



# Inflation targeting in emerging economies: Panel evidence

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## ABSTRACT

This paper shows there is no evidence that the inflation targeting regime (IT) improves economic performance as measured by the behavior of inflation and output growth in developing countries. The control of common time effects results in less negative and less significant IT impacts on inflation, inflation volatility and output growth volatility than previously found in the literature. Additionally, our analysis shows robust evidence of lower output growth during IT adoption. On balance, although lower long-run mean inflation signals that the central banks of emerging economies with inflation targeting are more inflation-averse, the costs of disinflation have not been lower than under other monetary regimes.

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## 1. Introduction

Has inflation targeting (IT) made monetary policy more efficient in developing countries? The theory provides conflicting predictions about its probable effects. Articles by [Bernanke and Woodford \(2005\)](#), [Caballero and Krishnamurthy \(2005\)](#), [Mishkin \(2000, 2004\)](#), and [Sims \(2005\)](#) warn that these economies' lack of institutional maturity and consistency of macroeconomic fundamentals could undermine credibility and give worse results.<sup>2</sup> Others studies, like [Bernanke et al. \(1999\)](#), [Mishkin \(1999\)](#) and [Svensson \(1997\)](#), take the opposite route and claim that since the initial credibility of emerging markets' central banks is low, practicing official inflation targeting makes their monetary policy more credible, and thus should lead to better macroeconomic outcomes. In this debate, a third neutral belief is that IT's features contribute very little to lower inflation; instead the decisive factor is central banks' greater emphasis on the behavior of inflation. According to [Romer \(2006, p. 532\)](#), this "conservative window-dressing" view of IT is due to Anna Schwartz.

On the empirical front, works like [Gonçalves and Salles \(2008\)](#), [Lin and Ye \(2009\)](#) [both published in this journal], [Batini and Laxton \(2007\)](#) and [International Monetary Fund \(IMF\) \(2006\)](#) have provided optimistic evidence about the performance of IT regimes in developing countries, with lower inflation rates and less volatile inflation and output growth. When compared to the less conclusive results of [Ball and Sheridan \(2005\)](#), [Gonçalves and Carvalho \(2009\)](#) and [Levin et al. \(2004\)](#) for developed economies, which better meet the preconditions for efficient IT policy, the aforementioned findings suggest that worries about lack of institutional maturity are unfounded. It seems that, as [IMF \(2006\)](#) claims, IT has been helpful in strengthening the institutions of developing economies necessary for macroeconomic stability, with more efficient monetary policy.

This paper re-evaluates the gains from IT in emerging countries and concludes that the "conservative window-dressing" view best describes their experience. With qualifications, we agree with previous indication that developing inflation targeters have reduced their inflation rates. Newly and more importantly, we uncover the output growth costs of the IT policies implemented and indicate that, after accounting for the inflation–output tradeoff, IT policy does not imply any gain in these dimensions. We also show that previously reported IT effectiveness in reducing volatilities has been overstated, and fade away when we account for the simultaneous decrease in the levels of inflation and output growth.

To our knowledge, [Gonçalves and Salles \(2008\)](#), denominated GS hereafter, is the first attempt to study the effect of IT in emerging markets. The authors apply [Ball and Sheridan's \(2005\)](#) cross-section difference-in-difference ordinary least squares approach to test whether the adoption of IT affects the inflation and output growth

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<sup>2</sup> [Calvo and Mishkin \(2003\)](#) list five fundamental institutional weaknesses common to emerging countries: (i) weak fiscal institutions; (ii) weak financial institutions, including government prudential regulation and supervision; (iii) low credibility of monetary institutions; (iv) currency substitution and liability dollarization; and (v) vulnerability to sudden stops of capital inflows.

of 36 emerging economies. They show that IT countries lower their average inflation rates and output growth volatilities relatively more than non-IT countries. With these findings, they conclude that “the often heard claim that Inflation Targeting regimes hinder economic growth is clearly not sustained by the empirical evidence. In sum, data so far suggest that the adoption of IT by emerging economies did contribute towards the attainment of superior outcomes in terms of economic performance” (p. 318).

Applying the same method of [Ball and Sheridan \(2005\)](#), [Batini and Laxton \(2007\)](#), denominated BL hereafter, are even more positive about IT performance in developing countries, showing not only that IT adoption reduces average inflation and the volatility of real output growth, but also the volatility of inflation. Like GS, BL do not rigorously study the rate of output growth, but rather its volatility.<sup>3</sup> Based on these findings, the latter authors state that: “Thus there is no evidence that inflation targeters meet their inflation objectives at the expense of real output stabilization” (p. 13).

The effectiveness of IT in lowering inflation in emerging economies also seems robust to controls for self-selectivity bias of policy adoption – a drawback of [Ball and Sheridan's \(2005\)](#) procedure. By extending [Lin and Ye's \(2007\)](#) propensity score matching approach to evaluate the treatment effect of IT in developing markets, [Lin and Ye \(2009\)](#) also show that, on average, IT has large and significant effects on lowering both inflation and inflation variability.

Taken together, these separate findings of lower inflation and reduced volatilities of inflation and output growth might suggest that the adoption of IT in emerging markets can enhance economic performance. However, the above works leave some room to doubt the conclusion regarding the efficiency of the IT regime relative to alternative monetary frameworks. First, from an economic policy evaluation perspective, the conclusion of welfare gains can only be unconditional of agents' preferences if the improvement in some macro indicators does not come at the cost of simultaneously worsening others. As a matter of assessing whether IT has led to a superior monetary policy performance, failure to analyze the rate of output growth seriously vitiates these authors' conclusion that IT does not hinder economic growth, given the consensus view among economists of a positive short-run relation between inflation variation and economic activity implied by the accelerationist Phillips curve.<sup>4</sup> In this context, inflation reduction in isolation just indicates that, among emerging economies, IT central banks are more averse to inflation than their non-IT counterparts.<sup>5</sup>

Second, on the matter of the techniques used by GS and BL, [Ball and Sheridan's \(2005\)](#) cross-section difference-in-difference OLS approach might not be sharp enough to evaluate the IT policy efficiency, as [Gertler \(2005\)](#) notices. The adoption of IT is an endogenous choice, taken at different times by countries with different unobservable characteristics, while the above approach does not account for the potential bias induced by endogeneity or control for time and country fixed effects. [Lin and Ye's \(2007\)](#) propensity score procedure deals with the self-selection problem, but by its cross-sectional nature does not control for time trends, countries' unobservable characteristics, or persistence.

In this paper we analyze the performance of IT in developing economies. By not only looking at inflation indicators, but also simultaneously looking at output growth indicators and their tradeoffs, we

apply a panel methodology that tries to isolate the improvement in performance exclusively due to the adoption of IT from other sources, such as common time-varying effects, country fixed effects and endogeneity. Instead of averaging the time series observations in pre- and post-periods and working in cross-section, we exploit the time and country-specific dimensions. In the evaluation of the non-simultaneous cross-country IT treatment, it is particularly important to control for the worldwide 1990s trend of falling inflation and macroeconomic volatility. By investigating variation within countries, the control for country fixed effects addresses the potential for omitted variable bias and improves the inference on the causal effect of IT on economic performance.

Panel evaluations of the IT treatment have already been attempted with fixed time and country effects by *Difference-GMM* (D-GMM), in works such as [Wu \(2004\)](#) and [Willard \(2006\)](#), among industrial countries only. Among developed and developing economies – jointly and separately – evaluations have been attempted using instrumental variable (IV) within-group-estimation, including time and country effects by [Mishkin and Schmidt-Hebbel \(2007\)](#); and by D-GMM and *System-GMM* (S-GMM) with fixed time effects for inflation and by FGLS with fixed time and random country effects by [Biondi and Toneto \(2008\)](#).

For industrial economies, when revising [Wu's \(2004\)](#) finding of IT's effectiveness in reducing inflation, [Willard \(2006\)](#) agrees with [Ball and Sheridan's \(2005\)](#) conclusion of no noticeable improvement. [Mishkin and Schmidt-Hebbel \(2007\)](#), who compare both industrial and emerging inflation targeters against high achieving industrial countries, conclude that IT adoption did improve each country's performance, but no better than in the case of the highly successful non-inflation targeters. Regarding real output, [Biondi and Toneto \(2008\)](#) find that IT developing economies grew less when they lowered inflation. However, [Biondi and Toneto \(2008\)](#) don't study the behavior of macroeconomic volatility or the gains/costs of IT in excess of the inflation–output tradeoff.

From an econometric perspective, the IV within-group estimator choice of [Mishkin and Schmidt-Hebbel \(2007\)](#) is not efficient, given that it ignores past information. Because the individual effects can be correlated with the regressors, the random-effect models in [Biondi and Toneto \(2008\)](#) do not seem adequate either. Thus, we evaluate every macro indicator by the two-step S-GMM panel estimator, which controls for simultaneity and omitted variable biases. The preference for the S-GMM over the D-GMM used in [Wu \(2004\)](#), [Willard \(2006\)](#), and [Biondi and Toneto \(2008\)](#) is because the former estimator is better instrumented to capture the effects of highly persistent variables than the latter, as demonstrated in [Arellano and Bover \(1995\)](#) and [Blundell and Bond \(1998\)](#). This attribute is particularly useful in our study, where countries that become inflation targeters persist in this regime until the end of the sample.

While these GMM estimation approaches are suited to micro data, where the number of time periods ( $T$ ) is small relative to the number of individuals ( $N$ ), it might be problematic in macroeconomics, where the number of instruments (a function of  $T$ ) climbs toward the number of countries ( $N$ ) in small samples. When instruments are too many, they tend to over-fit the instrumented variables and bias the results. In this context, while all papers mentioned in the preceding paragraph work with yearly, or even quarterly frequency, we summarize data over many three-year periods to make it possible to input the information contained in longer time series while holding down the number of instruments. Our strategy of summing data up over many three-year periods is also a sensible compromise between giving enough time for the sluggish responses of macro variables and separating the IT treatment effects from effects of other events occurring in close proximity. Yet, to avoid the over-fitting problem, we also reduce the dimensionality of the instrument matrix by collapsing its columns, as in [Calderon et al. \(2002\)](#). Finally, for accurate inference, we subjected our two-step standard errors to a finite sample correction, as suggested by [Windmeijer \(2005\)](#).

Besides the GMM panel estimators just described, we present estimates for simple pooled cross-section OLS, pooled OLS with a common

<sup>3</sup> [Batini and Laxton \(2007\)](#) just present plots of average output growth against output growth volatility (their Fig. 2) for pre- and post-IT adoption and state that “For real output growth ... the pattern is less clear ... with little change in average growth” (p. 9).

<sup>4</sup> As [Mankiw \(2001\)](#) says: “The [inflation-unemployment] tradeoff is inexorable because it is impossible to make sense of the business cycle, and in particular the short-run effects of monetary policy, unless we admit the existence of a tradeoff between inflation and unemployment ... The tradeoff remains mysterious, however, for the economics profession has yet to produce a satisfactory theory to explain it.” For the long-run tradeoff on inflation and growth, see [Bruno and Easterly \(1996, 1998\)](#).

<sup>5</sup> None of [Batini and Laxton \(2007\)](#), [Gonçalves and Salles \(2008\)](#) and [Lin and Ye \(2009\)](#) show results regarding the effects of IT on the rate of output growth.

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