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Monetary policy rules in emerging countries: Is there an augmented nonlinear taylor rule? ☆

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ABSTRACT

This paper examines the Taylor rule in five emerging economies, namely Indonesia, Israel, South Korea, Thailand, and Turkey. In particular, it investigates whether monetary policy in these countries can be more accurately described by (i) an augmented rule including the exchange rate, as well as (ii) a nonlinear threshold specification (estimated using GMM), instead of a baseline linear rule. The results suggest that the reaction of monetary authorities to deviations from target of either the inflation or the output gap differs in terms of the size and/or statistical significance of the coefficients in the high and low inflation regimes in all countries. In particular, the exchange rate has an impact in the former but not in the latter regime. Overall, an augmented nonlinear Taylor rule appears to capture more accurately the behaviour of monetary authorities in these countries.

1. Introduction

The low level of inflation achieved in recent decades in the developed world is often seen as the result of the adoption of policy rules by independent central banks. Taylor (1993) showed how monetary policy in the US during the 1980s and the early 1990s could indeed be described in terms of a clearly specified rule. Later studies (e.g., Clarida et al., 1998; Svensson, 1999; Taylor, 1999; Ball, 2000; Shortland and Stasavage, 2004; Ghatak and Moore, 2011) extended the original linear Taylor rule and emphasised possible nonlinearities in the reaction function of central banks (e.g., Taylor and Davradakis, 2006; Martin and Milas, 2013; Caglayan et al., 2016). These can arise either from nonlinear macroeconomic relationships (see Robert-Nobay and Peel, 2003; Dolado et al., 2005, among others) or from asymmetric preferences or objectives of policymakers (see Favero et al., 2000; Taylor and Davradakis, 2006; Surico, 2007; Cukierman and Muscatelli, 2008; Castro, 2011; Martin and Milas, 2004, 2013; Ahmad, 2016).

Several recent empirical studies have provided evidence of

nonlinearities and threshold effects in the reaction of monetary authorities to inflation and output gaps (see Favero et al., 2000; Taylor and Davradakis, 2006; Surico, 2007; Cukierman and Muscatelli, 2008; Castro, 2011; Martin and Milas, 2004, 2013; Ahmad, 2016, among others). However, only a few papers have addressed this issue in the case of developing and emerging economies (see Hasanov and Omay, 2008; Akyürek et al., 2011; Miles and Schreyer, 2012; Akdoğan, 2015; Holtemöller and Mallick, 2016).

The present study aims to fill this gap in the literature by estimating a threshold nonlinear Taylor rule in five inflation targeting (IT) emerging countries (Indonesia, Israel, Korea, Thailand, and Turkey); moreover, an augmented rule including the exchange rate is considered. Markov regime switching models have often been estimated to capture nonlinearities in monetary policy rules (Bae et al., 2012; Murray et al., 2015; Gonzalez-Astudillo, 2014). However, these have been criticised for not allowing a smooth transition between regimes (Castro, 2011), unlike Threshold Autoregressive (TAR) and Smooth Transition Autoregressive (STAR) models in which the regime change is driven by past values of the

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variables in the sample (Tong, 1990; Akdoğan, 2015).

Therefore in this paper we estimate a TAR specification which is ideally suited to capturing asymmetries in the behaviour of monetary policy authorities, unlike Markov regime switching models that treat regime changes as exogenous (since they are driven by an unobservable state variable - Atanasova, 2003; Balke, 2000; Castro, 2011). Moreover, this model allows to estimate the optimal threshold value of inflation in each country. The estimation method is the generalised method of moments (GMM), which has the advantage of taking into account the possible correlation between the regressors and the error term that could give rise to endogeneity problems.

The layout of the paper is as follows. Section 2 reviews the literature on the Taylor rule. Section 3 outlines the econometric model and discusses the data. Section 4 presents the empirical results. Section 5 offers some concluding remarks.

2. Literature review

Since the 1990s, several central banks around the world have adopted an inflation targeting framework (Bernanke and Mishkin, 1997). This is thought to have several advantages, namely: (1) to lead to more independent central banks; (2) to reduce inflation, making monetary policy more credible; (3) to decrease uncertainty about the expected level of inflation; and (4) to improve communication between policy-makers and the public, making monetary policy more transparent (Bernanke and Mishkin, 1997; Svensson, 2000; Gemayel et al., 2011). However, under this framework a lower inflation rate might be achieved at the cost of lower output and higher unemployment in comparison to other monetary regimes (Bernanke and Mishkin, 1997).

Taylor (1993, 1999) argued that the monetary policy of the Fed can broadly be described by an interest rate rule based on the deviations of output and inflation from target (see also Orphanides, 2002). The adoption of such a rule appears to have had a significant impact on economic performance in the US (Bernanke, 2004; Siegfried, 2010; Taylor, 2013a). Clarida et al. (1998) investigated the so-called Taylor rule in two sets of countries, i.e., the G3 (Germany, Japan and the USA) and the E3 (UK, France and Italy). They found that monetary authorities in the G3 adjusted the real interest rate in response to inflationary pressures following a forward-looking rather than a backward-looking rule, whilst in the E3 other central banks followed the German Bundesbank very closely. Gerlach and Schnabel (2000) concluded that monetary policy in the Economic and Monetary Union (EMU) area was well described by a Taylor rule, and Stuart (1996) reached the same conclusion for the UK. Côté et al. (2004) reported that none of their estimated seven simple Taylor rules for the Canadian economy was robust to model uncertainty.

Svensson (2003) argued that central banks should announce and follow a simple instrument rule (see also Judd and Rudebusch, 1998; McCallum, 1999; Taylor, 2000; Rudebusch, 2002). However, a number of papers have criticised the Taylor rule arguing that following it mechanically is undesirable (e.g., Ball, 2000; Svensson, 1999, 2003; McCallum and Nelson, 1999; Carlson, 2007; and Martin and Milas, 2013, among others). For example, the Federal Reserve cut the interest rate sharply during the stock market crash in 1987, the Asian crisis in 1997–98 (Carlson, 2007) and the recent global financial crisis. Similarly, the Bank of England reduced the interest rate from 5% in 2008 to 0.5% in March 2009 - the biggest cut since its creation in 1694 (Astley et al., 2009). Policy makers might need to adjust the rule when new information arrives (Taylor, 2000; Woodford, 2001). For instance, Martin and Milas (2013) pointed out that the Bank of England abandoned its monetary rule during the recent financial crisis with the aim of achieving financial stability. Taylor (2013b) suggested that deviations from the Taylor rule might be due to international spillovers.

Other issues raised in the literature include the accurate estimation of potential output (MacCallum and Nelson, 1999) and data uncertainty with real time as opposed to ex-post data (Orphanides and Van Norden,

2002; Hatipoglu and Alper, 2008). Under-forecasting or over-forecasting the output gap might lead to inappropriate policy actions (Orphanides, 2002). The Hodrick-Prescott (HP) filter is the most commonly used method because of its flexibility (Cerra and Saxena, 2000), but it has various disadvantages. The first is that the most recent observations suffer from a lack of accuracy (Shortland and Stasavage, 2004). The second is the possibility of misspecification of the underlying economic structure since the suggested values of the filter are specific to US data (Sarikaya et al., 2005). The third is the fact that output is more volatile in the case of the emerging economies; therefore, the estimation of trend output suffers from wider variation (Hatipoglu and Alper, 2008).

Another criticism of the baseline Taylor rule is that it does not allow the central bank to smooth interest rate movements (Goodfriend, 1991), whilst a smoothing parameter in the reaction function might be important to achieve credibility as well as to avoid any capital market disruption (McCallum, 1999; Levin et al., 1999 and Clarida et al., 2000, among others).

2.1. The augmented Taylor rule

The baseline Taylor rule might also be inappropriate for open economies subject to external shocks (Svensson, 2000, 2003); in this case it might be necessary instead to include other variables such as the exchange rate (see, Ball, 2000; Svensson, 2000, 2003; Obstfeld and Rogoff, 2000; Leitemo and Söderström, 2005; Ostry et al., 2012; Galimberti, and Moura, 2013, Ghosh et al., 2016, among others). Taylor (2001), Edwards (2007) and Mishkin (2007) conclude that this is in fact not required in the case of the developed economies; however, it might be in the emerging countries.

Ball (1999) had shown that following a monetary policy rule including the exchange rate instead of the original Taylor rule results in a lower variance of the consumer price index (CPI). Debelle (1999) also argued that the unpredictability of output and inflation is reduced in this way. Ball (1999) concluded that such an augmented rule was followed in Canada from 1975 to 2003, whilst Lubik and Schorfheide (2007) found that it was in the UK as well as Canada, but not in Australia and New Zealand. Moreover, Taylor (2000) argued that a flexible exchange rate combined with a policy rule based on inflation targeting is the only sound monetary policy for developing and emerging economies. A floating exchange regime was instrumental to achieving low and stable inflation in such countries according to Masson et al. (1997). However, this conventional wisdom is increasingly being questioned (Ghosh et al., 2016). The exchange rate pass-through can be significant and should also be considered (Svensson, 2000; Goldberg and Campa, 2010): it may force central banks targeting price stability to tighten their monetary policy, or lead to a competitiveness loss (Gagnon and Ihrig, 2004; Baily, 2003; Bailliu and Fujii, 2004; Ghosh et al., 2016).

In addition, Daude et al. (2016) pointed out that central banks in emerging markets with a flexible exchange rate regime frequently intervene in their foreign exchange market: they have an implicit comfort zone for smoothing exchange rate fluctuations, even if they do not specify an exchange rate target (see also Ghosh et al., 2016; de la Torre et al., 2013; Mohanty, 2013). Gali and Monacelli (2005), Adolfson et al. (2008), and Caglayan et al. (2016) also found that the behaviour of central banks is affected by exchange rate movements using dynamic stochastic general equilibrium (DSGE) models. Garcia et al. (2011) concluded that including the exchange rate in the linear Taylor rule does not provide any significant gain for developed countries, but it does in the case of emerging economies. Shortland and Stasavage (2004) showed that the central bank for West African Economic and Monetary Union (BCEAO) considered the foreign exchange position in addition to the inflation rate and the output gap in setting its monetary policy rule. Filosa (2001) also reported that central banks reacted strongly to exchange rate movements in Indonesia, Korea, Malaysia, Thailand, Brazil, Chile and Mexico. Further, Mallick and Sousa (2012) estimated a B-SVAR model including the exchange rate and found that the domestic currency

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