

# PLSC 504: “Topics in Political Methodology”

## Exercise Four

September 27, 2023

### Part I

Clive Granger won a “Nobel” Prize in economics in part because of his work on time series. In 1974, building on work by French economist Edmond Malinvaud (1966), Granger and his coauthor Paul Newbold derived the idea of “[spurious regressions](#)”: the phenomenon whereby, because integrated series have a tendency to “wander,” it is often the case that a regression of one on the other will appear to yield significant results, even if the two series are in fact completely independent.

Your task in Part I is to discuss the properties of fitting an OLS regression two unrelated I(1) series. You will do this via simulation. More specifically:

1. Generate two independent I(1) series (say,  $Y$  and  $X$ ),
2. Regress  $Y$  on  $X$ :

$$Y_t = \beta_0 + \beta_1 X_t + u_t$$

3. Record (a) the  $t$ -statistic and associated  $P$ -value for the estimated slope  $\hat{\beta}$ , (b) the  $R^2$  statistic for the regression, and (c) the Durbin-Watson  $\hat{d}$  statistic for first-order residual autocorrelation for that regression.
4. Repeat (1) - (3) many times, and display and discuss the distribution of these three statistics and what they suggest about the regressions of  $Y$  on  $X$ . Finally,
5. Vary  $T$  (the length of the two series) systematically, and repeat steps (1) - (4) for varying values of  $T$ .<sup>1</sup> Discuss how the distributions of  $ts$ ,  $P$ -values,  $R^2$ s, and  $\hat{d}$ s vary as the length of the series grows, and how this compares to what we would normally expect for two variables which are statistically independent of each other.

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<sup>1</sup>Consider starting with a value of  $T$  that would be considered very “short” for a time-series analysis (say,  $T = 25$ ) and increasing it to a very long series (perhaps  $T = 2000$ ). Note that it is usually a good idea to increase sample sizes in simulations geometrically rather than linearly.

## Part II

Beginning at least with Songer and Sheehan (1989), researchers have endeavored to verify empirically Mr. Dooley's famous quote that "th' Supreme Court follows th' iliction returns." The basic idea – going back at least to Dahl's work in the 1950s, but arguably to the Federalist Papers as well – is that, because members of the Court are appointed by the president and confirmed by the Senate, their political preferences (and, consequently, their decisions) will never stay too far out of line with those of the elected branches (and, therefore, the public).<sup>2</sup>

Here I'll ask you to add to those earlier efforts, using time series data. The main variable of interest is the percentage of decisions handed down in each October term of the U.S. Supreme Court which ruled in a conventionally left/liberal direction.<sup>3</sup> The main (sole) predictor is Jim Stimson's annual measure of [policy mood](#). In both instances, higher values indicate greater liberalism on the indicator. Both series are available annually, from 1952-2020; those data are available on the course [github repository](#).

Your assignment is to assess whether and to what extent the two series (Supreme Court liberalism and public mood) are related, in both the short- and long-term. In doing so, use the approaches and methods we discussed in class.

This assignment is due *electronically*, as a *PDF file*, at 11:59 p.m. EST on Thursday, October 5, 2023; you can submit your homework by emailing copies **both** to Dr. Zorn ([zorn@psu.edu](mailto:zorn@psu.edu)) and Mr. Morse ([nam@psu.edu](mailto:nam@psu.edu)). This assignment is worth 50 possible points.

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<sup>2</sup>This being 2023, we have recently seen a few particularly egregious violations of this general principle. We cannot, apparently, have nice things.

<sup>3</sup>Details can be found at the Supreme Court Database [website](#).