Assessing Monetary Policy via the Taylor Rule in a Selection of Middle-Income Emerging Market Economies: Issues and Evidence

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ABSTRACT
Monetary policies have a history of changing over time as central banks seek frameworks that suit the current state of their economies. In this research, the objective was to re-examine the famous Taylor rule (augmented to include the exchange rate) and proceed to establish its validity in the wake of recent unconventional policy developments from the United States. The Taylor rule posits that interest rates respond to the deviation of inflation from a given target and the output gap. The study is limited to five emerging market economies namely Brazil, Chile, Mexico, South Africa, and Turkey which are all inflation targeting economies with quarterly data observed between 1998 and 2020. Overall, the variables exhibited a mixed order of integration which necessitated the use of the ARDL bounds testing procedure in the time series framework. The study also invoked the panel vector autoregression model with impulse response functions computed using the local projections method. The study observed two main results. First, there is evidence that interest rates respond to inflation dynamics and demand fluctuations both in the short-run and long-run in most of these countries as predicted by the Taylor rule. Second, there is evidence of a significant association between policy rates and the exchange rate.

KEYWORDS: Inflation Targeting, Interest Rate, Output Gap, Exchange Rate, Emerging Markets.

1. INTRODUCTION AND BACKGROUND

In recent years, it has become common to compare ex-post the actual setting of policy rates by central banks with what would have been predicted by the Taylor rule, first proposed in Taylor (1993). The rule suggested that interest rates would be changed according to the deviation of inflation from a target and an output gap. The empirical literature in the industrial country context has grown significantly during the past decade, providing evidence on the relevance of an interest rate rule and inflation targeting as tools for the analysis of the conduct of monetary policy. One of the main goals of most central banks is to stabilize the economy and reduce economic fluctuations. This includes a reduction in inflation volatility, output variation, and exchange rate volatility.

The volatility of interest rates is of prime importance to monetary authorities, financial institutions, policymakers, and journalists since interest rates have such a central position in economic theories, models, and systems. Bond and foreign exchange market participants are also particularly concerned about the future evolution and variability of interest rates since volatility is a protagonist in the pricing, hedging, and risk management of financial instruments involving interest rates (Markellosa and Psychoyios, 2017).

Many central banks responded initially to the 2008–09 global financial crisis by sharply reducing policy interest rates. When this failed to bring about the hope for recovery in nominal spending, several of them, especially the US Federal Reserve and European Union (EU) Central Bank, experimented with Unconventional Monetary Policies. These included large-scale asset purchases to raise asset prices and increase the supply of bank reserves, targeted asset purchases to alter the relative prices of different assets, and continuous guidance to the public as to the future policy interest rate path. Though the empirical evidence is mixed, it is probably fair to state that the impact of these policies on nominal spending was disappointing, which led many central banks to consider further policy measures such as implementing the inflation targeting policy (Jobst and Lin, 2016).

Inflation targeting policy expresses quantitative inflation target and strong central bank legitimate duties to the transparency, accountability, and credibility of price stability when implementing monetary policies. The primary contention hidden in this idea is that an official announcement of an inflation target improves a central bank's credibility and helps to lower inflation and the volatilities of inflation and real output. In addition to general IT effects, it is equally interesting to understand some of the mechanisms and subtleties at play. For example, Fatás *et al*. (2007) concluded that while IT may have an advantage over alternative policy frameworks, it is the quantitative objective of monetary policy that provides the greatest benefits; so, did Batini and Laxton (2007), who argue that many EMEs (Emerging market economies) have successfully controlled inflation even though they had not met all the preconditions for adopting this policy, such as institutional independence. They conducted a survey among central bankers, which concluded that no IT central bank had met all the preconditions that were generally considered crucial for the success of the policy. They, therefore, concluded that it is not a question of institutional improvements leading to IT success, but of IT enabling institutional and technical improvements. Similarly, the results of Alpanda and Honig (2014) show that, given the role of central bank independence, IT in the EMEs leads to lower inflation; the more effective the policy is, the lower the degree of independence.

In the existing literature, a gap exists; most researchers have concentrated their studies on either individual countries (e.g., Castro, 2010; Boamah, 2012; Modenesi and Araújo, 2013; Ilbas and Røisland, 2013), regional-based experiences (e.g., Mohanty and Klau, 2004; Labonte, 2012; Posch *et al.*, 2018). Regarding emerging market economies, there has been limited research (e.g.,Devereux *et al*.,2006; Caporale *et al*., 2018; Aoki *et al*., 2019) on cross-sectional and regional economies, noting that much research has been carried out in the last 25 years for the Organization for Economic Co-operation and Development countries, this research will focus on emerging markets and whether interest rate settings are uniquely consistent with some of the countries or share a common feature of the conduct of monetary policy in emerging economies. It is often an argument that the exchange rate is important for middle-income emerging market economies' central banks.

The USA introduced a monetary policy known as Quantitative Easing (QE) which had a great impact on EMEs, for example, Mishra *et al*. (2014) found evidence of markets differentiating across emerging market countries around volatile episodes. Countries with stronger macroeconomic fundamentals, deeper financial markets, and a tighter macroprudential policy stance in the run-up to the tapering announcements experienced smaller currency depreciation and smaller increases in government bond yields. At the same time, there was less differentiation in the behavior of stock prices based on fundamentals suggesting that those markets having strong ties with China are not heavily affected by the economic downturn. Capital account openness initially played a role as well but diminished in importance in subsequent tapering and QE announcements. Bhattarai *et al*. (2018) investigated the United States (US) spillovers and their findings suggested that an expansionary US QE shock had significant effects on financial variables in EMEs. It led to an exchange rate appreciation, a reduction in long-term bond yields, a stock market boom, and an increase in capital inflows to these countries. These effects on financial variables are stronger for the fragile EME countries compared to other EMEs. For these various effects, this research seeks to re-visit the investigation of Mohanty and Klau (2004) in the light of the developments post-Global Credit Crunch.

Adopting the study by Mohanty and Klau (2004), the purpose of this study is to obtain some preliminary evidence about interest rate setting behavior in a selection of middle-income emerging market economies, the study will briefly analyze the conduct of the Taylor rule monetary policy and the potential variables in a typical central bank reaction function. The study will provide empirical evidence on interest rate setting behavior using a Taylor rule approach for each country in the sample (Brazil, Chile, Mexico, South Africa, and Turkey) using data from the Pre-QE and IT regime and during QE and IT regime (1998–2020). A panel data Taylor rule estimation will be used (Quantitative easing as a dummy variable) thereafter, an individual Taylor rule estimation for each country, including quantitative easing as dummy variables. Finally, the results from the study will try to answer some questions on the uncertainty of monetary policy via the Taylor rule as practiced by central banks of these countries.

1.1. TAYLOR RULE FUNDAMENTALS

Examining the monetary policy rules using the Taylor rule model, the interest rate-setting behavior in a selection of middle-income emerging market economies (IT countries), and a set of fundamentals that arise when central banks set the interest rate according to the Taylor rule. Following Taylor (1993), the monetary policy rule postulated to be followed by central banks can be specified as:

$$i_t^* = \pi_t + \phi(\pi_t - \pi^*) + \Upsilon y_t + r^* \quad (1)$$

where i_t^* is the target for the short-term nominal interest rate, π_t is the inflation rate, π^* is the target level of inflation, Υy_t is the output gap, or percent deviation of actual real GDP from an estimate of its potential level, and r^* is the equilibrium level of the real interest rate. It is assumed that the target for the short-term nominal interest rate is achieved within the period, so there is no difference between the real nominal interest rate and the target nominal interest rate. According to the Taylor rule, the central bank increases the target for the short-term nominal interest rate if inflation rises above its desired level and/or output is above potential output. The target level of the output deviation from its natural rate y_t is 0 because, under the natural rate assumption, the output cannot permanently exceed potential output. The target level of inflation is positive because it is generally believed that deflation is much worse for an economy than low inflation. Taylor assumed that output and inflation deviations enter the reaction function of the central bank with equal weights of 0.5 and that the equilibrium level of the real interest rate and the inflation target were both equal to 2% (Molodtsova and Papell, 2009).

The parameters π^* and r^* in Equation (1) can be combined into one constant term μ = r^*- ϕπ^*, which leads to the following equation,

$$i_t^* = \mu + \lambda\pi_t + \Upsilon y_t \quad (2)$$

where λ = 1 + ϕ. Because λ > 1, the real interest rate increases when inflation rises, and therefore Taylor's principle is satisfied. While it seems reasonable to postulate a Taylor rule for the United States that only includes inflation and the output gap, it is common practice, according to the Clarida *et al*. (1997), to include the real exchange rate in the specifications for other countries,

$$i_t^* = \mu + \lambda\pi_t + Y y_t + \delta q_t \quad (3)$$

where q_t is the real exchange rate, the basis for including the real exchange rate in Taylor's rule is that the central bank sets the target level of the exchange rate to ensure that the purchasing power parity (PPP) is maintained and increases (decreases) the nominal interest rate if the exchange rate depreciates (appreciates) from its PPP value. It has also become common practice to specify a variant of Taylor's rule that allows the interest rate to adjust gradually to reach its target level. Following Clarida *et al*. (1997), it is assumed that the observable effective interest rate partially adjusts to the target as follows:

$$i_t^* = (1 - P)i_t^* + Pi_{t-1} + V_t \quad (4)$$

Substituting Equation (3) into Equation (4) gives the following equation,

$$i_t^* = (1 - P)(\mu + \lambda\pi_t + Y y_t + \delta q_t) + Pi_{t-1} + V_t \quad (5)$$

The link between higher inflation and the expected appreciation of the exchange rate potentially characterizes any country where the central bank uses the interest rate as a tool in an inflation-targeting policy rule. In the context of the Taylor rule, three further predictions can be made. First, if the US output gap increases, the Fed will raise interest rates and cause the dollar to appreciate. If the foreign country also follows a Taylor rule, an increase in the foreign output gap will raise the foreign interest rate and cause the dollar to appreciate. Second, if the real exchange rate for the foreign country depreciates and is included in its central bank's Taylor rule, the foreign central bank will raise the interest rate, causing the foreign currency to appreciate and the dollar to depreciate. Third, if the interest rate is smoothed out, a higher interest rate will raise current and projected future interest rates. According to the uncovered interest rate parity and rational expectations, any event that causes the Fed to raise the rate of federal funds will result in an immediate appreciation of the dollar and an expected depreciation of the dollar (Molodtsova and Papell, 2009).

Mohanty and Klau (2004) reviewed the conduct of monetary policy and central banks' interest rate setting behavior in emerging market economies, using a standard open economy reaction function, testing whether central banks in emerging economies react to changes in inflation, output gaps, and the exchange rate in a consistent and predictable manner using the Taylor rule model. In most emerging economies, the interest rate responded strongly to the exchange rate; in some, the response is higher than that to changes in the inflation rate or the output gap. The result is robust to alternative specification and estimation methods. The results highlighted the importance of the exchange rate as a source of shock and support the "fear of floating" hypothesis. Evidence also suggests that in some countries the central bank's response to a negative inflation shock might be weaker than to a positive shock. Moreover, they stated that the limitations of their study may include focusing on the historical response of emerging economies' central banks; it does not provide evidence on the optimal monetary policy setting. This is a fertile area for research which will be emphasized in this current research as the sample countries are all inflation targeters. Second, monetary policy regimes in many countries have undergone significant changes during the past few years.

2. METHOD(S)

2.1. DATA DESCRIPTION

The empirical work used quarterly data for five selected emerging market economies namely Brazil, Chile, Mexico, South Africa, and Turkey. The selection of the five chosen countries (Brazil, Chile, Mexico, South Africa, and Turkey) was based on the need for focusing on emerging market economies that belong to the same income bracket with similar macroeconomic features in order to assess common patterns and differences so that this group of economies can learn from one another in optimal decision making. Based on the World Bank income classification, all these countries belong to the upper-middle-income group.

The use of quarterly data is customary in literature as observed in studies such as Taylor (1993), Mohanty and Klau (2004), and more recently Kaseeram (2010). Accompanying the standard use of quarterly data is the strong need for a large sample size arising from high-frequency data which consequently diminishes concerns of micro-numerosity (problems of small sample sizes).

The sampling period ranges from the first quarter of 1998 to the first quarter of 2020. Selection of this sampling period is based on two considerations. The main determining factor is data availability as data on one of the key variables, the interest rate, is hardly available prior to 1990, and in certain countries, it is not available until 1998 (quarterly data). The period 1998–2020 is therefore attractive in so far as it comprises the pre- and during IT periods for the selected countries.

The primary data sources are the IMF, Federal Reserve Economic Data, and WDI. These are reliable data sources as they have been used in influential papers such as Taylor (1993), Mohanty and Klau (2004), Devereux *et al*. (2006), and more recently Caporale *et al*. (2018) and Aoki *et al*. (2019).

2.2. MODEL SPECIFICATION

To achieve the study objectives, a time series approach is used, and it essentially uses quarterly data on the five EMEs observed between 1998 and 2020. The model specification is based on Mohanty and Klau's (2004) open economy framework following the Taylor (2001) model. In this model, central banks respond to the actual inflation rate, the output gap, and exchange rate dynamics as follows:

$$i_{it} = \delta_0 + \delta_1\pi_{it} + \delta_2 Y_{it} + \delta_3 xr_{it} + \delta_4 xr_{it-1} + \delta_5 i_{it-1} + \delta US_{QEt} + \varepsilon_{it} \quad (1)$$

$$i = 1, \dots, 5 \quad t = 1998Q1, \dots, 2020Q1$$

where i is the short-term interest rate or policy rate for the central bank, π is the annual rate of inflation, Y is the deviation of actual from the potential output, xr is the log level of the real effective exchange rate, Δ is the first difference operator, small subscripts i and t denote country and time respectively, δ_0,…, δ_5 are unknown parameters to be estimated, and ε is the error term. Variable description and a priori expectations approach are presented in the following subsection.

2.3. METHOD OF ESTIMATION

Several estimators can be performed in cases of a cointegrating relationship. The commonly used estimators are panel ordinary least square (OLS), Johansen maximum likelihood, the dynamic OLS, fully modified OLS, and the Pooled Mean Group. This study will estimate the OLS. When working with time series, it is standard, to begin with understanding the data generating process before estimating the specified model. In practice, there are several nonstationarity tests that one can apply in the context of time series. These techniques range from the common ADF and the Phillips–Perron (PP) to the Kwiatkowski–Phillips–Schmidt–Shin (KPSS), Elliot–Rothenberg–Stock Point Optimal (ERSPO), and the Ng Perron (NP). The afore-mentioned conventional tests namely the ADF, ERSPO, PP, NP, and KPSS tests are generally biased toward a false null hypothesis in the presence of a structural break (Perron, 1989). Against this background, this study resorted to the BreakPoint unit root tests proposed by Perron (1989) although the ADF and the PP methods are also applied as robustness checks. To achieve the given dynamic state of the Taylor rule, an appropriate approach is the bounds testing procedure proposed by Pesaran and Shin (2001). The bounds testing procedure starts with an estimation of a conditional ARDL model of the following form:

$$\Delta i_t = \delta_0 + \sum_{j=1}^{n}\varphi_j\Delta\ i_{t-j} + \sum_{j=0}^{n}\omega_j xr_{t-j} + \sum_{j=0}^{n}\gamma_j\,\Delta\pi_{tt-j} + \sum_{j=0}^{n}\gamma_j\,\Delta\pi_{tt-j}\times\omega' US_{QEt} + + \sum_{j=0}^{n}c_j\,\Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt}\times\pi_{t-1}$$
$$+ \xi_1\, i_{t-1} + \xi_2\, xr_{t-1} + \xi_3\,\pi_{t-1} + \xi_4 Y_{\,t-1} + \varepsilon_t \qquad (2)$$

$$t = 1, \dots, T$$

All variables are as defined before. Equation 2 is first estimated by the OLS's technique. From this unrestricted ARDL model, the presence of a long-run relationship can be tested by restricting the slope coefficients of variables in lagged levels. This specifies the following null and alternative hypotheses:

$$H_0\!: \ \xi_1 = \xi_2 = \xi_3 = \delta = 0$$

Against:

$$H_a\!: \ \xi_1 \neq \xi_2 \neq \xi_3 \neq 0$$

The computed F-statistic is then compared with the critical values tabulated by Pesaran *et al*. (2001). An F-statistic less than the lower bound would imply that variables are jointly integrated of order zero (I (0)) and hence no long-run relationship would exist. On the other hand, an F-statistic above the upper bound would imply that variables are jointly integrated of order one (1(1)) and hence a long-run relationship would exist among them. The decision would be inconclusive if the F-statistic lies in between the lower and the upper bound.

The value of the lower and the upper bound would require knowledge of k and the assumption of the long-run relationship. The conditional ARDL model in Equation 2 is represented by $k+1$ where k is the number of regressors and one is the lagged dependent variable. With respect to the assumption of the long-run relationship, Pesaran *et al*. (2001) suggest five cases.

The first case assumes no intercept and no trend, the second assumes a restricted intercept and no trend, the third assumes unrestricted and no trend, the fourth assumes unrestricted intercept and restricted trend, while the fifth assume unrestricted intercept and unrestricted trend. The widely used assumption in the empirical literature is case three and this is the assumption followed in this paper. If a long-run relationship is found to exist, then Equation (2) can be reparametrized into the following error correction representation:

$$\Delta SA\_i_t = \delta_0 + \sum_{j=1}^{n} \varphi_j \Delta\ SA\_i_{t-j} + \sum_{j=0}^{n} \omega_j xr_{t-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} \times \omega' US_{QEt} + \\ + \sum_{j=0}^{n} c_j\ \Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt} \times \pi_{t-1} + \xi_1\ SA\_i_{t-1} + \xi_2\ xr_{t-1} + \xi_3\ \pi_{t-1} + \xi_4 Y_{\ t-1}\ - \Phi \cdot ECT_{t-1} \\ + \varepsilon_t \qquad (3)$$

$$t = 1, \ldots, T$$

$$\Delta BR\_i_t = \delta_0 + \sum_{j=1}^{n} \varphi_j \Delta\ BR\_i_{t-j} + \sum_{j=0}^{n} \omega_j xr_{t-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} \times \omega' US_{QEt} + \\ + \sum_{j=0}^{n} c_j\ \Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt} \times \pi_{t-1} + \xi_1\ BR\_i_{t-1} + \xi_2\ xr_{t-1} + \xi_3\ \pi_{t-1} + \xi_4 Y_{\ t-1}\ - \Phi \cdot ECT_{t-1} \\ + \varepsilon_t \qquad (4)$$

$$t = 1, \ldots, T$$

$$\Delta MX\_i_t = \delta_0 + \sum_{j=1}^{n} \varphi_j \Delta\ MX\_i_{t-j} + \sum_{j=0}^{n} \omega_j xr_{t-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} \times \omega' US_{QEt} + \\ + \sum_{j=0}^{n} c_j\ \Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt} \times \pi_{t-1} + \xi_1\ MX\_i_{t-1} + \xi_2\ xr_{t-1} + \xi_3\ \pi_{t-1} + \xi_4 Y_{\ t-1}\ - \Phi \cdot ECT_{t-1} \\ + \varepsilon_t \qquad (5)$$

$$t = 1, \ldots, T$$

$$\Delta CH\_i_t = \delta_0 + \sum_{j=1}^{n} \varphi_j \Delta\ CH\_i_{t-j} + \sum_{j=0}^{n} \omega_j xr_{t-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} \times \omega' US_{QEt} + \\ + \sum_{j=0}^{n} c_j\ \Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt} \times \pi_{t-1} + \xi_1\ CH\_i_{t-1} + \xi_2\ xr_{t-1} + \xi_3\ \pi_{t-1} + \xi_4 Y_{\ t-1}\ - \Phi \cdot ECT_{t-1} \\ + \varepsilon_t \qquad (6)$$

$$t = 1, \ldots, T$$

$$\Delta TUR\_i_t = \delta_0 + \sum_{j=1}^{n} \varphi_j \Delta\ TUR\_i_{t-j} + \sum_{j=0}^{n} \omega_j xr_{t-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} + \sum_{j=0}^{n} \gamma_j\ \Delta \pi_{tt-j} \times \omega' US_{QEt} + \\ + \sum_{j=0}^{n} c_j\ \Delta Y_{tt-j} + \theta' US_{QEt} + \delta US_{QEt} \times \pi_{t-1} + \xi_1\ IN\_i_{t-1} + \xi_2\ xr_{t-1} + \xi_3\ \pi_{t-1} + \xi_4 Y_{\ t-1}\ - \Phi \cdot ECT_{t-1} \\ + \varepsilon_t \qquad (7)$$

$$t = 1, \ldots, T$$

From these specifications, Φ represents the Error Correction Term (ECT) which captures the speed of adjustment if the model encounters some disequilibria. It must carry a significant negative sign showing reversion of the model back to the state of rest in the case of an unexpected shock. In terms of the magnitude, the ECT ranges must lie between 0 and 1. If for instance, Φ turns out to be significantly 1, this would mean 100% of the disequilibrium will be corrected in the current period. The following subsections outline diagnostic checks of the ARDL bounds testing procedure.

In addition to the above estimations, postestimations like Parameter Stability, heteroscedasticity, and autocorrelation will be carried out. Testing for parameter stability is essential in models that rely on datasets plagued by structural breaks. Heteroscedasticity is a violation of the homoscedasticity assumption. The Breusch–Pagan test is used to detect the presence of heteroscedasticity in a time series data set. Autocorrelation, which is highly prevalent in time series data, occurs when the residuals from independent periods are correlated $corr\left(\mu_i;\mu_j\right) \neq 0 \, for \; i \neq j)$. If this is the case, the OLS estimates will remain unbiased, and consistent but inefficient in the class of best linear unbiased estimators.

2.4. VARIABLE DESCRIPTION

Interest Rate: The interest rate enters Equation (1) as the dependent variable. By measurement, the short-term interbank interest rate is used in this study. This choice is guided by the fact that many central banks until recently did not have an official policy rate. Furthermore, to the extent that monetary operating regimes varied considerably during the sample period, a short-term market rate is thought to be more appropriate in capturing the variety of operating procedures, than the actual policy rate. In most cases, the correlation between the policy rate and the short-term rate is uniformly high in various countries.

Output Gap: The output gap will be derived using a Hodrick–Prescott (HP) filter for measuring trend output and it is based on the following specification:

$$Min_t\left(\sum_{t=1}^{T}(y_t - T_t)^2 + \lambda\sum_{t=2}^{T_1}\left[\left(T_{t+1} - T_t\right) - \left(T_t - T_{t+1}\right)\right](11)\right.$$

The first term of the equation is the sum of the squared deviations $d_t = y_t$, T_t which penalises the cyclical component. The second term is a multiple λ of the sum of the squares of the trend component's second differences. This second term penalizes variations in the growth rate of the trend component. Following a recommendation by Hodrick and Prescott (1997), a value of 1600 is assumed for quarterly data. The inclusion of the output gap variable in this study is motivated by previous studies on the Taylor rule such as Mohanty and Klau (2004) and more recently Devereux *et al*. (2006), Caporale *et al*. (2018), and Chevapatrakul and Paez-Farrell (2018).

Exchange Rate: The Nominal Effective Exchange Rate (NEER) is used in this study as a proxy for the exchange rate. This is the geometric weighted average exchange rate of the main trading partners and is calculated by accounting for tradable goods in both the manufacturing production and input markets or the primary products. An increase (decrease) in the NEER reflects a depreciation (appreciation) of the local currency.

Inflation: Following most studies in the literature, inflation is proxied by changes in the CPI. Inflation reduces the purchasing power of each unit of currency, which leads to increases in the prices of goods and services over time. Owing to this consequence, maintaining price stability is one of the key objectives of every central bank by raising or decreasing the interest rate depending on whether the economy is experiencing inflationary or deflationary pressures.

3. RESULTS ANALYSIS AND DISCUSSION

3.1. DESCRIPTIVE STATISTICS

Descriptive statistics are important as they provide preliminary insights regarding the distribution of variables and the potential existence of outliers. In the present case, the mean, maximum, minimum, skewness, standard deviation, and kurtosis are primarily presented for each of the five EMEs (Brazil, Chile, Mexico, South Africa, and Turkey). Looking at descriptive Table 1 (appendices), the policy rate has been relatively high on average in Turkey as compared to the other four emerging markets. Inflation is highest on average in the case of Chile as compared to others and considerably lower in Turkey. The high CPI mean of Chile is not surprising given the corresponding low policy rate. A low policy rate decreases the opportunity cost of holding money leading to a rise in aggregate demand and a consequential increase in inflation.

The output gap is mostly negative on average across the five EMEs suggesting that actual output has been lower than the potential output. Looking at the standard deviation, the policy rates are more volatile in Turkey and Chile. For South Africa, Brazil, and Mexico, the policy rates are relatively stable. The skewness values are all positive indicating a long right tail. For the output gap and the exchange rate, the skewness values are negative implying a left tail. Except for Chile, the policy rates are leptokurtic while the exchange rate is mostly platykurtic (Table 3.1).

Tables 3.1

Table 3.1.1. Summary statistics—Brazil.

	Interest rate	Output gap	Exchange rate	CPI
Mean	14.37516	2.27E-12	105.6284	73.41135

Median	12.75000	0.003995	105.1923	68.56879
Maximum	46.00000	0.032728	148.1265	124.4659
Minimum	2.000000	-0.081773	60.73483	33.65839
Std. Dev.	7.920560	0.019286	21.37122	28.20557
Skewness	1.797705	-1.086710	-0.027088	0.332122
Kurtosis	7.346508	5.363378	2.089865	1.897382

Table 3.1.2. Summary statistics—Chile.

	Interest rate	**Output gap**	**Exchange rate**	**CPI**
Mean	4.688352	2.87E-12	102.4864	83.43936
Median	3.500000	0.001324	103.5766	83.48511
Maximum	30.79000	0.044728	115.8161	114.7371
Minimum	0.300000	-0.112875	83.50469	57.08033
Std. Dev.	3.969579	0.022702	6.645096	17.29291
Skewness	3.680274	-1.530642	-0.398587	0.222757
Kurtosis	22.87051	8.715384	3.136477	1.790108

Table 3.1.3: Summary statistics—Mexico.

	Interest rate	**Output gap**	**Change rate**	**CPI**
Mean	8.934212	1.82E-12	110.2790	80.86762
Median	7.663333	0.000413	112.3739	80.04325
Maximum	36.84667	0.030960	143.1672	122.9923
Minimum	3.303333	-0.165711	78.38879	39.40000
Std. Dev.	6.409379	0.025552	14.49126	22.58939
Skewness	2.252024	-3.228710	-0.182663	0.131359
Kurtosis	8.233143	21.06491	2.469498	1.991376

Table 3.1.4. Summary statistics—South Africa.

	Interest rate	**Output gap**	**Exchange rate**	**CPI**
Mean	8.227683	0.04179	118.799	76.76215
Median	7.266667	-6.70E+08	122.1189	73.46716
Maximum	20.12333	3.52E+10	155.0856	126.6963
Minimum	3.7	-1.88E+11	84.98551	40.03212
Std. Dev.	2.931536	2.29E+10	16.85683	26.05503
Skewness	1.509592	-5.950307	-0.02457	0.403036
Kurtosis	5.919606	50.84538	1.948647	1.877998

Table 3.1.5. Summary statistics—Turkey.

	Interest rate	**Output gap**	**Exchange rate**	**CPI**
Mean	24.80067	0.001029	96.06688	67.50953
Median	15.00000	0.003020	99.03540	61.83139
Maximum	183.2000	0.070293	118.1836	172.0552
Minimum	1.500000	-0.103306	65.45639	4.557868
Std. Dev.	28.38300	0.033422	12.68573	42.30258
Skewness	2.555650	-0.661448	-0.428486	0.578836
Kurtosis	12.45167	3.467993	2.431231	2.725378

The exchange rate on the other hand seems to be nonstationary both in mean and variance in all countries which is not surprising. Regarding the policy rates, the rates have generally eased and followed a downward trajectory. For Mexico, Brazil, Turkey, and South Africa in particular, the downward trends suggest that interest rates could be nonstationary in the mean. The output gap seems to be stationary in levels which are not surprising since this variable by construction captures the deviations of actual output from potential output.

Table 3.2. Breakpoint unit root tests.

	Levels	**First difference**	**Order of integration**
	t-statistic	t-statistic	
South Africa			
Interest rate	3.559	9.495***	I(1)
logCPI	2.244	6.160***	I(1)
Output gap	7.198***		I(0)
logREER	3.792	8.541***	I(1)
Chile			
Interest rate	3.306	14.857***	I(1)
logCPI	1.918	7.379***	I(1)
Output gap	5.235***		I(0)
logREER	4.453**		I(0)
Brazil			
Interest rate	4.851***		I(0)
logCPI	2.769	6.473***	I(1)
Output gap	4.975***		I(0)
logREER	3.295	6.965***	I(1)
Mexico			
Interest rate	4.700**		I(0)
logCPI	2.511	6.474***	I(1)
Output gap	5.758***		I(0)
logREER	3.294	6.966***	I(1)
Turkey			
Interest rate	4.894**		I(0)
logCPI	4.472**		I(0)
Output gap	3.971	9.005***	I(1)
logREER	3.342	9.067***	I(1)

Note: The specifications include an intercept and an Innovational outlier. The t-statistics rely on Vogelsang's (1993) asymptotic one-sided p-values. The 1%, 5%, and 10% critical values are 4.949, 4.444, and 4.193, respectively, in absolute terms. Considerations were made to establish if the trend component was significant in the unit root specifications. A full set of the results is attached in the appendix.

As is customary in the literature, the study considered two additional standard unit root tests namely the Augmented Dickey–Fuller and the Phillips–Perron tests as robustness checks. The results of these additional tests are presented in Table 3.3. In both cases, the null hypothesis is of a unit root and it is rejected if and only if the corresponding probability value is less than the 0.1 maximum significance level. Consistent with the results in Table 3.2, Table 3.3 confirms a mixed integration in which one is the maximum order of integration. In all cases, at least two variables are stationary in levels while the remaining variables are stationary after the first difference.

Table 3.3. ADF and PP unit root tests.

	ADF	PP				
	t-statistic	**t-statistic**				
South Africa	**Levels**		**I**	**Levels**		**I**
Interest rate	2.126	13.520***	I(1)	3.402**		I(0)
logCPI	2.998**		I(0)	6.254***		I(0)
Output gap	3.145**		I(0)	3.511***		I(0)
logREER	1.875	8.695***	I(1)	1.634	9.063***	I(1)
Chile						
Interest rate	2.249	11.163***	I(1)	3.404**		I(0)
logCPI	0.479	6.447***	I(1)	0.580	5.980***	I(1)
Output gap	4.169**		I(0)	4.216**		I(0)
logREER	3.455**		I(0)	2.667	8.734***	I(1)
Brazil						
Interest rate	3.854**		I(0)	2.956**		I(0)
logCPI	2.253	3.898***	I(1)	1.513	5.098***	I(1)
Output gap	4.536**		I(0)	4.595**		I(0)
logREER	1.820	6.588***	I(1)	1.797	7.083***	I(1)
Mexico						
Interest rate	4.674**		I(0)	1.878	5.981***	I(1)
logCPI	0.451	6.574***	I(1)	4.101**		I(0)
Output gap	5.015**		I(0)	4.992**		I(0)
logREER	0.686	9.026***	I(1)	0.712	9.026***	I(1)
Turkey						
Interest rate	2.126	13.794***	I(1)	3.431**		I(0)
logCPI	2.929**		I(0)	5.836**		I(0)
Output gap	4.169**		I(0)	4.217**		I(0)

Note: The t-statistics rely on MacKinnon's (1996) one-sided p-values. For the ADF test. The 1%, 5%, and 10% critical values are 3.510, 2.896, and 2.585, respectively, in absolute terms. For the Phillips–Perron test, the critical values are 3.402, 2.894, and 2.584, respectively. Considerations were made to establish if the trend component was significant in the unit root specifications. A full set of these results is available upon request as they are not presented here in the interest of brevity. denotes the first difference and I is the order of integration.

In the presence of stationary and nonstationary variables, standard cointegration tests such as the Johansen and the Engel–Granger tests no longer apply as they require all variables to be integrated of the same order. In this case, a more appropriate approach is the bounds testing procedure proposed by Pesaran and Shin (2001) which allows one to probe the existence of a long-run relationship when faced with a mixed integration of variables. This is the approach used in this study as similarly applied in Çelik and Deniz (2010) and more recently, Singh and Bhuyan (2016).

As a first step, the unrestricted error correction models were estimated for each of the five countries using the OLS method. These models were tested to ensure dynamic stability, the absence of serial correlation, and correct model specification. Results of these diagnostic tests are attached in the appendix but summarized in the text in the lower part of Table 3.4. In each case, the optimal number of lags for each variable was determined automatically by the Akaike Information Criterion. The F-tests were then computed to determine the joint significance of lagged level variables. The results are inconclusive if the F-statistic lies between the lower and the upper bound. An F-statistic below the lower bound would imply the lack of sufficient statistical evidence to suggest a long-run relationship.

Table 3.4 presents the bound testing results. Inclusion and exclusion of the trend component are based on the significance of the trend variable in the respective unrestricted error correction specifications. In all cases, the interest rate is the dependent variable.[1] Clearly from Table 3.4, the computed F-statistic is greater than the 5% upper critical bound. According to Pesaran and Shin (2001), this warrants rejection of the null hypothesis stating no cointegration. By implication, these results suggest the presence of a long-run relationship between the interest rate and its fundamental determinants in each of the five countries.

Table 3.4. Bounds testing procedure results.

	Model	Lower bound	Upper bound	F-statistic		
		5% critical value	5% critical value			
		I	I and T	I	I and T	
SA	ARDL (2, 2, 1, 4)	3.23	4.01	4.35	5.07	21.578^{**I}
Brazil	ARDL (6, 11, 10, 2)	3.23	4.01	4.35	5.07	6.364^{**IandT}
Chile	ARDL (1, 1, 0, 3)	3.23	4.01	4.35	5.07	55.183^{**IandT}
Turkey	ARDL (12, 0, 0, 1)	3.23	4.01	4.35	5.07	13.406^{**IandT}
Mexico	ARDL (4, 2, 2, 3)	3.23	4.01	4.35	5.07	22.345^{**IandT}

Note: I = specification with intercept and not trend, I and T = specification with intercept and trend. ** denote rejection of the null at 5% level. The order of the ARDL models was automatically determined by the Akaike Information Criterion (AIC).

3.2. REGRESSION RESULTS

Based on the evidence presented in Table 3.4, the study proceeds with estimating the conditional error correction models which reconcile long-run information with short-run dynamics. By so doing, the study is particularly able to distinguish between short-run and long-run effects of inflation, the exchange rate, and the output gap in the five respective countries. Bearing in mind the possibility of structural breaks, the final specification for each country included in most cases inflation targeting dummy taking the value one from the quarter of IT inception. An exception is Chile which introduced inflation targeting before the start of the sampling period. In some cases, the global financial crisis dummy was significant and therefore included in the model. For Brazil, the IT dummy was also insignificant and therefore excluded to avoid unnecessary model overfitting. The insignificance of the IT dummy for Brazil probably reflects the fact that IT was introduced a year after the commencement of our dataset. In this case, the baseline period would have a considerably small number of observations for comparison.

Table 3.5 presents short-run results, and it is portioned into five regression variants that represent the five countries with an interest rate as the dependent variable. In the interest of brevity, the table only includes significant short-run coefficients. A full set of results including insignificant coefficients not reported here can however be found in the appendix. Since each country entered with an ARDL model of a different order, the total short-run effect for each variable is calculated as the sum of only significant coefficients for differenced variables.

Estimation is through the OLS method with Heteroscedastic and Autocorrelation Covariance Newey–West standard errors. From the results, the coefficients on lagged interest rates are positive and significant at a 5% significance level, in the case of Chile, South Africa, Mexico, and Brazil, and insignificant for Turkey. The positive and significant lagged interest rates for South Africa, Mexico, and Brazil shows that past interest rate decisions by policymakers feed into current decisions. This finding is consistent with that of Caporale *et al.* (2018) in which the lagged policy rate is found to enter positively for Indonesia, Israel, South Korea, and Thailand. A study by Moreso, as observed in an earlier paper by Mohanty and Klau (2004) and replicated more recently in Caporale *et al*. (2018) as well as Giesenow and Haan (2019), finds a positive and significant short-run relationship between inflation and the policy rate which is stronger and sizeable in the case of Chile, South Africa, Mexico, and Turkey.

For Mexico and South Africa, the short-run response of interest rates to inflation dynamics (1.373 and 0.175) is larger than the 0.55 and 0.1 reported for the respective coefficients in Mohanty and Klau (2004). This is not surprising due to the difference in lag order specifications. The current study is based on a relatively long dataset which affords room for more lags. Having more lags by construction in turn increases the possibility of having a large cumulative short-run effect. Another possible explanation is that Chile, Mexico, and South Africa's policy responses to inflation dynamics might have turned more positive in recent years which can only be captured by an updated dataset. It is perhaps an indication that as the central banks of these countries became more experienced as inflation targeters, they have taken their mandate seriously for the market is very sensitive to credible policy actions.

[1] In three of the five cases in Table 6.1, the interest rate follows a stationary process in levels. There is a common debate on whether the bounds testing procedure is applicable in such cases where the dependent variable is I(0). Professor Ron Smith a co-author in Pesaran, Shin and Smith (2001) clarified this debate via email and the following was his opening statement "There is no problem in applying the bounds test if the dependent variable is I(0). The dependent variable can be I(0) or with sufficient lags I(2)."

Table 3.4 also confirms a negative and significant relationship between short-term policy rates and the exchange rate. The negative and statistically significant signs on the exchange rate variable indicate the relevance of exchange rate shocks on interest rate changes in these countries as similarly observed in Mohanty and Klau (2004). Noteworthy is that the coefficient is smallest for South Africa validating Ortiz and Sturzenegger's (2007) result that the country's central bank places a low preference for exchange rate fluctuations (0.003) relative to price fluctuations (0.443) although the result can be taken to reflect an implicit fear of floating.2

The output gap variable measured as the gap between actual and potential output capturing demand pressures is positive and statistically significant across the five countries. Looking closer, Table 3.5 shows that the effect is more sizeable in Brazil (0.602) followed by Chile (0.202), Mexico (0.132), South Africa (0.108), and lastly Turkey where the marginal effect is only 0.007. Notwithstanding the differences in the size of the coefficients, the positive and significant signs on this variable confirm the common argument that monetary policymakers in emerging markets respond to demand pressures. In an earlier paper by Sidaoui (2003), for example, it is argued that the Mexican central bank responded more aggressively to demand fluctuations. Bulut (2019), on the other hand, more recently found a strong connection between policy rates and output fluctuations in the context of Turkey. Similarly, for South Africa, concerns about the central bank (SARB) responding aggressively to tame inflationary pressures and economic overheating, have long been raised. Epstein (2003) for example and COSATU (2007) are well-known critics of SARB's aggressive policy responses. The latter is a long advocate of lower rates. COSATU has long maintained the argument that IT and the aggressiveness of SARB are jeopardizing the prospect of achieving the necessary accelerated and shared growth for South Africa. Moreover, over much of the sample period, South Africa has been experiencing progressively deteriorating GDP growth.

When one compares the elasticities of the exchange rate, inflation, and the output gap in the short-run from Table 3.5, one finds the effect of inflation and output gap larger than the effect of the exchange rate in most cases. For example, in the case of South Africa, a percentage increase in inflation raises the policy rate by 0.44% on impact while a percentage depreciation of the exchange rate raises the policy rate by only 0.003%. This is an observation that agrees with Singh and Bhuyan (2016) who find inflation and output gap matter more for the Indian central bank than the exchange rate in the short-run.

The inflation targeting dummy is negative and statistically significant for South Africa indicating that the mean policy rate is relatively low during the inflation targeting period as compared to the preinflation targeting era, thus indicating that the IT policy has succeeded in influencing the inflation expectation behavior of economic agents, unlike the case of Turkey. Turkey presents a different picture as the average policy rate is higher under inflation targeting. This result is consistent with Gürbüz *et al*. (2008) and critiques of Turkey's monetary policy stance. Critique of Turkey's monetary policy stance has regularly criticized the medium-term objectives of the country's central bank arguing that passing from an inflation target of 8% in 2005 to a target of 5% in 2006 was too ambitious and necessitated a very restrictive monetary policy which pushed interest rates to very high levels.

The estimated error correction terms are all negative and statistically significant at most 5% levels across the five regression variants. This is evidence that a long-run relationship exists and that the model reverts to an equilibrium state in the event of a short-run discrepancy. The short-run coefficient provides the magnitude of the adjustment to disequilibria caused by setting the incorrect interest rate, in the previous quarter, relative to the long-run equilibrium relationship. If the interest rate oversteps (under-steps) its long-run equilibrium value by 1% in the previous quarter, then it adjusts this quarter downward (upward) by 0.71%, 0.26%, 0.31%, 0.36%, and 0.9% for Chile, South Africa, Mexico, Turkey, and Brazil, respectively.Looking at the size of the coefficients, the speed of adjustment is highest for Brazil where it takes less than two quarters for a short-run disequilibrium to disappear and lowest in South Africa, where it takes about four quarters for a short-run discrepancy to vanish as 25.8% of the disequilibrium is corrected each quarter. This implies that relative to the other Central Banks the South African Reserve bank is more backward-looking in setting rates.

Table 3.5. Reaction function-short-run and long-run estimates.

Dependent variable: Change in policy rate (INT_t)

Short-run	**South Africa**	**Mexico**	**Turkey**	**Brazil**	**Chile**
INT_{t-1}	0.158	0.204	0.432	0.859	-0.319
CPI_t	0.443	1.373	0.369	0.045	0.283
GAP_t	0.105	0.132	0.007	0.602	0.122
$\Delta LRER_t$	-0.003	-0.009	-0.257	-0.101	-0.003
IT_t	-0.004	-0.018	0.450		
GFC_t	-0.007	-0.008	-0.0004		0.014

[2] According to Ball and Reyes (2004a) a country exhibits "Fear of Floating" when it claims to pursue a policy objective independent of the exchange rate, but regularly makes implicit interventions in the exchange rate market. This usually arises when a country has a large debt in foreign currency and a relatively high exchange rate pass-through. South Africa exhibited these features during the sampling period as it saw its currency depreciate for the best part of the last decade and also got relegated to Junk status due to its high debt.

ECT_{t-1}	-0.258*** (0.029)	-0.313*** (0.044)	-0.361*** (0.076)	-0.899*** (0.224)	-0.200** (0.074)
Long-run					
$LCPI_t$	0.012 (0.010)	0.525* (0.286)	0.880** (0.413)	0.001** (0.0007)	0.790* (0.205)
GAP_t	0.551*** (0.089)	0.763*** (0.163)	0.020 (0.533)	-0.090 (0.126)	0.202** (0.101)
$LRER_t$	-0.048*** (0.014)	-0.142*** (0.050)	-0.714*** (0.143)	-0.049** (0.018)	0.122** (0.040)
IT Dummy	-0.013** (0.007)	-0.058*** (0.020)	1.246*** (0.335)		
GFC_t	-0.030*** (0.005)	-0.027** (0.011)	-0.001 (0.037)	-0.026** (0.011)	0.070** (0.028)
Obs.	87	87	77	80	79
Breusch-G	0.5837	0.1374	0.2556	0.3194	0.1161
Breusch-P-G	0.0067	0.1892	0.0140	0.0411	0.3371
R-RESET	0.7428	0.2736	0.3423	0.9610	0.8949
Jarque Bera	0.2891	0.7821	0.2512	0.1078	0.3352

Note: *, **, *** denote significant at 0.1, 0.05, and 0.01, respectively. Figures in parentheses are standard errors.

The significance of the error correction terms, and their corresponding negative signs provide additional reassurance for one to consider long-run estimates. In this regard, the lower part of Table 3.5 provides the long-run results. Consistent with the literature (Caporale *et al*., 2018), the long-run coefficients are statistically significant in most cases. Evidence shows that the policy rate is adjusted upward when inflation and the output gap rise and when the local currency depreciates.

Looking at the individual variables and their respective countries, inflation tends to have the largest long-run effect on the policy rate in Turkey where a percentage increase in inflation raises the interest rate by a magnitude of 0.880% ceteris paribus followed by Mexico where the same inflation adjustment raises the interest rate by 0.525% although the statistical evidence accompanying this relation is significant at the margin. Despite the weak statistical evidence for Mexico, the long-run policy response of 0.525 is comparable to the 0.582 documented in Ruth (2004). For Brazil and Chile, the effect is positive but small while insignificant for South Africa. The latter result particularly suggests that policy rates in South Africa are more responsive to the other variables in the long-run relationship than to CPI.

A noteworthy result in the lower part of Table 3.4 is that the exchange rate elasticity (whose effect is small in the short-run) is stronger in the long-run. This is a crucial result that is consistent with arguments raised in recent literature concerning the behavior of monetary policymakers in the long-run. Aizenman *et al*. (2011) for example present evidence that central banks in inflation targeting emerging economies implicitly consider exchange rate movements in their conduct of monetary policy. Some authors such as Calvo and Reinhart (2002), Galimberti and Moura (2013), and Catalan-Herrera (2016) posit that the introduction of inflation targeting in the emerging countries hardly stops them from making interventions in the foreign exchange market. Brenner and Sokoler (2010) particularly use Israel's experience to demonstrate this argument while Ghosh *et al*. (2016) more recently provided equally supportive evidence of foreign exchange interventions that are consistent with the achievement of price stability within the auspices of inflation targeting.

The output gap enters positively and significantly in three (South Africa, Mexico, and Chile) out of five cases. For Brazil and Turkey, the effect of the output gap is not statistically significant at conventional levels implying that demand fluctuations may not be an important source of long-run policy adjustments in these countries. For South Africa, Mexico, and Chile where the effect is statistically significant, the relationship is more sizeable in Mexico (0.763), followed by South Africa (0.551) and Chile (0.202), respectively. This, implying the central banks of these countries are highly sensitive to demand pressures.

4. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

4.1. SUMMARY OF RESEARCH STUDY AND FINDINGS

The core objective of this study was to analyze monetary policy rules via the Taylor rule approach in selected EMEs (Brazil, Chile, Mexico, South Africa, and Turkey). The results can be summarized as follows. Lagged interest rates have a positive and significant effect on current rates in the case of Chile, South Africa, Mexico, and Brazil**.**However, for Turkey, the relationship is insignificant, perhaps due to the fiscal dominance caused by the high debt ratio which has severely constrained the conduct of monetary policy since the inception of the IT policy in 2002. The other challenges Turkey faced in the conduct of an IT monetary policy framework included a high level of exchange rate pass-through, inflation inertia, and a weak banking sector. The positive and significant lagged interest rates for Chile, South Africa, Mexico, and Brazil show that past interest rate decisions by policymakers have a bearing on current policy decisions. In other words, policymakers are backward-looking or adaptive in their policy outlook, for the purposes of avoiding sudden abrupt changes in policy and rather follow smooth and gradual changes. Furthermore, the output gap enters positively and significantly in three (South Africa, Mexico, and Chile) out of five cases. This confirms that central banks in these countries respond to demand fluctuations that may lead to economic overheating. However, in the case of South Africa, the policy response rate is lower than its peers, which might indicate pressures from trade unions as well as South Africa experiencing persistently low and deteriorating GDP growth rates over the sample period.

The study also found evidence of a link between exchange rates and policy rates which is minuscule in the short-run and sizeable in the long-run in some cases. In summary, a linear Taylor rule for the five EMEs shows that monetary authorities in the selected countries respond to inflationary pressures, output gap dynamics, and, to some extent, exchange rate movements. When reconciled with literature, the interest rate elasticities to inflation expectations are slightly larger than that observed in previous studies, and we take this to suggest a more aggressive stance of monetary policy toward price shocks. Meanwhile, the evidence on interest rate responses to exchange rate movements agrees with previous studies such as Mohanty and Klau (2004), Caporale *et al*. (2018), as well as Giesenow and Haan (2019).

The study assumed linearity in the way interest rates respond to its determinants. This may be a strong assumption hence future studies may need to consider modeling nonlinearities and asymmetries using the recently developed nonlinear ARDL model. Second, future studies may need to account for international spillovers, for instance, Beckmann *et al*. (2016). According to Taylor (2013), central banks no longer decide on policy rates in an independent way, but policy reactions have been increasingly affected by the international environment. It would be interesting to examine whether accounting for international spillovers has affected the extent to which political factors influence central bank policies.

4.2. RECOMMENDATION

Based on the results, several policy issues can be derived from the findings of this study. First, the case of Turkey firmly indicates that macroeconomic stability is quintessential for the introduction and implementation of IT. Second, monetary policy authorities in EMEs ought to keep track of the contribution of the exchange rate to domestic prices. The inflation-targeting framework did succeed during the early years of its inception, but the aftermath of the global financial crisis has seen a rise in inflation rates across EMEs beyond the upper band. This experience necessitates aggressive policy interventions that stem down inflationary pressures. From the results, we found evidence consistent with the behavior of fear of floating in which a significant link is confirmed between exchange rates and policy rates. This is inconsistent with a crucial precondition for inflation targeting that requires no interventions of the central bank in the foreign exchange market. It distorts the efficacy of monetary policy under IT. Based on this result, central banks in these countries are advised to maintain a clean float and limit exchange rate interventions.

CONFLICT OF INTEREST

None.

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