ENHANCED ECONOMIC STABILITY AND THE ROLE OF INFLATION TARGETING POLICY: EMPIRICAL STUDY ON CASE OF DEVELOPING COUNTRIES

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ABSTRACT

Inflation targeting has become the predominant monetary approach across the globe. In this paper, we examine the inflation targeting experience in developing countries. We estimate the effects of inflation targeting on macroeconomic performance in these economies. The approach is based on the methodology applied by Pétursson (2005) which uses panel data to assess the effects of inflation targeting while controlling for the Great Moderation. The work analyze the relationship between inflation targeting and macroeconomic performance for two groups: treatment and control group over the period 1980-2012. A key lesson from this experience is that inflation targeting monetary policy realizes macroeconomic performance and contributes to the reduction of inflation, especially in countries with hyperinflation.

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Contribution/ Originality

This study is one of very few studies which have investigated the issue of the inflation targeting experience in developing countries. It contributes to the economic literature on the topic by a critical question is whether that inflation targeting monetary policy realizes macroeconomic performance and reduces the hyperinflation.

1. INTRODUCTION

The workflow during the 70s has given rise to two types of monetary policy whose principle is based on targeting the exchange rate and monetary aggregates. These two policies have not been able to ensure the control of inflation in the long term. Their failures have been attributed to their degree of discretion and lack of credibility of their actions. At that time, a new debate is emerging between rules and discretion (Rules versus discretion). As a consequence of the cited literature (Kydland and Prescott (1977) and Barro and Gordon (1983)) a new policy is introduced in the early ninety. This is the "inflation targeting policy". The emergence of this monetary regime reflects a break with the existing theoretical framework at that time in terms of monetary policy. This policy does not target intermediate variables, but it acts on the final variable, namely "inflation".

Since the 1990s, the policy of inflation targeting (IT) is adopted as an alternative to the policy of targeting monetary aggregates or the exchange rate fixed. Practice of inflation targeting made his theory. The policy of

inflation targeting was adopted without the inherent theory. The practice of this policy prior to his theory, which came in later: Svensson (1999) and Woodford (2003). Due to tardiness of the theory of inflation targeting, many discussions have arisen. The recent debate has focused on the macroeconomic performance of the inflation targeting policy. New Zealand was the first country adopting inflation targeting in 1990. Although, economists have explained theoretically targeting inflation only from 1995 (Leiderman and Svensson (1995); Svensson (1997); Bernanke and Mishkin (1997)). This lack theoretical caused a reticence in some countries to the adoption of inflation targeting.

During the 20th century, the number of countries that have adopted this monetary regime has increased. Twenty-six Central Banks use inflation targeting as a framework for monetary policy, while others countries, mainly developing countries in preparing for the implementation of the new monetary regime. Until the first half of the 1990s, inflation targeting was designed primarily to industrialized countries. Bernanke *et al.* (1999); Mishkin and Schmidt-Hebbel (2007) and Landerretche *et al.* (2001) concluded that the adoption of inflation targeting is an opportunity for countries adopting this monetary regime. The work of Truman (2003); Levin *et al.* (2004) and Batini *et al.* (2005) show that the adoption of inflation targeting is a necessity to ensure the credibility of monetary policy. By against, Capistrán and Ramos-Francia (2006) point out some caveats about the efficiency of inflation targeting. In other works, Mishkin and Schmidt-Hebbel (2007) show that the adoption of inflation targeting in emerging countries gives less satisfactory results than in developed countries, although the decline in the inflation rate is very remarkable after inflation targeting. In this context, Rose (2007) shows that inflation targeting can ensure long-term performance more remarkable than other monetary regimes. Ball and Sheridan (2005) using a cross-section difference-in-differences model, show that there is no long-term difference between the industrialized countries. They yield arguments against the positive effects of inflation targeting. Gonçalvas and Salles (2008) applied the method of Ball and Sheridan (2005) on a sample of 35 new countries adopting inflation targeting. The results of their research were similar to those of the Batini *et al.* (2005). They find that inflation targeting leads to a decrease in the average inflation rate and reduce the volatility of GDP growth. In a new book recently published by the OECD, De Mello and Diego (2008) finds that the adoption of inflation targeting in emerging countries allows macroeconomic performance. In this respect, the results obtained in the majority of studies show that the monetary authorities in emerging economies are less attached to their goals of price stability. Inflation targeting in these economies is quite a difficult task because it is related to the unstable macroeconomic environment, like the fragility of institutions and lack of credibility of monetary policy. Views these shortcomings, developing economies have the challenge to acquire more credibility to ensure a price stability and sustainable economic growth. Indeed, the novelty of this regime (IT) consist to, on the one hand, the explicit commitment to consider inflation as the primary goal of monetary policy and on the other hand, the emphasis in is placed on the transparency and responsibility of the central bank. In addition, monetary authorities were aware of the success of this rule because the results were satisfactory for developed countries. This monetary rule requires several prerequisites structural and institutional as emerging markets could not ensure.

Thus, in the literature, it appears that most of the results are different because of the wide variety of samples. Some samples include all industrialized countries, countries that adopt explicit targeting and those adopting implicit targeting. In addition, many other studies disagree on the dates of the actual adoption of (IT) or the methods used, which significantly affects the results. This variety in the samples, time or methods causes a lot of divergences in the discussions.

The contradictions in the empirical work led us to look for, if inflation targeting contributes to macroeconomic performance. Indeed, the objective in this work is to obtain results in favor of the adoption of (IT).

The purpose of this article is to examine whether inflation targeting affects the volatility of inflation and enhance economic growth. We also verify the effectiveness of this policy through the achievement of economic performance. Thus, we hope to achieve two goals in this work: one is to contribute to the economic literature on the topic;

and the other is to have a more reliable yardstick available before recommending that any Central Bank joins the inflation targeting framework. Our empirical technique recently used by economists in the case of the theory of inflation targeting in developed countries. Indeed, we have adopted the "Great Moderation" approach of Pétursson (2005) that address one methodology well known in the literature. Than by using panel data, we test the effect of inflation targeting while controlling for the "Great Moderation". The most important advantage, "Great Moderation" approach gives us information about the stability of inflation and growth in developing countries that have adopted (IT) by the end of 2007 (called ITers or treatment group) and non ITers (or control group).

The remainder of the paper is organized as follows: section two present the econometric methodology and introduces the dataset. Section three shows the estimation results. Section four is devoted to the discussion. Finally, we conclude.The paper has additional tables in the appendices.

2. EMPIRICAL STUDY

We try to establish empirical studies that allow providing robust answers to show the important role of (IT) framework to enhance economic growth and stabilize the volatility of inflation. Our focus is to analyze the relationship between (IT) framework and economic performance. Empirical research is headed by factors:

-Work addressing the relationship between the volatility of inflation rate, the growth and inflation targeting in developing countries, are rare. Then, the conduct of monetary policy in industrialized countries differ in developing countries either by the operational and institutional frameworks of central banks in the presence of inflation targeting or different level of financial development.

-We follow a panel methodological approach in examining these issues. Most studies that have addressed this issue have been based on individual analyzed using time series analysis. A panel analysis provides some advantages. This method can distinguish two groups of countries, treatment group and control group (Ball and Sheridan (2005) and Pétursson (2005)).

2.1. Econometric Methodology and Data

To study the impact of inflation targeting on macroeconomic performance, we use the "Great Moderation" approach of Pétursson (2005) that address one methodology well known in the literature. In this work, the focus will be on the developing countries, because empirical studies dealing the case of these economies are rare and the results are sometimes contradictory. To test the effect of inflation targeting on macroeconomic performance, we evaluate its effect on inflation, output growth and their volatilities in developing economies.

Our empirical study is based on the use the methodology of Pétursson (2005). He argues that it's not clear whether falling inflation in inflation targeting countries can be related to the adoption of inflation targeting or whether this is simply a global phenomenon, a formal empirical analysis is needed. To do that the following panel model is estimated for the sample of N inflation targeting countries.

$$\pi_{it} = \alpha_{\pi t} + \beta_\pi \, IT_{it} + \gamma_\pi \, \pi_{it-1} + \mu_\pi \, y_{it-1} + \delta_0 \pi_t^w + \delta_1 \pi_{it-1}^w + \xi_{\pi it} \, . \qquad (1)$$

$i = 1 \ldots N, \ t = 1, \ldots, T.$

Where π_{it} is inflation in inflation targeting country i at time t, y_{it} is output growth in inflation targeting country i at time t, $\alpha_{\pi t}$ is the constant, π_t^w is the average inflation rate of a group of non-inflation targeting developing economies. This variable controls for the general evolution of the inflation level and IT it is a dummy variable which equals one from the first quarter after the adoption of inflation targeting and zero otherwise. The model also includes lagged on inflation to account for a possible bias due to potential correlation between the dummy variable and past inflation performance. This final variable controls for the general evolution of the inflation level. The lagged inflation is added for the same reason as in the Ball and Sheridan (2005) model, namely to control for the higher initial

inflation in inflation targeting countries. The model is estimated as a seemingly unrelated regression (SUR) with fixed country effects for the period 1980:1 – 2012:4, using different country samples[1]. A SUR is a set of equations which might be related, not because they interact, but because their error terms are related. For example an exogenous rise in global food and energy prices affects domestic inflation in all countries, whereas domestic causes of inflation might not have an effect on other countries. A General Least Squares estimator yields the best, Best Linear Unbiased Estimator (BLUE).

An alternative estimation approach is to include the non-inflation target countries in the sample group and to approximate the global disinflation trend with a time trend polynomial, $\lambda_\pi(t)$. The trend polynomial replacing π_t^w. In this case the inflation target countries can be thought of as the "treatment group" and the non-inflation target countries as the "non-treatment group". Again this regression is estimated with a SUR approach and the same country samples are defined.

$$\pi_{it} = \alpha_{\pi t} + \beta_\pi IT_{it} + \gamma_\pi \pi_{it-1} + \mu_\pi y_{it-1} + \lambda_\pi(t) + \xi_{\pi it}. \qquad (2)$$
$$i = 1 \ldots N + M, \ t = 1, \ldots, T.$$

Where, the country sample includes N inflation targeting countries and a control group of M − N countries. Hence, equation (2) is re-estimated with the trend polynomial. In order to confirm if IT really delivers a performance macroeconomic, we estimate the following equation:

$$y_{it} = \alpha_{yi} + \beta_y IT_{it} + \gamma_y y_{it-1} + \mu_y r_{it-1} + \varphi_y e_{it-1} + \delta_{y0} y_{it}^w + \delta_{y1} y_{it-1}^w + \xi_{yit}. \quad (3)$$
$$i = 1 \ldots \ldots \ldots N; \ t = 1, \ldots, T.$$

Where y_{it} output growth in inflation targeting country i at time t, r_{it} is the real interest rate in inflation targeting country i at time t, e_{it} is the real exchange rate in inflation targeting country i at time t (a rise in e_{it} denotes an appreciation) and y_t^w is average output growth in non-targeting developing countries and IT_{it} is a dummy variable which equals one from the first quarter after the adoption of inflation targeting and zero otherwise.

We define another model which includes all emerging markets. Just as in previous equation the averages y_t^w and y_{it-1}^w are replaced with a time trend $\delta_y(t)$.

$$y_{it} = \alpha_{yi} + \beta_y IT_{it} + \gamma_y y_{it-1} + \mu_y r_{it-1} + \varphi_y e_{it-1} + \delta_y(t) + \xi_{yit}. \qquad (4)$$
$$i = 1 \ldots N + M; \ t = 1, \ldots, T.$$

2.2. Data and Estimates

By using panel data, we test the effect of inflation targeting while controlling for the "Great Moderation" for the period 1980:1-2012:2, using different country samples. For robustness reasons, different country samples are being used. The first country sample includes all the 20 inflation targeting countries. The second sample includes the 11 countries that had adopted inflation targeting prior to 2002. The third sample includes the 6 countries that had adopted inflation targeting prior to 2002 and had inflation on average below 25% in the 1980s. The fourth sample includes the 3 countries that had adopted inflation targeting prior to 2002 and had inflation on average below 15% in the 1980s. The final sample includes the 4 countries that had adopted inflation targeting prior to 2002 and had an average inflation above 50% in the 1980s. We employ inflation that is measured as quarterly percentage change in the Consumer Price Index (CPI) and GDP growth rates from the IMF's International Financial Statistics (IFS). For missing data we used the annual base given by the World Bank. Our dataset consists of 53 developing countries examined over the period 1980-2012. The sample is composed of 20 developing countries that have adopted IT by

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[1]Zellner (1962). A seemingly unrelated regression (SUR) system comprises several individual relationships that are linked by the fact that their disturbances are correlated. Such models have found many applications. For example, demand functions can be estimated for different households (or household types) for a given commodity.

the end of 2007 (called ITers or treatment group) and 33 non ITers (or control group) (see table A in appendix).For purpose of comparability, our sample relies on Lin and Ye (2009) and Roger (2009). The developing countries category considered here refers to the World Bank classification, thus includes both low-income countries and emerging-market countries. Accordingly, we estimate treatment effect of IT upon macroeconomics variables by the chosen conservative starting dates of IT. Because effect of IT upon our variables is driven by the chosen starting dates of IT (see table 1).

3. ESTIMATION RESULTS

3.1. Effects on Average Inflation

Table 1contains the estimations of equation (1) and (2) for every country sample. The effects of IT are considered statistically significant for all groups of countries emerging even for countries that have experienced hyperinflation since the 80s.

Table-1. Estimation of the effects of inflation targeting on inflation.Estimation equation (1) and (2).Dependant variable: Inflation rate

	All emerging market economies with an inflation targeting regime [1]		Adoption prior to 2002 [2]		Adoption prior to 2002 and average inflation below 25% in 1980s [3]		Adoption prior to 2002 and average inflation below 15% in 1980s [4]		Adoption prior to 2002 and average inflation above 25% in 1980s [5]	
	Eq.1	*Eq.2*	*Eq.1*	*Eq.2*	*Eq.1*	*Eq.2*	*Eq.1*	*Eq.2*	*Eq.1*	*Eq.2*
Constant	2.18	4.6**	0.90	1.12	1.24	1.63	0.75	0.65	11.88	12.62
	(1.11)	(1.3)	(0.34)	(0.56)	(0.13)	(0.24)	(0.1)	(0.19)	(3.79)	(6.8)
π_{t-1}	0.65	0.66**	0.861	1.07	0.44	0.40	0.58**	0.47**	-0.18***	0.03*
	(0.34)	(0.41)	(0.03)	(0.02)	(0.03)	(0.04)	(0.04)	(0.05)	(0.17)	(0.19)
y_{t-1}	0.53	0.21**	0.008	-0.143	-0.39***	0.5	0.012**	0.01*	0.69	0.37***
	(0.5)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.06)	(0.06)	(0.19)	(0.22)
π_t^w	0.98		0.2		0.16		0.29		0.12	
	(1.0)		(0.07)		(0.07)		(0.08)		(0.11)	
π_{t-1}^w	-2.71		-0.18		-0.12		-0.32		-0.09	
	(1.05)		(0.07)		(0.08)		(0.05)		(0.19)	
IT Dummy	-2.32*	-2.6***	-0.71	-0.08	-0.48**	-0.19*	-0.463	-0.291	-11.8*	4.67**
	(1.05)	(1.7)	(0.45)	(0.54)	(0.15)	(0.22)	(0.12)	(0.14)	(0.17)	(6.56)
Time trend		1.19		-0.09***		0.015**		-0.01*		-0.07*
		(1.03)		(0.08)		(0.03)		(0.001)		(0.12)
R^2	0.87	0.86	0.997	0.99	0.90	0.83	0.99	0.99	0.97	0.95
Observations	1510	1473	964	949	486	479	332	328	370	364
Wald test (Chi2)	401.5	391.6	3197.3	3983	159.06	154.8	288.33	298.8	120.02	453.2
P- Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: Author's estimations.

- Numbers in parenthesis are standards errors.

*,**,*** respectively denote significance at the 1%,5 % and 10 % levels.

[1] 20 inflation targeting countries, Brazil, Chile, Colombia, Czech Republic, Hungary, Indonesia, Israel, Mexico, Peru, Philippines, Poland, South Africa, South Korea, Thailand, Turkey, Guatemala, Romania, Serbia, Slovakia and Ghana.

[2]The second sample includes the 11 countries, Brazil, Chile, Colombia, Czech Republic, Hungary, Israel, Mexico, Poland, South Africa, South Korea and Thailand.

[3]The third sample includes the 6 countries, Chile, Colombia, Hungary, South Africa, South Korea andThailand.

[4]The fourth sample includes the 3 countries, South Africa, South Korea and Thailand.

[5]The final sample includes the 4 countries, Brazil, Israel, Mexico, Peru and Poland.

Estimates for the inflation targeting dummy are generally negative, however, rarely significant. Significant results can only be reported in the country sample of countries with average inflation levels below 25 per cent in the 1980s. In addition we report that the inflation level is rarely significant, and is only reallyfelt in countries with below 15 percent average inflation in the 1980s. Estimates of equation (2), the results suggest that the adoption of IT has reduced the average inflation in the first sample.

Dummy coefficient is negative and insignificant, which has an ambiguous effect on the impact of the adoption of inflation targeting policy on the level of inflation, which explains Siklos (1999) and Brito and Bystedt (2010). In the same context Gonçalvas and Salles (2008) argue that hyperinflation is a very distinct phenomenon from moderate inflation and therefore can be treated differently. Dummy coefficient is negative and insignificant threshold. These results show that the inflation volatility increased sharply during periods of crises in developing markets.

After the crisis period Asian crisis, Mexican crisis and currency crisis, the coefficient of dummy is positive and significant, indicating that the adoption of IT has reduced the volatility of inflation; this is consistent with the work of Lin and Ye (2009).

In the last sample, the effects on inflation targeting on inflation are found to be statistically significant. These findings are similar to the findings of other studies, such as Neumann and Von Hagen (2002) and Truman (2003). However, Ball and Sheridan (2005) argue that countries have adopted the IT because the inflation rate is very high before adoption of this monetary regime.

3.2. Effects on Output Growth

The estimation of the equation of the volatility of output growth, the coefficient is positive and significant at 10% levels. These results confirm the work Mollick et al. (2008). They showed that the IT has a positive effect on economic growth. Dummy coefficient is negative and insignificant, which shows that the adoption of IT is not relevant for the improvement of economic growth during two periods.

The majority of studies have interpreted the targeting of inflation as a strict monetary rule (see Gonçalvas and Salles (2008)) and Lin and Ye (2009). Some work argues that the inflation targeting can be harmful for the growth (see Friedman and Kuttner (1996)). Pétursson (2005) confirms these arguments showing the average growth performance in targeting countries. The growth has fallen slightly on average after inflation targeting. This is however reversed when the hyperinflation countries are excluded.

The main results are reported in table 2. The positive effects of inflation targeting on output growth is significant in country groups including hyperinflation countries and in countries adopting the inflation target prior 2002.

In other worksthere is no evidence suggesting that inflation targeting has harmed growth (see Ball and Sheridan (2005)) and Truman (2003); Pétursson (2005) compare fluctuations in output growth before and after inflation targeting. He seems that growth variability has decreased in general after the adoption of inflation targeting, with largest gain in emerging countries.

Then, the significant coefficient states that inflation targeting had a negative effect in countries with an average inflation rate under 15 and 25 percent in the 1980s. The negative effect can be explained by periods of disinflation were initiated by the beginning of the inflation target regime, resulting in lower or negative growth as the case of these countries: South Africa, South Korea and Thailand. These countries have adopted targeting with low levels of inflation.

The exchange rate and the interest rate generally yield insignificant results, as expected. These findings confirm the studies of Pétursson (2005) who concluded that inflation targeting has led to fall in nominal interest rate.

It is however appropriate to keep in mind, as pointed out by Ball and Sheridan (2005) that any effects of this new regime on growth are likely to take some time to emerge. The history of inflation targeting is therefore probably too

short to give a definite answer on the link between inflation targeting and economic growth, even in the countries with the longest targeting history.

Table-2. Estimation of the effects of inflation targeting output growth.Estimation equation (3) and (4).

Dependant variable: Output growth

	All emerging market economies with an inflation targeting regime		Adoption prior to 2002		Adoption prior to 2002 and average inflation below 25% in 1980s		Adoption prior to 2002 and average inflation below 15% in 1980s		Adoption prior to 2002 and average inflation above 25% in 1980s	
	Eq.3	*Eq.4*	*Eq.3*	*Eq.4*	*Eq.3*	*Eq.4*	*Eq.3*	*Eq.4*	*Eq.3*	*Eq.4*
Constant	2.41	4.3	1.78	4.05**	2.34*	5.09**	3.38**	8.93	4.66**	9.24*
	(1.29)	(1.7)	(1.59)	(1.96)	(1.4)	(1.75)	(1.59)	(2.18)	(2.06)	(3.66)
y_{it-1}	0.16*	0.31**	0.24*	0.23**	-0.24*	-0.25	-0.56	-0.57	-0.39	0.37
	(1.3)	(0.8)	(0.03)	(0.04)	(0.04)	(0.04)	(0.045)	(0.04)	(0.06)	(0.06)
r_{it-1}	0.087	0.62	0.015	0.14	-0.05*	0.03	0.062**	0.01*	0.01	0.37
	(0.2)	(0.31)	(0.001)	(0.02)	(0.06)	(0.01)	(0.091)	(0.06)	(0.01)	(0.22)
y_t^w	0.47**	-	0.32**		0.56		0.49*		0.39*	
	(1.19)		(0.27)		(0.62)		(0.34)		(0.16)	
y_{t-1}^w	-0.54*		-0.07		-0.03		-0.09		-0.1*	
	(1.04)		(0.14)		(0.27)		(0.18)		(0.35)	
e_{it-1}	**0.089**	**-0.04**	0.025	-0.02	0.08	-0.05	0.013	0.36*	0.02	0.021
	(0.32)	(1.28)	(0.015)	(0.05)	(0.012)	(0.01)	(0.04)	(1.04)	(0.017)	(0.01)
IT Dummy	-2.73*	-2.11*	-2.58*	-1.2**	-0.74	-0.06	-1.44	-6.02*	-6.09*	-3.52*
	(0.41)	(0.7)	(0.76)	(1.035)	(0.78)	(0.88)	(1.08)	(1.05)	(1.87)	(2.58)
Time trend		0.05**		0.03***		-0.024*	-	-0.59		-0.06***
		(0.9)		(0.07)		(0.02)		(0.03)		(0.04)
R^2	0.86	0.82	0.97	0.96	0.42	0.79	0.64	0.52	0.99	0.97
Observations	1263	1356	884	866	730	562	328	408	341	357
Wald test (Chi2)	864	851	1046	1053	39	43	158	178	595	599
P- Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: Author's estimations

- Numbers in parenthesis are standards errors

*,**,*** respectively denote significance at the 1%,5 % and 10 % levels.

4. DISCUSSION

The purpose of this paper was to evaluate the effectiveness of the policy of inflation targeting. This topic has been the subject of many economic debates. In our study, we have tried to provide some robust answers to some ambiguous question so far. Based on various studies, we proposed a very recent approach in the economic literature: the method of "Great Moderation" of Pétursson (2005). We have shown that inflation targeting is relevant for developing economies. This same method was used by the same economists in the case of 20 OECD countries but the results are totally contradictory.

Our work has shown shortcomings. The regime of inflation targeting based on certain institutional conditions (such as the independence of the Central Bank and solid performance systems, and stable economic structures Pétursson (2005).The choice of macroeconomic variables is limited to the volatility of inflation, the rate of economic growth. Other studies, Kim and Beladi (2009) and Sachsida *et al.* (2003) and Al-Nasser *et al.* (2009) have taken into account the commercial independence of developing countries relative to the rest of the world which identifies the ability of the policy of inflation targeting to control the price change. The analysis of economic developments using this method in the case of developing countries lacks precision. Our methodology has not shown that the adoption of inflation targeting positively affects the dynamics of inflation. A new method is proposed, this is the method of evolutionary spectral analysis has been used by Ftiti and Essadi (2013).This method is used to model inflation in a

sample of four developed countries adopting inflation targeting. It can detect structural breaks in the series of inflation and which coincide with the economic facts Ben Aissa *et al.* (2004).

Recently some studies have focused on the comparison of the effect of inflation targeting on macroeconomic performance Ball and Sheridan (2005) and Vega and Winkelried (2005) and Batini *et al.* (2005). All these studies were based on the study on cross-section evidence, but they differ in the choice of control group of non targeters, and especially in the theoretical and econometric methods used. Then, the majority of studies have interpreted the targeting of inflation as a strict monetary rule (see Gonçalvas and Salles (2008)) and Lin and Ye (2009)). This study can be extended by studying other samples from different geographic areas. We can treat the case, for example, of the countries of Eastern Europe in order to have a more significant effect in our estimates.

5. CONCLUSION

In this work, we presented an empirical study to verify the relevance of the inflation targeting policy to ensure price stability in the case of developing countries. To this end, we applied the approach of "Great Moderation" of Pétursson (2005).

We used panel data to study two groups in our sample: the treatment group and the control group the (ITers and non ITers group) to show the effect of the policy of inflation targeting on inflation and economic growth.The methodology we have followed in this work has given us important information about the relevance of the adoption of inflation targeting in developing countries and particularly in countries that have experienced hyperinflation.

The results reported in this paper are generally conforming to what has already been found. However, this result cannot provide an argument against inflation targeting in developing countries. A significant effect on inflation and its volatility was found. Based to the results, it seems that inflation target have an important role in reducing inflation rates in developing economies. The use of the approach of "Great Moderation" to test the effects of inflation targeting in developing countries is one of the first attempts in developing economies. This choice is highly beneficial. In addition, the Pétursson (2005) approach is clear and intuitive; it used the time dimension of the data with use of panel data. We can conclude that the choice of inflation targeting in developing countries has helped to reduce inflation. These results are consistent with those of Gonçalvas and Salles (2008) and Lin and Ye (2009) and Manai (2014).

Finally, we conclude that inflation targeting may be desirable for economic reasons and it might improve economic performance in the future. Other political and institutional factors must be taken into account to judge properly the effect of inflation targeting on economic growth in developing market. In this context, we recommend preparing an environment of inflation targeting implementation for more economic performance.

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Appendix

Table-A. Country list

Treatment group		Control group		
Brazil	Poland	Algeria	Georgia	Morocco
Chile	Romania	Argentina	Hong kong	Paraguay
Colombia	Slovakia	Belarus	Iran	Russia
Czech Republic	South Africa	Bulgaria	Jamaica	Singapore
Guatemala	South Korea	Cape Verde	Jordan	Slovenia
Hungary	Thailand	China	Kazakhstan	Syria
Indonesia	Turkey	Costa Rica	Latvia	Trinidad and Tobago
Israel	Serbia	Croatia	Lebanon	Tunisia
Mexico	Ghana	Dominican Republic	Lithuania	Ukraine
Peru	Philippines	Egypt	Macedonia	Uruguay
		Estonia	Mauritius	Venezuela

Source: Lin and Ye (2009) and Roger (2009). Serbia and Ghana are two countries are absent in Lin and Ye 2009's sample.

Table-B. Developing inflation targeters along with their starting dates

	Soft IT: Default starting dates	Full Fledged IT: Conservative starting dates
Chile	January 1991	August 1999
Israel	January 1992	June 1997
Czech Republic	January 1998	January 1998
South Korea	April 1998	April 1998
Poland	September 1998	September 1998
Mexico	January 1999	January 2001
Brazil	June 1999	June 1999
Colombia	September 1999	October 1999
Philippines	January 2002	January 2002
South Africa	February 2000	February 2000
Thailand	May 2000	May 2000
Hungary	June 2001	August 2001
Peru	January 2002	January 2002
Slovakia	January 2005	January 2005
Guatemala	January 2005	January 2005
Indonesia	July 2005	July 2005
Romania	August 2005	August 2005
Turkey	January 2006	January 2006
Serbia	September 2006	September 2006
Ghana	January 2007	January 2007

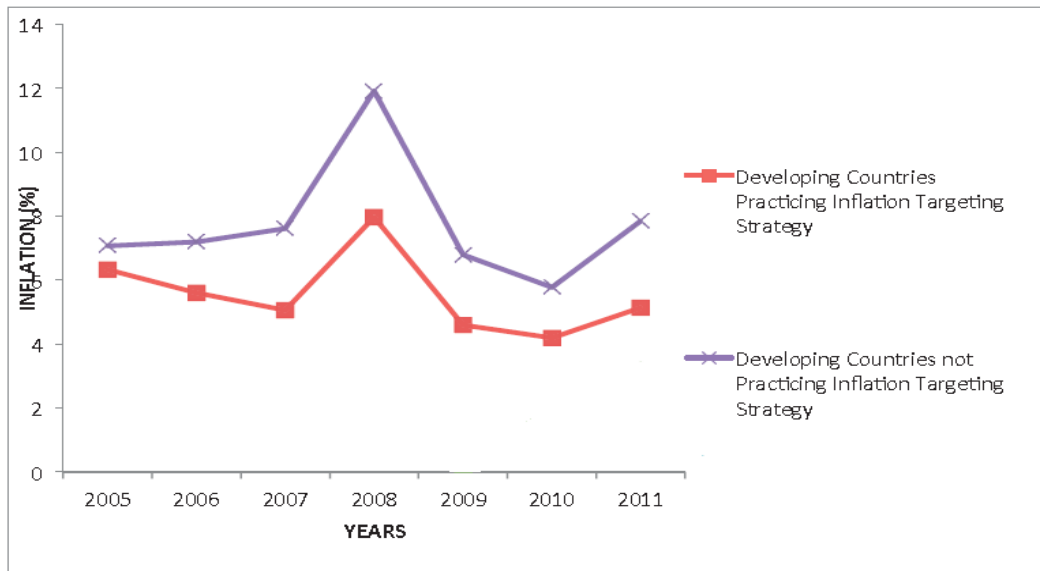**Source:** Rose (2007) and Roger (2009). Note that Slovakia abandoned IT in 2009 and joined the Euro Area.

Fig-1. Countries' rates before and after their passage to inflation targeting strategy
Source: Author's compilations