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Does exchange rate control improve inflation targeting in emerging economies?

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ABSTRACT

We investigate the role of exchange rates in inflation-targeting emerging economies. We give strong evidence that hybrid inflation-targeting frameworks, where exchange rate is managed, deliver a stronger nominal anchor, as they show better resistance to the 2007–2008 inflation shock.

1. Introduction

Inflation targeting (IT) is a monetary framework whose nominal anchor is based on price stability. The Central Bank (CB) was first thought of as an "inflation nutter" (King, 1997) that cannot control any variable other than prices without losing its credibility and endangering the monetary anchor. Svensson (1999) first spoke of flexible IT, as opposed to strict IT, because "the 'target variables' of the central bank include not only inflation but other variables as well, such as the output gap" (Svensson (2010), page 13). A new step was taken by García et al. (2009), who spoke of "hybrid inflation-targeting regimes" (HIT), in which the exchange rate is included in the CBs' reaction functions.

In an important work, García et al. (2009) systematically study HIT regimes. Their taxonomy included the open economy IT framework, as in Cavoli and Rajan (2006), and Natalucci and Ravenna (2008); IT with and exchange rate band, as in Lahiri and Vegh (2001) and Moron and Winkelried (2005); and exchange-rate-based IT, as in McCallum (2006). García et al. (2009) propose a DSGE (dynamic stochastic general equilibrium) model for studying IT rules of all types: plain vanilla IT as well as all HIT rules. They concluded that emerging economies (EEs) "are especially likely to benefit from some exchange rate smoothing because of the perverse impact of exchange rate movements on activity" (page 2).

The purpose of this letter was to test empirically whether or not exchange rate management improves IT, that is, does exchange rate management help the CBs to achieve their targets? Does it impact the CBs' credibility? Does it reduce the Taylor curve output/inflation volatility trade-off? In response to these questions, I carefully studied the reaction of 16 fully fledged inflation-targeting emerging economies (ITEEs) to the 2007–2008 inflation shock. This shock is a perfect example of an exogenous shock on prices that appeared on a worldwide scale. Furthermore, IT is a recent monetary policy framework; it was adopted by central banks during the early 2000s. Thus, it was the first price shock that these central banks had to deal with.

The letter is structured as follows. In Section 2, I briefly describe my methodology and data. Section 3 sets out my results. The final section provides a brief conclusion.

2. Methodology

2.1. Free floating or hybrid inflation targeting?

I subjected 16 inflation-targeting emerging economies (ITEEs) to the clustering analysis method of Levy-Yeyati and Sturzenegger (LYS,2005) in order to obtain a de facto classification of their monetary policy. This method groups the cases according to

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Table 1
Centroid values.

	$\sigma(e)$	$\sigma(\Delta e)$	$\sigma(r)$
Free floating	2.23	2.68	4.5
Dirty float	1.32	1.61	7.84
Fixed	0.35	0.44	3.78

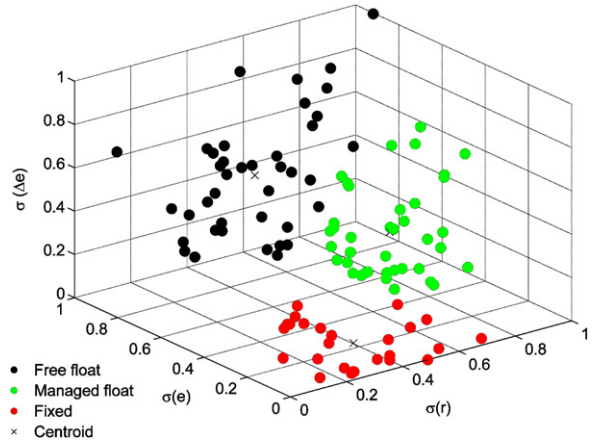

Fig. 1. Relative position of the three clusters.

similarity in the behavior of the three reference variables: changes in the nominal exchange rate ($\sigma(e)$), the volatility of these changes ($\sigma(\Delta e)$), and the volatility of international reserves ($\sigma(r)$). We added nine countries to the sample, as indicators of the two polar policies: free floating is represented by Australia, Canada, the USA, and Japan, and peg is represented by Croatia, Hong Kong, Kazakhstan, Kuwait, and Vietnam. I ran the K-means algorithm over the four stable years before the shock, that is 2002–2006. Nine ITEEs out of 16 countries were in the same cluster as the free floating indicators. This result indicates that these countries share the same de facto exchange rate regime. I considered these countries to be free floating inflation targeters (FFIT). These countries were Brazil, Chile, Colombia, Hungary, Indonesia, Poland, South Africa, and Turkey. One country was in the same cluster as the countries taken as indicators of peg: Peru. The remaining six countries, the Czech Republic, Israel, Mexico, the Philippines, the Slovak Republic, South Korea, and Thailand, formed a third cluster between the two polar groups; this was the managed float cluster (or dirty float cluster). Thus, I was able to divide my ITEE sample into two subgroups: free floating inflation targeters (FFITs) and hybrid inflation targeters (HITs) (see Table 1, Fig. 1).

2.2. "Diffs-in-diffs" analysis

I compared the performance of the FFIT countries with that of the HIT countries during the 2007–2008 price shock to determine whether or not control matters.

I used Ball and Sheridan's "diffs-in-diffs" strategy to determine the effect of exchange rate control on economic variables while considering the problem of correlation between the benchmark *pre*-period variable and the dummy variable. The mean reversion problem was also taken into account.

$$X_{post} - X_{pre} = a_0 + a_1 D + \varepsilon \quad (1)$$

$$X_{post} - X_{pre} = a_0 + a_1 D + a_2 X_{pre} + \varepsilon. \quad (2)$$

Here, X denotes any economic variable, such as average inflation, excess inflation, credibility, real interest rate, inflation volatility or output variability. The *pre* subscript indicates the time period before the inflation shock, and the *post* subscript indicates the time period after the shock. D is a dummy variable, taking a value of 0 if the country is FFIT and a value of 1 if the country is HIT. This equation measures the difference in average inflation rate (for instance) between the two time periods (*post* minus *pre*) as a function of the IT framework (dummy variable D) and the average inflation rate of the *pre*-shock period's average inflation.

2.3. Data and selection of time periods

The *pre*-period ranged from the first quarter of 2004 to the last quarter of 2006. I could not start the *pre*-period before 2004 because only a few EEs were IT in the early 2000s. The *post*-period started in the second quarter of 2007, when the inflation pressures appeared (see Giustiniani et al. (2009)). I ended the *post*-period in the third quarter of 2008 in order not to include the consequences of Lehman's bankruptcy. I used quarterly data from IMF IFS and Data-Stream. I tested many different settings, and the results are strong. Data are available from the author.

3. Results

3.1. The Taylor Principle

The OLS estimation of Eq. (1), with X denoting the real interest rate, shows that on average the FFIT real interest rate dropped by almost 100 bp ($a0 = -0.99$, p-value $<10\%$). The dummy variable was associated with a positive but not strong coefficient ($a1 = 0.62$, p-value $>10\%$), meaning that the real interest rate of HITs failed in the same proportion as it did for FFITs.

Eq. (2) (last column) reveals that this drop in the real interest rate was strongly and positively correlated with the *pre*-period level. CBs that had low real interest rates before the shock reacted more quickly and strongly than the others.

In the two groups of countries, the decline in the real interest rate shows that CBs did not raise their nominal rates faster than inflation. Thus, none of the CBs applied the Taylor Principle.

3.2. Target achievement

I used two alternative definitions of price dynamics: inflation (change in the Consumer Price Index) and excess inflation (deviation of inflation from the CB's target).

The impact of the inflation shock on inflation was less important in HITs: $a1$ had a negative value with a strong p-value when corrected by the *pre*-level period (in Eq. (2), $a1 = -1.87$, p-value $<1\%$).

As for inflation, the shock had a smaller effect on excess inflation in HITs than in FFITs. The estimated coefficient $a1$ had a negative value with a strong p-value when corrected by the *pre*-level period ($a1 = -1.30$, p-value <10).

Credibility was calculated as the difference between the CB inflation target and the expected inflation rate given by the WES survey. The estimation of both equations gave strong results. FFIT credibility dropped by 1.70 pp with the shock. HIT credibility fell, on average, by 1.18 pp less than FFIT credibility did (estimation of $a1$ in Eq. (1), p-value $<5\%$).

Our results seem to indicate that exchange rate control contributed to limiting the extent to which the inflation rate, excess inflation, and credibility worsened. This result suggests that HITs had a better monetary anchor than FFITs.

3.3. The efficiency curve

The efficiency of a monetary policy is generally evaluated by using the Taylor curve (see Svensson (2010)). The estimation of the two equations for the volatility of inflation and GDP gross (defined as the standard deviation) showed no strong support for any movement of the curve (see Table 2).

Table 2
Results.

	Inflation		Excess inflation		Credibility		σ(inflation)		σ(excess inflation)		σ(GDP gross)		Real interest rate	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Constant(a_0)	1.399*	4.790***	2.316***	2.755***	−1.701***	−2.024***	−0.024	0.179	−0.013	2.146***	0.839**	0.031	−0.994*	0.031
	(0.748)	(0.825)	(0.668)	(0.487)	(0.407)	(0.510)	(0.382)	(0.732)	(0.470)	(0.764)	(0.385)	(0.650)	(0.518)	(0.650)
Dummy(a_1)	−0.645	−1.875***	−1.257	−1.309*	1.182**	1.160**	0.959*	0.839	1.156*	0.019	0.436	0.312	0.628	0.312
	(1.058)	(0.694)	(0.944)	(0.669)	(0.575)	(0.574)	(0.541)	(0.666)	(0.665)	(0.625)	(0.545)	(0.528)	(0.733)	(0.528)
$X_{pre}(a_2)$		−0.640***		−0.866***		0.470		−0.066		−0.846***		0.581		0.581
		(0.130)		(0.225)		(0.451)		(0.199)		(0.263)		(0.385)		(0.385)
$r2$	0.026	0.661	0.112	0.586	0.232	0.291	0.183	0.19	0.178	0.542	0.044	0.186	0.05	0.186

4. Conclusion

My study clearly shows two distinct behaviors of emerging economies that have adopted an inflation-targeting framework: some have an independent floating exchange rate, whereas others have a managed float scheme. To our knowledge, this study is the first to provide strong evidence that the exchange rate strategy played a major role during the 2007–2008 price shock in ITEEs.

HIT is strongly associated with a weaker inflation surge, less deviation from the target, and less credibility loss.

Part of the explanation for this result comes from the lack of adherence to the Taylor Principle by both of the two groups. Thus, IT effectiveness has to be questioned.

Here is a paradox: the most credible CBs are not those that did what they said they would; the most credible CBs are those that enlarged their toolkit with other goals and tools, with no clear communication about these actions.

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