"Ex-ante" Taylor rules and expectation forming in emerging markets

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ABSTRACT

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The success of monetary policy in stabilizing inflation depends substantially on its influence on expectation formation of private agents. This paper provides a novel perspective on the expectation forming process of financial markets. Using forecasts for the short-term interest rate, the inflation rate, and output growth for 10 emerging markets in Latin-America, central and eastern Europe, we estimate expected ("ex-ante") Taylor-type rules. We find evidence for significant differences in the expectation formation process in the sense that the well-known Taylor principle fairly holds for only some countries, while for the other countries it does not. The adaption of an explicit inflation targeting regime seems to explain this cross-country differences. *Journal of Comparative Economics* **xxx** (xx) (2011) xxx–xxx. WHU – Otto Beisheim School of Management, Burgplatz 2, 56179 Vallendar, Germany; Center for EUropean Studies (CEUS), Burgplatz 2, 56179 Vallendar, Germany.
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1. Introduction

The past decades witnessed a worldwide reduction in inflation rates. In the 1980s Latin-American countries experienced the highest inflation rates of all countries averaging more than 200% per year. In contrast, in 2006 they had an average inflation rate of about 6%. A similar process of declining inflation rates took place in many central and eastern European countries during the 1990s. As a group, these countries reduced their inflation rates substantially from, on average, 45% per year in the 1990s down to, on average, 5% per year in 2007. This process of stabilizing inflation was achieved in individual countries under fairly different monetary and exchange rate regimes, ranging from the adoption of inflation targeting combined with floating exchange rates to the abandonment of independent monetary policy by introducing currency boards or even by dollarization of the economy.

While all stabilization strategies aim at increasing central bank credibility in order to stabilize inflation expectations and, thus, inflation itself, inflation targeting is the most prominent strategy. It is often argued that – in the first place – inflation targeting as well as monetary and exchange rate targeting regimes have important consequences for the expectation formation process which, in turn, leads to different economic performances. In order to influence inflation expectations central banks try to convince the public that they will fight inflation. Under inflation targeting regimes central banks use the announcement of an explicit inflation target to anchor inflation expectations. More general, central banks have become very transparent being open on issues of setting the policy rate. However, an intended "management of public inflation expectations" can only work if private sector beliefs are really influenced systematically by the chosen strategy and by the announcements of the particular central bank.

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This paper analyzes the public beliefs about interest rate setting of the central bank by examining the structure of the expectation formation process in financial markets. Since Taylor rules have become the prominent tool to describe central bank behavior, we evaluate the performance of a group of 10 emerging markets by the means of expected Taylor rules, i.e. "ex-ante" Taylor rules. We ask whether the internal relations of the forecasted variables (i.e., short-term interest rate, inflation and growth) can be described by Taylor rules.

The paper, thus, changes the perspective on interest rate rules away from the typical use in the academic literature as an ex-post reaction function for explaining central bank behavior. We use data from the Consensus Economic Forecast poll and examine whether "ex-ante" Taylor rules are present in the expectation formation process for emerging market variables. The data set includes Argentina, Brazil, Chile, Czech Republic, Hungary, Mexico, Poland, Slovakia, Turkey, and Venezuela. Since this country group includes inflation targeting countries as well as non-inflation targeting countries, we are also able to test whether the adoption of inflation targeting matters for our results.

To this end, this paper is structured as follows: The subsequent section briefly reviews the commonly applied empirical concept of Taylor-type rules which we use as the starting point of our analysis. Section 3 introduces the data set. Sections 4 and 5 present the empirical results. Subsequently, Section 6 studies the sample sub-group of inflation targeting countries in more detail by looking at the importance of the time-varying inflation target and the consistency issue. Finally, Section 7 concludes.

2. The empirical morphology of Taylor-type rules

All major central banks in industrial and emerging economies currently conduct monetary policy by using market-oriented instruments in order to influence the short-term interest rate. Since the seminal paper of Taylor (1993), it has virtually become a convention to describe the interest rate setting behavior of central banks in terms of monetary policy reaction functions. In its plain form, the so-called Taylor rule states that the short-term interest rate, i.e., the instrument of a central bank, reacts to deviations of inflation and output from their respective target levels. Although the Taylor rule started out as an empirical exercise, there is a clear theoretical link between optimal monetary policy and Taylor rules. Among others, Svensson (1997, 2003) showed that (contemporaneous and forward-looking) Taylor rules can be derived as the explicit solution of an optimal control problem within stylized macro models.

For the purpose of empirical exercises Clarida et al. (1998) propose a specific forward-looking variant of the Taylor rule which takes into account the pre-emptive nature of monetary policy as well as interest smoothing behavior of central banks. This particular type of reaction function has become very popular in applied empirical research. Although it is still in the spirit of the Taylor rule, specifications of this type represent a modification of the original Taylor rule and, thus, the literature often refers to them as Taylor-type rules. Following Clarida et al. (1998, 2000) and Taylor (1999) the baseline forward-looking policy rule takes the form:

$$i_t^* = \bar{i} + \alpha_1 E_t(\pi_{t+k} - \pi^*) + \alpha_2 E_t(y_{t+k} - y_{t+k}^*) \tag{1}$$

where i^* is the desired level of the nominal short-term interest rate, and $\bar{i}$ is its equilibrium level. The second term on the right-hand side is the expected deviation of the k-period ahead inflation rate (π) from the target rate (π^*) which is assumed to be constant over time.[1] The third term is the expected deviation of the k-period ahead level of output (y) from its natural level (y^*), i.e., the expected output gap $E(\hat{y}_t)$. The coefficients α_1 and α_2 which will be the center of our estimates represent the reaction coefficients.

The coefficient for the inflation gap α_1 is of particular importance. In order to act in a stabilizing manner it has to be greater than unity, which is referred to as the well-known *Taylor principle*. The central bank has to react with its nominal policy rate more than proportional than the underlying inflation shocks in order to increase to real interest rate. If the *Taylor principle* does not hold, the central bank reaction leads to a declining real interest rate in the case of rising inflation which clearly is at odds with stabilization efforts.[2]

The additional assumption of interest rate smoothing behavior implies that:

$$i_t = (1 - \rho)i_t^* + \rho i_{t-1} + v_t \tag{2}$$

with the parameter ρ representing the degree of interest rate smoothing (with $0 < \rho < 1$) and v_t represents an i.i.d. exogenous random shock to the interest rate. Combining Eqs. (1) and (2) leads to

$$i_t = (1 - \rho)(\bar{i} + \alpha_1 E_t(\pi_{t+k} - \pi^*) + \alpha_2 E_t(y_{t+k} - y_{t+k}^*)) + \rho i_{t-1} + v_t \tag{3}$$

Eq. (3) represents the econometric specification which is commonly used to describe central bank behavior.[3] It is reduced to the plain Taylor rule when ρ is zero and the horizon of the forward-looking behavior of the central bank, k, is also set equal to zero in econometric exercises.

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[1] In the subsequent analysis we allow the inflation target π^* to be time variant. This actually fits reality very well against the background that inflation targeting countries frequently announce inflation targets reflecting nothing else than the desired long-term inflation rate. As these countries are trying to decrease the perceived long-term inflation level they are announcing decreasing inflation targets.

[2] The Taylor principle, however, is a sufficient, but not a necessary condition for ruling out the existence of 'sunspot equilibria'. The necessary condition also includes the coefficient of the output gap.

[3] Since it contains expectations on the right-hand side that are not directly observable it is common to substitute them by the observed ex-post levels of the respective variables and rearrange the estimation equation into a form that contains the expectation errors of the central bank in the error term. This form is then estimated based on the General Methods of Moments.