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A study of macroeconomic effects on the growth of BRICS: a systematic review

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Abstract: The purpose of this paper is to synthesise the existing literature on study of macroeconomic variables on the economic growth of BRICS countries in a systematic manner, where GDP has been proxied as measure of economic growth; to study the macroeconomic variables affecting the stock market of BRICS nations through content analysis. Systematic literature review (SLR) has been carried out in line with the five-step process as formulated by Rowley and Slack (2004). The paper has largely contributed in terms of naming the major causative authors, some of the high-ranking journals, types of data and nation-wise input for the macroeconomic variables and growth of BRICS countries. Further, the results also highlighted the experiential in nature of these studies. Further, the study addressed the prevailing gaps that confine the influence of macroeconomic variables and restrict the growth of BRICS countries. Hence the literature is accordingly proposing directions for future research.

Keywords: BRICS; macroeconomic variables; GDP; systematic review.

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1 Introduction

Macroeconomics variables are the evaluation of the nation's economies unanimously. Macroeconomics variables are a parameter that reflects the periodic stir of economic trends of a nation's economy over a period of time. It includes gross domestic production, global trade, money supply, gross per capita income, national income, employment, inflation, budget deficits, and currency rate, etc. (Owoundi, 2016). All these factors control and influence the health of economy. For instance, an upward trend in GDP would lead to an enhanced outputs and economic development and vice versa. Of late, foreign direct investment (FDI), exports, savings and revenue are under study with relation to economic growth and have become the major interest area for economists (Bencivenga et al., 1996). Currently the most dreaded challenge for the BRICS policymakers is how to deal with the prevailing uncertainty relating to macroeconomic, that has attained its highest degree ever. Researchers established that it is the level of volatility in the markets that strongly impact the three important factors namely growth, exchange rate and inflation in the developing countries as compared to those already developed (Servén, 2003). Hence it draws attention of the experts to study its impact of these macroeconomic uncertainties on investment behaviour (Huizinga, 1993; Servén, 2002; Byrne and Davis, 2005). The scholars all across found this subject very interesting and worthwhile to study that how inland sensitivity of economic variables could affect both domestic and exterior markets (Chowdhury and Wheeler, 2015; Altarturi and Abduh, 2016; Ho, 2019). It is the exchange rate volatility that stands aloft amid a cluster of so many more uncertainties, because this one very crucial factor that tends to critically affect a number of financial economic variables comprising equity prices, interest rate and trade output (Byrne and Davis, 2005). These uncertainties end in rendering the capital cost and expected profitability unpredictable. This in turn will have a telling effect on investment decisions despite the fact that uncertainty may or may not behave as

envisaged (Caballero, 1991; Abel and Eberly, 1994; Chowdhury and Wheeler, 2015). Under the circumstances enumerated herein, questions are raised in mind about the outcome of investments made, more specifically private investments, that what will be the effect of macroeconomic uncertainties when the economies make plans to boost output (Terra and Valladares, 2010; Elbadawi et al., 2012; Couharde and Sallenave, 2013).

The overwhelming growth of the BRICS nations (Brazil, Russia, India, China and South Africa) has attracted the attention of global portfolio managers as dream destinations for diversified investment arenas to reap a rich yield. Through the various studies conducted on BRICS stock markets, there have been encouraging signs of the same moving hand in hand with US equities and strategic commodities (oil and gold) (e.g., Mensi et al., 2014). The susceptibility of BRICS to flow of information from the US stock market can be attributed to their strong trade and financial tie ups with the US economy as well as a sizeable investment flow from the US investors (Beirne et al., 2013; Mensi et al., 2014; Dakhlaoui and Aloui, 2016). Simultaneously, the unprecedented growth rate of economy in this region clubbed with commodity-centric nature, BRICS has come up to be a notable contributor in impacting the demand and supply of commodities thus contributing substantially to global economy (Aggarwal and Raja, 2019). To have a glimpse of what has been said here is we should know that while China and India are the leading consumers of crude oil, Russia is the largest exporter of the same commodity. Likewise India is the biggest consumer of gold produced by China in this region. Hence it helps to derive the effect of oil and gold markets of BRICS on macroeconomic variables (Mensi et al., 2014; Raza et al., 2016; Bekiros et al., 2017; Boubaker and Raza, 2017).

BRICS countries contain large pie of the globe in terms of population as it constitutes 41.53% of the world's population with 3.21 billion people (World Population Prospects, 2019). In terms of land cover it covers around 27% of the global land surface. BRICS accommodate 50% of world's workforce. It has plenty of natural and human resources due to developed educational systems that provides them with experienced, productive and efficient labour force. They also constitute 43% of global foreign exchange reserves. In 2018 it has 32.2% of the global GDP, which provide them with great power to economy. Member States of the BRICS group have a common objective to sustain, harmonise and reinforce the associations amid the member nations (Obstfeld, 1994).

In terms of GDP, China is considered as the second-largest economy of the world. It is believed that it will bypass USA in coming years (Aggarwal and Khurana, 2018). During 1990, China was contributing 3% in the manufacturing output and in 2015 it increased to 25%. It is expected to grow at a fast pace. Moving to India, it is contributing in the IT sector of the world. India is leading contributor in the export of IT services. Other BRICS countries boast of their natural resources. Brazil has abundance supply of iron ore, soybeans, and crude oil and is exporting to the world countries. Russia is blessed to have abundance of natural energy sources. It includes metals, minerals, crude oil and natural gas (Greenwood and Smith, 1997).

This paper extends the work on macroeconomic variables explaining the role of each factor in the economy.

This study covers the following objectives:

- To synthesise the existing literature on study of Macroeconomic Variables on the economic growth of BRICS countries in a systematic manner, where GDP has been proxied as measure of economic growth.
- To study the macroeconomic variables affecting the stock market of BRICS nations through content analysis wherein the author tried elaborated research gaps and provided road map for future research.
- To provide guide lines for future research.

The rest of the article is structured as follows: Section 2 contains theoretical framework followed by Section 3 that contains the research methodology of the study. Section 4 represents categorisation and scrutiny of the literature followed by the research gaps in the already carried studies and roadmap for ensuing research work for a conclusive finish.

2 Theoretical framework

The paper studied six macroeconomic variables that have an impact on the economic growth. These are FDI, foreign exchange rates, gross domestic product (GDP), interest rates, inflation and stock market. Vast amount of literature based upon various research studies is available to testify the importance of macroeconomic variables. It is mentioned in the coming section.

2.1 Macroeconomic variables

2.1.1 Foreign direct investment

FDIs are important for developing countries due to insufficient reserves and the technology. the capital is needed to motivate economic growth. FDI are measured an important factor for the economic development and an important asset for adapting to market requirements, competitiveness, representing for emerging economies an important element for economic development. In these conditions Brazil, Russia, India, China and South Africa, can evolve with the help of FDI to attain the developed economies.

FDI which came into being in the early twentieth century as an investment avenue in industries like mining and agriculture, in the history of emerging nations. In order to promote their nations, the government of emerging nations is providing various tax incentives and rebates for investments.

Vast amount of literature based upon various research studies is available to testify the importance of macroeconomic variables. Mathur and Singh (2013) have conducted an in depth study of the factors determining FDIs in 29 nations based on its economic and political determinants. Another study is conducted by Elfakhani and Mulama (2011) in reference to determinants of FDI in Brazil, India and China in emerging economies over the globe. The paper concluded the impact of exchange rates, currency exchange rates, interest rates, the size of national debt and sovereign credit rating risk on FDIs.

2.1.2 Foreign exchange rates

Foreign exchange (FX) rate determines currency value of one country with the currency value of another country. Innumerable research work has been done to establish the

relation between exchange rate and economic growth (Nucci and Pozzolo, 2001; Gala and Lucinda, 2006). Changes in the exchange rate have significant implications for an economy. It influences a country's international competitiveness and country's growth rate. Cross-border activities that involve shifting capital investments from one country to another trigger an increase in the level of portfolio or capital flows. These activities often affect the foreign exchange market. Thus, exchange rates have become an important factor determining the extent of trade as well as portfolio and direct investment flows in developing countries.

There have been mixed and misleading view points on depreciation and appreciation exchange rates. It is believed that undervaluation of currency positively impacts monetary growth as it enhances exports but it also shows the crucial limitation of disrupting the internal balance of the economy by increasing the inflation which may leads to the shortage of resources for domestic investments barricading the growth of supply line (Hausmann et al., 2005) There are many studies that depicts the contradictory results in relation with previous studies by depicting the non-linear relation between economic growth and exchange rates (Couharde and Sallenave, 2013; Juvenal and Taylor, 2008).

2.1.3 Gross domestic product

GDP becomes the universal and standard measure of economic growth of countries as it is the most important and accurate indication of economic growth of nations. Every nation tries to maximise the health of economy by increasing their GDP (Divya and Devi, 2014; Williams and Turton, 2014). IMF states that "GDP measures the monetary value of final goods and services – that are brought by the final user – produced in a given period of time (say a quarter or a year)." Economists usually take nominal and real GDP to measure the economic health of a nation as nominal GDP takes economic output of a nation without an inflation and real GDP takes economy of a country after adjusting the effects of inflation. India basically adopts policies that stimulate demand as India is a consumer driven economy (Kalyanaraman, 2016). GDP helps great economists, policy makers, investors and business to measure the impact of various government policies, economic shocks like fluctuations in oil prices.

2.1.4 Interest rate

Interest rates are the annual charges levied by a lender to a borrower, and hence more the interest, the more the cost of credit. As defined by Fisher (1930), it is explained as the percentage of the total amount loaned and prevailing price paid for validity to consume resources (Kwak, 2000). The interest rates are based on inflation rate, longevity of loan and the monetary policy. In other words, volatility in the interest rates is governed by the inflation rates. This directly impacts the economic growth rate. This factor determines the saving and investment by classical, neo-classical and contemporary economists. It is a critical constituent which translates the transmission of monetary policy actions to economic activities.

Value of money depends upon the inflation rate persistent in an economy, i.e., higher the inflation, lower will be the value of currency. Thus, higher the inflation rate, higher would be the interest rate. Since inflation is lower in the developed economies, a lower interest rate follows. Interest rates generally depend on various factors like inflation, GDP growth rate, FDI, exchange rate, etc. Interest rates (repo rate in Indian terms), which is

decided and released by central bank, is normalised according to inflation. Every central bank tries to keep its interest rates low, because low interest rate stimulates growth and deficit spending can be controlled.

2.1.5 Inflation

It has been established by scholars that the growth of manufacturing, agriculture and services are all differently impacted by an increased inflation. Interestingly, while manufacturing features an inverse relationship between CPI (consumer price index) and inflation level, it has been found providing a value addition to the growth of agricultural and services sectors. At macroeconomic level it has been a subject of increase interest for scholars to study the relation between inflation and growth across nations (Barro et al., 1995; Bruno and Easterly, 1998; Khan et al., 2001; Kremer et al., 2012). Inflation rate has been found to be affecting factors relating to FDI both internally and externally. The investors' decisions, generally speaking, are based on low inflation trends but they may also consider otherwise if they are assured that the returns on investment would be high above the inflation rate bringing a net profit situation. In case the returns are not higher than inflation rate, FDI is negatively impacted. Mexico is the right example to quote where pragmatic work caused the positive effect of FDI inflows on economic enhancement (Ramirez, 2000).

2.2 Stock market and macroeconomic variables

The stock market development scenario has registered a remarkably different over the last twenty years. We have seen an effective mobilisation of funds yielding a sizeable turnover ratio and thus benefiting the stock market intermediaries. It has also helped to stabilise stock prices which in turn helped stock market capitalisation and trading volume. Hence the investors were enriched much more than envisaged. Transparent guidelines came into being in the stock market which helped in efficient formulation of information to decide share prices in a much quicker way. Despite a quantum of factors governing the share prices, macroeconomic variables are one of the very important factors that decide the investment trends, which is the subject of study in this paper. In an economy the financial and expenditure model of the elite organisations largely impact the stock market index and reflect the economic conditions of a nation. Away from the role of macroeconomic fundamentals in an economy, stock markets saw the implementation of new guidelines with Basel III norms, a lesson learnt from the financial crisis of 2008 macroeconomic fundamentals. The current study has taken into account connection between stock market trend and macroeconomic variables, notwithstanding the fact that performances of markets are geared by variables like inflation rate, industrial production, FDIs, prices of gold, crude oil price, exchange rate, supply of money, bank credit, freedom in international trade, etc.

The stock market impacts the growth of economy's GDP by effecting the nation's financial conditions and confidence of consumers. In a bullish market when stock prices rises, it leads to increase in wealth of shareholders and also the value of the firm, further the companies will invest them for business expansion and diversification, low cost loads and advances expanding operations, recruitment of new skilled manpower etc. increase in the values of industries also leads to economic expansion through infrastructure, CSR etc. so, all these activities leads to increase the economy's GDP. There have been numerous

studies establishing a direct connection between economic advancement and stock market trends in the developing countries, (Levine and Zervos, 1996, Demirguc-Kunt and Maksimovic, 1994; Demirguc-Kunt and Levine, 1996, Rousseau and Wachtel, 2000). According to Holmstrom and Tirole (1993), stocks market indices are the best guidelines for the efficient investment managerial decisions which are no way comparable to the information related to a company's past or present performance data. Since poor performances are prone to take-over risks, the share prices will lay path for boosting productivity by formulating managerial incentives.

3 Research methodology

3.1 Research question

Having gone through two scores of research papers on 'Impact of Macroeconomic Variables on the growth of BRICS countries', the author adopted the main stimulus for conducting a systematic literature review (SLR) on the subject to re-establish the facts because this process helps in a methodology which is not only transparent but also scientific and replicable (Kushwah et al., 2020). Simultaneously, it also helps to critically explore the studies already done that lays the path for future studies related to the same (Bhatt et al., 2020; Khanra et al., 2020; Seth et al., 2020). It also looks into the impact of studies published in various journals covering varying objective, scope, and target audience for this very important aspect of impact on Macroeconomic Variables on the growth of BRICS countries. So, the SLR conducted opens a platform for scholars to discuss issues relating to some explicit journals, authors or other criterion. It is also worthwhile to mention here that in the recent past no such SLR has been carried out on the topic under reference. Hence all efforts have been put in to bridge the gaps that exist in various research papers on the topic with specific focus on the following three questions:

- RQ1 The contents of most recent research work on the contribution of macroeconomic variables in the development of BRICS countries?
- RQ2 The prevailing research themes on the topic impact of macroeconomic variables on the growth of BRICS countries?

3.2 Strategy for the literature search

The SLR has been carried out exactly in line with the five-step process as formulated by Rowley and Slack (2004) that comprises of

- a scanning the documents
- b making notes
- c structuring the literature review
- d writing the literature review
- e building the bibliography.

GDP is the most important measure of economic activity and is widely used by policy makers, analysts and academicians. Therefore, the author has used GDP to measure the economy growth of BRICS countries. It is considered as the most common and easily available data on the same.

Further content analysis was used to find out the most important macroeconomic factors effecting the growth. Scanning process included identification of keywords relevant to this study keeping in sight the time frame and duly considering which data to be taken into account and which to be shed off. We used Wiley, Elsevier, De Gruyter Open (DGO), Taylor and Francis, Springer, Emerald and other database (Google Scholar) for the literature search. Keywords used in the study: BRICS, macroeconomic variables, growth, GDP. This paper includes a time horizon from 2008–2020. Further the articles that satisfy the following conditions simultaneously are included in the study are as:

- articles published in recommended journals of repute approved by other scholars;
- only the articles published in English including research and conceptual papers have been taken up
- articles having the search keywords in the article title, keywords or abstract.

Taking into consideration the required research criteria, a database search was conducted in September 2020 including all relevant articles, numbering 40, that were intensely analysed graphically using pie-charts, percentages and Bar graphs and then incorporating the bibliography indicating all the sources referred in the SLR.

4 Data analysis and interpretation

Forty research papers have been taken as the basis of this research with specific reference to their dates of publication, journal in which they appear, location of study, details of data and use of statistical methods etc. (Appendix). On the above basis it helps to suitably understand the Impact of Macroeconomic Variables on the growth of BRICS countries basis the available literature.

4.1 Year of publication

Table 1 reflects how the various publications picked from the year 2008–2020 have been used to show that the last decade has attracted lot of scholars to conduct research on the said topic and the studies carried out after 2013 mainly throw light on the close connect between Macroeconomic Variables and the growth of BRICS countries.

Table 1 Year of publication

<i>Year</i>	<i>No of publications</i>	<i>Year</i>	<i>No of publications</i>
2008	1	2016	4
2012	1	2017	7
2013	2	2018	11
2014	4	2019	6
2015	2	2020	2

4.2 Journal of publication

Also an analytical study of journal publications revealed that the data established through 40 papers is covered by at least 33 publications of repute (Table 2). The world economy journal and Finance Research Letters is the most cited journal that has three publications each followed by Emerging Markets Review and Research in International Business and Finance with two citations each. The remaining journals had only one published article each.

Table 2 Journal name

<i>Journal name</i>	<i>No. papers</i>	<i>Journal name</i>	<i>No. papers</i>
<i>Business Governance and Society</i>	1	<i>International Journal of Financial Economics</i>	1
<i>The World Economy</i>	3	<i>International Journal of Management and Economics</i>	1
<i>Journal of Public Affairs</i>	1	<i>International Research Journal of Finance and Economics</i>	1
<i>Accounting</i>	1	<i>International Review of Financial Analysis</i>	1
<i>Applied Economics Letters</i>	1	<i>Journal of Chinese Economic and Foreign Trade Studies</i>	1
<i>Asia-Pacific Journal of Regional Science</i>	1	<i>Journal of Economic Studies</i>	1
<i>Competitiveness Review</i>	1	<i>Journal of Management (JOM)</i>	1
<i>Economic Modelling</i>	1	<i>Journal of the Knowledge Economy</i>	1
<i>Economics Letters</i>	1	<i>Journal on Management Studies</i>	1
<i>Emerging Markets Finance and Trade</i>	1	<i>North American Journal of Economics and Finance</i>	1
<i>Emerging Markets Review</i>	2	<i>Open Economic Review</i>	1
<i>Finance Research Letters</i>	3	<i>Research in International Business and Finance</i>	2
<i>Financial Innovation</i>	1	<i>Review of Development Economics.</i>	1
<i>Folia Oeconomica Stetinensia (FOS)</i>	1	<i>Review of Development Finance</i>	1
<i>Global Business Review</i>	1	<i>Review of International Economics</i>	1
<i>International Journal in Management and Social Science</i>	1	<i>The Globalization Conundrum-Dark Clouds Behind the Silver Lining</i>	1
<i>International Journal of Business and Social Science</i>	1	<i>International Journal of Financial Economics</i>	1
<i>International Journal of Financial Economics</i>	1	<i>International Journal of Management and Economics</i>	1
		<i>International Research Journal of Finance and Economics</i>	1

4.3 Geographical areas

Table 3 enumerates the rate of recurrence for data collection from various countries in the papers picked up for a review. Of course the main studies have been focussed on BRICS region as a single bloc, whereas multiple studies were conducted in comparison with US economy. Very few studies have been conducted BRICS countries individually. From Table 3, it is clear that the majority of studies have been conducted in comparison with developed countries, especially US where 9 studies have been conducted.

Table 3 Geographical area

<i>Country name</i>	<i>NO.</i>	<i>Country name</i>	<i>NO.</i>
BRIC	3	UK	3
BRICS	36	Canada	1
India	4	Germany	1
USA	9	Japan	1
China	2	South Korea	1
MINT	1	Singapore	1
E.U	1	Italy	1
Europe	1	Brazil	1
France	1	South Africa	1
		Russia	1

4.4 Publication house

Majority of the study used in our study is from Elsevier database followed by springer and Wiley which in combine have 26 studies, emerald has three papers in the study and De Gruyter Open (DGO) and Taylor and Frances has only two papers each.

Table 4 Publication house

<i>Publication house</i>	<i>Number</i>	<i>Publication house</i>	<i>Number</i>
De Gruyter Open (DGO)	2	ICTACT	1
Centre for Promoting Ideas	1	SAGE Publications	1
Elsevier	12	SLAA Private publications	1
Emerald	3	Springer	6
Euro Journals Publishing, Inc	1	Taylor and Francis	2
Growing Science	1	Wiley	8
IAEME Publication	1		

4.5 Sources of data

The papers reviewed are all empirical in nature. The data has been collected from secondary sources. The most of the sources where data has been collected is MSCI data followed by World Bank database, World Development Indicators, DataStream, Bloomberg and IMF data (Table 5).

Table 5 Sources of data

<i>Sources</i>	<i>Number</i>	<i>Sources</i>	<i>Number</i>
Energy Information Administration (EIA)	1	World inequality database	1
World economic outlook (WEO)	1	World bank database	6
World Economic Forum (WEF)	1	Wind economic database,	1
World Development Indicators	6	ICRG database	1
MSCI data	9	Pacific exchange rate database	1
DataStream	6	Federal Reserve Bank	1
Bloomberg	3	Centre For Monitoring Indian Economy Pvt Ltd	1
International monetary fund (IMF)	3	Economic Intelligence Council (EIC)	1
Yahoo finance	1	Portfolio Fund Research Global (EPFR) database	1
Reserve bank of India, RBI	1	World Gold Council	1
NSE/BSE	1	U.N COMTRADE database	2
The BIS Statistical Bulletin	1	Trade Map database	1
OECD DATABASE	1	Thomson Reuters DataStream	3
BRICS Joint Statistical Publication	1		

4.6 Statistical techniques/methods

Table 6 defines the most popular statistical models used in the present paper. Further, it can be analysed that VAR and ARCH/GARCH models are the most accepted models in analysing the time series data. Regression and cointegration analysis is another technique that has been used the most after Granger causality test.

Table 6 Statistical techniques

<i>S. no.</i>	<i>Techniques methods</i>	<i>No of articles</i>
1	Cointegration	6
2	Regression analysis	8
3	VECM Model	3
4	ARIMA	1
5	Granger causality test	10
6	ARDL model	0
7	Impulse response	2
8	ARCH/ GARCH family model	11
9	VAR	15

4.7 *Most prolific author*

The most prolific authors are Mensi et al. (2014, 2015, 2016) that has contributed in literature of BRICS.

4.8 *Content analysis*

Content analysis is defined as “a research technique for the objective, systematic, and quantitative description of manifest content of communications” (Berelson, 1952). Content analysis describes the information regarding the empirical findings of earlier research papers. The section describes the systematic content analysis on macroeconomic variables and stock market. It includes the following aspects:

4.8.1 *GDP and macroeconomic variables*

Table 7 presents the empirical findings of macroeconomic variables. The findings are further categorised into GDP and FDI; Export and GDP/GNP; GDP and Exchange Rate; GDP and other macroeconomic variables.

Table 7 Study of Macroeconomic variables affecting GDP

<i>Effect</i>	<i>Empirical findings</i>
GDP and FDI	According to Elfakhani and Mackie (2015) FDI variations are most affected by economic/financial and social blocks. Whereas political variables have a negligible effect on the same. Prakash and kumar (2017) shows that there is a significant connect between FDI of BRICS nations that is the resultant of variables like size of an organisation, inflation rate, gross capital formation in the country, cost of labour and openness in trade. Asongu et al. (2018) Demonstrate that more and more FDI is attracted to BRICS and MINT because of the market size, availability of enough infrastructure and open trade policies. However, it is interesting to note that the role of natural resources and the institutional quality is least significant in this direction.
Export and GDP/ GNP	Núñez Mora and Mata Mata (2019) reveals the bidirectional relationship between economic growth and exports of BRICS countries. The effect of exports and GDP has been observed of a much greater magnitude between Brazil and China. Raghutla (2020) established a stronger Bond between exports, imports and economic growth. Mishra et al. (2015) observed a positive connect between gross national product, per capita gross national product of an economy viz a viz exports and imports with BRICS.
GDP and exchange rate	Exchange (FX) rate determines currency value of one country with the currency value of another country. Innumerable studies have been carried out to establish the relation between exchange rate and GDP (Ruzima and Boachie, 2018) There are many studies that depicts the contradictory results in relation with previous studies by depicting the non-linear relation between GDP and exchange rates (Nasir et al., 2017)

Table 7 Study of Macroeconomic variables affecting GDP (continued)

<i>Effect</i>	<i>Empirical findings</i>
GDP with other macroeconomic variables	Berisha et al. (2019) established that income growth, real interest rates and inflation is the drive of GDP are positively connected factors, particularly, stronger during the post 2008 period, which tells upon the income equality for the BRICS nations. Younsi and Bechtini (2018) on the other hand scrutinised the casual connection between economic growth financial development and income inequality in the BRICS group. This research paper hints at implications relating to policy matters implemented to fight this inequality. The authorities need to formulate an effective fiscal policy for the inbuilt progressive taxation systems clubbed with an all inclusive vigorous development system with inclusion of ruler development policies, policies relating to income tax and public finance services (Gupta and Sun, 2019) Wait et al. (2017) established that GDP was influenced by the credit lending by the private sector and financial depth in the BRICS economies. Mallick and Sousa (2012) exposed that shrinking of monetary policies negatively impacted the output of the nation. It also reveals that real GDP growth is negatively impacted by such monetary policies along with a minimal inflationary negative effect.

The results finds a positive relationship between GDP and macroeconomic variables.

- a GDP and FDI: From the studies it was found that GDP is having a significant connect with FDI of BRICS nation as it leads to the development of the country.
- b GDP and export/import : studies reveals the bidirectional relationship between economic growth and exports of BRICS countries.
- c GDP and exchange rates: studies that depicts the contradictory results in relation with previous studies by depicting the non-linear relation between GDP and exchange rates.
- d GDP with other macroeconomic variables: Studies established that income growth, real interest rates and inflation is the drive of GDP are positively connected factors.

GDP was influenced by the credit lending by the private sector and financial depth in the BRICS economies.

4.8.2 Stock market and macroeconomic variables

Table 8 presents the empirical findings of macroeconomic factors on stock market. The findings are further divided into three parts, i.e., stock market relationship between BRICS countries; stock market relationship between BRICS countries and developed countries; stock market and FDI/FIIs; stock market with gold and oil prices; stock market and exchange rates; stock market with GDP; stock market with other macroeconomic variables.

Table 8 Study of macroeconomic variables affecting stock market

<i>Effect</i>	<i>Empirical findings</i>
Stock market and FDI/FIIs	Sahoo et al. (2018) explained the coordination trend of FDI and FII with nifty and sensx which determine a trend of stock market. These observations will have a determining implication not only for the national level policy makers but also for corporate institutions (Hammoudeh et al., 2016; Mensi et al., 2016; Ji et al., 2018). Further a study by Kaur et al. (2013) also found a significant relationship between Stock market and FDI.
Stock market with gold and oil prices	The estimation of the return and spillover volatility across the BRICS zone made by Patra and Panda (2018). Internally as well as externally (between gold oil and US stock markets) it is established that return spillovers are more than their counterparts relating to volatility spillovers. This works as a guide to opportunist investors to diversify their portfolio risk. If we talk of investment choice amid the BRICS nations, south Africa surfaces at top because gold is the first choice of investors outside the BRICS countries. Talking about the stock market responding to unprecedented oil price, Yildirim et al. (2018) found that positive shocks have been observed which have a statistically notable effect in the highly volatile zone across BRICS with the exception of China. According to Mensi et al. (2014), the stock market of the BRICS indicates reliance on the world's stock market and commodity markets. Also any changes in the US stock market have a direct bearing on the above mentioned scenario (CBOE volatility index). At the same time volatility spillovers from gold and crude oil have been found affecting the BRICS stock markets by Pandey and Vipul (2018).
Stock market and exchange rates	It was also found that exchange rates are greatly influenced by stock markets during both turbulent and calm period. These insights provide important guidelines for portfolio investments and hedging of currency risk (Chkili and Nguyen, 2014; Çepni et al., 2020; Adu et al., 2015; Su et al., 2012).
Stock market and GDP	The stock market impacts the growth of economy's GDP by effecting the nation's financial conditions and confidence of consumers. In a bullish market when stock prices rises, it leads to increase in wealth of shareholders and also the value of the firm, further the companies will invest them for business expansion and diversification, low cost loads and advances expanding operations, recruitment of new skilled manpower etc. increase in the values of industries also leads to economic expansion through infrastructure, CSR etc. so, all these activities leads to increase the economy's GDP (Akimade et al., 2020).
Stock market with other macroeconomic variables	It is not only the key macroeconomic variables (industrial production, exports, FDI, supply of money, rate of interest) that influence the movement of stock prices, it also is the cause of movement in other macro dimensions in an economy (Ahmed). Simultaneously, Mensi et al. (2015) established a very positive connect between political, financial and economic risk ratings and the returns of the stock market of BRICS nation. Also, as established by Ogbuide and Akanji (2018), the economic growth is significantly affected by stock market developments and a positive co relation is found to have been existent between ICS economic growth and stock market indicators. On the other hand, the economic growth in BRICS is not influenced by equity index channels of financial developments and money supply. Samargandi et al. (2019) reports that economic growth is invariably affected by market capitalisation. This study has also established the fact that the spill over effect on the growth of other economies are caused by financial development shocks in the Indian and Chinese markets. As found by Shi and Liu (2019) the mean between stock price fluctuation and the business cycle is significantly caused engulfing all distributions barring Russia. Virtually, all quantiles are covered by directional variance excepting in the tales for all BRICS nations. Therefore, the fluctuations in the stock price and business cycle are considered by the investors and economic policy makers with a view to efficiently improve the investment policies (Bianconi et al., 2013; Caporale et al., 2016; Belke et al., 2017).

- a Stock market and FDI/FIIs: Studies found a significant relationship between Stock market and FDI. As FDI/FIIs comes the stock market has a direct impact.
- b Stock market and Gold and oil prices: stock market responds hugely to unprecedented oil price. Yildirim et al. (2018) found that positive shocks have been observed which have a statistically notable effect in the highly volatile zone across BRICS with the exception of China. Moreover, the volatility spillovers from gold and crude oil have been found affecting the BRICS stock markets by Pandey and Vipul (2018).
- c Stock market and exchange rates: It was also found that exchange rates are greatly influenced by stock markets during both turbulent and calm period. These insights provide important guidelines for portfolio investments and hedging of currency risk
- d Stock market and GDP: The stock market impacts the growth of economy's GDP by effecting the nation's financial conditions and confidence of consumers
- e Stock market with other macroeconomic variables: industrial production, exports, FDI, supply of money, rate of interest influence the movement of stock price. Simultaneously, Mensi et al. (2015) established a very positive connect between political, financial and economic risk ratings and the returns of the stock market of BRICS nation. Samargandi et al. (2019) report that economic growth is invariably affected by market capitalisation.

5 Discussion and research gap

5.1 Findings

This section discussed the findings and identifies research gaps on the existing literature on study of Macroeconomic Variables on the economic growth of BRICS countries in a systematic manner, where GDP has been proxied as measure of economic growth. The findings are further categorised into GDP and FDI; Export and GDP/GNP; GDP and Exchange Rate; GDP and other macroeconomic variables. It was found that GDP is significantly impacted by the macroeconomic variables under study in most of the cases.

The second objective of the study was to study the macroeconomic variables affecting the stock market of BRICS nations through content analysis. Efforts have been made to incorporate all the related studies and acknowledged the following issues which are pertinent to our research area. The findings are further divided into three parts, i.e., stock market relationship between BRICS countries; stock market relationship between BRICS countries and developed countries; stock market and FDI/FIIs; stock market with gold and oil prices; stock market and exchange rates; stock market with GDP; stock market with other macroeconomic variables. It was found that stock market is impacted significantly by the macroeconomic variables under study.

Further from the study, it can be analysed that majority of the study has been conducted on BRICS. The most of the comparative study has been conducted on BRICS in comparison to developed countries but the majority of the study is in comparison with US followed by UK. Less study has been conducted in comparison with emerging countries. Further, it can be said that less studies has been submitted in Growing Science, Euro Journals Publishing, IAEME Publication, ICTACT, SAGE Publications, SLAA

Private Publications and other publication houses. Majority of the study used in our study is from Elsevier database followed by Springer and Wiley which in combine have 26 studies. The total papers reviewed are empirical in nature. The data has been collected from secondary sources, e.g., MSCI data followed by World Bank database, World Development Indicators, Data Stream, Bloomberg and IMF data. Further, the majority of the study is quantitative. Conceptual and qualitative study is almost negligible. The study contains the articles that are published from 2008 to 2020 time period. Further, it can be concluded that there has been growing interest in this subject matter after 2013. The studies have been based on various variables like income growth, real interest rates, and inflation.

The present study identifies that The Elsevier, Wiley and Springer is the most important publishers, which has published articles related to this domain. The section highlighted the majority of the papers are quantitative (empirical) in nature. Qualitative and conceptual studies are merely found. This review also found that the Majority of the study has been conducted on BRICS. We can also notice that much of the work is comparative study. Most of the comparative papers were done in comparison of US economy but less study have been conducted in comparison with emerging countries.

5.2 *Theoretical implications*

This study provides the literature on the macroeconomic variables impacting the GDP and stock market of BRICS countries. It also discusses about the way literature has been taking shape since 2008, the time when these effects were first highlighted. Other scholars, who are interested in studying the effect of macroeconomic variables on the GDP and stock market of BRICS countries, will find this review paper useful to carry out their research in future. At the same time, while collaborating for publishing their papers in reputed journals, they will also be able to understand through this SLR impact of macroeconomic variables on the GDP and stock market of BRICS countries as well as the merits of this emerging theoretical framework.

6 **Conclusions**

This research paper covers the “impact of macroeconomic variables on the Growth of BRICS countries” and based on the established the five-step process as formulated by Rowley and Slack (2004) that comprises of

- a scanning the documents
- b making notes
- c structuring the literature review
- d writing the literature review
- e building the bibliography.

On the criteria of inclusion and exclusion, significant keywords, diversified database and time frame scanning is based on. After critical analysis we have come to know about certain gaps which need to be developed in further studies. There is need for comparative study between developed and emerging economies in order to analyse the gaps, to know

about strengths of the developed countries and weakness/loopholes of emerging countries, i.e., where it is lacking in comparison of developed countries so that right policies and decision can be taken. There is also a need to conduct further studies on BRICS countries individually to know about the details of each country of BRICS. There is a need for continuous up gradation of research to cope up with the changing world. It has also been seen that major study that has been conducted so far is empirical, there is a need for conceptual, review paper and articles also, it is a necessity to exchange ideas, views and knowledge at conceptual level, which will build a bridge between many broad and important topics connected to BRICS.

The limitation of the study is that, we have only undertaken some variables of macroeconomic variables, other variables like social, financial, energy, political and environmental indicators were excluded. But, at the same time its limitations become the future scope of the study for the researchers.

There is a large scope for the researchers to conduct further study on different variables and factors, on different time period, by different methods on different countries.

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Appendix

Table A1 Notable papers on macroeconomic variables in the BRICS countries

S. no.	Author name	Journal name	Publication house	Country	Regression	Cointegration test	VECM model	VAR	Granger causality	Impulse response	ARCH/GARCH family model
1	Kutu and Ngilawa (2017)	<i>Folia Oeconomica Strehnensia (FOS)</i>	De Gruyter Open (DGO)	BRICS	No	No	No	No	No	No	No
2	Mensi et al. (2016)	<i>Review of international economics</i>	John Wiley & Sons Ltd	BRICS	No	No	No	No	No	No	No
3	Ravi (2018)	<i>International Journal in Management and Social Science</i>	SLAA Private publications	BRICS	No	No	No	No	No	No	No
4	Ahmed (2008)	<i>International Research Journal of Finance and Economics</i>	EuroJournals Publishing, Inc	India	No	Yes	No	No	Yes	No	No
5	Elfakhani and Mackie (2015)	<i>Competitiveness Review</i>	Emerald Insight	BRIC	Yes	No	No	No	No	No	No
6	Bianconi et al. (2013)	<i>Emerging Markets Review</i>	Elsevier	BRIC, USA	No	Yes	Yes	Yes	Yes	No	Yes
7	Sushanta et al. (2013)	<i>Open Economic Review</i>	Springer	BRICS	No	No	No	YES	No	Yes	No
8	Mensi et al. (2014)	<i>Emerging Markets Review</i>	Elsevier	BRICS	Yes	No	No	No	No	No	No
9	Prakash and Kumar(2017)	<i>Journal on Management Studies</i>	ICTACT	BRICS	No	Yes	No	No	Yes	No	Yes
10	Chikili and Nguyen (2014)	<i>Research in International Business and Finance</i>	Elsevier	BRICS	NO	No	No	Yes	No	No	No
11	Pandey and Vipul (2018)	<i>Journal of Economic Studies</i>	Emerald Insight	BRICS	No	No	No	No	No	No	Yes
12	Mishra et al.(2015b)	<i>Global Business Review</i>	SAGE Publications	BRICS	No	No	No	No	No	No	No
13	Wait et al. (2017)	<i>International Journal of Management and Economics</i>	De Gruyter Open (DGO)	BRICS	Yes	No	Yes	Yes	No	No	No
14	Haili (2014)	<i>International Journal of Business and Social Science</i>	Center for Promoting Ideas, USA	BRICS	NO	No	No	No	No	No	No
15	Ogbeide and Akanji (2018)	<i>Accounting</i>	Growing Science	BRICS	No	No	No	No	No	No	No

Table A1 Notable papers on macroeconomic variables in the BRICS countries (continued)

S. no.	Author name	Journal name	Publication house	Country	Regression	Cointegration test	VECM model	VAR	Granger causality	Impulse response	ARCH/GARCH family model
16	Adu et al. (2015)	<i>Review of Development Finance</i>	Elsevier	BRICS	No	No	No	No	No	No	Yes
17	Su et al. (2012)	<i>Applied Economics Letters</i>	Taylor and Francis	BRICS	No	No	No	No	No	No	No
18	Asongu et al. (2018)	<i>Financial Innovation</i>	Springer	BRICS and MINT	Yes	No	No	No	No	No	No
19	Caporale et al. (2016)	<i>Finance Research Letters</i>	Elsevier	BRICS	No	No	No	No	No	No	Yes
20	Jabalaneli and Rasoulinezhad (2018)	<i>Journal of Chinese Economic and Foreign Trade Studies</i>	Emerald Insight	BRICS and China	No	No	No	No	No	No	No
21	Yildirim et al. (2018)	<i>Emerging Markets Finance and Trade</i>	Taylor and Francis & Group	BRICS	No	No	No	Yes	Yes	No	No
22	Bonga-Bonga (2017)	<i>Review of Development Economics</i>	John Wiley & Sons Ltd	BRICS	No	No	No	No	No	No	Yes
23	Ji et al. (2018)	<i>International Review of Financial Analysis</i>	Elsevier	BRICS, USA	No	No	No	No	Yes	No	Yes
24	Sahoo et al. (2018)	<i>Journal of Management (JOM)</i>	IAEME Publication	India	Yes	No	No	No	No	No	No
25	Mensi et al. (2016)	<i>Finance Research Letters</i>	Elsevier	USA, France, UK, Germany, Japan, BRICS	No	No	No	No	No	No	Yes
26	Núñez Mora and Mata (2019)	<i>Business Governance and Society</i>	Springer	BRICS	No	No	No	Yes	Yes	No	No
27	Sharma et al. (2019)	<i>The Globalization Conundrum—Dark Clouds Behind the Silver Lining</i>	Springer	EU, BRICS	Yes	No	No	No	No	No	No
28	Ruzima and Boachie (2018)	<i>Asia-Pacific Journal of Regional Science</i>	Springer	BRICS	Yes	No	No	No	No	No	Yes
29	Mohsedine and Marwa (2018)	<i>Journal of the Knowledge Economy</i>	Springer	BRICS	No	Yes	No	No	Yes	No	No

Table A1 Notable papers on macroeconomic variables in the BRICS countries (continued)

S. no.	Author name	Journal name	Publication house	Country	Regression	Cointegration test	VECM model	VAR	Granger causality	Impulse response	ARCH/GARCH family model
30	Jiménez-Rodríguez and Morales-Zumaquero (2019)	<i>The World Economy</i>	Wiley	BRICS	No	No	No	Yes	No	No	No
31	Balcilar et al. (2020)	<i>The World Economy</i>	Wiley	BRICS	No	No	No	Yes	No	Yes	No
32	Belke et al. (2017)	<i>The World Economy</i>	Wiley	BRICS	No	Yes	Yes	Yes	No	No	No
33	Raghutla (2019)	<i>Journal of public affairs</i>	Wiley	BRICS	No	Yes	No	No	Yes	No	No
34	Hammeudeh et al. (2016)	<i>The World Economy</i>	Wiley	Europe, BRICS, USA,	No	No	No	Yes	No	No	Yes
35	Patra and Panda (2018)	<i>International Journal of Financial Economics</i>	Wiley	BRICS, USA	No	No	No	Yes	No	No	Yes
36	Shi and Liu (2019)	<i>Finance Research Letters</i>	Elsevier	BRICS	No	No	No	Yes	Yes	No	No
37	Gupta and Sun (2019)	<i>Economics Letters</i>	Elsevier	BRIC, Australia, Brazil, Canada, Chile, Hong Kong, Japan, Europe and USA	No	No	No	Yes	No	No	No
38	Çepni et al. (2020)	<i>Research in International Business and Finance</i>	Elsevier	BRICS, USA	No	No	No	Yes	Yes	No	No
39	Berisha et al. (2019)	<i>Economic Modelling</i>	Elsevier	BRICS	Yes	No	No	No	No	No	No
40	Nahla et al. (2015)	<i>North American Journal of Economics and Finance</i>	Elsevier	BRICS, 22 developed economies	No	No	No	Yes	No	No	No