Fall 12-2012

REASSESSING THE IMPACT OF INFLATION TARGETING IN EMERGING MARKET ECONOMIES

BABATUNDE AIYEMO
aiyemo@siu.edu

REASSESSING THE IMPACT OF INFLATION TARGETING IN EMERGING MARKET ECONOMIES

By

Babatunde Aiyemo

B.Sc, University of Ilorin, 2002

A Research Paper

Submitted In Partial Fulfillment of the Requirements for the

Master of Science Degree

Department of Economics

In the Graduate School

Southern Illinois University Carbondale

May 2013

RESEARCH PAPER APPROVAL

REASSESSING THE IMPACT OF INFLATION TARGETING IN EMERGING MARKET ECONOMIES

By

Babatunde Aiyemo

A Research Paper Submitted in Partial

Fulfillment for the Requirements

for the Degree of

Master of Science

in the field of Economics

Approved by:

Dr. Scott Gilbert, Chair

Graduate School

Southern Illinois University Carbondale

December 11, 2012

AN ABSTRACT OF THE RESEARCH PAPER OF

BABATUNDE AIYEMO, for the Master of Science degree in ECONOMICS, presented on December 11, 2012 at Southern Illinois University Carbondale.

TITLE: REASSESSING THE IMPACT OF INFLATION TARGETING IN EMERGING MARKET ECONOMIES

MAJOR PROFESSOR: Dr. Scott Gilbert

In this paper, we subject a seeming consensus on the impact of inflation targeting in emerging market economies to some robustness assessments. First we report performance along carefully redefined country brackets, we find little evidence to support the notion that economies with inflation targeting policies performed better than non-targeting economies in terms of GDP growth, inflation and economic volatility. In fact, there is a suggestion in the results that amongst certain clusters of economies, certain restrictive aspects of the policy actually inhibit growth

In a subsequent assessment, we control for extent of development using specific country proxies but equally observe, consistent with the above, that no evidence exists in the data of superior overall performances due to the practice of inflation targeting.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Today, the body of macroeconomics is in consensus about the primary aim of monetary policy being the stability of prices (see for instance, Batini, Nelson & Yates 2003; Pianalto, 2005). To achieve this objective, the macroeconomic toolkit offers a number of potential anchors, viz; inflation targeting, exchange rate targeting, nominal money growth targeting or an eclectic framework with multiple objectives (Roger, 2010). As Batini & Laxton (2006) and Jonas & Mishkin (2004) directly note however, inflation targeting stands out amongst all the above since it targets the price level directly, rather than intermediate variables. On the surface, this seems quite intuitive and hence an effective policy option which should imply that it would be the natural anchor of choice. Indeed, a vast body of theoretical constructs widely endorses this monetary management option.

However, just as strong and intellectual is the body of literature in opposition to this policy stance. Stiglitz (2008) for instance, has argued, amongst other things, that inflation should be considered more as a distortion signal from a wide-range of possible macroeconomic causal indices which requires a surgical rather than mechanical adjustment process; Frankel, on the other hand, notes poignantly that a proof of how flawed a philosophy of price anchorage is lies in the fact that not all (not even the most severe) potential macroeconomic red flags are beamed through inflation signaling viz the asset pricing crises of 1929 and 2008 (Frankel, 2012).

For how extremely polarized though equally compelling the arguments on both sides of the spectrum are, economists shifted to the empirical arena in search of a definitive evidence as to the efficacy or otherwise of inflation targeting, since surely, if models could not provide answers, figures should. Early work by Neumann & Von Hagen (2002) suggested inflation

targeting induces convergence amongst high inflation economies; the highly cited counter analysis of Ball and Sheridan (2005) however, showed that once mean reversion was controlled for, the results became insignificant. This result has been supported by Willard (2006), Walsh (2009), Lin & Ye (2007) and Miskin & Schmidt-Hebbel (2007), all utilizing variously re-specified measuring models. A counter result was however produced by Levin, Natalucci & Pigler (2004) in an AR analysis which observed 'core inflation' and Vega & Winkelreid (2005) with a propensity score analysis. Again, in the 2010 edition of the IMF journal, Scott Roger speaks definitively of inflation targeting economies having overall better macroeconomic performances between the dividing lines of 1991-2000 and 2001-2009. Such extremity in difference of results from observing more or less the same macroeconomic indices clearly highlights the sensitivity of outcomes to the methods applied in analysis and controls erected.

Without a consensus of opinion for the developed economies, analysts have sought to determine whether a more obvious impact could be observed as regards this policy in emerging market economies. Here, the results are less nuanced, although by no means uniform. The four pivotal empirical assessments in this substratum were carried out by Batini & Laxton (2007), Goncalves & Salles (2008), Lin & Ye (2009) and Brito & Brystedt (2010). All with the exception of Brito & Bystedt (2010) concluded that inflation targeting mattered for emerging market economies. Other studies which have corroborated this result are Vega & Winkelreid (2005), Walsh (2009), Mishkin & Schmidt-Hebbel (2007) and the quasi-empirical assessment of Scott Roger (2010).

Accordingly, by a numbers vote, it would appear that the empirics of the matter favor the position that inflation targeting matters for controlling inflation and output volatility in emerging market economies. Indeed, this position speaks to a very basic level of intuitiveness as it is

highly plausible that for emerging market economies, where inflation and growth volatility are severe problems, policies aimed at price stability will bear prompt and tangible impact. Analysts have hence summarized that coupled with the Ball & Sheridan (2005) results, it would appear that whilst inflation targeting does not matter for developed economies, it does for developing economies.

So finally, maybe some agreement is possible on the impact of inflation targeting, at least on the empirical sphere. But is this really the case? We claim here that the outcomes from the adoption of inflation targeting in emerging market economies are actually more nuanced than the implied consensus suggests. Indeed, all emerging market cum transition economies analyses of inflation targeting carried out to date have proceeded with an extreme assumption that developing economies are homogeneous entities; and this is accordingly being relayed in inaccurate conclusions. As we demonstrate, controlling for the level of development through the dual instruments of implied institutional depth and the enabling infrastructural underlay, virtually recasts what has hitherto been touted in the literature as gains due to a monetary policy tool as largely gains due to levels of institutional development.

The rest of this research paper is organized as follows; chapter 2 briefly reviews relevant literature with an emphasis on the four prior identified major findings on inflation targeting in emerging market economies, chapter 3 develops an alternative measurement methodology which basically identifies and isolates heterogeneity in an impact assessment framework; and discusses the source of data used in the research, chapter 4 presents and interprets the results therefrom and chapter 5 concludes.

CHAPTER 2

LITERATURE REVIEW

As has been briefly mooted in the introduction, the four pivotal analyses on the impact of inflation targeting in emerging market economies were carried out by Batini & Laxton (2007), Goncalves & Salles (2008), Lin & Ye (2009) and Brito and Bystedt (2010). Here, I review a theoretical background and briefly examine each of the empirical trajectories whilst creating a link with a broader literature on economic development and macroeconomic performance.

An excellent background to the theoretical pros and cons of inflation targeting as a policy option is provided in Batini & Laxton (2007). To summarize, Proponents of the policy claim inflation targeting helps build credibility and anchors inflation expectations more rapidly and durably by effectively communicating a country's policy objective whilst creating lower output costs of policy failure as compared to alternative monetary regimes such as rate pegs. Critics of the policy however claim that the targeting policy offers too little discretion and unnecessarily restrains growth in addition to unnecessarily jeopardizing the country's exchange rate stability. Of course, theorizing can only go so far, and attention quickly shifted to the empirical evidence. For the impact assessment in emerging market economies, the following stand out;

Ball & Sheridan (2005): The Ball & Sheridan analysis was aimed at assessing the impact of inflation targeting in major OECD economies, its inclusion in this section owes primarily to its pivotal impact on all subsequent literature relating to inflation targeting. The major contribution of this paper was in its highlight of the need to control for previous conditions in attempting to assess the impact of inflation targeting as a monetary policy option, since work preceding Ball & Sheridan made no such attempts and all accordingly reported significant

impacts. The findings of their paper suggested that inflation targeting had no impact on GDP volatility, Inflation volatility or interest rates volatility once mean reversion was controlled for.

There have been few criticisms of the econometric specification adopted by Ball & Sheridan, Willard (2006) for instance cites the low-power implication of aggregating many years of data into two distinct time periods, he however goes on to verify Ball & Sheridan's results using a panel specification. Bertrand et al (2004) further highlight the arbitrariness involved in the break-date specification of the counterfactuals where cross section data is used. Even though Ball & Sheridan indicate robustness to break-date change, the question of how significantly this impacts the results has remained a moot point.

Batini & Laxton (2007): Batini & Laxton was the first paper of note to replicate the Ball and Sheridan methodology in emerging market economies. The paper reviewed inflation targeting in 42 emerging market economies, structured on 13 inflation targeting economies, 22 counterfactuals selected from the JP Morgan Emerging Markets Bond Index, and 7 others of like-classification. In aspiring at extracting the sample economies from a defined pool, Batini & Laxton attempted to pay a degree of care, albeit weakly, to the possibility of some sort of heterogeneity amongst emerging market economies in terms of the potential impact of policy anchors. Their research found that inflation and output volatility were markedly lower in inflation targeting economies than non-targeting economies.

A possibly closer-to-life measure of the structure of emerging market economies is captured by the FTSE Global Equity Index Series, which ranks world stock markets into 4 distinct subcategories; Developed, Advanced Emerging, Secondary Emerging and Frontier. As this categorization is not inclusive of all economies which may be considered emerging markets,

we may subtly adduce to a fifth category which embraces all other emerging market economies not captured by the index.

To be sure, a very significant aspect of the raging debate on the impact of inflation targeting in emerging markets has to do with the actual classification of what an emerging market really is. The World Bank utilizes three roughly intersecting circles to define the transition of nations, viz; developing economy, emerging market and advanced economy, and so while regular literature classifies an emerging market as a step above a developing economy, World Bank does not to overly categorize nations as falling into either camp distinctly. The terminology 'transition economies' is also widely used to create an intersection between developing economies and emerging market economies especially in eastern European countries where a tractable assessment of the movement of certain bloc of nations from central planner orientation to market orientation was undertaken. So that, the intersection between developing and emerging-market, though nuanced, is potentially a basket full of heterogeneous groups, as is the intersection between emerging market economies and developed economies. An example of nations caught within this classification divide include South Korea, Taiwan and Israel (classified as developed by World Bank, but emerging market nations by a number of other indices) and Argentina, Bangladesh, and Afghanistan (which are excluded from almost as many emerging market classifications as they are included in).

Goncalves & Salles (2008): Possibly the most referenced study on inflation targeting in emerging market economies, Goncalves & Salles assessed the impact of inflation targeting in 13 emerging market inflation targeting economies against a counterfactual bloc of 23 countries, they ran the standard differences-in-differences regression technique of Ball &Sheridan with inflation and GDP volatility as dependent variables, adequately controlling for initial conditions and

found a high level of significance for emerging market inflation targeting economies. Issues with this research work lie in the fact that the researchers make absolutely no mention of how their counterfactuals were selected. To see an approximation of the heterogeneity in developmental blocs which potentially plagues the Goncalves & Salles sample, table 1 classifies the countries in their sample according to FTSE's September 2010 blocs[1]. Here it actually becomes apparent that the Goncalves & Salles analysis just might suffer from some sort of a bias since there seems to be a weak comparison of actual targeting economies against the counterfactuals used. Note closely that most of the inflation targeting countries on the table are classified as either fully developed or advanced economies whilst a significant quantum of their counterfactuals are not even listed in the FTSE index. Indeed, we will find that a more robust assessment of the impact of inflation targeting ought to properly account for the stage of development amongst the sampled groups.

Beyond the apparent lack of control for heterogeneity, the Goncalves & Salles paper contains a number of factual errors as they wrongly indicate the regime change dates of Chile, and Peru as 1991 and 1994 respectively whereas data places the actual dates as 1999 and 2002. The paper further utilizes the loose regime change dates of Israel and Mexico, all of which served to create a counterfactual break-date of 1998, which was lower than the corrected break date of 2000. The impact of this date error though is trivial as we ran their specification with the corrected date to no marked difference in outcomes (results not reported).

[1] More extensive details of the FTSE classifications are provided in the methodology.

TABLE 1: FTSE CLASSIFICATION OF COUNTRIES IN G & S RESEARCH

DEVELOPED	ADVANCED EMERGING	SECONDARY EMERGING	FRONTIER	NOT CLASSIFIED
Israel*	Brazil*	Chile*	Argentina	Costa Rica
Korea*	Hungary*	China	Bulgaria	Dominican Republic
	Mexico*	Colombia*	Cote d'Ivoire	Ecuador
	Poland*	Czech Republic*	Nigeria	El Salvador
	South Africa*	Egypt, Arab Rep.	Tunisia	Lebanon
	Taiwan	India		Panama
		Indonesia		Singapore
		Malaysia		Uruguay
		Morocco		Venezuela
		Pakistan		
		Peru*		
		Philippines*		
		Thailand*		
		Turkey		

*indicates an inflation targeting country

Lin & Ye (2009): Lin & Ye utilize a novel idea in an attempt at encasing a core of potential inflation-targeting economies by employing a propensity score matching technique to determine the average treatment effect of inflation. They follow a two-step procedure of first trimming down the 52-size sample inclusive of 13 inflation targeting economies and 39 non-targeting economies. Of the non-targeting economies, they use a probit score with inflation, money growth and GDP growth as potential identifiers of counterfactuals who have the macroeconomic prerequisites but do not adopt inflation targeting, they then extract from this counter-factual group individuals who attain a certain threshold score based on the lowest score

of actual targeting economies, and compare performances. They attempt a further shed of heterogeneity by utilizing countries with at least the same GDP per capita and population size.

The Lin & Ye analysis however does not say over what span the above GDP per capita averages are based, nor the countries which form the final-phase counterfactuals in their ultimate score assessment. Moreover, the research erroneously assumes that once an economy is classified as an inflation targeting economy, it is of like-status with every other emerging market inflation targeting economy hence the choice of a threshold score. This is however very far from the case. The FTSE Global Equity Index Series ranks two of the so-called emerging market inflation targeting economies on the Lin & Ye list as fully developed economies, i.e. at par with OECD economies (Israel and Korea), five of them as advanced emerging economies (Brazil, Hungary, Mexico, Poland, South Africa), five as secondary emerging (Czech Republic, Colombia, Peru, Philippines, Thailand) and one of them does not even make it into any categorization (Chile); this provides a first hint of how diversely different the baseline basket is. Even if we were to presume that the propensity scores for the members of the three categorized groups were similar, (which is a far shot) if the propensity score had yielded anything for Chile in the neighborhood of the other twelve targeting economies, it should have cast instant doubts on the validity of the technique as being able to produce credible results. But then again, observe how the assumption of homogeneity amongst all developing economies would suggest that an acceptance threshold be dictated by the targeting country with the lowest score; hence distorted results.

Brito & Bystedt (2010): Brito & Bystedt utilize extensive panel data techniques of system and difference GMM in analysis of the combined samples of Goncalves & Salles and Batini & Laxton. The subtext of the paper was a display of how a change of econometric

specification could yield different results. And the point was adequately made. The authors moved from low-ground OLS-panel data regressions to high-ground System GMM estimates where the measures of macroeconomic performance vis-à-vis the inflation targeting index swung from initially significant to ultimately insignificant.

While their objective was adequately communicated however, the Brito & Bystedt analysis instantly inherited the weaknesses of the Goncalves & Salles research paper in failing to account for the diversity of its sampled elements. Indeed, much as they accounted for possible endogeneiety, the GMM technique is not optimized to identify heterogeneity; hence, even though the Brito & Bystedt analysis produces results that mirror the ultimate findings of this research work, its highway is faulty, and so the uptakes from its approach are questionable. Moreover, the authors accede in utilizing the System-GMM approach that it does badly with large sample sizes, and so they attempted to fit the data into the model by averaging their macroeconomic indices into bundles of 3 years with no explanation for their choice of time-frame; which motivates a valid questioning of what exactly it is that the resulting output communicates, especially given that the very essence of monetary policy is highly short-term driven via business cycle management, and its impact becomes less and less observable as data is aggregated over longer periods.

Very plausibly also, the contrasting results of the Brito & Bystedt analysis may ultimately owe more to excessive data smoothing that it does to their econometric re-specifications since in addition to the above highlighted averaging, they control for hyperinflation by adopting a conversion mechanism for both GDP growth and inflation volatility which resulted in highly centered individual observations, which could naturally result in reduced sensitivity to inflation targeting-induced changes.

As a final point in this chapter, we underscore what we believe to have been the subtle factor at play in the papers reviewed thus far. Just as Ball & Sheridan observed that no cross-country analysis on the impact of inflation targeting is complete without controlling for initial conditions, we submit that no cross-country analysis on emerging market economies can be credibly undertaken without controlling for individual institutional development. The reasoning is apparent; institutions are robust in macroeconomic performance. This is duly noted in the literature by papers such as Acemoglu etal (2001, 2002), Easterly & Levin (2003), Jones (1981), Bardhan (1984), North (1990), and Hall & Jones (1999). Some potent and highly enlightening conclusions relating to the role of institutions in macroeconomic performance have similarly been adduced; Acemoglu etal (2003) conclude that a strong and robust relationship subsists between historically determined components of institutions and volatility and once controlled for, macroeconomic policies have only minor impact on volatility and crises. This conclusion was re-echoed by Easterly & Levine (2003) utilizing a completely different methodological toolset. Hall & Jones (1998) trail a subtler path however, finding that institutions and government policy serve as perfect substitutes.

Unlike a number of the above stated papers, we do not aspire to the knowledge of what influences the status of any country's institutions; we do however aver, in league with the referenced literature, that they are relevant aspects of any economy's performance and the commitment to improve them significantly impacts macroeconomic fundamentals; accordingly, we can only truly assess the impact of any policy, inflation targeting inclusive, in institutionally diverse entities such as emerging market nations, after controlling for such underlying interplay.

It is of note that no paper thus far has erected this layer of control in measuring the impact of inflation targeting on emerging market economies; and we can certainly reason out

how what looks like gains from inflation targeting can actually be gains attributed to institutional development. Again, this is fully plausible given that countries which have aspired to adopt this monetary regime have been required to erect certain institutional benchmarks prior to instituting inflation targeting. A careful observer will notice that one of the potential biases of previous studies creeps up here, since a category 1 sorting is initiated by the institutional requirements for adopting targeting. Not all emerging market economies can meet the platform requirements; so the roughest attempt at controlling for selection bias should at least only build into its sample pool countries which are capable of adopting the regime-i.e. an institutional threshold. So that one can posit validly that following the erection of these minimum institutional requirements, and the consequent macroeconomic impact, there was no further merit that the adoption of the inflation targeting policy engendered.

Accordingly, in the subsequent chapters, we erect a structure which marries both the existing models of measuring inflation targeting's impact in emerging markets with the underlying subtleties of institutional dynamics.

CHAPTER 3

METHODOLOGY

3.1 METHODS

In order to fully capture the specification implication of the issue of inflation targeting, we will utilize the same basic model adopted by the majority of previous research works dealing with measuring the impact of inflation targeting, which is the Ball & Sheridan (2005) model.

The model itself has evolved. The earliest variant used by Neumann and Von Hagen (2002) initiated a specification of the type:

$$X_{i,post} - X_{i,pre} = \beta_1 + \beta_2 IT_i + \square_i \quad (1)$$

Where X is a two-state outcome prior to and after the administration of some treatment, each state subscripted as pre and post with the treatment in this case being an adoption of the inflation targeting policy. IT is a dummy which equals 1 if a country inflation targets and 0 otherwise, and $\square$ is a stochastic term which is assumed identical and independently distributed across observations. Ball & Sheridan modify this specification to account for the possibility of mean reversion by controlling for initial conditions viz:

$$X_{i,post} - X_{i,pre} = \beta_1 + \beta_2 IT_i + \beta_3 X_{i,pre} + \square_i$$

(2)

The potency of this control shows up in the sense that it was the first empirical evidence that what had prior been touted as unambiguous gains due to inflation targeting were shown to be possibly no more than mean-reverting mirages.

Batini & Laxton (2006) and Goncalves & Salles (2008) run the exact same specification for different samples of emerging market economies. Brito & Bystedt (2010) however, run a modified version, adjusting for the use of dynamic panel estimation techniques.

Our claim to a misspecification in the application of this model vis-à-vis heterogeneity motivates a re-specification. To fully capture the evolving consequence of this, we will proceed in two phases; first with a broad group reclassification, then with built-in cross sectional controls for social infrastructure. Model-wise, we start with re-specifying (2) as:

$$X_{i,post}\text{-}X_{i.pre} = \beta_1 + \beta_2 IT_i + \sum_{i=1}^{3} \beta_{3i}\, INS_i + \sum_{i=1}^{3} \beta_{4i}\, INS_i IT_i + \beta_5 X_{i.pre} + \square_i \qquad (3)$$

The above is a demarcation structure which aligns the emerging market economies sampled into four distinct categories. INS is itself a dummy which equals 1 if an economy falls into either of the groups classified as INS1, INS2 and INS3 and 0 otherwise; and whilst we actually observe four categories, in order to avoid the dummy variable trap, three demarcations are made and economies which are not subsumed into any of the three listed categories are automatically built into category 4.

Our categorization follows the FTSE market classification of economies, excluding all nations listed as developed, with the exception of South Korea and Israel, both of which are included here since they are listed in all previous studies on inflation targeting as emerging markets. They are accordingly classified amongst the INS1 category of economies, which represents economies at the highest sub-echelon of inflation targeting. Other levels follow in similar ranking with INS3 representing the lowest sub-echelon demarcated; however since there are actually four categories, β_1 and β_2 will now capture representations for the unlisted INS4.

Whilst the FTSE index is quite comprehensive, like all other indices, it is not a compendium of all economies in the world. It operates by thresholds, so that we can be fairly confident that all economies which meet a certain level of market sophistry and above are listed on its scaling platform. Economies which do not attain the minimum market threshold for listing are excluded from its platform; these are listed here as INS4 economies. Hence the INS4 bloc of

economies comprises countries which are not listed on the FTSE index but appear in either the S&P, Batini & Laxton or Goncalves & Salles papers. In all, 66 countries make up our sampling basket. The full list is presented in appendix II.

There is need to emphasize what each of the coefficients will indicate in the re-specified model. In the Ball &Sheridan and Goncalves & Salles papers, the test of significance comes with the β_2 coefficient in equation (2). The approach of each paper was to average X over a given number of years prior to adopting inflation targeting by the referenced economies, where X was either GDP growth volatility or inflation for a given period sequence. The X variable was then averaged over another period of years after the policy adoption and the differences were compared with nations which did not adopt inflation targeting via the specified equation (2). Since a pre-and-post period was required for the non-targeting economies, a break-date obtained by averaging the years for economies which actually targeted inflation was used for the non-targeting economies, referred to in the literature as counterfactuals.

When we re-specify (2) in the form of (3), these coefficients take on a slightly more specific meaning. β_1 now signifies how similar the variations within the INS4 bloc economies which did not target inflation are, whilst β_2 indicates how significantly different INS4 targeting economies are in the post-targeting era from non-targeting INS4 economies. Similarly, the β_{3i} coefficient will signify how similar the variations within the non-targeting elements of the other sub-group of countries which did not target inflation are within themselves, whilst the interaction coefficients β_{4i} will indicate how much better or worse-off the targeting economies in each subgroup are from their peers post-targeting. The test of significance of inflation targeting will now be deduced from the significance or otherwise of β_2 and the interaction coefficients, $\beta_{4i.}$

As earlier mentioned, equation (3) has been erected to capture dynamics within four institutional clusters in order to mitigate the effect of a sample bias in evaluating the impact of inflation targeting. This however does not imply that within each of these clusters heterogeneity is absent, so that a significance of either β_2 or any of the β_{4i}'s might yet be indicative of within-cluster heterogeneity. So that even more potent for our results would be our ability to observe the impact of inflation targeting within a setting with less restriction still. Accordingly, at the second phase of analysis, we further reduce the four-bloc restriction and specify (4) as:

$$\Delta X_i = \beta_1 + \beta_2 IT_i + \boldsymbol{\beta_3' SI_i} + \beta_4 X_{i.pre} + \square_i \qquad (4)$$

Model (4) incorporates heterogeneity into the structure with a finer comb by controlling for it with a measure of each country's social infrastructure, SI. For this research work, we adopt the World Bank's Worldwide Governance Indicators to proxy for social infrastructure. The WGI dataset comprises a measure of governance in all economies along 6 specific watch-points, namely;

1. Voice and Accountability (SI1)
2. Political Stability and Absence of Violence (SI2)
3. Government Effectiveness (SI3)
4. Regulatory Quality (SI4)
5. Rule of Law (SI5)
6. Control of Corruption (SI6)

The individual indices are ranked from -2 to 2 for each country with -2 representing the lowest score and 2 representing the highest score. We find that the Government Effectiveness (SI3) index correlates between 70% and 93% with Political Stability (SI2), Regulatory Quality (SI4), Rule of Law (SI5) and Control of Corruption (SI6), which seems rather intuitive.

However, whilst it becomes imperative to avoid multicollinearity amongst the exogenous variables by proxying for the five high correlates with one of them, we run the risk of dropping a variable which might correlate highly enough with inflation targeting to create the impression that inflation targeting matters, while merely projecting the impact of the omitted variable. We address this by assessing combinations of each of the six variables with IT. Hence, β_3 in equation (4) is an nx1 vector of selected controls for social infrastructure.

Notice here that we no longer control for institutional blocs since these are instantly captured in levels by SI which approximates the average social infrastructure in each economy. In a manner of speaking, we have now created a structure which possesses 66 rather than 4 institutional blocs.

For each of the above models, in keeping with the standards of contemporary studies, we assess the impact of inflation targeting on four macroeconomic indicators, namely; annual inflation, annual GDP growth rate, inflation volatility, and GDP growth rate volatility. These are the measures so far observed in most previous literatures which have attempted to assess the impact of the inflation targeting policy on the economy. Our objective, as has earlier been noted, centers on building into specific existing models features that expound on causality, to this end, it is imperative that we are able to approximate results of previous studies as a necessary take-off point.

3.2 DATA SOURCES

GDP growth rates, Inflation data and the World Governance Indices are all obtained from the World Bank's website. The countries utilized in this research work are a pooled combination of the Goncalves & Salles, Batini & Laxton, S&P Index and FTSE emerging market index. Accordingly, 66 countries are utilized. The details are provided in appendix II.

Dates of assumption of Inflation Targeting are taken from the Centre for Central Banking Handbook, No. 29, 2012 edited by Gill Hammond and published by the Bank of England. Data on the Institutional blocs utilized (INS) comes from the FTSE Global Equity Index Series Country Classification for September 2010, available on the FTSE website.

The sample period is from 1979 to 2010. The choice of base year was occasioned by the need to retain a close-to-full basket on the occasions where we take first differences. The WGI dataset however, embraces observations from 1996 to 2010, with breaks in odd years less than 2000. The database was itself initialized in 1996. By implication, we assume that the averaged social infrastructural layers from 1996 to 2010 on the average serve as a good proxy for each country's average social infrastructure between 1980 and 2010. This however is a valid assumption, given that levels of institutions on the average exercise relatively stable relationships between countries through time (see for instance, Easterly & Levine 2003, Acemoglu et al 2001, 2002).

GDP growth and inflation data are used on an annual basis. We follow the structure of Goncalves & Salles in controlling for periods of hyper-inflation by sampling only within observations with inflation less than 50% basically because in re-running the equations to embrace periods inclusive of hyperinflation, whilst most of the qualitative results remain unchanged, the coefficients become truncated and unrepresentative of the average behavior we aspire to capture. The break-date, which is the demarcation period for counterfactuals, is computed in appendix III as 2002.

CHAPTER 4

RESULTS

All regression results are detailed in Appendix IV.

To demonstrate the evolution of the potential significance or otherwise of inflation targeting in emerging markets, our regression results are presented first with the basic model, and then with progressive controls, detailed in the methodology, which are intended to isolate as much as possible the pure impact of inflation targeting on the volatility of macroeconomic performances.

Significance here is evaluated using a t-ratio test of the significance of the coefficient of interest, the dummy variable, IT in the various patterns in which it is represented in each of models (2), (3), and (4). Specifically, we impose the null hypothesis;

$H_o : \beta_2 = 0$

Which would imply that inflation targeting as a policy option bears no significance for macroeconomic volatility.

Since we apriori are cognizant of how diverse the elements in our sample basket are, we naturally assume that the fixed standard error assumption of OLS may not hold, hence we control for potentially unstable standard errors by utilizing the White heteroskedasticity-consistent covariance matrix for all regressions.

Accordingly, we observe from table 1 of appendix IV that, as was rightly observed by Goncalves & Salles and Batini & Laxton, even after expanding the number of elements in their respective samples and increasing the years of observation, the reproduction of the Ball & Sheridan model for emerging markets indicates that the IT dummy bears a negative and significant sign in the regressions of inflation. Unlike Goncalves & Salles however, but

consistent with the findings of Batini & Laxton, the results for GDP growth rate volatility are not significant. We inquired into why this was so by re-running the regression with the specific Goncalves & Salles sample size; the results are presented in the starred column of table 1 and show that the IT dummy is now significant at 5%. This suggests again that the Goncalves & Salles sample pool is biased. Not surprisingly, the Batini & Laxton results conform to ours since they actually aspired to purge their sample of some measure of heterogeneity as has been indicated in the literature review. Once again, this highlights the sensitivity of the results to sample selection.

The other results for GDP growth rate and inflation volatility additionally side with the findings of Batini & Laxton in indicting that the IT dummy is negative and significant at 5% on each occasion. For all the regressions, the coefficient of mean reversion is negative and significant, implying a strong level of persistence in each of the observed indices.

Having established the base point, we present the results of Model (3) on table 2 of appendix IV, which observes the same regressions located within specific economic clusters. We note first that for all four indices measured, the non-targeting INS1 and INS4 clusters moved in completely reverse directions. One simple uptake from this is that very opposite results can be arrived at by simply weighting a sample to be either INS1 or INS4-heavy with proponents or counterfactuals. So that again we reiterate the role of a properly weighted sample in arriving at valid conclusions. When the results of table 2 are harmonized with table 1 of chapter 2, and table 1 of appendix IV, the simple conclusion remains that a significant quantum of the results produced thus far in the analysis of inflation targeting in emerging market economies are not credible; they merely feed off the extensive heterogeneity therein.

Observed along each column, we get a hint of how the component blocs averagely tended, with and without targeting inflation, when appraised vis-à-vis each of the four variables under consideration. Below I briefly analyze the dynamics within each category.

INS1

Within this bloc, for both inflation targeting economies and counterfactuals, average values for all observed indices fell between periods; however the fall in GDP growth volatility was not significant for the counterfactuals, but was for targeting economies. Moreover, we observe that targeting economies recorded greater fall in GDP growth rates, higher inflation rates and no difference in inflation volatility when compared with their non-targeting peers. In order to properly read-off the implication of the positive coefficient on the IT dummy for inflation in INS1, note that it does not mean that inflation increased in countries that targeted inflation, it rather implies that compared to non-targeting economies in this cluster, average inflation was (significantly) higher by the coefficient of the targeting dummy; and since non-targeting economies recorded a 5.1% fall in inflation, the average inflation-targeting economy reduced inflation by (-5%) + (2%) = -3% on the average between both periods.

The overall scorecard for inflation targeting here is not impressive; as, save for volatility of GDP growth rates, on the average, the results seem to suggest that they actually fared worse than non-targeting economies across the observed criteria and bracket. Keep a note however that in general, INS1 inflation targeting economies recorded lower inflation rates and inflation volatility between both periods observed.

It suffices to expound on what the asymmetric decline in GDP growth rates within this group of economies suggests. We do not attribute the dissimilarity in this index between targeting and non-targeting economies to inflation targeting, rather, it suggests that targeting

economies within this bloc are of a higher level of economic development than non-targeting economies and the decline observed is suggestive of the effects of the theory of convergence which posits that more developed economies tend on the average to grow at a slower rate than less developed economies as they progress through time (see Barro & Sala-I-Martin, 1992). By implication, yet more heterogeneity likely exists within even this carefully selected group of economies.

INS2

In this bloc, but for GDP growth volatility which fell by 1.6%, there was no significant trajectory amongst non-targeting economies. Targeting economies however, fared better as they reduced average inflation and inflation volatility by 2.5% and 1.69% respectively. Save for the possible existence of further sub-categories, inflation targeting may be said to have achieved positive dividends for the management of inflation within this bloc of countries.

INS3

Within this cluster, two features distinctly stand out for inflation targeting economies. Observe that for the INS3 bloc, there is no significant trajectory in behavior amongst non-targeting economies from any of the four observed indices; however, the targeting economies were significantly different from non-targeting economies in the near symmetric and simultaneous decline of GDP growth rates and volatility of inflation. In this cluster, GDP growth sank by all of 3% points amongst inflation targeting economies; we clearly cannot attribute this to convergence of any sort, since these economies are just a measure above the lowest sub-group. The only other thing that hints to what might be responsible for this is the fact that the volatility of their inflation was highly contained within the same bracket as well, and by a similar difference of 3% points. This is highly suggestive of restricted growth due to an excessively

contained monetary policy which had growth inhibiting consequences. Note again that the non-targeting economies within this cluster actually fared better overall.

INS4

As was briefly mentioned in the analysis of INS1, this group of countries, which represents the lowest sub-echelon in our sample basket, observed higher indices on all measures. GDP growth rates, volatility of GDP growth rates, inflation, and volatility of inflation rates were all higher; moreover, the IT dummy was highly insignificant across all observations. Of note, amongst counterfactuals, each observation was not only positive, but significant. The convergence theory can be seen manifest in their GDP growth rates, and the lack of any sophistry in monetary management skills are suggested by the swinging volatility of GDP growth rates and inflation. It is therefore interesting that in the midst of this, where we have the clearest opportunity to view a distinction amongst inflation targeting economies, that no evidence exists of its efficacy.

Now, coupling the above with the results for INS3, the position that developing economies ought to pay more focus to policies geared towards institution building is reinforced; since by and large, most macroeconomic impulses are merely reflective of this. Moreover, in being located within the lowest economic cluster, we can certainly reason out that the primal challenge for this group of countries should be less about monetary management, and more about developmental policies and fiscal discipline as indeed the data relays that whether or not social institutions are controlled for, a level of development exists beneath which the impotence of policy is unambiguously relayed.

The results presented above ought to be read-off with a measure of care, since there might be more divergent behavior than has been captured in this rather static bloc analysis. Can

we, for instance, really attribute the fall in GDP within INS3 to targeting inflation? or indeed, can we confidently claim that INS1 targeting economies actually did fare worse than non-targeting economies, and that this was unambiguously due to the adoption of inflation targeting? Is there somehow that we can adjust for the economic insecurities which probably prompted the embrace of this policy targeting in the first place, and can we isolate the effects of what could have been within these targeting countries from what eventually was? The slippery slope of falling off one cluster and into another whilst trying to make conclusive statements looms large, but in our final analysis we relax the cluster rigidity and fluidly control for what we believe is the actual delimiter behind the observed behavior thus far.

Tables 3, 4, 5 and 6 build social infrastructure into the model in graduated patterns so that the impact of inflation targeting can be reviewed in both uncontrolled and controlled phases. The most significant uptake from this analysis involves the uncontrolled-for influences on the volatility of macroeconomic indices which the practice of inflation targeting piggy-backs on. As we progressively erect controls, we show that the IT dummy systematically loses its valor.

We start on table 3 with GDP growth rate as the dependent variable. With the full assortment of institutional controls in place in column 1, notice that the IT dummy is quite insignificant; this is because most of the possible channels through which its effect could be 'disguised' have been controlled for. Further observe that for as long as a single SI control variable exists in the model, the IT dummy remains insignificant. When we exclude all SI controls however, we get model 2, and the IT dummy becomes significant at 5%. The simple implication of this is that cross-country analyses of the effects of inflation targeting on GDP growth-rates end up capturing certain social infrastructural interplays that correlate highly with

inflation targeting, which is partly why the IT dummy inadvertently captured the effects of convergence in the INS1 regressions.

When we replace GDP growth rate with Inflation on table 4, in the selective controls of regressions 2-7, the IT dummy loses significance only twice, with SI3 (Government Effectiveness) and SI4 (Regulatory Quality). Not surprisingly, aspects of these are pre-defined as conditions required for the adoption of inflation targeting. In league with our argument therefore, the development of these institutions, and not inflation targeting, is responsible for the control of inflation. The proof of this lies in the fact that controlling for them pitches all countries with similar institutional depth together, and from the results evident, even non-targeting economies operate on parallel inflation levels.

Table 5 offers a most interesting perspective to the discourse, here it is demonstrated that sometimes the relationship between the interplay of variables is not even linear. Observe that for all controls instituted, even with the full box of controls in column 1, when we observe inflation volatility as the dependent variable, the IT dummy is negative and highly significant across controls. Only when we update the model with the second moments of SI2, SI4 and SI5 on table 6B does the dummy succumb. This relays how intricate the weave between institutions and policy can get.

In our final set of regressions, table 6A repeats the process with GDP volatility as the dependent variable. Recall that in our replication of the Ball & Sheridan model, the IT dummy was insignificant for this category, and we had to compress our sample size to the specific Goncalves & Salles band to observe significance. In like fashion, we used the Goncalves & Salles sample to observe the place of controls on the IT dummy. Not unexpectedly, it too oscillates between significance and insignificance, depending on the control erected. As a further

note of how poorly this sample is, we refer the reader back to our Ball & Sheridan reproduction of this equation on table 2. Notice closely that the DW statistic reads 0.97, which indicates high serial correlation amongst the error terms. This offers yet another element to our position on how poorly this sample performs overall. As the model is fitted with more controls and the DW improves, the IT dummy loses significance.

We have paid little attention to the actual significance of the SI variables themselves, however a casual glance through the regression results will indicate that whilst some appear to matter more than others, and it is difficult to ascribe a single one exclusively to the workings of inflation targeting, they apparently all do matter for the control of macroeconomic volatility; accordingly, we are cautious about exclusively promoting one over the other since the channels through which each affects volatility may not be entirely apparent.

CHAPTER 5

CONCLUSION

Using the standard bulwark of the inflation targeting assessment in contemporary literature, the differences-in-differences methodology, we demonstrated alongside four standard macroeconomic volatility measures, that indeed, inflation targeting bears little evidence of success in emerging market economies. This was established with the alternate controls of a relocation of the sampled elements within approximate institutional clusters and the erection of infrastructural proxies.

We further established two leading causes of the misrepresented impact of inflation targeting in emerging markets as being non-representative sample selection and the failure to control for institutional aggregates. Indeed, it appears that more often than not, inflation targeting inadvertently captures the implication of highly correlated macroeconomic dynamics which are not controlled for.

Further examination of specifically channeled institutional emphasis as well as a possible role for policy in medium to longer run anchorage of macroeconomic aggregates, which are not observed here are left for future research.

REFERENCES

Acemoglu, D., Johnson, S., Robinson, J.A., (2001). 'The colonial origins of comparative development: an empirical investigation'. American Economic Review 91, 1369–1401.

Acemoglu, D., Johnson, S., Robinson, J.A., (2002). 'Reversal of fortunes: geography and institutions in the making of the modern world income distribution'. Quarterly Journal of Economics 117

Ball, L., Sheridan, N., (2005) 'Does Inflation targeting Matter?' in Bernanke, B.S., Woodford, M. (Eds.), The inflation targeting debate, NBER studies in business cycles. Vol. 32, University of Chicago Press, Chicago, IL.

Bardhan, P., (1984) 'The Political Economy of Development in India'. Basil Blackwell, Oxford.

Barro, R.J., Sala-I-Martin, X.,(1992) 'Convergence'. Journal of Political Economy 100(2): 223-251

Batini, N., Laxton, D., (2007) 'Under what Conditions can Inflation Targeting be Adopted? The Experience of Emerging Markets', In: Mishkin, F., Schmidt-Hebbel, K. (Eds).

Batini, N., Nelson E., Yates A., (2003) 'Hybrid Inflation and Price-Level Targeting' Journal of Money, Credit and Banking 35(3) 283-300.

Bertrand, M., Duflo, E., Mullainathan, S., (2004) How much should we trust differences-in-differences estimates? Quarterly Journal of Economics 119, 249–275.

Brito, D.R., Bystedt B., (2010) 'Inflation Targeting In Emerging Economies; Panel Evidence' J. Dev. Econ. 91 312-318.

Easterly, W., Levine, R., (2003) 'Tropics, Germs and Crops; How Endowments Influence Economic Development'. J. Monet. Econ. 50 3-39.

Frankel J (2012) 'The Death of Inflation Targeting', Project Syndicate.

Goncalves, C.E.S, Salles, J.M., (2008) 'Inflation Targeting in Emerging Economies: What do the Data Say?' J. Dev. Econ. 85 (1-2), 312-318

Hammond, G., (2012) 'State of The Art Inflation Targeting', Centre for Central Banking Studies 'Handbook # 29 2012.

Hall, R.E., Jones, C.L., (1999) 'Why do some countries produce so much more output per worker than others?' Quarterly Journal of Economics 114, 83–116.

Levin, A.T., Natalucci, F.M., Pigler, J.M., (2004) 'The Macroeconomic Effects of Inflation Targeting'. Federal Reserve Bank of St. Louis Review 86 (4), 51-80.

Lin, S., Ye, H., (2009). 'Does Inflation Targeting Make a Difference? Evaluating the Treatment Effect of Inflation Targeting in Seven Industrial Countries.' J. Monet. Econ 54, 2521-2533

Lin, S., Ye, H., (2009). 'Does Inflation Targeting Make a Difference in Developing Countries?' J. Monet. Econ 89 (1), 118-123

Neumann, M., von Hagen, J., 2002 'Does Inflation Targeting Matter?' Federal Reserve Bank of St. Louis Review 84 (4), 127-148.

North, D., (1990). 'Institutions, Institutional Change, and Economic Performance'. Cambridge University Press, Cambridge, UK

Pianalto, S. (2005) 'The Power of Price Stability' Research Department. Cleaveland, Ohio; Federal Reserve Bank of Cleveland, May.

Roger, S. (2010) 'Inflation Targeting Turns 20'. In Finance and Development Mag.

Stiglitz J (2008) 'The failure of Inflation Targeting', Project Syndicate.

Svensson L (2007) 'Optimal Inflation Targeting: Further Developments of Inflation Targeting' in **Mishkin, F and Schmidt-Hebbel Santiago, K (2007)** (eds), Monetary Policy Under Inflation Targeting, Banco Central de Chile

Vega, M., Winkelreid, D., **(2005)** 'Inflation Targeting and Inflation Behavior; A Successful Story'. International Journal of Central Banking 1 (3), 152-175.

Walsh, C.E. (2009) 'Inflation Targting: What have we learned? Lecture Delivered In 'International Experience with the conduct of Monetary Policy Under Inflation Targeting', Bank of Canada, July 22-23 2008

Willard, L.B., **(2006**) 'Does Inflation Targeting Matter? A Reassessment CEPS Working Paper No. 120

Woodford, M. (2003) 'Interest and Prices; Foundations of a Theory of Monetary Policy', Princeton, New Jersey, Princeton University Press.

APPENDICES

APPENDIX I

SUMMARY STATISTICS & COVARIANCE ANALYSIS

A; SUMMARY STATISTICS

	SI1	SI2	SI3	SI4	SI5	SI6
Mean	-6.31E-05	-0.17921	0.145593	0.222071	-0.00033	-0.03272
Maximum	1.199167	1.325	2.140833	1.9225	1.5525	2.250833
Minimum	-1.526667	-1.88583	-1.0175	-0.98083	-1.30083	-1.10917
Std. Dev.	0.719132	0.856716	0.650168	0.650193	0.719923	0.700449
Observations	66	66	66	66	66	66

	inflation	inflation	GDP	GDP	Inflation	Inflation	GDP	GDP
	srd. Dev pr	srd. Dev p	SGPRE	SGPOST	pre	post	pre	post
Mean	6.663369	3.077873	4.1913	2.934568	10.86921	5.985921	3.988184	4.628361
Maximum	16.81132	16.1435	17.38754	9.146276	32.41836	27.6342	14.37963	13.55178
Minimum	0	0	0	0	-0.817	1.050333	-4.812571	-1.273
Std. Dev.	4.422067	2.332594	2.937868	1.964576	7.992509	4.147443	3.54475	2.089924
Observations	66	66	66	66	66	66	66	66

B: COVARIANCE ANALYSIS

B; COVARIANCE ANALYSIS														
Covariance														
Correlation	SI1	SI2	SI3	SI4	SI5	SI6	SIPRE	SIPOST	SGPRE	SGPOST	IPRE4	IPOST2	GPRE4	GPOST2
SI1	0.509315													
	1													
SI2	0.328876	0.722842												
	0.542022	1												
SI3	0.265138	0.396951	0.416314											
	0.575796	0.72361	1											
SI4	0.313127	0.396922	0.386584	0.416346										
	0.679987	0.723529	0.928554	1										
SI5	0.302057	0.468276	0.429455	0.408656	0.510436									
	0.592412	0.770921	0.931615	0.886463	1									
SI6	0.270123	0.440744	0.415918	0.395921	0.460673	0.483195								
	0.54451	0.745768	0.927334	0.882714	0.927601	1								
INFLATION	0.637638	-0.36124	-0.60383	-0.15537	-0.55851	-0.52622	19.2584							
SRD. DEV PRE	0.203597	-0.09682	-0.21325	-0.05487	-0.17814	-0.1725	1							
INFLATION	-0.248063	-0.00926	-0.35183	-0.34231	-0.28934	-0.29097	2.372741	5.358556						
SRD. DEV PRE	-0.150156	-0.00471	-0.23556	-0.22917	-0.17495	-0.18083	0.23357	1						
GDP	-0.010302	0.335641	-0.02252	0.075895	0.058045	0.010944	-1.079596	0.365461	8.500293					
SRD. DEV PRE	-0.004951	0.135405	-0.01197	0.040343	0.027866	0.0054	-0.084379	0.05415	1					
GDP SRD DEV	0.247799	0.505351	0.130521	0.214333	0.156346	0.183316	1.450828	1.019151	2.884778	3.801082				
POST	0.178096	0.304872	0.103757	0.170376	0.112244	0.135265	0.169571	0.225819	0.507507	1				
INFLATION	0.897324	-1.4561	-1.30614	-0.77768	-1.29762	-1.2055	26.52594	1.471738	-5.98349	-1.07076	62.91232			
PRE	0.158521	-0.21593	-0.25522	-0.15195	-0.22899	-0.21865	0.762066	0.080157	-0.25874	-0.06924	1			
INFLATION	-0.552338	-0.96989	-1.26066	-1.33993	-1.28349	-1.12509	1.761591	3.067415	-0.83448	2.386098	7.406609	16.94066		
POST	-0.188038	-0.27716	-0.4747	-0.50453	-0.43647	-0.39324	0.097528	0.321946	-0.06954	0.297351	0.226875	1		
GDP	-0.023298	0.345224	0.571019	0.29102	0.771829	0.55967	-2.961553	-0.267906	-0.94851	-1.90713	-6.441481	-2.331893	12.37487	
PRE	-0.00928	0.115427	0.251576	0.128211	0.3071	0.228876	-0.19184	-0.032899	-0.09248	-0.27807	-0.230859	-0.161055	1	
GPOST2	-0.562278	-0.05604	-0.06991	-0.22451	-0.00432	-0.03726	-1.430092	1.599434	-0.01542	0.289011	-3.317335	0.435657	2.856352	4.301603
GDP POST	-0.379877	-0.03178	-0.05224	-0.16776	-0.00291	-0.02585	-0.157123	0.33314	-0.00255	0.071474	-0.201654	0.051035	0.391495	1

C: FTSE SEPTEMBER 2010 CLASSIFICATION OF COUNTRIES USED

DEVELOPED	ADVANCED	SECONDARY	FRONTIER	NOT CLASSIFIED
Israel	Brazil	Chile	Argentina	Algeria
Korea	Hungary	China	Bahrain	Armenia
	Mexico	Colombia	Bangladesh	Costa Rica
	Poland	Czech Republic	Botswana	Dominican Republic
	South Africa	Egypt	Bulgaria	Ecuador
	Taiwan	India	Cote d'Ivoire	El Salvador
		Indonesia	Croatia	Ghana
		Malaysia	Cyprus	Guatemala
		Morocco	Estonia	Kuwait
		Pakistan	Jordan	Latvia
		Peru	Kenya	Lebanon
		Philippines	Lithuania	Panama
		Russian	Macedonia, FYR	Singapore
		Thailand	Malta	Tanzania
		Turkey	Mauritius	Ukraine
		UAE	Nigeria	Uruguay
			Oman	Venezuela
			Qatar	
			Romania	
			Serbia	
			Slovak Republic	
			Slovenia	
			Sri Lanka	
			Tunisia	
			Vietnam	

APPENDIX II

ALL COUNTRIES USED IN THIS RESEARCH WORK

APPENDIX II: ALL COUNTRIES USED IN THIS RESEARCH WORK

S/N	CONSOLIDATED	S&P + FTSE	TARGETING ECONOMIES	GONCALVES & SALLES NON-TARGETING COUNTRIES	S/N	CONSOLIDATED	S&P + FTSE	TARGETING ECONOMIES	GONCALVES & SALLES NON-TARGETING COUNTRIES
1	algeria				34	malaysia	malaysia		malaysia
2	argentina	argentina		argentina	35	malta	malta		
3	Armenia		Armenia		36	mauritius	mauritius		
4	bahrain	bahrain			37	mexico	mexico	Mexico	
5	bangladesh	bangladesh			38	morocco	morocco		morocco
6	botswana	botswana			39	nigeria	nigeria		nigeria
7	brazil	brazil	Brazil		40	oman	oman		
8	bulgaria	bulgaria		bulgaria	41	pakistan	pakistan		pakistan
9	chile	chile	Chile		42	panama			panama
10	china	china		china	43	peru	peru	Peru	
11	costa rica			costa rica	44	philippines	philippines	Philippines	
12	colombia	colombia	Colombia		45	poland	poland	Poland	
13	cote d ivoire	cote d ivoire		cote d ivoire	46	qatar	qatar		
14	croatia	croatia			47	romania	romania	Romania	
15	cyprus	cyprus			48	russia	russia		
16	czech republic	czech republic	Czech		49	Serbia	Serbia	Serbia	
17	dominican republic			dominican republic	50	singapore			singapore
18	ecuador			ecuador	51	slovakia	slovakia		
19	el savador			el savador	52	slovenia	slovenia		
20	egypt	egypt		egypt	53	south africa	south africa	South Africa	
21	estonia	estonia			54	south korea	south korea		
22	ghana		Ghana		55	sri lanka	sri lanka		
23	guatemala		Guatemala		56	tanzania			
24	hungary	hungary	Hungary		57	thailand	thailand	Thailand	
25	india	india		india	58	tunisia	tunisia		tunisia
26	indonesia	indonesia	Indonesia	indonesia	59	turkey	turkey	Turkey	turkey
27	jordan	jordan			60	taiwan	taiwan		taiwan
28	kenya	kenya			61	uae	uae		
29	kuwait	kuwait			62	uruguay			uruguay
30	latvia	latvia			63	Ukraine			
31	lebanon			lebanon	64	venezuela			venezuela
32	lithuania	lithuania			65	vietnam	vietnam		
33	macedonia	macedonia			66	Israel	Israel	Israel	Israel

APPENDIX III

TARGETING COUNTRIES AND DATES OF ADOPTION BY PREVIOUS STUDIES & BANK OF ENGLAND							
S/N	COUNTRY	DATE OF ADOPTION		GONCALVES & SALLES	BATINI & LAXTON	BANK OF ENGLAND	
		LOOSE	STRICT				
1	Armenia		Jan-06				2006
2	Brazil		Jun-99	1999	1999	1999	1999
3	Chile		Sep-99	1991	1999	2000	2000
4	Colombia		Oct-99	2000	1999	2000	2000
5	Czech		Dec-97	1998	1998	1998	1998
6	Ghana	2002	May-07				2007
7	Guatemala		2005				2005
8	Hungary		Jun-01	2001	2001	2001	2001
9	Indonesia		Jul-05				2006
10	Israel	1992	Jun-97	1992	1997	1997	1997
11	Mexico		2001	1999	2002	2001	2001
12	Peru		Jan-02	1994	2002	2002	2002
13	Philippines		Jan-02	2002	2002	2002	2002
14	Poland		1998	1999	1999	1998	1998
15	Romania		Aug-05				2006
16	Serbia	Sep-06	Jan-09				2009
17	South Africa		Feb-00	2000	2000	2000	2000
18	South Korea		Apr-98	1998	1998	1998	1998
19	Thailand		May-00	2000	2000	2000	2000
20	Turkey		Jan-06				2006
	BREAK DATES			1998	1999Q4	1999.692	2002.05

APPENDIX IV

REGRESSION RESULTS

TABLE 1: THE BALL & SHERIDAN (MODEL (2))

VARIABLE	GDP GROWTH RATE	INFLATION	GDP GROWTH RATE VOLATILITY	GDP GROWTH RATE VOLATILITY**	INFLATION VOLATILITY
CONSTANT	4.09101	4.854682	2.328455	2.988548	2.539335
std. error	0.408227	1.202704	0.591725	0.611179	0.49189
prob	0	0.0001	0.0002	0	0
IT	-0.980693	-1.505842	-0.689766	-1.163465	-1.492829
std. error	0.442197	0.729464	0.503067	0.557644	0.52785
prob	0.0302	0.0431	0.1752	0.0447	0.0063
INITIAL CONDITIONS	-0.790749	-0.85394	-0.781502	-0.943861	-0.85129
std. error	0.076428	0.073967	0.096473	0.053092	0.090889
prob	0	0	0	0	0
R-Squared	0.69	0.76	0.645981	0.798	0.768106
DW	1.85	1.76	2.053581	0.97	1.755643
F-Stat	68.75	99.49	57.47817	65.09	104.3379
Observations	66	66	66	36	66
white heteroskedasticity consistent standard errors					
**Estimated using Goncalves & Salles Sample					

TABLE 2: IT & INSTITUTIONAL HETEROGENIETY (MODEL (3))

VARIABLE	GDP GROWTH	INFLATION	GDP GROWTH VOLATILITY	INFLATION VOLATILITY
CONSTANT	4.248022	5.802837	3.116769	2.781571
std. error	0.38006	2.998463	0.982002	0.662518
prob	0	0.0579	0.0024	0.0001
IT4 DUMMY	0.116654	1.287403	-0.349281	-0.641176
std. error	0.817627	2.558178	1.241089	1.081761
prob	0.8871	0.6167	0.7794	0.5557
INS1	-0.901643	-5.185209	-0.066262	-2.118443
std. error	0.384582	2.670033	0.82495	0.80393
prob	0.0226	0.0571	0.9363	0.0108
INS2	0.588521	-0.290735	-1.583963	-0.100055
std. error	0.55926	2.488818	0.842854	1.10445
prob	0.2971	0.9074	0.0653	0.9281
INS3	-0.247976	-1.176384	-0.788284	-0.403991
std. error	0.649481	2.414055	0.864942	0.948055
prob	0.704	0.6279	0.3659	0.6716
IT*INS1	-0.738926	2.315978	-1.51778	0.381287
std. error	0.352395	1.354474	0.184612	0.463325
prob	0.0405	0.0927	0	0.414
IT*INS2	-1.007832	-2.511082	-0.041125	-1.688562
std. error	0.621296	1.476303	0.563449	0.900716
prob	0.1103	0.0944	0.9421	0.066
IT*INS3	-3.067788	-0.876457	-0.962419	-3.040927
std. error	1.698151	2.009531	1.527377	0.774017
prob	0.0761	0.6644	0.5311	0.0002
INITIAL COND	-0.81719	-0.875386	-0.802205	-0.847541
std. error	0.068979	0.104042	0.107037	0.089512
prob	0	0	0	0
R-Squared	0.719424	0.78	0.673357	0.78
DW	1.67	1.792484	2.26	1.770531
F-Stat	1.59	24.80	14.69	25.14
Observations	66	66		
white heteroskedasticity consistent standard errors				

TABLE 3; (MODEL (4)) DEPENDENT VARIABLE - GDP GROWTH RATE							
	1	2	3	4	5	6	7
CONSTANT	4.219304	3.960928	3.995241	3.972438	3.932558	4.052179	4.025373
std. error	0.608459	0.382406	0.395116	0.385173	0.372386	0.423624	0.432353
prob	0	0	0	0	0	0	0
IT DUMMY	-0.35682	-0.628636	-0.443609	-0.620666	-0.637337	-0.555989	-0.58604
std. error	0.518462	0.432872	0.440391	0.435046	0.442928	0.416741	0.423435
prob	0.4941	0.1515	0.3178	0.1588	0.1553	0.1871	0.1714
SI1	-1.23279	-1.004764	-1.26408	-1.186393	-1.161685	-1.296094	-1.209601
std. error	0.510347	0.317279	0.540035	0.476734	0.480088	0.534322	0.526791
prob	0.0189	0.0024	0.0225	0.0156	0.0185	0.0183	0.0251
SI2	0.241706		0.36039				
std. error	0.418554		0.474032				
prob	0.5659		0.45				
SI3	-0.07934			0.345308			
std. error	1.062887			0.503887			
prob	0.9408			0.4958			
SI4	-0.68861				0.256766		
std. error	1.401562				0.463252		
prob	0.6251				0.5814		
SI5	0.733752					0.471623	
std. error	0.88426					0.549363	
prob	0.4101					0.394	
SI6	0.115613						0.373391
std. error	1.047429						0.548985
prob	0.9125						0.499
INITIAL GDP	-0.81723	-0.784898	-0.791371	-0.800998	-0.791423	-0.813264	-0.801234
std. error	0.07871	0.061222	0.063863	0.067722	0.062851	0.072588	0.070895
prob	0	0	0	0	0	0	0
R-Squared	0.739777	0.730363	0.735677	0.73309	0.731663	0.735979	0.734318
DW	1.804539	1.8	1.822568	1.806174	1.845816	1.820896	1.826053
F-Stat	20.25536	55.97969	42.44464	41.88534	41.58146	42.51049	42.14935
Observations	66	66	66	66	66	66	66
white heteroskedasticity consistent standard errors							

TABLE 4; (MODEL (4)): DEPENDENT VARIABLE - INFLATION

	1	2	3	4	5	6	7
CONSTANT	6.928915	4.634536	4.865379	6.063263	6.461971	5.512309	5.192301
std. error	1.760428	1.137647	1.282511	1.64	1.62	1.462593	1.335912
prob	0.0002	0.0001	0.00	0.0005	0.0002	0.0004	0.0003
IT DUMMY	-0.1876	-1.15	-1.56	-0.923	-0.638	-1.378855	-1.219297
std. error	0.799142	0.68	0.861	0.67	0.65	0.73396	0.709665
prob	0.8152	0.096	0.08	0.17	0.3279	0.0651	0.0908
SI1	1.509148	-1.196084	-0.437339	0.586879	1.438653	0.53	0.011319
std. error	1.135228	0.561545	0.762441	0.85	1.07	0.94	0.726658
prob	0.189	0.0371	0.57	0.4928	0.1845	0.58	0.9876
SI2	0.709316		-1.013234				
std. error	0.636401		0.967967				
prob	0.2697		0.30				
SI3	-0.403901			-3.164995			
std. error	1.878131			1.59			
prob	0.8305			0.0509			
SI4	-5.626682				-4.123276		
std. error	2.122757				1.78		
prob	0.0104				0.0236		
SI5	-1.628947					-2.628925	
std. error	2.045925					1.493979	
prob	0.4292					0.0835	
SI6	2.84074						-2.07
std. error	1.962055						1.18
prob	0.1531						0.08
INITIAL INFLATION	-0.940954	-0.843495	-0.87016	-0.938989	-0.941751	-0.941751	-0.899233
std. error	0.105047	0.071406	0.089014	0.104494	0.096671	0.10	0.09393
prob	0	0	0.00	0	0	0	0
R-Squared	0.830036	0.77009	0.776622	0.804904	0.82032	0.799352	0.78951
DW	2.070139	1.810296	1.68	1.74777	1.825274	1.729186	1.664392
F-Stat	34.79561	69.22355	53.01992	62.91667	69.62333	60.75356	57.20016
Observations		66	66	66	66	66	66
white heteroskedasticity consistent standard errors							

TABLE 5; (MODEL (4)): DEPENDENT VARIABLE - INFLATION VOLATILITY							
	1	2	3	4	5	6	7
CONSTANT	2.766967	2.400753	2.539096	2.731478	2.684665	2.620181	2.600261
std. error	0.477869	0.462194	0.497737	0.492218	0.497527	0.493884	0.493584
prob	0	0	0	0	0	0	0
IT DUMMY	-0.904412	-1.343269	-1.510743	-1.404438	-1.349419	-1.481586	-1.46545
std. error	0.52776	0.513569	0.535362	0.50042	0.491449	0.520234	0.515436
prob	0.092	0.0112	0.0064	0.0067	0.0079	0.006	0.006
SI1	-0.369424	-0.49975					
std. error	0.452134	0.294151					
prob	0.4173	0.0943					
SI2	0.754306		-0.066909				
std. error	0.553136		0.258007				
prob	0.178		0.7962				
SI3	-0.498314			-0.589156			
std. error	1.300643			0.345833			
prob	0.703			0.0935			
SI4	-0.919618				-0.625248		
std. error	1.027737				0.329618		
prob	0.3747				0.0625		
SI5	0.208811					-0.430097	
std. error	0.998606					0.315301	
prob	0.8351					0.1775	
SI6	0.069966						-0.442605
std. error	0.795513						0.309641
prob	0.9302						0.1579
INITIAL INFLATION	-0.850038	-0.837299	-0.852239	-0.871272	-0.858784	-0.863955	-0.863851
std. error	0.081579	0.091724	0.091487	0.085408	0.088947	0.086789	0.087213
prob	0	0	0	0	0	0	0
R-Squared	0.785228	0.77401	0.768264	0.774966	0.776059	0.772706	0.77272
DW	1.783751	1.720756	1.750136	1.762017	1.753734	1.738718	1.7528
F-Stat	26.04965	70.783	68.51528	71.17149	71.61972	70.25798	70.26376
Observations	66	66	66	66	66	66	66
white heteroskedasticity consistent standard errors							

TABLE 6 A; (MODEL (4)) DEPENDENT VARIABLE - GDP GROWTH RATE VOLATILITY

	1	2	3	4
CONSTANT	2.982617	2.952687	3.288993	3.039357
std. error	0.479598	0.591987	0.655698	0.516795
prob	0	0	0	0
IT DUMMY	-0.90787	-0.603145	-1.505252	-1.848857
std. error	0.635585	0.48315	0.666283	0.677635
prob	0.1646	0.2212	0.0316	0.0107
SI1	1.16402		0.712809	1.153252
std. error	0.54233		0.503164	0.477711
prob	0.041		0.1672	0.0223
SI2	0.232631		-0.142833	-0.030414
std. error	0.30295		0.274098	0.246442
prob	0.4492		0.6063	0.9026
SI3	1.766038		-0.804806	1.560998
std. error	1.335101		0.94068	0.988507
prob	0.197		0.3993	0.1251
SI4	-2.32071	-1.587669		
std. error	1.614362	1.299892		
prob	0.1621	0.2311		
SI5	-2.37545			-2.042837
std. error	1.277811			1.22442
prob	0.074			0.106
SI6	1.926766	1.52307	0.663688	
std. error	1.001011	0.876513	0.895863	
prob	0.0648	0.0922	0.4647	
INITIAL GDP	-0.91405	-0.89113	-0.959308	-0.985657
std. error	0.03901	0.066848	0.048775	0.051152
prob	0	0	0	0
R-Squared	0.851433	0.810433	0.81623	0.831169
DW	1.741836	1.371855	1.082741	1.170591
F-Stat	19.342	33.13258	21.46768	23.79497
Observations	36	36	36	36
white heteroskedasticity consistent standard errors				

TABLE 6 B; (MODEL (4)): DEPENDENT VARIABLE - INFLATION VOLATILITY

CONSTANT	2.71215
std. error	0.443324
prob	0
IT DUMMY	-0.925034
std. error	0.570349
prob	0.1103
SI1	-0.386729
std. error	0.456093
prob	0.4
SI2	1.069022
std. error	0.540838
prob	0.0529
SI4	-1.078497
std. error	0.735045
prob	0.1478
$SI2^2$	0.490358
std. error	0.459262
prob	0.2902
$SI4^2$	-0.117965
std. error	0.657956
prob	0.8583
$SI5^2$	-0.669637
std. error	0.755802
prob	0.3793
INITIAL INFLATI	-0.834374
std. error	0.081436
prob	0
R-Squared	0.791348
DW	1.75189
F-Stat	27.02281
Observations	66
white heteroskedasticity consistent standard errors	

VITA

Graduate School
Southern Illinois University

Babatunde Aiyemo

mailtunde@gmail.com

University of Ilorin
Bachelor of Science, Economics, May 2002.

Research Paper Title:

Reassessing the Impact of Inflation Targeting in Emerging Market Economies

Major Professor: Dr. Scott Gilbert.