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INFLATION TARGETING IN INDIA: SELECT ISSUES

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Abstract

The adoption of inflation targeting in India has been a much debated topic which also becomes a challenge for the emerging economy. Though inflation targeting has already been adopted in many emerging and advanced countries, acceptability in India is a matter of concern. The paper argues that an emerging country like India needs to consider the composition of consumer price index; state of macro econometric models; and young demographics, unemployment rate and lack of social security before adopting inflation targeting.

To modernize the monetary policy framework, India could consider introducing regular review of the regional economy; instituting a Monetary Policy Committee; and separating debt from monetary management, the paper argues.

Keywords: Monetary policy framework, inflation, inflation targeting, debt management

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Introduction

Inflation Targeting could be the next major policy measure adopted in India as the proposal is under active consideration by the Reserve Bank of India (RBI) and the Government of India (GOI). In recent years, there has been a debate on the monetary policy framework in the country, basically anchored around the philosophy of adopting inflation targeting (IT) in India.

What is Inflation Targeting?

IT targets the inflation rate and not the price level and is distinct from monetary targeting and interest rate targeting. IT regime assumes that price stability is explicitly the mandate; a quantitative target for inflation is publicly announced; monetary policy is based on an inflation forecast; there is transparency in monetary operations; and that accountability mechanism is in place (Roger, 2010; Hammond, 2012).

Evolution of Inflation Targeting

The key policy objective of central banking is price stability, and the concept of giving it a numerical precision was considered very modern after monetary and exchange rate targeting had failed in the 1980s. The hunt for a better target led to experimentation with a “checklist” of economic indicators by Australia in mid-1980s and explicit squeezing of inflation rate by New Zealand by late eighties (Singleton, 2011). After some trials and initial success, the IT regime was formally inaugurated in March 1990 in New Zealand with the negotiation of the first Policy Targets Agreement between the Government and the central bank. Historically, some countries, of which a few at the push of the International Monetary Fund (IMF), switched to IT after the successful adoption by New Zealand (1990), Canada (1991), and UK (1992). The spread of IT was contagious and according to Mahadeva and Sterne (2000), 54 countries had adopted IT by 1998. And, by 2004, according to Rose (2007) formal inflation targeting was in place in a number of countries making up one-quarter of world economy. The situation changed after the recent financial crisis and rethinking of the economic strategies that went wrong before 2008 compelling many economists and policy makers to conclude that the role of economic blinkers that IT imposed on the policy makers cannot be ignored (Frankel, 2012). Marcus (2014)² observed that application of IT in an emerging country like South Africa faced many challenges - opposition of the trade

² Governor, South African Reserve Bank, in a speech at Pretoria, October 30, 2014.

union; disagreement on limits of transparency; arguments whether IT regime was sufficient to ensure price stability; and finally, questions of the level of targets. It probably is for similar reasons that none of the countries have adopted IT after 2008, except Japan in 2013 but with a different motivation.

The price indices used for inflation targeting, the target band for inflation, the horizon and the speed of approach to inflation targeting and the penalty for not adhering to the target is different for different countries even if analysed amongst the advanced and emerging countries (Annex I and II). Most of the countries use CPI (Consumer Price Index) as the index for targeting inflation (Table 1). Also, the target horizon is about two to three years.

Table 1: Inflation target measure, type and horizon for select inflation targeting countries

Country	Target measure	Target 2013	Target type	Target horizon	Started in
Armenia	HCPI	4% \pm 1.5pp	Point with tolerance band	Medium term	2006
Australia	HCPI	2% -3%	Range	Medium term average	1993
Brazil	IPCA	4.5% \pm 2pp	Point with tolerance band	Annual target	1999
Canada	CPI	2% (mid-point of 1% - 3%)	Point with tolerance band	Medium term (Six-eight quarters)	1991
Chile	CPI	3% \pm 1pp	Point with tolerance band	Around two years	1990
Colombia	HCPI	3% \pm 1pp	Range	Medium term	1999
Czech Republic	HCPI	2% \pm 1pp	Point with tolerance band	Medium term (12-18 months)	1998
Ghana	HCPI	9% \pm 2pp	Point with tolerance band	18-24 months	2002
Guatemala	HCPI	4% \pm 1pp	Point with tolerance band	End of Year	2002
Hungary	CPI	3%	Point	Medium term	2001
Iceland	HCPI	2.5% \pm 1.5pp	Point with tolerance band	On average	2001
Indonesia	HCPI	4.5% \pm 1pp	Point with tolerance band	Annual target	1999
Israel	CPI	1% - 3%	Range	Within two years	1991
Japan	CCPI	2%	Point	Within two years	2012
Mexico	CPI	3% \pm 1pp	Point with tolerance band	Medium term	2001
New Zealand	HCPI	1% - 3%	Range	Medium term	1990
Norway	ACPI	2.5%	Point	Medium term	2001
Peru	CPI	2% \pm 1pp	Point with tolerance band	At all times	2002
Philippines	CPI	4% \pm 1pp (2013-14) 3% \pm 1pp (2015-16)	Point with tolerance band	Medium term	2002
Poland	CPI	2.5% \pm 1pp	Point with tolerance band	Medium term	1999
Romania	HCPI	2.5% \pm 1pp	Point with tolerance band	Medium term	2005
Serbia	CPI	4% \pm 1.5pp	Point with tolerance band	Medium term	2009
South Africa	CPI	3% - 6%	Range	On a continuous basis	2000
South Korea	HCPI	3% \pm 0.5pp	Point with tolerance band	Mid-term horizon	1998
Sweden	CPI	2%	Point	Annual	1993
Thailand	CCPI	0.5% - 3%	Range	Eight quarters	2000
Turkey	CPI	5%	Point	Medium term (3 years)	2002
United Kingdom	CPI*	2%	Point	At all times	1992

* Earlier, United Kingdom targeted RPIX pp: percentage point(s).

Note: CPI: Consumer Price Index; CCPI: Core Consumer Price Index; HCPI: Headline Consumer Price Index; IPCA: Broad National Consumer Price Index; ACPI: Annual Consumer Price Index. Sources: Hammond (2012), and Mahajan, Saha and Singh (2014).

Features of Inflation Targeting

The price indices used for inflation targeting, the target band for inflation, the horizon and the speed of approach to inflation targeting and the penalty for not adhering to the target is different for different countries (Annex III and IV). Most of the countries use CPI (Consumer Price Index) as the index for targeting inflation. Amongst the important features of IT, in most of the cases,

target horizon for operation is six to eight quarters and in some cases, even three years. In most of the cases, sophisticated models like dynamic stochastic general equilibrium (DSGE) models, autoregressive time series models and semi-structural models are used taking into account quarterly data (Annex V and VI). To inspire confidence in the market, in almost all the cases, forecasts are regularly and transparently disseminated along with the assumptions.

Experience with Inflation Targeting

Inflation targeting ushered in transparency and accountability in the monetary policy framework but was criticized by Keynesians and monetarists for causing unemployment and monetary brutalism (Davidson, 2006). Another common criticism was that it ignored asset prices (Singleton, 2011). Also, most damaging was the fact that there was no conclusive proof that IT resulted in lower and less variable rates of inflation (Ball and Sheridan, 2003; Borio and Filardo, 2007). In fact, in advanced countries, it emerged that IT and non-IT countries conduct monetary policy in a similar way – applying the Taylor Rule (TR), named after the famous Professor John Taylor of Stanford University. Also, interest rate adjustments are attempted by the central bank based implicitly on TR which implies calculation and forecast of output gap and deviations of inflation from the stipulated target. The estimation and forecast of output gap, and interest rate path involve use of many sophisticated econometric tools. Thus, adoption of IT was necessary as the level of inflation was higher than normally expected in most of the countries in the years before adoption (Annex VII). Marcus (2014) on reviewing the experience of South Africa cautions that IT involves many contentious issues especially when applied to emerging markets which are distinct from those faced by advanced countries. In fact, in most of the cases, targeters did not benefit much from the adoption of IT as statistical analysis reveals that inflation has been volatile in most of the countries even after adoption of IT (Annex VIII and IX). Also, inflation has not been very high in most of the countries which did not adopt IT (Annex X).

Inflation targeting and India

The argumentative Indians have been debating the adoption of IT for nearly two decades. In different publications of the RBI (1996; 1997) the issue of IT was discussed. Again, in 1999, a general discussion on inflation targeting in India started after the L. K. Jha Memorial lecture by the Governor of the Reserve Bank of New Zealand in 1999 on how New Zealand's experience with IT

can be relevant for developing countries (Brash, 1999). Further, a number of Committees set up by the RBI (2000), GoI (2007) and Planning Commission (2009) also recommended the implementation of IT. The debate received a fresh impetus when Rajan (2013), in his first speech as RBI Governor, again emphasized the importance of low and stable inflation for Indian monetary policy and thereafter, in January 2014 the Expert Committee of the RBI to Revise and Strengthen the Monetary Policy Framework (RSMPF) submitted the report recommending adoption of IT by January 2016 with headline CPI as a nominal anchor.

India does not have an implicit IT regime but generally, in policy making, general price level was an important consideration given the living standards, size of informal sector and incidence of poverty. Therefore, India has always been a low inflation country compared to other countries, especially amongst emerging and developing countries. In India, inflation measured by a traditional measure of Wholesale Price Index, started before independence, has been generally less than 9 percent and if measured by the Consumer Price Index (industrial workers) less than 10 percent (Mahajan, Saha and Singh, 2014).

The application of IT could be riddled with many difficulties (Reddy, 1999; Jalan, 2000; Gupta and Sengupta, 2014). The most important consideration in India is supply side constraints that contribute to inflationary pressures, especially for food items and fuel. A related aspect is lack of critical appreciation of supply constraints. To illustrate, recently, when onion prices were shooting up, an influential segment of population was happily concluding that farmers, an important vote bank, are the beneficiaries. The recognition of causes and economic implications of such “onion” episodes is lacking in policy making. In India, where still about two-third of agriculture is dependent on rain, and suitable supply-chain is lacking, supply side factors would continue to play a significant role in food prices.

In view of the fact that food prices are dependent on monsoons, the ensuing climate change is expected to put pressure on the food prices. In addition, food prices have been stubborn in recent years and are also impacted by the minimum support prices (MSP) of food grains which despite having risen significantly in recent years, are under pressure for further revisions on account of rising cost of farm equipment (Sonna et al., 2014; Gupta and Siddiqui, 2014). The Food Security Act, 2013, (FSA) which has assured food availability to nearly 80 crore people in the country are also expected to distort food prices. FSA has already begun to change the cropping pattern

implying that though land area under food grains would increase that for other agricultural products including onion and vegetables would decline. This is in addition to shrinking land use for agriculture on account of expanding urbanization. Further, in India, given the demographic factors, increasing demand for protein-rich food would cause persistent pressure on food items. In view of the size of demand in the country, imports could only be an expensive alternative, if any. Geo-political situation like sanctions by Western countries against Russia would also imply that such demand for vegetables, fruits and protein rich food could be diverted to India.

In the CPI, weight of food is high, illustratively, 47.58 per cent for the combined, 35.80 per cent for urban and 56.58 per cent for rural CPI. In addition, food prices were also impacted by fuel prices, and the weight for fuel and light is 9.49 per cent in combined CPI, 10.42 per cent in rural and 8.40 per cent in urban CPI. Thus, weights of food and fuel account for more than 57 per cent of CPI-Combined and 67 per cent for CPI-Rural. Hence, the pressure to contain the overall price level in combined headline CPI would be significantly large for non-food and non-fuel items. Inflation targeting in such regime would imply that when food prices increase, the prices of manufactured, services, housing and other miscellaneous items would need to decline.

Moreover, in India the arguments against inflation are constantly neglecting the demographic aspect. In this context, there has been some good research from Japan. Shirakawa (2012) argues that the economic profession does not make a distinction between the qualities of population in their models of economic growth. The behavior of the ageing population is different from the young population, as is their productivity and consumption pattern, which impacts the current account, reflecting the savings-investment gap in the economy. The "spending wave" hypothesis is associated with young population and Shirakawa (2012) refers to empirical studies correlating inflation with population growth rate in 24 advanced countries. Bullard, Garriga and Waller (2012) find that a young population generates high inflation and ageing population places downward pressure on inflation. Ikeda and Saito (2012) using a dynamic general equilibrium model report that ageing lowers real interest rates in the economy, implying lowering of inflation. Finally, Nishimura (2011), argued that in Japan, the US, and some other countries, asset markets are correlated to the working age population, and that bubbles coincide with turning points in demographic trends.

Blanchard, Dell' Ariccia and Mauro (2010) has been advising countries to raise their inflation targets, because targets that are set too low impact employment and growth. In traditional economic theory, there is a trade-off in employment and inflation. In a well-documented recent research, Dholakia (2014) demonstrates that such a trade-off does exist in India too. In India, given that unemployment rate, especially amongst the youth is very high, in a young demographic country, the key aspiration of every family, is employment for the willing individual.

Marcus (2014) observes that policy makers are not independent of the economy or society that they live in, and therefore a number of factors have to be taken into consideration while taking decisions. Economics cannot be isolated from general well-being of the society. The Census data released in July 2014 showed that unemployment in the country especially amongst the youth was very high, averaging nearly 20 percent for the age group of 15 to 24 years. In some states like Chhattisgarh, Madhya Pradesh, West Bengal, Rajasthan, Himachal Pradesh, and Jammu and Kashmir, unemployment rate was above 25 percent.

In the political economy literature, the central banker has to be conservative in approach with a basic aim to target the inflation rate. But also, it is necessary to signal to the market and analysts that the central bank and the government are in alignment on major economic issues. In fact, the issue of tolerance level of inflation in India needs a review to meaningfully anchor inflationary expectations. In India, 92 percent of the population was less than 60 years in 2010, compared to about 80 percent in advanced countries like Australia, Canada, New Zealand and the UK. Similarly, the proportion of people below 14 years was higher than 30 percent in India, compared to less than 20 percent in the above mentioned countries. Therefore, considerations like growth and employment are important for India.

Modernising the Monetary Policy Framework

The monetary policy framework that has been successfully followed in India and was hailed by the world during the great recession is the Multiple Indicator Approach (MIA). It may be mentioned that India was a pioneer in crafting the MIA after the South East Asian Crisis (SEAC) in 1997-98 and constantly monitored various factors before undertaking any monetary policy decision. These variables, besides inflation, include indicators pertaining to external, financial, banking and real sector. Thus, monetary policy under the MIA had a human face and was not mechanically tied to a

single numerical value. MIA involves lots of hard work as the RBI had always to be carefully watching various parameters to steer the economy away from any crisis. Consequently, Indian economy was able to stave off the SEAC and great recession.

The Finance Minister in his maiden Union Budget speech in July 2014 had observed that “it is also essential to have a modern monetary policy framework to meet the challenge of an increasingly complex economy. Government will, in close consultation with the RBI, put in place such a framework.” The objective of monetary policy varies in different countries. In the UK, objective of monetary policy is to deliver price stability, implying low inflation and, subject to that, to support the government’s economic objectives including those for growth and employment. In the US, monetary policy has two basic goals: to promote maximum sustainable output and employment, and to promote stable prices. In India, according to the RBI Act, 1934, the objectives of the Reserve Bank are “...to regulate the issue of Bank notes and the keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage.” The formulation, framework and institutional architecture of monetary policy in India have evolved over time around these objectives – maintaining price stability, ensuring adequate flow of credit to sustain growth, and securing financial stability.

The monetary policy framework can be modernized by a number of initiatives which are successfully followed in other countries. In the UK, every month, Agent’s Summary compiled by the Bank of England’s (BoE’s) 12 agents following discussions with 700 businesses is published to assist the monetary policy makers in conjunction with intelligence from other sources. Similarly, in the US, Beige Book, published eight times per year, is based on anecdotal information on current economic conditions collected by each of the Fed Reserve Banks in their respective districts through reports and interviews with key business contacts, economists, market experts, and other sources. The Beige Book is an important source of real time market intelligence for the Fed’s Open market Committee (FOMC).

Another key component of modern monetary policy is Monetary Policy Committee (MPC) which consists of members from within the central bank and experts in the country. An advanced country like the non-inflation targeting USA has twelve members while the UK has nine members. In the UK, the external members of the MPC are appointed for 3 years by the Chancellor and such appointments of independent members are designed to ensure that the MPC benefits from expertise

in the area of economics and monetary policy. In India, GOI (2013) and RBI (2014) have also recommended setting up of the MPC. In general, the MPC is not only expected to be accountable for the monetary policy decisions that are taken but also bring to the discussion, thinking and expertise on various aspects of the diverse economy. In absence of the 'Beige Book' or 'Agents Reports', containing regional development on near-real time basis, a larger number of MPC members, with diverse domain expertise, would be a truly representative group and lend credibility in monetary policy decisions.

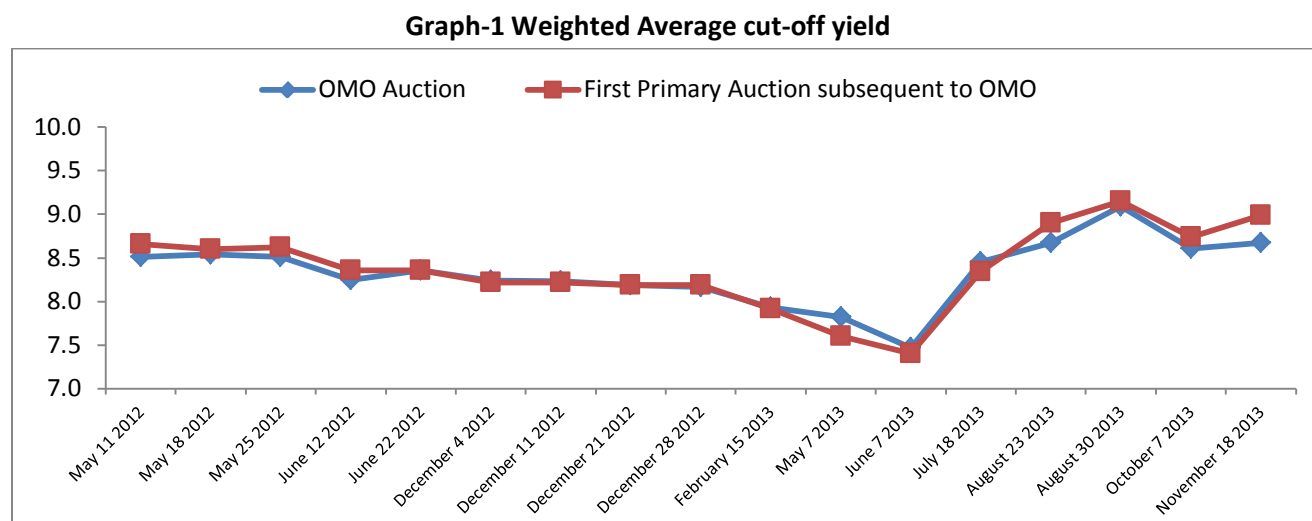
Transparency, clear communication and forward guidance are other pillars of modern monetary policy framework. To enhance transparency in operations, the US Fed prepares a quarterly report on balance sheet developments in addition to semi-annual reports to the Congress discussing the conduct of monetary policy and the future prospects along with a testimony from the Fed Reserve Board Chair. In the UK, minutes of the MPC meetings, with the voting pattern are also released to public within a fortnight.

The standard practice in the advanced countries is to disseminate research and models that are being used for forecasting. Since monetary policy takes time to act on output and inflation, sometimes more than two years, a forward looking assessment is essential. These forecasts are generally prepared by help of large macroeconomic models. Since adopting IT in October 1992, BoE has been placing quarterly inflation report in the public domain detailing the BoE's assessment of inflation and growth along with methodology of computing fan charts, and assumptions and models used in forecasting. The inflation report helps to share the BoE's thinking with the public, explaining the reasons for the decision. India, a developing and a vast country, with weak financial markets, and large inequalities of income and industrial development does not have an effective transmission mechanism of monetary policy.

The other aspect is management of internal debt in which the RBI's important role could conflict with its pursuit of the objectives of monetary policy.³ The monetary policy of the RBI partly aims to provide adequate liquidity and maintain an appropriate interest rate environment (RBI, 2014). In India, in recent years, interest rates of gilt-edged government securities were substantially lower and generally steady despite market turbulence than the average lending rate of commercial banks.

³ In the context of the US, the debate is presented in Powell (2014) and Greenwood et al. (2014).

This could be interpreted to imply that RBI makes efforts to ensure government borrowings are at lower rates of interest which can be substantiated by the fact that there is convergence in yields of the government securities and OMO auctions (Graph 1).



Source: RSMFP, RBI (2014).

RBI (2014) acknowledges that open market operations (OMOs) have largely become one-sided in recent years and resulted in expanding reserve money and indirectly monetising fiscal deficit. Hence, the recommendation that OMOs should be delinked from fiscal operations and “should not be used for managing yields on government securities” in RSMFP. This observation indeed is a grim reminder of the era of *ad hoc* Treasury Bills which reigned supreme from 1974 to 1993, camouflaging the actual implications of fiscal deficits. Generally, separation of debt from monetary management enhances credibility and independence necessary to pursue an inflation target, which is still uncertain in India.

In a similar context, a statistical analysis of the yield in government securities reveals that there is a dip during the time of floatation of new securities. Table 2 captures the movements in the yield of the government securities market. The G-Sec data have been collected from the website of Clearing Corporation of India Ltd. (CCIL) and information regarding the floatation dates of government securities with various maturity periods has been obtained from the Reserve Bank of India. The bonds with 5, 10, 15 and 30 years of maturity period have been selected as the benchmark maturity years. To calculate the dip in the interest rates, a formula of t-2 has been applied i.e. two days before each floatation day (date of auction) of various benchmark years have

been collected and if the interest rate is apparently lower than the $t-2^{\text{th}}$ day, it has been defined as a dip. However, a dip on the $t-1^{\text{th}}$ day and a subsequent recovery would not be considered as a dip. Subsequently in the next step, $t+2^{\text{th}}$ day has also been considered to check whether interest rate is moving upward after the floatation, which would confirm it as a complete dip.

Table 2: Behavior of Yield on Government Securities (maturities in years)

Year	5 Years*			10 Years**			15 Years***			30 Years****		
	N	T-2 to T	T-2 to T+2	N	T-2 to T	T-2 to T+2	N	T-2 to T	T-2 to T+2	N	T-2 to T	T-2 to T+2
2004-05	2	0	0	1	0	0	0	0	0	2		
2005-06	2	0	0	2	1	1	3	0	0	8		
2006-07	3	0	0	9	5	3	3	1	0	7		
2007-08	1	1	1	12	4	0	6	5	2	2	0	0
2008-09	7	5	4	14	4	2	2	1	1	4	2	2
2009-10	20	7	4	25	6	3	4	1	1	1	0	0
2010-11	18	6	1	15	4	0	0	0	0	12	3	1
2011-12	16	6	2	26	10	5	6	1	0	10	3	2
2012-13	18	8	2	15	7	2	5	1	1	19	11	1
2013-14	18	10	5	26	13	6	1	0	0	20	12	6

*4< maturity period <6; **9< maturity period <11; ***14< maturity period <16; ****29< maturity period <31.

Note: N=Number; T= Auction Day.

Sources: Author's calculations based on data from CCIL and the RBI.

Conclusion

The RBI has been contemplating adopting Inflation Targeting (IT) in India and replacing the time tested multiple indicator approach (MIA) used successfully since 1998. As the name indicates, MIA covers different aspects of the economy like exchange rates, growth, liquidity conditions in the market, financial stability of the institutions, employment, and also inflation while the focus of IT is only inflation. As can be easily compared, IT regime mounts blinkers on the central bank and absolves the central bank from other responsibilities: IT was in disrepute after the onset of the great recession in 2008.

Though IT sounds modern, it may not be suitable for a ready transplant in India given the current state of the economy as well as status of price indices. In view of the fact that prices of food grains

are fixed by non-economic and political reasons, adopting inflation target would only distort the market mechanism.

The important issue in India is lack of sophisticated econometric models in public domain and non-availability of reliable data for obtaining these forecasts on series like gross domestic product, inflation rates and employment. In India, such data, not even unreliable data, exists. Therefore, making policy decisions which impact long term decisions based on scantily available data could have perilous consequences.

In view of the young population of India, probably priorities in India are higher employment and growth and not just low inflation. There needs to be an extensive behavioral study on new tolerance levels of inflation, if any, in India, segregating the effect of food and non-food inflation, and the trade-off between growth and inflation. There will be some who may be mainly concerned about food inflation while many may be tolerant to inflation but not to unemployment. To conclude, demographic dividend in the country is not being appropriately used and as employment brings in responsibility, obligation and sense of belonging in any employee, higher employment is not only helpful in growth but also ensures that social unrest is minimized. The demographic pressure on employment is expected to increase further.

The models to establish threshold levels of inflation in India, and the sacrifice ratio should be discussed in public domain so as to inspire confidence in the numbers that are being proposed as a target.

Therefore, the period of transition from MIP to a new framework, if any, would need to be carefully managed, by wide-spread consultations, healthy debate, informed public opinion and appropriate sequencing. Changes in monetary policy framework deserve a focussed attention and well chalked out strategy to be successful.

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Annexure I

Inflation Targeting Countries – Advanced Economies

Country	Since when	Previous / why inflation targeting	Who sets the Target /goal independence	Target indicator, time frame and style
Australia	1993	None/Provide a new monetary anchor	Reserve Bank Board in agreement with Governor and the Minister of Finance	Target range of 2-3 per cent inflation on average over the economic cycle. Medium term
Canada	1990-1991	None/Provide a new monetary anchor and bring down inflation	The inflation targets are agreed jointly by the Government of Canada and the Bank of Canada	A target rate for total CPI of 2 per cent on a 12-month basis, with a 1-3 per cent control range. The current target range extends to December 2016
Japan	January 2013		The Act states, 'The Bank of Japan's autonomy regarding currency and monetary control shall be respected.' sufficiently.'	Price stability target of 2 per cent in terms of the year-on year rate of change in the CPI at the earliest possible time, with a time horizon of about two years.
New Zealand	1989-90	None/Part of extensive reforms, dissatisfaction with earlier outcomes; provide a new nominal anchor	The Minister of Finance and the Governor of the Reserve Bank shall together have a separate agreement setting out specific targets for achieving and maintaining price stability. This is known as the Policy Targets Agreement (PTA).	The current agreement, signed in September 2012, calls for inflation to be kept within 1 to 3 percent a year, on average over the medium term, with a focus on keeping future average inflation near the 2 percent target midpoint. The Reserve Bank has published an interactive inflation calculator on its website.
Norway	2001	Exchange rate / gradual movement towards flexible exchange rate and stronger emphasis on price stability	The Government has set an inflation target for monetary policy.	The operational target of monetary policy shall be annual consumer price inflation of close to 2.5 per cent over time.

Inflation Targeting Countries – Advanced Economies (Continued)

Country	Since when	Previous / why inflation targeting	Who sets the Target /goal independence	Target indicator, time frame and style
Sweden	Announced in January 1993, adopted in 1995	Exchange rate / Forced off a fixed exchange rate regime	The Executive Board of the Riksbank makes the monetary policy decisions without instruction from any other parties.	2 per cent target in annual change in headline CPI
South Korea	April 1998		Based on Bank of Korea Act, it sets the midterm inflation target to be applied for three years in consultation with the government.	The inflation target measure during the period from 2013 to 2015 is set at 2.5~3.5%, based on consumer price inflation (year on- year).
UK	October 1992	Exchange rate Inflation targeting	Forced off a fixed exchange rate regime to maintain price stability/ Price stability is defined by the Government's inflation target of 2%.	The inflation target of 2 per cent is expressed in terms of an annual rate of inflation based on the Consumer Prices Index (CPI).

Source: RBI (2014).

Annexure II

Inflation Targeting Countries – Emerging Economies

Country	Since when	Previous / why inflation targeting	Who sets the Target /goal independence	Target indicator, time frame and style
Chile	September 1999	High inflation due to expansionary policies, oil price hike during Gulf war, failure with exchange rate based stabilization programme, instability of money demand and difficulty in monetary targeting, provide a new monetary anchor and gradual disinflation.	Central bank/ Yes	Annual CPI (headline) Point target: 3 per cent/ +/- 1 percentage point/ Around 2 years.
Brazil	June 1999	Due to concerns on fiscal front, collapse of currency under speculative attack and search for a nominal anchor within IMF programme.	National Monetary Council (both Government and central bank Governor)/ Yes	Headline Broad National CPI/ 4.5 per cent +/-2 percentage point Yearly target.
Hungary	June 2001	Increasing incompatibility of fixed exchange rate regime and disinflation; need to bring down inflation with future EU membership in mind	Central bank/ Yes	CPI/ 3 per cent per annum/ Medium-term.
Indonesia	July 2005	The relationship between monetary aggregates and nominal income becoming tenuous due to instability in income velocity of money following financial deregulation and less success with exchange rate as nominal anchor.	Government in consultation with central bank/ Yes.	CPI / 4.5 per cent +/- 1 percentage point/ Medium term.
Israel	Informally in 1992; full-fledged from June 1997	Lock in disinflation and define the slope of the exchange rate crawling peg.	Government in consultation with central bank Governor/ Yes.	CPI / Target Range of 1- 3 per cent/ Within 2 years.

Inflation Targeting Countries – Emerging Economies (Continued)

Country	Since when	Previous / why inflation targeting	Who sets the Target /goal independence	Target indicator, time frame and style
South Africa	February 2000	Following liberalization and structural developments, changing relationship between output, prices and money growth, making monetary targeting less useful; need for greater transparency in policy.	Government in consultation with central bank/ Yes.	CPI / A Target range of 3-6 per cent/ On a continuous basis.
Peru	January 2002	Formalization of earlier regime; greater transparency of policy.	Target is approved by the Board of Directors.	CPI / 2 per cent +/-1 percentage point/ At all times.
Philippines	January 2002	Formalization and simplification of earlier regime; greater transparency and focus on price stability.	Government in consultation with central bank/Yes.	CPI / 4 per cent +/- 1 percentage point for 2012, 2013 and 2014/ Medium term.
Poland	1998	Considered the most effective way to bring down inflation as a precondition for subsequent EU membership.	Monetary Policy Council/ Yes.	CPI / 2.5 per cent +/- 1 percentage points/ Medium term.
South Korea	April 1998	Unstable money demand following structural changes in financial markets, and with 1997 financial crisis; discontinuation of exchange rate.	Central Bank in consultation with the Government/ Yes.	CPI / 3 per cent +/- 1 percentage point/ 3 years.
Thailand	May 2000	Inflation targeting considered more appropriate with floating exchange rate than money supply targeting after the financial crisis of 1997.	MPC in consultation with the Government/ Yes.	3.0 per cent +/- 1.5 percentage points/ 8 quarters.

Source: RBI (2014).

Annexure III

Inflation Targeting Countries – Advanced Economies

Country	Who sets the Target	Target Horizon	Accountability of Target Misses
Australia	Government and Central Bank	Medium Term	Open letter – No, Parliamentary Hearings – Yes, twice yearly
Canada	Government and Bank of Canada	6-8 quarters, current target extends to December 2016	Open letter – No, Parliamentary Hearings – Yes, twice yearly
Israel	Government in consultation with the Bank of Israel Governor	Within two years	Open letter – No, Parliamentary Hearings – Yes, twice yearly
New Zealand	Governor of Central Bank and the Minister of Finance	Medium Term	Open letter – Other, Parliamentary Hearings – Yes, Four times a year
Norway	Government	Medium Term	Open letter – No, Parliamentary Hearings – Yes
Sweden	Sveriges Riksbank	Normally two years	Open letter – No, Parliamentary Hearings – Yes, twice yearly
South Korea	Bank of Korea (BOK) sets the target in consultation with the Government	Three years	Open letter – No, Parliamentary Hearings – Yes
UK	Government, the target is reaffirmed each year by the Chancellor of the Exchequer in the annual budget statement	At all times	Open letter – Yes, Parliamentary Hearings – Yes, thrice yearly

Source: Hammond (2012).

Annexure IV

Inflation Targeting Countries – Emerging Economies

Country	Who sets the Target	Target Horizon	Accountability of Target Misses
Chile	Central Bank	Around two years	Open letter – No, Parliamentary Hearings – Yes, Four times a year
Brazil	National Monetary Council, This consists of: the Minister of Finance; the Governor of the Central Bank of Brazil; and the Minister of Planning, Budget and Management	Yearly	Open letter – Yes, Parliamentary Hearings – Yes, Six times a year
Hungary	Central Bank	Medium term	Open letter – No, Parliamentary Hearings – Yes, Once a year
Indonesia	The government, after consultation with Bank Indonesia	Medium term	Open letter – No, Parliamentary Hearings – No
Mexico	Board of Governors of Central Bank	Medium term	Open letter – No, Parliamentary Hearings – Yes, Not regular
South Africa	The Government sets the target after consultation with the Central Bank	On a continuous basis	Open letter – No, Parliamentary Hearings – Yes, at least thrice a year
Peru	The target is approved by the Board of Directors of Central Bank	At all times	Open letter – No, Parliamentary Hearings – Yes, once a year
Philippines	The National Government (through the Development Budget and Co-ordination Committee) in consultation with the Central Bank, the inflation target is announced two years in advance	Medium term (from 2012–2014)	Open letter – Yes, Parliamentary Hearings – No
Poland	Monetary Policy Council	Medium term	Open letter – No, Parliamentary Hearings – No
Thailand	A target is set by the MPC on an annual basis, no later than December, the target shall be reached in agreement with the Minister of Finance, which will then require approval by the Cabinet	Eight quarters	Open letter – Yes, Parliamentary Hearings – No

Note: MPC – Monetary Policy Committee.

Source: Hammond (2012).

Annexure V

Modeling and Forecasting – Advanced Countries

Country	Type of Models used by Central Bank	Published Forecasts	Forecast assumption on interest rates	Forecast owned by
Australia	DSGE plus small models and single equations	GDP, inflation and core inflation	Market or Constant	RBA
Canada	Suite of DSGE plus macro models	GDP, inflation and core inflation	Endogenous	Governing Council of BoC
Israel	Suite of models	Fan chart forecasts for inflation and key policy rate. Range forecast for GDP	Forward-looking policy reaction function — endogenous	Staff of BoI
New Zealand	Calibrated gaps model is main forecasting model. Suite of alternative models.	GDP, inflation and interest rate projections	Endogenous	MPC
Norway	DSGE models and a suite of forecasting models for 'nowcasting'	Key policy rate, output gap, CPI and core inflation	Endogenous	Governor of Norges Bank
Sweden	Time series model, indicator models, structural models (eg- DSGE)	GDP, CPI, core inflation and the repo rate	Endogenous	Board of Governors
South Korea	Dynamic Projection Model, DSGE model	Inflation and GDP	Market	Central bank
UK	Statistical and theoretical. Main forecasting model is DSGE	Inflation and GDP	Market rates	MPC

Note: DSGE - Dynamic Stochastic General Equilibrium, RBA – Reserve Bank of Australia, BoI – Bank of Israel, Nowcasting – Forecasting recent values, MPC – Monetary Policy Committee.

Source: Hammond (2012).

Annexure VI

Modeling and Forecasting – Emerging Countries

Country	Type of Models used by Central Bank	Published Forecasts	Forecast assumption on interest rates	Forecast owned by
Chile	Quarterly macroeconomic model, time series and DSGE	GDP and CPI	Consistent with the target	Board of Central Bank
Brazil	VARs, small and medium-sized macro models, DSGE	Fan chart forecasts of inflation and GDP	Constant and market	MPC
Hungary	Time series, expert, macro and DSGE	CPI, core inflation, GDP and labour market	Endogenous	Staff of MNB
Indonesia	DSGE, macro, ARIMA	Inflation, GDP and GDP components	Scenarios and expected inflation	Board of Governors of BI
Mexico	DSGE model, ECM	Inflation, GDP and employment	Endogenous	Staff of Central Bank
South Africa	Core macro forecasting plus suite of models	Fan chart forecast of Inflation and GDP	Constant	MPC
Peru	Semi-structural, DSGE, VAR	Inflation, GDP, BoP, inflation and GDP in trading partners	Taylor rule	Central bank
Philippines	Single equation, multi equation, (macro models being developed, DSGE model for policy simulation)	Inflation	Constant	Central bank
Poland	Suite of macroeconomic models; structural macro model is main one. DSGE model used for internal analysis	Inflation and core inflation, GDP and GDP components	Constant	Staff of National Bank of Poland
Thailand	Suite of models (DSGE being developed)	Core inflation and GDP	Constant	MPC

Note: DSGE - Dynamic Stochastic General Equilibrium, VAR – Vector Auto Regression, ARIMA - Autoregressive Integrated Moving Average, ECM – Error Correction Model, MPC – Monetary Policy Committee, MNB – Magyar Nemzeti Bank, BI – Bank Indonesia.

Source: Hammond (2012).

Annexure VII

Inflation Targeting Countries – Inflation Preceding Adoption

Country	Inflation targeting adoption Year	Inflation rate at adoption Year	Inflation rate for 3 years preceding adoption Year			Target inflation rate 2013	2013 average inflation rate
			<i>T</i>	<i>T-3</i>	<i>T-2</i>		
Australia	1993	1.8	7.3	3.2	1.0	2 – 3	2.4
Brazil	1999	4.9	15.8	6.9	3.2	4.5 +/- 2	6.2
Canada	1991	5.6	4.4	4.0	5.0	2	0.9
Chile	1999	3.2*				3 +/- 1	1.8
Colombia	1999	10.9	20.8	18.5	18.7	3 +/- 1	2.0
Czech Republic	1997	8.5	10.0	9.2	8.8	2 +/- 1	1.4
Ghana	2007	10.7	12.6	15.1	10.9	9 +/- 2	11.6
Guatemala	2005	9.1	8.1	5.6	7.6	4 +/- 1	4.3
Hungary	2001	9.2	14.2	10.0	9.8	3	1.7
Iceland	2001	6.4	1.7	3.2	5.1	2.5 +/- 1.5	3.9
Indonesia	2005	10.5	11.9	6.6	6.2	4.5 +/- 1	6.4
Israel	1997	9.0	12.3	10.0	11.3	1 – 3	1.5
South Korea	2001	4.1	7.5	0.8	2.3	3 +/- 0.5	1.3
Mexico	2001	6.4	15.9	16.6	9.5	3 +/- 1	3.8
New Zealand	1990	6.1	15.7	6.4	5.7	1 – 3	1.3
Norway	2001	3.0	2.3	2.3	3.1	2.5	2.1
Peru	2002	0.2	3.5	3.8	2.0	2 +/- 1	2.8
Philippines	2002	2.7	5.9	4.0	5.3	4 +/- 1	3.0
Poland	1998	11.7	28.1	19.8	15.1	2.5 +/- 1	1.0
Romania	2005	9.0	22.5	15.3	11.9	2.5 +/- 1	4.0
Serbia	2006	11.7	9.9	11.0	16.1	4 +/- 1.5	7.7
South Africa	2000	5.3	8.6	6.9	5.2	3 – 6	5.7
Sweden	1993	4.6	10.5	9.3	2.3	2	0.0
Thailand	2000	1.6	5.6	8.0	0.3	0.5 – 3	2.2
Turkey	2006	9.6	25.3	10.6	10.1	5	7.5
UK	1992	4.3	5.2	7.0	7.5	2	2.6

*Roger (2010).

Source: World Bank Data.

Annexure VIII

Inflation Targeting Countries: Average Inflation after adoption

Country	Inflation targeting adoption year	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Australia	1993	1.2	3.4	2.7	2.8	3.0	2.5
Brazil	1999			9.9	4.9	5.2	6.1
Canada	1991	1.4	2.3	2.3	2.1	1.5	1.8
Chile	1999						2.7
Colombia	1999			6.5	5.0	4.5	2.9
Czech Republic	1997		3.6	1.6	2.4	2.9	2.2
Ghana	2007					15.5	9.8
Guatemala	2005					5.7	4.8
Hungary	2001			5.6	5.1	5.1	3.8
Iceland	2001			3.5	5.2	10.0	4.4
Indonesia	2005					6.6	5.4
Israel	1997		2.5	2.0	1.3	3.5	2.2
South Korea	2001			3.3	2.5	3.5	2.5
Mexico	2001			4.8	3.9	4.9	3.8
New Zealand	1990	1.6	1.9	2.0	2.9	2.8	2.2
Norway	2001			1.4	1.5	2.8	1.4
Peru	2002				1.8	3.4	3.3
Philippines	2002				5.0	5.4	3.6
Poland	1998		7.6	2.1	1.9	3.6	2.9
Romania	2005					6.5	4.4
Serbia	2006					8.9	8.7
South Africa	2000			5.5	5.0	7.6	5.5
Sweden	1993	0.3	1.3	1.5	1.3	1.4	1.3
Thailand	2000			1.8	3.8	2.6	3.0
Turkey	2006					8.4	7.6
UK	1992	1.9	1.1	1.3	2.2	3.0	3.3

Source: World Bank Data.

Annexure IX

Inflation experiences after the adoption year

Country	Inflation targeting adoption year	Inflation rate at adoption year	Target inflation rate 2013	Minimum	Maximum	Average	Standard Deviation
Australia	1993	1.8	2 – 3	0.3	4.6	2.7	1.2
Brazil	1999	4.9	4.5 +/- 2	3.6	14.7	6.6	2.7
Canada	1991	5.6	2	0.2	2.9	1.8	0.7
Chile	1999	3.2*	3 +/- 1	1.4	3.3	2.4	0.9
Colombia	1999	10.9	3 +/- 1	2.0	9.2	5.3	2.2
Czech Republic	1997	8.5	2 +/- 1	0.1	10.6	3.1	2.5
Ghana	2007	10.7	9 +/- 2	8.7	19.3	12.7	4.3
Guatemala	2005	9.1	4 +/- 1	1.9	11.4	5.6	2.9
Hungary	2001	9.2	3	1.7	7.9	4.9	1.6
Iceland	2001	6.4	2.5 +/- 1.5	2.1	12.7	5.8	3.3
Indonesia	2005	10.5	4.5 +/- 1	4.3	13.1	6.9	3.0
Israel	1997	9.0	1 – 3	-0.4	5.7	2.5	1.9
South Korea	2001	4.1	3 +/- 0.5	1.3	4.7	2.9	0.9
Mexico	2001	6.4	3 +/- 1	3.4	5.3	4.3	0.6
New Zealand	1990	6.1	1 – 3	0.3	4.4	2.2	1.1
Norway	2001	3.0	2.5	0.5	3.8	1.8	0.9
Peru	2002	0.2	2 +/- 1	1.5	5.8	2.9	1.3
Philippines	2002	2.7	4 +/- 1	2.3	8.3	4.5	1.8
Poland	1998	11.7	2.5 +/- 1	0.8	10.1	3.6	2.5
Romania	2005	9.0	2.5 +/- 1	3.3	7.8	5.5	1.4
Serbia	2006	11.7	4 +/- 1.5	6.1	12.4	8.5	2.4
South Africa	2000	5.3	3 – 6	1.4	11.5	5.9	2.5
Sweden	1993	4.6	2	-0.5	3.4	1.3	1.1
Thailand	2000	1.6	0.5 – 3	-0.8	5.5	2.7	1.7
Turkey	2006	9.6	5	6.3	10.4	8.1	1.5
UK	1992	4.3	2	0.8	4.5	2.2	0.9

*Roger (2010).

Source: World Bank data.

Annexure X

Non - Inflation Targeting Countries: Average Inflation over the years

Country	1996 - 1998	1999 - 2001	2002 - 2004	2005 - 2007	2008 - 2010	2011 - 2013
Argentina	0.5	-1.1	14.6	9.8	8.5	10.2
China	3.4	-0.1	1.4	2.7	2.8	3.6
Hong Kong	5.0	-3.1	-2.0	1.7	2.4	4.6
India	9.8	4.1	4.0	5.6	10.4	9.7
Japan*	0.9	-0.6	-0.4	0.0	-0.2	0.0
Malaysia	3.8	1.9	1.4	2.9	2.6	2.3
Russia	30.1	42.7	13.4	10.5	10.9	6.8
Senegal	1.9	1.5	0.9	3.2	2.0	1.8
Singapore	1.0	0.8	0.6	1.2	3.3	4.1
Sri Lanka	11.6	8.3	7.8	12.5	10.7	7.1
Switzerland	0.5	1.1	0.7	1.0	0.9	-0.2
United States	2.3	2.8	2.2	3.2	1.7	2.2

*Japan adopted IT in 2013.

Sources: World Bank Data, OECD for Argentina.