{10}	60.1	35.6	17.68	13.31	11.66	8.45	5.70	25.07	18.80	—

Note: $\ln(BF_{ij} = \frac{m(y|M_i)}{m(y|M_j)})$ where BF_{ij} is the Bayes Factor comparing model M_i to model M_j, $m\,(y|M_i)$ is the marginal likelihood under model M_i, and $m\,(y|M_j)$ is the marginal likelihood under model M_j. Columns are M_i and rows are M_j. MCMC chains are run 50,000 times after discarding 20,000 burnin

References

Gill, Jeff. 2009. *Bayesian Methods: A Social and Behavior Sciences Approach.* Second ed. Boca Raton, FL: Chapman and Hall/CRC Press.

Jeffrey, Harold. 1961. *Theory of Probability.* New York: Oxford University Press.