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Exchange Rate Pass-Through as a Commitment Device under Inflation Targeting in Emerging Market

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ABSTRACT

This paper investigates the exchange rates pass-through into inflation in a sample of 10 emerging market adopting inflation targeting by the end of 2007. Our study examines the short-run and the long-run fluctuation of the exchange rates pass-through into inflation over the period from 1990:Q1-2012:Q4. Our estimations confirm that these countries experienced a low inflation and the exchange rate pass-through fall during the 1990s induced by a shift in their monetary policy. In all countries, the results show that the long-run exchange rate pass-through (ERPT) is higher than the short-run (ERPT). Moreover, we show that most differences in (ERPT) into prices are due to inflation targeting regime.

KEYWORDS: Monetary policy, Inflation targeting, Exchange rate pass-through and Emerging Market.

1. Introduction

Since the implementation of the inflation targeting strategy (IT), the number of countries has increased because this monetary strategy presented more advantages than disadvantages for countries that have adopted it. During the 80s and before the adoption of inflation targeting, these countries have experienced high inflation, which has a negative impact on economic growth and investment. Chu and Sek (2012) and Gerlach and Tillmann (2012) concluded that (IT) framework appears to be able to realize a stable macroeconomic situation. In this respect, since the introduction of the system of floating exchange rates in emerging economies, the works were sometimes conflicting and representative empirical limits. The extent to which exchange rate movements are passed on to consumer prices is an important issue in monetary economics and exchange rate policy. Recently, an important empirical and theoretical study on exchange rate pass through (ERPT) into import prices is emerging. Recently, theoretical and empirical researches on the (ERPT) to aggregate import prices have attracted a renewed attention. In this context, the focus has shifted to the stability of (ERPT) over time. Calvo (2001) and Ho and McCauley (2003) showed that high degree (ERPT) in emerging countries has an important effect on inflation. In practice, the degree (ERPT) plays an important role in the implementation of the policy of inflation targeting. Low (ERPT) can lead to a fairly independent monetary policy, which facilitates the implementation of a policy of IT (Choudhri and Hakura (2006) and Frankel and al. (2012)). Very recently, Beckmann and al. (2013) confirm that the adoption of inflation targeting strategy decreases the (ERPT) into prices, production and importations. Gagon and Ihring (2002) claim that, a greater emphasis on inflation stabilization allowed both lower mean inflation and reduced pass-through. Adolfson (2007) and Flamini (2007) show that the effectiveness of monetary policy is often conditioned upon the degree of (ERPT) suggesting that the degree of (ERPT) may contribute to the improvement of monetary policy and reduce average inflation. While for open adopting IT countries, the transmission of exchange rate changes to prices is an ambiguous effect. This ambiguity is explained by the role of the central bank to stabilize its objectives, namely price stability. However, work addressing the role of the exchange rate within the framework of inflation targeting are very scarce and the theoretical and empirical analyzes are still mixed (Odría and al. (2013)). To overcome this limitation, we use the error correction model (VECM). This econometric model provides advantage to generate changement of (ERPT) in ITers emerging countries. We estimate the short-run and the long-run (ERPT) after the adoption of IT. We also calculate (ERPT) for 10 emerging market that adopted IT in order to compare results and hence to provide some evidence with respect to the hypothesis that (ERPT) is low for emerging that adopted IT framework. This evidence sheds some light on the relevance of (ERPT) for emerging markets adopting the IT framework. The aim of this paper is to present new empirical evidence regarding ERPT in ten emerging markets that adopted IT. However, we investigate the effect of ERPT on prices particularly on inflation rates, distinguishing between ITers emerging countries.

We structure the paper such that section two present empirical analyses and introduces the dataset. In section three gives the estimations results. Finally, we give the conclusion. The paper has additional tables in the appendices.

2. Empirical study

Our aim is to test the variability of (ERPT) over time. For robustness, we seek what are the common characteristics of (ERPT) in emerging countries and what are the factors behind this change. Empirical estimates will contribute to the improvement of our knowledge of degree of (ERPT) into inflation when the emerging market using IT framework.

Econometric methodology and data

In this paper, we consider a new approach to study the variations in the degree of (ERPT). We estimate the effects of proposed explanatory variables and test their significativity. To estimate (ERPT), it is generally useful to consider an augmented Phillips curve with the following structure:

$$\pi_t = \alpha + \sum_{i=1}^{k} \beta_i \pi_{t-i} + \gamma(y_{t-1} - \bar{y}_{t-1}) + \sum_{i=1}^{k} \square_i \Delta txc_{t-i} + \varepsilon_t \quad (1)$$

Where: $\pi_{\square}$ is the inflation rate that is equal to the logarithmic difference of the CPI, $y_{t-1} - \bar{y}_{\square-1}$ is the output GAP, $\bar{y}_{t-\square}$ is obtained from the Hodrick-Prescott filter applied to the GDP series and $\Delta txc_{\square-i}$ is the log change in the exchange rate which is increasing the term of the Phillips curve. Thus, the coefficient $\square$ represents the short-run ERPT. However, the long-run (ERPT) is obtained by the calculated

$$\emptyset = \sum_{i=1}^{k} \theta_i \Big/ 1 - \sum_{i=1}^{\square} \beta_i .$$

However, it should be noted that in the long-run the entire variable may represent a long-run stationary relationship.

Therefore, the long-run ERPT represented by β_0 is obtained by considering the following equation:

$$cpi = \alpha + \beta_1 y_t + \beta_0 t\square c_t + \epsilon_t \quad (2)$$

In this case the short-run dynamics can not be shown until a ECM via equation (3) and the impact of short-run ERPT in this case is equal to $\omega = \theta_1 + \varphi\square_0$.

$$\pi_t = \alpha + \sum_{i=1}^{k} \beta_i \pi_{t-i} + \gamma(y_{t-1} - \bar{y}_{t-1}) + \sum_{i=1}^{k} \theta_i \Delta txc_{t-i} + \varphi ECT_{t-1} + \varepsilon_t \quad (3)$$

Where:

$$ECT_{t-1} = cpi - \alpha - \beta_1 y_t - \beta_0 txc_t$$

The data are quarterly and span the period 1990:1-2012:4. They are obtained from International Financial Statistics. According to IMF researchers, 10 of the emerging member countries had adopted IT (with flexible exchange rates) by 2007. In this regard, we use the nominal exchange rates variable (txc) as a dependent variable, GDP, IPC (consumer price index) and IPP (production price index) are expressed in logarithm.

3. Estimation results

Our aim is to test the variability of (ERPT) over time. For robustness, we seek what are the common characteristics of (ERPT) in emerging countries and what are the factors behind this change. We are interested to the dynamic of the long and the short-run of ERPT into inflation. The results are reported in table 1. Results show that the sign of coefficient corresponds to a decline of both inflation and pass-through. In case of Czech Republic, Thailand, Philippines and Peru, the variation of the exchange rate is transmitted to the inflation only 17% to 24% in the long-run. In this regard (ERPT) is incomplete and the transmission of the variation in the nominal exchange rates to the real rate is low. Monetary authorities do not have enough knowledge to respond quickly to price changes. This result is in line with previous findings of the literature (Ca'Zorzi, Hahn and Sanchez (2006)). However, there is some evidence of cointegration between all variables of model. On the short-run dynamics, all the coefficients of error correction terms are negative. This confirms that the dynamic system converges to a long-run equilibrium (table 2). In this respect, comparing the results, in all countries, it is clear that the long-run (ERPT) is higher than the short-run (ERPT). These results are same to Choudhri and Hakura (2006) study for emerging markets. The reduction of (ERPT) after the adoption of IT may be a smooth effect of the monetary policy changes. It means that when inflation is lowered and stabilized and the monetary policy gains credibility, (ERPT) will face a decrease.

Conclusion

In this paper we presented evidence on exchange rate pass-through (ERPT) for a set of emerging market economies. We ask if this regime change was followed by a decrease of (ERPT) into inflation, and therefore the extent to which monetary policy can be restructured to control inflation and achieving goals. However, a decrease in (ERPT) decreases inflation. Nevertheless, the role of (ERPT) is strong for the economies analyzed and still appears to be a significant variable driving inflation over the short and the long-run. Empirical analysis reveals that the decision to adopt IT significantly decreased the ERPT into inflation. The results are consistent with economic theory and are robust to the specification of parameters of the model. The literature on this issue acknowledges the importance of the inflation environment and the monetary policy credibility in determining (ERPT). Likewise, the estimation results will help to understand the relationship between the exchange rates and inflation, which could help policy-makers to better guide the adopted monetary policy.

Appendix

Table 1. Long-run ERPT into CPI inflation

		c	β_0 GDP	β_1 oil	β_2 txc	β_3 PPI	CointEq
1994Q1→2012Q4	Czech Republic	3.014	0.126 [1.82]	0.106 [8.57]	-0.206 [-4.68]	-1.665 [-30.24]	-0.084 [-0.934]
1993Q1→2012Q4	Thailand	-2.16	-0.221 [-4.26]		-0.240 [-3.22]		-0.020 [-0.843]
1995Q1→2012Q4	Poland	3.149	-0.221 [-1.334]	0.116 [4.842]	-0.459 [-3.93]	-1.095 [-4.82]	-0.022 [-0.633]
1990Q1→2012Q4	Mexico	1.956	0.076 [0.734]	0.059 [9.07]	-0.352 [-5.56]	-1.195 [-16.58]	-0.31 [-7.80]
1995Q1→2011Q4	Phillipine	1.579	-1.146 [-12.54]		-0.175 [-1.96]		-0.119 [-4.217]
1990Q1→2011Q4	Perou	-1.881	-0.488 [-11.56]		-0.181 [-3.9]		-0.114 [-17.78]
1995Q1→2011Q4	Indonisia	5.228	-1.225 [-11.85]		-0.439 [-2.01]		-0.199 [-2.73]
1990Q1→2011Q4	Hungry	5.306	-0.026 [-0.203]		-0.801 [-6.031]	-1.296 [-14.70]	-0.131 [-4.949]
1998Q1→2011Q4	Columbia	-0.07	-0.756 [-4.40]	0.261 [1.943]	-0.445 [-2.964]		-0.052 [-10.74]
1995Q1→2011Q4	Brazil	3.07	-1.729 [-57.62]		-0.311 [-17.65]		-0.149 [-5.074]

Source: Author's estimations.
Numbers in parenthesis are t-student.

Table 2. ERPT= $\omega = \theta_1 + \varphi\beta_0$ into CPI inflation: Error correction model

	Czech Republic	Thailand	Poland	Philippin	Perou	Mexico	Indonisia	Hungry	Columbia	Brasil
Constant	0.0038 [1.41]	0.0051 [1.308]	0.027 [4.29]	0.027 [4.29]	0.02 [18.58]	0.010 [5.28]	-0.0005 [-0.033]	0.017 [5.67]	0.034 [11.51]	0.018 [5.27]
π_{t-1}	0.254 [1.606]	0.432 [2.93]	0.21 [1.46]	0.024 [0.19]	0.066 [2.7]	0.833033 [5.12]	0.13 [0.85]	0.51 [4.06]	0.131 [1.485]	0.374 0.374
π_{t-2}	0.270 [1.673]	-0.194 [-1.203]	-0.177 [-1.18]	-0.156 [-1.25]	0.063 [3.30]	-0.367 [-1.915]	0.091 [0.563]	-0.39 [-4.11]	-0.664 [-7.95]	-0.087 [-0.89]
π_{t-3}	-0.02 [-0.123]	-0.054 [-0.347]	0.196 [1.565]	-0.168 [-1.39]	———	0.371 [2.03]	0.072 [0.461]	———	———	———
π_{t-3}	———	-0.207 [-1.246]	———	-0.132 [-1.07]	———	———	-0.061 [-0.445]	———	———	———
π_{t-4}	0.021 [0.122]	0.186 [1.210]	-0.125 [-1.031]	———	0.214 [1.174]	0.123 [0.839]	———	———	———	———
Δtxc_{t-1}	-0.114 [-2.11]	0.011 [0.493]	-0.066 [-2.44]	-0.015 [-0.436]	0.037 [2.312]	-0.25 [-10.76]	-0.130 [-0.50]	-0.058 [-1.183]	-0.044 [-2.073]	-0.014 [-1.18]
Δtxc_{t-2}	-0.018 [-0.324]	0.008 [0.32]	-0.036 [-1.267]	-0.004 [-0.127]	0.001 [0.148]	0.009 [0.239]	0.083 [0.333]	-0.125 [-2.728]	-0.038 [-1.751]	-0.010 [-0.843]
Δtxc_{t-3}	-0.092 [-1.648]	0.012 [0.406]	-0.018 [-0.670]	-0.044 [-1.194]	———	-0.068 [-1.76]	0.306 [1.31]	———	———	———
Δtxc_{t-4}	0.012 [0.24]	-0.01 [-0.56]	0.009 [0.38]	-0.083 [-2.20]	———	-0.03 [-0.83]	0.26 [1.184]	———	———	———
Δtxc_{t-5}	———	-0.007 [-0.22]	———	-0.046 [-1.21]	———	———	0.294 [1.25]	———	———	———
ECT_{t-1}	-0.084 [-0.934]	-0.02 [-0.84]	-0.02 [-0.63]	-0.119 [-4.21]	-0.114 [-17.78]	-0.31 [-7.8]	-0.19 [-2.73]	-0.13 [-4.9]	-0.05 [-10.74]	-0.14 [-5.07]
Short − run ERPT $\omega = \theta_1 + \varphi\beta_0$	-0.097	0.0169	-0.05	0.05	0.039	-0.14	-0.043	0.047	-0.02	0.031

Source: Author's estimations. Numbers in parenthesis are t-student.

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