Does a flexible exchange rate regime increase inflation persistence?

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A R T I C L E   I N F O

A B S T R A C T

A dynamic panel model with country and regime-specific smooth shifts in mean is applied to examine the impacts of exchange rate regimes on inflation persistence. We provide robust support for higher inflation persistence under floating rates than under pegged rates. However, the impacts of the exchange rate regime on relative inflation persistence is ambiguous. The neutrality of exchange rate regimes to inflation persistence tends to be observed if smooth shifts in mean are not controlled. Failure to control for contemporaneous correlation of disturbances and smooth shifts in mean overestimates inflation persistence.

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1. Introduction

Is inflation persistence an inherent structural characteristic of industrial countries? Does the exchange rate regime matter for monetary authorities reacting to inflation shocks and the persistence of these shocks? Applying data for 23 industrial countries over 1957Q1 to 2016Q4, several interesting results regarding the association between inflation persistence and exchange rate regimes are observed. First, after controlling for regime-specific smooth changes in mean due to shocks unrelated to regimes, inflation is more persistent (positively serially correlated) under floating rates than under pegged rates. This finding is not due to many other factors affecting inflation persistence, and it questions the notion that inflation is intrinsically persistent. Besides, our results are robust to the control for energy and financial crises, to data frequencies, to distinct lag selection criteria, to different selection of regimes, to the allowance of the trend behaviors of inflation rates, to the consideration of extrinsic persistence arising from output gaps, and to the possible endogeneity of *de facto* exchange rate regime classifications. Second, we find ambiguous effects of the exchange rate regime on relative inflation persistence.[2] Third, the

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neutrality of exchange rate regimes to inflation persistence tends to be observed if smooth shifts in mean are not controlled. Fourth, failure to control for contemporaneous correlation of disturbances and smooth shifts in mean overestimates inflation persistence. These results are new in literature and support the theoretical findings of Alogoskoufis and Smith (1991), Alogoskoufis (1992), Obstfeld (1995) and Kool and Lammertsma (2000).

Our empirical approach improves upon the existing literature in several important ways. First, the conventional strategy adopts a first-order autoregressive model with a constant slope coefficient and allows for an abrupt change in mean resulting from shocks unrelated to regimes (Burdekin and Siklos, 1999; Bleaney, 2001). However, we argue that shocks unrelated to regimes cause smooth rather than abrupt changes in mean. These temporary changes in mean may be difficult to detect and model by using dummy variables since the number of changes and the form of changes are unknown. Failure to consider these temporary changes in mean results in biased estimates of slope coefficients and inflation persistence. Following Enders and Lee (2012), we apply a single-frequency Fourier function to model smooth shifts in mean, which is helpful especially when the number of changes and the form of changes are unknown. Furthermore, smooth shifts in mean and autoregressive coefficients are allowed to change across regimes. Hence, our model is general and nests models in the existing literature as special cases. In addition, our sample period over 1957–2016 is also the longest in related literature with panel data.

Second, several studies apply a dynamic panel model and estimate the model with the methods of pooled OLS or fixed effects estimators (Bleaney and Francisco, 2005a,b, 2007; Meller and Nautz, 2012; Toulaboe and Terry, 2013). None of the above mentioned literature consider the likely contemporaneous dependence of disturbances across individuals. To control for contemporaneous correlation of disturbances, we apply the common correlated effects pooled (CCEP) estimator of Pesaran (2006) to estimate the model. Standard panel estimators and the CCEP estimator are inconsistent in a dynamic panel model with contemporaneous dependence of disturbances even when the number of individuals in the panel tends to infinity (Phillips and Sul, 2007; Everaert and De Groote, 2016). We therefore apply the double bootstrap method of Kilian (1998) to correct the finite-sample bias of CCEP estimates.[3]

Third, most existing literature adopt a non-nested estimation, which suffers from two drawbacks. One is the efficiency loss in estimation when sample periods are short, and the other one is the difficulty of examining whether inflation persistence significantly differs between regimes. Instead, we adopt a nested model to avoid the previous two problems in estimation and statistical inference.

Fourth, many other factors reduce inflation persistence such as the adoption of inflation targeting (Benati, 2008),[4] the central bank's aggressive response to inflation (Clarida et al.,1998; Carlstrom et al., 2009) and the declined variability of technology shocks (Carlstrom et al., 2009). However, none of the existing literature, except for Wu and Wu (2017), attempt to examine whether the association between exchange rate regimes and inflation persistence is attributable to broader and more global changes in monetary conditions instead of exchange rate regimes. To investigate this issue, we apply the difference-in-differences (DID) approach and thoroughly examine its pre-condition: the parallel trend assumption, which is not examined in Wu and Wu (2017).

Finally, a typical measure of persistence in an autoregressive process is the sum of autoregressive coefficients (O'Reilly and Whelan, 2005). Instead, we use half-lives to measure persistence; they are widely applied in the literature related to the mean-reverting behavior of real exchange rates (Murray and Papell, 2002; Rogoff, 1996).[5] The half-life of inflation is calculated from the impulse response function (IRF) of shocks to inflation that is constructed based on bias-adjusted estimates. As indicated by Murray and Papell (2002), one should measure persistence based on the IRF when the lag order of an autoregressive model is greater than 1.

1.1. Literature review

Theoretically, if a country follows a more accommodating policy, it may take longer time for inflation shocks to die out, which leads to persistent inflation (Dornbusch, 1982; Alogoskoufis and Smith, 1991; Obstfeld,1995). This is because pegged exchange rate regimes confer less monetary independence on a country. Besides, pegged regimes generate a Peso problem causing a higher interest rate for the pegged-rate country than the foreign country (Krasker, 1980), and the tighter monetary conditions facilitate inflation adjustment. However, the monetary policy can be freely used to accommodate inflation under flexible exchange rate regimes, resulting in the persistence of inflation. Hence, inflation is more persistent in a country with floating rates than in a country with pegged rates.

Empirically, many articles focus on OECD countries with time series data and *de jure* regime classifications, and there is no general consensus on the above theoretical implication.[6] Alogoskoufis and Smith (1991) find support for the above theoretical

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[3] The estimator proposed by Kilian (1998) is a mean-unbiased estimator, and hence our bias adjusted estimates are mean-unbiased estimates. An alternative estimator provided by Andrews (1993) is called the median unbiased estimator. As discussed in Murray and Papell (2002), Kilian's mean-unbiased estimator yields results comparable to those using the median-unbiased method. Both appear to be effective at reducing the bias in impulse response estimates.

[4] Benati (2008) finds that inflation persistence has declined for UK, CAN and AUT, countries that have adopted an inflation targeting regime.

[5] A half-life is the time required for the impact of inflation to fall to half of its initial impact. It clearly indicates the time needed for inflation to revert to its mean after a shock.

[6] There are also several papers that investigate the impact of different exchange rate regimes on inflation and find that various forms of fixed exchange rates indeed lower inflation (Ghosh et al., 1996, 2000; Bleaney, 1999; Bleaney and Francisco, 2005a, 2007).