THE RECIPROCAL RELATIONSHIP BETWEEN INFLATION AND ECONOMIC GROWTH WITH REFERENCE TO INDIA

Dr. A. Kasirajan
Assistant Professor, Department of Economics
R.K.M.Vivekananda College (Autonomous),
Mylapore, Chennai-India

Abstract
Economic expansion of a country brings out subtle changes in the economic well being of people. The macroeconomic variables like the level of employment, income, savings, consumption, money supply, demand for money, rate of interest, inflation etc., have been altering in the course of economic progress. There exists a large argue in the connection between inflation and economic growth, both theoretically and empirically. The differences in the relationship are highly reliant on the economic situation of the world. In the 1970's, it is noted that countries with high rates of price rises started to display lower rates of economic growth. Due to this reason, the view that inflation is positively related to growth was substituted by the fact that high level of inflation is negatively related to growth (Friedman 1976: 270-73). The latter vision is well known as the monetarist outlook of macroeconomics. The contradictory views in the relationship between inflation and growth are not only in the theoretical literature but also exist in experimental findings based on the macroeconomic and development condition of the countries under study. Among the numerous empirical studies the findings of Khan and Senhadji (2001) reveals that the economy of developing countries can accommodate higher inflation than that of developed ones. It is essential that economic policies should be backed up with statistical information and an understanding of economic theory. Collective action from the world wide should be taken on inflation making economic policies on this is just not easy but international coordination is important not just for achieving strong, sustainable and balanced growth but for maintaining enough liquidity in the economy.

Key Words : Inflation, Economic Growth, Openness, Money Supply

1. INTRODUCTION
Economic expansion of a country brings out subtle changes in the economic well being of people. The macroeconomic variables like the level of employment, income,
savings, consumption, money supply, demand for money, rate of interest, inflation etc., have been altering in the course of economic progress.

There exists a large argue in the connection between inflation and economic growth, both theoretically and empirically. The differences in the relationship are highly reliant on the economic situation of the world. In the 1970’s, it is noted that countries with high rates of price rises started to display lower rates of economic growth. Due to this reason, the view that inflation is positively related to growth was substituted by the fact that high level of inflation is negatively related to growth (Friedman 1976: 270-73). The latter vision is well known as the monetarist outlook of macroeconomics. The contradictory views in the relationship between inflation and growth are not only in the theoretical literature but also exist in experimental findings based on the macroeconomic and development condition of the countries under study. Among the numerous empirical studies the findings of Khan and Senhadji (2001) reveals that the economy of developing countries can accommodate higher inflation than that of developed ones.

**Definitions on Inflation**

Inflation is “overall general upward price movement of goods and services in an economy”. Based on this expression, it is obvious that inflation is measured for the whole economy. To measure inflation for the whole economy leads to the result that there will be the same inflation stated for each individual.

According to Milton Friedman Inflation tends to redistribute income and wealth. It is said to redistribute income away from wage earning classes who are alleged to consume it all, and towards the profit recipients in the community who are alleged both to save a good deal and to invest their savings.

Inflation”, wrote David Piachaud in 1978, “acts neither as Robin Hood nor as Robber Baron: neither the poor not the rich are affected in a uniform way”. He went on to note, however, that the distributional impact of inflation will be linked to its underlying causes, which may be different in various places and times. He also pointed out that, other things being equal, lower income groups may find it harder to cope with shifting prices because they have less capacity to switch their patterns of consumption in response.

**2. OBJECTIVES OF THE STUDY**

[1]To identify most impacting factors on the consumer price index inflation in India.

[2]To find the important determining or impacting factors of economic growth in India.

[3]To suggest measures to controlling the rising inflation in India.

**3. HYPOTHESIS OF THE STUDY**

A hypothesis can be defined as a logically conjectured relationship between two or more variables expressed in the form of a testable statement or in simple words we can say that hypothesis is the statement of purpose. The null hypothesis is a statement that shows

---

exact relationship between two variables, and this statement is expressed as no (significant) relationship between two variables or no (significant) difference between two groups. The alternative hypothesis is a statement expressing a relationship between two variables or indicating differences between groups. There are two hypotheses in this research study and these are;

- There is no relationship between the trends of Inflation and Economic Growth in Indian economy.

4. METHODOLOGY OF THE STUDY
This study is completely based on the secondary data analysis during the period 2001-02 to 2015-16. The data for the relevant variable may be collected from the cotton RBI reports, ministry of commerce, reputed journal articles, books, etc. The relevant statistical and econometric tools like regression analysis, averages, growth rate, t-test and ANOVA shall be used.

5. LIMITATIONS OF THE STUDY:
The study analysis is done on the basis of collected information’s and the statistical information may vary with the different sources.

6. REVIEW OF LITERATURE
- According to some analytical study inflation become major issue for both academics and policymakers. They explained about how it is hindrances to the growth of the nation. They have did clear analysis over the past five years, particularly on food inflation, demand and supply side factors behind surging food prices. Pointing out that how the policies are impacting on raising and falling of food articles and its prices. They emphasized on the increasing agricultural productivity\(^2\).
- According to Assoc ham Eco Pulse study FY 2009-2010 the inflation is averaged near 5%. According to AEP study titled inflation concerns for the Indian economy stated the surge in international commodity markets led by energy (crude oil, natural gas and coal), metals (copper, aluminum and iron ore) and food (cereal and meat) is likely to push the domestic prices up once the heavy fiscal and monetary measures taken as the crisis response starts to firm up the economic activity\(^i\).
- According to some school of thought, they explained about what is the best measure for inflation. Which is the suitable measure and relevant for monetary policy. In the present conditions of the economy, Consumer price index for industrial workers (CPI-IW) is preferable to either the wholesale price index or the GDP deflator\(^3\).

---

According to some analytical framework, they studied that aims at empirically identifying the determinants of inflation in India. In a cointegrated vector auto regression (VAR) framework, the empirical estimation is carried out. The error correction mechanism (ECM) of the co-integrated variables is also carried out. The impulse response function (IRF) of the co-integrated VAR system shows that there is a lag in the VAR System. There is a systematic analysis which is the best measure for inflation and what causes for inflation.

7. DATA ANALYSIS & INTERPRETATION

7.1 Econometric Models For Factors Influencing Inflation And Economic Growth

In India, formal macroeconomic regulation policies were implemented since the late 1950’s. Since then the macroeconomic policies of the country had different objectives. At present, like other developed and developing economies, the main objective of the India’s macro-economic policy is to achieve rapid economic growth together with low and stable inflation. The relevant variables are given in Table – 1 for the period 2001-2002 to 2015-2016.

Table – 1 : Macro Variables from 2001-2002 to 2015-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP</th>
<th>Money Supply</th>
<th>Industrial GDP</th>
<th>CPI</th>
<th>Capital Formation</th>
<th>Openness Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 – 2002</td>
<td>2559711</td>
<td>1313204</td>
<td>640043</td>
<td>5.16</td>
<td>591610</td>
<td>0.18</td>
</tr>
<tr>
<td>2002 – 2003</td>
<td>2683190</td>
<td>1498336</td>
<td>656737</td>
<td>3.20</td>
<td>682143</td>
<td>0.18</td>
</tr>
<tr>
<td>2003 – 2004</td>
<td>2785258</td>
<td>1717936</td>
<td>704095</td>
<td>3.72</td>
<td>679170</td>
<td>0.21</td>
</tr>
<tr>
<td>2004 – 2005</td>
<td>3004190</td>
<td>2005654</td>
<td>755625</td>
<td>3.78</td>
<td>750940</td>
<td>0.24</td>
</tr>
<tr>
<td>2005 – 2006</td>
<td>3242209</td>
<td>2245653</td>
<td>829783</td>
<td>5.57</td>
<td>931028</td>
<td>0.29</td>
</tr>
<tr>
<td>2006 – 2007</td>
<td>3543244</td>
<td>2719493</td>
<td>910413</td>
<td>6.53</td>
<td>1081792</td>
<td>0.34</td>
</tr>
<tr>
<td>2007 – 2008</td>
<td>3871489</td>
<td>3310038</td>
<td>1021204</td>
<td>5.51</td>
<td>1231265</td>
<td>0.40</td>
</tr>
<tr>
<td>2008 – 2009</td>
<td>4250947</td>
<td>4017855</td>
<td>1119995</td>
<td>9.70</td>
<td>1430764</td>
<td>0.43</td>
</tr>
<tr>
<td>2009 – 2010</td>
<td>4416350</td>
<td>4794775</td>
<td>1169736</td>
<td>14.97</td>
<td>1480943</td>
<td>0.53</td>
</tr>
<tr>
<td>2010 – 2011</td>
<td>4790847</td>
<td>5602698</td>
<td>1276919</td>
<td>9.47</td>
<td>1594475</td>
<td>0.49</td>
</tr>
<tr>
<td>2011 – 2012</td>
<td>5282386</td>
<td>6504116</td>
<td>1373339</td>
<td>6.49</td>
<td>1769792</td>
<td>0.57</td>
</tr>
<tr>
<td>2012 – 2013</td>
<td>5633050</td>
<td>7384831</td>
<td>1480657</td>
<td>11.17</td>
<td>1986645</td>
<td>0.73</td>
</tr>
<tr>
<td>2013 – 2014</td>
<td>5899847</td>
<td>838919</td>
<td>1494921</td>
<td>9.13</td>
<td>2002047</td>
<td>0.79</td>
</tr>
<tr>
<td>2014 – 2015</td>
<td>6195842</td>
<td>9517386</td>
<td>1500225</td>
<td>5.86</td>
<td>1999938</td>
<td>0.80</td>
</tr>
<tr>
<td>2015 - 2016</td>
<td>6580603</td>
<td>10550168</td>
<td>1802520</td>
<td>6.32</td>
<td>2250566</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Note: Figures in Rs. Crores except CPI and openness ratio.

7.2 Econometric models:

As mentioned above, two separate econometric models for inflation and economic growth are developed.

---

Gross Domestic Product: Gross domestic product (GDP) is the single standard indicator used across the globe to indicate the health of an economy. GDP provides one single number that represents the monetary value of all the finished goods and services produced within a country's borders in a specific time period. The method of Calculating India GDP is the expenditure method, which is,

\[ \text{GDP} = \text{consumption} + \text{investment} + (\text{government spending}) + (\text{exports-imports}) \]

and the formula is

\[ \text{GDP} = C + I + G + (X-M) \]

Where,

“C” stands for consumption which includes personal expenditures pertaining to food, households, medical expenses, rent, etc

“I” stands for business investment as capital which includes construction of a new mine, purchase of machinery and equipment for a factory, purchase of software, expenditure on new houses, buying goods and services but investments on financial products is not included as it falls under savings

“G” stands for the total government expenditures on final goods and services which includes investment expenditure by the government, purchase of weapons for the military, and salaries of public servants

“X” stands for gross exports which includes all goods and services produced for overseas consumption

“M” stands for gross imports which includes any goods or services imported for consumption and it should be deducted to prevent from calculating foreign supply as domestic supply

Population growth: The "population growth rate" is the rate at which the number of individuals in a population increases in a given time period, expressed as a fraction of the initial population. Specifically, population growth rate refers to the change in population over a unit time period, often expressed as a percentage of the number of individuals in the population at the beginning of that period. A positive growth rate indicates that the population is increasing, while a negative growth rate indicates that the population is decreasing.

Investments: Gross Capital Formation is Investment. When people save, they tend to invest. The percentage of the investment made each year out of the total GDP is called Gross Capital Formation. So, Rate of Gross Capital Formation is arrived as follows:

\[ \text{Rate of Capital Formation} = \frac{(\text{Investments})}{\text{GDP}} \times 100 \]

Consumer Price Index (CPI) Inflation: Inflation is the percentage change in the value of the consumer Price Index (CPI) on a year-on-year basis. It effectively measures the change in the prices of a basket of goods and services in a year. In India, inflation is calculated by taking the CPI as base.

Formula for calculating CPI Inflation=

\[ \frac{(\text{CPI value of current year} - \text{CPI value of previous year})}{\text{CPI value of previous year}} \times 100 \]
Industry: This is the industrial growth, used to proxy for industrialization processes and technological capacity or depth in developing countries. Along with trade variables, industrial value added works as an impetus affecting economic growth positively.

Inflation inertia: The current inflation by capturing expectations. This kind of expectation is highly linked to “adaptive expectations” where expectations are formed based on past history. The inflation expectations of economic agents are highly dependent on the past records of inflation so that it is included as one of the explanatory variables of the current inflation in the model.

Openness: Openness of the country measures the openness of the economy to the rest of the world. Openness of a country’s economy can be measured using different techniques. In this study, it is measured using trade intensity ratio (TIR). TIR refers to the ratio of import plus export to the GDP so as to indicate the level of openness of the country at a specific time t (Serranito, 2003). To measure the rate of openness data for imports, exports and GDP are required.

Money Supply: Money supply is the entire stock of currency and other liquid instruments in a country's economy as of a particular time. The money supply can include cash, coins and balances held in checking and savings accounts. It has been well documented in economic literature pertaining to India that excessive growth in money supply has been one of the important and prime reason behind the inflationary price spirals experienced in the past.

Model-1: Factors influencing Inflation

There are a number of factors for the current rate of inflation in the country. Based on theoretical grounds, some of the most plausible factors behind the increasing inflation can be specified in the inflation equation as:

\[ CPI_t = f(GDP_t, MS_t, CPI_{t-1}) \]  
\[ \text{where,} \]
\[ CPI_t = \text{Consumer Price Index at time } t \]
\[ GDP_t = \text{Growth Rate of Gross Domestic Product at time } t \]
\[ CPI_{t-1} = \text{Inflation Inertia (Inflation Expectation)} \]
\[ MS_t = \text{Money Supply at time } t. \]

\[ CPI_t = \alpha + \beta_1 GDP_t + \beta_2 MS_t + \beta_3 CPI_{t-1} + e_t \]  
\[ \text{where,} \]
\[ \alpha \text{ is the intercept term, } \beta \text{ is the beta co-efficient and } e \text{ is the normal error term. Among these variables, inflation expectation (CPI}_{t-1}) \text{ as an explanatory variable has been used by Friedman (1976). This model is estimated for the period 2001-02 to 2015-16 and the result is presented in Table – 2.} \]

---

### Table – 2 Factors influencing Inflation in India

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>GDP Growth Rate</td>
<td>-0.832</td>
<td>0.433</td>
<td>-0.574</td>
<td>-1.919*</td>
</tr>
<tr>
<td>Money Supply GR</td>
<td>0.135</td>
<td>0.295</td>
<td>0.134</td>
<td>0.458</td>
</tr>
<tr>
<td>CPI&lt;br&gt; t-1</td>
<td>0.811</td>
<td>0.322</td>
<td>0.761</td>
<td>2.519**</td>
</tr>
<tr>
<td>Constant</td>
<td>4.825</td>
<td>4.122</td>
<td>1.171</td>
<td>0.272</td>
</tr>
</tbody>
</table>

**ANOVA**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>67.100</td>
<td>3</td>
<td>22.367</td>
<td>2.794</td>
<td>0.101</td>
</tr>
<tr>
<td>Residual</td>
<td>72.057</td>
<td>9</td>
<td>8.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>139.157</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Model Summary**

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.694</td>
<td>0.482</td>
<td>0.310</td>
<td>2.82955</td>
<td>1.518#</td>
</tr>
</tbody>
</table>

Note: * and ** indicates 10 and 5 percent levels of significance respectively.

# D-W value in the range of 1.5-2.5 indicates the absence of auto-correlation.

Source: Computed from Table – 1

The test result indicates that CPI influenced by growth rate of GDP and its own lagged value, in which the latter is more powerful and positive in its relationship. However, the growth rate of GDP is significant at 10 percent level, and also negative in influencing the rate of CPI in India. This underscores the fact (Friedman 1976: 270-73) that higher rate of inflation, especially the CPI is negatively influenced by the growth rate of the economy. However, in explaining the changes in CPI, GDP (in log form) or real GDP is not considered, since the former was not helpful in providing a robust result, while the latter is in itself influenced by the price level and thus, cannot be used as an independent variable. Also, the model itself is significant at 10 percent level and explains 48.2 percent of the changes in the dependent variable, as suggested by R² value.

### Model: 2 Factors influencing GDP in India

The growth equation has five explanatory variables consisting of inflation, population growth rate, investment growth rate, openness of the country and industrial sector share in GDP. These explanatory variables are selected based on macro-economic theoretical framework and empirical growth literature. These explanatory variables are selected based on macro-economic theoretical framework and empirical growth literature. In many theoretical growth models such as Harrod (1938) and Domar (1946)⁶, population growth and capital accumulation are considered as essential determinants of economic growth. International trade theories, on the other hand, suggest that a country engages in trade

---

because it benefits from the trade economically. Due to this reason, openness of the economy to the rest of the world is considered as one contributor to the economic growth of a country (Salvatore, 2004). Modern macro-economic theories of money and economic development seem to agree that there exist a systematic relationship between money and economic development (Bemanke Alan et al. 1992; Ghatak 1995).

The economic growth equation as

$$\text{GDP}_t = f(\text{Inf}_t, \text{Ind}_t, \text{Pop}_t, \text{Inv}_t, \text{Open}_t, \text{MS}_t) \quad \ldots \ldots \ldots \ldots (3)$$

Econometrically, the economic growth model of the country is thus specified as,

$$\text{GDP}_t = \alpha + \beta_1 \text{Inf}_t + \beta_2 \text{Ind}_t + \beta_3 \text{Pop}_t + \beta_4 \text{Inv}_t + \beta_5 \text{Open}_t + \beta_6 \text{MS}_t + \epsilon_t \quad \ldots \ldots \ldots \ldots (4)$$

Where,

- $\text{GDP}_t$ - growth rate of GDP at time period $t$,
- $\text{Inf}_t$ - inflation rate at time $t$ measured by the consumer price index,
- $\text{Ind}_t$ - the growth rate of the industrial sector GDP;
- $\text{Pop}_t$ - population growth rate at time $t$,
- $\text{Inv}_t$ - the growth rate of capital formation,
- $\text{Open}$ - openness ratio of the economy.
- $\text{MS}_t$ – Money Supply growth rate.

The model is estimated for the period 2001-02 to 2015-16 and the result is presented in Table – 3.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>-0.292</td>
<td>-0.422</td>
<td>-2.075*</td>
<td>0.077</td>
</tr>
<tr>
<td>Industrial Growth Rate</td>
<td>-0.011</td>
<td>-0.025</td>
<td>-0.132</td>
<td>0.899</td>
</tr>
<tr>
<td>Population GR</td>
<td>-7.356</td>
<td>-0.628</td>
<td>-2.331**</td>
<td>0.053</td>
</tr>
<tr>
<td>Capital Formation GR</td>
<td>0.257</td>
<td>0.815</td>
<td>3.867***</td>
<td>0.006</td>
</tr>
<tr>
<td>Openness</td>
<td>0.787</td>
<td>0.077</td>
<td>0.268</td>
<td>0.796</td>
</tr>
<tr>
<td>Money Supply GR</td>
<td>0.307</td>
<td>0.484</td>
<td>2.413**</td>
<td>0.047</td>
</tr>
<tr>
<td>Constant</td>
<td>12.115</td>
<td>6.776</td>
<td>1.788</td>
<td>0.117</td>
</tr>
</tbody>
</table>

**ANOVA**

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Sig.</th>
</tr>
</thead>
</table>

---

Regression | 56.285 | 6 | 9.381 | 6.131*** | 0.016
Residual | 10.711 | 7 | 1.530 |
Total | 66.996 | 13 |

**Model Summary**

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.917</td>
<td>0.840</td>
<td>0.703</td>
<td>1.23697</td>
<td>1.546</td>
</tr>
</tbody>
</table>

*Note: *, ** and *** indicate 10, 5 and 1 percent levels of significance respectively.*

*Source: Computed from secondary data.*

It is noted that among the independent variables, all are statistically significant, except industrial growth rate and openness. Among others, CPI is significant with a negative sign, which is, as noted above, inversely influences the growth rate of GDP in the country, in the given period. Thus, higher price rise definitely pulls down the economy’s growth rate; population growth rate is also negatively significant, which is quite understandable, since higher growth rate of population will be a drag on the economy’s growth. Capital formation’s growth rate is highly significant with a positive sign, which underscores its importance in explaining the changes in the GDP. The ratio of Openness is also positively significant, which suggests that for a better growth of the economy, a consistent growth in country openness is indeed essential, since, theoretically, with unemployed resources, growing export and import ratio in GDP need not push the inflation rate up. The model as a whole explains more than 70 percent of the change in the dependent variable and it is a good fit.

The relationship between the growth rate of GDP and CPI in India is also shown graphically, in Chart – 1.
The chart portrays that the growth rate of GDP in India is clearly the mirror image of CPI inflation. Whenever the latter is low, the former is high and vice versa. This clearly calls for better targeting of inflation in the economy.

8. SUGGESTIONS

Some of my suggestions I mentioned below:

1. Stabilizing the exchange value of money by increasing the exports of domestic goods.
2. Increase the domestic goods production by the way of raising the incentives or encouraging the domestic entrepreneurs to start up the business.
3. Made the legislation that sale of agricultural land only for the production of agriculture commodities alone not for other uses.
4. Cut down the agricultural land sales and promote the agricultural productivity.
5. Made separate agriculture budget every year. That will induce agriculture growth and surplus production in the economy.
6. Encourage youngster to participate agriculture to modernization of agricultural sector.
7. Find the alternative solution for the imports of petroleum product.
8. Effective implementation of poverty alleviation programmes (i.e., find the correct individual to get benefit)
9. Encourage the saving habit of the domestic people that will create investments.

9. CONCLUSION

Inflation may reduce a country’s international competitiveness, by making its exports relatively more expensive, thus impacting on the balance of payments. Moreover, inflation can interact with the tax system to distort borrowing and lending decisions. Firms may have to devote more resources to dealing with the effects of inflation. Macroeconomists, central bankers and policymakers have often emphasized the costs associated with high and variable inflation. Inflation imposes negative externalities on the economy when it interferes with an economy’s efficiency.

It is essential that economic policies should be backed up with statistical information and an understanding of economic theory. Collective action from the world wide should be taken on inflation making economic policies on this is just not easy but international coordination is important not just for achieving strong, sustainable and balanced growth but for maintaining enough liquidity in the economy.

10. REFERENCES


---

Pratima Singh, Inflation in India: An empirical Analysis, ISAS Institute of South Asian studies, No.128 - 10 may (2011)

This is certified that the paper entitled

The Reciprocal relationship between Inflation and Economic Growth with reference to India

Authored by

Dr. A. Kasirajran
Assistant Professor, Department of Economics
R.K.M.Vivekananda College (Autonomous), Mylapore, Chennai-India

has been accepted & published online in IJIFR continuous 62nd edition

Volume 6-Issue 2, October 2018 under Paper ID: IJIFR/V6/E2/06.

The mentioned paper is accepted after rigorous evaluation through double blind peer reviewed process.