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# **FRACTIONAL INTEGRATION AND THE PERSISTENCE OF UK INFLATION, 1210-2016**

**Guglielmo Maria Caporale,  
Brunel University London, CESifo and DIW Berlin**

**Luis Alberiko Gil-Alana  
University of Navarra**

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## **Abstract**

This note examines the degree of persistence of UK inflation by applying fractional integration methods to historical data spanning the period 1210-2016; the chosen approach is more general than the popular ARMA models based on the classical I(0) vs. I(1) dichotomy. The full-sample results do not suggest that UK inflation is a persistent process; however, the recursive analysis indicates an increase in the degree of persistence in the 16th century, and more recently after WWI and in the last quarter of the 20th century. On the whole, monetary and exchange rate regime changes do not appear to have had a significant impact on the stochastic behaviour of inflation if one takes a long-run, historical perspective.

**JEL Classification:** C14, C22, E31

**Keywords:** UK inflation; persistence; fractional integration

**Corresponding author:** Professor Guglielmo Maria Caporale, Department of Economics and Finance, Brunel University London, UB8 3PH, UK. Tel.: +44 (0)1895 266713. Fax: +44 (0)1895 269770. Email: [Guglielmo-Maria.Caporale@brunel.ac.uk](mailto:Guglielmo-Maria.Caporale@brunel.ac.uk)

## **1. Introduction**

Inflation persistence is an important issue for both academics and central banks. The former are interested in understanding whether or not it can be deemed to be structural



### **3. Data and Empirical Results**

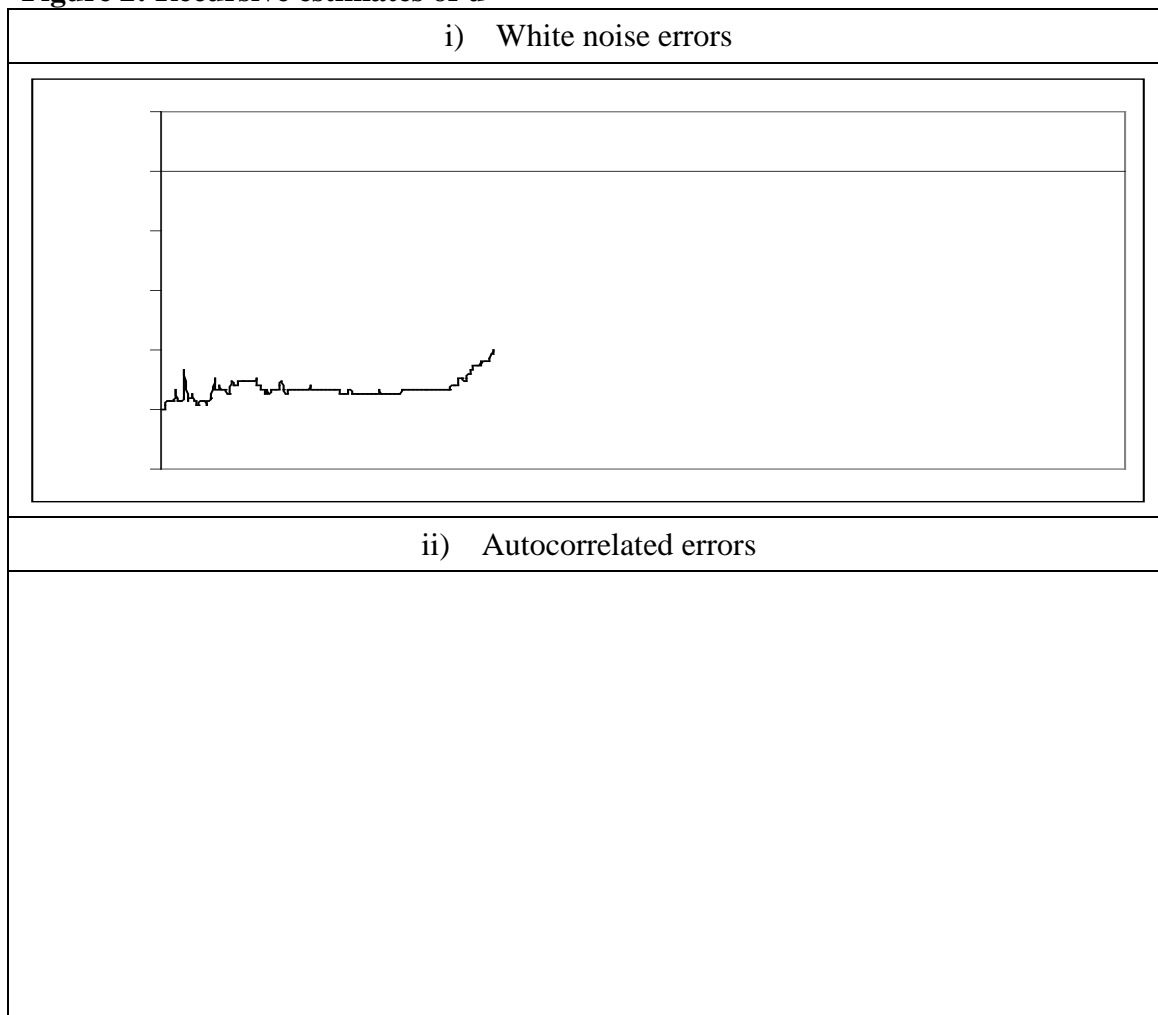
The series

the data, therefore more weight should be given to the white noise results, which suggest that over the sample as a whole UK inflation cannot be characterised as a persistent process. In terms of the price level, the implication of these results is that the I(1) hypothesis cannot be rejected with white noise residuals, whereas it is rejected in favour of mean reversion (I(d) with  $d < 1$ ) with autocorrelated ones. Table 2 reports the other estimated coefficients.

**Table 1: Estimates of d for the UK inflation rate**

century (1551), which is more marked with autocorrelated disturbances; further slight increases can be observed around 1917 and 1975; persistence then remains stable.

**Figure 2: Recursive estimates of d**



The red lines are the estimates of d while the black ones represent the 95% confidence intervals.

#### 4. Conclusions

This note has provided new evidence on the degree of persistence of UK inflation by applying long-memory methods to analyse a much longer span of data than in previous studies, more specifically the period going from 1210 to 2016. The approach used is preferable to the standard ARMA framework based on the classical dichotomy between the  $I(0)$  nonstationary and  $I(1)$  stationary cases, since it allows the differencing parameter to take fractional values and thus captures a much wider range of stochastic

behaviours. In addition, the classical methods have very low power if the alternatives are in fact fractional.

The full-sample results do not suggest that UK inflation is a persistent process; however, the recursive analysis indicates an increase in the degree of persistence in the 16th century, and more recently after WWI and in the last quarter of the 20th century. The evidence for the latter part of the sample is consistent with the findings of Caporale et al. (2018), who had also reported that the main change in the behaviour of persistence in recent times had occurred after WWI. On the whole, monetary and



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