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An empirical investigation of price and exchange rate bubbles during the interwar European hyperinflations

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Abstract

This study attempts to test for the presence of price and exchange rate bubbles during the interwar European hyperinflations of Germany, Hungary, and Poland. We suggest a testing methodology, which extends the Durlauf–Hooker approach, for conducting this empirical study. Exact Cagan hyperinflation models under rational expectations are rejected and evidence of neither price nor exchange rate bubbles can be found for the three countries examined.

JEL classification: C13; C32; E3
Keywords: Hyperinflation; Bubbles; Model misspecification; Fully modified method

1. Introduction

The existence of speculative bubbles has been an issue of long-standing debate. Many studies have applied Cagan's (1956) model to test for evidence of price bubbles during hyperinflation. This problem has probably attracted so much attention because it has far-reaching policy implications. In particular, the choice of an appropriate policy to deal with hyperinflation may very much depend on the true nature of the underlying inflation. If rational bubbles are not present, then it is only necessary to take control of the market fundamentals. If, however, inflation is being driven by a bubble phenomenon, then positive

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action is needed to shock expectations from the bubble path. Unfortunately, most previous studies assume the validity of the Cagan model as given and interpret deviations from the market fundamental solution as evidence of bubbles. This is undesirable because these deviations may be caused by model misspecification. Therefore, it is necessary to separate the test of the model specification from the test for the presence of bubbles. Recently, Durlauf and Hooker (1994) and Hooker (2000) have developed a new testing methodology that relies upon the orthogonality properties of the flow and stock variables in order to achieve this objective.[1] The Durlauf–Hooker approach has additional advantages over the parametric and nonparametric approaches commonly used in the literature. For example, their approach can extract the model noises of any linear and nonlinear stochastic processes that are correlated with information sets. As a result, their method can be employed to test for periodically collapsing bubbles (Evans, 1991) and stochastic explosive bubbles (Charemza & Deadman, 1995, 1997), which are difficult to identify using integration and cointegration methods (see Chen, 1995, 1999; Hooker, 2000).

The purpose of this paper is to test for the presence of misspecification and bubbles in Cagan's model using data from the interwar European hyperinflations of Germany, Hungary, and Poland.[2] Our analysis modifies and extends the Durlauf–Hooker framework in the following areas. Firstly, in contrast to Durlauf and Hooker (1994) and Hooker (2000), we decide not to impose any restrictive and arbitrary assumptions on the parametric process of the money demand disturbance of the Cagan model on the grounds that these assumptions may not be made correctly. Instead, we propose to use the exact version of the Cagan model for conducting our analysis. The advantage of using the exact Cagan model is that any deviations from the model, including the nonzero demand disturbance of any parametric process, will be captured by the model misspecification term. It, therefore, obviates the need to impose any assumptions on the unobservable demand disturbance. Secondly, in the Durlauf–Hooker framework, if both the flow and stock orthogonality conditions are rejected, it implies that model misspecification is likely to occur. However, as suggested by Durlauf and Hooker, further analysis is required to determine if a bubble exists. In view of this limitation, we suggest a testing methodology that extends the original Durlauf–Hooker approach with the aim of helping to detect the presence of bubbles in a more rigorous manner when evidence of specification error is found. Thirdly, we adopt the fully modified (FM) econometric techniques to allow for nonstationary components of estimators. The purpose of using the FM method is to make semiparametric correction for the endogeneity and serial correlation bias, caused by nonstationarity of variables in the limit distribution of the FM estimators (Phillips & Hansen, 1990). As we use the FM method in the present study, FM inferential statistics have to be used for conducting hypothesis testing. However, since the sample sizes for all three hyperinflation episodes are not large, we follow

[1] Chen (1995, 1996), applied this approach to test for model misspecification and bubbles in the US stock market and in Taiwan's foreign exchange market, respectively.

[2] We exclude Austria in our case study because its sample size is too small for the kind of semiparametric estimation that we use in the present analysis.