Macroeconomic Influence on the Stock Market: A Review

Influence on the Stock Market: A Review

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Abstract

The purpose of this study is to systematically review the finance theories, macroeconomic variables and the econometric methods employed by the past studies to investigate the nexus between the macroeconomic variables and the stock market. The study employs 58 studies, published in journals, which are rated by the Australian Business of Deans Council (ABDC). As per the review, dividend discount model, arbitrage-pricing theory and the efficient market model are the commonly used finance theories by the selected literature. The review results further showed that, selected past research have given more emphasize towards the macroeconomic variables and very poor attention on the international and global macroeconomic variables. Moreover, past studies have employed a very limited range of econometric methods to examine the association between the macroeconomic variables and the stock market.

Key Words: Stock market, macroeconomic variables, dividend discount model, arbitrage pricing theory, efficient market model.

INTRODUCTION

According to the theory of economics, an economy is a system, which allocates scarce resources among competing ends of a particular society. Macroeconomic variables are indicators which signal the current trends in the economy, like, the gross domestic product, rate of employment, consumer price index, balance of payments, broad money supply, lending interest rate, house hold consumption etc. (source: *https://data.worldbaindicatornk.org/*) . Stock market is an important segment in the financial system of any economy, as it facilitates the allocation of scares resources,by channeling the funds throughthe surplus units to the deficit units. As a part of a widespread economic system, stocks markets are inevitably exposed to theinfluences emerge within this system.

Over the past few decades, a large growing body of literature has investigated the influence of macroeconomic variables on the stock markets. However, a very poor attention has been given towards the review of such literature. Therefore, this paper aims to fill that gap by conducting

a comprehensive review on the carefully selected literature on this area. This study carries out a thorough literature review based on 58 studies, published in the journals, which are rated by the Australian Business of Deans Council (ABDC). The review comprises; the finance theories depict the nexus between the macroeconomic variables and the stock market, investigated macroeconomic variables and their effect to the stock market, and various economic tests and models employed to investigate the nexus between macroeconomic variables and the stock markets. The review will have important implications mainly for academic researchers.

heories on Macroeconomic Influence on Stock Market

Figure1 : Theoretical Background for the Nexus between the Stock Market and the Macroeconomic Variables.
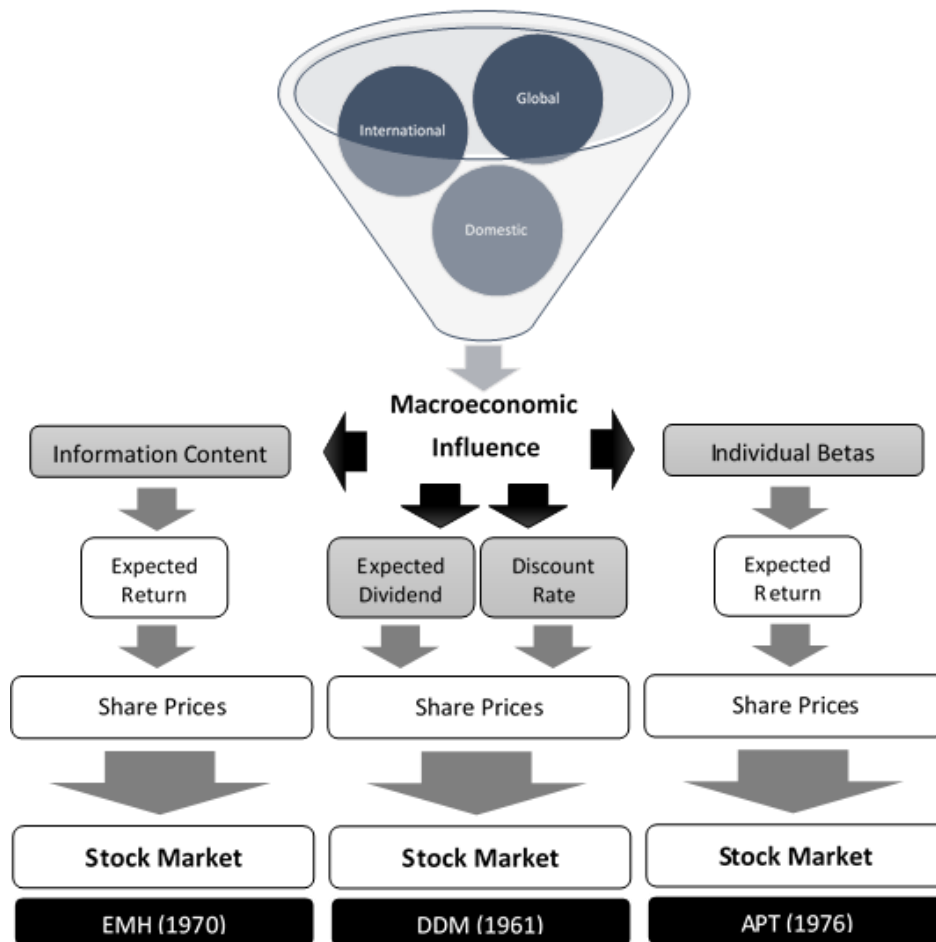
Dividend Discount Model (DDM)

DDM (Miller and Modiglliani, 1961) emphasizes the role of expected future dividends (or expected cash flows) and discount rate (or rate of return) in determining the current stock price. Change in any economic variable which influences expected cash flows and required rate of return will affect stock prices (Chen, Roll and Ross, 1986; Clare and Thomas, 1994; Khan *et al.*, 2015). Previous studies (for example; Gjerde and Sættem, 1999; Morelli, 2002; Gunasekarage, Pisedtasalasai and Power, 2004; Verma and Ozuna, 2005;Srivastava, 2010; Quadir, 2012) have highlighted the importance of DDM , in explaining the theoretical background of the nexus between stock prices and macroeconomic variables.

Efficient Market Hypothesis (EMH)

EMM (Fama, 1970) emphasizes the importance of available information in determining the share prices. Number of studies have attempted to examine market efficiency in respect tomacroeconomic information(Gay, 2008; Kurov and Stan, 2018).Ibrahim (1999)concludes that Malaysian stock market is not informationally efficient with respect to consumer prices, credit aggregates and official reserves.Kurov and Stan (2018) report that S&P 500 is significantly responding to the macroeconomic announcement emerge from real activity (which includes GDP, unemployment rate, employment, personal income, consumer credit), consumption (which includes new home sales), investment (which includes durable goods orders), government budget and prices (which includes producer price index).

Arbitrage Pricing Theory (APT)

APT (Ross, 1976) assumes that the returns on the particular subset of assets under consideration are subjectively viewed by agents (or factors) in the market. A number of studies have been carriedby employing APT to analyze the effect of macroeconomic variables on stock returns (or share price). Chen, Roll and Ross (1986) have developed a five-factor model including the macroeconomic factors; industrial production, expected inflation, unanticipated inflation, excess return of long-term corporate bonds over long-term government bonds and the excess return of long-term government bonds over T-bills.Clare and Thomas (1994) conclude that number of macroeconomic factors (such as oil prices, retail price index, UK private sector bank lending, current account balance) have been priced in the UK stock markets.Groenewold and Fraser (1997) propose a multifactor model, which incorporates both local and global macroeconomic variables. Srivastava (2010) employs a multifactor model to identified

macroeconomic factors (such as industrial production index, MSCI world equity index) which can explain pricing process of Indian stock market. Geambaşu *et al.* (2014) in their study apply APT on the Bucharest Stock Exchange and determined the macroeconomic factors with influence over shares' return.
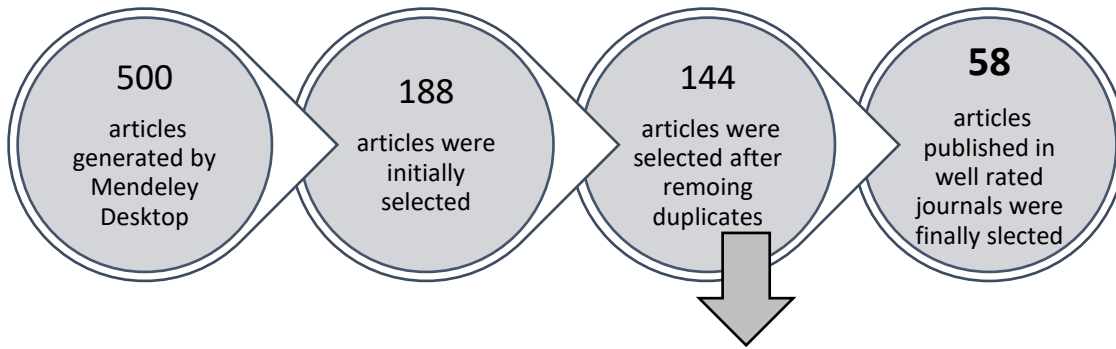
METHODOLOGY OF LITERATURE REVIEW

This study adopts the systematic literature review methodology following Tranfield et al. (2003) and Singh and Kumar (2014). As it is not possible to review all available literature on the topic, this review uses following delimiting boundaries for screening literature. These boundaries are;

- Papers which were published within the period 1986 to 2018 were considered;
- Papers with full-text available were considered.
- Papers published only in the journals rated by ABDC were considered;

For compiling the sample of published journal papers, a literature search was carried out in the light of Mendeley Desktop (version 1.19.1) , based on the keywords "Macroeconomic Variables and Stock Market" to be found in title, keywords or abstract. Initial search resulted in 481 published articles related to the topic. Subsequently, 188 articles were selected which are closely related with the research topic. Further screening removed 44 published articles which were duplicated. Finally, only 58 articles were selected as there were rated by the ABDC. The final sample of published 58 journal articles were analysed with respect to the to the citations, the year of publication, methodology used, journal of publication, country studied, econometric methods employed and macroeconomic variables examined and their impact on the stock market. Summary of systematic process of article selection and analysisis presented in Figure 2.

Figure 2: Summary of Systematic Process of Article Selection and Analysis

| 500 articles generated by Mendeley Desktop | 188 articles were initially selected | 144 articles were selected after remoing duplicates | 58 articles published in well rated journals were finally slected |

Systematic Analysis of Articles
Analysis by Year of Publication
Analysis by Journal of Publication

Analysis by Country Studied

Analysis by Research Methodology

Analysis by the Macroeconomic Variable and their

impact

ANALYSIS AND DISCUSSION OF LITERATURE

Fifty-eight articles identified through the systematic literature revieware analyzed in this section with respect to the citations, the year of publication, methodology used, journal of publication,country studied, econometric methods employed and macroeconomic variables examined and their impact on the stock market. The analysisis done to understand the trends and issues in the literature relevant to the macroeconomic influence on the stock market.

Citation Analysis

Citations means that someone has referenced work of other author(s). The citation analysis means studying cited references of a population of articles to find the most influential works in the field (Singh and Kumar, 2014). Current study used the citation information provided by Google Scholar for the purpose of citation analysis. The citation of each article is presented in Table 1.

Table 1: Citation of Articles

	Author(s)	No. Citations		Author(s)	No. Citations
1	Chen, Roll and Ross (1986)	5896	30	Rjoub, Türsoy and Günsel (2009)	71
2	Flannery and Protopapadakis (2002)	895	31	Hsing (2011)	70
3	Mukherjee and Naka (1995)	698	32	Tsoukalas (2003)	66
4	Wongbangpo and Sharma (2002)	432	33	Hussainey (2009)	58
5	Kwon and Shin (1999)	420	34	Yartey (2010)	56
6	Humpe and Macmillan (2009)	372	35	Brahmasrene and Jiranyakul (2007)	55
7	Bilson (2001)	336	36	Laopodis (2011)	49
8	Gjerde and Sættem (1999)	327	37	Shabri-Abd-Majid and Yusof (2009)	46
9	Ibrahim and Aziz (2003)	307	38	Quadir (2012)	46
10	Gay (2008)	265	39	Verma and Ozuna (2005)	40
11	Ratanapakorn and Sharma (2007)	233	40	Ready (2016)	36
12	Abugri (2008)	231	41	Srivastava (2010)	33
13	Gan, et al. (2006)	230	42	Havie (2007)	28
14	Chen (2009)	212	43	Ozcan (2012)	28
15	Ibrahim (1999)	194	44	Bouri, Jain and Biswal (2017)	26
16	Beltratti and Morana (2006)	194	45	Hsing (2011a)	23
17	Clare and Thomas (1994)	176	46	Hsing and Hsieh (2012)	21
18	Groenewold and Fraser (1997)	171	47	Snieska, Laskiene and Pekarskiene (2008)	15
19	Hondroyiannis and Papapetrou (2001)	137	48	Ato-Forson and Janrattanagul (2013)	14
20	Kyereboah-Coleman and Agyire-Tettey (2011)	126	49	Bhattarai and Joshi (2009)	11
21	Pal and Mittal (2011)	124	50	Kumari and Mahakud (2014)	11
22	Errunza and Hogan (1998)	120	51	GeambaŞu (2014)	10
23	Gunasekarage, Pisedtasalasai and Power (2004)	119	52	Yang et al. (2018)	8
24	Lijeblom and Stenius (1997)	114	53	Bhargava (2014)	8
25	Morelli (2002)	105	54	Kurov and Stan (2018)	7
26	Chinzara (2011)	87	55	Hassan and Al-refai (2012)	7
27	Osamwonyi and Evbayiro-osagie (2012)	83	56	Khan, et al. (2015)	7
28	Pilinkus and Boguslauskas (2009)	79	57	Kotha and Sahu (2016)	7
29	Hooker (2004)	71	58	Bastianin (2018)	6

It has found that all selected articles are cited more than 5 times. The 58 articles have 13,617 cited references. Average reference number was 235 per article. (Chen, Roll and Ross, 1986)is the most-cited article with 5896 citations. Mukherjee and Naka (1995), Kwon and Shin (1999), Flannery and Protopapadakis(2002) and Wongbangpo and Sharma (2002)were alsoamong the top five most-cited publications on macroeconomic influence on the stock market.

Analysis by Year of Publication

As per Figure 3, the analysis by year of publication shows that the selected articles were published almost consistently through the period from 1994 to 2018. Most of the research articles published are concentrated in 1999, 2009, 2011 and 2012. The highest number of studies is reported in 2009, which is 7. This could be attributed due to world economic slowdown during 2008 to 2009, which has urged the importance of investigation on macroeconomic influence on the stock market. The collapse in US economy in 2011 and the resulted world economic slowdown can be shown as the reason for the increased number of studies in the periods 2011 and 2012.

Figure 3: Analysis by the Year of Publication
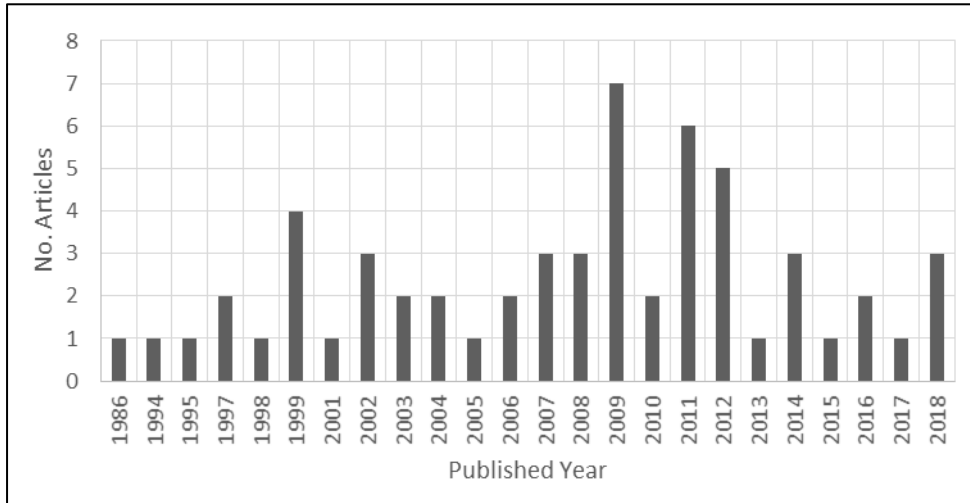
Analysis by Journal of Publication

The analysis by journal aims to identify the journals most involved in the study of literature about the macroeconomic influence of the stock market. In sum, 42 journals contained the selected published articles. All these journals are rated by the ABDC. Figure 4 presents those with more than one articles published on the macroeconomic impact on the stock market. It also shows that there are 9 such journals which provide more than one article. Applied Financial Economics provides maximum of 5 articles, whileInternational Journal of Economics and Financial Issues provides 4 articles published on macroeconomic impact on the stock market during 1986-2018.

Figure 4: Analysis by Journal of Publication

420
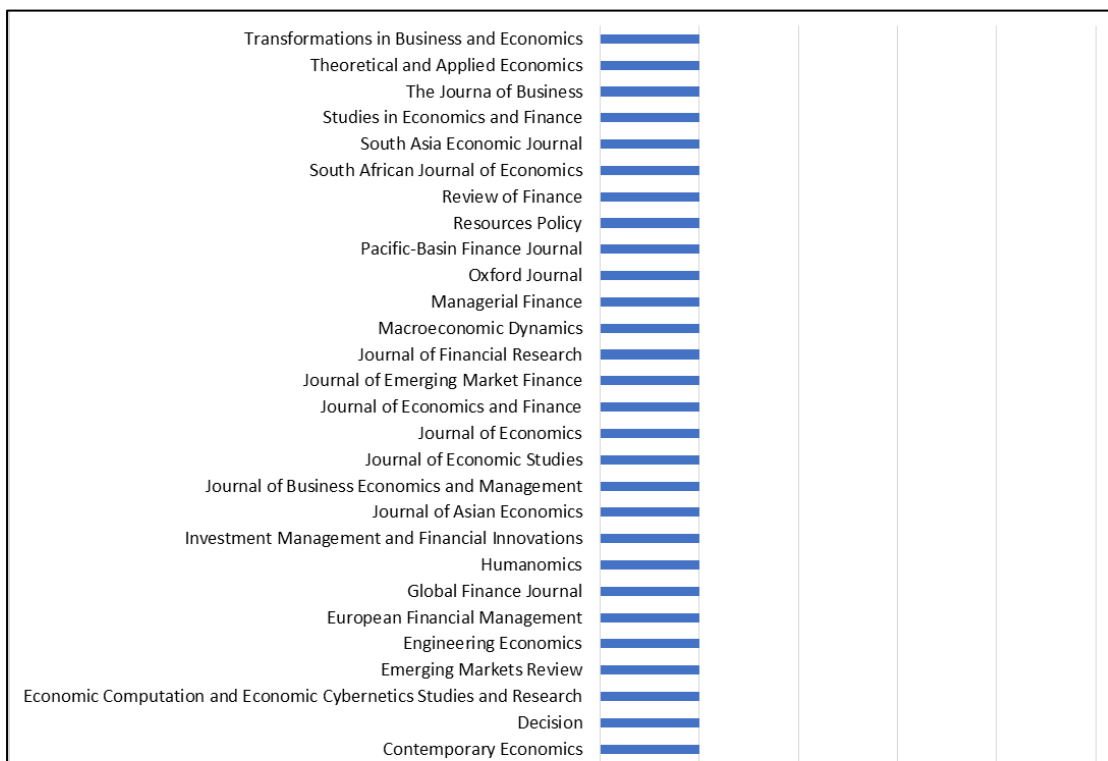
Anaalysis by Country Studied

Table 2 reports the countries chosen for selection of sample by the selected articles for the research. As per the table, 10 studies were carried out in based on USA market, which is the highest. Next is the Indian Market, which is appeared in 9 studies. Researchers have also given more priority towards the countries; Malaysia, Thailand, Brazil, Chile, Mexico, Turkey, Indonesia, Jordan, Pakistan, Philippines, South Africa, South Korea and Sri Lanka. There are 39 countries which appear in more than two studies.

Table 2: Analysis by Individual Countries Covered by Studies

	Country	No. of Studies		Country	No. of Studies		Country	No. of Studies
1	Argentina	3	24	India	9	47	Portugal	2
2	Argentina	2	25	Indonesia	4	48	Romania	2
3	Australia	1	26	Israel	1	49	Russia	2
4	Bangladesh	3	27	Italy	1	50	Saudi Arabia	1
5	Belgium	1	28	Jamaica	1	51	Singapore	1
6	Bolivia	1	29	Japan	2	52	Slovak	1
7	Botswana	1	30	Jordan	4	53	Slovenia	1
8	Brazil	6	31	Kenya	1	54	South Africa	4
9	Bulgaria	1	32	Lithuania	2	55	South Korea	4
10	Chile	5	33	Malaysia	7	56	Sri Lanka	4
11	China	3	34	Mexico	5	57	Switszerland	1
12	Colombia	3	35	Morocco	2	58	Taiwan	2
13	Costa Rica	1	36	Nepal	1	59	Thailand	7
14	Cyprus	1	37	Netherlands	1	60	Tunisia	1
15	Czech Republ	3	38	New Zealand	1	61	Turkey	5
16	Ecuador	1	39	Nigeria	3	62	UK	3
17	Egypt	2	40	Norway	1	63	Uruguay	1
18	Finland	1	41	Pakistan	4	64	USA	10
19	France	2	42	Panama	1	65	Venezuela	3
20	Germany	1	43	Paraguay	1	66	Vietnam	1
21	Ghana	2	44	Peru	2	67	Zimbabwe	2
22	Greece	3	45	Philippines	4			
23	Hungary	2	46	Poland	3			

Table 3 presents analysis by Morgan Stanley Capital Incorporation (MSCI) market classification (in 2018) and the number of countries covered by the studies. MSCI classifies stock markets as; developed emerging, frontier and standalone markets. As per the figure, researchers mainly focus on a single country setting for their study (47 studies). A little number of articles report on multiple counties settings (only 11 studies), which indicate lack of

systematic literature to compare findings across different contexts and cultures. According to this figure, the number of studies has been carried out within the emerging market context and developed market context. Only few studies are found within the frontier market context, which cover only one country. And no study is found within the frontier market context which cover multiple countries. Few studies are carried out between emerging and frontier markets, and emerging and developed markets. No study has been carried out covering frontier and developed markets, to investigate the macroeconomic influence on the stock markets.

Table 3: Analysis by MSCI Market Classification and the Number of Countries Covered by the Studies

	Single Country	**Multiple Countries**	**Total (No. Articles)**
Developed markets	17	3	**20**
Emerging markets	20	6	**26**
Frontier markets	8	0	**8**
Emerging & Frontier markets	-	1	**1**
Emerging & Developed markets	-	1	**1**
Frontier & Developed markets	-	0	**0**
Unclassified by MSCI	2	0	**2**
Total	**47**	**11**	**58**

Analysis by Research Methodology

Table 4 shows the frequency of the data used in the study. As per the table most of the studies has collected monthly data. The use of monthly data rather than daily or quarterly or annual data is in order to maximize the number of observations (Errunza and Hogan, 1998; Morelli, 2002; Yang *et al.*, 2018).

Table 4: Analysis by Frequency of Data

Data Frequency	**No. Studies**	**Percentage**
Daily	3	5%
Monthly	42	72%
Quarterly	10	17%
Yearly	3	5%
Total	**58**	100%

Table 5 shows the analysis of literature based on the econometric models and tests employed to investigate the macroeconomic impact on the stock market. As per the table, selected published articles adopt 18 econometric methods. Unit root test, the test of stationarity, is the most popular test within the selected studies as almost all the studies use time series data. Many studies (18) have employed cointegration analysis to investigate the long-run association between the macroeconomic variables and the stock market. Short-term impact analysis methods such as VAR, IRF, VDC and Granger Causality test have also employed in more than seven studies. There are 15 econometric methods, which have been employed in more than two studies.

Table 5: Analysis by the Econometric Methods

	Econometric Method	No. Studies
1	Unit Root Test	23
2	Cointegration Analysis	18
3	Vector Autoregressive Model (VAR)	15
4	Impulse Response Function (IRF)	12
5	Variance Decomposition (VDC)	10
6	Vector Error Correction Model (VECM)	9
7	Granger Causality Test	8
8	Multifactor Regression Models	7
9	GARCH	7
10	Error Correction Mechanism (ECM)	5
11	ARCH	4
12	Autoregressive Distributed Lag (ARDL) Model	3
13	Autoregressive Integrated Moving Average (ARIMA) Model	2
14	Principle Component Analysis (PCA)	2
15	Innovation Accounting Analysis	2
16	The common long memory factor model	1
17	Generalized Method of Moments (GMM)	1
18	General-to-Specific (GETS) methodology	1

Analysis by Macroeconomic Variablesand Their Impact

This section analyses the selected literature based on the macroeconomic variables, which have been investigated under the three sub-headings; domestic macroeconomic variables, international macroeconomic variables and global macroeconomic variables.

Domestic Macroeconomic Variables

Past studies identify, the domestic macroeconomic variables as country specific macroeconomic variables (by Gjerde and Sættem, 1999), state macroeconomic variables (by Fama, 1981; Chen, Roll and Ross, 1986; Clare and Thomas, 1994), country factors (by Abugri, 2008) and as local factors (by Khan et al., 2015; Yang et al., 2018).

Domestic Interest Rate

Proxies - Previous studies use a range of proxies for domestic interest rate for example; the term structure[9] of interest rate (Chen, Roll and Ross, 1986; Clare and Thomas, 1994; Chen, 2009), 3-month treaseary bill rate (Clare and Thomas, 1994; Khan *et al.*, 2015), 12-month treasury bill rate (Hondroyiannis and Papapetrou, 2001), 90-day bank-accepted bill rate (Groenewold and Fraser, 1997), 91-day certificate deposit rate (Yang et al., 2018), 3-month NIBOR rate (Gjerde and Sættem, 1999; Hooker, 2004), 6-month LIBOR rate (Snieška, Laskiene and Pekarskiene, 2008), Federal fund rate (Verma and Ozuna, 2005; Beltratti and Morana, 2006; Chen, 2009), policy interest rate (Abugri, 2008) and ten-year bond yield (Srivastava, 2010). Some researchers have used nominal interest rate (Osamwonyi and Evbayiro-osagie, 2012; Ozcan, 2012; Forson and Janrattanagul, 2013; Bhargava, 2014; Geambaşu *et al.*, 2014) while others use the real interest rate (Gjerde and Sættem, 1999; Hooker, 2004; Hsing, 2011a, 2011b).

Significant Impact - Mukherjee and Naka (1995), Hondroyiannis and Papapetrou (2001), Verma and Ozuna (2005), Abugri (2008), Humpe and Macmillan (2009), Hussainey and Ngoc (2009), Hsing (2011a), Kyereboah-coleman and Agyire-Tettey (2011), Hsing and Hsieh (2012) and Papadamou, Sidiropoulos and Spyromitros (2017) find a significant negative influence of domestic interest rate on the stock market. In contrast, Hussainey and Ngoc (2009) ShabriAbd.Majid and Yusof (2009) and Chinzara (2011) find a significant positive influence.

Short-run or Long-run Relationship - Moreover, a short-run nexus between domestic interest rate and the stock market was found by Gjerde and Sættem (1999), Pilinkus and Boguslauskas (2009), Al-jafari, Salameh and Habbash (2011) and Yang et al. (2018) whilst Bhattarai and Joshi (2009) Srivastava (2010), Ozcan (2012) and Kotha and Sahu (2016) find a long-run relationship.

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[9]This is calculated as; treasury bond rate *less* treasury bill rate(Chen, Roll and Ross, 1986)(Clare and Thomas, 1994)

Causal Relationship - Furthermore, a bidirectional causality between the domestic interest rate and the stock market was found by Wongbangpo and Sharma (2002) and Gunasekarage, Pisedtasalasai and Power (2004) whilst Beltratti and Morana (2006), Gan et al. (2006), Ratanapakorn and Sharma (2007) and Kumari and Mahakud (2014) find an unidirectional causality from domestic inter-est rate to the stock market.

Insignificant Impact - However, Clare and Thomas (1994), Chanchart, Valadkhani and Havie (2007), Snieška, Laskiene and Pekarskiene (2008), Laopodis (2011), Hassan and Al refai (2012), Quadir (2012) Forson and Janrattanagul (2013) and Kumari and Mahakud (2014) do not find a significant relationship between domestic interest rate and the stock market.

Domestic Inflation

Proxies - Some researchers have used the general inflation rate of the economy to analyse the influence of the change in domestic price level on the stock market (Errunza and Hogan, 1998; Morelli, 2002; Hooker, 2004; Beltratti and Morana, 2006; Chen, 2009). On the other hand CPI or consumer price index is the most commonly used proxy for domestic inflation (Bilson, Brailsford and Hooper, 2001; Verma and Ozuna, 2005; Khan *et al.*, 2015; Yang *et al.*, 2018). Moreover, WSPI or whole sale price index (Srivastava, 2010), retail price index (Clare and Thomas, 1994) and the index of manufacturing prices (Groenewold and Fraser, 1997) have also been used as proxies for domestic inflation.

Significant Impact - Mukherjee and Naka (1995), Humpe and Macmillan (2009), Chinzara (2011), Hsing (2011a, 2011b), Kyereboah-coleman and Agyire-Tettey (2011) and Hsing and Hsieh (2012) find that domestic inflation has a significant negative influence on the stock market, but Clare and Thomas (1994), Wongbangpo and Sharma (2002) and Ratanapakorn and Sharma (2007) find a significant positive impact.

Short-run or Long-run Relationship - Moreover, a short-run nexus between domestic inflation and the stock market was highlighted by Ibrahim (1999), Al-jafari, Salameh and Habbash (2011) and Yang *et al.* (2018) whilst Bhattarai and Joshi (2009), Srivastava (2010), Ozcan (2012), Forson and Janrattanagul (2013) and Kotha and Sahu (2016) state a long-run relationship.

Causal Relationship - Furthermore, a bidirectional causality between domestic inflation and the stock market was found by Wongbangpo and Sharma (2002), Al-jafari, Salameh and Habbash (2011) and Kumari and Mahakud (2014) whilst Ibrahim (1999), Tsoukalas (2003),

Gunasekarage, Pisedtasalasai and Power (2004), Beltratti and Morana (2006) and Ratanapakorn and Sharma (2007) state an unidirectional causality from domestic inflation to the stock market.

Insignificant Impact - However, Mukherjee and Naka (1995), Gjerde and Sættem (1999), Bilson, Brailsford and Hooper, (2001), Flannery and Protopapadakis (2002), Morelli (2002), Ibrahim and Aziz (2003), Verma and Ozuna (2005), Gan *et al.* (2006), Chanchart, Valadkhani and Havie (2007), Snieška, Laskiene and Pekarskiene (2008), Pilinkus and Boguslauskas (2009), Hussainey and Ngoc (2009) and Khan *et al.* (2015) do not find a significant relationship between domestic inflation and the stock market.

Domestic Output

Proxies - GDP or Gross Domestic Production is the most commonly used proxy for domestic output (Pilinkus and Boguslauskas, 2009; Osamwonyi and Evbayiro-osagie, 2012). Other proxies are; expected GDP growth (Hooker, 2004), GNP or Gross National Production (Flannery and Protopapadakis, 2002; Wongbangpo and Sharma, 2002), industrial production (Chen, Roll and Ross, 1986; Clare and Thomas, 1994; Errunza and Hogan, 1998; Gjerde and Sættem, 1999; Bilson, Brailsford and Hooper, 2001; Morelli, 2002; Yang *et al.*, 2018), IIP or Industrial Production Index (Groenewold and Fraser, 1997; Abugri, 2008; Chen, 2009; Srivastava, 2010; Khan *et al.*, 2015). Some researchers have used nominal output (Beltratti and Morana, 2006; Humpe and Macmillan, 2009) whilst others use real output (Gan *et al.*, 2006; Hsing, 2011b).

Significant Impact - Clare and Thomas (1994), Flannery and Protopapadakis (2002), Abugri (2008), Humpe and Macmillan (2009), Hussainey and Ngoc (2009), Hsing (2011b, 2011a) and Hsing and Hsieh (2012) find a significant positive impact from domestic output to the stock market. On the contrary, Hondroyiannis and Papapetrou (2001), Brahmasrene and Jiranyakul (2007) and Forson and Janrattanagul (2013) state significant negative impact.

Short-run and Long-run Relationship - Moreover, a short-run relationship between domestic output and the stock market was stated by Errunza and Hogan (1998), Al-jafari, Salameh and Habbash (2011) whilst, Kwon and Shin (1999), Srivastava (2010), Forson and Janrattanagul (2013) and Forson and Janrattanagul (2013) find a long-long run relationship.

Causal Relationship - Furthermore, a bidirectional causality between the stock market and domestic output was reported by Wongbangpo and Sharma (2002), Ratanapakorn and Sharma (2007), Al-jafari, Salameh and Habbash (2011) and Papadamou, Sidiropoulos and Spyromitros

(2017) whilst, Gjerde and Sættem (1999), Hondroyiannis and Papapetrou (2001), Tsoukalas (2003), Beltratti and Morana (2006) and Gan *et al.* (2006) report an unidirectional causality from domestic output to the stock market.

Insignificant Impact - However, Mukherjee and Naka (1995), Groenewold and Fraser (1997), Ibrahim (1999), Bilson, Brailsford and Hooper (2001), Morelli (2002), Laopodis (2011), Quadir (2012) and Khan *et al.* (2015) conclude that domestic output as insignificant.

Domestic Money Supply

Proxies - As pre the literature, narrow money supply (M1) is the most common proxy of money supply (Clare and Thomas, 1994; Bilson, Brailsford and Hooper, 2001; Morelli, 2002; Verma and Ozuna, 2005; Beltratti and Morana, 2006; Chen, 2009). Other proxies are; M2 money supply (Liljeblom and Stenius, 1997; Flannery and Protopapadakis, 2002; Ibrahim and Aziz, 2003; Chanchart, Valadkhani and Havie, 2007; Hassan and Al refai, 2012), and M3 money supply (Groenewold and Fraser, 1997; Shabri Abd. Majid and Yusof, 2009; Chinzara, 2011; Kumari and Mahakud, 20A14; Kotha and Sahu, 2016).

Significant Impact - A significant positive impact of domestic money supply towards the stock market was reported by Mukherjee and Naka (1995), Flannery and Protopapadakis (2002), Shabri Abd. Majid and Yusof (2009) and Hsing (2011b). In contrast, a significant negative impact is reported by Clare and Thomas (1994), Errunza and Hogan (1998), Abugri (2008) and Humpe and Macmillan (2009).

Short-run and Long-run Relationship - Moreover, Errunza and Hogan (1998), Ibrahim and Aziz (2003), Pilinkus and Boguslauskas (2009) and Al-jafari, Salameh and Habbash (2011) highlight a short-run nexus between domestic money supply and the stock market, whilst a long-run nexus is pointed out by Kwon and Shin (1999), Ibrahim and Aziz (2003), Gunasekarage, Pisedtasalasai and Power (2004), Bhattarai and Joshi (2009), Hassan and Al refai (2012) Ozcan (2012), Forson and Janrattanagul (2013) and Kotha and Sahu (2016).

Causal Relationship - Furthermore, a bidirectional causality between domestic money supply and the stock market was reported by Wongbangpo and Sharma (2002) while, an unidirectional causality from domestic money supply to the stock market was found by Tsoukalas (2003), Gunasekarage, Pisedtasalasai and Power (2004), Beltratti and Morana (2006), Brahmasrene

and Jiranyakul (2007) and Ratanapakorn and Sharma (2007). Unidirectional causality from stock market to domestic money supply (Al-jafari, Salameh and Habbash, 2011).

Insignificant Impact - However, Groenewold and Fraser (1997), Ibrahim (1999), Morelli (2002), Chanchart, Valadkhani and Havie (2007), Chen (2009), Chinzara (2011), Hsing (2011a) and Khan *et al.* (2015) find that domestic money supply as insignificant.

Other Domestic Macroeconomic Variables

Clare and Thomas (1994), Ibrahim (1999), Flannery and Protopapadakis (2002) and Mittal and Pal (2011) have analysed the impact of *domestic consumer credit* on the stock market. Chen, Roll and Ross (1986), Clare and Thomas (1994), Gan *et al.* (2006) Chinzara (2011) and Bastianin and Manera (2018) have studied the effect of *domestic crude oil prices* on the stock market. Effect of *domestic gold prices* was studied by Chinzara (2011). Gjerde and Sættem (1999), Morelli (2002) amd Laopodis (2011) have investigated the nexus between *retail trade* and the stock market. Groenewold and Fraser (1997) and Flannery and Protopapadakis (2002) study the effect of *domesticemployment* on the stock market while Snieška, Laskiene and Pekarskiene (2008), Pilinkus and Boguslauskas (2009) and Rjoub, Türsoy and Günsel (2009) study *domestic unemployment*. Chen, (2009) and Hsing and Hsieh (2012) investigate the impact of government *debt.* Flannery and Protopapadakis (2002) and Yartey (2010)analyse how *personal income* affect the stock market. Yartey (2010) analyses the impact of *domestic investment* on the stock market.

International Macroeconomic Variables

Past studies have used cross-country macroeconomic variables like exchange rate, inflation of a foreign country (Verma and Ozuna, 2005), regional macroeconomic variables like regional trade and regional economic activity (Khan et al., 2015). In this study, "international macroeconomic variables" cover all the macroeconomic variables outside the local economy, but which are not recognised under the global macroeconomic variables (see the sub section 2.2.3).

Exchange Rate

Proxies - Foreign currency exchange rate expresses a currency in terms of another currency. Previous studies have frequently used USD/Local Currency exchange rate (Bilson, Brailsford

and Hooper, 2001; Hooker, 2004; Khan *et al.*, 2015; Yang *et al.*, 2018). In addition to that Yen/Local Currency (Groenewold and Fraser, 1997), German Deutsche/Local Currency (Morelli, 2002) exchange rates were also found in literature. Some researchers use the real exchange rate (Shabri Abd. Majid and Yusof, 2009; Kyereboah-coleman and Agyire-Tettey, 2011) whilst others use the nominal exchange rate (Ibrahim, 1999; Tsoukalas, 2003; Verma and Ozuna, 2005; Snieška, Laskiene and Pekarskiene, 2008).

Significant Impact - Clare and Thomas (1994), Hondroyiannis and Papapetrou (2001), Ratanapakorn and Sharma (2007), Chinzara (2011) and Kyereboah-coleman and Agyire-Tettey (2011) find that exchange rate has a significant positive impact on the stock market. On the other hand Ibrahim and Aziz (2003), Verma and Ozuna (2005), Brahmasrene and Jiranyakul (2007), Abugri (2008), Gay (2008) and Hsing (2011a) report that as negatively significant.

Short-run and Long-run Relationship - Moreover, a short-run relationship between exchange rate and the stock market was found by Ibrahim (1999), Pilinkus and Boguslauskas (2009) and Al-jafari, Salameh and Habbash (2011) whilst, Kwon and Shin (1999), Ozcan (2012) and Kotha and Sahu (2016) find a long-run relationship.

Causal Relationship - Furthermore, a bidirectional causality between exchange rate and the stock market was reported by Wongbangpo and Sharma (2002) by Al-jafari, Salameh and Habbash (2011) whilst, Ibrahim (1999), Wongbangpo and Sharma (2002), Tsoukalas (2003) and Gan *et al.* (2006) report a unidirectional causality from exchange rate to the stock market.

Insignificant Impact - However, Mukherjee and Naka (1995), Groenewold and Fraser (1997), Morelli (2002), Gunasekarage, Pisedtasalasai and Power (2004), Rjoub, Türsoy and Günsel (2009) and Srivastava (2010) find no significant nexus between exchange rate and the stock market.

Foreign Interest Rates

Proxies - Abugri (2008), Hussainey and Ngoc (2009) and Khan *et al.* (2015) investigate the influence of *U.S. 3-month T-Bill Yield* on domestic stock market. Hsing (2011b) analyses both *U.S. Government Bond Yield* and *UK Government Bond Yield*. Wu and Lee (2015)studies the impact of *U.S. Money Market Rate* and *U.S. Term Spread* on domestic stock market. Verma and Ozuna (2005) in their comparative study investigate the impact of foreign countries' interest rates (Argentina, Mexico, Brazil and Chile) on each stock market under the study.

Significant Impact - Hussainey and Ngoc (2009) and Hsing (2011b) report a significant positive relationship between foreign interest rate and the domestic stock market whilst, Abugri (2008) and Hsing (2011b) find a significant negative relationship.

Insignificant Impact - An Insignificant influence was found by Verma and Ozuna (2005) and Khan *et al.* (2015).

Foreign Stock Markets

Proxies - Hsing (2011b), Hsing and Hsieh (2012) and Wu and Lee (2015) studies the impact of *U.S. stock market Index* on domestic stock market. Hsing and Hsieh (2012) investigate the influence of *German stock market Index* on Poland stock market while Hsing (2011b) analyses the effect of *UK Stock Market Index* on South African stock market. Gunasekarage, Pisedtasalasai and Power (2004) find the influence of *S&P 500 Composite Price Index* and *Nikkei 225 Price Index* on Sri Lankan stock market. Hsing (2011b) and Hsing and Hsieh (2012) have found a significant positive nexus between foreign interest rate and the domestic stock market.

Significant Impact - Hsing (2011b) and Hsing and Hsieh (2012) have found a significant positive nexus between foreign interest rate and the domestic stock market.

Short-run or Long-run Relationship - Gunasekarage, Pisedtasalasai and Power (2004) found a long-run nexus between the US stock market and Sri Lankan stock market.

Causal Relationship - Gunasekarage, Pisedtasalasai and Power (2004) found a unidirectional causality from the US stock market to Sri Lankan stock market.

Insignificant Impact- Gunasekarage, Pisedtasalasai and Power (2004) found no significant influence from the Nikkei 225 Price Index to Sri Lankan stock market.

Foreign Output

Proxies - Hussainey and Ngoc (2009) in their study investigate the impact of *U.S. Industrial Production* on Vietnam stock market Khan *et al.* (2015)analyse the effect of *regional GDP* of South Asia on the stock markets in Bangladesh, India, Sri Lanka and Pakistan.

Foreign Inflation

Proxies - Verma and Ozuna (2005) in their comparative study investigate the impact of foreign countries' inflation (of Argentina, Mexico, Brazil and Chile) on each stock market under the

study. Khan *et al.* (2015)analyse the effect of *regional CPI* of South Asia on the stock markets in Bangladesh, India, Sri Lanka and Pakistan.

Significant Impact -Khan *et al.* (2015)analyse the effect of *regional GDP* of South Asia on the stock markets in Bangladesh, India, Sri Lanka and Pakistan and found a significant relationship.

Other International Macroeconomic Variables

Clare and Thomas (1994) and Ozcan (2012) have examined the impact of *current account balance* on the domestic stock market. Influence of the *trade balance* is studied by Liljeblom and Stenius (1997), Kwon and Shin (1999), Flannery and Protopapadakis, (2002), Hassan and Al refai (2012) and Khan *et al.* (2015). Also, Ozcan (2012) investigates the effect of *export volume* on the domestic stock market. Ibrahim (1999) and Hassan and Al refai (2012) have studied the influence of *official reserves* on the domestic stock market. Wu and Lee (2015) examine the impact of *U.S. M1 and M3 monetary aggregates*, *U.S. credit spread* and *U.S. unemployment rate* on the individual stock markets of ten industrialized countries. Khan *et al.* (2015) analyses the effect of *regional money supply* and *interregional trade balance* of South Asia on the stock markets in Bangladesh, India, Sri Lanka and Pakistan.

Global Macroeconomic Variables

In this review, "global macroeconomic variables" covers macroeconomic variables, which are common to the entire world. Bilson, Brailsford and Hooper (2001), Abugri (2008) and Khan et al. (2015) in their studies clearly recognize global economic variables.

Global Crude Oil Prices

Proxies - Arabian Light crude oil (Gjerde and Sættem, 1999) and Brent Crude Oil Price Index (Gunasekarage, Pisedtasalasai and Power, 2004) are found in literature as proxies of global curd oil prices.

Significant Impact -Gay (2008) reports that global crude oil prices have a significant positive impact on the domestic stock market whilst, Brahmasrene and Jiranyakul (2007) and Chanchart, Valadkhani and Havie (2007) report that as negatively significant.

Short-run or Long-run Relationship - Moreover, Hassan and Al refai (2012) and Ozcan (2012) find a long-run nexus between global curd oil prices and the domestic stock market.

Insignificant Impact - However, Gunasekarage, Pisedtasalasai and Power (2004) do not find any significant relationship.

Global Inflation

Proxies - Gunasekarage, Pisedtasalasai and Power (2004) and Khan *et al.* (2015) studies the impact of global inflation on the domestic stock market, by taking *world consumer price index* (WCPI) as the proxy.

Insignificant Impact - Gunasekarage, Pisedtasalasai and Power (2004) and Khan *et al.* (2015) found no significant impact.

Global Stock Market

Proxies - Previous studies have used *MSCI World Index* as a proxy of global stock market to investigate the nexus between the global stock market and the domestic stock market (Bilson, Brailsford and Hooper, 2001; Gunasekarage, Pisedtasalasai and Power, 2004; Hooker, 2004; Abugri, 2008; Srivastava, 2010; Khan *et al.*, 2015).

Significant Impact -Bilson, Brailsford and Hooper (2001), Abugri (2008) and Khan *et al.* (2015) found significant impact.

Insignificant Impact -Gunasekarage, Pisedtasalasai and Power (2004), Hooker (2004), Khan *et al.* (2015).

Global Output

Proxies - Khan *et al.* (2015) includes global output into his study. Previous studies have used *Industrial Production Index of the OECD*(Gjerde and Sættem, 1999)*world industrial production*(Gunasekarage, Pisedtasalasai and Power, 2004)and *world GDP*(Khan *et al.*, 2015) as the proxies of global output or production.

Significant Impact - Khan *et al.* (2015) found a significant relationship between the global output and the domestic stock market.

Insignificant Impact - However |Gjerde and Sættem (1999) and Gunasekarage, Pisedtasalasai and Power (2004) found it as insignificant.

FINDINGS FROM LITERATURE REVIEW

Based on the analysis of selectedjournal articles, the current study found following issues most relevant to literature on, macroeconomic impact on the stock market.

5.1 Poor attention towards global macroeconomic variables

The review of literature based on the macroeconomic variables has shown that very little attention has been paid to research the impact of global macroeconomic variables on the stock market. Although some research has been carried out to examine the impact of international macroeconomic variables on the stock market, very few number of international macroeconomic variables (for example exchange rate) covered by such studies.

5.3 Lack of research in frontier markets

Compared to developed and emerging markets, very little number of studies has been conducted in the frontier market context.

5.3Lack of inter-country research

Most of the studies have given focus towards single country setting in evaluating the macroeconomic influence on the stock market. Very little number of studies was found which covers more than two countries. Identified research gaps in this connection are shown below;

- Poor attention towards the studies which cover multiple frontier markets,
- Poor attention towards the studies which cover frontier and developed markets,
- Lack of studies in the context of emerging and frontier markets,
- Lack of studies in the context of emerging and developed markets.

5.4 Lack of application in ARCH and GARCH models

Most of the studies have employed cointegration analysis, VAR, Granger Causality to examine the macroeconomic impact on stock market. Very poor attention was given by researchers to evaluate the association between volatilities of macroeconomic variables and the stock market by employing ARCH and GARCH models.

CONCLUSION

The review of literature based on the macroeconomic variables has shown that very little attention has been paid to research the impact of global macroeconomic variables on the stock market. Although some research has been carried out to examine the impact of international macroeconomic variables on the stock market, very few number of international macroeconomic variables (for example exchange rate) covered by such studies. This research gap can be filled by including many new and unexamined international and global macroeconomic variables into the future studies. Moreover, as the impact of given macroeconomic variables on a given stock market, varies based on different time intervals and based on different econometrics techniques employed. Thus, there is enough room to carry out research work time to time in the same context to capture and understand such impact.

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