

**Vol. XI**

**(ISSN 2229-5755)**

**Number 9**

**(Special Issue) January-December 2021**

# **EDUCATION TODAY**

**A Multidisciplinary International  
Peer Reviewed/Refereed Journal**

**APH PUBLISHING CORPORATION**

8. Koul L. (1997) Methodology of Educational Research (3<sup>rd</sup> revised edition), New Delhi: Vikas Publishing House Private Limited, P.424.
9. K.P Pandey (1963), Fundamental of Educational Research Delhi : Amitabh Praksh cited by Parminder kaur Ravisutra (2007) Educational Tracks, Hyderabad : Neelkanth Publications S, P160
10. Mouley George G. (1994) The Science of Educational Research, New Delhi: Euresia Publishing House, P.90.
11. R.A.Sharma, (2007) Fundamental of Education Research, Meerut, Loyal Book Depot, p.143
12. R.P.Taneja (2003) Anmol Dictionary of Education. New Delhi: An mol publication Pvt. Ltd, P.206
13. R. S. Patel (2001) Fundamental Concepts of Research (Research Handbook), Jay Publication, First Edition, P. 27
14. S.C. Soti and R.K.Sharma (2002), Research in Education, New Delhi Atlantic publishers and distributors, p.151
15. Singh, D.R.(1974) A Study Of Achievement Motivation In Relation To Sex, Socio-economic Status And Academic Background among Teacher Trainees, Unpublished Dissertation, (BHU.)
16. W. J Goode, and Paul Hatt (1952), Method in Social Research, New York :Mc Graw Hill book co. cited by Avdhesh Jha S. (2011). Research Methodology, New Delhi: A.P.H. Publishing Corporation, P.117

# COVID 19 & Exchange Market Pressure Index-Exploring the Currency Crisis in India

Dr. Doa Naqvi\* and Rahat Zabi\*\*

## ABSTRACT

The world economy has been quite volatile since the last century- a situation which has further worsened since the COVID-19 outbreak. The purpose of this paper is to examine the Exchange Market Pressure Index (EMPI) for gauging the currency crisis in Covid-19 period. EMPI is used in early warning system for predicting imminent financial crises. The data set of this study covers the period of January 2015 - June 2021 of Indian economy. The data has been retrieved from the RBI database. Exchange Market Pressure Index is the composition of percentage change in exchange rate, foreign exchange reserve and interest rate, it is used for the application of KLR model, Logit/Probit model and other models of early warning system. In this paper, we construct the EMPI and compare it with the threshold value for recognizing the currency crisis. In this study we found that India faced currency crisis in the month of February 2020, May 2020, July 2020 and December 2020 in the 78 months chosen as sample. The study will also attempt to look into the reasons behind this observation. This paper will help academicians, researchers, professionals in the construction of an index which may prove to be a useful tool in prediction of currency crisis.

**Keywords:** Covid-19, EMP Index, Currency Crisis, Threshold Value.

## INTRODUCTION

“*What we know about the global financial crisis is that we don’t know very much.*” by Paul Samuelson (Ozili, 2020)

During the last three decades, the world economy has faced a number of financial crises, such as Mexican tequila crisis (1994), South East Asian currency crisis (1997), Russian financial crisis (1998), Argentine Great depression (1998-2002), Collapse of Lehman brother’s crisis (2008) and most recently, the pandemic of COVID-19 (2020). These crises not only created financial complications for several countries but also shrunk the growth of world economy. Naturally, the financial market of India i.e., currency market, forex market, equity market also gets affected by these crises –as a corollary. Because of such adverse situations, Indian financial system often faces challenges in maintaining ‘*financial firmness*’ (Singh, 2011). The case of Novel Coronavirus came from China in 2019 which spread overall the world. As per World Health Organisation, this virus infected the approximately 29 crores people and approximately 54 lakhs death as on 5 January 2022. This pandemic resulted as a key risk for human health as well as economy health. It created distortion in domestic demand, external demand and international trade (Ministry of Finance, 2020).

According to Luca Fonaro (2015), financial crisis has been considered as an unexpected seize of international capital inflows, sharp decline in output, consumption, and assets prices. The

---

\*Assistant Professor, Department of Business Administration, Khwaja Moinuddin Chishti Language University, Lucknow.  
E-mail: doa.naqvi@gmail.com

\*\*Research Scholar, Department of Business Administration, Khwaja Moinuddin Chishti Language University, Lucknow.  
E-mail: zabi.rahat123@gmail.com

financial crises could be divided into two broad groups- currency and sudden stop crises and debt, and banking crises (Balaga & Padhi, 2019). As per Yamini Karmarkar and Surbhi Vani (2014), there are many researchers who have been working on building early warning systems for predicting crisis and in recognizing the financial and economic indicators which give signals for crisis. An Early warning system is the mechanism that monitors, analyses and gives information about an upcoming crisis with the help of the movement or variability in financial indicators (lonela, 2014). A Currency crisis is a situation in which countries face sharp devaluation of currency, huge exhaustion of foreign exchange reserves, increment in interest rates or forcing restrictions on capital flows (Balaga & Padhi, 2019). At this time countries are imposing restriction on international trade which affects the exchange rate, foreign reserves and interest rates –factors which may lead to currency crisis. In this paper, we construct an index for currency crisis which is known as Exchange Market Pressure Index (EMPI), this index is used in early warning system for the identification of currency crisis and also attempt to look into the reason behind crisis. Matthieu Bussiere and Marcel Fratzscher (2006) said in their paper, Exchange Market Pressure Index is the weighted average of the change of real effective exchange rate, change in foreign exchange reserves, and the change in the interest rate. Exchange market pressure index allows capturing successful and unsuccessful speculative attacks.

The following section provides a brief overview of existent literature in the context of the Impact of COVID-19 on the Indian Economy, EMP Index, its variables and applicability in predicting currency crisis in different scenarios.

## REVIEW OF LITERATURE

### COVID-19 and Indian Economy

In the wake of COVID-19 outbreak, The Indian economy faced crisis in all economic sectors. This crisis led the huge loss of employment approximately 13 million people between February to October 2020 (Ramakumar & Kanitkar, 2021). The According to IMF's World Economic Outlook (WEO) April 2020, the world economy is expected to contract by 3% in 2020 as a result of COVID -19 pandemic, even worse than during the 2008-2009 subprime crisis. In the Pandemic of COVID -19, RBI observed the large fluctuations in the prices of various assets such as currency, equity and bonds (RBI, 2020).

### History of EMPI

Firstly, the concept of Exchange Market Pressure was proposed by Girton and Roper. EMP measures the entire pressure on Exchange rate, which has been relieved through exchange rate or intercepted through the foreign exchange reserves change. The monetary models worked directly in the measurement of exchange market pressure in early stages. But after some time EMPI is used for measuring exchange market pressure by the aggregation of changes in reserves and exchange rate (Patnaik, Felman, & Shah, 2017).

Weymark (1995) included the interest rate changes in EMP Index which was developed by the Girton & Roper (1977)

### Concept of Exchange Market Pressure

Exchange market pressure is defined as the scale of money market disequilibrium that must be managed through exchange rates or foreign exchange reserves (Ratnasari & Widodo, 2017). According to Tsedevsuren & Batsuuri ( 2016), EMP Index reveals the tendency of domestic currency to grow/decline its value and equilibrium of the domestic money market. This index explains the pressure which is absorbed through the changes in nominal interest rate, increase/decrease in interest rate, or changes in official foreign reserves.

EMP Index shows the currency crisis through the large depreciation of exchange rate or large increment in interest rate or significant loss in foreign reserves (Guru & Sarma, 2016).

Matthieu Bussiere and Marcel Fratzscher (2006) stated in their study that currency crisis usually occurs after banking crisis. They used exchange market pressure in early warning system for calculating currency crisis. EMP Index is a weighted average of the movement in the interest rate, change in foreign exchange reserve and movement in real effective exchange rate. According to this study EMPI helps to capture the successful and unsuccessful speculative attacks.

Cuneyt Sevim et. al (2014) claimed that financial pressure index is defined as percentage of change of average of the gross foreign exchange reserve of the central bank and Repo rates (in terms of US Dollar Exchange Rate). An increment in US dollar Exchange rate & repo rate and decline in gross foreign exchange reserve of central banks tend to an increase in financial pressure index (FPI). Financial crises occur when the values of financial indicators crossed the threshold of FPI.

In the study of Anuradha Guru (2016), EMPI is constructed for currency market. Exchange market pressure index (EMPI) is the combination of at least two out of three variables, namely interest rate, exchange rate, and international reserves.

EMPI is constructed to help in the identification of currency crisis by tracking monthly changes in Exchange rate and international reserves (Balaga & Padhi, 2019).

EMPI is the sum of annualised changes in exchange rate and foreign reserves. Its main objective is to manage exchange market pressure and avoid currency crisis. In computation of EMP Index some researchers uses two out of three components (Exchange rate and Reserves) while other uses all three (Exchange rate, reserves and interest rate). The component of an exchange market pressure index depend on the structure of economy and the regime of exchange rate adopted. Those countries are practising fixed exchange regime, two components are considered in EMPI and economies practising flexible exchange ragime, three components are used in EMPI (Nigeria, 2016).

After the eruption of European Exchange Rate Mechanism (ERM) crisis in 1992, there is a plethora of studies constructed an EMP Index. Some of the noteworthy contributions in this context are mentioned below:

<b>Variables of EMPI in different literature</b>	
<b>Variables</b>	<b>Authors</b>
1-Exchange Rate 2-Foreign Exchange Reserves	(Kaminsky, Lizondo, & Reinhart, 1998), (Berg & Pattillo, 1999), (Edison, 2003), (Kang, 2004), (Megersa & Cassimon, 2015), (Modekurti, 2015) (Balaga & Padhi, 2017), (Khalaf, 2018), (Balaga & Padhi, 2019)
1-Exchange Rate 2-Foreign Exchange Reserves 3-Interest Rate	(Weymark, 1995), (Bussiere & fratzscher, 2006), (Candelon, Dumitrescu, & Hurlin, 2014), (Sevim, Oztekin, Bali, Gumus, & Guresen, 2014), (Guru, 2016), (Nigeria, 2016), (Guru & Sarma, 2016) (Abdelsalam & Abdel-Latif, 2020)

## PROPOSED METHODOLOGY

The objective of this paper is to empirically construct an EMPI to measure currency crisis in India and observe the reasons behind crisis in COVID-19 Period. Recognition of currency crisis involves following steps: 3.1- Identification and selection of variables based on literatures and macroeconomic structure of the economy, 3.2- Calculate the monthly percentage change in variables, 3.3- Building of an EMPI, 3.4- Calculation of Threshold value, 3.5- Identification of Currency Crisis.

### Identification of Variables and Selection of Variables

There are three aspects for recognizing the currency market pressure– depreciation in exchange rate, decline in foreign exchange reserve, increase in interest rates. EMPI is the combination of all three aspects (Guru & Sarma, 2016). In this study we have taken 78 months data of Real effective exchange rate ( $E_t$ ), foreign exchange reserve ( $R_t$ ), and real interest rate ( $I_t$ ) of India.

### Calculate the Monthly Percentage change in Variables

In this step, we compute  $e_t$ ,  $r_t$ , and  $i_t$  are the monthly percentage changes in real effective exchange rate, foreign exchange reserve, and real interest rates (Sevim *et al.*, 2014).

$$e_t = (E_t - E_{t-1})/E_{t-1}$$

$$r_t = (R_t - R_{t-1})/R_{t-1}$$

$$i_t = (I_t - I_{t-1})/I_{t-1}$$

(See Table-1)

$e_t$  measures changes in real exchange rate,  $r_t$  reflects movement in foreign exchange reserves,  $i_t$  measures changes in real interest rates.

### Building of an EMPI

In this step, EMPI is constructed with the help of percentage change of the standardized average of real effective exchange rate, real interest rate, and foreign exchange reserve (Sevim *et al.*, 2014).

$$EMPI = \frac{\left(\frac{e_t - \mu_e}{\sigma_e}\right) - \left(\frac{r_t - \mu_r}{\sigma_r}\right) + \left(\frac{i_t - \mu_i}{\sigma_i}\right)}{3} \quad (\text{eq.1})$$

where  $\mu$  and  $\sigma$  are the mean and standard deviation of real effective exchange rate, foreign exchange reserve, and real interest rate respectively. (See Table-2)

### Calculation of EMPI in different literatures

Authors	EMPI
(Abdelsalam & Abdel-Latif, 2020)	$EMPI_t = \delta \Delta ER_t - \zeta \Delta FR_t + \gamma \Delta IR_t$
(Balaga & Padhi, 2019)	$EMPI = \frac{\Delta E}{E} - \frac{\sigma_E \Delta R}{\sigma_R R}$
(Guru, 2016)	$EMPI_t = e_t - \frac{\sigma_e}{\sigma_r} r_t + \frac{\sigma_e}{\sigma_i} i_t$

Authors	EMPI
(Sevim , Oztekin, Bali, Gumus, & Guresen , 2014)	$EMPI_t = \frac{\left(\frac{e_t - \mu_e}{\sigma_e}\right) - \left(\frac{r_t - \mu_r}{\sigma_r}\right) + \left(\frac{i_t - \mu_i}{\sigma_i}\right)}{3}$
(Kang, 2004)	$EMPI = \frac{\Delta e}{e} - \left(\frac{\sigma_e}{\sigma_R}\right) \frac{\Delta R}{R}$

**Calculation of Threshold Value-** TV is the computation of mean of EMPI with a factor,  $\alpha$  of standard deviation.

$$TV = \mu_{empi} + \alpha\sigma_{empi} \tag{eq.2}$$

$\mu_{empi}$  is the mean of EMP Index

$\sigma_{empi}$  is the standard deviation of EMP Index

$\alpha$  is the coefficient value that improves the signal performance.

**Different Coefficient values from the literature**

$\alpha = 1.5$	$\alpha = 2$	$\alpha = 2.5$	$\alpha = 3$
(Kang, 2004), (Sevim <i>et al.</i> , 2014), (Megersa & Cassimon, 2015), (Balaga & Padhi, 2017) (Balaga & Padhi, 2019),	(Bussiere & fratzscher, 2006), (Candelon, Dumitrescu, & Hurlin, 2014), (Guru & Sarma, 2016), (Sevim <i>et al.</i> , 2014)	(Edison, 2003) (Sevim <i>et al.</i> , 2014)	(Kaminsky, Lizondo, & Reinhart, 1998), (Berg & Pattillo, 1999), (Pukeliene & Deksnyte, 2010) (Sevim <i>et al.</i> , 2014) (Guru & Sarma, 2016)

**3.5- Identification of Currency Crisis-**In this step, the value of EMPI is compared to Threshold Value (TV), which represents in binary value (0,1).

$$1 \text{ if } EMPI_t > TV, 0 \text{ Otherwise} \tag{eq.3}$$

Currency crisis define as an event '1', when the value of is more than the threshold value, otherwise there is no crisis '0'. **(See Table-3)**

**RESULTS**

In the pandemic of Novel Coronavirus (COVID-19), countries are controlling imports and exports, this influenced the value of currency. EMPI involves three variables, those have pressure on currency market. Depreciation in exchange rate, rise in interest rate, significant fall in foreign exchange reserve shows an attack on currency market. EMPI is calculated on monthly basis for the period of January 2015 to June 2021. The month in which the value of EMPI (by using eq. 1) is greater than Threshold Value (by using eq. 2) considered as currency crisis. We found, that the months of February 2020, May 2020, July 2020 and December 2020 was facing currency crisis because of sharp changes in exchange rates, foreign exchange reserve and changes in inflation which impacted real interest rate. The study determined and tabulating months, which reports currency crisis with different standard deviation levels. We are depicting analysis of data on yearly basis.

### Year 2015

In Figure-1, We have not discovered any EMPI Value that are higher than the threshold value. As a result, there will be no currency crisis in 2015.

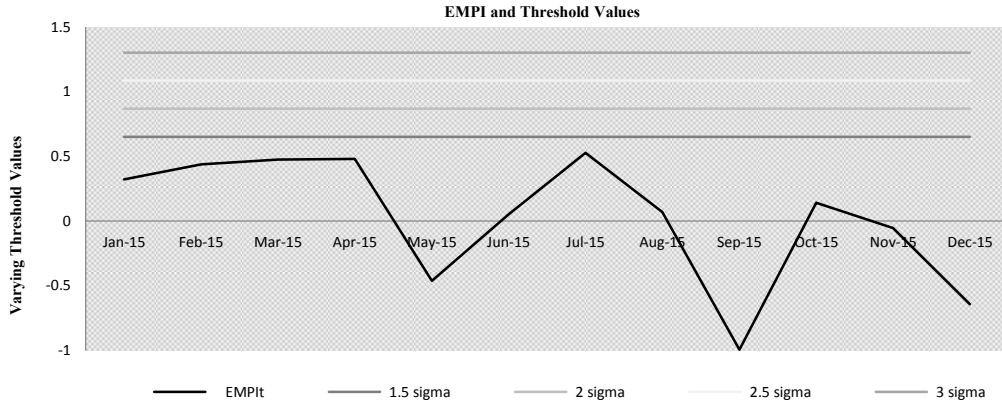


Figure-1

### Year 2016

None of the months reflect or indicate a value of EMPI that is more than Threshold Value (See figure-2) in 2016. Therefore, there is no crisis.

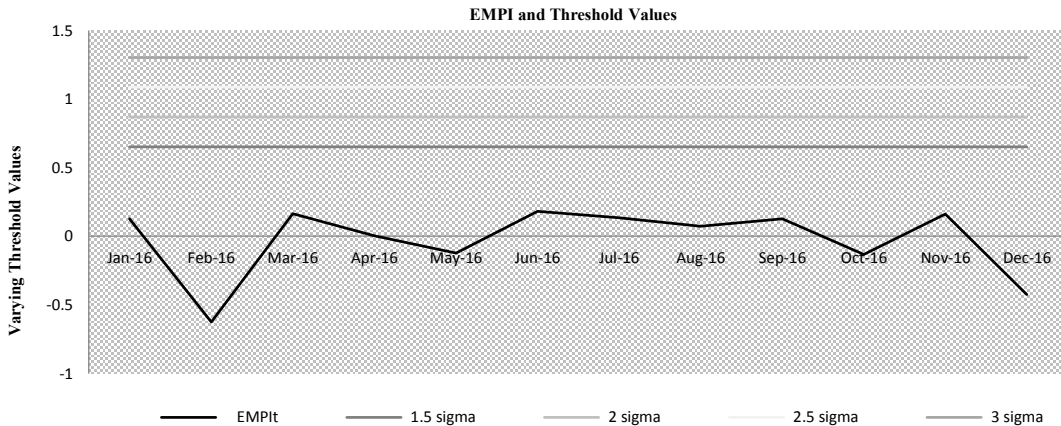


Figure-2

### Year 2017

We have not found any value of EMPI greater than threshold value which means that there is no currency crisis in 2017 (See Figure 3).



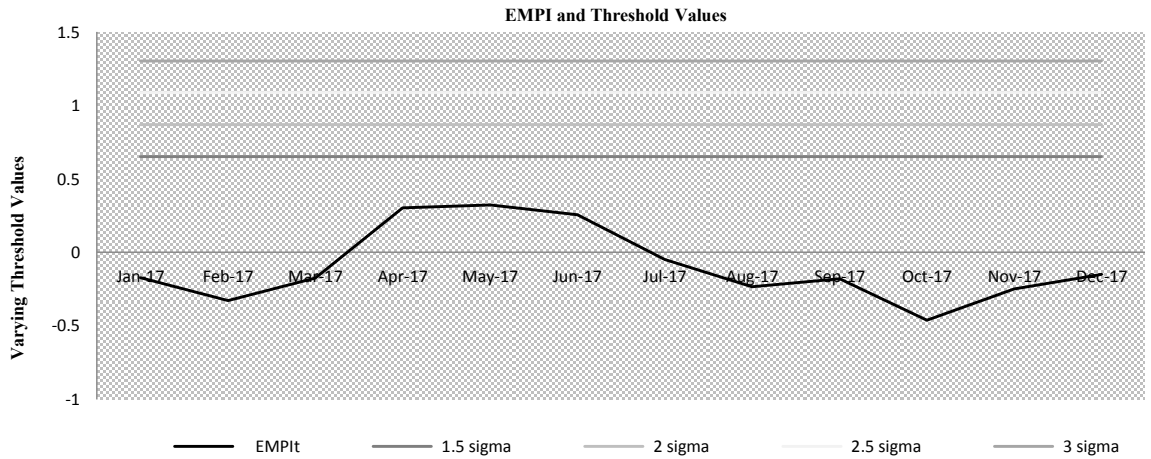


Figure-3

### Year 2018

None of the month in 2018 reflects or indicates an EMPI Value greater than Threshold Value (See Figure-4). As a result, there is no currency crisis.

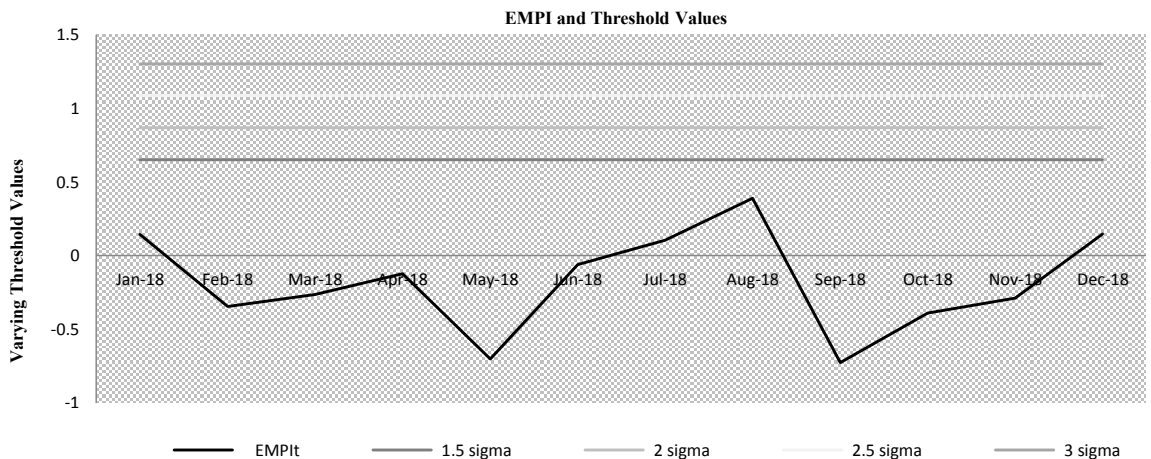


Figure-4

None of the month in 2018 reflects or indicates an EMPI Value greater than Threshold Value (Figure-4). As a result, there is not a crisis.

### Year 2019

In figure-5, We have not found any value of EMPI is more than Threshold value. So there is no currency crisis in 2019.

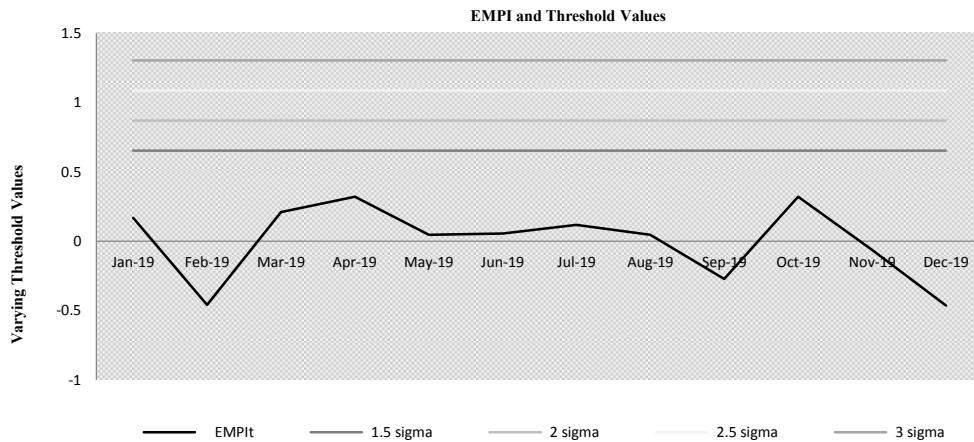


Figure-5

### Year 2020

Due to the outbreak of COVID-19, financial market was very volatile after January 2020. It led the huge variations in Rupees. Advanced and Emerging countries' currency was facing downward pressure (RBI Bulletin, April 2020). We have found the values of EMPI are greater than Threshold Values in the month of February, May, July and December 2020 with different values 1.5, 2, 2.5, and 3 of standard deviation levels, which represents the currency crises (Figure-6).

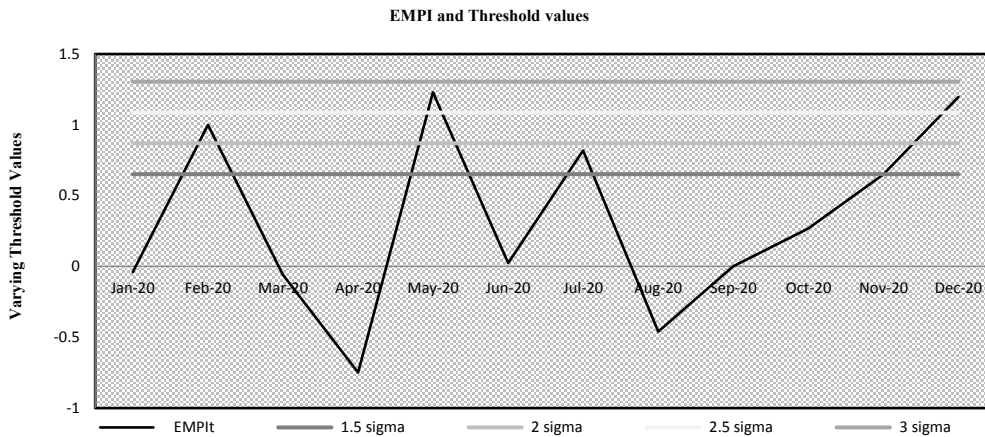


Figure-6

Currency crises are recognised in month of February with the coefficient of 1.5 and 2, May with the coefficient of 1.5, 2, and 2.5, July with the coefficient of 1.5 and 2, and December with the coefficient of 1.5, 2, and 2.5 (See tables a, b, c, d). The reason behind the currency crises are the high volatility in exchange rates, foreign exchange reserve and interest rate in the COVID -19 Period (RBI, 2020).

**Table (a)**

<b><math>\alpha</math> values</b>	<b>EMPI February 2020</b>	<b>TV</b>	<b>EMPI&gt;TV 0 or 1</b>
$\alpha=1.5$	0.999111199	0.651995985	1
$\alpha=2$	0.999111199	0.86932798	1
$\alpha=2.5$	0.999111199	1.086659976	0
$\alpha=3$	0.999111199	1.303991971	0

**Table (b)**

<b><math>\alpha</math> values</b>	<b>EMPI May 2020</b>	<b>TV</b>	<b>EMPI&gt;TV 0 or 1</b>
<b><math>\alpha=1.5</math></b>	1.229093946	0.651995985	1
$\alpha=2$	1.229093946	0.86932798	1
$\alpha=2.5$	1.229093946	1.086659976	1
$\alpha=3$	1.229093946	1.303991971	0

**Table (c)**

<b><math>\alpha</math> values</b>	<b>EMPI July 2020</b>	<b>TV</b>	<b>EMPI&gt;TV 0 or 1</b>
$\alpha=1.5$	0.817422455	0.651995985	1
$\alpha=2$	0.817422455	0.86932798	1
$\alpha=2.5$	0.817422455	1.086659976	1
$\alpha=3$	0.817422455	1.303991971	0

**Table (d)**

<b><math>\alpha</math> values</b>	<b>EMPI December 2020</b>	<b>TV</b>	<b>EMPI&gt;TV 0 or 1</b>
<b><math>\alpha=1.5</math></b>	1.197123697	0.651995985	1
$\alpha=2$	1.197123697	0.86932798	1
$\alpha=2.5$	1.197123697	1.086659976	1
$\alpha=3$	1.197123697	1.303991971	0

## Year 2021

In the 2021 year, we are not able to search out the value of foreign exchange reserves from July 2021, we took data till June 2021. In Figure 7, there is no EMPI value over Threshold Value; therefore currency crisis is not pointed out in 2021 till June.

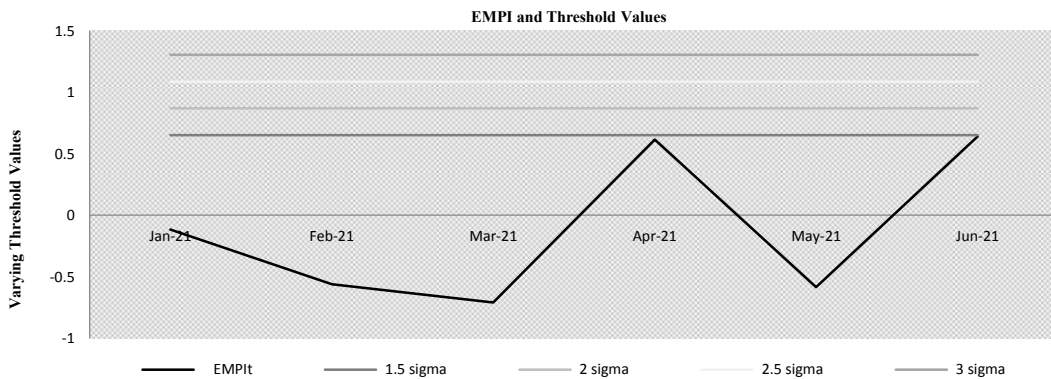


Figure-7

So, we have recognised February, May, July and December 2020 as currency crisis months out of 78 months (January 2015 to June 2021) with different heuristic values of sigma levels.

## Interpretation

The currency market pressure is defined as a significant increment in EMPI value in comparison to threshold value (Guru & Sarma, 2016) such as the month of February, May, July and December 2020 show increment in EMPI value. The growth in exchange rate, loss of foreign exchange reserves and increase in interest rates leads to rise in exchange market pressure index value (Central Bank of Nigeria, 2016). An increment in EMPI value indicates excess demand of foreign currency and selling pressure on domestic currency in foreign exchange market, which leads to currency crisis (Guru & Sarma, 2016). So, the variations in real effective exchange rate, foreign reserves and interest rates exhibit the movements in EMPI value. In the 2020, Indian Economy faced sharp changes in exchange rates, huge outflows and inflows and high changes in interest rates, Which led currency crises in India in the months of February, May, July, and December.

## CONCLUSION

In this study, we have constructed an EMPI (via eq. 1) to measure the currency crisis by using three variables i.e., real effective exchange rate, real interest rate, foreign exchange reserve. We have also calculated Threshold Values by using eq. 2 and examine the reasons behind the currency crisis. In the proposed methodology, we used monthly percentage change in variables, percentage change in standardised average of variables, and different coefficient values. This study shows that no currency crises have been observed except in the months of February 2020, May 2020, July 2020 and December 2020 out of 78 months chosen for the study. Due to Novel Coronavirus, Indian economy was facing currency crises in 2020. This pandemic impacted the all economic sectors of Indian Economy. The results of this study can be used for the understanding of India's currency market.

## IMPLICATION

Exchange Market Pressure Index is a composite measure of currency crisis. This study can be extended to find out the further Macroeconomic variables which impacts EMPI. Exchange Market Pressure Index may help the RBI to monitor the signals and fluctuations in currency market and take corrective action

for undesired movements in exchange rate, foreign reserves of central banks and interest rates. There is an ample room for future research to construct an index for financial crisis in the shock of COVID-19.

## REFERENCES

- Abdelsalam, M., & Abdel-Latif, H. (2020). An Optimal Early Warning System for Currency Crises under model Uncertainty. *Central Bank Review*.
- Balaga, M. R., & Padhi, P. (2017). Evaluating Indian Economy's Vulnerability to Currency Crisis. *Theoretical and Applied Economics*, 97-114.
- Balaga, M. R., & Padhi, P. (2019). Identifying the Early Warnings of Currency Crisis in India. *Foreign Trade Review*, 269-299.
- Berg, A., & Pattillo, C. (1999). Predicting Currency Crises: The Indicators Approach and an Alternative. *Journal of International Money and Finance*, 561-586.
- Bussiere, M., & Fratzscher, M. (2006). Towards a New Early Warning System of Financial Crises. *Journal of International Money and Finance*, 953-973.
- Candelon, B., Dumitrescu, E.-I., & Hurlin, C. (2014). Currency crisis early warning systems: Why they should be dynamic. *International Journal of Forecasting*, 1016-1029.
- Edison, H. (2003). Do Indicators of Financial Crises Work? An Evaluation of an Early Warning System. *International Journal of Finance & Economics*, 8, 11-53.
- Fonaro, L. (2015). Financial Crisis & Exchange Rate Policy. *Journal of International Economics*, 202-215.
- Girton, L., & Roper, D. (1977). A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience. *American Economic Review*, 537-548.
- Guru, A. (2016). Early warning system of finance stress for India. *International Review of Applied Economics*, 273-300.
- Guru, A., & Sarma, M. (2016). Exchange Market Pressure in India. *Macroeconomics and Finance in Emerging Market Economies*, 1-20.
- IMF. (2020, April). The Great Lockdown. *World Economic Outlook*.
- Ionela, S. A. (2014). Early Warning Systems- Anticipation's Factors of Banking Crises. *Procedia Economics and Finance*, 158-166.
- Jackson, J. K., Weiss, M. A., & et. al., (May 2020). Global Economic Effects of COVID-19. *Congressional Research Service*.
- Kaminsky, G., Lizondo, S., & Reinhart, C. (1998). Leading Indicators of Currency Crises. *IMF (Staff Papers)*, 1-48.
- Kang, I. (2004). A Study on the Early Warning Indicators of Currency Crisis: A Regional Perspective. *International Area Review*, 159-178.
- Karmarkar, Y., & Vani, S. (February 2014). Early Warning Signal System for Economic Crisis: A Threshold and Indicators Approach. *Pacific Business Review International*.
- Khalaf, A. H. (2018). Foreign Exchange Market Pressure Index and Monetary Policy in Iraq. *Economic Annals*.
- Megersa, K., & Cassimon, D. (2015). Assessing Indicators of Currency Crisis in Ethiopia: Signals Approach. *African Development Review*, 315-330.
- Ministry of Finance. (2020). *Monthly Economic Report (March and April)*. Department of Economic Affairs.
- Modekurti, K. (2015). Early Warning Signals for a Currency Crisis in India. *SSRN*.
- Nigeria, C. B. (2016). Foreign Exchange Market Pressure. *Education in Economics Series*, 6.
- Ozili, P. (2020). 100 Quotes from the Global Financial Crisis: Lessons for the Future. Available at SSRN: <https://ssrn.com/abstract=3500921> or <http://dx.doi.org/10.2139/ssrn.3500921>.
- Patnaik, I., Felman, J., & Shah, A. (2017). An Exchange Market Pressure Measure for Cross Country Analysis. *Journal of International Money and Finance*.
- Pukeliene, V., & Deksnysyte, I. (2010). Currency Crises: Models and Their Possibility in Lithuania. *Economics and Management*, 206-2011.
- Ramakumar, R., & Kanitkar, T. (2021). Impact of COVID-19 Pandemic on the Indian Economy: A Critical Analysis. *Economic Investigation*.
- Ratnasari, A., & Widodo, T. (2017). *Exchange Market Pressure and Monetary Policies in ASEAN5*. Retrieved from [https://mpira.uni-muenchen.de/81543/1/MPRA\\_paper\\_81543](https://mpira.uni-muenchen.de/81543/1/MPRA_paper_81543).

- RBI. (2020, December). Managing Exchange Rate Volatility in the Time of COVID-19. *RBI Bulletin*, 95-102.
- RBI Bulletin. (April 2020). *Seventh Bi-monthly Monetary Policy Statement, 2019-20 Resolution of the monetary policy committee (MPC) Reserve Bank of India.*
- Sevim, C., Oztekin, A., Bali, O., Gumus, S., & Guresen, E. (2014). Developing an early warning system to predict currency crises. *European Journal of Operation Research*, 1095-1104.
- Singh, T. R. (2011). An Ordered Probit Model of an Early Warning System for Predicting Financial Crisis in India. *IFC Bulletin no. 34*, 185-201.
- Tsedevsuren, M., & Batsuuri, D. (2016). *Measuring Exchange Market Pressure in Mangolia: EMP Index*. Retrieved from Central Bank of Mangolia: <https://www.mongolbank.mn/documents/tovhimol/group6/6-18.pdf>
- Weymark, D. N. (1995). Estimating Exchange Market Pressure and the Degree of Exchange Market Intervention for Canada. *Journal of International Economics*, 273-295.

## APPENDIX

**Table 1: Monthly Percentage change in Variables**

				$e_t = (E_t - E_{t-1})/E_{t-1}$	$r_t = (R_t - R_{t-1})/R_{t-1}$	$i_t = (I_t - I_{t-1})/I_{t-1}$
Months	$E_t$	$R_t$	$I_t$	$e_t$	$r_t$	$i_t$
Jun-21	101.78	4542492	2.84	0	0.044420783	-0.006993007
May-21	101.78	4349293	2.86	0.021682393	-0.001528484	-0.424547284
Apr-21	99.62	4355951	4.97	-0.020741178	0.032472037	0.346883469
Mar-21	101.73	4218953	3.69	0.005634638	-0.017594087	-0.133802817
Feb-21	101.16	4294511	4.26	0.004169148	-0.002899467	-0.193181818
Jan-21	100.74	4306999	5.28	-0.009049774	0.006248931	0.1
Dec-20	101.66	4280252	4.8	-0.016352201	0.005401365	0.88976378
Nov-20	103.35	4257257	2.54	-0.011383203	0.025525788	0.329842932
Oct-20	104.54	4151292	1.91	0.008003086	0.032970106	-0.176724138
Sep-20	103.71	4018792	2.32	0.023891796	0.005660669	-0.216216216
Aug-20	101.29	3996171	2.96	-0.009485625	-0.000702179	-0.003367003
Jul-20	102.26	3998979	2.97	0.017613693	0.047245173	-0.148997135
Jun-20	100.49	3818570	3.49	-0.007408139	0.023142669	-0.022408964
May-20	101.24	3732197	3.57	0.007764284	0.033198755	0.332089552
Apr-20	100.46	3612274	2.68	0.00439912	0.002809152	-0.355769231
Mar-20	100.02	3602155	4.16	-0.041035475	0.037194581	0.178470255
Feb-20	104.3	3472979	3.53	-0.006193425	0.032658122	0.37890625
Jan-20	104.95	3363145	2.56	-0.006907646	0.025062193	-0.082437276
Dec-19	105.68	3280918	2.79	0.012357506	0.013512395	-0.410147992
Nov-19	104.39	3237176	4.73	-0.000478744	0.024695172	-0.165784832
Oct-19	104.44	3159160	5.67	0.007621804	0.028675105	-0.1

				$e_t = (E_t - E_{t-1})/E_{t-1}$	$r_t = (R_t - R_{t-1})/R_{t-1}$	$i_t = (I_t - I_{t-1})/I_{t-1}$
Months	$E_t$	$R_t$	$I_t$	$e_t$	$r_t$	$i_t$
Sep-19	103.65	3071096	6.3	0.004165859	0.003222232	-0.105113636
Aug-19	103.22	3061232	7.04	-0.019846168	0.037400169	-0.016759777
Jul-19	105.31	2950869	7.16	0.018964683	-0.003875639	0.004207574
Jun-19	103.35	2962350	7.13	0.009080258	0.005935746	-0.017906336
May-19	102.42	2944870	7.26	0.006980631	0.006892991	-0.008196721
Apr-19	101.71	2924710	7.32	0.004047384	0.024100436	-0.00947226
Mar-19	101.3	2855882	7.39	0.026030588	-0.003053798	-0.039011704
Feb-19	98.73	2864630	7.69	-0.011018732	0.007718042	-0.073493976
Jan-19	99.83	2842690	8.3	-0.009328173	0.02961321	0.007281553
Dec-18	100.77	2760930	8.24	0.008809691	0.006705463	0.02615193
Nov-18	99.89	2742540	8.03	0.03309546	-0.054081274	0.153735632
Oct-18	96.69	2899340	6.96	-0.010236462	-0.001542795	0.051359517
Sep-18	97.69	2903820	6.62	-0.043661282	0.023942847	-0.006006006
Aug-18	102.15	2835920	6.66	-0.002051583	0.024482055	0.093596059
Jul-18	102.36	2768150	6.09	0.007381163	-0.004642115	0.140449438
Jun-18	101.61	2781060	5.34	0.008135728	0.000205	-0.007434944
May-18	100.79	2780490	5.38	-0.008265276	-0.009546573	-0.052816901
Apr-18	101.63	2807290	5.68	-0.006160767	0.016820907	-0.048576214
Mar-18	102.26	2760850	5.97	-0.009492445	0.007602134	0.013582343
Feb-18	103.24	2740020	5.89	-0.033333333	0.018712194	0.130518234
Jan-18	106.8	2689690	5.21	-0.009919347	0.02865655	0.011650485
Dec-17	107.87	2614760	5.15	0.000649351	0.009789875	-0.068716094
Nov-17	107.8	2589410	5.53	0.014492754	0.001535522	-0.195050946
Oct-17	106.26	2585440	6.87	0.003588969	-0.011266205	-0.045833333
Sep-17	105.88	2614900	7.2	-0.020355292	0.026937019	-0.019073569
Aug-17	108.08	2546310	7.34	0.000740741	0.009615156	-0.111380145
Jul-17	108	2522060	8.26	0.009817672	0.008078022	-0.103148751
Jun-17	106.95	2501850	9.21	-0.003354767	0.019947654	0.086084906
May-17	107.31	2452920	8.48	-0.005099203	0.023401743	0.105606258
Apr-17	107.86	2396830	7.67	0.015344065	-0.000571262	0.109985528
Mar-17	106.23	2398200	6.91	0.019383936	-0.013078297	-0.058583106

				$e_t = (E_t - E_{t-1})/E_{t-1}$	$r_t = (R_t - R_{t-1})/R_{t-1}$	$i_t = (I_t - I_{t-1})/I_{t-1}$
Months	$E_t$	$R_t$	$I_t$	$e_t$	$r_t$	$i_t$
Feb-17	104.21	2429980	7.34	0.012238951	-0.012227344	-0.066157761
Jan-17	102.95	2460060	7.86	-0.007710843	0.00919742	0.0234375
Dec-16	103.75	2437640	7.68	0.001931434	-0.014103077	0.024
Nov-16	103.55	2472510	7.5	-0.000482625	0.012780024	0.079136691
Oct-16	103.6	2441310	6.95	0.012509773	-0.011331192	0.025073746
Sep-16	102.32	2469290	6.78	-0.001658698	0.010025442	0.102439024
Aug-16	102.49	2444780	6.15	-0.002918572	7.77226E-05	0.194174757
Jul-16	102.79	2444590	5.15	0.021261798	0.00017593	-0.056776557
Jun-16	100.65	2444160	5.46	0.009123722	0.011069744	-0.005464481
May-16	99.74	2417400	5.49	0.004329876	0.005561495	-0.051813472
Apr-16	99.31	2404030	5.79	0.008837871	0.010631679	-0.091051805
Mar-16	98.44	2378740	6.37	0.011716341	0.001844708	0.052892562
Feb-16	97.3	2374360	6.05	-0.030683403	0.006686198	0.078431373
Jan-16	100.38	2358590	5.61	0	0.019472324	-0.015789474
Dec-15	100.38	2313540	5.7	-0.009277537	-0.006424737	-0.042016807
Nov-15	101.32	2328500	5.95	0.00326765	0.011287682	-0.062992126
Oct-15	100.99	2302510	6.35	0.022787118	0.003718428	-0.108146067
Sep-15	98.74	2293980	7.12	-0.0164359	-0.011177158	-0.094147583
Aug-15	100.39	2319910	7.86	-0.010546028	0.02743172	-0.006321113
Jul-15	101.46	2257970	7.91	0.014092954	-0.003526099	0.273752013
Jun-15	100.05	2265960	6.21	0.009790069	0.00991211	-0.068965517
May-15	99.08	2243720	6.67	-0.021528738	0.014817093	-0.027696793
Apr-15	101.26	2210960	6.86	-0.003346457	0.034299508	0.053763441
Mar-15	101.6	2137640	6.51	0.010442566	0.023646481	0.003081664
Feb-15	100.55	2088260	6.49	0.007212261	0.02800573	-0.025525526
Jan-15	99.83	2031370	6.66	0.034079138	0.001301307	-0.119047619
Dec-14	96.54	2028730	7.56	$e_t$	$r_t$	$i_t$
$\mu$				0.000791293	0.010525371	0.001685688
$\sigma$				0.015124258	0.016739439	0.176521726



**Table 2: EMPI Construction**

Months	$\frac{e_t - \mu_e}{\sigma_e}$	$\frac{r_t - \mu_r}{\sigma_r}$	$\frac{i_t - \mu_i}{\sigma_i}$	$EMPI_t = \frac{\left(\frac{e_t - \mu_e}{\sigma_e}\right) - \left(\frac{r_t - \mu_r}{\sigma_r}\right) + \left(\frac{i_t - \mu_i}{\sigma_i}\right)}{3}$
Jun-21	-0.052319481	2.024883336	-0.049165022	<b>0.641132944</b>
May-21	1.381297475	-0.720087105	-2.414620462	<b>-0.58447003</b>
Apr-21	-1.423704264	1.311075362	1.955554079	<b>0.614308393</b>
Mar-21	0.320236852	-1.679832699	-0.767545773	<b>-0.709047207</b>
Feb-21	0.223340206	-0.801988472	-1.103929303	<b>-0.56085919</b>
Jan-21	-0.650680974	-0.255470902	0.556953043	<b>-0.116399611</b>
Dec-20	-1.133509777	-0.306103773	5.030984641	<b>1.197123697</b>
Nov-20	-0.804964828	0.896112281	1.859019011	<b>0.650055488</b>
Oct-20	0.476836091	1.340829581	-1.010696132	<b>0.268989847</b>
Sep-20	1.527380854	-0.290613205	-1.234419745	<b>0.000782635</b>
Aug-20	-0.679498991	-0.670724374	-0.028623621	<b>-0.459615662</b>
Jul-20	1.112279311	2.193610017	-0.853621964	<b>0.817422455</b>
Jun-20	-0.542137821	0.753746757	-0.136496803	<b>0.025037378</b>
May-20	0.461046805	1.354488861	1.871746171	<b>1.229093946</b>
Apr-20	0.238545704	-0.460960422	-2.024991069	<b>-0.749135262</b>
Mar-20	-2.765541768	1.593196151	1.001489003	<b>-0.056952205</b>
Feb-20	-0.461822237	1.322191898	2.136963937	<b>0.999111199</b>
Jan-20	-0.509045729	0.868417497	-0.476558696	<b>-0.039062309</b>
Dec-19	0.764745746	0.178442291	-2.333048111	<b>-0.463286691</b>
Nov-19	-0.083973514	0.846491982	-0.948724692	<b>-0.062068741</b>
Oct-19	0.451626168	1.084249811	-0.576051968	<b>0.319941337</b>
Sep-19	0.223122743	-0.43628335	-0.605020846	<b>-0.272727151</b>
Aug-19	-1.364527201	1.605477797	-0.104494017	<b>0.045485526</b>
Jul-19	1.201605359	-0.860304201	0.014286548	<b>0.118529235</b>
Jun-19	0.548057583	-0.274180324	-0.110989305	<b>0.054295984</b>
May-19	0.40923249	-0.216995302	-0.055984094	<b>0.045417698</b>
Apr-19	0.21528928	0.810962919	-0.063210052	<b>0.321014049</b>
Mar-19	1.668795566	-0.811208068	-0.23055174	<b>0.209011919</b>
Feb-19	-0.780866406	-0.167707474	-0.425894677	<b>-0.458156186</b>
Jan-19	-0.669088443	1.14029142	0.03170072	<b>0.167634566</b>

Months	$\frac{e_t - \mu_e}{\sigma_e}$	$\frac{r_t - \mu_r}{\sigma_r}$	$\frac{i_t - \mu_i}{\sigma_i}$	$EMPI_t = \frac{\left(\frac{e_t - \mu_e}{\sigma_e}\right) - \left(\frac{r_t - \mu_r}{\sigma_r}\right) + \left(\frac{i_t - \mu_i}{\sigma_i}\right)}{3}$
Dec-18	0.530167971	-0.228198084	0.138601878	<b>0.146857255</b>
Nov-18	2.1359174	-3.859546469	0.861366746	<b>-0.287420774</b>
Oct-18	-0.729143567	-0.720942072	0.281403486	<b>-0.389560718</b>
Sep-18	-2.939157412	0.801548741	-0.043573637	<b>-0.727060769</b>
Aug-18	-0.187967961	0.833760533	0.520674557	<b>0.388822376</b>
Jul-18	0.435715247	-0.906092808	0.786100124	<b>0.105240855</b>
Jun-18	0.485606255	-0.616530261	-0.051668608	<b>-0.060864205</b>
May-18	-0.59881081	-1.199081024	-0.308758532	<b>-0.702216789</b>
Apr-18	-0.459662874	0.376089999	-0.284734934	<b>-0.12276927</b>
Mar-18	-0.679949916	-0.174631686	0.067394851	<b>-0.262395584</b>
Feb-18	-2.256284314	0.489073889	0.729839604	<b>-0.345790274</b>
Jan-18	-0.708176264	1.083141341	0.056450829	<b>0.143805302</b>
Dec-17	-0.009385101	-0.043937906	-0.398827857	<b>-0.150716955</b>
Nov-17	0.905926099	-0.537045989	-1.114517959	<b>-0.24854595</b>
Oct-17	0.184979339	-1.301810379	-0.269196444	<b>-0.462009161</b>
Sep-17	-1.398189938	0.980418004	-0.117601712	<b>-0.178457882</b>
Aug-17	-0.003342485	-0.054375475	-0.640520776	<b>-0.232746245</b>
Jul-17	0.596814621	-0.14620254	-0.593889723	<b>-0.047759214</b>
Jun-17	-0.274133107	0.562879265	0.478123685	<b>0.255623281</b>
May-17	-0.389473382	0.769223625	0.588712636	<b>0.32282096</b>
Apr-17	0.962213893	-0.662903476	0.61352131	<b>0.304277243</b>
Mar-17	1.229325936	-1.410063211	-0.341424227	<b>-0.174053834</b>
Feb-17	0.756907043	-1.359228003	-0.384334835	<b>-0.328885265</b>
Jan-17	-0.56215231	-0.079330636	0.123224562	<b>-0.172752794</b>
Dec-16	0.075384903	-1.471282734	0.126411139	<b>-0.423162231</b>
Nov-16	-0.084230169	0.13469107	0.438761873	<b>0.163074258</b>
Oct-16	0.774813529	-1.305692657	0.132493939	<b>-0.132795063</b>
Sep-16	-0.16199087	-0.029865329	0.570770177	<b>0.126304659</b>
Aug-16	-0.245292372	-0.624133694	1.090455402	<b>0.073676446</b>
Jul-16	1.353488192	-0.618266895	-0.331190079	<b>0.134677073</b>
Jun-16	0.550931371	0.032520415	-0.040505884	<b>0.180981967</b>

Months	$\frac{e_t - \mu_e}{\sigma_e}$	$\frac{r_t - \mu_r}{\sigma_r}$	$\frac{i_t - \mu_i}{\sigma_i}$	$EMPI_t = \frac{\left(\frac{e_t - \mu_e}{\sigma_e}\right) - \left(\frac{r_t - \mu_r}{\sigma_r}\right) + \left(\frac{i_t - \mu_i}{\sigma_i}\right)}{3}$
May-16	0.233967362	-0.296537777	-0.303074077	<b>-0.121881497</b>
Apr-16	0.532031211	0.006350758	-0.525360221	<b>0.004340583</b>
Mar-16	0.722352639	-0.518575501	0.290088226	<b>0.164621788</b>
Feb-16	-2.081073721	-0.229348941	0.434766228	<b>-0.625218811</b>
Jan-16	-0.052319481	0.534483427	-0.098997227	<b>0.12772224</b>
Dec-15	-0.665740408	-1.012585147	-0.247575725	<b>-0.641967094</b>
Nov-15	0.163734107	0.045539809	-0.366401434	<b>-0.05237584</b>
Oct-15	1.4543407	-0.406641011	-0.622199644	<b>0.141833348</b>
Sep-15	-1.139043848	-1.296490758	-0.542897877	<b>-0.992810828</b>
Aug-15	-0.749611726	1.009971023	-0.045358723	<b>0.071666858</b>
Jul-15	0.879491738	-0.839422979	1.541262549	<b>0.527110436</b>
Jun-15	0.594989528	-0.03663567	-0.400240846	<b>0.052704337</b>
May-15	-1.475776918	0.256383865	-0.166452489	<b>-0.461948514</b>
Apr-15	-0.273583667	1.420246901	0.295021777	<b>0.48056167</b>
Mar-15	0.638131959	0.783844046	0.007908242	<b>0.476628082</b>
Feb-15	0.424547597	1.044261925	-0.154152204	<b>0.438219106</b>
Jan-15	2.200957182	-0.551037812	-0.683957207	<b>0.321987388</b>

Source: Authors calculations

Data source: RBI database.

$E_t$  is real effective exchange rate,  $R_t$  is foreign exchange reserve,  $I_t$  is real interest rate (lending rate- consumer price index).  $e_t$ ,  $r_t$ , and  $i_t$  are the percentage changes in real effective exchange rate, foreign exchange reserve, and real interest rates.  $\mu$  and  $\sigma$  are the mean and standard deviation of effective exchange rate, foreign exchange reserve, and real interest rate.

Data of December 2014 is used for the calculation of changes in January 2015' Data.

**Table 3: Threshold Value and Identification of Currency crisis**

Months	$EMPI_t$	$Threshold Value = \mu_{empi} + \alpha\sigma_{empi}$							
		$\alpha = 1.5$		$\alpha = 2$		$\alpha = 2.5$		$\alpha = 3$	
		$EMPI_t > TV=1,$ Otherwise 0	0	$EMPI_t > TV=1,$ Otherwise 0	0	$EMPI_t > TV=1,$ Otherwise 0	0	$EMPI_t > TV=1,$ Otherwise 0	0
Jun-21	0.641132944	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-21	-0.58447003	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0

Months	$EMPI_t$	$Threshold\ Value = \mu_{empi} + \alpha\sigma_{empi}$							
		$\alpha = 1.5$		$\alpha = 2$		$\alpha = 2.5$		$\alpha = 3$	
		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0	
Apr-21	0.614308393	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-21	-0.709047207	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-21	-0.56085919	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-21	-0.116399611	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-20	1.197123697	0.651995985	1	0.86932798	1	1.086659976	1	1.303991971	0
Nov-20	0.650055488	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Oct-20	0.268989847	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-20	0.000782635	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-20	-0.459615662	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-20	0.817422455	0.651995985	1	0.86932798	0	1.086659976	0	1.303991971	0
Jun-20	0.025037378	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-20	1.229093946	0.651995985	1	0.86932798	1	1.086659976	1	1.303991971	0
Apr-20	-0.749135262	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-20	-0.056952205	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-20	0.999111199	0.651995985	1	0.86932798	1	1.086659976	0	1.303991971	0
Jan-20	-0.039062309	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-19	-0.463286691	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Nov-19	-0.062068741	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Oct-19	0.319941337	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-19	-0.272727151	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-19	0.045485526	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-19	0.118529235	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jun-19	0.054295984	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-19	0.045417698	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Apr-19	0.321014049	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-19	0.209011919	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-19	-0.458156186	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-19	0.167634566	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-18	0.146857255	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Nov-18	-0.287420774	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0

Months	$EMPI_t$	$Threshold\ Value = \mu_{empi} + \alpha\sigma_{empi}$							
		$\alpha = 1.5$		$\alpha = 2$		$\alpha = 2.5$		$\alpha = 3$	
		<b>EMPIt&gt;TV=1, Otherwise 0</b>		<b>EMPIt&gt;TV=1, Otherwise 0</b>		<b>EMPIt&gt;TV=1, Otherwise 0</b>		<b>EMPIt&gt;TV=1, Otherwise 0</b>	
Oct-18	-0.389560718	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-18	-0.727060769	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-18	0.388822376	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-18	0.105240855	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jun-18	-0.060864205	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-18	-0.702216789	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Apr-18	-0.12276927	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-18	-0.262395584	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-18	-0.345790274	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-18	0.143805302	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-17	-0.150716955	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Nov-17	-0.24854595	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Oct-17	-0.462009161	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-17	-0.178457882	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-17	-0.232746245	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-17	-0.047759214	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jun-17	0.255623281	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-17	0.32282096	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Apr-17	0.304277243	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-17	-0.174053834	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-17	-0.328885265	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-17	-0.172752794	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-16	-0.423162231	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Nov-16	0.163074258	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Oct-16	-0.132795063	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-16	0.126304659	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-16	0.073676446	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-16	0.134677073	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jun-16	0.180981967	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-16	-0.121881497	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0

Months	$EMPI_t$	$Threshold Value = \mu_{empi} + \alpha\sigma_{empi}$							
		$\alpha = 1.5$		$\alpha = 2$		$\alpha = 2.5$		$\alpha = 3$	
		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0		EMPI <sub>t</sub> >TV=1, Otherwise 0	
Apr-16	0.004340583	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-16	0.164621788	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-16	-0.625218811	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-16	0.12772224	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Dec-15	-0.641967094	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Nov-15	-0.05237584	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Oct-15	0.141833348	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Sep-15	-0.992810828	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Aug-15	0.071666858	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jul-15	0.527110436	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jun-15	0.052704337	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
May-15	-0.461948514	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Apr-15	0.48056167	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Mar-15	0.476628082	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Feb-15	0.438219106	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
Jan-15	0.321987388	0.651995985	0	0.86932798	0	1.086659976	0	1.303991971	0
		1.30238E-16							
		0.43466399							

Source: Authors calculation

# Social Criticism in the Poetry of William Blake

Dr. Madhu Jain\*

Pen is mightier than the sword and when this pen is dipped in bright colours and accompanied by superb designs, the impact is indelible. William Blake had three professional careers, which brought him to the notice of the contemporary connoisseurs, first as a competent engraver, for which he was trained for seven years (1772-79) as an apprentice under Basire; second as an original and powerful designer, an inventor of graphic ideas, for which he studied at the Royal Academy and third, as an untutored author of appealing lyrics, bewildering prophecies and outrageous criticism. He was a philosopher, reformer and the champion of freedom. He wished to purge the society of the evils prevalent therein. He was a rebel who showed strong hatred for established forms of Government and justice.

He was drastically annoyed to see the domination of reason, identified with political tyranny, psychological repression, sexual frustration and the stifling of imagination of poetic genius in the eighteenth century England. So he was venomously against the then prevalent corruption and waged a life long struggle against them. He witnessed the industrial revolution and its repercussions on society. He was pained to see mankind groaning under iron wheels of dehumanized machines and iron chains of repression crushing the very happiness and life of human beings. People became jobless. child labour prevailed, the society became materialised and it was arid, devoid of love, peace and mercy. As he was intrinsically a painter and a poet, his acidity against this corruption flowed out of his pen in the form of his poetry.

**London in The Songs Of Experience** presents a satirical criticism of the society in which he lived. London is depicted with all its dark, ugly, negative, sordid and evil aspects. The lonely wanderer in London is horrified to see;

**In every cry of every Man.**

**In every Infants cry of fear**

**In every voice; in every ban.**

**The mind forged manacles I hear**

His compassionate heart was outraged and wounded by the suffering which society inflicts on its humbler members. Human beings are sacrificed at the altar of efficient working operation of rules and laws. How is it possible that a civilized society should tolerate such abnormalities as chimney sweepers and harlots. The helpless and poor chimney sweeper is condemned to a life of misery and it is supported by the church. The hapless soldier's sighs suggest the lack of military authority. A soldier must enjoy authority and power but he is exploited by the court. The cursed life of a harlot is forced upon her by the marriage laws. The poet laments:

**How the Chimney sweeper's cry,**

**Every black'ning Church appals;**

**And the hapless Soldier's sigh,**

**Runs in blood down Palace walls.**

The poem highlights the callousness of society, adversity of war, a torture physical and mental; indifference of government, church and the whole ruling and upper class.

---

\*Associate Professor, Dept. of English, Arya Mahila Degree College, Shahjahanpur.

**The Holy Thursday** is a slap of Blake on his contemporary society. It exposes the hypocrisy of the so-called benevolent who are very proud that they have done great social service by opening charity schools for the poor. Here his attack becomes more concentrated. The children educated at Charity schools are shown going to church to show their thankfulness. They are called **the flowers** while **the Grey headed beakles with wands as white as snow** are at their heels to crush them as snow crushes flowers. Blake says that in the state of Innocence, there ought to be no restrictions, no regimentation, no marching, no controlling guardians, there ought to be merely free, uninhibited play on the echoing green. All the restrictions destroy Innocence. Innocence can be preserved not by going to church but by freely and spontaneously frisking like a mighty wind raising to heaven the voice of their song. But we are shocked to see **Is that trembling cry a song.**

**The Holy Thursday** is seen as an outraged admonition to a society which could congratulate itself on the charity children's procession. In the Holy Thursday of Experience, the children are hungered. They are starved or semi-starved. It is the unjust social system that has brought about the draught to the poor.

**And their sun does never shine,  
And their fields are bleak and bare,  
And their ways are filled with thorns,  
It is eternal winter there.**

Another poem **The Little Vagabond** presents a stinging satire on the state of affairs in churches. The drawbacks and the inhumanity of the church is exposed when the little child expresses a strong preference to be in the ale-house. The child says to his mother :

**But if at the church they would give us some Ale,  
And a pleasant fire our souls to regale,  
We'd sing and we'd pray all the live-long day,  
Nor ever once wish from the church to stray.**

**A little Boy Lost** is a scathing satire on religious fanaticism and persecution. The little boy asked The Holy Father and priest how he can love others and his fellow human beings more than himself. The priest interprets this heresy against the moral law of duty. So standing on the urizenic altar, the priest declared that the boy was the very devil and dared judge the holy mystery of religion on the touchstone of reason. Religion, thus only teaches blind faith and superstition and reactionary thinking. The free play of imagination in Innocence is destroyed by tyrant priests who work by reason and rationality and not by heart. The child who is as innocent as a little bird, is sacrificed at the altar of religion. He has to pay the penalty with his head.

**The weeping child could not be heard,  
They stripped him to his little shirt,  
And bound him in an iron chain,  
And burned him in a holy place,**

## **WHERE MANY HAVE BEEN BURNED BEFORE.**

Poetry of William Blake was the literature of challenge and of reconstruction of new values. The milieu in which his poems were written was the primary motivating force for him. He fully realised his human and social responsibility. His poetry raises its voice against authority and establishment and he