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THE PROSPECTS OF MINT NATIONS: TESTING THE EFFICIENT MARKET HYPOTHESIS

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Abstract

MINT nations include Mexico, Indonesia, Nigeria and Turkey. The term was popularized by Jim O'Neill as these countries were emerging market giants like BRICS nations. These countries are expected to witness tremendous growth in the next few decades and hence it becomes necessary to test the efficiency of these emerging countries. Here in the study the closing prices of Mexico's Indice de Precios y Cotizaciones (IPC), Indonesia's Jakarta Stock Exchange Composite Index, Nigeria's All Share Index and Turkey's XU 100, were analyzed for the period between February 2012 and July 2018. The study applied Jarque-Bera test, Kurtosis and Augmented Dickey Fuller Test to test the Efficient Market Hypothesis in MINT nations. Mexico showed an inclination towards the efficient market, as the kurtosis was marginally leptokurtic and the probability of bubble formation could be low. Whereas Nigeria, Indonesia and Turkey failed to satisfy EMH as the stock market returns were substantially leptokurtic and even the probability of bubble formation could be comparatively higher for Nigeria and Indonesia than the other MINT nations. It could be concluded that MINT nations require certain reforms to achieve market efficiency.

Index Terms— MINT Nations, Efficient Market Hypothesis, Jarque-Bera test, ADF, Kurtosis, Stationarity
JEL Classification— G14, N25, N26, N27, C58, C87

I. INTRODUCTION

There has been extensive research on the Efficient Market Hypothesis, which originated in the 1960s and is debated for more than five decades in the financial markets. Fama (1970)[20] in his paper, has stated that only if the stock prices reflect the available information in the market, it can be called efficient market. As this condition is accomplished, participants in the market would not face abnormal losses or gains. Research by Fama (1998)[22] suggests that the returns over a long horizon must be examined to understand the inefficiency of the market. He further

provides shreds of evidence that the anomalies generated split randomly between underreaction and overreaction and analyzes that the expected value of abnormal returns is zero. This indicates that the market returns should pass through the normality test to be called efficient. It is analyzed that for short horizons normality gives a better approximation than for longer horizons. For long horizons, skewness becomes more important. This depicts the importance of skewness and kurtosis for testing the efficiency of the market. Fama (1970)[20] shows considerable evidence of positive dependence in changes in day- to- day prices and returns. Hence, to test the efficiency of the market, day- to- day returns are mostly considered.

The validity of the Efficient Market Hypothesis has important implications in the investment strategies and has relevance to regulatory authorities. Market participants devise their strategies considering the characteristics of the market. Market regulators also analyze the efficiency of the market to make certain reforms to ensure efficient capital allocation in the economy.

This paper tests the market efficiency of MINT nations. MINT nations include Mexico, Indonesia, Nigeria and Turkey. The term was identified by Jim O'Neill as these countries were emerging market giants and had certain similarities. The similarities included the "inner demographics" of the nations, the GDP was estimated to go up with some reforms within the nations, and the nations are in such a geographical position which would encourage trade with other countries.

MINT nations are considered as emerging market giants, and three of the four countries are included in G20 nations. Cowen (2018)[15] states that Mexico is the wealthiest country among the "middle income countries." Its per capita income is about $1800, which is greater than that of Brazil and China. Balji (2018)[9] identifies that Indonesia would be the next market for the growth and development of technology companies, as Asian markets are untapped and have high economic growth. Report by Reuters Staff (2018b)[50] states that due to the robust growth in construction and industrial output, Turkish GDP expanded 7.4% in 2017, its fastest annual rate since 2013. However, the current economic situation in Nigeria is not favorable as IMF suggests that Nigerian citizens are getting poorer owing to its slow recovery from the recession and further delay in policy action and the complex foreign exchange system is contributing to the tension in the economy.

The countries are expected to grow and hence it becomes necessary to test the efficiency of these emerging countries. This paper has tested the Efficient Market Hypothesis by analyzing the closing prices of Mexico's Indice de Precios y Cotizaciones (IPC), Indonesia's Jakarta Stock Exchange Composite Index, Nigeria's All Share Index and Turkey's XU 100.

II. LITERATURE REVIEW

This paper presents a thematic literature review, where the research conducted by the fellow researchers across the world is divided into two sections. The first section of the literature review throws some light on the Efficient Market Hypothesis and Stationarity, followed by section two, which includes the reports and research conducted on MINT nations both individually and as a whole.

Efficient Market Hypothesis and Stationarity:

This section addresses some of the literature works on testing EMH of various stock markets using normality tests and stationarity tests.

Fama (1998)[22] gives us the evidence that for short horizons normality provides a better approximation and for long horizons, skewness provides clearer approximation. To further substantiate this, Peters (1996)[4] identifies from the analysis of US stock market data, that the Random walk hypothesis is weakened if the data series is not normally distributed. Fama (1991)[21] has identified that there is a revival of interesting research on the predictability of stock returns from past returns and other variables. Hall & Sola (1993)[23] for the very first time introduced stationarity check and extended Augmented Dickey Fuller (ADF) test to analyze if the stock prices are stationary or moving towards explosive roots. Through ADF test Zeren & Konuk (2013)[56] tested the efficiency of emerging markets like India, Russia and China and concluded that the efficient market hypothesis is valid. KSS unit root test was also tested on markets like Argentina, Indonesia, Mexico and Turkey to conclude that the efficient market hypothesis could be accepted. Burak & Zeren (2014)[12] have used Fourier ADF unit root test and KSS unit root test to test the efficient market hypothesis for G20 countries. The results observed that nine markets had a weak form of efficiency. Further (Hamid, Suleman, Shah, & Akash, 2010)[24] tested weak form of efficiency using unit root tests in countries like Japan, Australia, Pakistan, Korea, Hong Kong, Thailand, Taiwan, India, Indonesia, Philippine and Sri Lanka and it was concluded that monthly prices do not follow random walk in Asia Pacific region as the returns were not normally distributed. Normality test for efficiency of markets was also conducted by Borges (2008)[11] to conclude that the countries with leptokurtic and skewed distribution failed the normality test. Similar tests were conducted by Dima & Miloş (2009)[16] in Romanian Markets, by Šonje, Alajbeg, & Bubas (2011)[48] in Croatian markets and by Shamshir, Baig, & Mustafa (2018)[47] in Pakistani stock markets to find the traces of efficient markets.

MINT Nations:

This section contains the reports and review of the literature on MINT nations both individually and as a whole. In the research by Durotoye (2014)[17], it could be understood that the term MINT was popularized by Jim O'Neill of Goldman Sachs as these countries have favorable demographics in the making. Post 2014, further research was conducted on MINT nations. Akpan, Isihak, & Asongu (2014)[1] have undertaken Panel data analysis to identify the determinants of foreign direct investment in MINT nations and was concluded that both the countries i.e., the investing country and the host country have mutually benefitted from FDI. Hence, it could be analyzed that the governments should gear up to maintain the economy level and make it attractive for investments. Another research on MINT nation includes the paper by Asteriou, Kaan, & Keith (2016)[7] which examines the impact of exchange rate volatility on international trade volumes. The paper concludes that the linkages can be found only in Turkey on a long-term basis. Another research by African Researcher Asongu (2015)[6] has assessed the growth determinants in MINT nations for the period 2001- 2011 and was concluded that governance is significant in non- contemporary specifications.

Mexico

Mexico is viewed as the economy with high potential. Reuters Staff report of (April 2018a)[49] states Mexico is Latin America's second largest economy, which grew by 1.1% in the first quarter of 2018 and also observes that the inflation has begun to ease for the convenience of the consumers. Further Millan (2018)[36] observes that London- based Index (FTSE), is working on partnerships with Latin American countries including Mexico, as global investors raise their exposure to emerging markets, as they have potential to grow. Mexico's focused stock index (MSCI Mexico ETF) is planned to be launched in the first quarter of 2019. Further to substantiate the growth story of Mexico it can be seen in the report of O'Boyle (2018)[40] that Mexico opens its second stock exchange, BIVA. Mexican economy has substantial potential to grow, as private capital funds are creating a new ecosystem of companies, which would be soon ready for public offerings. It could also be understood from the reports of Cowen (2018)[15] and Kitchener (2018)[32] that Mexico benefits as it shares its borders with the US. The migrants earn and the earnings are remitted to Mexico, which is a net benefit to Mexico. Dissertation by Lahrech (2007)[33] tries to find the link between the stock prices of Mexico and US post NAFTA agreement, using Dynamic Conditional Correlation (DCC) and the results show that NAFTA has increased the correlation between US and Mexican equity markets. But on the contrary, Blecker & Esquivel (2010)[10] analyzed the expectation and reality of economic impact on Mexico due to NAFTA agreement, based on the Mexico's growth, economic convergence, employment, wages, trade investments and income distribution and was concluded that NAFTA, failed to fulfill the promise of closing the development gap between US and Mexico. Further analysis by Nippani & Arize (2005)[38] indicates that Mexican markets are not only closely integrated with the US market, but also follows the events of the US as US markets do.

Indonesia

Though Balji (2018)[9] sees Indonesia to be the next market for the growth and development of technology companies, as Asian markets are untapped and have high economic growth, the report by Suhartono & Vishnoi (2018)[52] states that the series of terrorist attacks on Indonesia has shattered confidence among equity investors. Indonesian market overtook Philippines stock market in the race to the bottom. Jakarta Composite Index drops 8.1 percent this year, which is the worst in Asia. Following benchmark indices of Turkey, Mongolia and Dubai, Jakarta Composite Index (JCI) is the major loser for the year 2018, as per the data tracked by Bloomberg. Further reports by Salna (2018)[45] identifies that in Indonesia 40% of Indonesian government bonds are held by foreign investors. This makes the economy vulnerable to sharp outflows. The government also runs on current account deficit, as it needs to borrow for its spending. A similar situation was observed in 2013 when the Federal Bank raised the idea of withdrawing stimulus, and during this rupiah had decreased 20% against the dollar. But to the rescue of the investors, the report by Suhartono (2018)[51] states that top ASEAN money managers are seeing positive growth in Indonesian stock market, as it has reached its bottom level and is said to stabilize. Even in the past, it could be observed through the research of Khajar (2008)[31] that though Global Financial Crisis has impacted Indonesian stock market, the Indonesian capital market gave the highest average market return. Additionally, through the research of Sullivan (1993)[53] it could be observed that Indonesia has vested its economic growth through deregulation.

There has been extensive research on the Efficient Market Hypothesis of Indonesian Markets. Almudhaf & AlKulaib (2013)[4] has analyzed weak form market efficiency for CIVET countries, which includes Indonesia for the period 2002-2012 using unit root tests and variance ratio tests. The results showed that Indonesia follows a random walk process and the stock indices are stationary. Complementing to it Jeyanthi (2010)[27] proves that Indonesian market has weak form efficient as the series is non-stationary. But on the contrary, Jarrett (2010)[26] analyzes the weak form of efficiency in Pacific- basin, which includes Indonesia and finds that weak form of efficiency are violated as the stock prices of Indonesia are predictable and Hamid, Suleman, Suleman, (2010)[24] tested weak form of market efficiency for the period of 2004 to 2009 using Autocorrelation, Runs Test, Ljung-Box Q-statistic Test, the Variance Ratio and Unit Root Test in Indonesia and it was concluded that random walk does not exist as the monthly returns are not normally distributed as they are negatively skewed and leptokurtic. Even the researchers Wongbangpo (2000)[55] and Shaik & Maheswaran (2017)[46] find that Indonesian Markets reject the Efficient Market Hypothesis.

Nigeria

Nigerian stock market has been vastly analyzed by the researchers. Analysis of All Share Index, by Ikoku & Hosseini (2008)[25] shows that out of ten years, seven years gave positive nominal returns. But the real returns were positive only for four years and USD returns were positive for six out of ten years. To understand the determinants of Nigerian stock market development, John, Ojong, Sebastian & Akpan (2010)[28] analyzed the stock market in Nigeria from 1970-2007 and found that savings rate, one- period lagged stock market development and stock market liquidity were major predictors of development in Nigerian Market. Hence increasing the liquidity in the market by enlisting the stocks of domestic firms can increase the efficiency in the market. Another study by Nurudeen (2009)[39] on stock market development leading to economic growth as an evidence from Nigerian stock market, proves that development of stock market through increasing the efficiency and productivity of the firms, removal of market barriers, encouraging firms to access capital on the stock market would lead to the economic growth. Complementing to the study of Nurudeen (2009)[39], Asuquo & Akpan (2013)[1] signifies the importance of the Nigerian Stock Market in its economic development. Further Udoka & Anyingang (2013)[54] determines the relationship between All share Index of Nigeria, changes in stock prices, value of shares traded and market capitalization. It was found using the least squares regression technique that there is a direct relationship between market capitalization and All Share Index and was found that direct relationship existed between value of shares traded and All share index.

Osazee & Idolor (2014)[43] tested Nigerian stock market returns for the period April 2005 to Sept 2010 using mean, standard deviation, skewness, kurtosis, Jarque-Bera (JB) and ADF stationarity tests and it was identified that Monday, Thursday and Friday gave negative market returns and positive returns can be achieved on the days of Tuesday and Wednesday. It was also identified that by performing special transactions on Tuesday and Wednesday, abnormal gains can be made. Another paper by Campbell (2011)[13], studies the impact on the value of the companies traded in the Nigerian stock exchange based on the announcement of the stock dividend. Through the study, it was analyzed that the companies which chose their own announcement

dates outside the Nigerian stock exchange window, earned abnormal returns if they were traded frequently. but those companies which were not traded frequently faced abnormal losses. this again shows the failure of the weak form of efficiency. Though both the papers fail the assumption of weak form of efficiency in Nigerian Markets owing to the abnormal returns gained by the market participants, the research by Kelikume (2016)[30], Osad & Gabriel (2014)[42] and Magnusson & Wydick (2002)[34] provide evidences that Nigerian Markets has certain traces of efficient markets.

Turkey

Though the report by Reuters Staff Report (2018b)[50] states that due to the robust growth in construction and industrial output, Turkish GDP expanded 7.4% in 2017, its fastest annual rate since 2013, President Recep Tayyip has taken greater control of monetary policy and has made nation uninvestable. As the president tightened the grip, Turkey's default rose and stocks fell. The liquidity and, the fundamental shift in a the market looks like a crisis, as stated by Ashworth (2018)[5]. As per the report of Jones (2018)[29] the financial markets of Turkey are dilapidated as Lira is slumping, stock markets are not sound, and investors are dumping country bonds.

Researchers Naceur, Ghazouani, & Omran (2007)[37] try to identify the various macro-economic variables which have an impact on the stock market prices and development for MENA countries, which includes Turkey. The paper concluded that financial intermediary, saving rate, stabilization variable and stock market liquidity are the variables which have a significant impact on the stock market development and the paper by AlJahwari (2012)[3] concluded that foreign contributions and changes in oil prices do not have much impact on the stock market prices. Further the research on EMH provided weak signs of efficiency in the research conducted by Omran & Farrar (2006)[41] and El-Erian & Kumar (1995)[18], but on the other hand, Aksoy, Karatepe, Secme, & Benli (2013)[2] analyzed that the markets are inefficient as they were non-stationary.

III. RESEARCH METHODOLOGY

The study is focused on analyzing the Efficient Market Hypothesis of MINT nations by analyzing Jarque-Bera normality test, Kurtosis and Augmented Dickey Fuller test. Jarque-Bera test is the test of normality and Augmented Dickey Fuller test analyzes if the stock prices are stationary or are moving towards explosive roots. Here, log normal of the closing prices of Mexico's Indice de Precios y Cotizaciones (IPC), Indonesia's Jakarta Stock Exchange Composite Index, Nigeria's All Share Index and Turkey's XU 100 were calculated for the period between February 2012- July 2018.

IV. STUDY OUTPUT

The table 1.0 illustrates the results for Jarque-Bera Test and Kurtosis for the stock market returns of Mexico, Indonesia, Nigeria and Turkey.

TABLE 1.0 NORMALITY TEST AND SKEWNESS

	Jarque-Bera Test	Kurtosis	Remarks
Mexico	235.49	4.817298	Marginally Leptokurtic
Indonesia	766.6756	6.319713	Substantially Leptokurtic
Nigeria	1781.226	8.13719	Substantially Leptokurtic
Turkey	1646.261	7.786368	Substantially Leptokurtic

From table 1.0 it could be observed that returns of the stock indices of Indonesia, Nigeria and Turkey are substantially leptokurtic as the kurtosis is above 6 and the returns from Mexican stock indices is marginally leptokurtic as the kurtosis is closer to 3.
The Figure 1.0 illustrates the probability distribution of Indice de Precios y Cotizaciones (IPC), from February 2012 to July 2018.

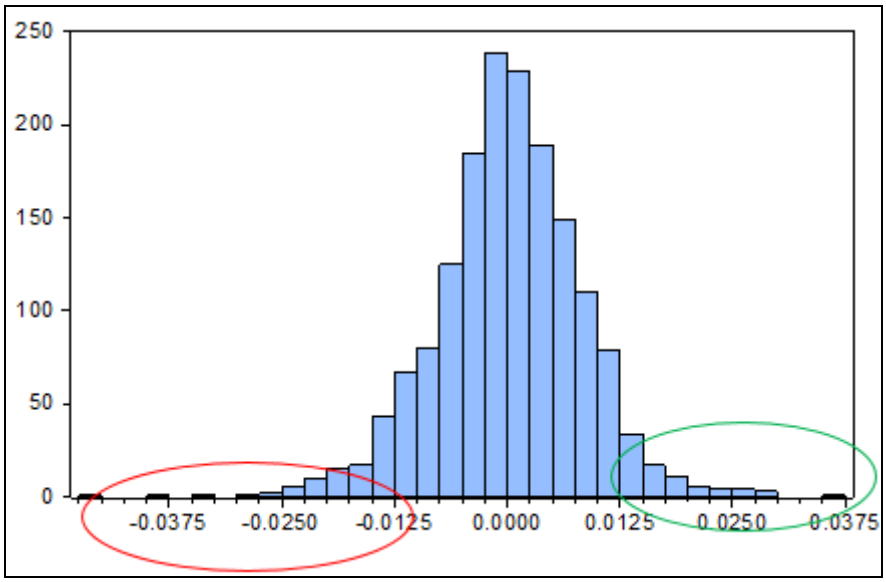

Figure 1.0 Probability distribution of Mexico's Indice de Precios y Cotizaciones (IPC)
From the visual perspective the data appears marginally leptokurtic

The figure 1.1 illustrates the probability distribution of Indonesia's Jakarta Stock Exchange Composite Index, from February 2012 to July 2018

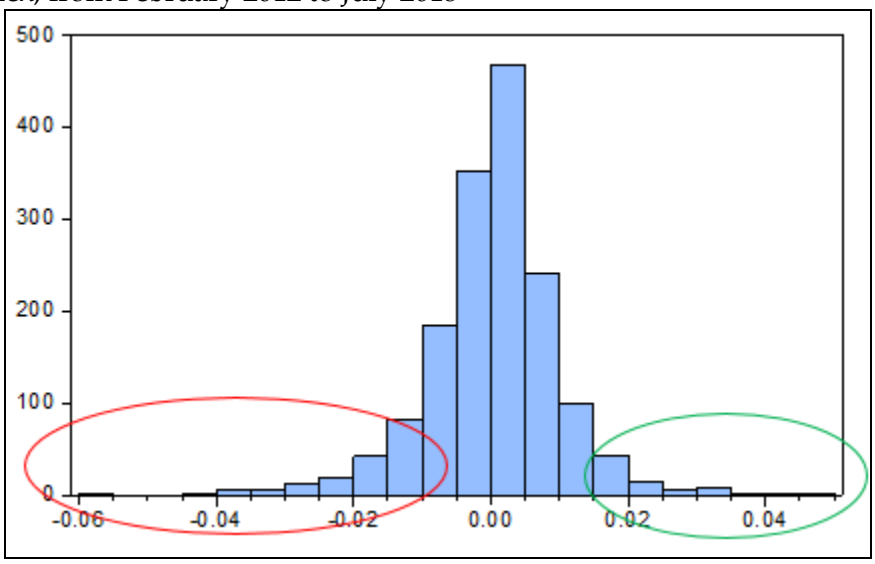

Figure 1.1 Probability distribution of Indonesia's Jakarta Stock Exchange Composite Index
From the visual perspective the data appears substantially leptokurtic

The figure 1.2 illustrates the probability distribution of Nigeria's All Share Index, from February 2012 to July 2018.

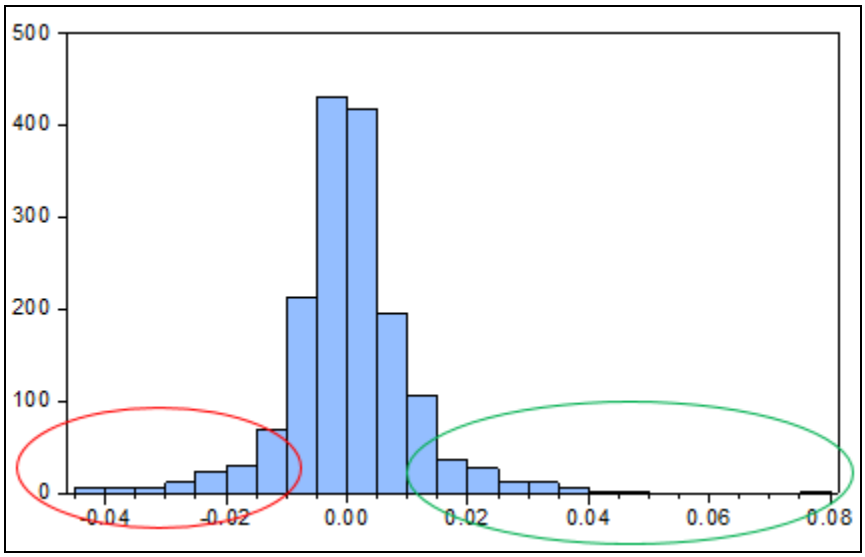

Figure 1.2 Probability distribution of Nigeria's All Share Index
From the visual perspective the data appears substantially leptokurtic

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The figure 1.3 illustrates the probability distribution of Turkey's XU 100, from February 2012 to July 2018.

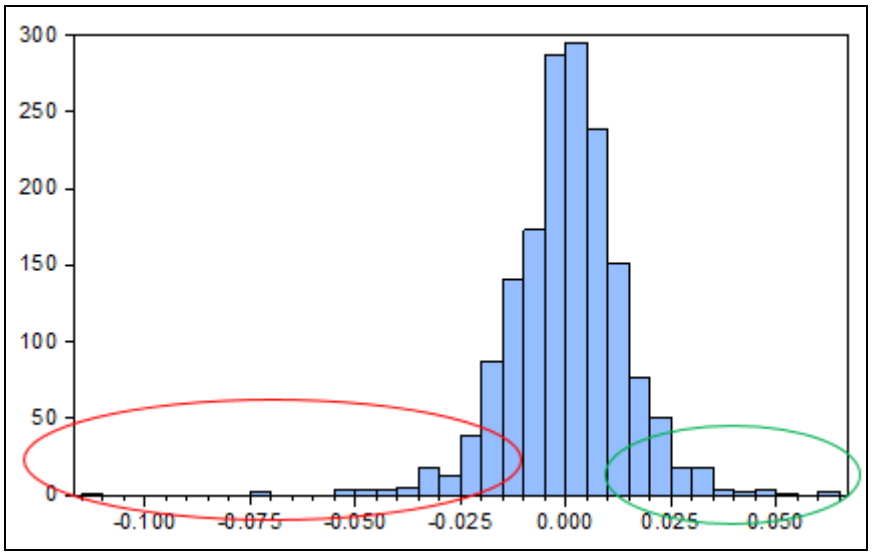

Figure 1.3 Probability distribution of Turkey's XU 100

From the visual perspective the data appears substantially leptokurtic

Stationarity Test [ADF]

Ho: Log normal of the prices have unit root

The table 1.1 illustrates the results of Augmented Dickey Fuller Test for the stock market returns of Mexico, Indonesia, Nigeria and Turkey.

Table 1.1 Stationarity Test [ADF]

	t- statistic	Probability	Common Remarks	Specific Remarks
Mexico	-36.98132	0	• Index values can be predicted • There is a possibility of bubble formation	• Probability of bubble formation is low
Indonesia	-25.53782	0	• Index values can be predicted • There is a possibility of bubble formation	• Probability of bubble formation is high
Nigeria	-28.25517	0	• Index values can be predicted • There is a possibility of bubble formation	• Probability of bubble formation is high

Turkey	-41.70383	0	• Index values can be predicted • There is a possibility of bubble formation	• Probability of bubble formation is low

From table 1.1 it can be observed that MINT nations are stationary and hence can be predicted. But as the indices are stationary, the probability of bubble formation in Indonesia and Nigeria is high, as the t- statistic is comparatively greater in these countries.

V. CONCLUSION

Fama (1998)[22] has depicted the importance of skewness for longer horizons to test the Efficient Market Hypothesis and has also stated that the expected value of abnormal returns is zero. Here Indonesia, Nigeria and Turkey are substantially leptokurtic. We analyze that Indonesia and Turkey have abnormal losses, whereas Nigeria has abnormal gains. These three countries fail to pass the efficiency test as they earn abnormal profits and face abnormal losses. Mexico, on the other hand, is marginally leptokurtic this shows an inclination towards the efficient market.

All the MINT countries have successfully rejected the Ho for ADF test, which indicates the Index values can be predicted, but this also brings along the probability of bubble formation. On observing the t-statistic it can be concluded that Nigeria and Indonesia have a high probability of bubble formation. This fails the Efficient Market hypothesis as Fama (1965)[19] has confirmed that bubbles do not exist in an efficient market.

As Mexico is marginally leptokurtic and has a low probability of bubble formation, it is inclined towards the efficient market. This can be justified with the reports of Cowen (2018)[15] and Kitchener (2018)[32] as Mexico is benefiting as it shares borders with the US. Even the Mexico is strengthening its financial market, by opening the second stock exchange in Mexico (O'Boyle, 2018)[40]

On the other hand, Nigeria's stock market returns have a kurtosis greater than 8 and the intensity of bubble formation could be high. This can be justified as Nigeria had entered into recession in 2016 as the prices of oil slumped from $100/ barrel to $48/barrel (Martin, 2016)[35] and the repercussion continues even in 2018 (Carsten, 2018)[14]. Therefore, it could be concluded that in the current scenario MINT nations require certain reforms to achieve market efficiency.

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