Contagion, Confounding, and Causality: Confronting the Three C's of Observational Political Networks Research

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Abstract

Contagion across various types of connections is a central process in the study of many political phenomena (e.g., democratization, civil conflict, voter turnout). Over the last decade the methodological literature addressing the challenges in causally identifying contagion in networks has exploded. In one of the foundational works in this literature, Shalizi and Thomas (2011) propose a permutation test for contagion in longitudinal network data that is not confounded by selection (e.g., homophily). We illustrate the properties of this test via simulation. We assess its statistical power under various conditions of the data; including the nature of the contagion, the structure of the network through which contagion occurs, and the number of time periods included in the data. We then apply this test to an example domain that is commonly considered in the context of observational research on contagion—the international spread of democracy. We find evidence of the international contagion of democracy. We conclude with a discussion of the practical applicability of the Shalizi & Thomas test to the study of contagion in political networks.

Keywords: social networks, contagion, homophily.

1 Supplementary Appendix

In this appendix we report supporting analyses not included in the main text. In Figure 1, we present descriptive analyses of the networks in our simulation study. In Figure 2, we report on supporting results in our simulation study. In Figure 3, we present the distribution of contagion parameter estimates in the Polity data application.

References

Shalizi, C. R., and A. C. Thomas. 2011. "Homophily and contagion are generically confounded in observational social network studies." *Sociological Methods and Research* 40 (2): 211–239.

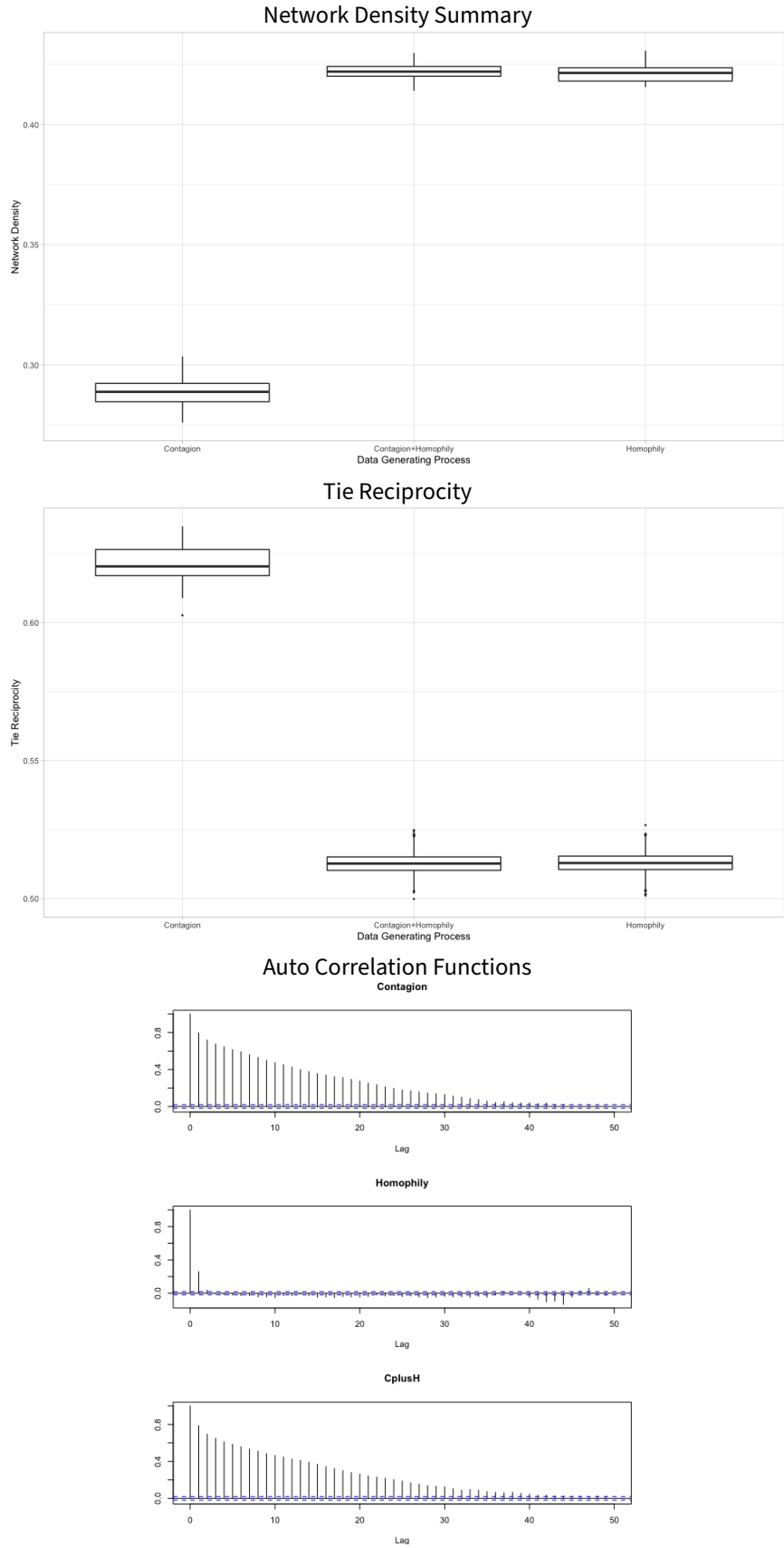

Figure 1. The above plots indicate the network density, tie reciprocity and the ACF of data produced from the different data generating processes.

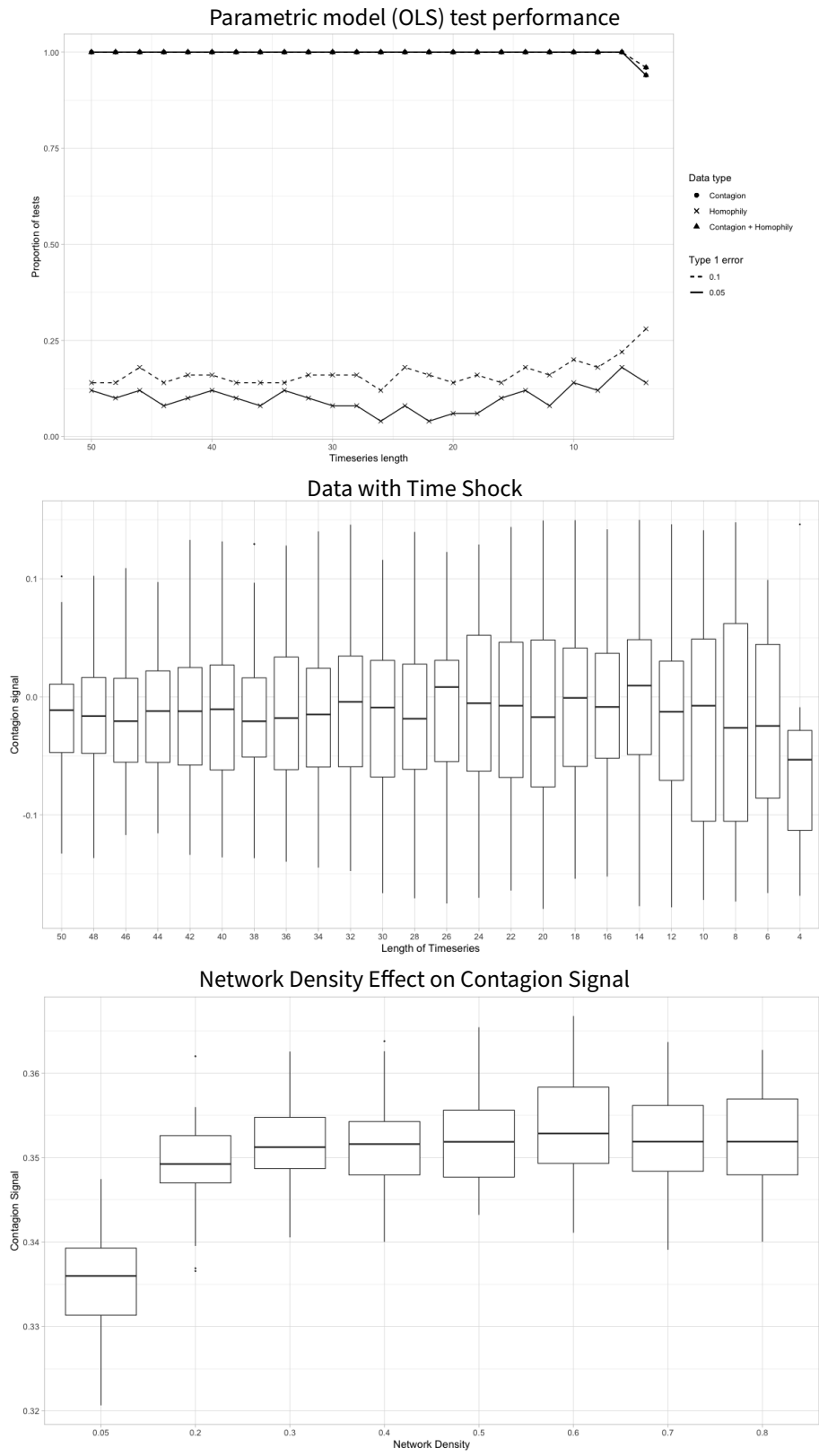

Figure 2. The first plot summarizes power and type-1 error of the OLS estimator of the true model. The second plot gives the contagion signal distribution for simulated data with a time shock. The last plot shows the effect of different network densities on contagion signal detection. At each density, 50 networks were simulated with a time series length of 50.

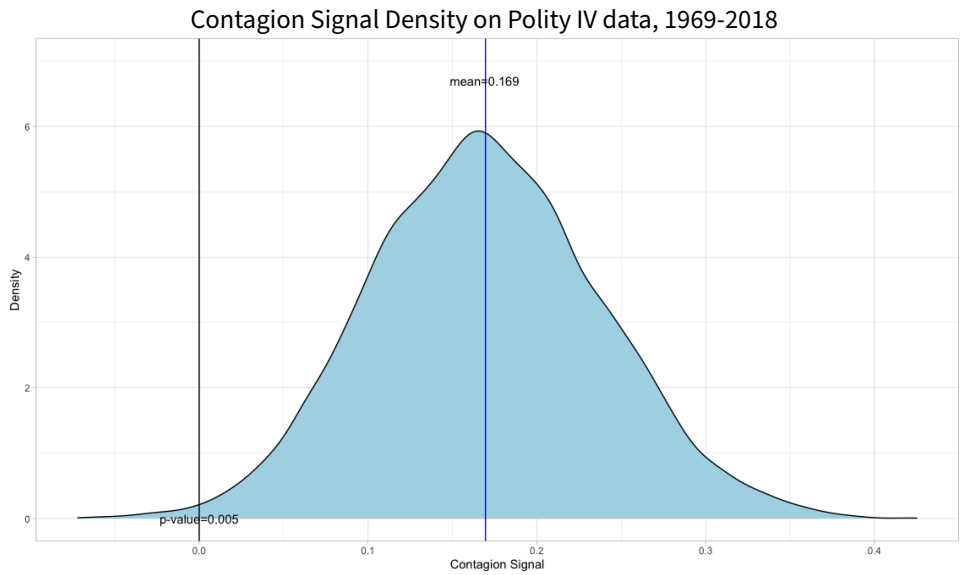

Figure 3. Kernel density of the contagion signal from a single Shalizi Thomas test, conducted on the differenced series of 50 years of the Polity IV data. The data comprises of 118 countries.