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Stability and Economic Performance of the Inflation-Targeting Policy Facing the Crisis

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ABSTRACT

This paper analyzes the inflation targeting policy in emerging economies. More specifically, the development of this work aims to study the conduct, effectiveness and performance of this monetary policy strategy in a context of instability. Taking into account the financial collapse of 2008 and 2009 that has produced the worst global recession since the 1930s. We are developing an econometric approach based on the estimation of the efficiency frontier: Variability of inflation - variability of output, which allows us to deduce measures of economic performance and measures of the efficiency of monetary policy. Our results show a significant difference within the macroeconomic performance in a global economic environment characterized by an international financial crisis. We show that these differences are generally due to the choice of this monetary policy strategy.

Keywords: Inflation Targeting, Stability, Performance, Efficiency Frontier
JEL Classifications: E52, E63

1. INTRODUCTION

Inflation targeting is a monetary policy strategy (since the 1990s) that is based on a direct target of inflation and abandons any explicit intermediate targets with a specific horizon for achieving this quantitative objective.

According to the literature review, Mishkin's (2000) definition seems the most comprehensive: "Inflation targeting is a monetary policy strategy that encompasses five main elements: (i) Public announcement of medium-term inflation objective, (ii) an institutional commitment to price stability as the main objective of monetary policy, to which other objectives are subordinated, (iii) an inclusive information strategy in which many variables, and not just monetary aggregates or the exchange rate, are used to decide the implementation of policy instruments, (iv) greater transparency of monetary policy through communication with the public and the market (…), (v) increased accountability of the central bank to achieve its objective." Anchoring by inflation seems to combine at the same time, ease of control and transparency for the public. In this spirit, inflation targeting, initially adopted by some industrialized countries, provides a framework for better economic and financial decision-making. It would help to define a

more credible monetary policy and increase public understanding of the central bank's strategy to reach the inflation target. This transparency is likely to provide a clear picture of medium- and long-term inflation prospects and subsequently reduce the specter of "surprise" inflation. All this explains the attractiveness of this monetary policy strategy on emerging countries.

The introduction of the inflation-targeting policy had a real effect on level and expectations and on other macroeconomic variables such as output, Mishkin (1997); Mishkin and Schmidt-Hebbel (2002); Truman (2003); Mishkin and Schmidt-Hebbel (2007). This effect has been noticed in periods prior to the financial crisis (1990-2007).

The crisis period of 2008-2015, in which the real economy generated one of the most important international economic shocks. We therefore recall that the financial collapse of 2008 and 2009 has produced the worst global recession since the 1930s. The gross domestic product (GDP) growth rate is falling, sometimes close to 0%, the trade surplus falls, the deficit of the balance of current accounts increases, the virtuous circle of growth tends to become a vicious circle, Salama (2014). Our analysis will focus in this case on the effectiveness of this monetary strategy in the

face of the financial crisis. Facing this crisis, particular attention should be given to determining whether the characteristics specific to a particular economic policy framework could have helped the target countries to better manage any state of shock. A number of economists Blanchard et al. (2010), Stiglitz (2008), Leijonhufvud (2011), Giavazzi and Giovannini (2011) Öztürk et al. (2014) stipulated that central banks should re-examine a monetary policy framework focusing on inflation targeting following the international financial crisis.

As a follow-up to the literature on earlier periods, our analysis deals with the effects of inflation targeting in emerging countries over the recent period (crisis and post-financial crisis). The works of Dueker and Fisher (1996), Lee (1999), Blackburn and Pellonni (2005), Stiroh (2006), Brito and Bystedt (2011), Willard (2011), show that an economic environment characterized by credibility a low level of uncertainty, is conducive to growth.

Before starting our empirical analysis to evaluate inflation targeting performance over the recent period, based on the work of Cecchetti and Krause (2002), Cecchetti et al. (2006), Mishkin and Schmidt-Hebbel (2007), Aguir and Smida (2015), we estimate the efficiency frontier: Variability of inflation - output variability, which allows us to deduce measures of economic performance and monetary policy efficiency in the Post-crisis period.

2. INFLATION EFFICIENCY, ECONOMIC GROWTH

This section examines the growth rates (GDP) and inflation rates in emerging countries as a result of the implementation of an inflation targeting strategy by comparing pre- and post- targeting (2004-2007 and 2008-2015). Applying the following methodology: Inflation targeting policy is economically efficient, when it generates an increase in the degree of stability in the macroeconomic environment, Ftiti and Hichri (2014), Aguir (2014), Armand (2017), Thornton and Vasilakis (2017).

The year 2004 represents the period of stationarity of the target; the targets of inflation are arranged at a constant level or aligned for an indefinite future, Miskhin and Scmidt (2007), Aguir and Smida (2015) (Table 1).

For countries adopting this strategy, they performed better than those that did not pursue an inflation targeting strategy and the decline in GDP growth during the crisis was lower for inflation targeters.

The inflation rate in these countries is much lower both before and after the crisis than countries which do not practice this strategy of inflation targeting and in which the fluctuation gap during the crisis is lower.

As a result, emerging countries that practice the inflation targeting strategy have a higher growth rate than countries that do not pursue this strategy after the crisis. In other words, they are more efficient. Our results show and with the comparison of countries that this monetary regime is favorable to a sustainable and non-volatile

economic growth, with a stable and low level of inflation (Tables 2 and 3). Our results confirm those found by Öztürk et al. (2014) by comparing these indicators before and after the crisis (from 2005 to 2011) in the developed countries. Central banks practicing this strategy also have a global vision that is not limited to maintaining inflation stability around the target, but also real economic stability Tapsoba (2012), Armand (2013), Ftiti and Hichri (2014). Tend to react more strictly to inflationary pressures and set their interest rates more strictly, Arnone and Remolli (2013), Aguir and Smida (2015), Armand (2017).

3. THE EFFECTIVENESS OF INFLATION-TARGETING FACING CRISIS IN EMERGING ECONOMIES

Before starting our empirical analysis in order to evaluate the performance of this monetary regime in the face of the crisis, based on the inflation targeting literature, three macroeconomic variables have effects on the environment monetary policy: Macroeconomic performance, the dimension of shocks, monetary performance, Mishkin and Schmidt-Hebbel (2007), Aguir (2014), Levieuge and Lucotte (2014), Aguir and Smida (2015), Thornton and Vasilakis (2017).

3.1. Method of Estimation

This section estimates the variability of inflation - output variability by OLS, Cecchetti and Krause (2002) Mishkin and Schmidt-Hebbel (2007) and Aguir and Smida (2015)[1] Which allows to build an efficiency frontier and deduce measures of economic performance and measures of the efficiency of monetary policy[2]. The measure of an economy's performance in terms of output-inflation variability determined by quadratic deviations from output inflation[3]:

$$L = \lambda \, (\pi 1 \text{-} \pi 1^*)^2 + (1 \text{-} \lambda) \, (\gamma 1 \text{-} \gamma 1^*)^2$$

With:

$\pi 1$ is the rate of inflation;
$\pi 1^*$ is the target of inflation;
$\gamma 1$ is the logarithm of the output level;
$\gamma 1^*$ is the target or the trend level of the output; λ is the weight attached to inflation.

Thus, our measure of macroeconomic performance, L, is a weighted average of the observed variability of inflation and output relative to their target levels[4].

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1 For more details on this section see Aguir and Smida (2015). Efficiency of monetary policy under inflation targeting. Economics Bulletin, 35(1), 788-813.
2 An indicator of the degree of optimality of monetary policy. Movements towards the efficiency frontier indicate an improvement in monetary policy.
3 The derivative of a standard conventional lens of a central bank which consists of the minimization of the loss function.
4 If ΔL = LNIT - LIT is negative, then countries without IT have better macroeconomic performance than countries with IT. The difference between the observed measures of the performance of countries without IT in the post-crisis period (LNIT - post crise) and those of countries with

Table 1: Period after inflation targeting

Contries	Convergence period	Stationarity period	Period of crises
Czech republic	1998:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
South Korea	1998:T2 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Poland	1999:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Brazil	1999:T2 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Chile	1999:T3 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Colombia	1999:T3 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
South Africa	2000:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Thailand	2000:T2 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Mexico	2001:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Hungary	2001:T3 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Peru	2002:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Philippines	2002:T1 to 2003:T1	2004:T1 to 2007:T4	2008:T1 to 2015:T4
Turkey	2002:T1 to 2003:T4	2004:T1 to 2007:T4	2008:T1 to 2015:T4

Table 2: Effect of inflation targeting strategy before and after the crisis: Inflation targeting countries

Countries	Year IT adopted	Rate of inflation targeting practice (%)	Inflation rate in 2015	Development rate in 2015	Average inflation rate after crisis in 2004-2007	Average inflation rate before crisis in 2008-2015	Average development rate after crisis in 2004-2007	Average development rate before crisis in 2008-2015
South Africa	2000	4-6	4.6	2.30	4.80	5.29	5.49	3.09
Brazil	1999	4.5±2	6.9	3.10	4.03	5.91	5.10	4.21
Chile	1999	1-4	3.9	2.30	4.68	5.02	5.07	3.85
Colombia	1999	3-4	4.5	3.10	4.03	5.88	6.10	5.38
South Korea	1998	1±1	0.7	3.60	2.46	1.81	4.87	4.01
Hungary	2001	1±1	0.3	3.10	4.51	2.87	2.93	4.10
Israel	1992	2±1	0.5	2.80	1.30	2.40	5.47	3.84
Mexico	2001	4.5±2	2.7	2.50	3.93	4.98	3.90	4.68
Peru	2002	2±1	3.6	3.30	1.79	2.58	5.80	3.69
Philippine	2002	4-5	1.4	5.90	4.94	4.24	5.53	5.21
Poland	1999	1.5±1	0.6	3.90	2.33	2.69	5.53	4.24
Czech republic	1998	2-4	0.3	4.50	2.41	2.21	6.50	3.58
Thailand	2000	0.5-2.5	0.9	3.80	2.31	2.34	4.90	4.52
Turkey	2006	4±2	7.1	4.00	9.84	7.89	5.67	4.32
Average rates					3.81	4.07	4.84	4.19

Table 3: Effect of inflation targeting strategy before and after the crisis: Non-inflation targeting countries

Countries	Rate of inflation targeting practice (%)	Inflation rate in 2015	Development rate in 2015	Average inflation rate after crisis in 2004-2007	Average inflation rate before crisis in 2008-2015	Average development rate after crisis in 2004-2007
Argentina	6.20	6.40	8.90	11.80	4.10	1.10
Bolivia	4.10	5.10	4.30	2.10	4.80	4.10
Bulgaria	1.10	3.60	7.30	2.40	6.80	1.04
Croatia	1.05	2.60	3.20	1.00	4.80	1.20
Georgia	5.0	2.80	9.20	7.10	9.40	5.30
Morocco	2.6	4.50	4.30	1.00	7.60	3.00
Paraguay	4.1	3.0	9.60	4.70	4.80	1.00
South Africa	5.9	1.0	4.50	5.10	5.20	1.20
Uruguay	8.7	1.0	6.4	6.70	4.10	2.50
Average rates			6.41	4.65	5.73	2.27

The change in performance due to change in the size of shocks is derived from the following combination of optimal output and inflation variances:

$$S = \lambda (\pi 1 - \pi 1^*)^2_{opt} + (1 - \lambda) (\gamma 1 - \gamma 1^*)^2_{opt} \quad {}^{5}$$

$(\pi 1 - \pi 1^*)^2_{opt}$: Deviations of inflation from the target under an optimal policy.

$(\gamma 1 - \gamma 1^*)^2_{opt}$: Deviations of the output from the target under an optimal policy. Measures the efficiency of monetary policy:

IT (LIT - post crise) reflects differences in macroeconomic performance.

5   S is a measure of supply shock variability. A negative value of ΔS = Spost

IT post_crise- S pre IT post_crise implies that IT countries are confronted with smaller shocks following the adoption of inflation targeting.

Table 4: Cohesion between L, E et S

IT countries	L1	E1	S1	Non-IT countries	L2	E2	S2	Variations		
								L2-L1	E2-E1	S2-S1
IT countries (in % of L)	13.83	2.0114	11.8216	Non-IT countries (in % of L)	27.21	5.4019	21.8181	17.40	7.4142	9.9958
IT countries, before-crisis (in % of L)	18.01	2.5814	15.4386	Non-IT countries before crisis (in % of L)	28.64	4.9017	23.7483	10.63	2.3221	8.3179
IT countries, after-crisis (in % of L)	7.46	1.2416	6.2284	Non-IT countries after crisis (in % of L)	25.61	5.8722	19.7478	18.15	4.6325	13.5275

$$E = \lambda\,[(\pi 1 - \pi 1^*)^2_{opt}] + (1 - \lambda)\,[(\gamma 1 - \gamma 1^*)^2 - (\gamma 1 - \gamma 1^*)^2_{opt}]^6$$

The calculation of these performance measures requires the estimation of the boundary of the output-inflation variability.

We will proceed in two main steps: We estimate a simple demand and global offer model, and then use these estimates to construct the efficiency boundary and calculate L, S and E[7].

In order to identify the impact of the IT, our approach is to compare performance between two groups: Our study concerns 14 emerging countries practicing inflation targeting and 9 emerging countries practicing other monetary policies.

- Countries with IT before IT#IT country after IT,
- Countries with IT after IT (total period)# countries without IT (total period),
- Countries with the pre-crisis IT (2004-2007)# countries without the pre-crisis IT (2004-2007) country with IT crisis period (2008-2015)# countries without IT crisis period (2008-2015).

3.2. Estimated Results

A comparison of two groups of countries from 2004 to 2015 (full period) shows that countries pursuing inflation targeting have shown better economic performance. This performance gain is reflected in the positive value $\Delta L = 10.81$, which comes from 42% of positive supply shocks and 58% of monetary policy efficiency under the inflation targeting regime (Table 4).

The difference in the weighted average of the observed variances in inflation and output, related to their target levels, improved during the post-crisis L2-L1 = 18.15; shocks to the target countries were smaller (S2-S1); the monetary performance of these countries is closer to the optimal policy (E2-E1) and that the inflation targeting policy is economically efficient, following an increase in the stability of the macroeconomic environment in pre- and post- crisis periods.

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6   E indicates that the monetary performance is closer to the optimal policy. ΔE = ENIT_Postcrise - EIT_Post crisis; A negative value of ΔE implies that the policy of the countries without the CI is more efficient in the post-crisis period.

7   For more details see Aguir and Smida (2015). Efficiency of monetary policy under inflation targeting. Economics Bulletin, 35(1), 788-813.

4. CONCLUSION

The international financial crisis has hit low-income countries hard. At the end of 2010, emerging and developing economies, as a group, experienced a production loss of about $2.6 trillion. Exports would be 20% lower than the 2010 forecast before the onset of the crisis. The amount of public assistance in 2010 decreased by $20 billion.

A first analysis of a sample of emerging inflation-targeting countries shows that these countries adapt better to the crisis. The inflation rate has decreased, its variability has been lower and inflation expectations have been lower. All this explains the attractiveness of this strategy to emerging countries.

In a second step, and following a review of the literature on the main studies, they show a negative effect of cyclical volatility on economic growth. The study of how macroeconomic variables, and in particular monetary variables, play a role in growth theory shows that a stable macroeconomic environment is conducive to good economic growth. Subsequently, the performance of the inflation targeting policy was judged on the basis of the stability effect of the macroeconomic environment and in particular the environment of monetary policy. The inflation rate has decreased, its variability has been lower and inflation expectations have slumped. This proves that this regime is conducive to economic growth. The comparison between countries in pairs shows that the inflation targeting country recognizes more macroeconomic performance.

This result confirms the stylized facts presented and the postulates developed in the literature, Vega and Winkelried (2005) and Batini and Laxton (2007), Ftiti (2010; 2014), Armand (2013; 2017), Aguir and Smida (2015).

In order to achieve our objective, we studied the effectiveness of the inflation targeting policy in the 2008-2015 period (crisis period) by estimating the efficiency frontier: Variability of inflation - output variability, which allows us to deduce measures of economic performance and measures of the efficiency of monetary policy. The obtained results show that adoption of inflation targeting is conducive to sustainable economic growth and that the inflation- targeting country experiences more macroeconomic performance than non-targeting countries and that these differences are generally attributable at the choice of this new regime, during the crisis time.

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