

Price stability in Open-Economy under Inflation Targeting Regime with Factors Influencing Inflation Volatility: The Case of Brazil

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Abstract

This paper analyzes the relevance of the inflation targeting (IT) policy in achieving its primary goal of medium term price stability in a open economy allowing the investigation of Brazil's experience with inflation targeting. It finds that this monetary policy regime has been associated with a general reduction in inflation, principally through a reduction in inflation expectations. The question addressed in this paper is to identify factors that may influence volatility of inflation and why Brazil are more successful than others adopting the policy of inflation targeting.

Keywords: Price Stability, Open Economies, Inflation Targeting

Introduction

Since the early 90s, a new monetary policy, called "inflation targeting (IT)" policy, has been adopted. It has been defined as a framework of monetary policy which consists in announcing an inflation target in advance to the public. The target level (or range) is the main argument in the central bank loss function. The central bank boards are independent in choosing the instrument to be followed in order to minimize the loss function.

This regime is characterized by (1) an explicit quantitative inflation target, either an interval or a point target, where the center of the interval or the point target currently varies across countries from 1.5 to 2.5 percent per year, (2) an operating procedure that can be described as 'inflation-forecast targeting', namely the use of an internal conditional inflation forecast as an intermediate target variable, and (3) a high degree of transparency and accountability¹.

The regime of inflation targeting was adopted by a number of increasingly important countries, especially in emerging countries from the last years of the Nineties. At the end of 2013, it accounted for eighteen emerging countries pursuing a strategy of inflation targeting. The growing popularity of this monetary policy strategy has resulted in the phasing out of

¹ See, for instance, Leiderman and Svensson (1995), Haldane (1995), Haldane (1997), Mayes and Riches (1996), McCallum (1997), Svensson (1997a), Freedman (1996), and Bernanke and Mishkin (1997).

some alternative monetary regimes. The inflation targeting provides a simple and predictable to the monetary policy framework to channel the expectations of inflation and direct downward through strengthening the credibility and transparency of central banks. It allows greater flexibility, especially in case of endogenous or exogenous shock, the exchange rate peg does not allow. Finally, in a context of instability in the money demand function, it provides a satisfactory alternative to the control of monetary aggregates as an intermediate target.

Thus, although a majority of emerging countries still continues to anchor monetary policy on the exchange rate (55% of emerging economies in 2010), the share of emerging inflation targeters has steadily increase in 2012 to reach more than 13%.

The growing interest of central banks in industrialized and emerging countries for inflation targeting is naturally accompanied by an intensification of academic research about it. The first work, essentially descriptive, have focused on discussing the various operational aspects of monetary policy, and the terms of its effectiveness and viability. Subsequently, a second generation of work has in turn sought to empirically test the benefits in terms of macroeconomic performance of the adoption of inflation targeting. Fraga et al. (2005), Johnson (2002), Mishkin and Schmidt-Hebbel (2007), Rose (2007). In addition to the institutional conditions, the introduction of the policy of inflation targeting also affects the economic environment. "While price stability is the primary objective of most central banks, it is also interested in the fight against unemployment, economic growth, the stability of financial markets, the interest rate and the foreign exchange markets," Mishkin (2010)

The experience of emerging markets in terms of adoption of this plan is not homogeneous across countries due to the existence of differences in the nature of the convergence process towards the formal adoption of inflation targeting, and the macroeconomic scenario in which this process has developed. This is why a comparative analysis remains interested because it is possible to collect some lessons related to the implementation of this scheme that can be used to assist other countries that have not yet adopted this plan and those who evaluate seriously final adoption.

It is in this paper to present an evaluation of Brazilian experiences that have adopted inflation targeting, and report thereafter, the results obtained from the implementation.

To do this, we'll examine the History of Brazil monetary policy in Section 2. Section 3 presents the impact and the impact of the adoption of inflation targeting. The question addressed in this paper is to identify factors that may influence volatility of inflation and why some countries are more successful than others adopting the policy of inflation targeting.

2. A Brief History of Brazil Monetary Policy

In Brazil, the stabilization based on the exchange rate as the Brazilian Real Plan 1994 to January 1999 was successful, and has resulted in a reduction in inflation, the rate increased from 2500% in December 1993 to about 3.2 % in December 1998 Following the currency crisis, the problems of misalignment of the exchange rate and the lack of a clear strategy of monetary policy led Brazil to adopt the anchor inflation, seeing that the anchor best means to stabilize the economy, including prices under a flexible exchange rate.

Immediately after his appointment in February 1999, the new Governor of the Central Bank of Brazil has recognized the need for a speedy implementation of an alternative nominal anchor and announced that Brazil will soon adopt a strategy of inflation targeting .

On the other hand, it has decided to increase the interbank interest rate of 600 basis points, 45% to stop the fall of the Real and restore the credibility of monetary policy.

Emerging countries have been engaged in limiting the flexibility of the exchange rate not only through the explicit use of the exchange rate bands, but also through frequent interventions in the foreign exchange market. Frequently respond to flexible exchange rate movements may turn it into a nominal anchor for monetary policy that takes as target inflation. To avoid this problem, the central bank must act on changes in the exchange rate in the short term, which may help to mitigate the destabilizing effects of changes in the exchange rate.

The adoption of inflation targeting must comply with certain conditions.

The inflation target as the tolerance intervals will be set by the National Monetary Committee on the proposal of the Ministry of Finance. It is the responsibility of the central bank to implement the policies needed to achieve the target. The central bank will also, via a quarterly report, report on the various decisions of monetary policy as well as results and future prospects of the latter in terms of the inflation rate.

In Brazil, the President of the Republic may dismiss members of the Monetary Policy Committee, which sets theoretically the central bank may have to take some steps against its policy of inflation targeting. Nevertheless, there is in this country a broad political consensus on monetary policy to follow, as well as the de facto independence may be sufficient to suggest. The independence of law may indeed be too costly politically. Two main questions arise: first, the Central Bank of Brazil will she be able to improve and assert its independence from the Government and maintain its commitment to control inflation? Then, the Government may he take the steps and required reforms to establish a sustainable fiscal policy consistent with low inflation.

If Brazil can not meet these two challenges, monetary policy will become discretionary fiscal dominance will settle and the regime of inflation targeting will grow. The financial crisis that hit Brazil in 1999 did not help matters as he was forced to float the real and trigger a panic in January 1999.

Given the history of Brazil, the threat of inflation is very likely, then the central bank expected inflation of between 30 and 80% and a GDP contraction of (-3 to -6%) in 1999.

A first decision should be made: to return to a fixed or given parity, or continue to float the real. Monetary authorities have opted to maintain the floating, but it was not therefore find nominal anchor a new point. Targeting a monetary aggregate seemed unrealistic given the uncertainties surrounding this latest crisis.

The alternative was to conduct a fully discretionary policy without explicit anchor. But the environment in which bathed the economy has raised his hand a firmer and transparent engagement. Ultimately, the choice of monetary policy has focused on inflation targeting. A multi-year goal was decided by providing an inflation rate of 8% for 1999, 6% for 2000 and 4% in 2001, with a threshold of tolerance was set to $\pm 2\%$. These objectives represent the median of the target area. The latter is set at 3.5-5.5% in 2013.

The only problem that arose was then on the date of public announcement of this. While Brazil has taken risks by opting for a multi-year goal, it would have further compounded by announcing immediately. Not knowing the possible reaction of the various markets face their decision and that the pace of future trends in inflation, monetary authorities have preferred to act with caution and opt for a solution in two phases. In March 1999, Brazil announced a target to reduce inflation to less than 10% in the fourth quarter of 1999 before moving to the establishment of a comprehensive system of inflation targeting for the end of June in 1999.

The stated goal for the end of the year were utilized in temporary anchorage point and helped to avoid panic. But Brazil had an advantageous fiscal position at that time. It is indeed managed to turn its deficit in 1997 a cumulative surplus of 3% of GDP in early 1999 This budget

recovery has given Brazil a little confidence since interest rates again peaked at 39% , level prior to the floating of the real.

Referring to some quick lack of reliable estimates, the authorities decided to raise interest rates to 45%. With this decision the monetary authorities have sought to reduce the overreaction of the market and inflation expectations. Therefore, it was decided to focus down interest rates. Brazil responded to the crisis by combining fiscal discipline, monetary tightening, accompanied by inflation targeting, and external financial support. The decline in inflation allows the Brazilian central bank to loosen monetary brake. Result: interest rates fell to their lowest level in 20 years.

The Latin American countries have faced over the years 1980 to very high inflation, particularly because of the monetary financing of the budget deficit. That is why it has become necessary to implement monetary policy frameworks that reduce incentives to fiscal slippage. Several approaches have been taken to achieve this goal, from dollarization to inflation targeting.

Stabilization plans based on an exchange rate policy has had a rapid impact on inflation (through their impact on expected short-term), while countries that have adopted inflation targets had much more progressive results (credibility of monetary policy require more time to build), the effectiveness of inflation targeting would be slower but longer lasting.

It is not easy to know how the good results on inflation are directly attributable to inflation targeting. Indeed, inflation targeting was often accompanied or preceded by important structural reforms (introduction of sound fiscal policies, for example), thereby making it more difficult to estimate the impact of these factors on the performance economic. Thus the adoption of inflation targeting has generally done gradually (Chile 1990, Colombia in 1991, Peru in 1993, Mexico 1999) or at the end of a currency crisis (Brazil).

Econometric Tests on the Factors Influencing the Volatility of Price.

During the last two decades, the level and volatility of inflation fell for a number of countries. Among them were the countries with very high inflation rate as some countries of Latin America or Eastern Europe. This improvement coincided with one hand a decline in economic volatility and secondly by taking into account price stability at the heart of monetary policy. Despite this general trend towards price stability and reform of monetary policy remain some heterogeneity between countries. Generally developed economies have a volatility much lower than emerging economies inflation.

The question addressed in this section is to identify factors that may influence the volatility of inflation and why Brasil more successful than others adopting the policy of inflation targeting. Several factors may be considered. We think of the economic and financial structure of the country.

Indeed, characterized by low fiscal and monetary institutions economy is facing difficulties in maintaining its inflation target.

Many economists have been interested in this debate. Pétursson (2009) identifies a number of factors that influence the volatility of inflation:

- The economic structure as the size of the economy and per capita income;
- The volatility of output;
- Exposure to external shocks such as the correlation between the global and domestic output or the correlation between private consumption and movements in the exchange rate;
- Indicators of trade such as exchange diversification or the share of domestic products in exports;

- Indicators on fluctuations in the exchange rate ie the volatility of the risk premium in the exchange rate or the degree of pass-through;
- The performance of monetary policy in the forecasts of monetary policy and the level of independence of the central bank.

Eliminating non-significant variables, Pétursson (2009) retains the indicators of fluctuations in exchange rates and performance indicators of monetary policy.

Amato & Gerlach (2002) also study the determinants that influence inflation in the policy framework of inflation targeting. They use a probit model taking into account the structural indicators, such as trade openness ratio, a measure of credibility and other variables related to the volatility of real shocks. Schmidt-Hebbel & Mishkin (2007) introduce different measures of independence and credibility of the central bank for a sample including a large number of countries to test their impact on inflation volatility. Carare & Stone (2006) study certain tax and financial indicators and attempt to test whether these measures affect the stability of inflation and therefore the choice of the policy of inflation targeting. Finally, Hu (2006) uses a panel regression including a share of economic variables such as the fiscal position and secondly, institutional variables such as the independence of the central bank and a variable classification schemes exchange and finally as control variables, inflation and the growth rate of GDP.

Analysis of Factors Affecting The Volatility of Inflation Targeters Countries

The choice of our sample involves a restriction in some sense on the estimation method chosen. Indeed, the panel data estimates are most suitable in the case where it has a lot of people and little time data.

The advantage of using this method is that it allows to operate both the temporal and individual dimensions and taking into account the heterogeneity between those in individuals in the sample. A random effects model is proposed to try to identify the factors influencing the volatility of inflation for countries adopting the policy of inflation targeting and those adopting other monetary rules.

$$INFVOL_{i,t} = \mu + \gamma_1 OF_{i,t} + \gamma_2 PF_{i,t} + \gamma_3 OC_{i,t} + \gamma_4 OIL_{i,t} + \gamma_5 NER_{i,t} + \gamma_6 PB_{i,t} + \gamma_7 D_{i,t} + \alpha_i + \delta_t + \epsilon_{i,t}; \quad (1)$$

with: μ is a constant, γ_i with $i = 1, \dots, 5$ are coefficients, α_i is the fixed effect of country size, δ_t is the fixed effect of the time dimension and $\epsilon_{i,t}$ is the term error.

$INFVOL_{i,t}$ is the volatility of inflation in country i at time t , $OF_{i,t}$ is financial openness, $PF_{i,t}$ is financial depth, $OC_{i,t}$ is the trade openness, $PB_{i,t}$ is the position fiscal or budgetary and $D_{i,t}$ is a dummy that takes the value 1 if the country adopts inflation targeting and 0 otherwise. Using the estimation of a random effects model was due to the relevance of the latter with respect to a fixed effect model. Indeed, in models with fixed effects, we assume that α_i and δ_t are constant, non-random effects, which are therefore simply change the value of the constant μ depending on the values of i and t .

While for the random-effects models, we assume that α_i and δ_t are random words and exert more effect on the constant of the model, but on the whole model.

3.1. The variables used

The study period chosen is from 1990Q1 to 2014Q1 quarterly data.

The variables used to estimate our model are mainly related to the economic and financial structure of Brasil. Four variables are selected to describe a Brasil's structural characteristics: the fiscal position, trade openness, external debt and financial depth.

- Fiscal Position (PBt)

It is measured by the balance of the GDP-weighted fiscal balance. If this variable is positive, it is in the case of a surplus, if it is negative, it is a deficit. A deficit in the budget balance of the government means that the authorities will put pressure on the central bank to finance this deficit. This therefore implies a deviation from the monetary authorities of their central goal of price stability. Therefore, they adopt an expansionary monetary policy, which will cause an increase in the money supply and thus inflation. However in the case of a surplus in the budget balance, the central bank is isolated from government pressure and therefore can conduct monetary policy on price stability in an independent manner. It is then expected that the sign of the coefficient for this variable is negative. These data are mainly derived from the database International Financial Statistics in the General Government section.

- Commercial Opening (OCt)

It is measured by the ratio of imports to GDP. An economy with a high degree of trade openness is exposed to the exchange rate and thus inflation. However, if the monetary authorities consider that trade openness in the implementation of the policy of inflation targeting, it can lead to a stable inflationary environment. Therefore, it is expected that the sign of this indicator is negative for countries that adopt inflation targeting. These data come from two different databases: International Financial Statistics.

-World oil price: (OILt)

The US dollar-basis oil price index that is an average of the three spot price index of Texas, U.K. Brent and Dubai. The world oil price is seasonally adjusted using the Census X12 method. Data source: IMF, International Financial Statistics.

- Exchange rate: (NERt)

The data is collected using Datastream. The period average bilateral nominal exchange rate vis-à-vis the US dollar are used.

- Financial Opening (OFt)

It is approximated by the ratio of external debt in GDP. Given the unavailability of data for some countries, we adopt the approach of Lane and Milesi-Ferretti & (2001). According to these authors, the stock of external debt is approximated by the sum of portfolio investment and other investment liabilities under the database of the International Investment .More debts the country is open financially, the more is difficult to ensure stable inflation. Therefore, it is expected that the sign of this variable is positive.

- Financial Depth (PFt)

It is calculated by the ratio of M2 to GDP, which represents the degree of monetization of the economy. This variable is an important indicator of the financial system's ability to raise funds to support the economy.

Over the country has a high ratio, the greater its ability to finance deficits and therefore greater independence and the ability of monetary authorities to implement a focused price stability policy. Therefore, the expected effect of this indicator is a negative effect. These data are derived from the database of the International Financial Statistics.

The relationship between the volatility of inflation in both the tax position, financial depth and trade openness is assumed to be negative. However, this relationship is expected to positive external indebtedness.

The results

Table 1 summarizes the results of the estimation of our model by the method of random effects panels. These results were classified into three periods.

The first part of the table 1 presents the estimates for total period. The second part contains only the period with inflation targeting. The final period presents period without inflation targeting.

Regarding the degree of trade openness, the coefficient is negative for emerging markets. However, these coefficients are not significant.

This does not allow us to conclude with precision about the negative effect of a large trade openness on inflation volatility, in case of adoption of the policy of inflation targeting.

The variable "financial depth" is the proportion of the M2 money supply / GDP has a positive but insignificant sign. These coefficients contradict the initial hypothesis which states that the more / GDP ratio M2, the higher inflation level and variability will be low, Hu (2006).

Regarding the variable "Financial openness" which measures the degree of external debt, it is significant for all countries except for countries that do not target inflation.

However, it is positive for emerging markets (EmE) groups (I) and (II) also. This implies a significant positive effect of debt on the volatility of inflation in emerging markets.

Table 1:
Estimating Panel Data Random Effects

	total period (I)	period with inflation targeting (II)	period without inflation targeting (III)
μ	0,304* (3.68)	0.1322 (0.3042)	0.352 (1.821)
$OF_{i,t}^a$	0.123*** (0.059)	0.1252*** (0.0616)	-112136.2 (112918)
$PF_{i,t}^b$	0.002 (0.085)	0.0114 (0.0911)	1.123 (1.312)
$OC_{i,t}^c$	-0.055 (0.246)	-0.0457 (0.2511)	-1.062 (1.343)
$OIL_{i,t}^d$	0.22* (1.86)	0.15*** (5.08)	0.29** (2.43)
$NER_{i,t}^e$	0.05 (1.55)	0.07*** (3.46)	0.13*** (5.78)
$PB_{i,t}^f$	-2.57** (1.30)	-2.662** (1.3797)	-5.381 (4.382)
$D_{i,t}^g$	-0.219 (0.274)	- -	- -
R^2			
within	0.0603	0.0629	0.1538
between	0.7343	0.7176	1.000
overall	0.1175	0.1148	0.1902
Nb d'observations	96	40	56

The standard deviations of the coefficients are shown in parentheses.

[***]: Threshold of significance at 1%

[**]: Threshold of significance at 5%

[*] Threshold of significance at 10%

[p]: p-value of Statistics

[a]: financial openness

[b] financial position

[c]: open trade

[d]: fiscal position

[e]: dummy

"Position budget" variable approximates the fiscal position of a country. The coefficient has a negative and significant at the 5% mark. We note that for countries adopting inflation targeting, an increase of 1 million results in lower 2.66% of the volatility of inflation in

emerging economies .This finding supports the initial hypothesis which states that an economy with monetary and financial institutions have developed more facilities to adopt an approach focused on stable inflation policy.

Indeed, a positive tax position allows the government to meet its deficit without having recourse to financing from the central bank through expansionary policies leading to greater inflation.

For countries not adopting the policy of inflation targeting, no coefficient is significant at different thresholds of 1%, 5% and 10%.

Conclusion

The results of the model also shows an ambiguous impact of trade dependence on the volatility of inflation in the case of adoption of the policy of inflation targeting. Regarding financial depth that reflects the ability of the financial system to mobilize funds to support the economy, we deduce that the financial system is more robust, higher the volatility of inflation tends to fall. This is true for developed economies. However, for Brazil economies this link is positive reflecting the vulnerability of the financial system in those markets, which usually use the external debt in foreign currency in order to raise funds to support the economy, resulting in a significant change price levels.

Inflation targeting provides a simple and predictable to the monetary policy framework to harness inflation expectations and guide them down through strengthening the credibility and transparency of Brazilien central bank. In addition, it allows for some flexibility, especially in the case of endogenous or exogenous shock, the anchor of the exchange rate does not help. Finally, in a context of instability in the money demand function in Brazil, it provides a satisfactory alternative to the control of monetary aggregates as an intermediate target.

References

- Aguir, A. (2014) « Inflation Targeting: An Alternative to Monetary Policy » International Journal of Economics and Finance Vol 6, No 7
- Aguir, A. (2014), " The effects of inflation targeting strategy on the growing performance of emerging countries"International Journal of Economics, Commerce and Management Vol. II, Issue 8.
- Aguir,A.(2014) "Price stability in Open-economy under inflation targeting regime with factors influencing inflation volatility" International Finance and Banking Vol. 1, No. 2, December.
- Ball, L. (1998) "Policy Rules for Open Economies," Research Discussion Paper 9806 (Sydney: Reserve Bank of Australia).
- Celasun, O., Gaston, G., and Alessandro, P., (2004) "Obstacles to Disinflation: What Is the Role of Fiscal Expectations?" IMF Working Paper 04/111 (Washington: International Monetary Fund).
- Dennis, R., (2001) "Monetary Policy and Exchange Rates in Small Open Economies," Federal Reserve Bank of San Francisco Economic Letter 2003-16, May, (San Francisco: Federal Reserve Bank of San Francisco).
- Galí, J., and Tommaso, M., (2004) "Monetary Policy and Exchange Rate Volatility in a Small Open Economy" (unpublished; Barcelona: Universitat Pompeu Fabra).
- Hördahl, P., Oreste, T., and David, V. (2003) "A Joint Econometric Model of Macroeconomic and Term Structure Dynamics" (unpublished; Frankfurt: European Central Bank).

- Mishkin, F. S., (2004) "Can Inflation Targeting Work in Emerging Market Countries?" paper presented at an IMF conference in honor of Guillermo A. Calvo, Washington, D.C., April.
- Parrado, E., (2004) "Inflation Targeting and Exchange Rate Rules in an Open Economy," IMF Working Paper 04/21 (Washington: International Monetary Fund).
- Porter, N., (2004) "Wage Compression, Employment Restrictions and Unemployment: The Case of Mauritius," IMF Working Paper 04/205 (Washington: International Monetary Fund).
- Porter, N., & J. Y. Yao. (2005). 'Inflation Targeting Lite in Small Open Economies: The Case of Mauritius. IMF Working Paper, WP/05/172.
- Rudebusch, G., and Tao, W., (2003) "A Macro-Finance Model of the Term Structure, Monetary Policy, and the Economy," Federal Reserve Bank of San Francisco Working Paper 2003-17, September, (San Francisco: Federal Reserve Bank of San Francisco).
- Sacerdoti, E., Gamal, E., Padamja, K., and Yudong, Y., (2005) *Mauritius: Challenges of Sustained Growth* (Washington: International Monetary Fund).
- Sims, C. A., (2001) "Solving Linear Rational Expectations Models," *Computational Economics*, Vol. 20, pp. 1–20.
- Stone, M. (2003) "Inflation Targeting Lite," IMF Working Paper 03/12 (Washington: International Monetary Fund).
- Svensson, L.E.O. (2000) "Open Economy Inflation Targeting," *Journal of International Economics*, Vol. 50, pp. 155–183.
- Truman E., (2003) *Inflation Targeting and the International Financial System: Challenges and Opportunities* (Washington: Institute for International Economics.)