Capital Market Development and Economic Growth: Evidence from the Mint Countries

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Abstract

Mexico, Indonesia, Nigeria and Turkey are 4 countries referred to as the 'MINT', and have been predicted to be gigantic economies by 2050. Leading Authors and researchers have argued in various studies that financial development is an engine to economic growth, and it is expected that this will drive the realisation of the predictive outcome of these countries. The study thus focuses on how capital market development as a subset of financial development has directly translated to economic growth of the MINT for a 13-year period of 2000—2012, through the composition of a balanced panel dataset comprising capital market activity variables of market capitalisation ratio to gross domestic product (GDP), number of listed securities and value of transactions as ratios of GDP and gross fixed capital formation respectively; with key economic growth indicators of change in GDP, gross domestic savings relative to GDP and gross fixed capital formation relative to GDP. The results reveal that number of listed securities is the most impacting capital market development measure on economic growth of the MINT as a group. This indicator was seen to be negative and significantly related to GDP, but positive and significantly related to gross domestic savings and gross fixed capital formation ratios to GDP. Statistical evidence further shows that Indonesia is mostly affected positively by capital market development, especially since it both increases gross domestic savings and gross fixed capital formation ratios. It is recommended that the study's timeframe should be elongated in other to conduct long run econometric analysis that can be more valid and reliable.

Keywords: Capital market development, economic growth, market capitalisation, value of transactions and gross domestic product (GDP)

1. Introduction

MINT—an acronym that stands for Mexico, Indonesia, Nigeria and Turkey is a term that was first coined by Fidelity Worldwide Investment (2011) and later popularised by O'Neil (2013), as 4 developing countries that would soon be colossal as a result of immense contributions they would make to the world economy due to their speedy growth. In order to critically investigate this growth, the study theorises and strongly supports the notion that capital market development is an engine to economic growth based on evidences of extant literature in the subject. Therefore, quantitative measures that proxy for capital market development is used as independent variables against key economic growth indicators as dependent variables. Numerous studies have found mixed evidences regarding this link and thus the subject continues to receive much attention from researchers over time. For example, Carlin and Mayer (2003) argue that financial configuration and its intermediation process is an important predictor for economic growth rate, capital accumulation and productivity. On the contrary, Garretsen, Lensink and Sterken (2004) found a weak relationship between financial market development and economic growth, due to the fact that the former caused only a 0.4% increment in the later, which led them to posit that market capitalisation as a ratio of GDP, a proxy for financial market development is not a key determinant of economic growth.

1.1 Introduction to MINT

The characteristics of the MINT economies include features like able-bodied and young individuals who are expected to aid the growth of the ageing and shrinking population. Fraser (2011) defined the MINT as 'powerhouses' of the world economy which much attention should be given, compared to the BRICS—an acronym connoted to mean Brazil, Russia, India, China and South Africa. Additionally, O'Neill (2013) also perceiving these countries from their demographics as an important aspect of their economic development, predicts that they would be part of the ten biggest economies by the year 2050.

In this light, Turkey is seen to be strategically located at the edge of the European Union (EU) with billions of dollar worth of trade agreements with countries in Asia and Africa. Mexico too, considered as the largest economy in Latin America is also strategically located between the US and South America, with ever increasing exports. 75% of these exports are made to the US alone which has led to an increase in its GDP to about 3.5% yearly (Breard, 2015). Indonesia and Nigeria as well are leading the commodity production industry and are benefiting immensely from the ever growing demand of raw materials and fuel respectively. The MINT countries excluding Nigeria are also members of the 'G-20' major economies of both developing and developed

countries[1]. Nigeria's has more of a geographic advantage in that it is Africa's biggest economy, and has been the 26th largest economy in the world for more than 10 years (Adibe, 2014).

Considerably, another significant aspect of the MINT countries is that, they are members of the Next Eleven (N-11), another acronym much earlier coined by O'Neil (2005), comprising 11 countries that are expected to also have speedy economic growth in the 21st century; because as Adibe (2014) rightly points out, 2011 saw the MINT as top four countries in the N-11 jointly accounting for approximately 73% of the total GDP of the group.

1.2   Problem Statement

The effect of the 2007-2008 financial crisis on world economies has created increased interest in the financial sector, with its financial intermediation role of circulating money from surplus availability to deficit needs. With the Capital market at the centre of this function, its development has never been more important to the MINT as they are currently referred to as "frontier" (or emerging) markets in the international scene, according to Boseler (2013). The assumption therefore is that the development of the capital market will have a knock-on effect that will lead to a subsequent growth in the private sector, which will in turn cause an increase in the overall wealth of the economy through wage increases, higher standards of living of employees, business expansions and more tax funds to Governments, finally effecting an increase in overall spending for nation building, capital and infrastructural developments. Unfortunately, it is more likely that a break in this chain and other unforeseen factors may cause arbitrary effects to final outcomes.

Traditional economic growth theories of Harrold-Domar (1948) and Solow (1956)[2] also relied on assumptions that an economy grows as savings and labour force increases; as well as aggregate income being a function of consumption, investment and government spending respectively. But recent studies have failed to reach a consensus of what really is the driver for economic growth. While some argue strongly for capital market development, others posit that it is actually economic growth that precedes capital market development. As Zegada Escobar (2011) rightly points out, authors have opined that the development of capital markets and economic growth can both be mutually causal or exclusive. The core of this matter now is that when the BRICS were first formed, investors turned attention to these countries taking various risk approaches to making different investments with a long term view to reaping high returns. Perhaps, there may have been a widely agreed notion among those investors that economic growth can be reflected in the activities of the BRICS capital markets. Kirby (2015) revealed that financial institutions launched BRIC-themed funds to meet an insatiable demand by investors. However, the sluggish growth of Russia and Brazil in the group greatly affected the returns on these funds and ultimately threatened to crumble the bloc.

The lessons learned from the BRICS experience suggest that investors are weary of the MINT hype and financial markets are not too concerned about treating this disparate group of countries as a 'good bloc', in spite of data suggesting that they have stronger potentials than their predecessors (Elliott, 2014). In line with this, Wright (2014) argued that continuous public reforms has seen Nigeria grow at an average of 7% since the year 2000, but is being faced with political and security problems. Turkey too is able to achieve high growth, but at the expense of growing external imbalances. Indonesia and Mexico on the other hand both have market-friendly reforms, but are faced with their own share of idiosyncratic problems. The bugging question therefore is that can statistical evidence prove that the MINT countries are qualified, or have the potential to be considered as a syndicate of peculiar economic performances, as a result of the development of their capital markets over time? A discursive answer to this question is therefore the major goal of this research work.

1.3   Aim and Objectives

This study hence seeks to critically investigate the capital markets of the MINT economies, with measurements that proxy for markets development such as size, liquidity, volatility and integration as the independent variables, and how these have affected the growth of key economic growth indicators serving as the dependent variables namely: gross domestic product (GDP), gross domestic savings and gross fixed capital formation over the years of 2000—2014. In so doing, the following specific objectives are to:

- Critically assess the theoretical and empirical framework of capital market development and economic growth.
- Evaluate the capital market developments and economic growth of the MINT economies.
- Identify principal factors that seem to mostly influence the economic growth and development of the

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[1] The G-20 is an acronym for 'group of twenty', which are 20 different countries represented by key agencies of their governments and financial systems with the primary aim of promoting financial stability among its members. The G-20 nations are said to collectively account for as much as 85% of gross world product (GWP) and two-thirds of the world population. (EITI.org, 2015).

[2] These theories are discussed in more detail in the review of related literature.

MINT economies.
- Statistically reveal the MINT country that has the greatest growth potential from observed evidence.
- Unravel subjects for future research based on empirical findings and make rational recommendations.

1.4   RESEARCH QUESTIONS

In other to achieve the above objectives, the following questions are thus postulated:
- What are the theoretical and empirical evidences of capital market development and economic growth?
- How has capital market development aided economic growth of the MINT?
- Are there factors that mostly influence the economic growth of the MINT?
- Which MINT country has the greatest potential for growth from evidence?
- Is there a subject arising that demand future research attention?

1.5   Study Organisation

The study is structured into 5 chapters. First the *Background,* which discussed the introduction to the MINT economies, aim, objectives and research questions has been completed; while the *Literature Review* will try to answer the first research question and objective proposed through the critical evaluation of evidences from existing studies. This *Methodology* section will further go on to describe the dataset, statistical technique and justifications of its use. Subsequently, the *Results* of the tests thus follows with tables and figures of presentations including detailed discussions of their implications, which will then lead to the final chapter of *Conclusion and Summary* of findings.

2. Literature Review

To find out how Capital market development has directly affected economic growth, a critical review of a host of research studies are discussed here. The structure first starts with an overview of capital market development, as well as some theoretical viewpoints, primarily in relation to its activity indicators like, value and volume of transactions, volatility, liquidity, listed securities and index returns; then next is economic growth theories and empirical evidences, and finally an evaluation of the evidences of the relationship of both concepts. A summary is provided at the end to amalgamate the findings and provide a direct answer to the first objective and research question proposed in the Background.

2.1   Capital Market Development

The provision of an avenue where investors meet companies and the government who are interested in raising long-term capital in the form of equity and debt, is the major function of capital markets[1]. In other words, as Greenwood and Jovanovic (1990) puts it, a capital market fulfils the main financial intermediation role of redistributing funds from surplus uses to deficit needs. In terms of structure, the capital market is divided into a primary market for the issue of new securities, and a secondary market for the trading of these securities between investors. In terms of security-type, the capital market is divided into an equity market for the trading of common shares and equity related instruments, and the bond market for the trading of debt related instruments. There are a host of financial securities and instruments that are created with different risk-return classification primarily aimed at satisfying investors' appetite. It is observed that Capital markets are majorly considered among many reviewed studies in a more holistic approach of 'financial development', which mainly points to financial liberalisation, developed banking systems and strong regulatory oversights.

Thus, Capital market deepness is a term used to refer to how developed a financial system is, especially in relation to the integration of a capital market with international financial institutions. This deepness also directly relates to capital market activity of market capitalisation, trading and turnover of securities (Torre, Gozzi and Schmukler, 2007). These activities are key variables that are used in research literature to quantify the inner workings of a capital market, and compare these with other variables in an attempt to measure observable relationships. In a bid to clearly understand capital market development and decide what constitute a developed and developing or emerging capital market, Alrgibi, Ariff and Murray (2010) collected data from the World Bank of countries grouped into high-income, middle income and low-income categories in order to check the key differences in their capital markets. Market capitalisation as a ratio of GDP was seen to be significantly higher in high income countries than that of the other groups. This clearly justifies this variable as a significant determinant for the development of a capital market.

Similarly, as the allocation of funds is central to the core function of capital markets, liquidity is another

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[1] The term 'long-term capital' is traditionally described in financial studies as capital provided for investment for at least a year or longer (Sulivan and Sheffrin, 2003). That is not to say that capital market do not provide access to short term capital, but the long-term capital provision in this context is only used to describe a major determinant of well-functioning capital markets.

determinant of development with the identification of the fact that, the easier it is to convert financial investments into raw cash and vice versa, will ensure the efficiency and effectiveness of this function. Burger, Warnock and Warnock (2008) also conjectures that the level of development of a capital market is directly linked to the state of development of a country's economy, pointing the ratio of private credit to GDP, robustness of the Bond tier market and market size as measured by market capitalisation as key variables that shows this connection. Consistent with this, extant literature on the relationship between capital market development and economic growth is grouped into four main theories by Zegada Escobar (2011:23), of supply-leading, demand-following, mutual causation and mutual exclusion. He however posits that the supply-leading view is the most popular.

2.1.1   Supply-Leading

This viewpoint supports the motion that capital market development precedes economic growth, which implies that the causation relationship is that there are activities in capital markets that can favourably or adversely affect the growth of key economic system indicators. In testing this, İyidoğan (2013) employed a long run regression analysis based on the granger causality econometric test on 1998—2012 monthly data of Turkey to show that financial development has a direct but nonlinear relationship that causes growth of an economy. Eita and Jordaan (2007) also recommended that financial reforms and appropriate policies should be put in place to encourage speedy development of Bostwana's financial institutions, because it is seen that there was a unidirectional relationship between financial development and economic growth between the period of 1977—2006. The author made use of the similar granger-causality econometric test, but with a long run cointegrated approach of Vector Autoregression (VAR).

2.1.2   Demand-Following

Here, capital market development is seen to be preceded by economic growth. Therefore, the direction of causation opposite, that is, the economy has to be influenced by 'something' or a 'number of things' in order to grow, before observable development in form of key proxies of capital market activities can be identified. There are considerable amount of supporters for this theory, for example, Gries, Kraft and Meierrieks (2011) reveals that their tests of finance-led economic growth hypothesis on 13 Latin America and Carribean countries showed a stronger relationship of causality of economic growth to financial development with a VAR and Vector Error Correction Model (VECM) statistical analysis, thereby implying a negative relationship between financial development causing economic growth. Similarly, Rafindadi and Yusuf (2013) tried to find out whether the leading role played by the South African economy in the African continent is as a result of its economic growth caused by financial development. Their result shows that financial development does not cause growth in GDP, but instead, it is South Africa's trade openness and private credit issued by Banks that has fuelled growth between the 1980—2011 period. In contrast, Adusei's (2014) showed a one-way relationship of financial development to economic growth of 24 African economies between 1981—2010 with the same testing methods.

2.1.3   Mutual Causation

Capital market development and economic growth is seen from the standpoint of a mutually causal relationship here in that, there are factors that can both contribute to the growth of the economy and development of capital markets at the same time, and these influences in turn can affect changes on both sides. Apergis, Filippidis and Economidou (2007) provides support for this by showing that financial deepening as a measure of financial development has had a bi-directional causal relationship with economic growth of 15 Organisation for Co-operative Economic Development (OECD) countries and 10 non-OECD countries for up to 25 years. Acaravci, Ozturk and Acaravci (2009) findings is consistent with this theory as they also found a two-way relationship between financial systems and economic growth of 24 African countries.

2.1.4   Mutual Exclusion

This is perhaps the most controversial viewpoint of them all, and it is no surprise that there is a dearth of empirical literature that supports this. Proponents of this theory states that the growth of the economy or development of capital markets are not linked in any way, and therefore independent of each other. A study by Graff (1999) strongly posit the theory that financial transactions on capital markets and economic growth are not causally related, and even results that tend to refute this truth are not empirically established. He goes on to say that the latter (economic growth) is a popularised notion that has arisen from history, while the former (financial market development) is deep-seated in the financial revolution of the 17th century. However, after testing this, he consequently lends support for the supply-leading view.

2.2   *Economic Growth*

The concept of the drivers of Economic growth has been existing from time in memorial. The models developed by schools of thought of different views can be grouped into exogenous and endogenous[1]. In summary of these

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[1] The grouping into exogenous and endogenous models is especially curled from the work of Alghamedi (2012) where he defined exogenous as external factors affecting economic growth, and endogenous as internal factors or influences on

school of thoughts, it is of good point to note that only the exogenous models developed by the different authors is seen not to support capital market development as an additional influence on the economic system growth, especially when the 'steady-state' has been reached. Also, the mention of economic growth usually relates to common measures of economic earnings like gross domestic product (GDP) and per capita income or GDP per capita. In other cases, it involves a host of growth ratios, wealth accounting and developmental economic variables like income growth rate, unemployment rate, gross domestic savings and gross capital formation.

2.2.1 Exogenous Growth Factors

Neoclassical economists have been awarded much praise for developing exogenous models that attempts to explain the factors directly affecting the growth of an economy. These factors as they posit are 'external to the system'. The so-called idea of growth of an economy is first described by Harrod (1948) through the Harrod-Domar model and extended to include a "steady state" by Solow (1956), with the Solow-Swan model. They purport that the 2 major factors that affect economic growth are labour and capital. To put this more clearly, the theory suggests that an economy with an increasing workforce or lower unemployment rate, and unlimited availability of resources through accumulation of savings by households over time to fund capital intensive projects will naturally translate to growth—although this growth is dependent on how efficient the capital is used, which is measured by a capital-output ratio (Cheung, 2013). However, the higher the employment rate and increased capital, the growth will eventually become static without exhibiting much influence from any further inputs, based on the 'diminishing marginal returns' assumption[1].

Cass (1965) later showed that an economy reflect the above effects of labour and optimum capital savings in that gross domestic product (GDP) or output of goods produced annually will grow at the same static rate. Any other abnormal or additional growth that seems to reduce or increase this rate that is not labour nor capital comes from 'outside the model', which can be innovation and technological advancements. Through a detailed survey of academic literature on the economic growth theory paradigm, Spear and Young (2011) in support for the exogenous nexus to economic growth argued that it should be termed the model of "Cass-Malinvaud-Koopmans" in order to identify the significant contributions made by other authors like Koopmans (1965) and Malinvaud (1972).

2.2.2 Exogenous Growth Evidence

In quantifying the theoretical models of the exogenous growth theory, some authors have carried out empirical works in an attempt to put the case to rest. A very good detailed example is that of Bhattarai (2004) using a large panel dataset of 208 countries for up to 40 years (1960—2000), showing that savings, investments, tax, trade ratios and population growth rates can act as predictive variables that can explain growth rates in per capita income. The results of an ordinary least squares (OLS) regression analysis with country-fixed and time-specific effects, show that a first set of 6 Asian countries and 3 European countries have had significant increases in their per capita growth rates ever since 1960. The Organisation for Economic Co-operative Development (OECD) countries forming the second group only started showing significant growth from 1970 onwards, which later dwindled with time; while the third group which are poor countries in Asia, Africa and Latin America showed very low, negligible or even some cases, inversed growth in per capita income. The study concludes by positing that variables like inflation rate, government spending, economic openness and foreign exchange rate regimes are also significant in explaining economic growth.

Cheung (2013) in full support of the exogenous model explanations of economic growth, opined that it is not surprising to see that low income or developing nations usually enjoy significant growth, because their economies are still far from being at optimal growth states. For example, China has been growing at almost 10% for up to 30 years while UK only grew by a minuscule average of 2% in the same period. Similarly, Germany and Japan grew faster than the US in the 10 years period after World War II. These evidences perhaps is a result of high returns from inputs of personnel manpower, capital investments and technological advancements. Meanwhile, Camron (1998) earlier revealed that innovations and technological advancements in the form of research & development spending and patent registrations, have actually increased economic growth, but in a slow and uncertain pattern due to differences in the diffusion of these trends in governmental agencies, as well as small, large, indigenous and foreign companies that make up the economy.

2.2.3 Endogenous Growth Factors

When focus was driven in more detail to the internal workings of an economy, endogenous models were developed during the latter part of the 20th century to explain that the long term growth of an economy will usually result from a set of aggregate factors within the economic system 'in the now' (Alghamedi, 2012). One of the consequence of this new thought saw the abolishment of the diminishing returns idea of resource inputs, in order to constitute a robust framework that argues that interaction between producers creates a knowledge base

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economic growth that are inside the growth model.

[1] This is also referred to as the law of variable proportions, which states that new value derived from the consumption of an increased use of a resource will be less than the value derived from an earlier use, until it becomes nil or negligible.

that benefits everyone, in such a way that the value derived from the addition of capital and labour cannot diminish. Romer (1986) and Rebelo (1991) explains that holding the exogenous effect on growth constant, current government policies and decisions can affect the choices of households and companies in their provision of human capital and funds that drives production and investments. In so doing, long-term growth rate will experience an abnormal change that just cannot be explained by exogenous factors alone. Pagano (1993) in extending this theory argues that the growth that results from endogenous factors is a sustainable one.

2.2.4   Endogenous Growth Evidence

The endogenous growth framework provided the basis for researchers to realise that financial institutional developments can affect, and be affected by government policies, which will in turn affect the decisions of participants in the economy, and therefore influence long term economic growth. A typical example of an early study that tested these assumptions was that of Greenwood and Jovanovic (1990) who stipulated the financial intermediation role of financial institutions of distributing capital to better uses. They argue that this role allows growth and development of financial institutions to mimic that of key economic measures like investment rate and GDP, as far as the highest efficiency is achieved in the allocation of funds. From another perspective, Rivera-Batiz (2002) more recently showed in an endogenous model using a set of countries spanning the years of 1960—1990, that strong democratic nations tend to have higher economic growth, as the policies and decisions of Government would usually have a stronger impact on the economy.

2.2.5   Contemporary Issues

A paradigm shift that threatens to crumble the entire idea of economic growth theories is seen to be gaining momentum in the 21st century. It is the idea of measuring economic growth effectively, which Authors have argued is a major reason why models using GDP are not a 'one-size-fits-it-all' approach, because the influences on this variable largely differs among countries. Whereas, the growth of an economy is supposed to be measured from a human standpoint of how happy they are or how better their standard of living has become, as a result of good governance and technological advances. In this light, Costanza, Hart and Posner et al (2009) strongly criticizes the misplaced use of GDP to measure general economic progress. They call for a common consensus to be reached whereby better variables that truly tests for sustainable growth will be developed and used for empirical studies to suggest more valid policies for Government. But Coyle (2014, 2015) argues that even though the gap between what we care about and what GDP measures is getting bigger, there are no other better measures that are reliable.

2.3   MINT Economies and Markets

In line with Burger, Wanock and Wanock (2008) and Boseler (2013), the Mexican, Indonesian, Nigerian and Turkish economies are considered as developing or emerging, and the World Bank rightly classifies these economies as such. Therefore, their capital markets falls within the group of developing capital markets with specific determinants identified to be market size, liquidity, turnover, trade volumes, volatility and integration as pointed out by Yartey (2008). Based on *Figure 2.1* below, Levine (1997), tries to illustrate the link between capital markets and economic growth by pictorially showing how the functions of finance in an economy can endogenously lead to growth[1].

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[1] Levine's (1997) original diagram has been edited to fit this study.

Figure 2.1: Theoretical link of Capital markets to Economic growth
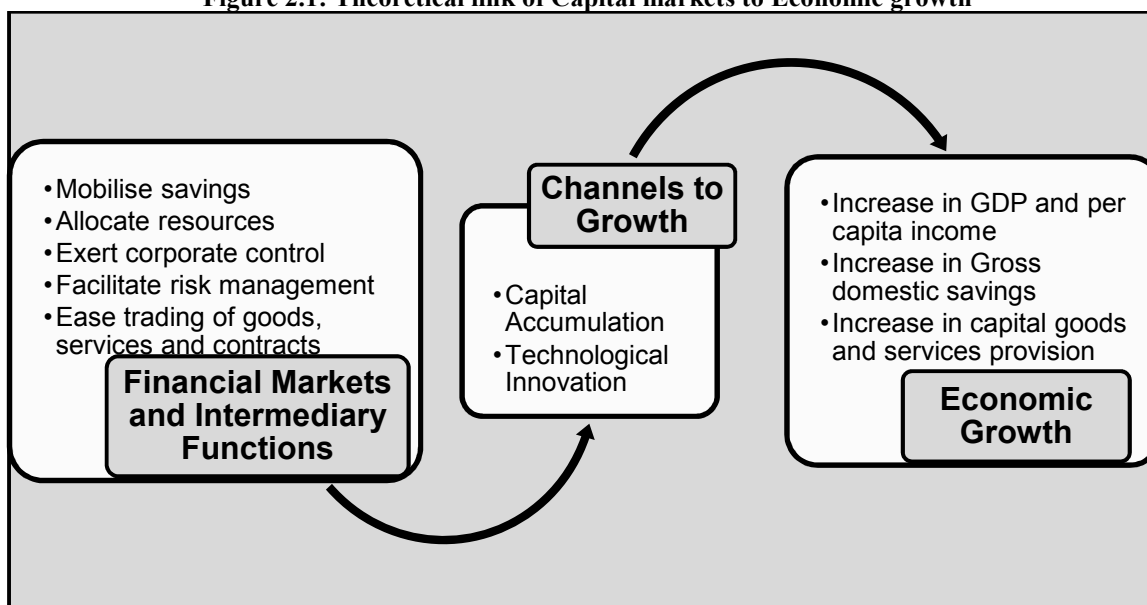
Source: Adopted and adjusted from Levine (1997)

Consequently, Rojas-Suarez (2014), posited that there are a group of 4 issues that can be regarded as the conditions for spurring the development of capital markets in emerging economies. These are macroeconomic stability, sound banking systems, high institutional quality and adequate regulatory and supervisory framework. While macroeconomic stability may refer to indicators of economic growth like GDP, per capita income, savings, unemployment rate and foreign direct investments and others, sound banking systems, high institutional quality and adequate regulatory supervisory frameworks on the other hand may not be quantifiable. However, close proxies can be made to constitute these qualities especially in relation to the activity or inner workings of the MINT capital markets.

2.3.1   Capital Market Activity

In a bid to understand the developments of the capital markets of the MINT overtime, their activities will be analysed by representation of market capitalisation, number of listed securities, value of transactions, turnover ratio and stock market index returns. These proxy for market size, liquidity and volatility which are central to financial development of an economy, in line with the opinions of Adries (2009), Arestis and Demetriades, (1997) as well as Levine and Zervos (1998) respectively.

Market Capitalisation (MCAP): Figure 2.2 (see Appendix B*)* shows MCAP as a percentage of GDP for the period spanning 1996—2012. MCAP is calculated as current average price of all shares of all listed companies in the market, multiplied by the total number of shares outstanding of these companies that are floated for trade. Nigeria and Indonesia recorded the highest peak in mid-2007 of up to 50% of GDP before falling sharply with its peers to about 20% of GDP in mid-2008. Ever since, Mexico, Indonesia and Turkey have recovered and finished off in 2012 with values of 44%, 43% and 39% respectively. Nigeria is however lagging behind with a value of only 12% in the same year. Overall, the MINT each had an average of 28%, 31% 16% and 29% respectively, which made their total average to be 26% for 25-year period.

Number of Listed Securities (NLS): Analysis of the NLS in Figure 2.3 (see Appendix B*)* shows that Indonesia is leading with an average of 346, seconded by Turkey with 307, Nigeria 200, and Mexico 155. While NLS is seen to have been steadily growing for Indonesia and Turkey for the 25-year period, Mexico seems to have been experiencing declining growth, while Nigeria has not recorded any major change since, as NLS was 183 in 1996 and only 192 in 2012. Furthermore, the global financial crisis that saw the demise of many companies did not seem to affect Turkey and Indonesia much, as they are seen to have recorded minor increases in number of listed companies in 2007 and 2008. NLS for Turkey in 2006 was 314 which increased to 319 and fell by only 2 to 317 in 2007 and 2008 respectively, while Indonesia on the other hand, had 344, 383 and 396 in 2006, 2007 and 2008 respectively. Average companies listed by the MINT for the entire period are 155, 346, 200 and 307 respectively with an overall average of all 4 countries of 252.

Value of Transactions (VAT): The trend in VAT as a percentage of GDP from 1996—2012 as shown in *Figure 2.4 (see Appendix B)* evidences highest activity in Turkey's capital market. VAT peaked to more than 65% of GDP in 2000, 47% in 2007 and 58% in 2010, before finishing off at 44% in 2012. However, the lowest points were seen in 1998 (25%), 2002 (30%) and 2008 (33%). None of its peers however has had a similar record, as their highest peaks were not even up to the lowest troughs of Turkey, which implies that trading activity was

slower in these other markets. Indonesia had 20%, 15% and 26% in 1997, 2005 and 2007 respectively, while Mexico had 11%, 6% and 10% in those same years. The Nigeria trend line creeps around the realms of 1% for most of the period, with its highest points in 2007 and 2008 of 10% each. This greatly weighed down on the overall average of all 4 countries with an approximate value of 16%.

Turnover Ratio: This indicator is stocks traded divided by the average market capitalisation as shown in *Figure 2.5 (see Appendix B).* It is observed that a similar pattern with VAT as a percentage of GDP is experienced among the MINTs. Turkey's trend line evidences highest activity with peaks of almost 200%, 195% and 163% for the year 2000, 2003 and 2011 respectively. Individual market averages were 30%, 48% 11% and 150% for Mexico, Indonesia, Nigeria and Turkey respectively, and the overall average was approximately 60%.

Index Return: The S&P Global Markets BMI is used as a measure of capital market index return as a measure for volatility, to give an incline of the riskiness of investments. It measures the price change of each MINT market in comparison to the USD as a national currency for the same 25-year period of 1996—2012. As shown in *Figure 2.6* below, returns trend of the individual markets almost closely follow themselves. Again, Turkey is seen to have the highest activity with an average of 35% return. This is followed by Indonesia and Mexico with each recording approximately 18%. Nigeria also lags behind here at 14%, while the MINT total average is 21%.

Figure 2.6: Annual percentage change of the S&P Global Equity Indices of MINT capital markets (1996—2012)
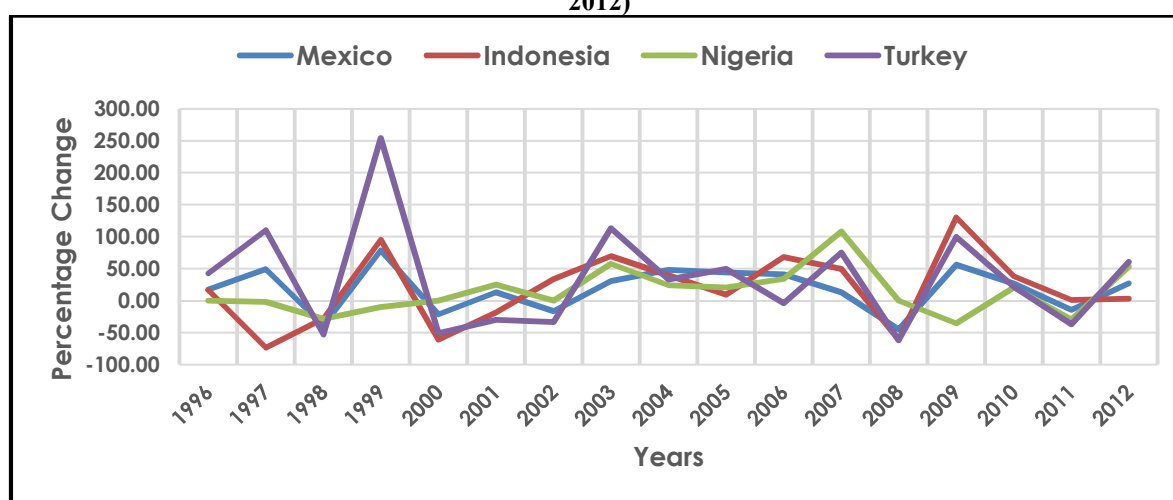
Source: Researcher's illustration from data obtained from World Bank (2015)

2.3.2 Macroeconomic Stability

In the context of the study, measures of macroeconomic stability will be taken to be broadly represented by GDP growth, gross domestic savings growth, inflation rate, unemployment rate, investments and others. However, it is good point to note that one of the major attributes noticed with the MINT economies were their demographics as revealed by O'Niell (2013), although data collected form the World Development Indicators (WDI) of the World Bank limited the analytics of this characteristics. But, historical data of some of the economic growth indicators were composed and are analysed below.

Gross Domestic Product (GDP): *Figure 2.7 (see Appendix B)* shows GDP growth rate in percentage terms for the MINT countries for 30 years (1984—2013). It is observed that GDP has not grown much overall as all countries are just slightly above 0% at the end of 2013. However, Indonesia and Nigeria seemed to have finished at the same percentage growth rate of over 5% in 2013. It is further observed that Nigeria had a very high spike of GDP growth between the years of 2003 to 2005 of almost 35%, with its lowest trough of negative growth in 1987 of less than 10%. Indonesia too is seen to have had a negative growth of about 12% in 1998. Mexico has the slowest growth with a 30-year average of only 2.63%, followed by Turkey with 4.39%, and Nigeria and Indonesia with 4.63% and 5.36% respectively. Total average GDP growth of the MINT is recorded at 4.25%. GDP per capita growth has an exact same pattern.

Gross Domestic Savings (GDS): Analysis of MINT's GDS as a percentage of GDP shown in *Figure 2.8 (see Appendix B)* shows that on average, Indonesia has been able to save more than her peers. From the definition of GDS which is GDP less consumption, this means that Indonesia consumes far less and saves more. GDS was at its highest in 2011 which was above 35% of GDP. As at the end of 2013, Indonesia's GDS stood at 33% and an overall average of 31% for the entire period. Mexico records the steadiest pattern of this indicator for the 30-year period, but has a lower GDS percentage of almost 21% at the end of 2013, with a total average of almost 22%. The lowest trough in GDS was experienced by Nigeria in 1998 when it was at a minuscule 1.83%, while the highest peak among her peers was also experienced in 1989 and 2000 of more than 39%. The total average of the MINT countries is 23%.

Gross Capital Formation (GCF): This represents the total monetary amount that has been expended on capital goods and services like roads, bridges, drainages, healthcare institutions among others by the Government. This indicator sometimes is used as a yardstick to measure the infrastructural development of a country. As shown in *Figure 2.9 (see Appendix B),* the GCF as a percentage of GDP of Indonesia is yet highest again from 1984 (27%) till the end of 1997 (32%), and from 2001 (23%) until 2013 (34%). This suggests that Indonesia has expended more on capital goods year-on-year for the entire 30-year period. The lowest is Nigeria again with a GCF in 2013 of 15% and an overall average of 11% among her peers in the entire period. Its highest peak was observed in 2010 of 17.29%. Mexico and Turkey record averages of 22% and 21% respectively, and the combined average of the MINT stands at 20.33%.

Foreign Direct Investments (FDI): The amount of investments foreign companies resident in other countries invests in the MINT is revealed by FDI. *Figure 2.10 (see Appendix B)* shows that Nigeria surprisingly records the highest average FDI as a percentage of GDP of 3.37% for the 30-year period, with the highest peak of more than 10% in 1994 alone. However, FDI has fallen to its lowest among her peers in 2013 of only 1%. In contrast, Mexico has the highest FDI in the same 2013 of almost 4%. Indonesia and Turkey is seen to record the lowest average FDI for the period of 0.93% and 0.99% respectively, but Indonesia had the lowest trough in the year 2000 of -2.76%, which implies net FDI outflows. The total FDI average for the 4 countries of the MINT is 1.86%.

Inflation: The Consumer price index (CPI) is used as the measure for inflation for the MINT for a period of 40 years spanning 1974—2013. This is a measure of the annual percentage change in prices of a basket of common goods and services of the consuming populace. As shown in *Figure 2.11* below, Mexico recorded the highest inflationary peak of more than 130% in 1987, but has fallen to its lowest of almost 4% in 2013. This percentage is also seen to be the lowest among the other MINT countries, as Indonesia, Nigeria and Turkey are observed to be having percentage values of 6%, 9% and 8% in that same year. Indonesia is seen to have had the steadiest inflation trend which has been under 20% for most of the period, followed by Nigeria under 35% for most of the period, and an overall average of 21%. Lastly, Turkey is observed too to record the most peaks of more than 100% with an overall average of 45%. The total average for all 4 countries stands at 25%.

Figure 2.11: Inflation (Consumer Price Index (CPI) Percentage Change) of the MINT (1974—2013)
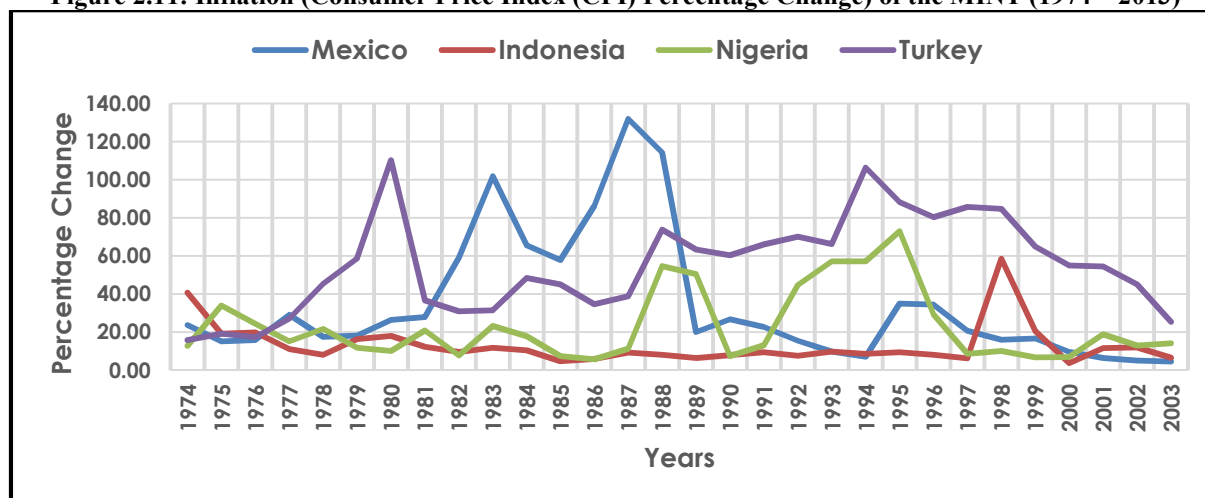
Source: Researcher's illustration from data obtained from World Bank (2015)

2.4 Evidences of Capital Markets and Growth

Findings for capital market development's impact on economic growth have failed to reach a common conclusion, especially as authors have employed different statistical technics that have various shortcomings. Studies can be largely grouped into Time series, Cross sectional and Panel data analysis. Lu (2001) noted that as time series analysis depends on a large array of data, the Vector Autoregression (VAR) test when used can amount to loss of degrees of freedom which affects the reliability of results. Cross sectional studies on the other hand are said to be limited to heterogeneity and omitted variable bias (Ang, 2008), while panel analysis averages data across time and may not be suitable for long run tests (Levine, 2003).

2.4.1 Time Series Analysis

Hossain and Kamal (2010) conducted a long run study on the Bangladesh economy to test the effect of stock market development on their economy for over 30 years of 1976—2008. Stock market development was represented by market capitalisation as a ratio of GDP, while economic growth was represented by GDP and income per capita. Their granger causality and cointegration test on the dataset showed that there is a long run association between capital market development and economic growth, which is unidirectional in nature, i.e.

stock market developments lead to economic growth.

Another study by Al-Qudah (2014) used market capitalisation and value of trades as a ratio of GDP to represent stock exchange development of the Jordan economy from 1978—2012. The vector auto correction (VECM) and pairwise granger causality test results show that there is a positive and significant relationship between capital market developments with GDP. This relationship was also seen to run only from market development to economic growth.

Nguyen and Pham (2014) also carried out a time series study spanning 1981Q3—2012Q3, to check the effect of stock market development on economic growth in Canada and Australia of which they found a unidirectional positive and significant relationship between stock market development and economic growth in Canada. But Australia evidenced a negative relationship. This is similar to a case study of Mauritus and Nowbutsing (2009) who measured stock market size and liquidity using market capitalisation and value of shares traded, to show that there is a positive relationship of stock market development that leads to growth in GDP.

A short run time series study on the effects of market capitalisation ratio (MCR) on GDP growth of newly industrialised countries namely Brazil, India, Mexico and others showed that capital market development and economic growth is country specific, as the Granger causality test for Mexico evidenced a unidirectional relationship of MCR to GDP, while many others were different by showing bi-directional relationships. However, Mexico failed the stationarity and cointegration tests, implying that the Mexican stock market was not stationary in 2005. Many economic problems have been pointed out for Mexico according to a study by the IMF and World Bank (2013). It is noted that Mexico lacks long term investments and complex developmental issues that has the potential to stunt market development.

2.4.2   Cross-Section Analysis

A study on the relationship between capital inflows of foreign direct investments into the capital markets of 103 countries, between 2001—2007 by Luca and Spatafora (2012), showed that foreign direct investments and domestic credit do not translate to long term investments, capable of increasing fiscal balance as a share of GDP, and stabilise consumer price index (CPI) as a measure of inflation. Said differently, this simply means that capital market activity does not translate to economic growth.

Luintel, Khan and Arestis et al (2008) used a data sample of 14 countries for 27-30 years (including Mexico and Indonesia) to compose a cross sectional dataset, in the test of financial structure and development with output levels of GDP and gross fixed investments (GFI). A 'fully modified ordinary least squares (OLS) regression' analysis was employed as the econometric test, and the results reveal mixed findings between the independent variables of stock market capitalisation ratio and value of transactions with economic growth. 5 countries showed positive associations, 4 were negative, while the other 4 were insignificant. It was however concluded that the relationship between finance and growth is specific to a countries economic structure.

It was indeed a puzzle for Ghimire and Giorgoni (2009) who argue that their extensive study of how stock market activity lead to economic growth reveals contradictory findings. They however proceeded to compose a cross sectional data of 121 countries for over 36 years, with stock market capitalisation, value of shares traded and turnover ratio as proxies for financial development, with GDP, GDP per capita and gross capital formation as indicators of economic growth. Their findings were also mixed, as stock market variables showed positive relationship with economic growth variables both in the long run and short run. In contrast, bank activity institutional variables were negative with economic growth in the short run.

2.4.3   Panel Analysis

Using a panel VAR framework on 15 years data of 27 developing countries, Seetanah, Sawkut and Sannasee et al (2010) used a generalised method of moments (GMM) regression test to show that stock market development is positive and highly significant with real GDP per capita. They also used similar stock market variables with previous Authors. It was however noted that the enormity of the stock market development coefficients were relatively small, implying that the stock markets of developing countries are still not developed enough to impact significantly on economic growth. It was therefore recommended that policies that aim to deregulate and liberalise the financial system of these countries should be enacted by the respective governmental agencies and parastatals.

Seetanah, Subadar and Sannassee et al (2012) carried out a similar study on 10 least developed countries from 1995—2009, where it was established that stock markets were not associated with economic growth. But when Abiy Hailemariam (2014) studied the relationship between foreign direct investments and stock market boom of 17 emerging markets and 10 developed markets for 12 years (2000—2011), and their findings were contradictory on the same stance in that stock markets were seen as an engine and "wheel" for economic growth, due to the evidence of test results that revealed that market capitalisation and turnover ratio boosted economic growth both directly and indirectly. It was further argued that stock market development is able to validly predict future economic performance of countries.

2.5   Summary
It appears that the association between capital market development and economic growth is more of a mutually causative and inclusive one, although more studies found a unidirectional association from the perspective of capital market leading to economic growth. Following the views of Alghamedi (2012) who stated that the role capital markets play in an economy is colloquial and thus has a knock-on effect on everything else, the first 2 study objectives have now achieved in the critical analysis of existing literature and evaluation of the capital markets and economic growth of the MINT with historical data. In generally therefore, let it be noted that capital market development effects varies by specific country markets and economic systems based on the position of Ghimire and Giorgoni (2009) and several others.

3. Methodology
In harmony with existing studies and theories presented in the literature review, some quantitative measures referenced by the hypotheses are first explained, then the method of data collection of the variables is described, as well as the methodology employed in testing these variables.

3.1   Quantitative Measures
As seen earlier, many other financial development factors can account for economic growth, but however, Capital market development measures like market size and liquidity, which gives an insight to market activity will be the focus subjected to empirical testing. Detailed explanations of the measures are presented in the sub-headings below with examples of the variables that are used to represent them.
3.1.1   Market Activity
Adries (2009) argued with evidence that the size of a country's Capital market is directly correlated with indicators of economic growth. A country's capital market size relates to the total market value of the securities of companies in the capital market or the raw number of listed securities[1] tradable by all investors. These can be measured by either annual capital market capitalisation relative to annual gross domestic product (GDP), i.e. capital market capitalisation as a ratio of GDP or the total number of listed securities year-on-year.

Similarly, the ability for investors to quickly sell their securities or move between forms of asset classes on normal daily trades suggests how liquid a Capital market is. The assumption here is that the more liquid a Capital market is, the more stable it is and therefore encourages more investors to make long term investments. This is in line with the work of Levine and Zervos (1998). Liquidity can be measured by the ratio value of transactions to GDP or ratio of value of transactions to capital formation. Expressing annual value of transactions as a ratio of annual total GDP is said to also suggest size and level of activity of a capital market according to Arestis and Demetriades (1997:786) and Mohtadi and Agarwal (2004) respectively.
3.1.2   Economic Growth
This refers to indicators which measures the annual growth of an economy. Solow (1956) is attributed much praise for simplifying the understanding of economic growth by stating that inputs into labour, capital and technology are the major factors that drive economic growth. These inputs increase gross domestic product (GDP)—and others like gross domestic savings and gross capital formation have also been proved to drive economic growth as in Rasmidatta (2011) and Bakare (2011). Foreign direct investments can also be called a measure of economic growth as it is also a form of input of investments but by international investors.

3.2   Operational Variables
The following is the list of the dependent, independent and control variables[2] used in the study with their operational descriptions and notations. These variables are adopted as the right measures from one or more of the studies reviewed.
3.2.1   Dependent Variables
A dependent variable is that which is directly affected by one or more other variables in an equation. It can also be understood as that variable in which the causation of change either negative or positive is determined by the change in one or more independent variable. These variables are also referred to as 'Y' variables.
GDMPD: This is the annual GDP of a country, defined as the aggregate (total) value of goods and services or income of everyone living in the MINT countries in any single year. The annual change in this variable is used.
GDMSR: This is annual gross domestic savings as a ratio of GDP of a country, which is calculated as GDP less

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[1] Listed "securities" is mentioned as opposed to listed "companies" to signify that companies may choose to raise both equity (ordinary shares) and debt (corporate bonds) capital, although this is more common in developed capital markets. Treasury bonds too are securities issued by the Government used to finance capital expenditures. The 'listed securities' measure therefore denotes an encapsulation of true size, not just by listed company equities but by total tradable securities.
[2] One of the control variables used in particular is foreign direct investments which is defined as the amount of investments or capital inflow of individual and institutional investors not resident in the country. The frequency of inflow or outflow can significantly affect the value of their shares which might in turn affect total capital market capitalisation.

total consumption of the MINT countries in any single year.

GFCAR: This is annual gross fixed capital formation as a ratio of GDP of a country, which is the yearly amount of fixed investments of capital goods of the MINT countries.

3.2.2   INDEPENDENT VARIABLES

An independent variable is that which directly affects a dependent variable in an equation. It can also be understood as that variable that causes a change of either a negative or positive nature in a dependent variable. One or more independent variables can affect a single dependent variable. These variables are also referred to as 'X' variables.

MKET: This is annual capital market capitalisation as a ratio of GDP of a country, which is the total value of MINT capital markets relative to their GDP in any single year.

NOLS: This is annual number of listed securities tradable by investors in the MINT capital markets.

VATG: This is annual value of transactions of a capital market, which here is the total value of transactions of the MINT capital markets annually as a ratio of GDP.

VATC: This is similar to *VATG* except that the values are computed as a ratio of gross fixed capital formation.

3.2.3   Control Variables

A control variable may indirectly affect a dependent variable but may not be absolutely classified as independent based on the contextual framework of a research study and the testing methodology.

FDNR: This is annual foreign direct investments, used here to capture the amount of capital inflows in the form of investments in MINT countries by foreign investors yearly. This variable is expressed as a ratio of GDP.

GDMSR: This was classified as a dependent variable above, but also used as a control variable in one of the models as will be presented later.

Table 3.1: Summary of the operational variables

S/N	'Y' Variables	'X' and Control Variables	Notations
1.	Gross domestic product (GDP) $GDMPD = f$	(market capitalisation ratio, number of listed securities,	MKET NOLS
2.	Gross domestic savings $GDMSR = f$	value of transactions ratio to GDP, value of transactions ratio to capital formation,	VATG VATC
3.	Gross fixed capital formation $GFCAR = f$	foreign direct investments ratio to GDP, gross domestic savings ratio to GDP)	NDXR FDNR

Source: Researcher's illustration

3.3   RESEARCH HYPOTHESES

The hypotheses are listed under sub-headings of economic growth indicators of change in GDP, gross domestic savings ratio and gross fixed capital formation ratio. The control for foreign direct investments (FDNR) will be included in all hypotheses, while that of gross domestic savings (GDMSR) will only be in $H0_1$.

3.3.1   H0_1: CHANGE IN GDP

Hypothesis 1: There is no relationship between capital market development indicators and change in GDP.

The capital market development indicators operationalised above as the independent variables are MKET, NOLS, VATG and VATC; while the control variables here used are FDNR and GDMSR. In line with the study objectives, this hypothesis aims to check the impact of capital market development on GDP growth, by controlling for savings and capital inflows that is assumed to affect GDP growth positively.

3.3.2   H0_2: GROSS DOMESTIC SAVINGS RATIO

Hypothesis 2: There is no relationship between capital market development indicators and gross domestic savings ratio.

Capital market development indicators in $H0_1$ are used here also with a control for only foreign direct investments. The hypothesis aims to check how capital market activity has principally affected the ratio of economic savings to GDP. Even though capital markets may affect GDP growth which may in turn affect economic savings, it is desirable to see the direct effect from capital markets development itself.

3.3.3   H0_3: GROSS FIXED CAPITAL FORMATION RATIO

Hypothesis 3: There is no relationship between capital market indicators and gross fixed capital formation ratio.

With the same independent variables used in the previous 2 hypothesis and a control for foreign direct investments as in $H0_2$, this hypothesis will test the impact of capital market activity on capital goods expenditure as a ratio of GDP, in order to reveal any significant association gross fixed capital formation may have with capital market activity as well.

3.4   DATA

The first stage of data collection involved the download of quantitative data from the sub-databases of the World Bank Development indicators (2015) online. These data comprised of measures of the dependent, independent and control variables of each MINT country, classified under their respective sub-headings in a tabular format. The GDP, gross domestic savings and gross fixed capital formation were monetary dollar ($) amounts converted as current prices with the respective average yearly foreign exchange rate of the dollar to the Mexican Peso, Indonesian Rupiah, Nigerian Naira and Turkish Lira respectively. Market capitalisation, value of transactions and foreign direct investments data were also expressed as monetary dollar amounts, while number of listed securities was simply public companies securities available for trade expressed in numerical form.

The next stage involved the computation of data into appropriate forms in Microsoft Office Excel for Windows (version 2013). These appropriate forms include the computation of the change in GDP *(GDMPD)*, ratio of gross domestic savings to GDP *(GDMSR),* ratio of gross fixed capital formation to GDP *(GFCAR),* ratio of market capitalisation to GDP *(MKET),* ratio of value of transactions to GDP *(VATG),* ratio of value of transactions to gross fixed capital formation *(VATC)* and ratio of foreign direct investments to GDP *(FDNR).*

The entire dataset of the MINT countries when first arranged into a time series from 2000—2012 had 130 observations (13 years x 10 variables). Missing data which mainly affected values for years 2013 and 2014 were deleted from the dataset to achieve a balanced panel. When stacked together, the total series of 13 years with 4 cross-sections gave 52 data points (13 years x 4 countries) on the panel structure and a total number of observations of 416 (52 data points x 8 variables).

Table 3.2: Excerpt of data sourced

YEAR	GDMPD	GDMSR	GFCAR	MKET	NOLS	VATG	VATC	FDNR
2000	5.58	21.60	16.54	17.46	245	20.77	103.29	1.67
2001	0.44	20.26	16.50	17.01	247	13.11	80.64	1.73
2002	3.64	21.05	18.75	13.39	245	10.40	61.86	1.47
2003	5.46	21.41	18.38	19.26	244	10.93	63.58	1.70
2004	13.11	21.15	18.20	23.09	247	13.95	71.14	3.07
2005	5.14	25.02	19.80	26.69	251	16.03	80.10	2.66
2006	6.40	19.73	19.66	31.82	248	16.75	78.79	2.93
2007	5.25	22.88	20.59	45.81	260	23.50	120.38	2.77
2008	3.59	20.22	20.23	20.14	263	18.48	100.26	2.33
2009	0.51	23.69	22.94	31.87	263	18.08	91.02	1.85
2010	7.08	24.36	23.75	36.67	276	21.64	104.37	2.13
2011	5.97	26.24	23.29	28.54	282	19.90	86.24	1.78
2012	4.11	21.98	22.77	34.71	297	16.26	74.84	2.18

Source: Researcher's illustration

The summary of the dataset are averages of the MINT countries. Change in GDP (GDMPD) has been highest in 2004, which implies that GDP grew by about 13%. Similarly, the average of market capitalisation as a ratio of GDP (MKET) is surprisingly highest in 2007 with over 45%, which signifies increased market activity in that year. Foreign direct investment relative to GDP appears to be largely volatile in the period.

3.5   MODEL SPECIFICATION

A parsimonious model is one that is well specified and can be relied upon to give valid results of the relationship between the independent and dependent variables. The general form of the model specified based on the panel data structure as in Bhattarai (2004) is given as:

$$\begin{bmatrix} y_{1,1} & x_{1,1} & e_{1,1} \\ . & . & . \\ y_{1,T} & x_{1,T} & e_{1,T} \\ y_{2,1} & x_{2,1} & e_{2,1} \\ . & . & . \\ y_{2,T} & x_{2,T} & e_{2,T} \\ . & . & . \\ . & . & . \\ y_{N,1} & x_{N,1} & e_{N,1} \\ . & . & . \\ y_{N,T} & x_{N,T} & e_{N,T} \end{bmatrix}$$

Where $y_{i,t}$ represents the indicators used to represent economic growth in country *i*, in time *t*, $x_{i,t}$ are the several independent variables of capital market development in country *i*, in time *t* as well as control variables in country *i* and time *t* as well. Finally, $e_{i,t}$ represents country specific factors that can influence each country's economic growth relationship with capital market activity differently. Since this model applies to the MINT, we

can express it clearer as:

$$\begin{bmatrix}
y_{mexico,1} & x_{mexico,1} & e_{mexico,1} \\
y_{mexico,2} & x_{mexico,2} & e_{mexico,2} \\
\cdots & \cdots & \cdots \\
\cdots & \cdots & \cdots \\
y_{indonesia,1} & x_{indonesia,1} & e_{indonesia,1} \\
y_{indonesia,2} & x_{indonesia,2} & e_{indonesia,2} \\
\cdots & \cdots & \cdots \\
\cdots & \cdots & \cdots \\
y_{nigeria,1} & x_{nigeria,1} & e_{nigeria,1} \\
y_{nigeria,2} & x_{nigeria,2} & e_{nigeira,2} \\
\cdots & \cdots & \cdots \\
\cdots & \cdots & \cdots \\
y_{turkey,1} & x_{turkey,1} & e_{turkey,1} \\
y_{turkey,2} & x_{turkey,2} & e_{turkey,2} \\
\cdots & \cdots & \cdots \\
\cdots & \cdots & \cdots
\end{bmatrix}$$

To show the interplay of the variables in the statistical equations, 3 main models are thus formulated, and they provide the basis for the achievement of the study's objectives, and provision of answers to the research questions.

3.5.1 MODEL 1 (M1)

$$GDMPD_{MINT} = \alpha_1 + \alpha_2 MKET_{MINT} + \alpha_3 NOLS_{MINT} + \alpha_4 VATG_{MINT}$$
$$+\alpha_5 VATC_{MINT} + \alpha_6 FDNR_{MINT} + \alpha_7 GDMSR_{MINT} + \mu_t \qquad (1)$$

M1 directly relates to *H0₁* in the test of capital market development and growth in GDP. The statistical result hence will give a direction whether to accept or reject the null hypothesis.

3.5.2 MODEL 2 (M2)

$$GDMSR_{MINT} = \beta_1 + \beta_2 MKET_{MINT} + \beta_3 NOLS_{MINT} + \beta_4 VATG_{MINT}$$
$$+\beta_5 VATC_{MINT} + \beta_6 FDNR_{MINT} + v_t \qquad (2)$$

M2 directly relates to *H0₂* in the test of capital market development and gross domestic savings as a ratio of GDP. The statistical result will also determine the acceptance or rejection of the null hypothesis.

3.5.3 MODEL 3 (M3)

$$GFCAR_{MINT} = \theta_1 + \theta_2 MKET_{MINT} + \theta_3 NOLS_{MINT} + \theta_4 VATG_{MINT}$$
$$+\theta_5 VATC_{MINT} + \theta_6 FDNR_{MINT} + v_t \qquad (3)$$

Similarly, *M3* directly relates to *H0₃* in the test of capital market development and gross fixed capital formation as a ratio of GDP. The statistical test results will as well determine the acceptance or rejection of the null hypothesis.

μ_t, v_t, and q_t are country specific effects assumed to be i.i.d normal[1]

Table 3.3: Summary of hypotheses and models for statistical analysis

Hypotheses (H) and Models (M)		Relationship
H0₁, M1	Capital market development and growth in Gross domestic product (GDP) GDMPD = ∫ (MKET, NOLS, VATG, VATC, FDNR, GDMSR)	0
H0₂, M2	Capital market development and Gross domestic savings ratio: GDMSR = ∫ (MKET, NOLS, VATG, VATC, FDNR)	0
H0₃, M3	Capital market development and Gross fixed capital formation ratio: GFCAR = ∫ (MKET, NOLS, VATG, VATC, FDNR)	0

Source: Researcher's illustration

From the test results of *M1* and *M2,* it is expected that capital market development will be positively associated with growth in GDP and Gross domestic savings, while the relationship with GFCAR of *M3* may be positive or negative.

3.6 SCOPE AND SIGNIFICANCE

There is currently an abundance of literature of capital market development and economic growth; but there is a lack of literature primarily focusing on the MINT economies. This research work will therefore be mainly significant in adding to the depth of knowledge of extant literature, by filling the gap of non-focus on the MINT

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[1] Independent and identically distributed (i.i.d) random errors is one of the fundamental assumptions of the OLS regression technique which states that the error terms in a regression equation must be independent and not correlate with the dependent variable 'y' in order to ensure consistent estimates of the 'x' variables. But however, they must be normally distributed in a form similar to the 'y' variable. See Quora.com (2015) and Cross Validated (2015).

economies. The study follows the data composition of Yarbara (2012)[1] and Mohtadi and Agarwal (2004), but adopts a slightly different methodology related to the study of Bhattarai (2004)[2], which is seen to provide newer insights on the association between capital market development and economic growth, with its primary application on the MINT countries.

3.7 TESTING PROCEDURE AND LIMITATIONS

The panel least squares (PLS) regression analysis with fixed effects specification will be employed to test the models. This specification helps to clearly show if country-specific factors are also determinants of any causal relationship identified. This analysis will be carried out using E-views (version 8), a state-of-the-art statistical software widely used among Researchers and Academicians.

3.7.1 DATA LIMITATIONS

Best possible steps were taken right from the data collection stage (especially in relation to converting many of the variables to growth estimates instead of their raw monetary values) to address any possible limitations on observations that may cause the model to be less parsimonious. As Agarwal and Mohtadi (2004) argues, the collection of data should be from a single source to avoid possible measurement problems, which resulted in weak statistical regressions and possible unreliable estimates, as in the work of Levine and Zervos (1998). The study therefore collects all data from a single source, the World Bank's WDI database.

Another peculiar limitation of the dataset is heterogeneity, which implies the correlation between the countries variables. To correct heterogeneity in the models, the 'fixed' effects specification is used as a 're-estimator', and the F-statistic is then compared in order to make a decision of the best results to choose.

3.7.2 STATISTICAL LIMITATIONS

Additionally, the statistical limitations of the models falls within the realms of not adhering to the assumptions of the OLS regression analysis which will result in: (i) the non-normality of observations as a result of the presence of outliers[3], (ii) very high collinear or multicollinearity of independent variables as a result of measures that are too closely related, (iii) correlation between the error term and the 'y' (dependent) variable, referred to as heteroskedasticity, (iv) non-distribution of series observations across its mean over time which is referred to as non-stationarity and (v) correlations among the 'y' and 'x' (independent) variables which is referred to as autocorrelation.

The normality test are carried out to see if the data are normally distributed, which is evidenced by the Jarque-Berra coefficient and probability values of each variable. The data are also analysed via descriptive statistics showing mean, median, maximum, minimum and standard deviation etc in order to graphically examine the extent of normality; a test of collinearity is carried out through a correlation matrix examination to check for any close relationships between the 'x' variables; and finally, the use of White's heteroskedastic co-variance specification during the OLS test is done to treat any possible heteroscedasticity and ensure 'homoscedastic' estimates. Non-stationarity and autocorrelation are not applicable to the model as it only concerns long-run studies of many years using time series data (Gujarati, 2004:26; Brooks, 2008). The treatments of these limitations are interpreted in the next chapter and the results are shown in their respective tables and figures in the appendix.

3.8 ETHICAL CONSIDERATIONS

Reasonable care has been taken in ensuring that the study is in by no way an infringement of copyright in the collection of data and use of software for econometric testing. This is done by sourcing data from the World Bank database of which are freely available to the entire public and the use of the E-views software within the Publisher's terms and conditions as well as the software's user license agreement.

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[1] As an interesting point of reference, his study used monthly stock market index returns of Kenya, Tanzania and Uganda of the East African Community (EAC) for the period of September 2001—December 2010 to regress on 91-day treasury bills representing their debt market, with the main aim of assessing how regionally integrated their capital markets are. The results succinctly revealed that capital market integration for the EAC has not deepened for the period. This was achieved by the use of a composition of a panel dataset with co-integration and Granger-causality statistical tests for long-run relationships.

[2] In Mohtadi and Agarwal (2004), the authors represented the independent variable of capital market development with market capitalisation ratio, total value of shares traded ratio and turnover ratio—and regressed them on GDP and private sector investments of developing countries. This time, results did show strong positive relationships directly and indirectly for GDP growth and investments respectively. The panel dataset was a dynamic one, comprising 21 developing countries over 21 years with the use of one-way and two-way fixed and random effects of long run statistical tests. Bhattarai (2004) too used fixed effects and ordinary least squares (OLS) regressions on his panel dataset of the determinants of economic growth for OECD, emerging and poor countries, which showed support for the endogenous theory of economic growth.

[3] Outliers are observations that tend to lie far away from a distribution of similar observations in a series.

4. RESULTS AND FINDINGS

This chapter presents the interpretation of the results of the specified models that were tested with the various statistical techniques and tools.

4.1   PRELIMINARY FINDINGS

It is imperative to first examine comparative statistics of capital market development variables and the key indicators of economic growth. *Table 4.1 (see Appendix A)* highlights the average growth of each of these indicators. Generally there has been negative growth of almost all indicators throughout the 13 years period. Average growth in number of listed securities stands at about 1.5%[1]. Gross fixed capital formation as a ratio of GDP is seen to have the highest average growth of approximately 2.5%. Quite surprisingly, the growth in the change of GDP has the largest decline in growth of almost -77%.

4.1.1   CAPITAL MARKET DEVELOPMENT INDICATORS

Figure 4.1 shows the growth of market capitalisation (MKET) as a ratio of GDP, value of transactions as a ratio of GDP (VATG) and value of transactions as a ratio of gross fixed capital formation (VATC). MKET experienced its highest growth in 2007 and 2009 of about 31% and 37% respectively. Particularly, the value in 2009 is not surprising as it suggests that the aftermath of the financial crisis would have shifted investors' confidence away from developed to developing markets, which would have surged security prices upwards. VATG and VATC had similar trends with their highest growth of approximately 29% and 35% in the year 2007 respectively, and also the largest fall in 2001 of 58% (VATG) and in 2002 of 30% (VATC).

Figure 4.1: Trend in MKET, VATG and VATC (2000—2012)
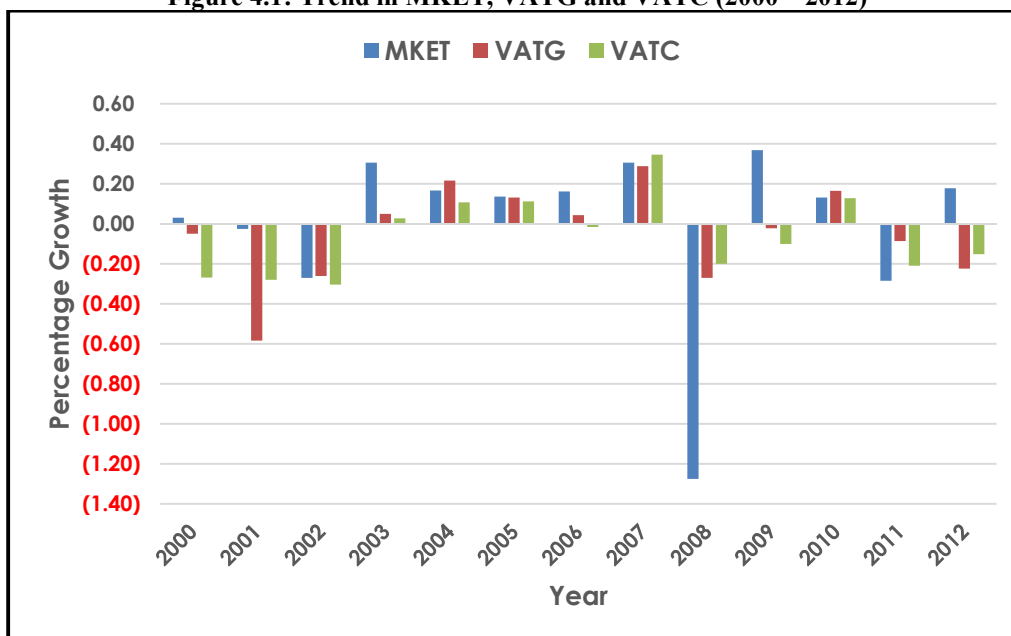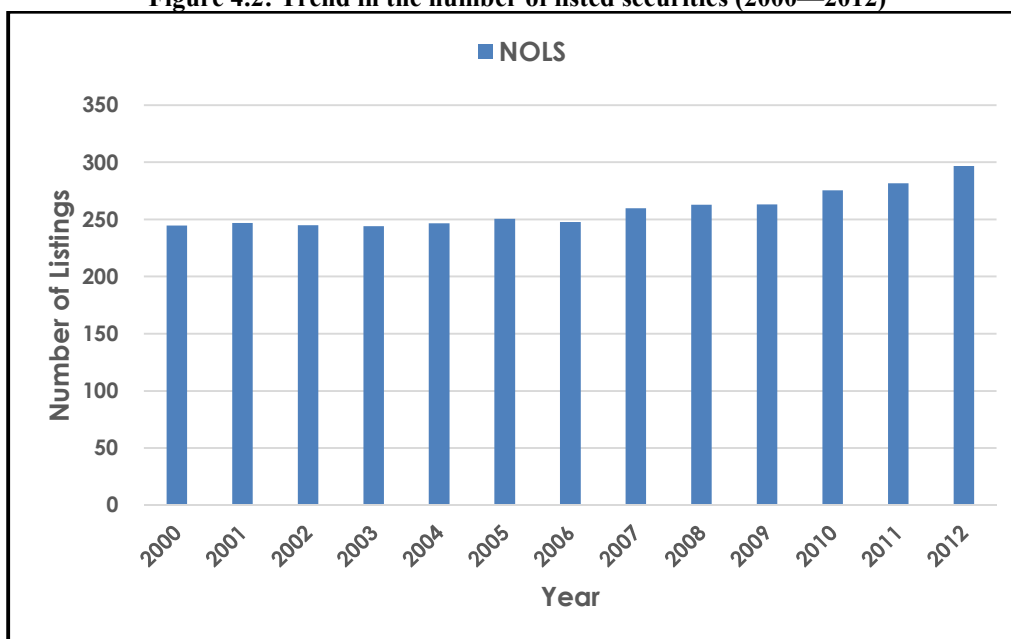

Source: Researcher's illustration using data from World Bank (2015) in Microsoft Office Excel (2007)

Number of listed securities (NOLS) as shown in *Figure 4.2* below has not grown much but has had an overall increase in the 13-year period.

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[1] See footnote beneath *Table 4.1* in Appendix A for a discussion of the computational methodology that yielded these results.

Figure 4.2: Trend in the number of listed securities (2000—2012)

Source: Researcher's illustration using data from World Bank (2015) in Microsoft Office Excel (2007)

4.1.2   ECONOMIC GROWTH INDICATORS

Change in gross domestic product (GDP) (GDMPD) of the MINT countries as shown in *Figure 4.3* below has had a wild movement in the period. The year 2004 was the average highest peak for all the countries combined.

Figure 4.3: Trend in change of GDP (GDMPD) (2000—2012)
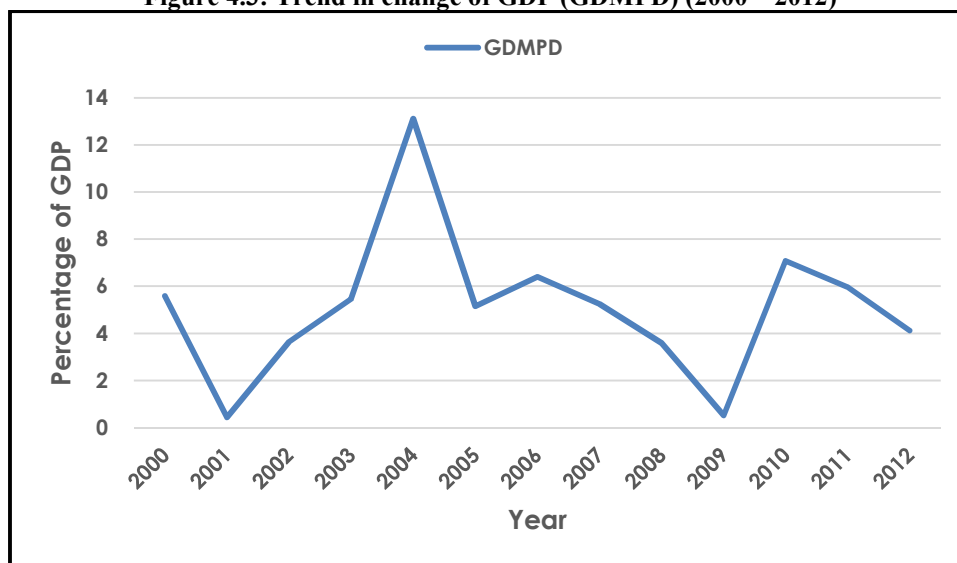
Source: Researcher's illustration using data from World Bank (2015) in Microsoft Office Excel (2007)

Figure 4.4 shows that gross domestic savings (GDMSR) has had the greatest ratio of GDP for the entire period.
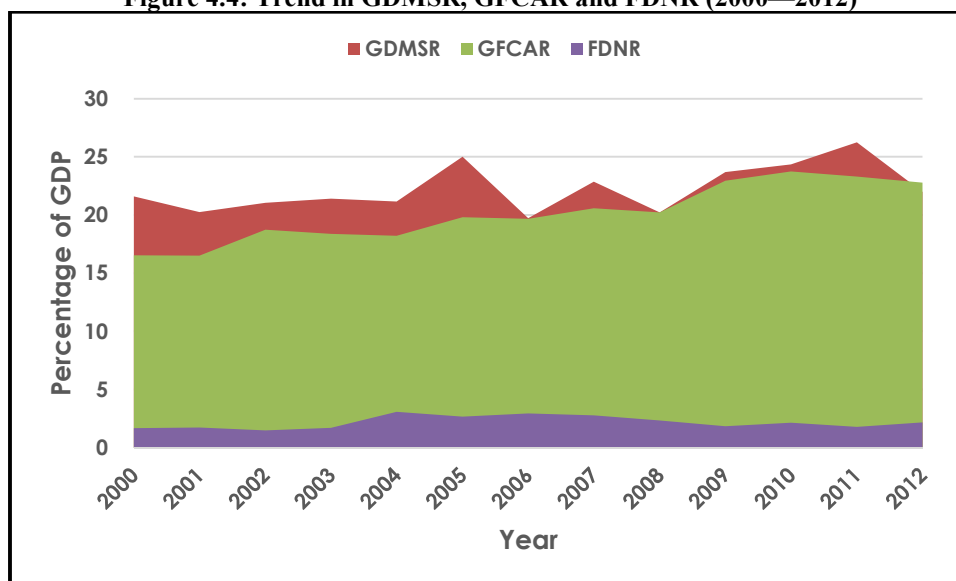
Figure 4.4: Trend in GDMSR, GFCAR and FDNR (2000—2012)

Source: Researcher's illustration using data from World Bank (2015) in Microsoft Office Excel (2007)

4.2   DESCRIPTIVE STATISTICS
The following tables and figures are descriptive statistics of the variables used for the test.

4.2.1   GROUP SAMPLE AND NORMALITY
As shown in *Table 4.2 (see Appendix A),* some of the variables are right skewed, while others are left skewed. Only GDMPD's Skewness is almost 3 (2.82), but with high Kurtosis of 19 implying fat tails. VATG, VATC and FDNR have Kurtosis of almost 4 which also implies normal tails, but with varying Skewness. The observations of all variables are complete at 52, which shows that there were no missing data. The *Jarque-Bera* results used to report normality show high values for GDMPD, VATG and VATC with probabilities that are significant at 1%, 5% and 5% respectively, implying that these are the only variables that are fairly normally distributed. GFCAR *Jarque-Bera's* probability is highly insignificant at 85%. *Figure 4.4 (see Appendix B)* shows these graphically.

4.2.2   CORRELATION ANALYSIS
As shown in *Table 4.3 (see Appendix A),* all variables are not highly correlated except for the 97% correlation between VATG and VATC. The next highest correlations noticed is between GFCAR with GDMSR of almost 59% and VATG with NOLS of about 53%, These correlations are fairly acceptable and it is expected that the regression test results will not be affected by these, because insignificant variables will still be dropped in the re-estimations of the models.

4.3   REGRESSION TEST RESULTS
The third assumption of homoskedasticity was ensured during the regression estimation itself by the use of *White* Heteroskedastic consistent estimates of diagonal formations, in order to both solve any error term with 'y' variable correlations *within* and *between* the dataset; i.e. along time (years) and across cross-sections (MINT countries). Results of $H0_{1—3}$ of Models *M1—3* respectively are revealed below.

4.3.1   H0$_1$, M1: CAPITAL MARKET DEVELOPMENT AND GDMPD
The regression test results of Model 1 in *Table 4.4 (see Appendix A),* defined as '*M1',* which was estimated with a cross-section fixed effects specification reveals that MKET and the 2 control variables of FDNR and GDMSR are insignificant, which signifies that their impact on GDMPD are negligible. NOLS and VATG are both significantly associated with GDMPD at the 5% level, while VATG is significant at 10%. This is evidenced by their probability values. Furthermore, NOLS and VATC had negative coefficient values, but VATG showed a positive coefficient which implies that value of transactions relative to GDP has the potential of increasing GDP. A 1% rise in the ratio causes GDP to increase by almost 40%. Similarly, a 1% rise in number of listed securities and value of transactions relative to gross fixed capital formation has the ability of decreasing GDP by approximately 3% and 7% respectively.

The model was subsequently re-estimated as *M1(b)* by dropping market capitalisation as a ratio of GDP which was the only insignificant independent variable[1]. The results as shown in *Table 4.5 (see Appendix A)* did

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[1] Market capitalisation (MKET) was dropped from the regression since it was insignificantly related to the dependent variable (GDMPD in this case). The re-estimation without it will thus help to evidence the real effect the other variables have

not change much except that NOLS, VATG and VATC are all now significant at the 5% confidence level, while FDNR is at 10%.

Overall, the F-statistic was positive and significant in both estimations, but showed a higher goodness of fit and significance in *M1(b)*. This implies that the model specification without market capitalisation ratio is more valid in explaining the change in GDP. In other words, number of listed securities, value of transactions as a ratio of GDP and value of transactions as a ratio of gross fixed capital formation together explains changes in GDP better. The coefficient of variation or R-squared is 31% which shows that NOLS, VATG and VATC are jointly responsible for up to 31% of the total variations in GDMPD. These results leads to non-acceptance of the null hypothesis $H0_1$ of no relationship between capital market development and change in GDP of the MINT countries, with the argument that capital market development indeed can considerably explain economic growth when measured by change in GDP.

Discussion: Although the estimation time frame is only 13 years, the result shows that the activities of the MINT capital market has been partly instrumental to the growth of their economies. Particularly, the impact of capital market activity on GDP growth is more pronounced in Indonesia, with Nigeria and Turkey next in the order. It is quite surprising however to see that capital market development had actually caused more harm than good in the Mexican economy, because its cross-section fixed effect coefficient is negative at -6.858032. Nevertheless, the model lends support to the supply-leading capital market theory, as well as the endogenous economic growth theory that capital market development leads to economic growth, only when explained by the number of listed securities and value of transactions. It is of good point to remember that these are capital market size and liquidity measures as noted by Levine (1997) and Arestis and Demetriades (1997). The findings thus follows the panel studies of Seetanah, Sawkut and Sannasee et al (2010), but in direct contrast with Seetanah, Subadar and Sannassee et al (2012) evidences.

4.3.2 H0₂, M2: CAPITAL MARKET DEVELOPMENT AND GDMSR

Model 2 defined as *'M2'* results are shown in *Table 4.6 (see Appendix A),* which was also estimated with a cross-section fixed effects specification. It is surprising to see that all the independent variables of capital market development is insignificantly related to GSMSR, which implies that capital market development cannot explain gross domestic savings as a ratio of GDP. The highest insignificance was shown by the probability values of VATG and VATC which was followed by NOLS and MKET.

When re-estimated as *M2(b)* in *Table 4.7 (see Appendix A)* by dropping VATC from the model, the results shows that only NOLS is positively associated with GDMSR with a probability value that is significant at 10%. The coefficient value further evidences that a 1% rise in the number of listed securities would cause gross domestic savings ratio to subsequently increase by approximately 3%. Here, the F-statistics and probability of 18.83(0.00) also suggests a higher goodness of fit than *M1(b)*. Accordingly, the R-squared coefficient of variation evidences that *M2(b)* is able to explain at least 75% of the total variation of GDMSR, leading to a non-acceptance of the null hypothesis of $H0_2$ again.

Discussion: Number of listed securities is only seen here as a determinant of economic growth with the gross domestic savings relative to GDP measure. It is also noticed that the foreign direct investments control variable is negatively related to gross domestic savings with a high coefficient of -141%, which may have largely contributed to the dilution of the effects seen in the other capital market development independent variables. Again, the supply-leading and endogenous growth theories of capital market development and economic growth is still strongly supported. Indonesia is also seen to have reflected most of the impact again of the number of listed securities representing capital market development. This is expected as her economy had the highest number of listed securities throughout the 13-year period—even with continuous listing increases across the years of the financial crisis. Mexico this time came second in the order, which is subsequently followed by Nigeria. Turkey had a negative cross-section effect coefficient of about -9.31, implying that capital market development had summarily decreased gross domestic savings for the entire period. These findings again contradict that of Seetanah, Subadar and Sannassee et al (2012), and subsequently supports Seetanah, Sawkut and Sannassee et al (2010).

4.3.3 H0₃, M3: CAPITAL MARKET DEVELOPMENT AND GFCAR

Model 3 which is also defined as *'M3'* is estimated with the same cross-section fixed effects specification, for the sake of revealing the effects of capital market development on economic growth with the gross fixed capital formation measure, GFCAR of capital goods expenditure as a ratio of GDP. The results shown in *Table 4.8 (see Appendix A)* reveals that MKET and NOLS are both positive and significantly associated with GFCAR, while

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on the dependent variable. The subsequent variables that were dropped from the other re-estimated models also follows this reason. This practice is very common in statistical analysis of variable relationships (See Arestis and Demetriades, 1997; Seetanah, Subadar and Sannassee et al (2012) as well as Seetanah, Sawkut and Sannassee et al (2010).

VATC is negative but significant. Thus, only the VATG measure of capital market activity was seen to be insignificant to GFCAR.

    With the exclusion of this variable, the re-estimated *M3(b)* results shown in *Table 4.9 (see Appendix A)* now reveals that only MKET and NOLS are positively related to GFCAR at a confidence level of 5% and 1% respectively. In this vein, a 1% increase in each of these variables will subsequently result to an 11% and 6% increase in GFCAR, as shown by the coefficient values of 0.112035 and 0.058037 respectively. It is also seen that the model had the highest and strongest fit among the other models of *M1(b)* and *M2(b)* based on the F-statistic and Prob(F-statistic) values, with also a higher coefficient of variation measured by an R-squared value of about 88%. Hence, the null hypothesis of $H0_3$ is also not accepted.

Discussion: Market capitalisation and number of listed securities are measures that signifies the size of a country's capital market as argued by several studies (Yartey, 2008; Adries, 2009 and Yarbara, 2012 inclusive). Model 3 results simply shows that the size of the MINT capital markets are strong determinants of economic growth when the gross fixed capital formation ratio measure is considered. In order words, higher market capitalisation as a ratio of GDP and number of listed securities both have the potential of predicting the level of gross fixed capital formation, but with a stronger effect in Mexico. However, it is surprising to see that the Indonesian, Turkish and Nigerian economies in this order, have each reflected higher negative values to the effect of market capitalisation ratio and number of listed securities on their economies, which statistically suggests that capital market activity had actually reduced capital goods expenditure in these countries. But it appears that these negative effects were not strong enough to cause both measures to reflect negative coefficient values in the group panel regression. The model results also provide direct supports and contradictions to the panel studies earlier pointed out.

Table 4.10: Summary of regression test results (Re-estimated models)

Model Dependent Variable	Model Significant Independent and Control Variables' Coefficient and Probabilities		Individual Independent and Control Variable T-Statistic	Model R-squared	Model F-Statistic and Probability
GDMPD	MKET	NA	NA	0.310715	2.422933 *(0.029472)*
	NOLS	-0.029887 *(0.0419)*	-2.097007		
	VATG	0.397775 *(0.0280)*	2.273712		
	VATC	-0.069513 *(0.0448)*	-2.066715		
	FDNR	1.620921 *(0.0927)*	1.719595		
	GDMSR	-0.029504 *(0.8380)*	-0.205658		
GDMSR	MKET	NA	NA	0.749727	18.82969 *(0.000000)*
	NOLS	0.030593 *(0.0819)*	1.780721		
	VATG	NA	NA		
	VATC	NA	NA		
	FDNR	-1.407176 *(0.0314)*	-2.222556		
GFCAR	MKET	0.112035 *(0.0118)*	2.626692	0.876195	44.48548 *(0.000000)*
	NOLS	0.058037 *(0.0005)*	-2.097007		
	VATG	NA	NA		
	VATC	NA	NA		
	FDNR	NA	NA		

Alternate Hypotheses (HA) and Models (M)			Evidenced Impact (5% significance)
HA$_1$, M1(b)	Capital market development and change in GDP		
		GDMPD = f(GDMSR)	0
		GDMPD = f(VATG)	+
		GDMPD = f(NOLS, VATC)	-
HA$_2$, M2(b)	Capital market development and Gross domestic savings ratio: GDMSR = f(NOLS)		+
HA$_3$, M3(b)	Capital market development and Gross fixed capital formation: GFCAR = f(MKET, NOLS)		+

Source: Researcher's illustration

According to *Table 10,* it is seen that overall, the non-acceptance of all 3 null hypotheses based on the statistical results leads to the acceptance of the alternate hypothesis. The effect of capital market development on economic growth is mixed when economic growth is measured by GDP, but positive when measured by gross domestic savings and gross fixed capital formation ratios, relative to GDP. 'NA' signifies variables either not included in the respective re-estimated model or not significant.

4.4   DIAGNOSTIC Test RESULT

The cross-section redundant fixed effects analysis on all 3 re-estimated models were carried out as diagnostic tests to further investigate the parsimony of the models, in explaining the relationship between the independent and dependent variables. Specifically, this test reveals how varied the results are *between* the individual countries in the panel structure, with the null hypothesis that *they are not varied*. The results however as presented in *Tables 4.11* to *4.13 (see Appendix A)* suggest that the 3 models estimated with the panel least squares regressions specified after cross section fixed effects, are robust enough in explaining the relationship between capital market development and economic growth. Furthermore The cross-section F and Chi-square probabilities are positive and highly significant at 5%, 1% and 1% for *M1(b), M2(b)* and *M3(b)* respectively. This implies that the effect of capital market development on economic growth is indeed *largely varied* across the MINT countries in the panel dataset, which means that the growth in these economies have varied reflections on specific capital market activity measures. *M3(b)* diagnostic results of MKET, NOLS and VATC with GFCAR had the highest cross-section F and Chi-square probability values.

5. CONCLUSION

With the controversy that still surrounds the effect of financial development on economic growth in the academic universe, the study streamlined the focus on how the development of the capital markets of MINT countries has resulted to economic growth over a 13-year period of 2000—2012. The core problems identified are that investors have refused to treat the MINT countries as syndicate members of peculiar characteristics, due

to the fact that investments are not being made the way they were on BRIC countries, through the launch of BRIC-themed funds as noted by Kirby (2015)—even though positive data and economic outlook of key indicators presented by many researchers like Elliot (2014), Wright (2014) and Breard (2015) among others, suggest that these countries are the next powerhouses of the world economy[1]. Additionally, Zegada Escobar (2011) earlier stated that the direction of causation between capital markets development and economic growth can either be mutually contributory, i.e. come from the former to the later or vice versa; or mutually exclusive, i.e. not even remotely related. The thought of this was indeed puzzling and formed part of the motivations of the study.

Precise objectives and research questions were first postulated which included the critical review of extant literature on the subject, evaluation of capital market development and economic growth of the MINT with historical data, identification of principal factors mostly influencing the economic growth of the MINT, revelation of the country that possess the greatest growth potential from capital market developments and finally unravel fresh subjects that deserves future research. The study is seen to be the first of its kind as available studies principally focusing on the MINT countries are unknown and were not found by the researcher. This forms an inadmissible addition to the wealth of knowledge in finance and economics.

5.1   EXTANT LITERATURE
More Authors seem to support the notion that it is capital market development that leads to economic growth. This conclusion were mostly arrived at, through time series studies of long run relationships like in Mauritus and Nowbutsing (2009), Hossain and Kamal (2010) and Al-Qudah (2014). Also, the endogenous economic growth theory has been proved true either directly or indirectly in these studies and many other research works, and so it is rational to debunk the idea of exogenous factors being the primary cause of economic growth.

5.2   EVALUATING THE MINT ECONOMIES
The historical data of capital market activity and economic growth of the MINT economies largely varies among the individual countries. It is noticed that Indonesia and Turkey have more favourable stock market development and economic progress over time, especially in the number of listed companies and turnover ratio respectively. Nigeria lagged behind in most of the results, except for foreign direct investments (FDI) where there was a record of the highest average across a 30-year period. Mexico on the other hand is seen to mostly have slow but steady advancements especially in the growth of GDP.

5.3   EMPIRICAL EVIDENCE
In the use of the 2000—2012 data however, the analysis of these countries as a group in the preliminary findings were obviously different. Market capitalisation and value of transactions ratio of GDP and gross fixed capital formation recorded low increases, with market capitalisation having the greatest decline in 2008. Similarly, the growth in number of listed securities also is evidenced to have been very slow. On the economy side, GDP is observed to be largely volatile across the years, with a very high peak in 2004 and lowest troughs in 2001 and 2009, while gross domestic savings ratio is seen to have the largest share of GDP. These results are not surprising since the MINT are emerging countries and need other financial developmental framework in order to spur economic growth (Boseler, 2013 and Rojas-Suarez, 2014)

5.3.1   GROUP EMPIRICAL RESULTS
Panel least squares (PLS) regression analysis results show that market size, and liquidity as measured by market capitalisation ratio to GDP, number of listed securities and value of transactions as a ratio to GDP and gross fixed capital formation can explaining the associations between capital market development and economic growth of the MINT countries, as there were high statistical significances between these variables and economic growth indicators of change in GDP, gross domestic savings and gross fixed capital formation ratios to GDP.

As a group, number of listed securities is seen to be the most impacting on change in GDP, gross domestic savings and gross fixed capital formation ratios to GDP. It is seen as negative and significant with change in GDP, but positive and significant with gross domestic savings and gross fixed capital formation ratios. Market capitalisation as a ratio of GDP is observed to only affect gross fixed capital formation ratio positively with a high statistical significance. The results strongly evidences a direct relationship between capital market development and economic growth. This relationship is one-way, and arises from capital market activities which then leads to growth in key economic indicators.

5.3.2   INDIVIDUAL COUNTRY IMPACT
Positive impact of Indonesia's economic growth of change in GDP in the 13-year period is mostly reactive to number of listed securities, value of transactions ratios to GDP and gross fixed capital formation respectively,

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[1] Other Authors who presented strong arguments in favour of this stance have been identified earlier to be Fraser (2011), Boseler (2013), O'Neill (2013), and Adibe (2014) etc,

but the Mexican economy negatively reacts to these capital market development measures. When economic growth is measured by gross domestic savings as a ratio of GDP, the Indonesian economic growth is also mostly reactive to number of listed securities positively, while Turkey's growth is seen to be negatively affected by this. With the consideration of gross fixed capital formation relative to GDP, only Mexico was positively affected by market capitalisation ratio and number of listed securities.

5.3.3   IMPLICATIONS

Overall, the study findings are mixed among the individual countries, but still lends credence to the supply-leading theory of capital market development and the endogenous theory of economic growth, and thus supports studies like that of Mohtadi and Agarwal (2004), Yartey (2008), Adries (2009), Seetanah, Sawkut and Sannasee et al (2010) as well as İyidoğan (2013). It is therefore indeed true, as observed from the findings of the statistical tests carried out, that even when the same estimation methodologies are used, the relationship between capital market development and economic growth can exhibit varying results among countries as posited by Arestis and Demetraides (1997) and Ghimire and Giorgoni (2009).

5.4   RECOMMENDATIONS

It is strongly recommended that the time frame of data collection should be elongated in order for more thorough statistical tests to be carried out, with better valid results. Also, the impact of foreign direct investments on the Nigerian economy and the other individual countries in the MINT group deserves some further research. Additionally, the same study can be carried out by applying a different methodology like time series data composition and cross-country analysis, in order to observe how the results may differ among the constituents. Volatility and market integration too are also 2 other areas of capital market development that have the potential of explaining economic growth of the MINT countries. It is recommended that this is explored as well.

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APPENDIX A
TABLES
This section presents various tables that show the results of the respective tests and analyses of the study.

Table 4.1: MINT indicators of capital market and economic growth[1]

YEAR	GDMPD	GDMSR	GFCAR	MKET	NOLS	VATG	VATC	FDNR
2000	7.75	-0.01	0.02	0.03	0.00	-0.05	-0.27	-0.06
2001	-11.74	-0.07	0.00	-0.03	0.01	-0.58	-0.28	0.04
2002	0.88	0.04	0.12	-0.27	-0.01	-0.26	-0.30	-0.18
2003	0.33	0.02	-0.02	0.31	0.00	0.05	0.03	0.14
2004	0.58	-0.01	-0.01	0.17	0.01	0.22	0.11	0.45
2005	-1.55	0.15	0.08	0.13	0.02	0.13	0.11	-0.15
2006	0.20	-0.27	-0.01	0.16	-0.01	0.04	-0.02	0.09
2007	-0.22	0.14	0.05	0.31	0.05	0.29	0.35	-0.06
2008	-0.46	-0.13	-0.02	-1.27	0.01	-0.27	-0.20	-0.19
2009	-6.04	0.15	0.12	0.37	0.00	-0.02	-0.10	-0.26
2010	0.93	0.03	0.03	0.13	0.05	0.16	0.13	0.13
2011	-0.19	0.07	-0.02	-0.28	0.02	-0.09	-0.21	-0.20
2012	-0.45	-0.19	-0.02	0.18	0.05	-0.22	-0.15	0.18
AVG	**-0.77**	**-0.01**	**0.02**	**-0.01**	**0.01**	**-0.05**	**-0.06**	**-0.01**

Source: Researcher's illustration using Microsoft Office Excel (2007)

Table 4.2: Group Sample Statistics

STATISTIC	GDMPD	GDMSR	GFCAR	MKET	NOLS	VATG	VATC	FDNR
Mean	5.10	22.28	20.11	26.65	259	16.91	85.89	2.18
Median	5.02	20.84	21.53	24.00	250	9.89	44.29	2.14
Maximum	33.74	35.46	35.07	51.88	459	67.23	329.66	5.05
Minimum	-5.70	11.83	5.47	9.13	125	0.57	6.24	-1.86
Std. Dev.	5.22	6.79	7.10	11.94	95	17.26	87.15	1.26
Skewness	2.82	0.49	-0.18	0.40	0	1.19	1.22	-0.44
Kurtosis	19.13	2.05	2.84	1.96	2	3.35	3.25	3.96
Jarque-Bera	632.26	4.02	0.34	3.73	3	12.47	13.05	3.65
Probability	0.0000	0.1342	0.8452	0.1545	0.2209	0.0020	0.0015	0.1616
Sum	265.09	1158.34	1045.59	1385.92	13459	879.22	4466.04	113.10
Sum Sq. Dev.	1388.88	2349.22	2569.95	7271.48	464257	15185.44	387330.20	80.35
Observations	**52**	**52**	**52**	**52**	**52**	**52**	**52**	**52**

Source: Researcher's illustration using Microsoft Office Excel (2007)

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[1] The computational methodology for the values in the table are as follows:
GDMPD and MKET are simple average values of the MINT countries calculated by adding the monetary dollar amounts and dividing by 4; and then their growth rates were calculated by the subtraction of a previous year's value from a current year, dividing by the previous year's value and then multiplying by 100.
GDMSR, GFCAR, VATG and FDNR which are already measured relative to GDP, that is a percentage of GDP are also simple averages of the 4 MINT countries and are thus recalculated with the growth rate methodology explained above.
NOLS is in its raw numerical value without any adjustments except for the simple average taken of all 4 MINT countries across the 13-year period.
VATC which is already measured as a percentage of GFCAR is also the simple average of the MINT countries with the growth rate recalculated with also the same method too.
These adjustments were only performed to form the bases for the illustrative Figures of *4.1, 4.2, 4.3* and *4.4;* and are not used for any other purpose. The overall dataset methodology of Chapter 3 is far superior to this as it is the 'right' way to deal with dataset of its kind for all the tests of the models.

Table 4.3: Correlation matrix of all the variables

	GDMPD	GDMSR	GFCAR	MKET	NOLS	VATG	VATC	FDNR
GDMPD	1	-0.0051	-0.2492	-0.0641	0.08022	-0.0479	-0.0613	0.28447
GDMSR		1	0.58762	0.14929	0.37504	-0.3178	-0.4272	-0.3417
GFCAR			1	0.51083	0.488	0.18862	0.0322	-0.2972
MKET				1	0.29865	0.36694	0.31307	0.1722
NOLS					1	0.52764	0.44388	-0.3579
VATG						1	0.97118	-0.1746
VATC							1	-0.1414
FDNR								1

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.4: M1 Regression analysis of Capital market and GDMPD
Dependent Variable: GDMPD
Method: Panel Least Squares
Date: 08/08/15   Time: 08:39
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.856124	4.913345	1.802463	0.0787
MKET	-0.028810	0.059551	-0.483788	0.6310
NOLS	-0.028730	0.014192	-2.024340	0.0493
VATG	0.398147	0.177188	2.247026	0.0300
VATC	-0.065645	0.034854	-1.883424	0.0666
FDNR	1.720114	1.091980	1.575225	0.1227
GDMSR	-0.017490	0.150387	-0.116297	0.9080

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.312812	Mean dependent var	5.097812
Adjusted R-squared	0.165558	S.D. dependent var	5.218513
S.E. of regression	4.766998	Akaike info criterion	6.132352
Sum squared resid	954.4192	Schwarz criterion	6.507591
Log likelihood	-149.4411	Hannan-Quinn criter.	6.276210
F-statistic	2.124295	Durbin-Watson stat	1.966732
Prob(F-statistic)	0.048689		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.5: M1b Re-estimation of Capital market and GDMPD
Dependent Variable: GDMPD
Method: Panel Least Squares
Date: 08/08/15 Time: 08:42
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.209539	4.807072	1.915831	0.0621
NOLS	-0.029887	0.014252	-2.097007	0.0419
VATG	0.397775	0.174945	2.273712	0.0280
VATC	-0.069513	0.033634	-2.066715	0.0448
FDNR	1.620921	0.942618	1.719595	0.0927
GDMSR	-0.029504	0.143463	-0.205658	0.8380

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.310715	Mean dependent var	5.097812
Adjusted R-squared	0.182476	S.D. dependent var	5.218513
S.E. of regression	4.718425	Akaike info criterion	6.096938
Sum squared resid	957.3322	Schwarz criterion	6.434653
Log likelihood	-149.5204	Hannan-Quinn criter.	6.226410
F-statistic	2.422933	Durbin-Watson stat	1.972898
Prob(F-statistic)	0.029472		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.6: M2 Regression analysis of Capital market and GDMSR
Dependent Variable: GDMSR
Method: Panel Least Squares
Date: 08/08/15   Time: 08:45
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.80494	3.941673	4.517103	0.0000
MKET	0.066825	0.043492	1.536482	0.1317
NOLS	0.023163	0.016686	1.388138	0.1722
VATG	0.220272	0.167716	1.313359	0.1960
VATC	-0.045672	0.034614	-1.319472	0.1940
FDNR	-1.428568	0.568109	-2.514600	0.0157

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.760618	Mean dependent var	22.27579
Adjusted R-squared	0.716082	S.D. dependent var	6.786982
S.E. of regression	3.616375	Akaike info criterion	5.564931
Sum squared resid	562.3611	Schwarz criterion	5.902647
Log likelihood	-135.6882	Hannan-Quinn criter.	5.694403
F-statistic	17.07864	Durbin-Watson stat	1.945350
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.7: M2b Re-estimation of Capital market and GDMSR
Dependent Variable: GDMSR
Method: Panel Least Squares
Date: 08/08/15   Time: 08:46
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.69415	3.676234	4.269082	0.0001
MKET	0.048439	0.039575	1.223981	0.2275
NOLS	0.030593	0.017180	1.780721	0.0819
VATG	0.025604	0.071461	0.358293	0.7218
FDNR	-1.407176	0.633134	-2.222556	0.0314

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.749727	Mean dependent var	22.27579
Adjusted R-squared	0.709911	S.D. dependent var	6.786982
S.E. of regression	3.655465	Akaike info criterion	5.570962
Sum squared resid	587.9468	Schwarz criterion	5.871153
Log likelihood	-136.8450	Hannan-Quinn criter.	5.686048
F-statistic	18.82969	Durbin-Watson stat	1.841757
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.8: M3 Regression analysis of Capital market and GFCAR
Dependent Variable: GFCAR
Method: Panel Least Squares
Date: 08/08/15   Time: 08:48
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.763640	3.508409	1.927837	0.0605
MKET	0.109035	0.041762	2.610850	0.0124
NOLS	0.050087	0.014968	3.346342	0.0017
VATG	0.216794	0.136967	1.582816	0.1208
VATC	-0.054702	0.030765	-1.778074	0.0825
FDNR	-0.686727	0.516948	-1.328425	0.1910

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.884672	Mean dependent var	20.10741
Adjusted R-squared	0.863216	S.D. dependent var	7.098672
S.E. of regression	2.625400	Akaike info criterion	4.924454
Sum squared resid	296.3872	Schwarz criterion	5.262169
Log likelihood	-119.0358	Hannan-Quinn criter.	5.053926
F-statistic	41.23117	Durbin-Watson stat	1.116795
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.9: M3b Re-estimation of Capital market and GFCAR
Dependent Variable: GFCAR
Method: Panel Least Squares
Date: 08/08/15   Time: 08:50
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.227768	3.449848	1.515362	0.1368
MKET	0.112035	0.042652	2.626692	0.0118
NOLS	0.058037	0.015570	3.727398	0.0005
VATC	-0.019784	0.014460	-1.368242	0.1782
FDNR	-0.656836	0.515104	-1.275152	0.2089

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.876195	Mean dependent var	20.10741
Adjusted R-squared	0.856499	S.D. dependent var	7.098672
S.E. of regression	2.689085	Akaike info criterion	4.956917
Sum squared resid	318.1718	Schwarz criterion	5.257109
Log likelihood	-120.8798	Hannan-Quinn criter.	5.072003
F-statistic	44.48548	Durbin-Watson stat	1.021174
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.11: M1b Diagnostics: Capital Market Development and GDMPD
Redundant Fixed Effects Tests
Equation: EQ01
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.636452	(3,43)	0.0200
Cross-section Chi-square	11.757404	3	0.0083

Cross-section fixed effects test equation:
Dependent Variable: GDMPD
Method: Panel Least Squares
Date: 08/08/15   Time: 08:59
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.199359	2.847414	0.070014	0.9445
NOLS	0.017675	0.010249	1.724572	0.0913
VATG	0.015543	0.181411	0.085678	0.9321
VATC	-0.014951	0.035429	-0.422014	0.6750
FDNR	1.411075	0.824088	1.712287	0.0936
GDMSR	-0.077399	0.121883	-0.635030	0.5286

R-squared	0.135839	Mean dependent var	5.097812
Adjusted R-squared	0.041908	S.D. dependent var	5.218513
S.E. of regression	5.107993	Akaike info criterion	6.207657
Sum squared resid	1200.213	Schwarz criterion	6.432800
Log likelihood	-155.3991	Hannan-Quinn criter.	6.293972
F-statistic	1.446164	Durbin-Watson stat	1.788944
Prob(F-statistic)	0.225939		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.12: M2b Diagnostics: Capital market development and GDMSR
Redundant Fixed Effects Tests
Equation: EQ02
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.714195	(3,44)	0.0008
Cross-section Chi-square	19.599780	3	0.0002

Cross-section fixed effects test equation:
Dependent Variable: GDMSR
Method: Panel Least Squares
Date: 08/08/15   Time: 09:01
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.80512	2.098813	7.530505	0.0000
MKET	0.185525	0.049008	3.785606	0.0004
NOLS	0.041491	0.006192	6.701132	0.0000
VATG	-0.315764	0.053134	-5.942739	0.0000
FDNR	-1.781117	0.439876	-4.049133	0.0002

R-squared	0.635155	Mean dependent var	22.27579
Adjusted R-squared	0.604105	S.D. dependent var	6.786982
S.E. of regression	4.270384	Akaike info criterion	5.832496
Sum squared resid	857.1006	Schwarz criterion	6.020116
Log likelihood	-146.6449	Hannan-Quinn criter.	5.904425
F-statistic	20.45547	Durbin-Watson stat	1.690363
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

Table 4.13: M3b Diagnostics: Capital market development and GFCAR
Redundant Fixed Effects Tests
Equation: EQ03
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	38.854354	(3,44)	0.0000
Cross-section Chi-square	67.313851	3	0.0000

Cross-section fixed effects test equation:
Dependent Variable: GFCAR
Method: Panel Least Squares
Date: 08/08/15   Time: 09:03
Sample: 2000 2012
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.48985	2.396542	4.377078	0.0001
MKET	0.336927	0.077904	4.324896	0.0001
NOLS	0.026896	0.007545	3.564890	0.0008
VATC	-0.028528	0.004853	-5.878153	0.0000
FDNR	-1.780957	0.578080	-3.080812	0.0034

R-squared	0.548217	Mean dependent var	20.10741
Adjusted R-squared	0.509767	S.D. dependent var	7.098672
S.E. of regression	4.970252	Akaike info criterion	6.136030
Sum squared resid	1161.060	Schwarz criterion	6.323649
Log likelihood	-154.5368	Hannan-Quinn criter.	6.207959
F-statistic	14.25804	Durbin-Watson stat	0.705782
Prob(F-statistic)	0.000000		

Source: Researcher's illustration using Econometric Views (E-views) version 8

APPENDIX B
FIGURES
This section presents various figures that show the results of the respective tests and analyses of the study.
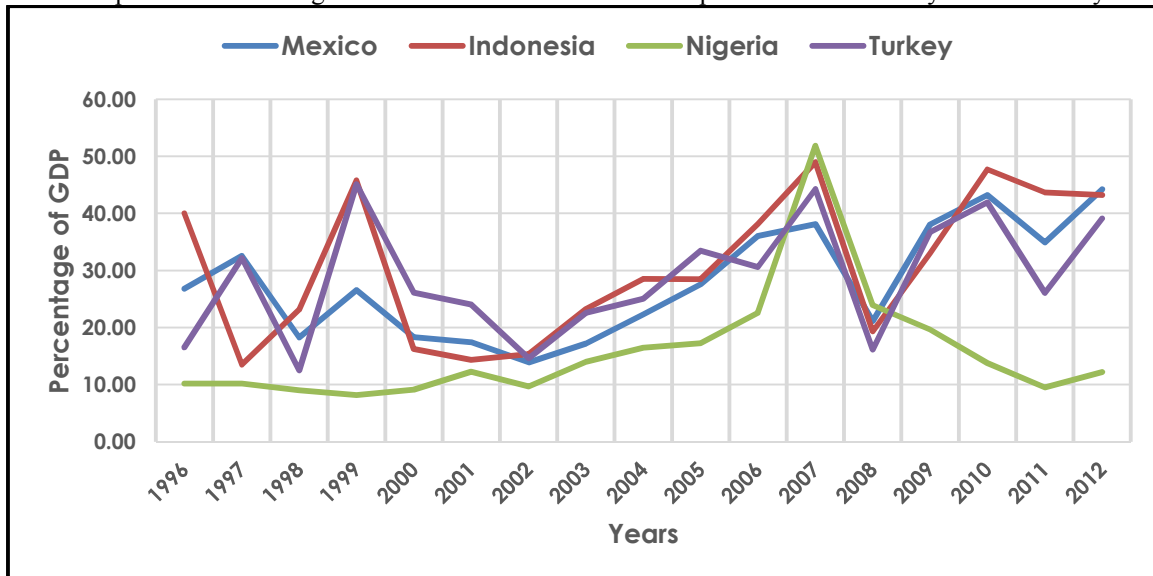

Figure 2: Market capitalisation as a percentage of GDP of the MINT
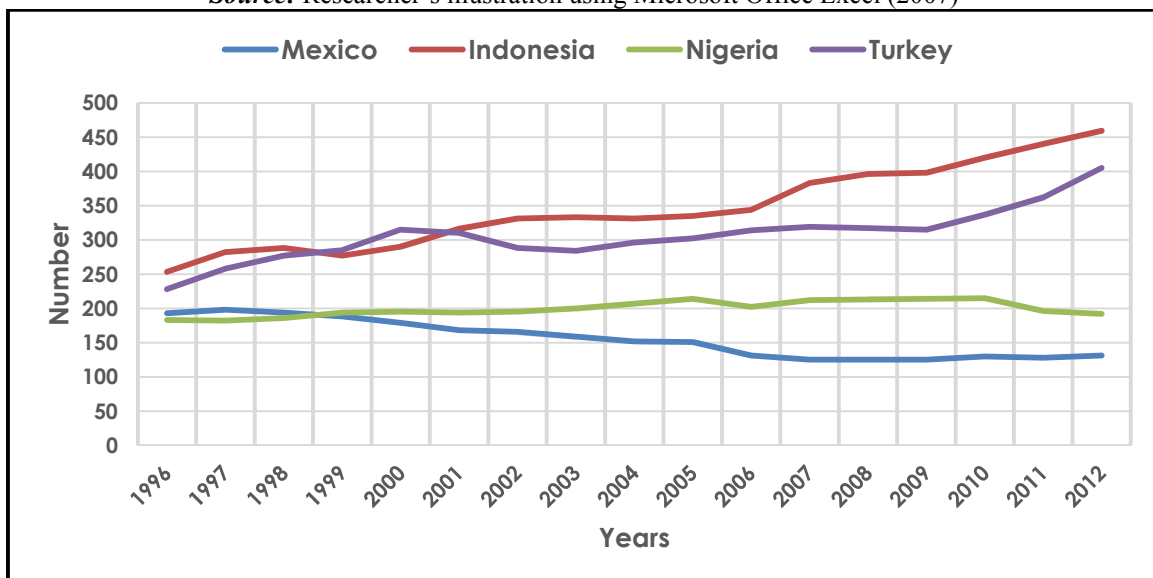*Source:* Researcher's illustration using Microsoft Office Excel (2007)

Figure 3: Number of Listed Securities of the MINT
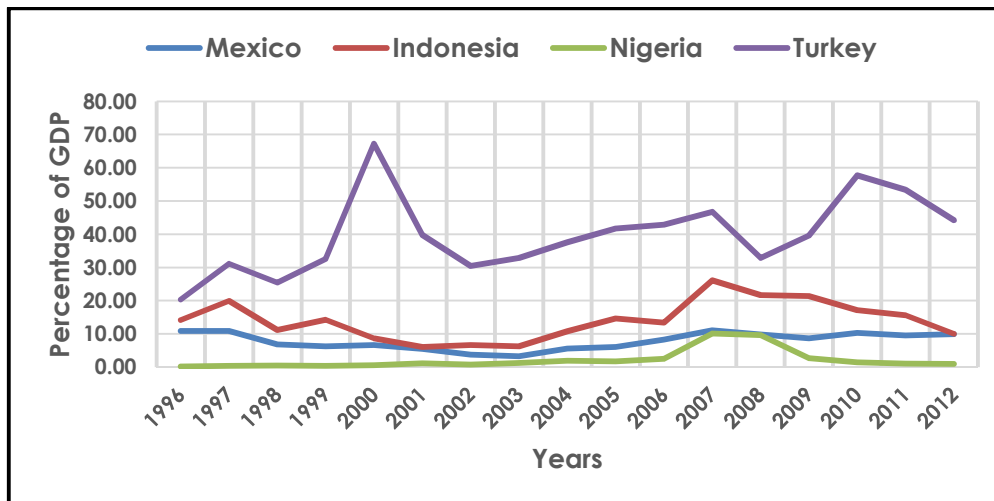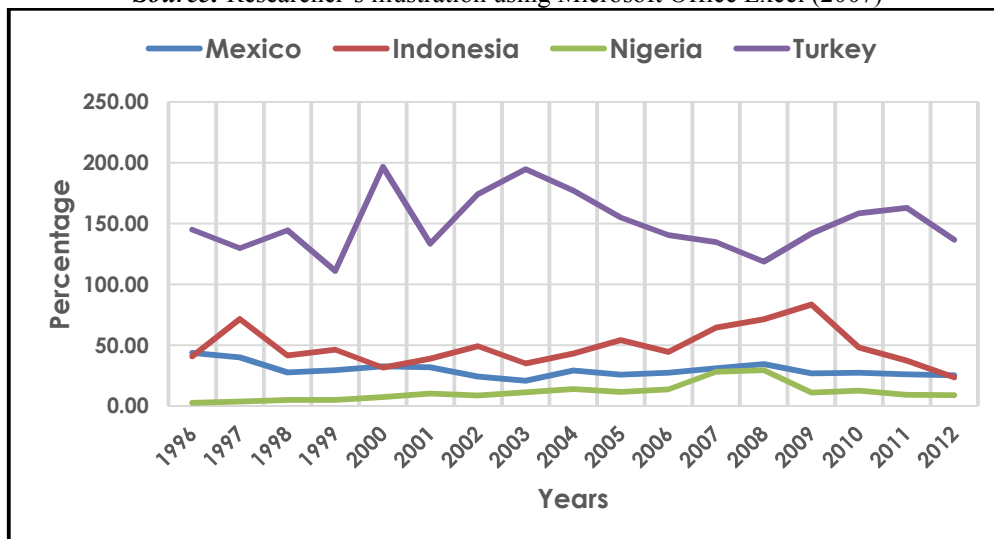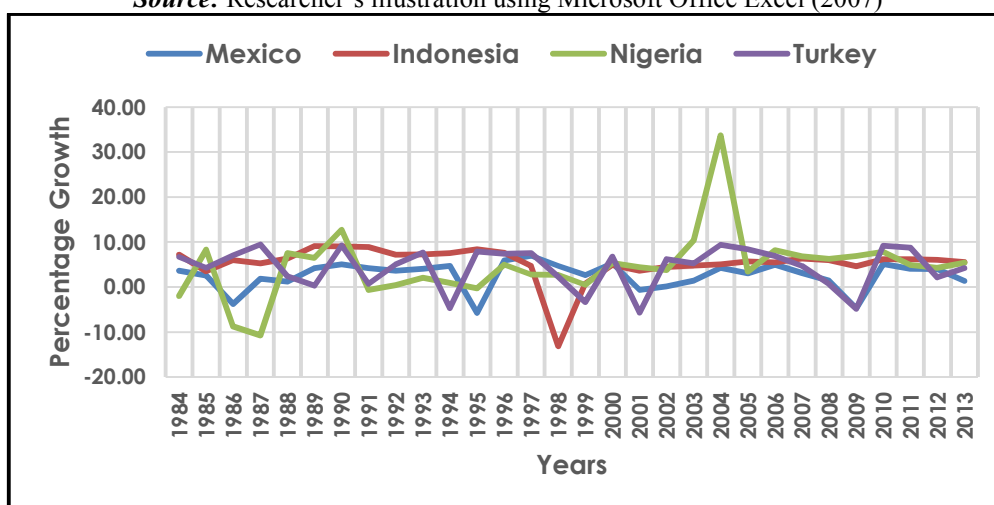*Source:* Researcher's illustration using Microsoft Office Excel (2007)

Figure 4: Value of Transactions as a percentage of GDP of the MINT
Source: Researcher's illustration using Microsoft Office Excel (2007)

Figure 5: Turnover Ratio of the MINT
Source: Researcher's illustration using Microsoft Office Excel (2007)

Figure 7: Gross Domestic Product (GDP) of the MINT
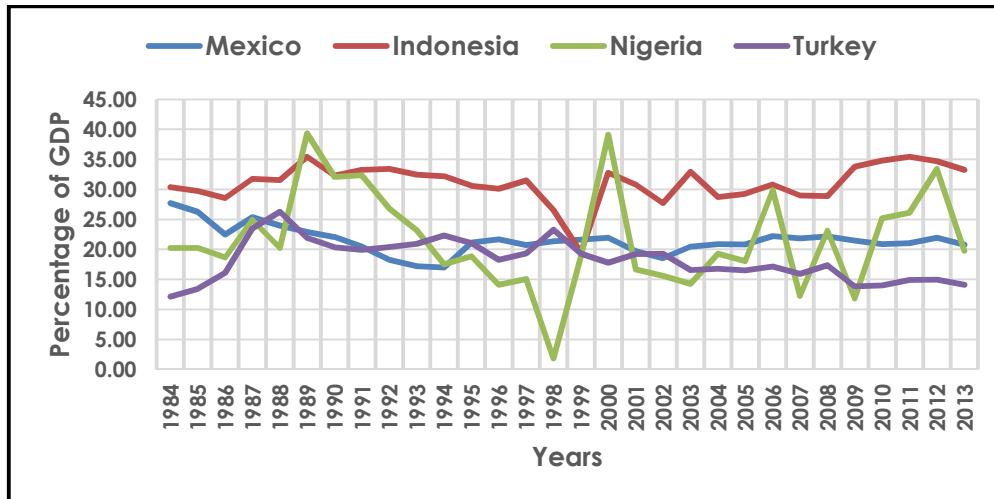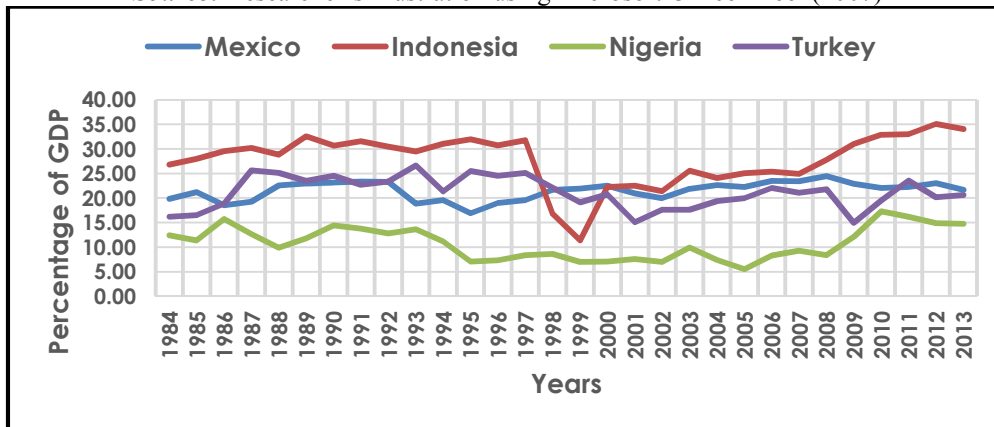*Source:* Researcher's illustration using Microsoft Office Excel (2007)

Figure 8: Gross Domestic Savings of the MINT
Source: Researcher's illustration using Microsoft Office Excel (2007)

Figure 9: Gross Fixed Capital Formation of the MINT
Source: Researcher's illustration using Microsoft Office Excel (2007)
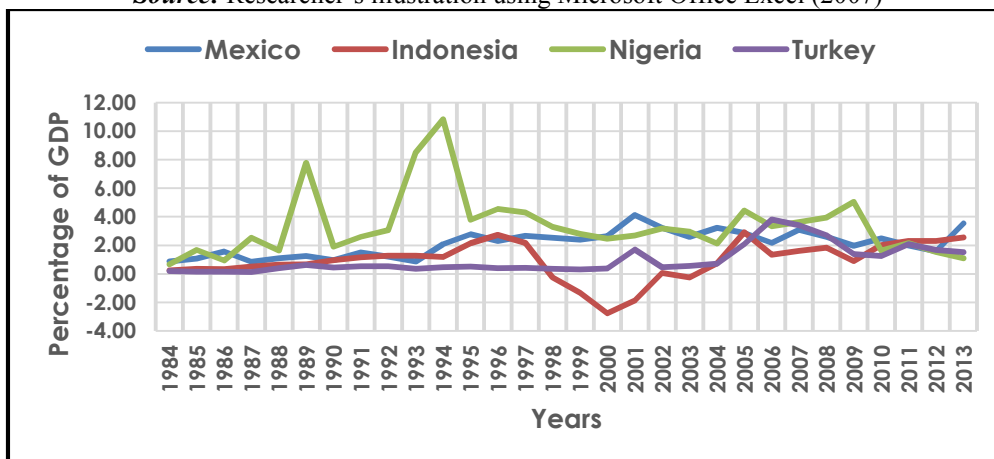

Figure 10: Foreign Direct Investments (FDI) of the MINT
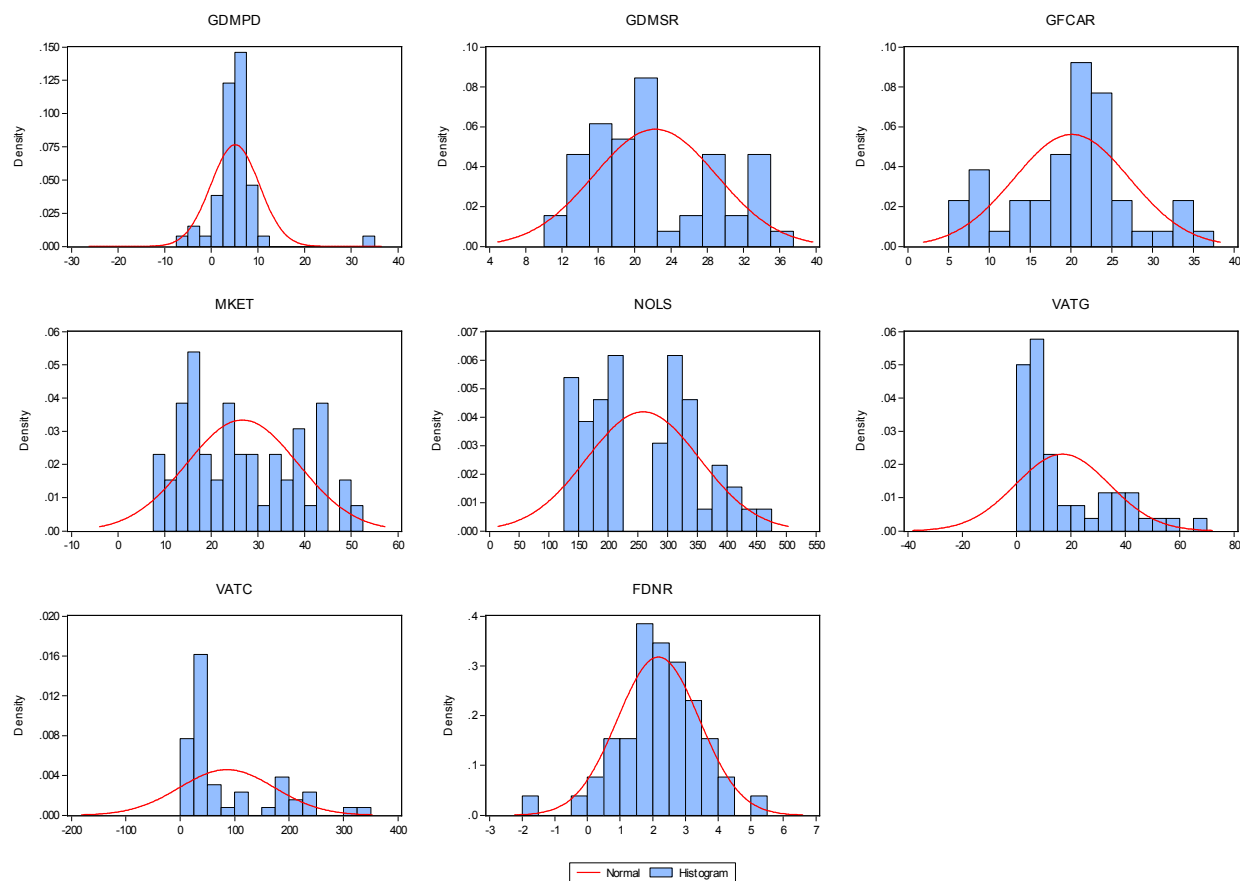*Source:* Researcher's illustration using Microsoft Office Excel (2007)

Figure 4: Normal distribution histograms and curves of the Variables
Source: Researcher's illustration using Econometric Views (E-views) version 8