
Testing for Fractional Cointegration: The Relationship between Government Popularity and Economic Performance in the UK^{*}

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Summary. This paper investigates the relationship between the quarterly opinion poll lead of UK governments over the period 1955-1996, and a set of economic indicators. The hypothesis of a causal link between these variables is often debated, but there is a difficulty in testing the link by conventional econometric methods. These require either stationarity or the I(1) property, but there is strong evidence from a number of different studies that opinion poll series are fractionally integrated, being nonstationary but also mean-reverting.

This paper tests the hypothesis of fractional cointegration using bootstrap methods. It first discusses the problem of defining a cointegrating relationship between series that may not have the same order of integration, and suggests a generalized cointegration model that might account for this case. Bootstrap tests of the regular and generalized (non-)cointegration hypotheses are performed, as well as tests of the null hypothesis that cointegration of either type exists. Both the regular and double bootstrap statistics are calculated, the latter method providing a correction to the finite sample size distortion to the estimation of unknown parameters.

The tests reveal little or no evidence of a link between the political and economic cycles, a conclusion that reinforces the results of earlier work suggesting that the political cycle is generated by the internal dynamics of the opinion formation process. The findings are reinforced by a case-specific Monte Carlo study, showing that the methods have ample power to reveal cointegrating relations, if they exist.

1 Introduction

A substantial literature has accumulated over recent decades, seeking theoretical and econometric links between economic conditions and the popularity of governments. Leading contributions include Goodhart and Bhansali [17], Nordhaus [28], Frey and Schneider [16], Pissarides [29], Minford and Peel [26], Holden and Peel [20], Rogoff and Sibert [30]. The evidence from econometric studies, treating this as a conventional time series modelling problem, has been at best equivocal. For example, Pissarides [29] uses the time series techniques suggested by Davidson et. al. [12] and finds some nominally significant correlation between government popularity

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and economic indicators (growth, inflation, unemployment, the exchange rate and tax rate). However, his equation does not have much predictive power. While plenty of anecdotal evidence can be cited in support of either view, whether government popularity follows the economic cycle remains an unresolved question.

More recent research has found that for a wide range of countries and democratic political systems, party support is a fractionally integrated process. See for example Byers, Davidson and Peel [6, 7, 8], Box-Steffensmeier and Smith [4] and Dolado, Gonzalo and Mayoral [13]. Byers et al. [6], henceforth referred to as BDP, show that for the UK, the monthly Gallup series for Conservative and Labour support can be well modelled as ARFIMA(0, d ,0) with d around 0.75. In other words, the series is covariance nonstationary, but also not a random walk, tending to return from excursions away from the median². In their paper, BDP propose a model to account for these findings based on the aggregation of heterogeneous poll responses, appealing to a well-known result of Granger [18]. The model accounts for the magnitude and duration of swings in aggregate opinion as due to the particular mix of committed and floating voters in the population. The innovations in the process are assumed to be news, of both the economic and non-economic variety. The BDP model therefore accounts for the cyclical behaviour of opinion by the internal dynamics of the aggregate opinion-formation process.

This explanation contradicts the view that swings in support follow economic indicators over the cycle. BDP explain this finding by noting that opinion polls aggregate the heterogeneous opinions of voters who perceive economic circumstances differently, so that issues on whose significance voters are divided, even if important, may have little effect on support. Thus, borrowers and depositors take a different view of the interest and inflation rates. Likewise, the unemployment rate can mean different things to different people, witness the so-called ‘North-South divide’ and the contrasting fortunes of manufacturing and service industries, in the UK.

However, a formal test of the relationship remains wanting. Two statistical approaches to testing for time series relationships are in common use, the correlation approach and the cointegration approach. Neither of these is valid when the data in question are fractionally integrated. Since the party support series are nonstationary, ordinary tests of significance are subject to the well-known ‘spurious correlation’ critique. On the other hand, cointegration analysis relies on tabulations of the distribution of certain functionals of Brownian motion, and accordingly are based on the assumption that the time series have variances diverging at the rate n . In the case of a fractionally integrated or $I(d)$ process ($d > 1/2$) this rate is n^{2d-1} , and the limit processes are not Brownian motion but fractional Brownian motion. The Brownian

²Since support measures are confined to the unit interval, the random walk is not, of course, a feasible model of the raw data. BDP model the series for $\log[\bar{X}_t/(1 - \bar{X}_t)]$ where $100\bar{X}_t$ is the sample average support. Since this process is defined on $(-\infty, +\infty)$ a random walk is a logically feasible representation. This would be manifested in the raw data by a tendency for support to cluster near either 100% or 0%, a phenomenon not commonly observed in democratic countries. In practice, note that the range of variation of the \bar{X}_t series is such that the logistic transformation is nearly linear, and the same model explains either series equally well.