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INFLATION TARGETING – A CROSS COUNTRY ANALYSIS

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Abstract

Monetary policy is concerned with the measures taken to regulate the supply of money, the cost and availability of credit in the economy. The primary role of the central banks is monetary stability, that is, to sustain confidence in the value of the country's money. Ultimately, this means low and stable expectations of inflation. Because increase in money supply, increases the level of inflation. So, one of the important objectives of monetary policy is to ensure price stability. In the past years, a number of monetary authorities have made strong policy declarations that give increased emphasis to inflation control. With this background the study intends to examine the macroeconomic performance of countries which have adopted Inflation Targeting (IT). The study is based on secondary data and has been collected from the RBI, World Bank and IMF reports. The results of the study have some policy implications.

Key Words: Inflation, Inflation Targeting, GDP, Unemployment.

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1. Introduction

Monetary policy is one of the two macroeconomic policies used by modern government to control the level of economic activity in the economy, the other policy being the fiscal policy. It is also called credit policy since it controls the quantity and direction of bank credit. Monetary policy which the central bank, the monetary authority of the country, formulates and executes traditionally operates through the control of the cost and quantity of money supply.

Monetary policy has short-run as well as long-run goals. In advanced economies its basic objectives are to stabilise the internal and external value of the currency. However, in developing economies, it is geared to achieve other objectives apart from playing the stabilisation role. In the short run it aims to achieve price stability – both internal and external, while in the long run it seeks to achieve economic growth with full employment and equity in income distribution along with developing and regulating a strong and resilient financial system. Monetary policy can be either expansionary or contractionary policy, reduces the total money supply, or increases it slowly. An expansionary policy is traditionally used to combat unemployment spur investment in a recession by lowering interest rates and easing the liquidity conditions in the financial market, while a contractionary policy involves raising interest rates and tightening liquidity to combat inflation.

There are four main ways to frame monetary policy in controlling inflation,

- Focus on Exchange Rate
- Focus multiple indicators (GDP, IIP, Exchange rate, Inflation)
- Focus on Inflation (since 1990s)
- Focus on Money Supply

In the above mentioned ways Inflation Targeting is becoming a standard operating procedure for central banks around the world in controlling the inflation. Over the past two decades, many central banks have adopted an inflation targeting (IT) framework.

Inflation targeting is a monetary policy strategy used by central banks for maintaining inflation at a certain level or within a specific range. In general, central banks normally follow a policy of keeping inflation sufficiently low. However, in inflation targeting, there is a preset, publicly declared target. Using methods such as interest rate changes, the central bank and other

monetary authorities are expected to guide inflation to a targeted level or range. Such a policy makes the central bank focus on a single variable and imposes a penalty if the target is not adhered to. This policy was initially adopted by New Zealand in 1990, although other countries, most notably Germany, had evolved something close to inflation targeting considerably earlier. Thereafter, many countries have adopted inflation targeting as a part of monetary policy during the 1990s (Saha, 2014).

1.1 What is Inflation targeting?

Inflation targeting is an economic policy in which the central bank estimates and makes public a projected, or "target", inflation rate and then attempts to steer actual inflation towards the target through the use of interest rate changes and other monetary tools (Sudacevschi, 2011).

1.2 Preconditions for Inflation targeting

There is consensus in the literature that five pre-conditions are important to be sufficiently fulfilled when a country, particularly a developing country, considers adopting inflation targeting. A summary of these is given, for instance in Mishra and Mishra (2009), as follows:

- Central bank autonomy from the government;
- Absence of fiscal dominance, that is, a monetary financing of budget deficit;
- Sufficiently developed financial system and monetary transmission effectiveness;
- Low currency substitution and liability dollarization;
- Absence of external shocks (Marjan, 2013).

1.3 Advantages of Inflation Targeting

By adopting inflation targeting as a strategy for control general prices, a country can avail following advantages.

- Enables monetary policy to focus on domestic considerations (unlike exchange rate targeting).
- Does not depend on the stable money-inflation relationship (like monetary targeting).
- More easily understood by public and highly transparent.

- Allows the monetary authorities to use all available information to decide best course for monetary policy.
- Increases accountability of Central Bank.
- Provides a focus for the expectations of the financial markets and general public, thus allowing Central Bank to respond to short-run developments.
- If the Central Bank commands sufficient respect and credibility that people believe the target will be hit, households and companies as well as the government can plan ahead, negotiating wages on the basis of expecting low and stable inflation.
- The policy is self-reinforcing: low inflation expectations lead to low inflation, confirming the low expectations and so on.
- Countries adopting inflation targets have tended to have lower and more stable inflation after the change than before, and their policy regime has proved durable.
- Investors know what the central bank considers the target inflation rate to be and therefore may more easily factor in likely interest rate changes in their investment choices.
- This is viewed by inflation targeters as leading to increased economic stability.

Inflation targeting is not without limitations. A few of them are:

- Too much discretion that results in the inability to influence inflation expectations.
- Higher exchange rate volatility as inflation targeting ignores exchange rate levels.
- Inability of inflation targeting to be successful in countries that do not meet strict preconditions.

1.4 Working Framework of Inflation Targeting

The central bank forecasts the future path of inflation and compares it with the target inflation rate (the rate the government believes is appropriate for the economy). The difference between the forecast and the target determines how much monetary policy has to be adjusted. Some countries have chosen inflation targets with symmetrical ranges around a midpoint, while others have identified only a target rate or an upper limit to inflation. All countries have set their inflation targets in the low single digits. An inflation target of zero is not recommended because it would not allow real interest rates to fall sufficiently to stimulate overall demand when a central bank is trying to boost the economy (Jahan).

A major advantage of inflation targeting is that it combines elements of both "rules" and "discretion" in monetary policy. This "constrained discretion" framework combines two distinct elements: a precise numerical target for inflation in the medium term and a response to economic shocks in the short term (Jahan).

Rather than focusing on achieving the target at all times, the approach has emphasized achieving the target over the medium term - typically over a two- to three-year horizon. This allows policy to address other objectives - such as smoothing output - over the short term. Thus, inflation targeting provides a rule-like framework within which the central bank has the discretion to react to shocks (Jahan).

1.5 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. Inflation targeting that's written into the law began with New Zealand in 1989. After some trials and initial success, the Inflation targeting regime was formally started 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). After pursuing inflation targeting informally for pretty long time, for the first time in 2012, the US Fed made the first formal statement in its history, that it has an inflation target of 2%.

Table 1: Evolution of Inflation Targeting

Country	Inflation targeting adoption date	Inflation rate at adoption date (percent)	2010 end-of-year inflation (percent)	Target inflation rate (percent)
New Zealand	1990	3.30	4.03	1 - 3
Canada	1991	6.90	2.23	2 +/- 1
United Kingdom	1992	4.00	3.39	2

Australia	1993	2.00	2.65	2 - 3
Sweden	1993	1.80	2.10	2
Czech Republic	1997	6.80	2.00	3 +/- 1
Israel	1997	8.10	2.62	2 +/- 1
Poland	1998	10.60	3.10	2.5 +/- 1
Brazil	1999	3.30	5.91	4.5 +/- 1
Chile	1999	3.20	2.97	3 +/- 1
Colombia	1999	9.30	3.17	2 - 4
South Africa	2000	2.60	3.50	3 - 6
Thailand	2000	0.80	3.05	0.5 - 3
Hungary	2001	10.80	4.20	3 +/- 1
Mexico	2001	9.00	4.40	3 +/- 1
Iceland	2001	4.10	2.37	2.5 +/- 1.5
Korea, Republic of	2001	2.90	3.51	3 +/- 1
Norway	2001	3.60	2.76	2.5 +/- 1
Peru	2002	–0.10	2.08	2 +/- 1
Philippines	2002	4.50	3.00	4 +/- 1
Guatemala	2005	9.20	5.39	5 +/- 1
Indonesia	2005	7.40	6.96	5 +/- 1
Romania	2005	9.30	8.00	3 +/- 1
Serbia	2006	10.80	10.29	4 - 8
Turkey	2006	7.70	6.40	5.5 +/- 2
Armenia	2006	5.20	9.35	4.5 +/- 1.5
Ghana	2007	10.50	8.58	8.5 +/- 2
Albania	2009	3.70	3.40	3 +/- 1

Source: Hammond (2011), Roger (2010) and IMF staff calculations.

The above table 1 showed the list of countries which have adopted Inflation Targeting along with the adoption year and targeted inflation rate.

2. Objectives

- To compare Inflation in selected countries before and after Inflation targeting policy implementation.
- To compare Inflation, GDP growth and Unemployment between Inflation Targeting (IT) Countries and Non Inflation Targeting (NIT) Countries.

3. Methodology

The present study is based on secondary data collected from IMF, World Bank, RBI and MOSPI. The collected data are analyzed with descriptive statistics. The list of Advanced and Emerging and Developing Countries (as per IMF Classification) considered for the study are as follows:

Table 2: List of IT Countries Considered for the study.

Advanced Countries		
Country	**Inflation Targeting (IT) Adoption Year**	**Data Period**
Australia	1993	1981-2017
Israel	1997	1981-2017
UK	1992	1981-2017
USA	2012	1981-2017
Developing Countries		
Ghana	2007	1981-2017
Indonesia	2005	1981-2017
Peru	2002	1981-2017
South Africa	2000	1981-2017
Turkey	2006	1981-2017
India	2015	1981-2017

Table 3: List of Non IT Countries Considered for the study.

Advanced Countries		
Country	**Inflation Targeting (IT) Adoption Year**	**Data Period**
France	-	1992-2017
Germany	-	1992-2017
Hong Kong	-	1992-2017
Developing Countries		
Iran	-	2005-2017
Nigeria	-	2005-2017
Urugway	-	2005-2017

4. Results and Discussion

This section discusses the descriptive statistics of the macroeconomic variables of the countries which have introduced Inflation Targeting and comparison of macroeconomic variables between advanced and emerging and developing countries. Keeping in view the objectives of the study, the results are elaborated as follows:

Table 4: Descriptive Statistics of Macro Economic Variables of UK

Macro Economic Variables of UK	**N**		**Minimum**		**Maximum**		**Mean**		**Std. Deviation**	
	Before IT	**After IT**	**Before IT**	**After IT**	**Before IT**	**After IT**	**Before IT**	**After IT**	**Before IT**	**After IT**
CPI	11	26	3.43	0.05	11.88	4.46	6.11	2.11	2.50	1.05
GDP Growth	11	26	-1.09	-4.19	5.75	4.04	2.57	2.13	2.27	1.63
Unemployment	11	26	6.87	4.33	11.62	10.35	9.77	6.57	1.71	1.79

United Kingdom is the pioneer country which adopted the IT as the effective tool of monetary policy as early as 1992. Descriptive statistics of macroeconomic variables of UK are presented in

table 4. The study period considered reveals that, though the country has been successful in reducing CPI after IT, there exists an unexpected positive relationship between CPI and the GDP Growth, and Unemployment rates in the economy. After IT, the CPI has reduced by 4 percent (difference between 6.11 and 2.11), where the GDP Growth has reduced by 0.44 percent (difference between 2.57 and 2.13) which implies that, with reduced general prices, the output generation explained in terms of GDP has also reduced and on the contrary, with the reduced price levels, the unemployment rate has also reduced. This confirms the absence of trade off between inflation and unemployment rates in UK for the study period. The standard deviation values of inflation and GDP growth have also been reduced after introduction of IT in UK for the said period.

Table 5: Descriptive Statistics of Macro Economic Variables of Australia

Macro Economic Variables of Australia	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	12	25	1.01	0.22	11.35	4.63	7.11	2.51	3.02	1.14
GDP Growth	12	25	-2.22	1.92	5.68	5.02	2.83	3.29	2.38	0.89
Unemployment	12	25	5.78	4.23	10.73	10.87	7.98	6.39	1.58	1.67

Australia has adopted inflation targeting in the year, 1993 being one of the earliest countries to adopt the IT measure succeeding UK. Descriptive statistics of macroeconomic variables of Australia are presented in table 5. Between 1981 and 2017, in the 36 years of time line, the CPI has reduced considerably by 4.6 percent (from 7.11 percent to 2.51 percent), which implies that the general prices have come down after IT measures. The GDP Growth has increased by 0.46 percent marginally, establishing an indirect relationship between the CPI and GDP Growth. Alongside, it can be observed that, as the CPI has considerably reduced, the unemployment rate has reduced by an amount of 1.59 percent, not confirming an inverse relationship between the two macro variables as explained by the Philips Curve. The standard deviation value of CPI and GDP growth has reduced after IT, representing the less volatility after IT measures.

Table 6: Descriptive Statistics of Macro Economic Variables of Israel

Macro Economic Variables of Israel	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	16	21	10.04	-0.60	373.22	9.00	78.63	2.31	111.72	2.49
GDP Growth	16	21	0.57	0.03	7.76	8.17	4.80	3.54	2.40	1.93
Unemployment	12	21	6.10	4.22	14.08	13.51	9.34	9.12	2.75	2.85

The above table 6 showed the descriptive statistics of macroeconomic variables of Israel. Before IT, Israel had maximum CPI rate as high as 373.22 percent which was reduced to mere 9 percent after IT witnessing a tremendous decrease. After IT along with the decrease in CPI values, the unemployment rate also came down by 0.22 percent disproving the argument put forth by A W Philips in early 1960-70 decade. The mean values of all the macro variables considered have shown a decreased value compared between before and after IT period, where the magnitude of decrease is largest (76.32%) in CPI and smallest in Unemployment rate (0.22 percent) in post IT period. The CPI standard deviation value (111.72%) was very high before IT period which has reduced to 2.49% after IT. A high standard deviation indicates that the data points are spread out over a large range of values.

Table 7: Descriptive Statistics of Macro Economic Variables of USA

Macro Economic Variables of USA	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	31	06	-0.36	0.12	10.33	2.13	3.30	1.44	1.79	0.73
GDP Growth	31	06	-2.78	1.49	7.26	2.86	2.78	2.18	2.02	0.52
Unemployment	31	06	3.99	4.36	9.71	8.07	6.36	6.02	1.68	1.46

. Descriptive statistics of macroeconomic variables of USA are presented in table 7. USA is the latest country to bring in IT measure in 2012. The data considered reveals that, IT measure has facilitated the reduction of CPI by 1.86 percent, followed by reduction in GDP growth by 0.60 percent and unemployment rate by 0.34 percent. This confirms that, the all the three macro variables have reduced after IT. The data reveals the direct relationship between reduced general price level, GDP growth and unemployment rates in USA which stands as an evidence for the collapse of Philips Curve analysis. The mean values and standard deviation scores of CPI and Unemployment implies a positive trend while the reduced GDP growth scores raise a cause of concern to the economy during post IT measures.

Table 8: Descriptive Statistics of Macro Economic Variables of Ghana

Macro Economic Variables of Ghana	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	26	11	10.06	7.13	122.87	19.25	32.57	13.38	28.37	3.98
GDP Growth	26	11	-6.92	3.72	8.65	14.05	3.74	6.99	3.42	3.22
Unemployment	16	11	3.6	2.15	10.36	5.32	6.82	3.45	2.02	1.25

Table 8 denotes the pre and post assessment of Inflation Targeting among macro economic variables of Ghana with respect to CPI, GDP Growth and Unemployment. The range of difference between maximum and minimum CPI was 112.81 percent (difference between 122.87 and 10.06) before IT and this range has been considerably reduced to 12.12 percent (difference between 19.25 and 7.13) after IT, which is also supported by the reduced mean (average) value by 19.19 per cent and standard deviation by 24.44 per cent in post IT. The minimum value of GDP Growth which was negative before IT has become positive after IT during the study period considered and post introduction of IT, the maximum value of GDP growth (14.05 per cent) has increased more than thrice the minimum value (3.72 per cent). The mean value of GDP growth has almost doubled before and after IT in the period considered for study, where the standard deviation has been more or less constant. The maximum rate of unemployment and the mean values have been halved when compared pre and post IT to an extent of -5.04 per cent and -3.37 per cent respectively, though there is a very least percent change observed in the minimum values of before and after IT to and extent of -1.45 per cent. Therefore, in Ghana, the observation

of macroeconomic variables represents that, after the IT, the percentage of CPI and unemployment has decreased while that of GDP Growth has increased.

Table 9: Descriptive Statistics of Macro Economic Variables of Indonesia

Macro Economic Variables of Indonesia	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	24	13	3.69	3.53	58.45	13.11	10.98	6.60	10.65	2.91
GDP Growth	24	13	-13.13	4.63	8.22	6.35	4.74	5.54	4.27	0.57
Unemployment	20	13	2.10	4.05	6.71	8.06	4.12	5.62	1.63	1.52

Table 9 depicts the pre and post assessment of Inflation Targeting among macro economic variables of Indonesia with respect to CPI, GDP Growth and Unemployment. The observation of Indonesian economy reveals that, CPI has reduced after IT measure by 4.38 percent. The GDP growth has increased by 0.8 percent proving to have a negative relationship with reduced general price level post IT measure. The unemployment data denotes to have an inverse relationship with CPI, where the unemployment rate has increased by 1.5 percent as against decreased CPI level after IT in the study period in Indonesia. This trend stands in support of simple Keynesian model and Philips curve, which advocate the inverse relationship between inflation and unemployment. The mean values of CPI has decreased post IT while the mean values of GDP growth and unemployment rates have increased after the implementation of IT in Indonesian economy in the study period. The standard deviation has been declined after the IT measure.

Table 10: Descriptive Statistics of Macro Economic Variables of Peru

Macro Economic Variables of Peru	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	21	16	1.98	0.19	7481.66	5.79	611.37	2.79	1737.42	1.26
GDP Growth	21	16	-12.31	1.10	12.31	9.13	1.58	5.36	6.52	2.35
Unemployment	14	16	4.80	2.96	7.90	5.80	5.76	3.94	0.76	0.81

Peru`s economy has witnessed a significant reduction in general price level explained in terms of CPI in the span of 36 years from 1981 to 2017, due to the introduction of IT measure since 2002 (as shown in table 10). The maximum value of CPI was 7481.66 percent before IT measure which was reduced to 5.79 percent after the implementation of IT measure in Peru. Its mean value has also shown a magnificent decrease by 608.58 percent in the study period. The examination of the data also establishes a direct relationship between CPI and Unemployment rate which reduced by 1.82 percent, not accordance with the theory of Philips curve analysis, being an issue of concern. However, the reduction in CPI is accompanied by increase in GDP growth, which proves to have a negative relationship between the two variables in post IT period. The mean value of GDP growth has increased by 3.78 percent, while the mean score of unemployment has reduced by 1.82 percent in Peru, indicating a positive trend in the economy after IT implementation.

Table 11: Descriptive Statistics of Macro Economic Variables of South Africa

Macro Economic Variables of South Africa	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	19	18	5.18	-0.69	18.65	10.06	12.16	5.40	3.77	2.43
GDP Growth	19	18	-2.14	-1.54	5.36	5.60	1.56	2.88	2.35	1.81
Unemployment	09	18	16.90	22.33	25.37	27.33	21.25	24.71	2.70	1.57

South Africa adopted IT during the beginning of the millennium in 2000. It is observed from the table 11 is that South African economy has been successful in reducing the CPI by 6.76 percent after adopting IT. The mean values of CPI have been halved after the introduction of IT in the African economy. The examination of the data on CPI and GDP growth shows an inverse relationship between the two variables. With the decrease in CPI, the GDP growth has increased by 1.32 percent. The data set also reveals that, the unemployment rate has increased by 3.46 percent as against decreased value of CPI, revealing an inverse relationship between the two variables and instructing the existence of trade off between CPI and Unemployment rates in South African economy in the study period. After the IT, the standard deviation scores of all the variables have been declined, implying that values of statistical data are close to the mean values of variables in South Africa.

Table 12: Descriptive Statistics of Macro Economic Variables of Turkey

Macro Economic Variables of Turkey	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	25	12	8.18	6.25	105.21	11.14	54.48	8.49	24.92	1.46
GDP Growth	25	12	-5.96	-4.70	9.64	11.11	4.58	5.25	4.34	4.12
Unemployment	18	12	6.49	8.15	10.84	12.55	8.45	9.86	1.40	1.29

IT was implemented in Turkish economy by 2006. It is found from the table 12 is that the adoption of IT facilitated the reduction of CPI by 46 percent in Turkey. The GDP growth and Unemployment rates increased by 0.67 percent and 1.41 percent respectively after the embracing of IT. It implies that, Turkey witnessed an inverse relationship between reduced general price level in the economy, its GDP growth rates and Unemployment rates in the period considered for study. The economy confirms the tradeoff between the CPI and Unemployment rates as explained by Philips curve. The standard deviation value of CPI has reduced significantly after IT, whereas, the standard deviation values of GDP growth and unemployment has marginally decreased in post IT period.

Table 13: Descriptive Statistics of Macro Economic Variables of India

Macro Economic Variables of India	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
CPI	34	3	3.26	3.33	13.87	4.95	8.11	4.39	3.08	0.92
GDP Growth	34	3	1.06	6.62	10.26	8.15	6.26	7.29	2.19	0.78
Unemployment	24	3	3.41	3.49	4.43	3.52	3.93	3.50	0.32	0.016

India has been the latest country to adopt IT in 2015. As the table 13 explained the Indian economy witnessed a decrease of 8.92 percent in the maximum value of CPI in the IT period. The average value of CPI before IT was 8.11 percent which was reduced by half to 4.39 percent after IT. On an average, the GDP growth increased by 1.03 percent and unemployment reduced by 0.43 percent after IT. Therefore, it could be observed that, there exists a negative relationship between CPI and GDP growth in India and also the trade off is absence between CPI and Unemployment rate in the economy during the study period. Hence Indian economy also stands as an exception to the functioning of Philips Curve, which explains an inverse relation between the two variables considered. Though, the reduced general price level is accompanied by reduced unemployment, exhibits as a sign of relief to the economy, in the long term. The increased GDP growth after IT is a good sign to the developing economy like India.

Table 14: Comparison of macroeconomic variables between Advanced IT and NIT countries.

Advanced IT Countries	**N**			**Mean**			**Std. Deviation**		
	CPI	GDP Growth	Unempl-oyment	CPI	GDP Growth	Unempl-oyment	CPI	GDP Growth	Unempl-oyment
Australia	26	26	26	2.45	3.18	6.55	1.15	1.03	1.84
Israel	26	26	26	4.04	4.06	9.44	4.26	2.13	2.82
UK	26	26	26	2.11	2.13	6.57	1.05	1.63	1.79
Advanced Non IT Countries									
France	26	26	26	1.45	1.54	9.89	0.74	1.39	1.59
Germany	26	26	26	1.72	1.4	4.13	1.1	1.9	1.63
Hong Kong	26	26	26	2.8	3.71	4.13	3.93	3.24	1.63

The table 14 denotes the comparison of macroeconomic variables namely CPI, GDP growth and Unemployment rate between three advanced countries which adopted IT and three countries which have not adopted IT. Australia Israel and UK are considered as sample nations with IT and France, Germany and Hong Kong are considered for non IT countries.

The average score of macroeconomic variables considered for the study pertaining to advanced IT countries are moderately higher compared to the score of variables of non IT countries in the study period. Among the IT countries, Israel has highest mean and standard deviation scores of CPI, GDP growth and Unemployment rate percentage, while Hongkong has the highest values of all the three macroeconomic variables among the NIT countries.

The average CPI of advanced IT countries is higher compared to that of non IT countries. Similarly, the average GDP growth among IT countries is higher. It implies that, though the CPI is higher in IT countries, their GDP growth percentages are also higher, which substantiates the fact that, a moderate level of CPI is an essential to boost the economic growth among advanced nations. However, the Unemployment rate is marginally higher in IT countries than non IT countries, which could be attributed to the rising cost of production and technology issues, and, is a cause of concern.

In conclusion it can be opined that, the advanced countries with IT have relatively higher CPI and GDP growth when compared with non IT countries, though, unemployment rates show an opposite trend. It implies that, former group perform better than the later.

Table 15: Comparison of macroeconomic variables between Emerging and Developing IT and NIT countries.

Developing IT Countries	**N**			**Mean**			**Std. Deviation**		
	CPI	GDP Growth	Unempl-oyment	CPI	GDP Growth	Unempl-oyment	CPI	GDP Growth	Unempl-oyment
Indonesia	13	13	13	6.6	5.54	5.62	2.91	0.57	1.52
Peru	13	13	13	2.97	5.48	3.66	1.14	2.6	0.56
Turkey	13	13	13	8.46	5.54	9.92	1.4	4.08	1.26
Ghana	13	13	13	13.32	6.86	3.56	3.73	2.96	1.19
Developing Non IT Countries									
Iran	13	13	13	17.54	3.02	11.64	8.6	5	0.98
Nigeria	13	13	13	11.47	4.78	4.52	3.69	2.85	1.14
Urugway	13	13	13	7.61	4.5	7.92	1.34	2.28	1.75

In table 15, totally seven emerging and developing countries are considered for the comparison of the macro variables viz. CPI, GDP growth and Unemployment rates. The first group consists of four countries viz. Indonesia, Peru, Turkey and Ghana, which have adopted IT, and the second group consists of three countries without IT which includes, Iran, Nigeria and Urugway.

The data reveals that, among the IT adopted nations, Ghana has highest CPI with moderate GDP growth but least Unemployment showing the progressive state of the economy. On the counter-side, Iran has highest CPI accompanied by higher Unemployment and least GDP growth which signals the poor state of macro variables amongst non IT countries.

The average values of CPI, GDP growth and Unemployment among IT countries are 7.83 percent, 5.85 percent and 5.69 percent respectively, as against 12.20 percent of CPI, 4.10 percent of GDP growth and 8.02 percent of Unemployment rate among non IT countries. It implies that, the CPI in IT countries is 4.37 percent lesser than CPI in non IT countries, GDP growth is 1.75 percent higher while the Unemployment is 2.33 percent lesser among IT countries compared to non IT countries.

The data clearly reveals that, positioning of IT countries is better compared to Non IT developing countries in the study period considered. This is also true with the Standard deviation values of the respective groups.

5. Conclusion and Findings

The present study listed the descriptive statistics of macroeconomic variables viz. CPI, GDP growth and unemployment for the selected IT and NIT countries. Though the Advanced countries viz. UK, Israel and USA have shown direct relationship between inflation and growth, (as the inflation declines growth also declines) the percentage of decline in growth is very less compare to inflation. The group consists of countries viz. UK, Australia, Israel, USA, Ghana, Peru and India stands as exception to the functioning of Philips Curve, which explains an inverse relation between the inflation and unemployment. In these countries the reduced general price level is accompanied by reduced unemployment, which exhibits a relief to the economies.

The countries viz. Australia, Ghana, Indonesia, Peru, South Africa, Turkey and India have depicted the negative relationship between inflation and growth as expected by the study. Further Indonesia, South Africa and Turkey have showed the trend stands in support of simple Keynesian model and Philips curve, which advocate the inverse relationship between inflation and unemployment.

The average CPI of advanced IT countries is higher compared to that of non IT countries. Similarly, the average GDP growth among IT countries is higher. It implies that, though the CPI is higher in IT countries, their GDP growth percentages are also higher, which substantiates the fact that, a moderate level of CPI is an essential to boost the economic growth among advanced nations. The data clearly reveals that, positioning of emerging and developing IT countries is better compared to Non IT emerging and developing countries in the study period considered.

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