Journal of Applied Economics. Vol XIV, No. 2 (November 2011), 269-296

ON THE NONLINEAR CAUSALITY BETWEEN INFLATION AND INFLATION UNCERTAINTY IN THE G3 COUNTRIES

Mehmet Balcilar
Eastern Mediterranean University

Zeynel Abidin Ozdemir
Gazi University

Esin Cakan*
University of New Haven

Submitted August 2010; accepted July 2011

This study examines the dynamic relationship between monthly inflation and inflation uncertainty in Japan, the US and the UK by employing linear and nonlinear Granger causality tests for the 1957:01-2006:10 period. Using a generalised autoregressive conditional heteroskedasticity (GARCH) model to generate a measure of inflation uncertainty, the empirical evidence from the linear and nonlinear Granger causality tests indicate a bi-directional causality between the series. The estimates from both the linear vector autoregressive (VAR) and nonparametric regression models show that higher inflation rates lead to greater inflation uncertainty for all countries as predicted by Friedman (1977). Although VAR estimates imply no significant impact, except for Japan, nonparametric estimates show that inflation uncertainty raises average inflation in all countries, as suggested by Cukierman and Meltzer (1986). Thus, inflation and inflation uncertainty have a positive predictive content for each other, supporting the Friedman and Cukierman-Meltzer hypotheses, respectively.

JEL classification codes: C22, E31
Key words: inflation, inflation uncertainty, Granger-causality, nonlinear Granger-causality

---

* Esin Cakan (corresponding author): Department of Economics and Finance, University of New Haven, 300 Boston Post Road, West Haven, CT 06516, phone: (203)-932 7496, fax: (203)-931 6076, email: ecakan@newhaven.edu. Zeynel Abidin Ozdemir: Department of Economics, Gazi University, Besevler, 06500, Ankara, Turkey, e-mail: zabidin@gazi.edu.tr. Mehmet Balcilar: Department of Economics, Eastern Mediterranean University, Famagusta, Turkish Republic of Northern Cyprus, via Mersin 10, Turkey, e-mail: mehmet.balcilar@emu.edu.tr.

I. Introduction

The link between inflation and inflation uncertainty is an important indicator in determining monetary policy for the monetary authority. Researchers generally agree that the welfare cost of inflation is highest when the future inflation rate is unpredictable. Friedman's (1977) Nobel lecture outlined the most well known argument on inflation and its cost to welfare, suggesting that an increase in average inflation would raise nominal uncertainty about future inflation, which might cause an adverse output effect. Ball (1992) formally justifies Friedman's well-known insight by employing a game of asymmetric information. Contrary to Friedman (1977) and Ball (1992), Ungar and Zilberfarb (1993) establish that inflation gives rise to a lower level of uncertainty using a model in which agents invest more resources in forecasting inflation as inflation rises, leading to lower nominal uncertainty.

These researchers do not present the only argument in the literature. Cukierman and Meltzer (1986) proposed a model to explain credibility, ambiguity, and inflation with asymmetric information. According to their argument, in the presence of higher inflation uncertainty, central banks tend to create inflation surprises to realise real economic gain. In other words, Cukierman and Meltzer conclude that inflation and inflation uncertainty had positive correlation, and the direction of causality was from inflation uncertainty to inflation. However, the opportunistic response of the central banks is not the only possible outcome, depending on their independency. Holland (1995) argues that more inflation uncertainty could lead to a lower average inflation rate if the central bank minimizes the welfare losses arising from more inflation uncertainty, which is the opposite of Cukierman and Meltzer's hypothesis. This would produce the stabilization motive of the monetary authority, the so-called "stabilizing Fed hypothesis". Holland claims that, as inflation uncertainty rises due to increasing inflation, the monetary authority responds by contracting money supply growth to eliminate inflation-uncertainty and the associated negative welfare effects. Therefore, a rise in inflation uncertainty will cause a fall in average inflation.

Though they differ in the direction of causality, both Friedman's and Cukierman and Meltzer's hypotheses suggest a positive relationship between inflation and inflation uncertainty. Ungar and Zilberfarb (1993) and Holland (1995), with different directions of causality, support instead a negative relationship.

There are contradictory results in the empirical literature. Engle (1982) introduced autoregressive conditional heteroskedasticity (ARCH), and Bollerslev (1986) created