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**Should Developing Countries Target
Low, Single Digit Inflation to Promote
Growth and Employment?**

Sarah Anwar
Iyanatul Islam

Employment
Policy
Department

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Preface

The primary goal of the ILO is to contribute, with member States, to achieve full and productive employment and decent work for all, including women and young people, a goal embedded in the ILO Declaration 2008 on *Social Justice for a Fair Globalization, and*¹ which has now been widely adopted by the international community.

In order to support member States and the social partners to reach the goal, the ILO pursues a Decent Work Agenda which comprises four interrelated areas: Respect for fundamental worker's rights and international labour standards, employment promotion, social protection and social dialogue. Explanations of this integrated approach and related challenges are contained in a number of key documents: in those explaining and elaborating the concept of decent work², in the Employment Policy Convention, 1964 (No. 122), and in the Global Employment Agenda.

The Global Employment Agenda was developed by the ILO through tripartite consensus of its Governing Body's Employment and Social Policy Committee. Since its adoption in 2003 it has been further articulated and made more operational and today it constitutes the basic framework through which the ILO pursues the objective of placing employment at the centre of economic and social policies.³

The Employment Sector is fully engaged in the implementation of the Global Employment Agenda, and is doing so through a large range of technical support and capacity building activities, advisory services and policy research. As part of its research and publications programme, the Employment Sector promotes knowledge-generation around key policy issues and topics conforming to the core elements of the Global Employment Agenda and the Decent Work Agenda. The Sector's publications consist of books, monographs, working papers, employment reports and policy briefs.⁴

The *Employment Working Papers* series is designed to disseminate the main findings of research initiatives undertaken by the various departments and programmes of the Sector. The working papers are intended to encourage exchange of ideas and to stimulate debate. The views expressed are the responsibility of the author(s) and do not necessarily represent those of the ILO.

José Manuel Salazar-Xirinachs
Executive Director
Employment Sector

¹ See http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf

² See the successive Reports of the Director-General to the International Labour Conference: *Decent work* (1999); *Reducing the decent work deficit: A global challenge* (2001); *Working out of poverty* (2003).

³ See <http://www.ilo.org/gea>. And in particular: *Implementing the Global Employment Agenda: Employment strategies in support of decent work*, "Vision" document, ILO, 2006.

⁴ See <http://www.ilo.org/employment>.

Foreword

At the 99th session of the International Labour Conference in 2010, constituents endorsed the need to promote a ‘pro-employment’ macroeconomic framework. It was felt that the current framework, while making an important contribution to the goal of macroeconomic stability, paid insufficient attention to the way in which monetary, fiscal, and exchange rate policy, along with capital account management either helped or hindered employment creation and poverty reduction. In the standard framework that has evolved since the days of the structural adjustment programmes of the 1980s and 1990s and has remained intact during the 2000s, the emphasis is on attaining key nominal targets pertaining to debts, deficits and inflation. The rationale is that attaining such targets in the medium to long run will engender a predictable macroeconomic environment that is crucial for supporting growth and hence employment creation. It now appears, however, that macroeconomic stability is necessary, but by no means sufficient to engender inclusive, job-rich growth.

In this broader context, this paper revisits a key issue in monetary policy, namely, the setting of inflation targets for developing countries. The paper points out that the current tendency is to target low, single digit inflation, though this cannot be supported by robust empirical evidence or by the historical experience of developing countries. Indeed, most studies, using both cross-sectional data and country-specific experiences, show that the relationship between growth and inflation has clear ‘threshold effects’ suggesting that setting too low an inflation target can impose opportunity costs in terms of foregone growth and employment creation.

The paper also shows that implementing inflation targeting regimes represent a major challenge in the presence of supply-shocks which are a common phenomenon in developing countries. Furthermore, there is little evidence that the benefits of reduced inflation are being transmitted in the form of reduced costs of borrowing since such costs are likely to be determined by structural factors. The paper argues that it is difficult to establish that inflation targeting developing countries do significantly better in terms of labour productivity, vulnerable employment, working poverty and growth than their non-inflation targeting counterparts.

The paper urges a return to the pragmatic advice offered by the founding fathers of the IMF who encouraged member states to aim for ‘reasonable price stability’ within a framework of growth-promoting policies and refrained from prescribing low, single digit inflation targets that were universally applicable to all member states. As with all Employment Working Papers, this one is intended to stimulate debate and discussion on a key policy theme that is germane to growth and employment creation.

Azita Berar Awad
Director
Employment Policy

Abstract

This paper revisits a key issue in monetary policy, namely, the setting of inflation targets for developing countries. This review is timely because of recent proclamations by the IMF that one needs a ‘wholesale re-examination’ of macroeconomic policy principles in the wake of the global economic and financial crisis of 2007-2009. The paper points out that the current tendency is to target low, single digit inflation, but this cannot be supported by robust empirical evidence or by the historical experience of developing countries. Indeed, most studies, using both cross-section data and country-specific experiences, show that the relationship between growth and inflation has clear ‘threshold effects’ suggesting that setting too low an inflation target can impose opportunity costs in terms of foregone growth and employment creation.

The paper also shows that implementing inflation targeting regimes represent a major challenge in the presence of supply-shocks which are a common phenomenon in developing countries. Furthermore, there is little evidence that the benefits of reduced inflation are being transmitted in the form of reduced costs of borrowing since such costs are likely to be determined by structural factors. The paper argues that it is difficult to establish that inflation targeting developing countries do significantly better in terms of labour productivity, vulnerable employment, working poverty and growth than their non-inflation targeting counterparts. The paper urges a return to the refreshing eclecticism of the founding fathers of the IMF who encouraged member states to aim for ‘reasonable price stability’ within a framework of growth promoting policies and refrained from prescribing low, single digit inflation targets that were universally applicable to all member states.

Contents

	<i>Page</i>
Preface.....	iii
Foreword	v
Abstract	vii
Tables	ix
Figures.....	x
1. Introduction	1
2. Inflation targets in developing countries: an overview	2
3. The Relationship between Growth and Inflation: Evidence and Implications	7
4. Decadal Evidence: The Growth and Inflation Relationship.....	10
5. Additional Aspects of Inflation Targeting in Developing Countries	14
Sources of inflation matter	14
Inflation, Poverty and Employment	16
Cost of borrowing	17
6. IT vs. Non IT countries: an assessment of 24 countries.....	19
7. Conclusion.....	21
Bibliography.....	23

Tables

	<i>Page</i>
Table 1: Inflation Targeting Countries (Emerging and Developing Countries).....	3
Table 2: IMF policy statements on inflation in 19 developing countries: examples from the Article IV consultation process	6
Table 3: Cross-country Threshold Studies	8
Table 4: Country-level Threshold Studies.....	9
Table 5: Median Growth and Inflation Rates (2000-07)	10
Table 6: IT Developing Country and Comparator Country List	19

Figures

	<i>Page</i>
Figure 1: Long Run Median Inflation Rates, Recent Inflation vs. Median Targeted Inflation Rate	4
Figure 2: Growth and Inflation Relationship (Linear).....	7
Figure 3: Growth and Inflation Relationship (Non-Linear)	7
Figure 4: Inflation Growth Relationship (1980-89)	11
Figure 5: Inflation Growth Relationship (1990-99)	11
Figure 6: Inflation Growth Relationship (2000-07)	12
Figure 7: IT Countries and Non-IT Countries Inflation rate	13
Figure 8: IT Countries Growth Inflation Relationship (2000-2007)	13
Figure 9: Non-IT Countries: Inflation Growth Relationship (2000-07)	14
Figure 10: Co-movement of Inflation and Food Price Index	15
Figure 11: Inflation and Poverty Relationship	17
Figure 12: Change in Median LDC Interest Rates	18
Figure 13: Macro Indicators (2000-2007)	20
Figure 14: Labour Productivity	20
Figure 15: Labour market indicators (2000-07)	21

1. Introduction

The impetus behind this paper is the increasing global recognition that the pre-crisis macroeconomic policy paradigm needs to be revisited⁵. The former Managing Director of the IMF, argued the case for a ‘wholesale re-examination of macroeconomic policy principles’ in the wake of the Great Recession of 2008-2009 at a recently held conference.⁶ He observed that ‘... recent experience has raised profound questions about the pre-crisis consensus on macroeconomic policies’.⁷ Moreover, he specifically noted that the pre-crisis advice of ‘keeping inflation low and stable was the best way to secure optimal economic performance.’ However, currently the debate on inflation targeting (IT) has been reignited and needs to be revisited.⁸ Olivier Blanchard, the Director of the IMF’s Research Department, pointed out ‘key aspects of the old framework that no longer hold post-crisis, including the pre-crisis convergence on a ‘beautiful construction’ of a single monetary policy target—low and stable inflation—and a single policy instrument—the central bank’s policy rate.’ He lamented that ‘Beauty is not synonymous with truth’.⁹ Even back in 2005, the IMF questioned the desirability of single-digit inflation targets, highlighting that keeping inflation at relatively low levels for a sustained period required high real interest rates and constrained potential seigniorage income. Moreover, they established that consensus is lacking on the appropriate inflation range for low-income countries (IMF, 2005). Despite this, maintaining low single digit inflation continued to be an important feature in the PRGF-supported programs, which sought to keep inflation in the 4-6 per cent range in low income countries.

The rationale behind IT is to improve central bank credibility and reduce inflation expectations. IT has been the dominant monetary policy paradigm since 1990. As of 2001, the majority of the IT countries are from the developing world and this is likely to be the case for the future. Therefore, the relevance of IT, specifically in the developing country context, should be examined. From a developing country perspective, controlling inflation takes on a great deal of salience if it can be shown that it promotes growth and employment.¹⁰ However, it appears, both in terms of cross-section evidence and country-specific experiences, that the relationship between inflation and growth is non-linear. This suggests the existence of a ‘threshold’ effect in

⁵ The authors gratefully acknowledge that a previous version of this paper was subjected to an extensive critical appraisal by Scott Roger (IMF). Anis Chowdhury (UN-DESA) also kindly suggested various editorial amendments to strengthen the arguments presented in this paper, while Duncan Campbell (ILO, Geneva), Sher Verick (ILO, Geneva), Nomaan Majid (ILO, Geneva) and Riswanul Islam (former ILO official, Geneva) made some very perceptive observations that have been incorporated in this version of the paper. Ishraq Ahmed offered commendable research assistance by undertaking a content analysis of IMF Article IV consultations. The standard caveat applies. The authors bear full responsibility for any remaining errors and omissions.

⁶ ‘IMF triggers debate on crisis lessons’, IMF Survey online, March 8, 2011 available at imf.org/external

⁷ ‘Macro and Growth Policies in the Wake of the Crisis’, opening remarks by Dominique Strauss-Kahn, former Managing Director, IMF at the IMF Conference on Macro and Growth Policies in the Wake of the Crisis, Washington DC, March 7, 2011 available at imf.org/external

⁸ Ibid.

⁹ ‘IMF triggers debate on crisis lessons’, IMF Survey online, March 8, 2011 available at imf.org/external

¹⁰ For a comprehensive review of empirical and theoretical literature, see Chowdhury (2005).

which growth is positively related to inflation up to a certain point. Once that point or threshold is reached, inflation has a statistically significant negative impact on growth. The implication is that while high inflation hurts growth, too low an inflation rate might also impose opportunity costs in terms of foregone growth and employment creation. Hence, when setting inflation targets, policy-makers in developing countries should utilize the knowledge on threshold effects. They should also take account of country-specific historical circumstances. Yet, the evidence seems to be that this is not being done. There is a proclivity to set low, single digit inflation targets that cannot be justified on the basis of empirical evidence and the historical experience of developing countries. A more eclectic approach is desirable in which the core principle of price stability is upheld without necessarily linking this principle to specific numerical targets that are not anchored in robust empirical evidence. This is the key message of the paper.

The rest of the paper is structured as follows. In Section II, the inflation targets currently adopted in developing countries are briefly discussed and compared with historical benchmarks. This is complemented by examining the nature of the macroeconomic policy advice on controlling inflation that is offered to developing countries by the IMF. The objective is to gauge the extent to which inflation targets that are being prescribed for developing countries are indeed too low vis-à-vis historical benchmarks. In Section III, evidence is presented on the relationship between inflation and growth in developing countries, including a tabular summary of various studies on threshold effects in the inflation-growth relationship. Both cross-section evidence and country-specific experiences are reviewed. In Section IV, the relationship between inflation and growth over recent decades are explored and further evidence is provided on the shift in the relationship in the 2000s, which gives credence to the non-linear relationship highlighted in the literature. In Section V, additional aspects of IT that are relevant to developing countries are analyzed. These are: (a) the importance of identifying and taking into account the source of inflation; (b) the relationship between inflation, poverty and unemployment; and (c) whether the benefits of a reduction in inflation are reflected in reduced borrowing costs. Finally, in Section VII, we compare 12 IT countries with 12 non-IT (NIT) countries, with similar characteristics, in terms of macroeconomic, labour market and poverty indicators to explore the differences in performance.

2. Inflation targets in developing countries: an overview

Presently, 27 countries around the world have adopted IT.¹¹ The majority of IT countries are emerging and developing countries (18). The median inflation target of these 18 countries is 3.5 per cent (Table 1).¹² Excluding the countries in transition, Armenia, Czech Republic, Hungary, Poland, Romania and Serbia, there are 12 developing countries, with a median inflation target of 4.25 per cent.

¹¹ New Zealand was the first country to formally adopt an inflation target of 0-3 per cent in March 1990.

¹² Authors' calculation based on available data from central bank websites as of April 2011

Table 1: Inflation Targeting Countries (Emerging and Developing Countries¹³)

Inflation Targeting Country	Target Inflation Rate	Median Target
Armenia	3-5 per cent	4 per cent
Brazil	2.5-6.5 per cent	4.5 per cent
Chile	2-4 per cent	3 per cent
Columbia	2-4 per cent	3 per cent
Czech Rep.	1-3 per cent	2 per cent
Ghana ¹⁴	7.2-11.2 per cent	9.2 per cent
Guatemala	4-6 per cent	5 per cent
Hungary	2-4 per cent	3 per cent
Indonesia ¹⁵	4-6 per cent	5 per cent
Mexico	2-4 per cent	3 per cent
Peru	1-3 per cent	2 per cent
Philippines	3-5 per cent	4 per cent
Poland	1.5-3.5 per cent	2.5 per cent
Romania	2-4 per cent	3 per cent
Serbia	3-6 per cent	4.5 per cent
South Africa	3-6 per cent	4.5 per cent
Thailand	0.5-3 per cent	1.75 per cent
Turkey	4.5-6.5 per cent	5.5 per cent
Median Inflation Target (excluding economies in transition: Armenia, Czech Rep, Hungary, Poland, Romania and Serbia, 12)		4.25 per cent
Median Inflation Target (all developing countries and economies in transition, 18)		3.5 per cent

Source: Authors' calculations based on the most recent Central Bank website reported inflation target rates (2011), list of inflation targeting countries procured from Hammond (2011)

¹³ The developing country list is based on IMF classifications for Developing and Emerging Economies: (<http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/groups.htm>); Economies in Transition are separated based on UN (<http://unpan1.un.org/intradoc/groups/public/documents/un/unpan008092.pdf>) and IMF classifications.

¹⁴ The inflation target was 9.2 (between 7.2 and 11.2 per cent) in December 2010, the target is revised annually: <http://www.bog.gov.gh/privatecontent/public/File/MPAFSD/Inflation%20Developments%20&%20Outlook%20-%20February%202011.pdf>

¹⁵ The inflation target in Indonesia will be revised even lower to 4.5 per cent in 2012: <http://www.bi.go.id/web/en/Moneter/Inflasi/Bank+Indonesia+dan+Inflasi/penetapan.htm>

How were these inflation targets set? Was any attempt made to link them to the historical experience of developing countries? An approximation of the long run inflation rate of the IT developing countries can be obtained by observing the behaviour of inflation over five decades. The median long run inflation rate (1961-2009) is well above the median inflation target in all the countries under review. Even when removing the period of 1989-1995, which was a period characterized by unusually high inflation, it is clear that the median target inflation set is well below the long run median inflation rate in all cases. Though the goal may have been to set the target well below the high rates of inflation experienced by these countries, the question is whether these targets have been set too low.

Figure 1: Long Run Median Inflation Rates, Recent Inflation vs. Median Targeted Inflation Rate

Source: World Bank Databank, 2011, authors' calculations

Inflation rates in the last decade (2000-2009) appear to be significantly closer to the targets. However, the targets are still lower than the median inflation rates in all of the countries¹⁶, though, in Peru and Thailand, they are quite close. This would suggest that the inflation targets are unduly influenced by inflation rates in the 2000s rather than long run rates. The fact that the long-run inflation rates (based on 50 years) have played little or no role in the determination of inflation targets in developing countries is intriguing. This issue is particularly important if the decline in inflation in the 2000s relative to previous decades turns out to be a temporary phenomenon.

In general, there is not much evidence that monetary authorities in developing countries have made a determined effort to use long run data to work out an appropriate inflation target. It is possible that they have been influenced by the policy advice they receive from the IMF on controlling inflation. There appears to be some evidence that the IMF prefers low, single digit inflation when offering policy advice to developing countries in controlling inflation. A 2007 report by the Independent Evaluation Office notes that in 29 Sub-Saharan African countries that had access to IMF financial support in the mid-2000s, the average targeted inflation rate was 5 per cent or less (Independent Evaluation Office, 2007). Table 2 provides some recent examples on IMF policy statements on controlling inflation in a diversified sample of 19 developing countries. These examples were harnessed from a content analysis of recent (2009 and beyond) Article IV consultations. The IMF policy statements seem to prefer controlling inflation at low single digit levels, ranging between medium term inflation projections of 2.2 per cent for Jordan to 6.5 per cent for Egypt. The content analysis of such policy advice derived from the Article IV consultations was also unable to decipher clearly stated reasons that support a particular inflation target.

The IMF's continued concerns about inflationary pressures are reflected in the 2011 Global Monitoring Report. The report notes that emerging economies are at risk of overheating pressures associated with rapid credit growth, inflation, and possible asset price bubbles (Global Monitoring Report, 2011). The report argues that inflationary expectations are rising and policy targets have been exceeded in a number of Asian and Latin American countries. Moreover, strong capital inflows that exacerbate overheating pressures are complicating the policy response. The report advises tightening policies.

¹⁶ Data for Chile was not available.

Table 2: IMF policy statements on inflation in 19 developing countries: examples from the Article IV consultation process

Country	Projected inflation to 2015	IMF Policy statements
Albania	3 per cent	Recommended cautious monetary stance to be followed with emphasis on 'anchoring inflation expectations'.
Armenia	4 per cent	Recommended that policy rates should be raised further if there is evidence of demand pressures or supply shocks on inflation.
Bangladesh	4.5 per cent	Has been asked to hike up interest rates to prevent inflation because of the accommodative conditions.
Benin	2.2 per cent	Recommended to use monetary policy monitor inflation and use exchange rate as nominal anchor if needed.
Bolivia	3.5 per cent	Recommended to tighten monetary conditions to prevent excess liquidity, credit creation and inflation.
Cambodia	3 per cent	Recommended to reduce the injection of real liquidity to avoid inflationary pressures and authorities asked to monitor "liquidity overhang".
Egypt	6.5 per cent	The central bank should be ready to tighten monetary conditions if inflation picks up.
Ethiopia	6.1 per cent	"Maintaining a low reserve money growth policy in 2010/11 is needed to sustain a low inflation environment along with raising interest rates."
Ghana	5 per cent	"The authorities should stand ready to tighten policies, if needed, to avoid an upturn in inflation expectations."
Honduras	5 per cent	"The monetary and exchange rate policies should be geared at keeping inflation low..."
India	5.2 per cent	Further monetary tightening required to lower inflation.
Indonesia	3.8 per cent	A "continued effective communication of a proactive policy" required to lower the level of inflation. "Inflationary risks in 2010/11 arise from rising commodity prices and supply-side constraints."
Jordan	2.2 per cent	The central bank should be ready to tighten monetary conditions if inflation accelerates. The exchange rate provides an "appropriate" nominal anchor.
Kenya	5 per cent	If inflationary pressures arise, the central bank should be ready to tighten liquidity conditions. Should also adopt a formal inflation targeting framework.
Malawi	5.9 per cent	Recommends that monetary policy should rely more heavily on interest rate adjustments to inflation targets.
Mauritania	5 per cent	Recommended authorities to be vigilant and "respond appropriately" if higher food prices and foreign exchange market pressures intensify.
Mongolia	5 per cent*	"The increase in spending, however, will increase inflation (especially the wage and pension increase) and place a heavier burden on monetary policy to contain inflation."
Rwanda	5 per cent	Recommends the authorities to combat inflation by "strengthening monetary and exchange rate policies to ensure low and stable inflation." Exchange rate used as a nominal anchor to reduce imported inflation.
Turkey	4.1 per cent	Credit growth should be moderated to dampen inflation expectations.

Source: Compiled from the latest available Article IV consultations. *From World Economic Outlook database, October 2010

3. The Relationship between Growth and Inflation: Evidence and Implications

Setting low, single digit inflation is consistent with a growth-inflation relationship that is linear and negative (as in Figure 2), but inconsistent with the standard finding that the growth-inflation relationship is non-linear and exhibits statistically significant threshold effects (as in Figure 3). Thus, this crucial element that is corroborated by a wide range of studies that seem to be missing in the determination of medium-to-long run inflation targets for developing countries. Given evidence on the non-linear relationship between inflation and growth and long run historical trends, there seems to be little justification, at least on growth grounds, to focus monetary policy on bringing inflation down to the low single digits in developing countries, especially if such a policy has economic costs in terms of forgone growth and the capacity of such growth to create jobs. This point is substantiated in this section by a comprehensive review of various cross-section and country-specific studies.

Figure 2: Growth and Inflation Relationship (Linear)

Figure 3: Growth and Inflation Relationship (Non-Linear)

Table 3 highlights the various thresholds estimated in the non-linear relationship between inflation and growth in cross-country studies.

Table 3: Cross-country Threshold Studies

Cross-Country Study	Author and Year
Using both cross-section and panel data for a sample of 93 developing and industrialized countries and break points of 15 per cent and 40 per cent in spline regression, Fischer showed not only the presence of non-linearities in the relationship between inflation and growth, but also that the strength of this relationship weakens for inflation rates above 40 per cent.	Fischer (1993)
Dornbusch and Fischer found that inflation rate in the moderate range of 15-30 per cent does not usually accelerate to extreme levels.	Dornbusch and Fischer (1993)
Using data for 127 countries, Bruno found that growth rates declined only when inflation rates moved beyond 20-25 per cent and that growth increased as inflation rose up to the 15-20 per cent range.	Bruno (1995)
Using panel data for 87 countries, during the period 1970-90, Sarel found evidence of a significant structural break at an annual inflation rate of 8 per cent - implying below that rate, inflation does not have a significant effect on growth, or it may even show a marginally positive effect.	Sarel (1996)
This study examined the determinants of economic growth using inflation data for 26 countries, which experienced inflation crises during the period 1961-92. In their empirical analysis, inflation rate of 40 per cent and over is considered as the threshold level for an inflation crisis. They found inconsistent relationship between inflation and economic growth below this threshold level when countries with high inflation crises were excluded from the sample	Bruno and Easterly (1998)
This IMF study uses data from 140 countries (comprising both developed and developing countries) from 1960-1998 and find that the threshold level of inflation above which inflation significantly slows growth is estimated at 1-3 per cent for developed countries and 11-12 per cent for developing countries. ¹⁷	Khan and Senhadji (2001)
This study uses panel data from both developed and developing countries to find that the estimated thresholds varied widely from as high as 15 per cent per year for the lower-middle-income countries to 11 per cent for the low-income countries, and 5 per cent for the upper-middle-income countries.	Sepehri and Moshiri (2004)
Non-linear regression estimates of the relationship between inflation and economic growth for 80 countries over the period 1961-2000 suggest higher inflation is associated with moderate gains in growth up to a threshold of 15-18 per cent inflation	Pollin and Zhu (2006)
The paper uses a panel-data sample of 124 countries during the period from 1950-2004 and a dynamic panel threshold model to find an estimated inflation threshold of 17.2 per cent for developing countries. If inflation exceeds this critical value, its growth reducing effect is very close to the one estimated for industrialized countries and if inflation is below this critical value there is no significant impact on growth.	Kremer, Bick and Nautz (2009)
Using a panel sample of 46 developing countries (13 IT countries) with data from 1980-2006, the study finds that IT actually results in lower output growth during adoption.	Brito and Bystedt (2010)

Moreover, using a model developed by Khan and Senhadji model (2001), many country-level threshold effects have been tested, giving credence to the view that current

¹⁷ However, the authors acknowledge that the estimated coefficients in the growth-inflation regression may be biased due to endogeneity between growth and inflation. They also note that “The positive effect of inflation on growth is only present for inflation rates lower than.... 18 per cent for developing countries.” (p. 16). This implies that the upper bound is 18 per cent.

inflation targets suggested for developing countries are too low. A tabular summary is presented in Table 4.

Table 4: Country-level Threshold Studies

Country	Country-Level Study	Author and Year
India	Using annual data for the period 1971-98, the study finds that there is no threshold level of inflation for India; however, their findings clearly suggest that an increase in inflation from any level has negative effect on economic growth.	Singh and Kalirajan (2003)
Bangladesh	Using annual data for the period of 1980-2005, the estimated threshold model suggests 6 per cent as the threshold level above which inflation adversely affects economic growth.	Ahmed and Mortaza (2005)
Pakistan	Using an annual dataset from 1973-2000, the study estimates the threshold level of inflation as 9 per cent. An inflation rate higher than this rate is detrimental for the economic growth.	Mubarik (2005)
Egypt	Using annual data from the last 25 years and controlling for various growth determinants, the empirical study find that inflation at 15 per cent and higher has negative effects on growth. This estimated threshold has been found to vary within a broad confidence interval with a lower bound ranging between 9-12 per cent. The study proposes that the central bank target an inflation rate in the 9-12 per cent range.	Kheir-El-Din and Abou-Ali (2008)
Nigeria	The study uses annual time series data from 1970-2008 to establish an inflation threshold of 8 per cent for Nigeria.	Salami and Kelikume (2009)
Mexico	The estimated threshold model suggests 9 per cent as the threshold level of inflation above which inflation significantly slows economic growth.	Risso and Sánchez Carrera (2009)
Indonesia	A threshold VAR model is used to test for changes in the relationship between inflation and growth. ¹⁸ The results are consistent with a threshold level between 8.5-11 per cent producing structural shifts in the relationship between inflation and growth.	Chowdhury and Ham (2009)
South Africa	By estimating an inflation threshold in a non-linear finance-growth regression for quarterly data collected from February 2000-July 2010, they study finds that the least adverse effects of inflation on finance-growth activity are established at an inflation level of 8 per cent. Above and below this level, real activity losses gradually begin to be magnified the further one moves from the threshold. This evidence finds the South African Reserve Banks (SARB) 3-6 per cent inflation target as being too restrictive in sustaining real economic activity through financial intermediary channels.	Phiri (2010)
Ghana	Using data from 1960-2008 and threshold regression models, the study finds evidence of an inflation threshold level of 11 per cent at which inflation starts to significantly hurt economic growth in Ghana. Below the 11 per cent level, inflation is likely to have a mild effect on economic activities, while above this threshold level, inflation would adversely affect economic growth. The study concluded that the current medium term inflation target of 6-9 per cent annual average set by the Bank of Ghana and the Government respectively is well below the 11 per cent threshold is in the right direction.	Frimpong and Oteng-Abayie (2010)

Although there is some variation in the summarized evidence, overall there is a clear trend that the targeted inflation rates are too low compared to the threshold rates. Out of the nine countries, the study on India is the only one that does not find a

¹⁸ The results so far are exploratory and limited by a small data sample.

threshold effect. Recent cross country studies (2001-present) suggest inflation threshold rates between 8 and 17 per cent. Country-level studies suggest slightly lower thresholds ranging from 6 to 15 per cent.

4. Decadal Evidence: The Growth and Inflation Relationship

The majority of IT countries adopted IT in the last decade. In the 2000-2007 period (before the onset of the global financial crisis), both emerging and developing countries categorized as medium growth (between 3 and 6 per cent) and high growth (above 6 per cent) are associated with higher median inflation at 5.7 per cent and 5.8 per cent respectively (Table 5). Low growth countries (less than 3 per cent) have a lower medium inflation rate at 3 per cent. This would suggest that higher inflation is associated with higher growth.

Table 5: Median Growth and Inflation Rates (2000-07)

Growth Category	Growth Median	Inflation Median
High Growth (40)	7.7	5.8
Medium Growth (74)	4.6	5.7
Low Growth (31)	1.8	3.0
Full Sample (145)	4.7	5.4

Note on sample sizes: 145 countries for 2000-2007 period. Countries classified into performance categories based on growth rates (good = above 6 per cent; medium = between 6 and 3 per cent; low = under 3 per cent).

Source: IMF World Economic Outlook Data 2009, authors' calculations.

This paper provides new evidence which suggests that the inflation-growth nexus has probably changed in the low inflation environment of the 2000s, which implies that the targets should change as well. In order to test whether there is a significant shift in the growth-inflation nexus over time, a scatter plot and simple regression between inflation and growth for emerging and developing countries are shown for various sub-periods between the 1980s and 2000s. In the 1980s, there is a weak negative relationship (R^2 is only 0.004) between inflation and growth when countries with inflation over 20 per cent are removed as outliers (Figure 4). However, the relationship is negative even with all the outliers included.

Figure 4: Inflation Growth Relationship (1980-89)

Source: IMF World Economic Outlook Data 2009, authors' calculations, outliers with over 20% inflation were removed; however, the relationship remains the same.

In the 1990s, the relationship between inflation and growth is slightly positive when countries with inflation above 20% are excluded as outliers (Figure 5). There are a large number of countries with extremely high levels of inflation and when these are included in the sample there is a negative relationship.

Figure 5: Inflation Growth Relationship (1990-99)

Source: IMF World Economic Outlook Data 2009, authors' calculations, outliers with over 20% inflation were removed; however, the relationship changed as with the cases of inflation above 20% there was a negative relationship.

In the 2000-2007 period, a strong shift is evident in the data. There are not many cases of outliers with extreme rates of inflation. The relationship between growth and inflation is mildly positive, with very high growth figures (above 10 per cent) dominating (Figure 6).

Figure 6: Inflation Growth Relationship (2000-07)

Source: IMF World Economic Outlook Data 2009, authors calculations

Supplementary evidence to support the thesis of a significant shift in the growth-inflation relationship is provided in Figure 7. Here a distinction is made between the relative performance of IT and NIT regimes in terms of growth and inflation. As can be seen, in the 2000s, both IT and NIT regimes had rather low inflation relative to the 1990s. IT countries show a much steeper decline in inflation from the 1990s to the 2000s, simply because the median inflation rate for the IT regimes was much higher than NIT countries, but there is not much difference between IT and NIT countries in the 2000s. Both groups have significantly lower inflation averages and the growth average is almost the same.

Figure 7: IT Countries and Non-IT Countries Inflation rate

Source: World Economic Outlook Data 2009, authors' calculations. This graphical representation draws on the work of Rogers (2010)

In developing countries, which have higher thresholds of inflation (above which growth is projected to decline), the present situation could indicate that the threshold is no longer being crossed as often regardless of whether they are IT or NIT countries. It is clear that the positive relationship between growth and inflation seems to hold for both IT and NIT countries in the 2000-2007 period¹⁹.

Figure 8: IT Countries Growth Inflation Relationship (2000-2007)

¹⁹ IT is important to not that becoming an IT country is not exogenous as they had higher inflation to begin with.

Figure 9: Non-IT Countries: Inflation Growth Relationship (2000-07)

Source: IMF World Economic Outlook Data 2009, authors calculations.

Note that these include IT countries that are emerging or developing economies and NIT countries that are emerging or developing economies. Angola and Zimbabwe have been taken out as outliers.

A recent study by the IMF, compares IT and NIT countries in their performance during the crisis. Though they found that advanced IT countries had higher GDP growth rates than their NIT peers, there was no such difference for emerging countries (Carvalho Filho, 2010).

5. Additional Aspects of Inflation Targeting in Developing Countries

Sources of inflation matter

Developing countries currently face higher rates of inflation not because of poorer macro-management, but because oil and food prices are soaring and these items represent a much larger share of the average household budget than in rich countries (Stiglitz, 2008). Most developing countries are prone to supply shocks due to their high dependence on agriculture and imported energy. A classic case is the food and energy price shocks that badly hit developing countries in the late 2000s. Today, high and rising food prices pose a major policy challenge. Indeed, the correlation coefficient between median inflation rates in LDCs (least developed countries) and a global food price index

is 0.8 (Figure 10).²⁰ One estimate suggests that about 44 million people might be pushed into at least transient episode of poverty as a result of high and rising food prices.²¹

Figure 10: Co-movement of Inflation and Food Price Index

Source: US Energy Information Association and the Food and Agriculture Organisation of the United Nations

Supply-side shocks may simultaneously reduce growth and raise inflation. Tightening monetary policy in response to this kind of shock may make the situation worse (Friedman and Kuttner, 1996; Chowdhury 2005). Output fluctuations will be greater when macroeconomic policies remain focused on price stability in the face of such shocks as the burden of adjustment falls on only one variable (output). That is, strict IT might introduce a pro-cyclical bias into monetary policy for countries in which supply-side inflation is commonplace. The degree of this bias will depend on the relative importance of supply-side factors in determining inflation and the amount of discretion exercised by monetary authorities. There is a growing body of empirical research that finds a robust, negative cross-country relationship between growth and growth volatility. They also find a significant negative correlation between growth and medium-term business cycle fluctuations (See for example, Ramey and Ramey, 1995; Kroft and Lloyd-Ellis, 2002).

The above discussion suggests that IT should be flexible enough to respond differently depending on the source of inflation. However, the role that monetary policy can play in dealing with supply shocks is strictly limited and central banks should refrain from using the policy interest rate to deal with such supply side forces, especially when the inflation surges are accompanied by food price increases. Interventions by the government to enhance food security represent much more appropriate responses.

²⁰ Authors' estimates

²¹ World Bank latest issue of 'Food Price Watch' available at www.worldbank.org/foodcrisis/food price watch report, February 2011.

It should be noted that well established IT regimes, most notably in developed countries seek to be flexible in dealing with supply-side shocks by making a distinction between ‘core inflation’ and ‘headline inflation’, where the former eliminates volatile components – such as sharp movements in food and energy prices. Hence, monetary authorities target ‘core inflation’ and can ignore sharp, but temporary, movements in ‘headline inflation’.

It is not obvious that this approach can be readily transplanted to developing countries partly because of lack of long run data on ‘core inflation’ and partly because the greater susceptibility of developing economies to supply-side shocks and greater weight of food prices in the consumer price basket means that ‘headline inflation’ should not really be ignored. In that case, a flexible approach towards targeting ‘headline inflation’ is warranted as an IMF study on Sri Lanka makes it clear:

‘The susceptibility to supply-side shocks particularly food prices and large weight of commodities in CPI basket in Sri Lanka make targeting a narrow range for headline inflation difficult. Thus, consideration could be given to defining a headline inflation target with a relatively wide tolerance level...’²²

Inflation, Poverty and Employment

Even if it is shown that IT does a good job at stabilization, it is crucial to remember that the stabilization role of monetary policy is only one of the tasks facing central banks; the other task is to contribute directly to economic growth, employment creation and poverty reduction. Given that the focus of monetary policy has been to keep inflation in the low single digits, and the belief that subsequently growth and employment will take care of themselves, it is not surprising that there is a large gap in the literature on the impact of IT on unemployment (Epstein, 2007).

Many economists have argued that inflation affects people with low incomes significantly more than those with high incomes. Since wage adjustments typically lag behind price rises, inflation reduces the real wage. If there are any savings, the poor mostly hold it in money. Inflation reduces the real value of money holdings. If inflation is unanticipated, the poor will be harmed even more disproportionately as they have a weaker bargaining power and are generally unable to hedge against inflation. Using data on median inflation and poverty from 2000-09, Figure 11 suggests that there is a weak positive relationship between inflation and poverty.

²² Anand *et al* (2011:12). The authors suggest that, over time, the monetary authorities in Sri Lanka might wish to construct a consistent series of ‘core’ inflation.

Figure 11: Inflation and Poverty Relationship

Source: World Bank Development Indicators (2009), authors' calculations

However, if real wage declines due to inflation then employment should rise. Therefore, the employment effect of inflation can outweigh the real wage effect on poverty. This is likely to be the case, as the inflation elasticity (real wage) of poverty is found to be significantly less than the output (ETOTemployment) elasticity of poverty. For example, one IMF study by Ghura, Leite and Tsangarides (2002) using pooled data from a cross section of 85 countries has found the inflation elasticity of the income of the poor to be 0.03 as opposed to the output (employment) elasticity of 0.94.

One study examines survey data on people's preferences about inflation versus unemployment (Jayadev, 2006). Unlike previous research where people were asked if they disliked inflation, Jayadev investigated 'which is a bigger problem: inflation or unemployment?' thus reflecting that there is a trade-off between the two (at least in the short to medium term). Jayadev finds that those in the lowest quintile of the income distribution are more likely to perceive unemployment as a more serious problem than inflation, whereas those in the top quintile are more likely to have the opposite view. Hence, concerns over employment and inflation have an important poverty dimension.

Cost of borrowing

In many emerging and developing countries, maintaining very low inflation rates requires significant increases in the real interest rate (Epstein, 2008; 2009). High real interest rates affect investment and may have negative consequences for growth and development. Stiglitz (2008) notes that in countries like China, inflation is approaching 8 per cent, 18.2 per cent in Vietnam, and 5.8 per cent in India, whereas, in the US, inflation stands at 3 per cent. Does that mean that these developing countries should raise their interest rates far more than the US? (Stiglitz, 2008). He argues that inflation in developing countries is mostly, imported; therefore, raising interest rates won't have much impact on the international price of grains or fuel. But, unless taken to an intolerable level, these measures by themselves cannot bring inflation down to the targeted levels. For example, even if global energy and food prices increase at a more moderate rate, for example, 20 per cent per year and get reflected in domestic prices, bringing the overall inflation rate to, say, 3 per cent would require markedly falling prices elsewhere. That would almost surely entail a marked economic slowdown and high unemployment.

If one uses the data from a diversified sample of least developed countries and compares median lending rates (both nominal and real) and the interest rate spread as a crude measure of borrowing costs for the 2000s and the previous decade, borrowing costs seem to have gone up over the relevant period (Figure 12). Thus, the low inflation dividend is not being captured in lower borrowing costs that can support higher investment by both the private and public sector. This has deleterious implications for investment prospects and hence for growth and employment creation.

One reason why borrowing costs may not come down to capture the premium of reduced inflation risks is that such costs might be determined largely by structural factors. It is likely that in many developing countries the banking system is dominated by a few large financial (and multinational) institutions. Such market imperfections might mean that the premium of reduced inflation risks are being largely captured by these institutions rather than being passed on to borrowers in the form of lower cost of credit. These market imperfections are likely to be compounded by the weak institutional and legal environment prevailing in many developing countries. Indeed, one study that examines the lending performance of banks in developed and developing economies using a sample of 91 large banks in 45 countries finds that banks in developing countries charge higher fees and higher interest rates on loans to small and medium-sized firms (SMEs) than banks in developed countries. More importantly, they provide a smaller share of investment loans to than banks in developed countries (Thorsten et al, 2011). This is important because firm-level surveys consistently show that lack of access to finance and cost of credit are binding constraints on the growth of SMEs in developing countries. IT regimes – however flexible and effective – cannot deal with these structural issues and hence are limited in their capacity to make a major contribution to employment creation.

Figure 12: Change in Median LDC Interest Rates

Source: World Development Indicators, World Bank Databank, 2010, Aggregates compiled by authors based on available data from LDC countries

6. IT vs. Non IT countries: an assessment of 24 countries

So far, the evidence has been provided at an aggregate level and has focused on growth and inflation. This section extends the analysis by comparing 12 IT countries with 12 NIT countries with similar characteristics and by using labour market and poverty indicators. However, it is important to highlight that difference in data presented between IT vs NIT does not imply causality. A set of comparator countries was selected by matching an IT country with a NIT country using the criterion of having similar HDI scores, similar level of income per capita and being from the same or a nearby region. The comparator set is highlighted in Table 5.²³

Table 6: IT Developing Country and Comparator Country List

Developing IT Countries	Comparator Country Set
Brazil	Venezuela
Chile	Argentina
Colombia	Ecuador
Guatemala	Honduras
Mexico	Uruguay
Peru	Panama
Philippines	India
Indonesia	Jordan
Ghana	Kenya
Thailand	Sri Lanka
Turkey	Lebanon
S. Africa	Botswana

Comparing the IT countries with their NIT countries in terms of macroeconomic variables does not indicate large differences. Both had similar levels of GDP growth, with inflation being slightly higher for the selected sample of NIT countries (Figure 13).

²³ Of course, the selection procedure is arbitrary, but there are no commonly agreed criteria that can be used to design an appropriate sample. Given that the sample of IT developing countries is rather small (12 if one excludes the transition economies), the sample of NIT developing countries then becomes too large and diverse. Hence, the rationale for comparing 12 IT developing countries with a sample of 12 NIT countries that exhibit similar characteristics.

Figure 13: Macro Indicators (2000-2007)

Source: IMF World Economic Outlook Data 2009, authors' calculations

The discussion now focuses on assessing the relative performance of IT and NIT countries for the standardized sample using productivity, labour market and poverty indicators. Data from the 2000-2007 period has been used. While a number of factors, especially labour market institutions, can affect labour productivity and other labour market indicators, including poverty, we find interesting association between IT or NIT and these indicators. For example, labour productivity is higher in NIT than in comparable IT countries.

Figure 14: Labour Productivity

GDP per person employed (constant 1990 PPP \$)

Source: IMF World Economic Outlook Data 2009, authors calculations, time period 2000-2007

While there is not much difference in the unemployment and poverty rates between IT and NIT countries, vulnerable unemployment is higher in IT countries (Figure 15). Of course, simply demonstrating an association between a set of indicators and variations in policy regimes (in this case, IT vs NIT), does not imply causality. Nevertheless, there is little evidence that developing IT countries have better performance indicators than a comparable sample of NIT developing countries.

Figure 15: Labour Market Indicators (2000-07)

Source: Key Indicators of the Labour Market (KILM), 6th Edition, ILO, authors' calculations.

7. Conclusion

There is ample evidence to suggest the current inflation targets that have been set in developing countries that have adopted IT regimes are probably too low. They seem to have been influenced by data from the 2000s. Of course, world-wide inflation has come down in the 2000s, but whether this will last remains an open question. Long run inflation rates based on observations of five decades suggest that the targeted inflation rates are not in accordance with historical trends. There is some evidence that the targeted inflation rates are influenced by the policy advice that IMF offers to developing countries, but no clear reasons are given to justify such policy advice. The literature on the non-linear relationship between inflation and growth clearly indicates that the threshold at which inflation becomes harmful to growth is much higher for developing countries and that moderate inflation up to a certain point has a positive impact on growth.

There is little evidence that monetary authorities in developing countries have used this knowledge on the threshold effects of inflation on growth to determine inflation targets. Decadal evidence indicates that the inflation-growth relationship has shifted in the 2000s. Implementing IT regimes represent a major challenge in the presence of supply-shocks which are a common phenomenon in developing countries. Furthermore, there is little evidence that the benefits of reduced inflation are being transmitted in the form of reduced costs of borrowing since such costs are likely to be determined by structural factors. The paper has also shown that it is difficult to establish that IT developing countries do significantly better in terms of labour productivity, vulnerable employment, working poverty and growth than their NIT counterparts.

What, then, is a way forward? One should distinguish between the need to safeguard price stability as a core principle and the more restrictive notion of targeting a specific inflation rate. One should go back to the refreshing eclecticism of the founding fathers of the IMF. As the preamble of the IMF's Article of Agreement IV notes: "... each member shall ... endeavor to direct its economic and financial policies toward the objective of fostering orderly economic growth with reasonable price stability, with due regard to its circumstances". The preamble not only expects monetary policy to attain simultaneously both a reasonable price target and orderly growth, but also, contrary to the IT regime, it does not specify any quantitative target. There is no presumption of the suitability of one target (less than 5 per cent) that is universally applicable as due regard needs to be given to country specific circumstances.

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