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Stress Testing and Risk Management

Highlights

Economic Development Department

Impact of Foreign Direct Investment

Discovering Thoughts, Inventing Future

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An Independent Study on the Impact of Foreign Direct Investment on the Kenyan Economy

By Robert Ouko Obonyo & Charles Y.Tibbs
Student Kenyatta University

Abstract- The researchers carried out an independent study which sought to analyze the impact of foreign direct investment on diverse economies in various countries of the world. The study reviewed a total of fifteen journal papers obtained from credible peer reviewed journals. Foreign direct investment (the independent variable) was measured in log form to enhance accuracy and the economy (the dependent variable) was measured by the gross domestic product, inflation rate and the balance of payment. There was a unanimous agreement by the authors that foreign direct investment affect host country's economic growth through physical capital accumulation, technology spillovers, creation of employment opportunities and enhancing productivity by bringing competition to the economy through skills and knowledge transfer. The review noted that no recent research has been done on the trends, determinants and pattern of foreign direct investment in Kenya and published in a credible peer reviewed journal.

Keywords: foreign direct investment, economy, gross domestic product, inflation, balance of payment.

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An Independent Study on the Impact of Foreign Direct Investment on the Kenyan Economy

Robert Ouko Obonyo [α] & Charles Y.Tibbs [σ]

Abstract- The researchers carried out an independent study which sought to analyze the impact of foreign direct investment on diverse economies in various countries of the world. The study reviewed a total of fifteen journal papers obtained from credible peer reviewed journals. Foreign direct investment (the independent variable) was measured in log form to enhance accuracy and the economy (the dependent variable) was measured by the gross domestic product, inflation rate and the balance of payment. There was a unanimous agreement by the authors that foreign direct investment affect host country's economic growth through physical capital accumulation, technology spillovers, creation of employment opportunities and enhancing productivity by bringing competition to the economy through skills and knowledge transfer. The review noted that no recent research has been done on the trends, determinants and pattern of foreign direct investment in Kenya and published in a credible peer reviewed journal. This study therefore recommends that a study should be done on the same to fill this glaring gap.

Keywords: foreign direct investment, economy, gross domestic product, inflation, balance of payment.

Chapter One

I. Introduction

a) Background of the study

This study looked at the role played by foreign direct investment in the economy of various countries like India, Kenya, Pakistan, Australia, Turkey, Venezuela, Ireland, Poland and other European Union nations. The study sought to explore whether FDI has a positive or negative impact or no effect at all in the nations' economy. The key independent variable in the study was foreign direct investment which is made up of capital that foreigners invest in various sectors. The economy was measured by a number of variables which for the purpose of this research was limited to gross domestic product, inflation and balance of payment. The components of gross domestic product as used in the study is as shown below:-

$$Y=C+I+G+(X-M)$$

Where

Y=GDP
I=Investment expenditure
C=Consumption expenditure
G=Government expenditure
(X-M)=Net imports

Various studies have been done on the relationship that exists between foreign direct investment and diverse economies in the world. After reviewing fifteen papers published in peer reviewed journals, there was unanimous agreement by (Arisoy, 2012; Zorska, 2005; Jaffri, Asghar, Ali & Rooma, 2012) that foreign direct investment can affect host country's economic growth through physical capital accumulation, technology spillovers, creation of employment opportunities, enhancing productivity by bringing competition to the economy, skills and knowledge transfer. The interest in foreign direct investment is generally attributed to its employment generation capacity, its effect on the productivity development growth and its dynamic link to competitiveness (Arisoy, 2012).

Foreign Direct Investment was defined by (Rizvi & Nishat, 2010) as not only a simple transfer of money but as a mixture of financial and intangible assets such as technologies, managerial capabilities, marketing skills and other assets. Multinational enterprise was identified by (Grosse, 1988) to be an important vehicle for effecting international transfer of funds, technology, management skills and products. He (Grosse, 1988) further noted that the impact of foreign direct investment is on employment, national income and balance of payment. Developing economies are facing shortage of capital and are racing against each other to attract more and more of foreign direct investment (Ullah, Haider & Hashim, 2012)

In their ground breaking study on the impact of foreign direct investment on sectoral adjustment of the Irish economy, (Ruane & Gorg, 1997), underscored the fact fdi produced roughly 69% of the net output and 45% of jobs in Irish manufacturing industries in 1993.They further noted that in terms of regional employment, FDI became a vehicle for dispersing manufacturing employment across the country and away from the manufacturing bases in Dublin and Cork. The paper concentrated on the manufacturing sector as the sector where hitherto fdi has the most impact.

b) Problem specification

Kenya as a nation is endowed with various resources & minerals like oil, natural gas, coal & renewable energy. At the same time the country faces numerous problems like that of unemployment, inflation,

Author α: Ph.D (Finance) Student Kenyatta University, Kenya.
e-mail: robertobonyo@yahoo.com
Author σ: Department of Accounting and Finance Masinde Muliro University of Science and Technology, Kenya.
e-mail: tibbscharles@yahoo.com

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slow economic development & inadequate distribution of wealth. These challenges were further aggravated by the enactment of interest cap law which has effectively denied local investors in Kenya access to cheap credit. These challenges have created a lacuna in the economy which ultimately requires a solution which should be thought outside the box. Developing countries should aim to make the political and economic environment conducive to the inflow of foreign capital as this will contribute considerably to enhancing domestic employment opportunities (Mudida, 2002). According to a new Africa Attractiveness Survey 2017 report by Ernst and Young, Kenya which is the region's anchor economy had its foreign direct investment projects drop by 57.9 per cent while capital investment declined by 55.5 per cent in 2016. Kenya should therefore move very fast to reclaim her position as the region's most attractive FDI destination hence the timeliness of this study.

Devolution in Kenya had been billed to be a success story for counties which efficiently utilized the devolved funds for spurring economic growth. However, on the other hand it has turned out to be a den of impunity effectively devolving corruption to the grassroots level grossly undermining its objective of bringing equity in wealth distribution. It is against this background that this study is seeking to explore the role that foreign direct investment in Kenya can play in addressing the aforementioned challenges of unemployment, inflation, slow economic growth and inequality in wealth distribution.

c) Objectives of the study

i. To explore the impact of foreign direct investment on the economy of Kenya.
ii. To identify existing study gaps and recommend areas for further study.

d) Significance of the study

This research will seek to compliment the literature available on the impact of foreign direct investment on the Kenyan economy. This study will also fill the gap on the trends, patterns and determinants of foreign direct investment in Kenya as the empirical literature reviewed hereafter show that no research study had been done on the same in Kenya and published in reputable peer reviewed journals. This study will explore the advantages and disadvantages emanating from Greenfield investments thereby increasing the knowledge of economic policy makers. This will help them make sound economic policy decisions as they seek for solutions to the challenges facing our developing nation of Kenya. Exploring the impact of foreign capital on economic growth has important policy implications i.e. if FDI is found to have a positive impact on growth, then this will weaken arguments for restricting foreign investment (Jimborean & Kelber, 2017). If, however, FDI is found not to exert a positive impact on growth, then this would suggest the need to reconsider the measures adopted by countries to attract FDI (Jimborean & Kelber, 2017). If FDI is mainly driven by domestic factors, policy makers are better able to affect it, whilst if FDI mainly reacts to global factors, recipient countries are vulnerable are vulnerable to global shocks even if domestic policy makers maintain prudent macroeconomic policies (Jimborean & Kelber, 2017).

The global economy is in turbulence due to various reasons some of which are unrest in the Middle East (Syria, Iraq, and Yemen), the zika virus in Latin America and the slowdown in the economic growth of China. Kenya too has not been left out and as correctly pointed out by various citizens in the country; there is a popular view among the people that the much touted economic growth has not translated into jobs for the common citizens. This study therefore seeks to look at the significance of foreign direct investment in relation to the role it can play in the creation of job opportunities.

Kenya has got one of the highest unemployment rates in the world which is currently standing at 40 % (Ieconomics, 2017).Unemployment comes with numerous effects to the economy and the society as it reduces the purchasing power of an individual & the community at large (Ieconomics, 2017). The unemployed young people tend to look for alternative sources of income like crime. Unemployment also leads to distrust in the administration and the government which can in turn lead to political instability. Foreign direct investment will address this and therefore the importance of this study need not to be overemphasized.

Kenya is currently experiencing a very high inflation rate which is slowing down the economic growth of the nation. As was observed by (Focus Economics, 2017), Kenya's inflation rate climbed to 9.0% in February 2017 from 7.0% marking the highest level in over five years. This figure went above the Central Bank's inflation target range of 5.0% plus/minus 2.5 percentage points (Focus Economics, 2017). The prices of goods and services are rapidly on the rise and as a result of this the purchasing power of the Kenyan shilling is falling. For the economy to run smoothly the inflation rate should be checked by the Central Bank of Kenya (Focus Economics, 2017).

The Kenyan president, signed the 2015 Banking (Amendment) Bill into law on August 24, 2016 (Simiyu, 2016). On the streets, Kenyans felt liberated. At the Nairobi Securities Exchange (NSE) investors were gnashing their teeth as all the 11 counters dropped in prices and bled a record Shs.45 billion in one trading session (Alushula, 2017). Even the Central Bank of Kenya's monetary policy committee admits that this law has complicated its work. Currently, credit to the private sector is at a 10-year low (Alushula, 2017). The private

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sector in Kenya plays a very important role in the growth of the gross domestic product which is a pointer to growing economy. Reduction of profit to the private sector implies that there is very little or no capital at all. This therefore leaves a big gap that can only be bridged by the foreign direct investments.

Kenya still suffers from inadequate distribution of wealth because the good intentions of sessional paper number 10 of 1965 which aimed to adequately address it were marred endemic issues (Gates, 2007). Even though the government has made great progress in tackling this issue, foreign direct investment through the establishment of special economic zones will crown it with success. This study will demystify avenues that the government can explore to provide an out of the box solution to the perennial problems of unemployment, inflation, slow economic growth, inadequate capital to the private sector and unequal distribution of wealth.

e) Scope of the study

This paper will have only one independent variable i.e. foreign direct investment and three dependent variables namely the gross domestic product, inflation and balance of payment which will be used to measure the topic of the 'economy'. The word economy is very wide and the study has narrowed down to use the three variables which can efficiently and conveniently measure it. This study will be done in Kenya and the data will be obtained from fifteen papers published in various journals. The study will involve panel data spanning forty years i.e. from 1976 to 2016 that will be analyzed using regression analysis. Statistical analysis software of eviews version eight will be used. Both the independent and dependent variables shall be used in their log forms to enhance accuracy and efficiency.

f) Limitations of the study

This study will be very complex and it will require a lot of time and financial resources to conduct it to its final conclusion. As these limitations are anticipated, the researcher will develop a thorough and comprehensive implementation schedule and budget to carry out the same. The issue of time will also be addressed by setting aside three hours every day for the study until final completion, submission and publication of this independent study paper.

g) Organization of the paper

This independent study paper comprises of chapter one which has the background of the study, problem specification, the objectives of the study, significance of the study, scope of the paper and limitations of the study. Chapter two presents review of the conceptual literature and contains an introduction, conceptual review and research gaps. In chapter three there is a review empirical literature that deals with impact of foreign direct investment. It also contains summary table of empirical review and research gaps. Chapter four gives the conclusion, recommendations on the research gaps, proposed conceptual framework and the research design. References are listed in the final page.

Chapter Two

II. Review of Conceptual Literature

a) Introduction

i. *Foreign Direct Investment*

Foreign direct investment is derived from the idea of a company redirecting a portion of its activities/capital to a chosen foreign country (Blackhurst & Otten, 1996). It is an investment made by an entity or a person in business concerns in another country in the form of either establishing business operations or acquiring business assets in the other country such as ownership or controlling interest in a foreign country (Aminews, 2014). It involves capital investment, transfer of management skills or technological expertise (Aminews, 2017). It can take various forms which include opening a subsidiary or associate company in a foreign country, acquiring a controlling interest in an existing foreign company or by means of amalgamating (merger) with a foreign company(Investopedia,2017). As per the guidelines of the Organization of Economic Cooperation and Development (OECD), controlling interest is achieved by acquiring at least 10% of ordinary shares in a foreign company (Investopedia, 2017).

There are various categories of foreign direct investment; FDI can either take the form of horizontal foreign direct investment which occurs when a company establishes a similar business in a foreign land (FDI Report, 2016). Another category is the vertical form which occurs when different but related business activities from the investor's core business are established or acquired in a foreign country (FDI Intelligence, 2016). The importance of the Greenfield sector as a factor influencing economic growth and development need not to be overemphasized. According to (Fingar, 2016) a total of 1.89 million jobs worldwide were created by FDI alone in 2016. This therefore implies that Greenfield investments are a big time employer that needs to be tapped. Unemployment is a major problem in Kenya because the progressive economic growth is not translating in to jobs for the citizens. A solution outside the box is required to tackle this issue and hence foreign direct investment can help provide a solution for this menace.

FDI has the most tangible impact on economic development and is the most solid indicator of a country's competiveness. FDI may boost the productivity of all firms not just those receiving foreign capital (Jimborean & Kelber, 2017). In 2015, FDI injected 713 billion dollars into the global economy with India

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taking 63 billion dollars worth of FDI projects (FDI Report, 2016). In 2016, India became a big story in the FDI industry after trailing China for a long period of time. India has developed friendly tax policies, streamlined permit requirements, easened land acquisition rights, provided affordable labour and adequate infrastructure to international investors. Of significance is that these investor friendly policies were accelerated by the current premier Narendra Modi who formed the government in 2013. Kenya too underwent political transition around this time hence the relevance of this study.

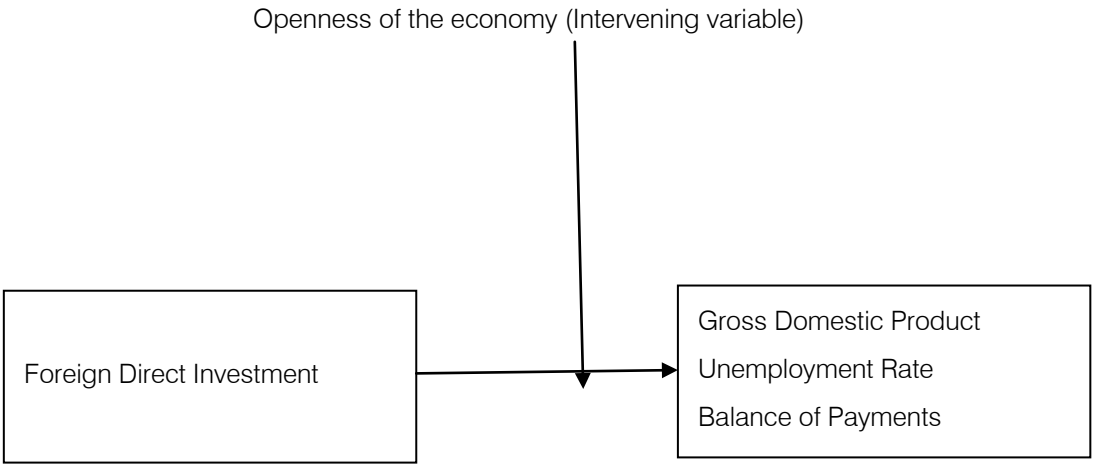
What is it that is attracting foreign investors to India? According to the FDI report of 2016, investors were interested in coal, oil, natural gas and renewable energy sectors. This strikes attention because Kenya too is well endowed with these resources. The government should intensify her efforts of aggressively marketing Kenya as a destination for foreign direct investment. Foreign Direct Investment is important because it is considered to be a catalyst for future economic growth (FDI Report, 2016). This form of investment is also less volatile as income compared to other forms of investments(FDI Report, 2016). Inflows from FDI provide a valuable source of foreign exchange and long term capital to finance the balance of payments (FDI Report 2016).

In their recent study that looked the foreign direct investment drivers and growth in Central and Eastern Europe in the aftermath of global 2007 financial crisis (Jimborean & Kelber, 2017) showed that fdi inflows are driven by both external (i.e. macroeconomic and financial conditions in the euro area, global macroeconomic conditions and global risk environment and domestic determinants (past fdi, human capital, market size, infrastructure, competitiveness, corporate tax system, risk premium, trade openness, geographical proximity to Western Europe, accession to the European Union and progress in implementing structural reforms). By using panel data analysis they (Jimborean & Kelber, 2017) also found out that fdi has a positive impact on economic growth. This study although it is good, relevant and recent, it looked at the foreign direct investment drivers and determinants in the European Union which is a more developed region compared to Africa. This therefore shows that there is need for replicating the same study in Kenya which is an upcoming middle class economy and also underwent a post election crisis in 2007.

For fdi to occur the firm must have both ownership advantage and internalization advantage while the foreign market must offer locational advantage (Jimborean & Kelber, 2017). According to existing literature, the main determinants of foreign direct investment are past foreign direct investment, human capital, market size, infrastructure, competiveness, the corporate tax system, risk premium, trade openness, progress of implementation of structural reforms and the growth potential of recipient countries (Jimborean & Kelber, 2017).

b) The conceptual background

Table 1.1: Conceptual framework



Source Author, 2017

The International Monetary Fund (IMF) defines foreign direct investment as "… investment made to acquire lasting or long term interest in enterprises operating outside of the economy of the investor."It is an important source of external finance which implies that Kenya with its limited amount of capital can receive foreign exchange beyond her national borders from wealthier nations.FDI will be the antecedent variable.

i. *Gross Domestic Product*

Gross domestic product is the dependent variable implying that it will measure the economy which is considered to be a very broad topic. Mudida (2003)

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defines Gross Domestic Product as the 'total monetary value of all final goods and services produced within the geographical boundaries of a country'.

ii. *Theoretical background*

a. Ricardo's theory of comparative advantage

In his theory of comparative advantage, David Ricardo imagined two countries England and Portugal producing two commodities cloth and wine using labour as the sole unit of production. Ricardo further assumed that the productivity of labor varied between industries and across countries. This theory is all about two countries and two trade items that make it not to be in line with common sense because several countries and items are involved in international trade.

b. Production Cycle Theory of Vernon

This theory was developed by Vernon in 1966 and he used it to explain certain types of FDI made by US companies in Western Europe after the Second World War (Denisia, 2010). This investment was done in the manufacturing industry. Vernon believed that innovation, growth, maturity and decline are the four major stages of production life cycle (Product Life Cycle Stages, 2017). According to him, first the United States transnational companies created new innovative products for export and the local market. Vernon further hypothesized that as the American products landed in the foreign markets other companies imitated them and supplied the same in the local markets. They were thus forced to build production facilities in these countries to maintain their market shares. This theory has a loophole because America is not a sole player in international trade as there are over 200 countries engaged in same including even underdeveloped countries.

c. The theory of exchange rates on imperfect capital markets

Informational imperfections cause external financing to be more expensive than internal financing so that the changes in wealth translate into changes in the demand for direct investment (Froot & Stein, 1991). When the wealth of domestic agents goes down, that depreciation of the domestic currency can lead to the acquisition of domestic assets by foreign companies.

Chapter Three

III. Review of Empirical Literature

a) Introduction

The hot topic of Greenfield investments and its impact on world economies has been discussed by a number of scholars at various levels and forums. This chapter contains a comprehensive review of existing literature, emerging issues emanating from the empirical review and research gaps.

b) Empirical Review

The fact that foreign direct investment has a positive influence on various sectors of the economy was noted by (Sharma & Satinderpal, 2016: Makki & Somwaru, 2004) who found out that there is a positive correlation between wages paid and foreign direct investment inflow and that one per cent change in wage rate causes positive changes in FDI. The fact there is a negative elasticity coefficient between FDI and deficit in balance of position means that one per cent increase in the deficit level in the balance of payment causes a reduction in percentages of FDI inflows in the country (Sharma & Satinderpal, 2016). Chege, 2015 carried out a study on the impact that foreign direct investment has on economic growth in Kenya based on a sample of thirty observations and noticed that there is a positive relationship between foreign direct investment and economic growth in Kenya. From a sample of 30 observations, he further opined that the coefficient of variation (R squared) was at 72.5% which means that the explanatory variables explain about 72% of all changes in the dependent variable (Chege, 2015). The p value (f statistic) was found to be 0.0485 which was less than 5% making it significant meaning that explanatory variables jointly influence the dependent variable (Chege, 2015).

In their study on foreign direct investment and current account balance of Pakistan that employed the use of autoregressive distributive lag model over a period of twenty eight years (Jaffri, Asghar, Ali & Asjed, 2012) postulated that in the case of Pakistan, foreign direct investment has worsened current account excluding current transfers (CABECT). They (Jaffri et al:Grosse,1988) further observed that foreign direct investment helps to build up capital, create employment, develop productive capacity, enhance skills of local labour and managers through transfer of technology and helps the country integrate with the rest of the world. In their unique study that looked at the trends, patterns and determinants of Australian direct investment, (Sharma & Bandara, 2012) found out that countries which are open, have large domestic market and have a similar language and culture to Australia's attract most of its foreign investment. Countries in regional blocks tend to attract Australian investments (Sharma & Bandara, 2012).

Foreign direct investment is positively associated with currency (Rupee) depreciation and exchange rate volatility deters Greenfield investment as was found out by (Ullah, Haider & Hashim, 2012) in their research that looked at the impact of exchange rate volatility on foreign direct investment in Pakistan. Foreign direct investment affects host country's economic growth via two channels which are technology spillovers and physical capital accumulation as was argued by (Arisoy,2012) when he published his study that dwelt on the impact of foreign direct investment on

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total factor productivity and economic growth in Turkey. He (Arisoy, 2012) further reasoned that the interest in fdi is generally attributed to its employment generation capacity, its effect on productivity development growth and its dynamic link to competitiveness.

Some drawbacks in foreign direct investment have been seen as was concluded by (Rizvi & Nishat, 2010) that whatever other benefits which may accrue from fdi, it should not be expected to create employment opportunities in any of the three countries i.e. Pakistan, India & China directly and fdi enhancement policies must be supplemented by other measures to stimulate employment growth. It has been noted that in terms of regional employment, foreign direct investment can be used as a vehicle for dispersing manufacturing employment across the country and away from the manufacturing bases in Dublin and Cork (Ruane & Gorg, 1997). Foreign direct investment brought transition and transformation to the Polish economy (Zorska, 2005). When labour management bargaining industry is wide, (Zhao, 1998) identified two effects of foreign direct investment which are the collusion effect and the threat point effect. He (Zhao, 1998) further stated that foreign direct investment reduces the negotiated wage, union employment and competitive wage if the union cares more about employment than wages. (Barrel & Pain, 1997) found out that the acquisition of knowledge based specific assets to be an important factor behind the growth of foreign direct investment suggesting that investments are likely to be an important channel for the diffusion of ideas and technologies.

There is no generally accepted foreign direct investment theory with every new evidence adding some new elements and criticisms to the other ones (Denisia, 2010). The extent to which foreign direct investment is growth enhancing depends on the degree of complimentarity and substitution between fdi and domestic investment (De Mello Jnr, 1999).

c) Emerging Issues

Research on foreign direct investment its trend, determinants and impact on the Kenyan economy is relatively new and out of the papers reviewed only one was from Kenya. There is an urgent need to carry out a current study on the same. It was noted in the review that research on the topic has been done extensively in the developed like United Kingdom, Australia, China, Poland, Ireland & India making them not very suitable in understanding the Kenyan situation.

Table 1.2: Empirical review table

Author(s)	Findings	Research gaps
1. Mamta Sharma and Dr.Satinderpal studied on the impact of fdi on the Indian economy. Their work was published in the International Journal of Innovative Research and Development volume 5 issues 2 on January 2016.The study used economic growth variables of GDP, currency, stock market, foreign exchange reserves, interest rate, current account, exports, imports and unemployment rate.	The study revealed the following:- i)There is a positive correlation between wages paid and FDI inflow.1% change in wage rate causes positive changes in FDI. ii)There is negative elasticity coefficient between FDI and deficit in balance of position reveals that 1% increase in the deficit level in the balance of payment causes a reduction in percentages of FDI inflows in the country.	-The study was carried out in India and not in Kenya hence there is a necessity of carrying out a similar study in the country. -The study is not well structured. Introduction, literature review, methodology, findings and conclusion not clearly arranged. -There is no conceptual framework indicating clearly the dependent and independent variable and how they affect each other. -The abstract is disorganized and not informative.
2. Isaac Chege. Studied the Impact of foreign direct investment on economic growth in Kenya. It was published in the International Journal of economics, commerce and management vol.III issue II of November 2015. The dependent variable was economic growth and independent variable FDI.	Found out that there is a positive relationship between foreign direct investment and economic growth in Kenya. From a sample of 30 observations, the coefficient of variation (R squared) was at 72.5% which means that the explanatory variables explain about 72% of all changes in the dependent variable. The p value (f statistic) was found to be 0.0485 which was less than 5% making it significant meaning that explanatory variables jointly influence the dependent variable.	-The study period was from 1984 to 2013 making the study old. A current study covering up 2016 should be done. -The sample size of thirty is very small.
3. Atif Ali Jaffri, Nabila Asghar, Mahnaz M Ali & Rooma Asjed. Foreign Direct Investment and current account balance of Pakistan. The period of	The study found out that in the case of Pakistan foreign direct investment has a worsened CABECT both in the long run and short run i.e. increase	-The study was carried out in Pakistan leaving a gap for the same study in Kenya. -The study period was between

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	study is 28 years and they employed the use of autoregressive distributive lag model and obtained data from the state bank of Pakistan. Pakistan Economic and Social Review, Vol.50 no.2 (Winter 2012), pp 207-222.Published by the Department of Economics, University of Punjab. The study used natural log of income outflow as a dependent variable and natural log of foreign direct investment as an independent variable. The study used regression analysis.	in FDI causes increase in income outflow of balance of payments of Pakistan and worsens current account balance excluding current transfers(CABECT) .Observes that fdi helps to build up capital, create employment, develop productive capacity, enhance skills of local labour and managers through transfer of technology and helps the country integrate with the rest of the world. FDI in Pakistan went to oil & gas exploration, communication & financial services.	1983 and 2011 making the study data too old. -The study did not touch on sector and company wise repatriation of profit and intensity of input imports attached with FDI inflows. -Recommended further study on sector impact of fdi on employment generation and tax collection in Pakistan.
4.	Kishor Sharma and Yapa Bandara. Trends, Patterns and Determinants of Australian Foreign Direct Investment. Journal of Economic Issues, Vol. 44 No.3 (September 2010) pp.661-676 published by Taylor and Francis Limited. Stable URL http://www.jstor.org/stable/20778708 accessed on 19.04.2017.	Found out that countries which are open have large domestic market and have a similar language and culture to Australia's attract most of its foreign investment. Countries in regional blocks tend to attract Australian investments. Though they did not prove statistically, their findings suggested that countries that are economically more stable and have strong institutional credibility tend to attract Australian investment.	-The study did not segregate Australian offshore investment data by key sectors e.g. manufacturing and services etc. -The measure for openness as a determinant of fdi was not clearly defined and measured. -The study measured knowledge capital using research and development expenditure. This is problematic as it is not accurate. -They did not prove statistically one of their assertions that countries that are economically more stable and have strong institutional credibility tend to attract Australian investment.
5.	Sami Ullah, Syed Zeeshan Haider and Parvez Hashim. Impact of Exchange Rate Volatilty on Foreign Direct Investment: A Case Study of Pakistan. Pakistan Economic and Social Review, Vol.50 no.2 (Winter 2012), pp.121-138. Published by Department of Economics, University of Punjab. This study has used time series data for fdi, exchange rate, exchange rate volatility, trade openness and inflation from 1980-2010. Used time series techniques of unit root test, volatility analysis, co integration technique and causality analysis to obtain the results. Data obtained from World Bank's reliable data source World Development Indicators.	-The team found out that FDI is positively associated with Rupee depreciation and exchange rate volatility deters FDI. They also concluded that trade openness increases fdi while the premise does not hold for inflation as it is insignificant. The study used fdi, exchange rate, exchange rate volatility, trade openness and inflation as its variables. All the variables were used in their log form.	-This study is unique in that it has not been done in Kenya.
6.	The Impact of Foreign Direct Investment on Total Factor Productivity and Economic Growth in Turkey by Ibrahim Arisoy. The Journal of Developing Areas, Vol.46 No.1 (Spring 2012 pp 17-29).Published by College of Business, Tennessee State University. Stable URL http://www.jstor.org/stable/23215420. Variables for the study are GDP, FDI and Total Factor Production (TFP).The paper argues that two main channels through fdi can affect host country economic growth are technology	The paper argues that foreign direct investment can influence the economy through technology spillover and physical capital accumulation. The study's empirical results indicated that foreign direct investment contributes positively to total factor productivity and growth through capital accumulation and technological spillovers.	-The study has not incorporated other variables and factors like macroeconomic stability, foreign trade, inflation and external economic conditions that may also have an impact on foreign direct investment and total factor production. -A similar study has not been done in Kenya. - The researcher decries the fact that very few studies have been done on the relationship between fdi and total factor productivity.

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	spillovers and physical capital accumulation. The interest in fdi is generally attributed to its employment generation capacity, its effect on the productivity development growth and its dynamic link to competitiveness. It provides employment opportunities, enhances productivity by bringing competition to the economy. It is a tool for transferring skills, technology and knowledge stock among countries. The study covered a period of 45 years i.e. from 1960-2005.		
7.	The Impact of Foreign Direct Investment on Employment Opportunities: Panel Data Analysis: Empirical Evidence from Pakistan, India and China by Syed Zia Abbas Rizvi and Muhammad Nishat. Published by Pakistan Institute of Development Economics in 2010. Stable URL http://www.jstor.org/stable/41261350. Accessed on 10.05.2017 .Defined fdi as not only a simple transfer of money but as a mixture of financial and intangible assets such as technologies, managerial capabilities, marketing skills and other assets. The scope of the study covered three countries namely Pakistan, India and China. Panel data regression analysis was used.	-The study covered a period of 24 years, from 1985-2008. -Found out that GDP shocks explain 0.75 per cent change in employment during the second year then it gradually bottom out.	-The study is weak because it uses on one parameter of measuring economic growth i.e. employment rate and GDP ignoring other important ones like balance of payment. -The study covered India, Pakistan & China. A similar study should be done in Kenya. -The researchers did not explicitly differentiate between direct and indirect impact of fdi growth. -The data is too old.
8.	The Economic Impact of Foreign Direct Investment: A Case Study of Venezuela by Robert Grosse published by Springer sourced from Management International Review Vol. 28 No.4 (4th Quarter 1988), pp.63-78. Stable URL http://www.jstor.org/stable/40227906 accessed on 10.05.2017. Identifies multinational enterprise to be an important vehicle for effecting international transfer of funds, technology, management skills and products. The impact of fdi is on employment, national income and balance of payment.-4	The study used employment, gross domestic product & balance of payment to measure the dependent variable-economy. -Found out that fdi tends to offer net benefits to the host country that either would not be available from other sources or would be more costly to obtain from other alternative vehicles.	-Did not touch on the impact that fdi has social and political issues. -The data is too old i.e. was collected in 1988. -The study is confined just to the manufacturing sector while ignoring other sectors i.e. extractive and service sectors.
9.	The Impact of Foreign Direct Investment on Sectoral Adjustment in the Irish Economy by Frances Ruane & Holger Gorg published by Sage Publications Limited sourced from National Institute Economic Review, No.160 (April 1997) pp 76-86. Stable URL http://www.jstor.org/stable/2372418 accessed on 10.05.2017.The study employed the use of employment to measure the econonmy. Underscored the fact produced roughly 69% of the net output and 45% of jobs in Irish	-The research found out that Ireland is over dependant on foreign direct investment to the extent that if it were to experience massive outflow of fdi the result would be disastrous. -It also found out that employment in Irish owned firms declined by 14% and employment in foreign owned firms increased by 43% in the period beginning 1975-1995. -There has been significant structural changes in foreign investment with increasing share of employment in internationally traded services.	-The paper/research is old. It has existed for 20 years. -The paper concentrated on manufacturing sector ignoring other sectors of the Irish economy. -The paper has no abstract. -The methodology is not clearly spelt out.

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manufacturing industries in 1993.Noted that in terms of regional employment, FDI became a vehicle for dispersing manufacturing employment across the country and away from the manufacturing bases in Dublin and Cork. The paper concentrated on the manufacturing sector as the sector where hitherto fdi has the most impact.		
10. Foreign Direct Investment and Transformation: Evolution and Impacts in the Polish Economy by Anna Zorska published by Taylor and Francis Limited sourced from Eastern European Economics Vol.43 No.(July-August 2005),pp 52-78 Stable URL http://www.jstor.org/stable/4380430 accessed on 10.05.2017 Used the theory of international production to gain more insight on the effects on fdi. OLI theory developed by Dunning (1981:1993) identifies the determinants considered by an enterprise for fdi:- a) O-ownership of firm specific competitive advantages like capital, technology, skills, information, methods of management, organization, marketing e.t.c b) Utilizing the above advantages in a foreign location (L) c) Internationalization of the advantages within and across the borders.	-FDI led to the transition and transformation of the Polish economy. -Found out that fdi pattern is concentrated in traditional manufacturing. The technology pattern of fdi is based on international production. -FDI/TNC's contribution in facilitating Poland's economy passing to innovation stage is insufficient.	-The study is not detailed on the impact that fdi has on the Polish economy.
11. Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries by Shiva S.Makki and Agappi Somwaru published by Oxford University Press sourced from American Journal of Economics, Vol.86 No.3 (August 2004) pp.795-801 Stable URL http://www.jstor.org/stable/3697825 accessed on 10.05.2017.Observes fdi and trade is often seen as a catalyst for economic growth in developing countries. Examined data from 66 developing countries over a period of 30 years.	-Found a strong positive interaction between fdi and trade on in advancing economic growth. -Fdi stimulates domestic investment. -The contribution of fdi to economic growth is enhanced by its positive interaction with human capital and sound macroeconomic policies and institutional stability.	The study is good and relevant but has no abstract.
12. The Impact of Foreign Direct Investment on Wages and Employment by Laixun Zhao published by Oxford University Press sourced from Oxford Economic Papers, Vol.50 No.2 (April 1998) stable URL http://www.jstor.org/stable/3488735 accessed on 10.05.2017. FDI brings increased demand in the international market for domestically produced intermediate goods through their foreign branches, and thus raises domestic employment. Concerning trade and factor prices, the most well known theoretical constructs are the factor price equalization theorem and the Stolpher-Samuelson theorem.	-When labour management bargaining is industry wide two effects of FDI are identified: the collusion effect and the threat point effect. -It is shown that fdi always reduces the negotiated wage, fdi reduces union employment and the competitive wage if the union cares more about employment than wages	-The study has just used one variable of the economy to measure the impact on the economy. -The scope of the study is not comprehensive e.g. the title of the study does not indicate the place where the study was done.

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13. Foreign Direct Investment, Technological Change and Economic Growth Within Europe by Ray Barrel and Nigel Pain published by Wiley on Royal Economic Society sourced from the Economic Journal, Vol.107 No.445 (Nov, 1997) pp 1770-1786 stable URL http://www.jstor.org/stable/2957907 accessed on 10/05/2017.Fdi is intimately connected to the transfer of technologies between nations.	-Found the acquisition of knowledge based specific assets to be an important factor behind the growth of fdi suggesting that such investments are likely to be an important channel for the diffusion of ideas and technologies.	-The study was done in Europe. A similar study should be done in Kenya.
14. Foreign Direct Investment Theories: An overview of the Main FDI Theories by Vintila Denisia sourced from European Journal of Interdisciplinary Studies (2010). Economists believe that fdi is an important element in economic development in all countries especially in developing ones. From a macro perspective fdi is regarded as a generator of employment, high productivity, competiveness and technology spillovers. It also means higher export, access to international markets and international currencies substituting local bank loans. It also increases productivity, technology transfer, managerial skills, international production networks, reducing unemployment and access to international market.13	The study found out that there is no generally accepted theory with every new evidence adding some new elements and criticisms to the other ones.	-The study is much of theory and not empirical. -The fact that there is no generally accepted fdi theory calls for further research on the same.
15. Foreign Direct Investment-Led Growth: Evidence from Time Series and Panel Data by Luiz R.De Mello, Jnr published by Oxford University Press sourced from Oxford Economic Papers Vol.51 No.1 Sympossium on Trade Technology and Growth (Jan, 1999) pp 133-151 Stable URL http://www.jstor.org/stable/3488595 accessed on 11.05.2017.Used time series and panel data from a sample of OECD countries for a period of 10 years. The impact of fdi on growth is expected to be two fold, capital accumulation in the recipient economy is expected to be growth enhancing by encouraging incorporation of new inputs and technologies in the production function. Through knowledge transfer fdi augments existing knowledge through labour training and skill acquisition. It also introduces alternative management practices and organizational arrangements.	-Found that the extent to which fdi is growth enhancing depends on the degree of complimentarity and substitution between fdi and domestic investment.	-The study is good but 18 years old. -The title does not indicate where the study was done.

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Chapter Four

IV. Conclusions and Recommendations

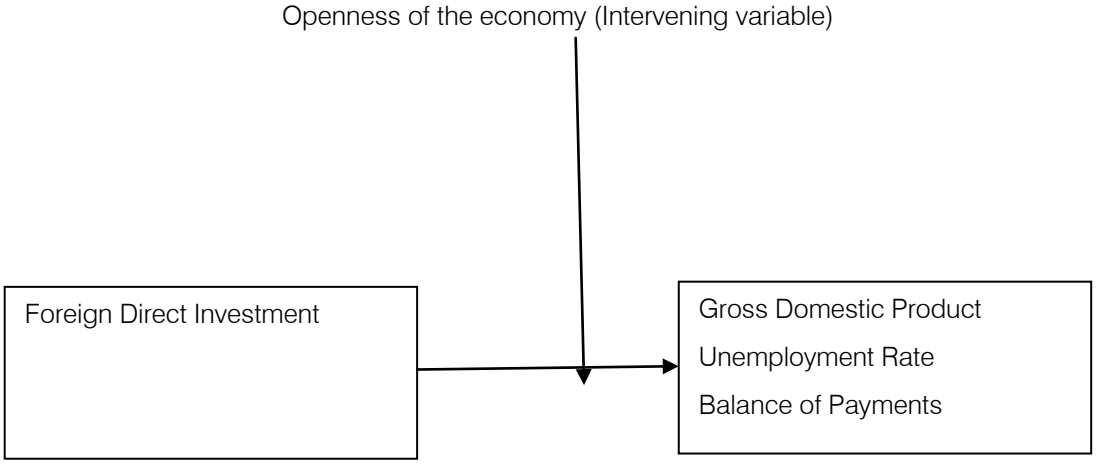
The review found out that foreign direct investment has positive influence on economic growth as it leads to creation of job opportunities, physical capital accumulation and improvement of production courtesy of technological spillovers and diffusion of ideas (Chege, 2016; Arisoy, 2012; Rizvi & Nishat, 2010; Grosse, 1988; Ruane & Gorg, 1997; Zorska, 2005; Makki & Somwaru, 2004; Zhao, 1998). It was also noted that multinational companies tend to pay better salaries than indigenous firms and that there is a positive correlation between wages paid and foreign direct investment inflow (Sharma & Satinderpal,2016). This in turn leads to improved living standards of the population. Foreign direct investment also brings competitive advantage to the host nation.

a) Scope for further study

As had been mentioned earlier, most of the studies on foreign direct investment have been extensively done in developed nations like United Kingdom, Australia, Ireland, Poland, India & China. This leaves a gap in emerging middle income economies like Kenya hence the review is recommending that an immediate study be done on the same to seal this gap. It has also been noted with serious concern that no study has been done on the trends, patterns and determinants of Greenfield investment on the Kenyan economy. The researcher is therefore recommending that a study on the same should be expeditiously done and published in a peer reviewed journal to fill the existing gap.

b) Proposed conceptual framework

Table 1.3: Conceptual framework



c) Research design

The studies reviewed embraced causal research design in their endeavor to find out the empirical association between the independent variable (foreign direct investment) and dependent variable (the economy). It is possible to replicate these studies in Kenya.

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Stress Testing and Risk Management of the Equity Market in New Zealand

By Andrew Maree
Reserve Bank of New Zealand

Abstract- The banking supervision sets out the need to conduct stress tests for the financial institutions in New Zealand. For the purpose of stress tests, the paper develops a methodology to calculate a series of severe but plausible economic scenarios. Five widely-used statistical distributions are investigated in fitting the return series of NZ 50. We show that the Skewed *t* distribution has the best goodness of fit and generates the most suitable stress test scenarios. Our approach could be an important component of sound risk management for the Reserve Bank of New Zealand. The financial institutions are expected to continue to develop their stress testing frameworks, and to use the results in our paper to inform their capital management and risk appetite setting processes.

Keywords: tail risk; goodness of fit; stress test scenarios.

GJMBR-B Classification: JEL Code: C46; C58; G10



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Stress Testing and Risk Management of the Equity Market in New Zealand

Andrew Maree

Abstract- The banking supervision sets out the need to conduct stress tests for the financial institutions in New Zealand. For the purpose of stress tests, the paper develops a methodology to calculate a series of severe but plausible economic scenarios. Five widely-used statistical distributions are investigated in fitting the return series of NZ 50. We show that the Skewed *t* distribution has the best goodness of fit and generates the most suitable stress test scenarios. Our approach could be an important component of sound risk management for the Reserve Bank of New Zealand. The financial institutions are expected to continue to develop their stress testing frameworks, and to use the results in our paper to inform their capital management and risk appetite setting processes.

Keywords: *tail risk; goodness of fit; stress test scenarios.*

I. Introduction

The New Zealand banking system was about NZD 500 billion in June 2016, around twice New Zealand annual GDP (IMF, 2017). In New Zealand, registered banks are required to conduct stress tests and report the results as part of their Internal Capital Adequacy Assessment Process (ICAAP) (Reserve Bank of New Zealand, 2015). Stress testing a bank's portfolio of assets (such as loans) involves evaluating what would happen to the portfolio in the face of various adverse events. Applied across a bank, a stress test can be described as "the evaluation of a bank's financial position under a severe but plausible scenario." Stress testing is an important risk management tool for banks in evaluating their vulnerability to various types of risk across their balance sheet. The Basel II international capital framework has a specific role for stress testing to help ensure banks have sufficient capital to absorb unanticipated losses in severe economic downturns (BCBS, 2011).

A stress test may examine the consequences for banks of a full macroeconomic scenario that affects multiple aspects of the banks' business, or concentrate on a downturn in a particular sector. According the Reserve Bank of New Zealand (2015), a combination of risk factors determines the full macroeconomic scenario. In this paper, we are particularly interested in the risk factor of the stock market in New Zealand, since this risk factor is the most important factor in determining market risk of banks.

Author: *Macro Financial Policy Department, Reserve Bank of New Zealand. e-mail: amaree0526@gmail.com*

To design stress test scenarios of the stock market in New Zealand, we consider the NZX 50 Index (NZ50). NZ50 is the main stock market index in New Zealand. It comprises the 50 biggest stocks by free-float market capitalisation trading on the New Zealand Stock Market (NZSX). The calculation of the free-float capitalisation excludes blocks of shares greater than 20% and blocks between 5% and 20% that are considered strategic. The index was introduced as the NZSX 50 Index in March 2003 and replaced the NZSE 40 Index as the headline index. It was renamed the NZX 50 Index in late 2005. The NZSE 40 Capital Index replaced the Barclays index in 1992, although the Barclays index is still compiled by the NZX but not made widely available.

To quantitatively design stress test scenarios of the stock market, we model daily returns of NZ50. As early as 1963, Mandelbrot recognized the heavy-tailed and highly peaked nature of certain financial time series. Guo (2017) creatively introduced several widely-used heavy-tailed distributions to fit the Standard&Poor's 500 index returns, and showed the Skewed *t* distribution has the best goodness of fit. Guo further successfully quantified scenarios of the stock market index return in the United States. With the insights from Guo (2017), this paper considers the widely-used heavy-tailed distributions discussed in Guo, and shows the Skewed *t* distribution also provides the best goodness of fit among these heavy-tailed distributions in modeling the stock market returns in New Zealand.

The aftermath of the recent Financial Crisis emphasized the importance of stress testing practice. Stress tests offer useful information to the Reserve Bank in its role as a prudential regulator. Our results are crucial for the Reserve Bank to determine the ability of banks or financial institutions to deal with a financial crisis.

a) Literature Review

Guo (2017) compared five widely-used statistical distributions in fitting the Standard&Poor's 500 index returns: normal, Student's *t*, Skewed *t*, normal inverse Gaussian (NIG), and generalized hyperbolic (GH) distributions. Guo showed the Skewed *t* distribution has the best goodness of fit and generates suitable stress test scenarios. The paper adopted the Skewed *t* distribution in Hansen (1994). There are some

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other types of asymmetric Student's *t* distribution as in Zhu and Galbraith (2012). In this paper, we also consider the Skewed *t* distribution as in Hansen (1994) for its simplicity and empirical performance. Since Barndorff-Nielsen (1977) introduced generalized hyperbolic distributions into the equity market, the GH distribution has gained increasing attentions in financial econometrics. In this paper, we also consider the normal inverse Gaussian distribution since the NIG distribution is one of the most popular subclass of the GH distribution, in financial modeling (see Figueroa-Lopez, et al., 2011, for a survey). In this paper, we reconsider these five distributions but focus on the financial market in New Zealand.

Recently, researchers and practitioners have gained rapid increasing interests in design of stress test scenarios in the financial industry. There are two main strands of the interests. The first strand is on the Mahalanobis distance based method to construct stress scenarios for risk factors. Breuer, Jandacka, Rheinberger and Summer (2009) proposed a suitable region of plausibility in terms of the risk-factor distribution and search systematically for the scenario with the worst portfolio loss over this region. Darne, Levy-Rueff and Pop (2013) suggested a rigorous and flexible methodological framework to select and calibrate initial shocks to be used in bank stress test scenarios. The second strand focuses on the nonparametric likelihood based method to construct stress scenarios for risk factors. Glasserman, Kang and Kang (2014) presented a method for selecting and analyzing stress scenarios for financial risk assessment, with particular emphasis on identifying sensible combinations of stresses to multiple factors. Flood and Korenko (2014) introduced a technique for selecting multidimensional shock scenarios for use in financial stress testing. Finally, Kapinos and Mitnik (2016) developed a simple, parsimonious, and easily implementable method for stress-testing scenarios choices using a top-down approach that incorporates the heterogeneous impact of shocks to macroeconomic variables on banks' asset valuation. In this paper, we focus on parametric methods and consider a single risk factor as a starting point.

There are many other researches on the stock market returns in New Zealand, such as in Firth (1997) and Choi, Pang and Fu (2009). However, there is no research on the topic of designs of stress test scenarios. There are some researches on stress test of New Zealand's banking system as in Jang and Kataoka (2013), but not specifically focusing on the financial market. The remainder of the paper is organized as follows. In Section 2, we introduce the heavy-tailed distributions. Section 3 summarizes the data. The estimation results are in Section 4. Finally, we conclude in Section 5.

II. The Heavy-Tailed Distributions

Similar as in Guo (2017), we consider four types of widely-used heavy-tailed distribution in addition to the normal distribution: (i) the Student's *t* distribution; (ii) the Skewed *t* distribution; (iii) the normal inverse Gaussian distribution (NIG); and (iv) the generalized hyperbolic distribution (GH). All the distributions have been standardized to ensure mean and standard deviation equal to zero and one respectively. Their probability density functions are given as follows.

i. Student's *t* distribution

$$f(e_t \mid \nu) = \frac{\Gamma(\frac{\nu+1}{2})}{\Gamma(\frac{\nu}{2})[(\nu-2)\pi]^{1/2}}\left(1+\frac{e_t^{\,2}}{(\nu-2)}\right)^{-\frac{\nu+1}{2}}, \quad (1)$$

where ν indicates degrees of freedom and e_t is daily equity market index return in New Zealand.

ii. Skewed *t* distribution

$$f(e_t \mid \nu, \beta) = \begin{cases} bc\left(1+\frac{1}{\nu-2}\left(\frac{be_t+a}{1-\beta}\right)^2\right)^{-(\nu+1)/2} & e_t < -a/b \\ bc\left(1+\frac{1}{\nu-2}\left(\frac{be_t+a}{1+\beta}\right)^2\right)^{-(\nu+1)/2} & e_t \geq -a/b \end{cases} \quad (2)$$

where e_t is the standardized log return, and the constants a, b and c are given by $a = 4\beta c\left(\frac{\nu-2}{\nu-1}\right)$, $b^2 = 1+3\beta^2-a^2$, and $c = \frac{\Gamma(\frac{\nu+1}{2})}{\sqrt{\pi(\nu-2)}\Gamma(\frac{\nu}{2})}$. The density function has a mode of $-a/b$, a mean of zero, and a

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unit variance. The density function is skewed to the right when $\beta > 0$, and vice-versa when $\beta < 0$. The Skewed *t* distribution specializes to the standard Student's *t* distribution by setting the parameter $\beta = 0$.

iii. Normal inverse Gaussian distribution (NIG)

$$f(e_t \mid \mu, \alpha, \beta, \delta) = \frac{\alpha\delta K_1(\alpha\sqrt{\delta^2 + (e_t - \mu)^2})}{\pi\sqrt{\delta^2 + (e_t - \mu)^2}} \exp(\delta\sqrt{\alpha^2 - \beta^2} + \beta(e_t - \mu)) \quad (3)$$

where $K_\lambda(\cdot)$ is the modified Bessel function of the third kind and index $\lambda = 0$ and $\alpha > 0$. The NIG distribution is specified as in Prause (1997). The NIG distribution is normalized by setting $\mu = -\frac{\delta\beta}{\sqrt{\alpha^2 - \beta^2}}$ and $\delta = \frac{\left(\sqrt{\alpha^2 - \beta^2}\right)^3}{\alpha^2}$, which implies $E(e_t) = 0$ and $Var(e_t) = 1$.

iv. Generalized hyperbolic distribution

$$f(e_t \mid p, b, g) = \frac{g^p}{\sqrt{2\pi}\left(b^2 + g^2\right)^{\frac{1}{2}\left(p - \frac{1}{2}\right)} d(p,b,g) K_p(g)} q\left(\frac{e_t - m(p,b,g)}{d(p,b,g)};\ p, b, g\right) \quad (4)$$

where $\tilde{R}_n = \frac{K_{n+p}(g)}{g^n K_p(g)}$, $d(p,b,g) = \left[\tilde{R}_1 + b^2\left\{\tilde{R}_2 - \tilde{R}_1^2\right\}\right]^{-\frac{1}{2}} \geq 0$, and $m(p,b,g) = -b\, d(p,b,g)\tilde{R}_1$.

p, b and g are parameters. The generalized hyperbolic distribution is a standardized version of Prause (1997).

III. Data

We fit the heavy tailed distributions with the normalized equity market index returns of New Zealand. We choose the NZX 50 Index as it is the main stock market index in New Zealand. The index is designed to measure the performance of the 50 largest, eligible stocks listed on the Main Board (NZSX) of the NZX by float-adjusted market capitalization. Representative, liquid, and investable, it is widely considered New Zealand's preeminent benchmark index. The index is float-adjusted, covering approximately 90% of New Zealand equity market capitalization. We collected the standardized NZ 50 daily dividend-adjusted close returns from Yahoo Finance for the period from January 2, 2003 to July 6, 2017, covering all the available data in Yahoo Finance. There are in total 3560 observations. Figure 1 illustrates the dynamics of NZ 50, and the two biggest spikes were observed on October 9, 2008 and October 13, 2008. The recent financial crisis also witnessed significant volatility in the financial market.

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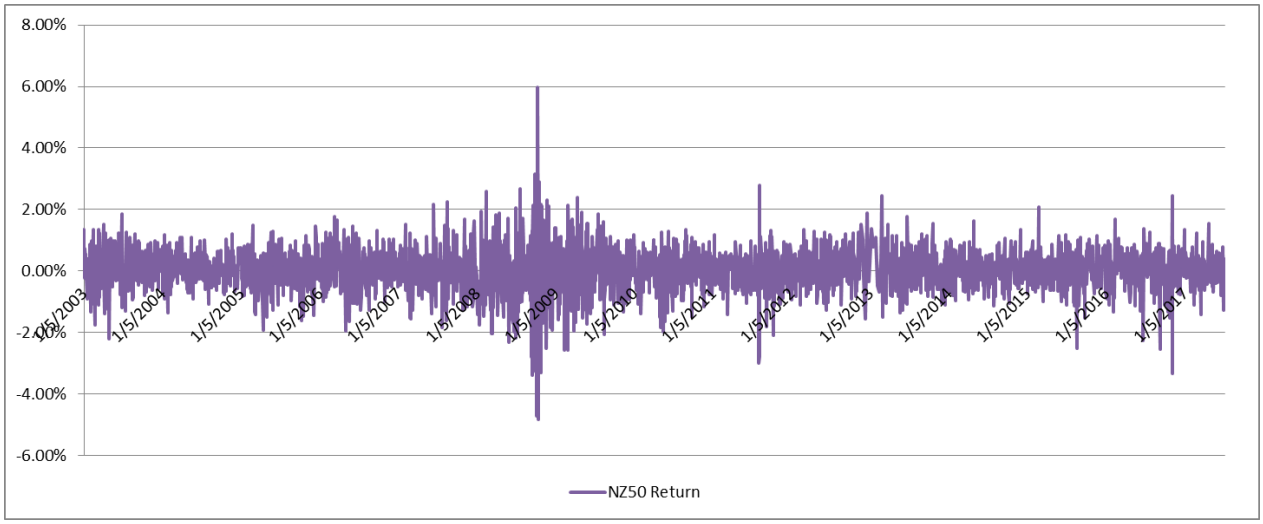


Figure 1: NZ50 returns

Table 1 exhibits basic statistics of the NZ 50 returns. The results show the NZ 50 daily returns are leptokurtotic and negatively skewed. The extreme downside move is slightly less than the extreme upside move, which is at odds with most of major stock market indexes over the world.

Table 1: Descriptive statistics

min	max	mean	std	skewness	kurtosis
-4.82%	5.99%	0.04%	0.68%	-0.35	5.02

Figure 2 is the histogram of the raw data. We fit the returns by the Gaussian distribution and the Student's *t* distribution. The upper panel in Figure 2 is fitted by the normal distribution. Clearly, the Student's *t* distribution has a much better in-sample goodness of fit.

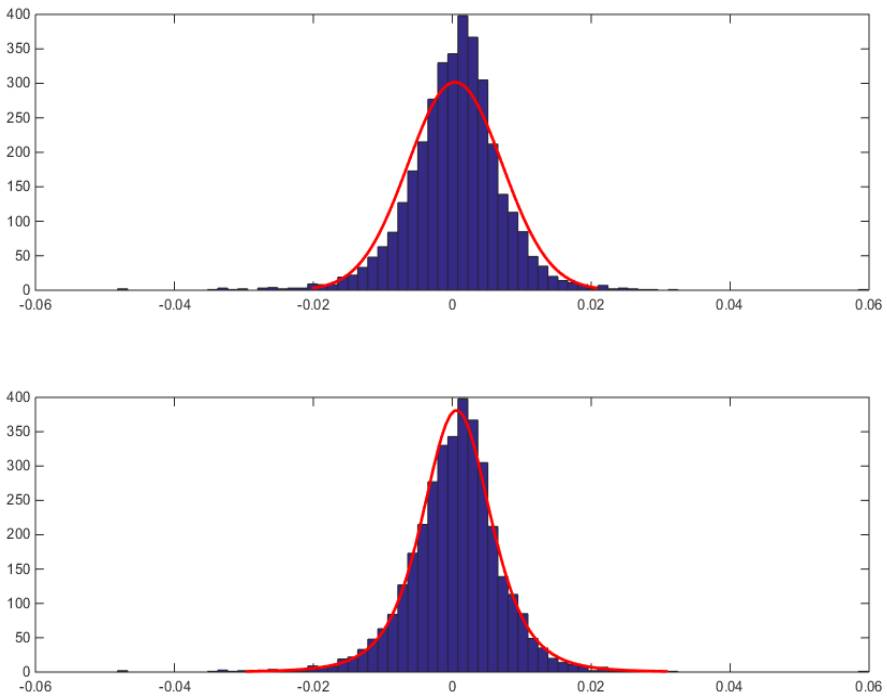


Figure 2: NZ50 returns - Normal vs. Student's *t*

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IV. Empirical Results

a) Parameters Estimation

The raw return series is normalized to allow zero mean and unit standard deviation. The series is fitted by the maximum likelihood estimation (MLE) method and the estimation results of the key parameters are given in Table 2. All the parameters are significantly different from zero at 10% significance level.

Table 2: Estimated values of key parameters

	Normal	Student's *t*	Skewed *t*	NIG	Generalized Hyperbolic
Symmetric	Y	Y	N	N	N
Fat-tailed	N	Y	Y	Y	Y
Estimated Parameters		Nu=4.56	Nu=4.63; beta=-0.034	alpha=1.54; beta=-0.054	p=-1.235; b=-.063; g=0.367

b) Goodness of Fit

Based on Huber-Carol, et al. (2002) and Taeger and Kuhnt (2014), we investigate the four heavy-tailed distributions and the benchmark normal distribution in fitting the NZ50 daily returns through four different criteria: (i) Kolmogorov-Smirnov statistic; (ii) Cramer-von Mises criterion; (iii) Anderson-Darling test; and (iv) Akaike information criterion (AIC).

a. Kolmogorov-Smirnov statistic is defined as the maximum deviation between empirical CDF (cumulative distribution function) $F_n(x)$ and tested CDF $F(x)$:

$$D_n = \sup_x |F_n(x) - F(x)|, \quad (5)$$

where $F_n(x) = \frac{1}{n}\sum_{i=1}^{n} I_{[-\infty,x]}(X_i)$.

b. Cramer-von Mises criterion is defined as the average squared deviation between empirical CDF and tested CDF:

$$T = n\int_{-\infty}^{\infty} [F_n(x) - F(x)]^2 dF(x) = \frac{1}{12n} + \sum_{i=1}^{n}\left[\frac{2i-1}{2n} - F_n(x_i)\right]^2 \quad (6)$$

c. Anderson-Darling test is defined as the weighted-average squared deviation between empirical CDF and tested CDF:

$$A = n\int_{-\infty}^{\infty} \frac{(F_n(x) - F(x))^2}{F(x)(1-F(x))} dF(x),$$

and the formula for the test statistic A to assess if data comes from a tested distribution is given by:

$$A^2 = -n - \sum_{i=1}^{n} \frac{2i-1}{n}\left[\ln(F(x_i)) + \ln(1-F(x_i))\right]. \quad (7)$$

d. Akaike information criterion (AIC) is defined as:

$$AIC = -2k - 2\ln(L), \quad (8)$$

where L is the maximum value of the likelihood function for the model, and k is the number of estimated parameters in the model.

The comparison results are showed in Table 3, indicating the Skewed *t* distribution has the best goodness of fit compared with other selected types of distribution, followed by the generalized hyperbolic distribution, and the Student's *t* distribution.

Table 3: Comparison of selected types of distribution

	Normal	Student's *t*	Skewed *t*	NIG	Generalized Hyperbolic
K-S Test	0.015	0.007	0.005	0.008	0.006
Cv-M Test	0.021	0.014	0.011	0.015	0.013
A-D Test	1.43	1.21	1.13	1.19	1.15
AIC	12811.8	12201.2	11976.3	12320.4	12108.7

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c) Stress Test Scenarios

We adopt Value at Risk (VaR) to calculate stress test scenarios. In quantitative risk management, VaR is defined as: for a given position, time horizon, and probability *p*, the *p* VaR is defined as a threshold loss value, such that the probability that the loss on the position over the given time horizon exceeds this value is *p*.with the estimated parameters in Section 4.1, we calculate VaRs for different confidence levels:

$$VaR_{\alpha}(e_t) = \inf\{e \in \square : P(e_t > e) \leq 1-\alpha\}, \quad (9)$$

where $\alpha \in (0,1)$ is the confidence level. We select the following levels for downside moves: {99.99%, 99.95%, 99.9%, 99.5%, 99%}, and for upside moves: {0.01%, 0.05%, 0.1%, 0.5%, 1%}. From Equation (9), the stress test scenarios based on the VaR levels are given as in Table 4. Table 4 indicates that the Skewed *t* distribution has the closest VaRs to the nonparametric historical VaRs compared with other types of distributions.

Table 4: Scenarios for NZ50 shocks

Left Tail					
Confidence	99.99%	99.95%	99.90%	99.50%	99.00%
Empirical	-4.82%	-4.35%	-3.34%	-2.45%	-1.92%
Normal	-2.56%	-2.21%	-2.03%	-1.74%	-1.56%
T	-4.59%	-4.05%	-3.65%	-2.88%	-2.34%
Skewed T	-4.76%	-4.38%	-3.19%	-2.51%	-2.01%
NIG	-4.01%	-3.67%	-3.12%	-2.81%	-2.31%
GH	-4.61%	-4.13%	-3.46%	-2.67%	-2.11%

Right Tail					
Confidence	0.01%	0.05%	0.10%	0.50%	1.00%
Empirical	5.99%	3.09%	2.77%	2.09%	1.69%
Normal	2.56%	2.21%	2.03%	1.74%	1.56%
T	4.59%	4.05%	3.65%	2.88%	2.34%
Skewed T	5.26%	3.23%	2.89%	2.15%	1.75%
NIG	4.42%	3.89%	3.22%	2.75%	2.31%
GH	4.77%	3.98%	3.34%	2.71%	2.06%

V. Conclusions

Stress testing is a tool to assess the resilience of financial institutions to a hypothetical adverse event, usually a severe but plausible economic downturn. Introducing a comprehensive stress testing framework for the New Zealand banking system is a strategic priority for the Reserve Bank. In this paper, we focus on the NZX 500 index, the most important risk factor in the banking sector, and develop a methodology to construct its stress test scenarios. By comparing empirical performance of different statistical distributions, our results show the Skewed *t* distribution could generate the most suitable stress test scenarios for NZ50.

There are two directions for further research. First, one may introduce the fat-tailed distributions to the generalized autoregressive conditional heteroskedasticity (GARCH) framework and study their implications in designs of stress test scenarios. Second, one may combine the risk factor of stock market returns with other risk factors, such as unemployment and interest rates, and investigate how to extend the Skewed *t* distribution to the tail-dependence framework for designs of stress test scenarios.

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The Determinants of Economic Growth in BRICS Countries

By Foued Sabbagh
University of Sousse

Abstract- The purpose of this article is to provide a theoretical framework with a brief literature particularly linking the various determinants of economic growth. These determinants are its basis in the reconciliation of those three theories of exogenous growth, endogenous growth and the convergence between these two forms of growth. In this context, the convergence paths to long-term economic growth requires a set of economic, social, cultural and political factors on either regions, or cross country, or some countries or see all over the world countries. These hypotheses are tested in an econometric study of dynamic panel data from five BRICS countries during the period 2000-2012. The econometric model in this article is presented in the form of a conditional convergence equation to treat the origins of economic growth.

Keywords: *exogenous growth, endogenous growth, brics countries, dynamic panel data, methods for ordinary least squares (OLS).*

GJMBR-B Classification: *JEL Code: A10*



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The Determinants of Economic Growth in BRICS Countries

Les Déterminants De La Croissance Économique Des Pays BRICS

Foued Sabbagh

Résumé- L'objectif de cet article est de fournir un cadre théorique par une brève littérature reliant en particulier les différents déterminants de la croissance économique. Ces déterminants trouvent son fondement dans le rapprochement entre trois théories celles de la croissance exogène, de la croissance endogène et de la convergence entre ces deux formes de croissance. Dans ce cadre, la convergence vers des sentiers de croissance économique à long terme requiert sur un ensemble des facteurs économiques, sociales, culturelles et politiques concernant soit des régions, soit des transversales par pays, soit certains pays ou voir tous les pays du monde. Ces hypothèses sont testées dans une étude économétrique sur des données de panel dynamiques de cinq pays des BRICS durant la période de 2000 à 2012. Le modèle économétrique dans cet article est présenté sous la forme d'une équation de convergence conditionnelle pour traiter les origines de la croissance économique.

Mots-Clés: croissance exogène, croissance endogène, pays brics, données de panel dynamiques, méthodes des moindres carrées ordinaires (MCO).

Abstract- The purpose of this article is to provide a theoretical framework with a brief literature particularly linking the various determinants of economic growth. These determinants are its basis in the reconciliation of those three theories of exogenous growth, endogenous growth and the convergence between these two forms of growth. In this context, the convergence paths to long-term economic growth requires a set of economic, social, cultural and political factors on either regions, or cross country, or some countries or see all over the world countries. These hypotheses are tested in an econometric study of dynamic panel data from five BRICS countries during the period 2000-2012. The econometric model in this article is presented in the form of a conditional convergence equation to treat the origins of economic growth.

Keywords: exogenous growth, endogenous growth, brics countries, dynamic panel data, methods for ordinary least squares (OLS).

I. Introduction

Le débat de la croissance économique a été constitué un enjeu majeur de la théorie et l'analyse empirique de plusieurs économistes. Les premières théories reposent sur le modèle néoclassique de la croissance exogène développé par (Solow, 1956, 1957), (Solow, Tobin, Von Weizscher, et Yaari, 1966). Ces théories attribuent l'origine de la croissance selon la croissance de la population active et le progré technique exogène. Mais le renouveau théorique de la croissance économique a commencé à utiliser de nouvelles perspectives d'où la naissance de la théorie de la croissance endogène. Ce concept de croissance économique a été développé en particulier par (Romer, 1986, 1990, 1994). Cette présentation du modèle théorique est exposée sur l'origine de la croissance selon l'accumulation du capital physique, technique, humain, public et les intermédiaires financiers. Cette nouvelle théorie de la croissance économique ouvre des perspectives nouvelles à l'analyse de l'origine endogène de la croissance à long terme. Toutefois, les aspects exogène et endogène qui sont au centre de ces débats laissent entrevoir une ouverture avec la nouvelle notion de la convergence entre ces deux aspects. Cette notion a été relancée dernièrement grâce à l'imbrication entre ces deux types de croissance par le principe de convergence conditionnelle (Barro, 1990, 1991, 1996), (Barro, et Sala-i-Martin, 1992, 2004). D'après ces théories, il semble donc pertinent de soumettre les modèles de la croissance exogène et endogène et d'évaluer les déterminants de la croissance économique dans les pays BRICS[1]. Malgré leur importance comme un pôle économique émergeant dans le monde, les pays dits du BRICS font l'objet de peu de recherche en matière de croissance économique. D'après, (Wilson, et Purushothman, 2003) de la note de firme Goldman Sachs, les BRICS pourraient devenir beaucoup plus grande vigueur dans l'économie mondiale en 2050. L'importance de l'intégration économique des BRICS dans une zone unique en tant que moteur de croissance économique plus élevée dans le monde. Lorsque l'on parle de taux de croissance, on parle alors de la croissance économique du produit intérieur brut (PIB) par habitant. Ce dernier indicateur est considéré comme un bon indicateur de l'analyse de la performance économique d'un pays.

Le but de cet article est de faire une revue de la littérature récente reliant les déterminants de la croissance économique, d'en explorer la notion de la

Author: Faculté de Droit et des Sciences économiques et politiques de Sousse, Université de Sousse. e-mail: fouedsabbagh_2010@yahoo.fr

[1] Le groupe de pays communément appelé BRICS est composé de cinq pays (le Brésil, la Russie, l'Inde, la Chine et l'Afrique du Sud) qui sont considérés comme une zone de coopération économique, commerciale et politique émergente dans le monde.

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convergence conditionnelle entre la croissance exogène et endogène et d'en analyser les résultats empiriques existant sur les données de panel pour la période 2000-2012 sur un échantillon de cinq pays des BRICS. Pour répondre à la problématique suivante, quels sont les déterminants de la croissance économique des pays BRICS et comment mesure-t-on cette croissance dans ces pays?. Cet article s'organise de la manière suivante. La première partie présente une bréve littérature théorique pour déterminer l'origine de la croissance économique. La deuxième partie sera consacrée à l'analyse empirique des déterminants de la croissance économique des pays BRICS.

II. Les Déterminants De La Croissance Économique : Une Revue De La Littérature

L'objet de cet article est tout d'abord de passer d'une revue de la littérature qui est avancée pour expliquer les déterminants de la croissance économique à une analyse empirique des différentes possibilités étudiées dans cette partie. Les différentes théories passées en revue de la littérature mettent l'accent sur l'apport de la croissance exogène, de la croissance endogène et de la notion de convergence entre ces deux types de modèles. Ces travaux théoriques ou empiriques ont développé des approches explicatives du phénomène de la croissance économique. La plupart des principaux travaux empiriques se penchent sur les applications en transversale par pays. Ces études théoriques et empiriques ont examiné la possibilité que la complémentarité entre la croissance exogène et la croissance endogène donne naissance à la notion de convergence. Face à ce débat théorique, plusieurs travaux abordent la question de la convergence pour éprouver les imbrications des deux types de croissance. Certains auteurs ont alors recherché des méthodes permettant d'identifier les déterminants de la croissance économique qui expliquent la notion de convergence et les différences de la croissance entre les pays. En effet, la croissance occupe de nos jours l'esprit de nombreux modèles théoriques et recherches empiriques. Cet article se concentre essentiellement sur trois analyses tendent à être privilégiées où le taux de croissance par habitant sera identifié, avec une référence des pays BRICS. La plus ancienne de ces analyses repose sur le modèle néoclassique de la croissance exogène. La deuxième analyse présente la croissance endogène avec de nouvelles perspectives. La troisième analyse met l'accent sur la notion de convergence conditionnelle.

a) La croissance exogène

Cette revue de la littérature commence par exposé des théories des différentes origines de la croissance exogène. Le modèle néoclassique de croissance exogène, dans sa version de base, est dû à (Solow, 1956) par une contribution à la théorie de la croissance économique inspirée du modèle Harrod Domar. Le résultat de ce modèle sera une sous-utilisation du capital si le taux d'intérêt devient rigide, quelque part au-dessus du niveau correspondant au rapport capital-travail équilibré. Il montre qu'aucune théorie crédible de l'investissement peut être construite sur l'hypothèse de prévision parfaite et arbitrage au fil du temps. L'analyse de (Solow, 1956) se base sur les rendements d'échelle constants, la diminution de la productivité marginale du capital, de manière exogène déterminés le progrès technique et la substituabilité entre capital et travail. Il introduit un progrès technique, représenté comme un déplacement de la fonction de production pour des quantités de travail et de capital, le niveau de la production obtenue est plus élevé. De plus, le progrès technique est considéré comme exogène. Cette théorie attribue l'origine de la croissance par tête au montant de capital technique investi. L'essentiel des innovations technologiques est fait d'agents privés par les dépenses de recherche et le développement éducatif. En effet, l'investissement par tête va augmenter et par conséquent le niveau de la production va augmenter. En outre, si le taux d'épargne a été fixé à un niveau exogène. Dans ce cadre, si toute l'épargne est investie, les rendements sont décroissants, la substitution du capital au travail selon les coûts relatifs de l'un à l'autre, la concurrence devient monopolistique et des comportements price-makers, ainsi le niveau de production d'un pays sont déterminés par l'investissement par tête qui y est effectué. Ensuite, le taux de croissance du produit ne dépend que d'une variable, alors que le progrès technique est du type exogène. Enfin, le taux d'épargne ne détermine que les niveaux de l'état d'équilibre des différentes variables, mais pas leurs taux de croissance. Il détermine que le niveau du capital par tête est donc du produit par tête. Ces premières analyses, qui sont supposées expliquer la croissance exogène selon le modèle néoclassique jusqu'à la seconde guerre mondiale sont dispersées. En revanche, la période après la Seconde Guerre mondiale a connu une forte croissance dans les pays développés ce qui permet de renouveler la théorie de la croissance exogène par (Solow, 1957), (Solow, Tobin, Von Weizsacher, et Yaari, 1966). Ce modèle intervient en pleine période de la croissance d'origine exogène et met en évidence le rôle primordial du progrès technique exogène. La nouvelle ride décrire par (Solow, 1957) est un moyen élémentaire de séparer les variations de la production par tête due au progrès technique de celles qui sont dues à des changements dans la disponibilité de capital par tête. Cette méthode repose essentiellement sur une nouvelle hypothèse que les facteurs sont payés leurs produits marginaux, mais il pourrait facilement être étendu à des marchés de facteurs monopolistiques. En outre, le principal effet

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d'une augmentation de l'investissement brut est de moderniser le stock de capital en cours d'utilisation (Solow, Tobin, Von Weizsacher, et Yaari, 1966). Ils démontrent que l'investissement brut à une conséquence normale du progrès technologique sera une tendance à la hausse du taux de salaire réel. Depuis le capital existant fonctionne sous coefficient fixe, il finira par arriver un moment dans la vie de chaque millésime de l'investissement lorsque les coûts de l'utiliser pour produire une unité de production de salaire dépassent une unité de production. Ces théoriciens expliquent cette renouvelle de la croissance en intégrant à côté du travail et du capital, un troisième facteur c'est le progrès technique pour expliquer la croissance à long terme. En effet, quand le facteur capital est constant, seule la croissance de la population active va augmenter le stock de capital et par ailleurs, les changements techniques et la fonction de production agrégée faire croître le salaire réel. Par conséquent, les coefficients d'un facteur fixe entrainent que toute unité concrète du capital a une capacité de production donnée et nécessite un complément de travail donné. Le progrès technique joue un rôle important comme un facteur de croissance à long terme, même si elle est considérée comme exogène et caractérisée par le biais de changements technologiques qui compense continuellement l'effet modérateur des rendements décroissants[2]. (Lucas, 1988) examine les perspectives de la construction d'une théorie néoclassique de la croissance et du commerce international qui est compatible avec certaines des principales caractéristiques du développement économique. Ce modèle correspond à la preuve du dernier siècle ainsi démontre que le modèle néo-classique dépasse le simple cadre en mettant l'accent sur l'accumulation de capital physique et le changement technologique, sur l'accumulation de capital humain grâce à l'éducation, l'expérience et la santé. Les récentes théories de la croissance exogène examinent si le modèle de (Solow, 1957) est conforme à la variation internationale dans le niveau de vie (Mankin, Romer, et Weil, 1992). Ce modèle est produit à partir de la notion d'investissement en capital humain. D'autres théories démontrent que le développement financier à un impact sur la croissance exogène (Levine, 1999), (Levine, Loayza, et Beck, 2000). Ils présentent des preuves concernant les déterminants juridiques, politiques et réglementaires du développement de l'intermédiation financière. Ces récentes théories examinent essentiellement si la composante exogène de développement de l'intermédiation financière défini par le cadre juridique, politique et réglementaire influe positivement sur la croissance économique. Plus récemment, le modèle de croissance avec taux d'épargne exogène (Barro, et Sala-i-Martin, 2004) examine que la seule source possible de la croissance par habitant est l'accumulation de capital physique en ajoutant les agrégats macroéconomiques suivants comme les ménages ou familles, les entreprises et les marchés sur la structure de base de l'équilibre générale.

b) La croissance endogène

Le modèle de base de la théorie de la croissance endogène insiste sur l'accumulation de quatre facteurs principaux comme le capital physique, la technologie, le capital humain et le capital public (Romer, 1986, 1990). L'accumulation de ses nombreux facteurs va mettre l'importance de ces nouvelles théories de la croissance.

L'accumulation du capital physique: Dans le modèle fondateur de la croissance endogène développé par (Romer, 1986), le capital physique dans une entreprise provoque des effets positifs sur les autres entreprises. Ce modèle intégralement spécifié de croissance à long terme dans lequel la connaissance est supposée être une entrée en production qui a une augmentation de la productivité marginale. Il s'agit essentiellement d'un modèle d'équilibre concurrentiel avec le changement technologique endogène. En effet, le stock de connaissance pour la production de biens et services dans une entreprise provoque que l'investissement a un double effet, d'un côté sur la production de l'entreprise et de l'autre côté sur la productivité des autres entreprises grâce à la présence d'externalités technologiques. L'explication de ce phénomène d'externalité entre les entreprises, réside dans le fait que l'investissement dans des progrès technologiques endogènes est le point de départ de ce modèle. Par conséquent, on conclut que l'investissement agit directement sur la croissance et indirectement sur le progrès technique. En ce sens, (Li, et Liu, 2005) démontrent que l'impact des investissements directs étrangers sur la croissance économique à un effet positif, négatif ou négligeable, selon les conditions économiques, institutionnelles et technologiques dans l'économie bénéficiaire.

L'accumulation du capital technique: La croissance de ce modèle est entraînée par le changement technologique, qui découle de décisions d'investissement intentionnelles effectuées par des agents de la maximisation du profit (Romer, 1990). Dans ce modèle, la particularité de la technologie comme une entrée, c'est que le changement technologique peut acquérir des biens nouveaux (brevet) et des innovations, d'où la technologie est un bien public et non rival. Cette théorie mettre en avant le rôle important de la recherche-développement au cours de la période

[2] L'analyse théorique de la croissance exogène inspiré selon le modèle de (*Solow, 1957*) et (*Solow, Tobin, Von Weizsacher, et Yaari, 1966*) montre que de facteur du progrès technique exogène est important par la croissance à long terme (*Aghion, et Howitt, 1997*) et (*Artelaris, Arvantidis, et Petrokos 2006*).

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de changement technologique et les externalités de connaissances. Dans ce cadre, l'étude de (Guellec, et Van Pottelsberghe De la Potterie, 2001) souligne l'importance de la technologie pour la croissance économique, qu'elle soit développée par les entreprises, le secteur public ou qu'elle provienne de sources étrangères. En effet, l'activité de la recherche et développement est important pour la productivité et la croissance économique. Cette activité a un rendement social[3] qui est supérieur à son rendement privé (brevet), celà expliqué selon les différentes formes d'aide ou subvention de l'Etat à la recherche et développement des entreprises. En outre, les Etats prévoient des financements adéquats pour la recherche et développement dans le secteur public, notamment dans l'éducation, la santé et la formation professionnelle. La recherche et développement sont une activité spécifique qui a des effets substantiels sur la croissance économique à long terme. Selon l'explication de (Jones, 1995), la croissance dans le modèle est endogène dans le sens que le progrès technologique, qui génère de la croissance à long terme, les résultats de la recherche et développement mené par des agents de maximisation du profit.

L'accumulation du capital humain: Le modèle de croissance endogène a renouvelé l'analyse du capital humain comme spécifique à la production de biens particuliers, et est acquis à travers l'expérience (Lucas, 1988). Ce modèle permet de prendre en compte le rôle de l'investissement en capital humain et d'expliquer les considérations de l'avantage comparatif qui déterminent les marchandises se produit où sera également dicté le taux de croissance du capital humain de chaque pays. Le capital humain désigne donc l'ensemble de l'accumulation des capacités par un individu qui accroissent leur force productive et exerce un effet positif sur toute la société. En effet, l'accumulation de capital humain améliore la productivité marginale, ce qui engendre les énormes pressions pour l'immigration vers les pays riches. A la différence du capital technique, le capital humain est rival et exclusif, puisque incorporé aux individus. Cependant, (Lucas, 1988) ajoute l'hypothèse de l'existence des externalités provenant du capital humain dans la production, ainsi leur modèle est justifié par la prise en compte des mécanismes de diffusion du savoir faire. L'idée fondamentale est que l'activité de plusieurs individus naît une compétence collective. Pour améliorer la capacité productive des individus, il faut améliorer les temps à la formation. Ainsi l'accumulation du capital humain se réaliserait en fonction d'arbitrage entre la détermination du salaire individuel sur le marché du travail et la formation ou l'expérience professionnelle. Chaque individu est en effet, dépendent du certains nombres de connaissances essentielles qui supposent comme un certain nombre de compétences, qu'il a un impact sur la société. Dans ce cadre, le développement éducatif est un investissement du capital humain dont l'individu. En outre, le taux de croissance réel par habitant est déterminé d'une grande part par le rôle important du capital humain dans la société. En effet, l'externalité dans la production, la formation et la compétence des individus justifiant de subventions publiques à l'éducation. Pour celà (Barro, et Sala-i-Martin, 2004) démontrent que la croissance endogène peut se produire si les rendements du capital humain ne tombent pas dans le long terme en dessous de certains niveaux, où la valeur de base doit être positive.

L'accumulation du capital public: L'Etat doit financer les infrastructures où les dépenses publiques jouent un rôle fondamental et contribuent à accroître la productivité du capital privé (Barro, 1990). Cette théorie présente un modèle de croissance endogène suppose des rendements constants à un large concept de capital. Cette présente analyse se fonde sur les relations de la taille et les dépenses du gouvernement, le taux d'épargne privé et le taux de croissance économique d'origine endogène. Les investissements aux infrastructures publiques opérées par l'Etat et les collectivités locales sont au coeur du modèle élaboré par (Barro, 1990). Cette nouvelle théorie de la croissance endogène souligne les imperfections tiennent aux problèmes de moindre rentabilité de l'innovation et de l'appropriation. Les services gouvernementaux sont assurés par une taxe proportionnelle qui affecte la production ou l'utilité. Dans ce contexte, le taux d'imposition décourage l'activité économique mais a un impact négatif sur la croissance. Ce taux augmente avec les dépenses publiques productives, mais il diminue par la suite. Ces effets contradictoires impliquent l'existence de l'importance rôle de l'Etat pour créer des structures institutionnelles et de subventionner les activités non rentables qui maximiserait par conséquent la croissance économique. En effet, le gouvernement joue un rôle neutre dans l'économie mais parfois à un impact négatif sur l'activité économique. L'analyse de (Ehrlich, et Lui, 1999) indique également que la relation entre le gouvernement, la corruption, et la croissance de l'économie est non linéaire. L'intervention du gouvernement dans l'activité économique privée fait le plus mal dans les pays les plus pauvres et ceux qui ont un niveau de décollage critique.

c) La convergence entre la croissance exogène et endogène

Les travaux réalisés sur la notion de convergence entre la croissance exogène et endogène

[3] Désigne le total de rendement privé de la recherche et développement plus les effets externes sur les autres entreprises en même secteurs ou en secteurs différents d'une économie consernée par l'activité de recherche et développement.

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sont appuyés sur les modèles théoriques ou empiriques de la croissance à long terme pour tendre à dégager les déterminants de la croissance économique. Ces études ont donné naissance à de nouveaux concepts par la convergence absolue, en particulier les études détaillées de (Barro, 1996) et (Bensidoun, et Boone, 1998) la convergence conditionnelle, en particulier les travaux de (Barro, 1991), (Barro, et Sala-i-Martin, 1992), (Mankiw, Romer, et Weil, 1992) et les clubs de convergence, en particulier les études de (Berthélemy, et Varoudakis, 1995), (Berthélemy, et Dérnurger, 2000) et la convergence régionale selon les travaux (Roubini, et Sala-i-Martin, 1991), (Rodrick, 2001), (Przeworski, et Limongi, 1993), (Aghion, 2002) et (Martin, et Sunley, 2005). Les mesures de la convergence concernent soit des pays en même région, soit certains groupes de pays ou clubs, soit des pays pauvres et des pays riches ou voire une transversale par pays. Pour distinguer entre la croissance exogène et endogène les régressions empiriques de convergence conditionnent par le signe du coefficient du capital initial à une régression des taux de croissance à la fois sur le revenu initial et le capital initial (Kocherlakota, et Yi, 1995). La notion de convergence s'est diversifiée et compliquée, ainsi prend quatre formes. On note également dans cette section de littérature de la convergence entre la croissance exogène et la croissance endogène, la convergence absolue, la convergence conditionnelle, les clubs de convergence et la convergence régionale. Pour expliquer les approches qui ont utilisé pour mesurer la convergence et pour répondre à la question de (convergence-divergence)[4], on doit traiter les spécificités de chaque forme de convergence.

Convergence absolue: L'étude de (Barro, 1996) sur la croissance économique par les théories de la croissance endogène et néoclassique examine que si toutes les économies sont identiquement la même, sauf pour leurs intensités de capital de départ, alors la convergence serait applicable dans un sens absolu; c'est à dire les pays pauvres auraient tendance à croître plus rapidement par habitant que les pays riches. Cette hypothèse se concentre sur le niveau des économies de pays pauvres dans laquelle le taux de croissance par tête est plus élevé que celle des pays riches. Dans ce contexte, la notion de convergence absolue fournir une explication au phénomène de rattrapage des économies initialement des pays riches par les pays pauvres au niveau mondial. En effet, la convergence absolue entre ces pays se réalise si les pays ont le même sentier d'équilibre à long terme alors dans ce cas ils aient les mêmes caractéristiques structuelles c'est-à-dire le taux d'investissement, le taux de croissance de la population, le niveau de la technologie et d'autres indicateurs macroéconomique. Pour adopter le même sentier d'équilibre à long terme, il faut que le pays initialement pauvre connaisse une forte croissance par tête que le pays initialement le plus riche. En revanche, si les pays n'ont pas les mêmes caractéristiques structurelles, leurs sentiers d'équilibre à long terme sont différents. Une des principales différences entre les modèles de croissance exogènes et endogènes, c'est qu'un choc transitoire de la part de l'investissement présent différent de long terme sur la production par habitant (Huh, et Kim, 2013). L'approche de la convergence absolue et appliqué sur les pays a les mêmes caractéristiques structurelles, si les pays sont similaires en termes de préférences et de la technologie, alors les niveaux de revenu de l'état d'équilibre pour eux seront les mêmes, et avec le temps ils ont tous tendance à atteindre ce niveau de revenu par habitant (Islam, 1995). Cette approche comme démontre (Bensidoun, et Boone, 1998) dans leur article, si les niveaux de vie des différentes économies tendent à se rapprocher dans le temps en s'attachant au rattrapage des pays riches par les pays pauvres.

Convergence conditionnelle: La notion générale de convergence conditionnelle décrire en particulier dans le modèle néoclassique de croissance diminue le rendement du capital reproductible (Barro, 1991, 1996). Dans ce contexte, l'existence d'une convergence dans le sens que les économies ont tendance à croître plus rapidement en termes de capital doit être en dessous de la position de l'état d'équilibre. Ce phénomène de convergence observée par la théorie de (Barro, et Sala-i-Martin, 1992) est composé en divers effets. D'abord, les effets liés à la diminution des rendements du capital et des déséquilibres entre les différents types de capital dans le cadre d'une économie fermée. Ensuite, les effets impliquant la mobilité du capital et du travail dans les économies. Enfin, les effets qui impliquent la diffusion progressive de la technologie. De plus, l'étude de (Barro, et Sala-i-Martin, 2004) montre que la convergence de la première espèce d'où les pays pauvres tendent à croître plus vite que les pays riches a tendance à générer la convergence de la deuxième sorte de dispersion réduite du revenu ou produit par habitant, mais ce processus est compensé par de nouveaux troubles qui ont tendance à augmenter la dispersion. La convergence s'entend ici comme étant

[4] Le modèle prédit la convergence des taux sur la base que les pays pauvres vont croître plus rapidement par rapport aux pays riches de croissance. La convergence serait absolue (ou inconditionnelle), se déplaçant vers un état d'équilibre commun, ou les économies sont homogènes (technologie identique, le taux d'épargne, le taux de croissance de la population et taux de dépréciation), ou conditionnelle, se déplaçant vers des positions différentes à l'état stationnaire, dans le cas des économies hétérogènes (*Artelaris, Arvanitidis, et Petrakos, 2006*). En outre, l'étude de (*Bensidoun, et Boone, 1998*) démontre que la divergence des PIB par tête dans le monde est expliquée par la croissance des pays initialement les plus pauvres qui n'a pas été systématiquement plus rapide que celle des pays riches. En moyenne, les écarts de niveaux de vie entre pays se sont creusés.

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un mécanisme permet d'assurer le sentier d'équilibre à long terme. Dans le modèle de (Solow, 1956), le PIB par tête d'un pays atteint, à long terme, une valeur d'équilibre, ou plutôt une succession de valeurs d'équilibres du fait de l'existence du progrès technique. Le système économique est au mieux en équilibre sur un couteau de croissance d'équilibre. Cette attachée théoricienne de ce modèle a été appelée convergence conditionnelle. Toutefois, il existe une relation inverse entre taux de croissance par tête et PIB par tête initial, puisque si un pays converge vers leur sentier d'équilibre à long terme d'autant plus élevé qu'il en est éloigné à la situation d'équilibre. Selon (Barro, 1996), si les économies différentes à plusieurs égards, y compris la propension à épargner et à avoir des enfants, la volonté de travailler, l'accès à la technologie et les politiques gouvernementales, alors la force de convergence ne s'applique que dans un sens conditionnel.

Clubs de convergence: La notion de club de convergence entre pays d'un même groupe où « club » est traitée par les travaux de (Berthélemy, et Varoudakis, 1995), et (Berthélemy, et Dérnurger, 2000), chacun des « clubs de convergence » définis présente des caractéristiques propres du point de vue des facteurs déterminant la croissance. Ces points de rupture sont déterminés à la fois par le transfert de la technologie étrangère, l'investissement direct étranger, le développement financier et le développement éducatif. Dans un club de pays, il peut avoir une convergence si les caractéristiques structurelles sont identiques quelles que soient les conditions initiales[5]. L'idée générale tirée des travaux des clubs de convergence est que lorsqu'il y a une convergence on pourrait trouver un modèle de croissance commun aux pays appartenant à ce club comme les pays de l'OCDE ou les pays de la zone Euro. En revanche, lorsqu'il n'existe pas de convergence entre des pays appartenant à différents clubs alors le modèle de croissance sera différent d'un club à l'autre.

Convergence régionale: La littérature qui étudie la relation entre le régime de commerce, le développement financier et la répression financière de (Roubini, et Sala-i-Martin, 1991) montrent que les variables indicatrices régionales pour les pays d'Amérique Latine ne sont plus significatives. Ainsi, la mauvaise performance de ces pays au cours des dernières décennies est liée aux politiques commerciales et financières menées par leurs gouvernements. En effet, la relation entre le degré d'ouverture économique entre la même région et l'orientation du régime commercial est trés importante pour accroître le taux de croissance par tête de tous les pays de la même région. En ce sens, (Rodrick, 2001) propose une série des indicateurs pour analyser les déterminants fondamentaux de la croissance économique. Ces indicateurs explorent les rôles respectifs des politiques microéconomiques et macroéconomiques, les institutions, l'intégration et la géographie, l'économie politique et les conditions initiales dans les modèles de la convergence technologique et l'accumulation de conduire dans certains pays. Tout d'abord, les régimes politiques dans les pays appartenant au même régime ont un impact direct sur les déterminants de la croissance économique (Przeworski, et Limongi, 1993). De plus, les innovations et les transferts technologiques se réfèrent à l'adaptation, au marché local ou à des conditions géographiques particulières. Par conséquent, le taux de croissance pour une intensité d'innovation donnée sera élevé (Aghion, 2002). La nouvelle théorie de la croissance endogène et le développement régional ouvrent une nouvelle perspective pour les déterminants des facteurs de la croissance économique, puisque ces facteurs comme les rendements croissants, le capital humain et la technologie se développent inégalement dans l'espace économique et se différencient aux plans local et régional. Pour résumer ce débat, (Martin, et Sunley, 2005), mettent en évidence que la convergence régionale dans le monde industrialisé révèle un taux de convergence lente que celui obtenu par les modèles néoclassiques orthodoxes. Lorsqu'un pays ayant un taux de croissance plus élevé, il doit respecter les normes de développement régional comme le cas des pays Sud-Est Asiatiques, ainsi les mécanismes de croissance par la théorie opèrent dans l'espace économique. L'intégration régionale conduit donc à une convergence des revenus et des rendements par tête à l'intérieur de l'économie locale appartenant à la même région.

III. Méthodologie Et Base De Données

La méthodologie choisie dans cette partie empirique se compose de trois sections complémentaires de l'étude de la littérature empirique. D'abord, dans la première section, je présente les différentes définitions et sources des variables explicatives séléctionnés pour l'estimation par la méthode de moindres carrées ordinaires (MCO). Ensuite, dans la deuxième section, je développe le modèle empirique choisi pour confirmer la méthode d'estimation. Enfin, dans la troisième section, je discute les résultats obtenus.

a) Base de données

Les données annuelles utilisées dans cet article sont obtenus essentiellement de la base de données fournies dans (cf. Annexe 2). Cette étude se concentre sur le taux de croissance réel par habitant comme une variable dépendante et un ensemble des variables

[5] Dans le modèle néoclassique les conditions initiales concernant l'acquis des économies, notamment le capital humain et physique accumulé.

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indépendantes des données de panel couvrant la période de 2000 à 2012, dans laquelle un groupe des cinq pays des BRICS a été établi dans cette partie. Ces pays formant l'échantillon applicable pour étudier les déterminants de la croissance économique (cf. Annexe 1). La base de données s'applique en particulier à ces cinq pays des BRICS qui comprennent notamment des taux de croissance sont plus élevées.

b) Modèle

Dans cet article, le cadre empirique pour la détermination de la croissance économique est succinctement fourni par (Barro, 1996) comme un modèle de base, ainsi d'autres travaux empiriques déterminent ce phénomène on note en particulier (Barro, 2001), (Chen, et Feng, 2000), (Diemer, 2002). La différence dans le taux de la croissance économique entre les différents pays est devenue une cible de recherche importante pour les chercheurs. Le modèle économétrique de base dans cet article peut être décrit donc sous la forme d'une équation de convergence suivante:

$$Dy = f(y, y\hat{}*) \quad (1)$$

Dy: taux de croissance de la production par habitant
y: le niveau actuel de la production par habitant
y*: le niveau d'équilibre de long terme de la production par habitant

$(\partial Dy/\partial y) < 0$ et $(\partial Dy/\partial y\hat{}*) > 0$

Dans le modèle néoclassique, Dy est inversement proportionnelle à y et positivement lié à y*. Le taux de croissance, Dy, diminue en y pour y* et à la hausse en y* pour y. La valeur cible y* dépend d'un éventail de choix privés et publics et des variables environnementales. Ces choix et ces variables comprennent des indicateurs macroéconomiques, sociales, politiques, institutions gouvernementales et sur le caractére de la production nationale. Par exemple, une meilleure application des droits de propriété, de moins de distorsions du marché, et une plus grande volonté de sauver ont tendance à augmenter y*. Dans un cadre qui inclut le capital humain, y serait généralisé pour englober les niveaux de capital physique et humain. Dans certaines théories, Dy augmente avec le rapport de l'homme au capital physique. Pour un niveau donné de production initiale par habitant, y une augmentation du niveau de l'état d'équilibre, y* augmente le taux de croissance par habitant sur un intervalle de transition. Si le gouvernement améliore le climat de la démocratie, les droits de propriété, le respect de la loi ou si les agents économiques décident d'avoir moins d'enfants ou au moins dans une économie fermée pour sauver une fraction plus importante de leurs revenus. Dans ces cas, l'augmentation de la cible, y*, se traduit par une augmentation transitoire du taux de croissance de l'économie. Comme le volume de production y augmente, les effets de rendements décroissants ramènent éventuellement le taux de croissance Dy à une valeur déterminée par le rythme du progrès technologique. Pour des valeurs données des variables de choix et d'environnement donc, y*, un niveau de départ plus élevé de la production par habitant, y implique un taux de la croissance par habitant plus faible. Cet effet correspond au principe de convergence conditionnelle. L'isolement de la force de convergence nécessite un conditionnement sur les déterminants de l'état d'équilibre de long terme. Au niveau de l'état d'équilibre, le niveau de la production par travailleur augmente encore en raison des innovations exogènes augmenté la main-d'oeuvre technologique, bien que la production par travail efficace reste constante[6] . Dans l'économie des pays BRICS, la production, la consommation et l'investissement seront en mesure de croître à la même vitesse. Il faut comprendre que la croissance à l'état d'équilibre est un concept utile que dans la compréhension de la croissance économique.

D'une part, compte tenu de l'état d'équilibre sorti de niveauy*, une augmentation de la production diminue son taux de croissance en raison des rendements décroissants ($(\partial Dy/\partial y) < 0$). De l'autre part, compte tenu du niveau de sortie de niveau y, une augmentation du niveau d'équilibre final de sortie y*, comme une conséquence de l'amélioration des conditions exogènes favorables à l'économie, va augmenter le taux de croissance de la production *($(\partial Dy/\partial y\hat{}*) > 0$)*. Sur la base de ce modèle et de ma discussion sur les déterminants de la croissance économique des pays BRICS. J'ai choisi le modèle statistique multivarié de base suivante:

$$Y_{it} = \alpha + \beta_1(PIB)_{it} + \beta_2(EDU)_{it} + \beta_3(NATA)_{it} + \beta_4(INF)_{it} + \beta_5(FCPH)_{it} + \beta_6(INV)_{it} + \beta_7(POPACTIVE)_{it} + \beta_8(LE)_{it} + \beta_9(GOV)_{it} + \beta_{10}(OUV)_{it} + \beta_{11}(LOI)_{it} + \beta_{12}(DEM)_{it} + \varepsilon_{it}$$

Ou l'indice i désigne les pays BRICS (le Brésil, la Russie, l'Inde, la Chine, l'Afrique du Sud), t désigne le temps annuel de 2000 à 2012, Y désigne le taux de croissance réel par habitant, le PIB est le taux de croissance par habitant, EDU est la durée de la scolarité obligatoire, NATA indique le taux de natalité, brut (pour 1000 personnes), INF indique le niveau de l'inflation, FCPH indique la formation brute de capital fixe (% du PIB), INV désigne la formation brute de capital (% du PIB) c'est à dire l'investissement intérieur brut,

[6] Le travail efficace peut être exprimée comme $L_e = L_0 e^{gt}$, ou L_e est le main-d'oeuvre efficace, et L_0, le travail initial, g est le taux de croissance du progrès technologique et t, temps.

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POPACTIVE désigne la croissance de la population active, moyenne annuelle, LE désigne le score global de la liberté économique, GOV est la part moyenne des dépenses publiques en pourcentages du PIB, OUV est la part moyenne de la somme des importations et des exportations en % du PIB, LOI indique l'indice du respect de la loi et DEM indique l'indice de la démocratie et ε est le terme d'erreur. Ces variables explicatives dans ce modèle de base consiste à exécuter les pays de BRICS par les données de panel dynamique[7]. De nombreuses variables économiques sont considérées comme importantes pour les déterminants de la croissance économique, y compris l'investissement, le capital humain, le commerce, le capital physique, le rôle de la loi et de la démocratie (Goel, et Korhonen, 2011), (Barro, 1996, 2001).

c) Résultats et discussions empiriques

Ces résultats d'estimation présentent les taux de croissance économiques dans les pays BRICS. Ils examinent en particulier les variables explicatives de modèle de base qui sont étendues pour répondre aux questions de la problématique de cet article. Le (cf. Tableau 1), suivante présente la matrice des coefficients de corrélation pour les principaux variables estimés. Ces variables sont définies dans la note sur le degré de corrélation. On constate notamment qu'il y a une forte corrélation entre le PIB et le taux de croissance réel par habitant est égal à 0.982331, entre l'investissement intérieur brut en % du PIB et la formation de capital physique est égale à 0.989492, et entre la population active et la formation de capital physique est égale à 0.956013. En revanche, on note qu'il y a une plus faible corrélation entre les dépenses publiques et la formation de capital physique est égale à -0.701209, entre les dépenses publiques et l'investissement intérieur brut en % du PIB est égal à – 0.763684, ainsi entre l'indice de la démocratie et l'indice du respect de la loi est égal à -0.712149. Le tableau de matrice des coefficients de corrélation indique la significativité par le forte ou par la faible corrélation entre les différentes variables explicatives.

Tableau 1: Matrice des coefficients de corrélation

	Y	PIB	EDU	NATA	INF	FCPH	INV	POPACTIVE	LE	GOV	OUV	LOI	DEM
Y	1.000000	0.982331	0.030964	-0.276335	-0.223918	0.619179	0.675839	0.658413	-0.395685	-0.631716	0.322454	-0.131705	0.478170
PIB	0.982331	1.000000	0.154486	-0.429612	-0.147030	0.618139	0.674450	0.639907	-0.477419	-0.594694	0.370915	-0.285082	0.589110
EDU	0.030964	0.154486	1.000000	-0.533570	0.374112	-0.062519	-0.026017	-0.170080	-0.552864	-0.013742	0.434490	-0.575187	0.442454
NATA	-0.276335	-0.429612	-0.533570	1.000000	-0.174911	-0.286262	-0.270269	-0.221482	0.551621	-0.069001	-0.255771	0.875575	-0.836798
INF	-0.223918	-0.147030	0.374112	-0.174911	1.000000	-0.421077	-0.375333	-0.462725	-0.109189	0.093301	0.152799	-0.406152	-0.058532
FCPH	0.619179	0.618139	-0.062519	-0.286262	-0.421077	1.000000	0.989492	0.956013	-0.487664	-0.701209	0.327751	-0.002963	0.626277
INV	0.675839	0.674450	-0.026017	-0.270269	-0.375333	0.989492	1.000000	0.949249	-0.524583	-0.763684	0.336096	-0.012448	0.613526
POPACTIVE	0.658413	0.639907	-0.170080	-0.221482	-0.462725	0.956013	0.949249	1.000000	-0.498487	-0.762147	0.184067	0.027022	0.577445
LE	-0.395685	-0.477419	-0.552864	0.551621	-0.109189	-0.487664	-0.524583	-0.498487	1.000000	0.578687	-0.046167	0.499579	-0.660821
GOV	-0.631716	-0.594694	-0.013742	-0.069001	0.093301	-0.701209	-0.763684	-0.762147	0.578687	1.000000	-0.172397	-0.110091	-0.301102
OUV	0.322454	0.370915	0.434490	-0.255771	0.152799	0.327751	0.336096	0.184067	-0.046167	-0.172397	1.000000	-0.178257	0.427088
LOI	-0.131705	-0.285082	-0.575187	0.875575	-0.406152	-0.002963	-0.012448	0.027022	0.499579	-0.110091	-0.178257	1.000000	-0.712149
DEM	0.478170	0.589110	0.442454	-0.836798	-0.058532	0.626277	0.613526	0.577445	-0.660821	-0.301102	0.427088	-0.712149	1.000000

Tandis que, le (cf. Tableau 2) présent les résultats de la régression en utilisant les moindres carrés ordinaires (MCO). Le niveau des risques d'erreur est mesuré respectivement à un taux de 1%, 5% et 10% à la fin dans un test d'estimation statistique parce que l'hétéroscédasticité pourrait être important dans l'ensemble des variables explicatives des pays BRICS. Dans la colonne 1, on remarque qu'il y a trois coefficients prennent les signes négatifs, ainsi les coefficients de taux de natalité, de taux de l'inflation, de la formation de capital physique, de la liberté économique, des dépenses publiques, de l'indice de la démocratie sont statistiquement les plus significatifs. En outre, la qualité de est égale à 0.994464 et l'ajustement est tout à fait satisfaisant avec un ajusté aussi plus élevé et égal à 0.993051 et un écart type de la régression est plus bas et égal à 0.309807. Bien que la durée de l'éducation obligatoire, l'investissement brut

[7] Les données de panel dynamique (DPD) sont un package pour l'estimation des modèles de données de panel dynamique (*Doornick, Arellano, et Bond, 2001*).

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intérieur en % du PIB et le taux d'ouverture économique ont un effet positif direct sur le taux de croissance puisqu'ils sont les variables les plus significatives avec un signe comme prévu et négatif. Ainsi, le taux de natalité, la formation de capital physique, la forte croissance de la population active, la liberté économique et l'indice de la démocratie jouent un rôle important sur le taux de croissance. En revanche, le taux d'inflation, les dépenses publiques et l'indice du respect de la loi sont trouvés d'avoir des conséquences négatives sur la croissance dans les pays BRICS. Tous ces résultats dans ce (cf. Tableau 2) sont conformes à l'étude théorique pour les déterminants de la croissance économique des pays BRICS.

Tableau 2: Régression en utilisant les Moindres Carrés Ordinaires (MCO)

Dependent Variable: Y

Method: Panel Least Squares

Date: 07/02/14 Time: 16:33

Sample: 2000 2012

Cross-sections included: 5

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.219462	4.202587	-0.528118	0.5999
PIB	1.052894	0.024597	42.80599	0.0000
EDU	-0.049746	0.245844	-0.202347	0.8405
NATA	0.149924	0.041069	3.650511	0.0007
INF	0.007968	0.021524	0.370189	0.7129
FCPH	0.080082	0.059518	1.345498	0.1849
INV	-0.074692	0.049113	-1.520806	0.1350
POPACTIVE	3.02E-07	9.23E-07	0.326691	0.7454
LE	0.001865	0.025194	0.074023	0.9413
GOV	0.043030	0.053851	0.799055	0.4283
OUV	-0.009417	0.007047	-1.336273	0.1879
LOI	0.236092	0.428864	0.550505	0.5846
DEM	0.040764	0.045619	0.893574	0.3761
R-squared	0.994464	Mean dependent var		5.921599
Adjusted R-squared	0.993051	S.D. dependent var		3.716390
S.E. of regression	0.309807	Akaike info criterion		0.683403
Sum squared resid	4.511084	Schwarz criterion		1.137178
Log likelihood	-7.502098	F-statistic		703.5898
Durbin-Watson stat	0.847956	Prob(F-statistic)		0.000000

Le taux de croissance réel par habitant: La variable dépendante est le taux de croissance réel par habitant réel par habitant pour la période de 2000 à 2012. Le PIB à long terme sera utilisé comme un raccourci pour désigner le PIB réel par habitant d'un panel dynamique des pays BRICS. Cet indicateur se compose des dotations en capital physique et en ressources naturelles, dépend également de l'intensité de facteur travail et de facteur progrès technique, ainsi les évaluations du capital et du capital physique sous différentes formes des indicateurs significatifs de croissance exogène et endogène.

PIB annuel par habitant en %: Le coefficient PIB par habitant de départ sur la croissance à moyen terme est

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plus élevé, il semble donc qu'une forte croissance du PIB. Ce coefficient s'interprète comme un taux conditionnel de convergence. Le coefficient de 1.052894 avec un écart type de 0.024597 en % d'erreur est plus élevé, ce qui signifie un taux de convergence significative est plus élevé.

La durée de la scolarité obligatoire: Le capital humain apparaît à travers le nombre d'années d'études obligatoire, il s'agit d'un coefficient négatif de la durée de scolarisation égale à -0.049746 avec un écart type de 0.245844 est significatif. Une augmentation de la durée de scolarisation entraîne une augmentation du taux de croissance.

Le taux de natalité: L'estimation de cette variable indique que la croissance économique est significativement corrélée positivement au taux de natalité. Le coefficient est de 0.149924 avec un écart type de 0.41069 est significatif pour la croissance démographique. Ce taux souligne à long terme que si la population est plus élevée se fait au détriment de la croissance de la production par personne et par conséquent une augmentation de la qualité de capital par travailleur. Dans ce cadre, le coefficient estimé du taux de natalité dans la régression de la croissance montre que ce taux à un impact sur le niveau de l'état d'équilibre de la production par habitant y*, si le taux de croissance de la population est de plus en plus élevé.

Le taux d'inflation: Le coefficient estimé du taux d'inflation et de 0.007968 avec un écart type de 0.021524 implique que si le taux d'inflation est plus faible, le taux de croissance est plus élevé. Ce coefficient est significatif indique une relation strictement forte entre le taux d'inflation et le taux de croissance dans les pays BRICS. Ce résultat signifie que l'inflation devrait être plus tolérée pour obtenir un taux de croissance plus élevé.

La formation brute de capital en % du PIB: Le résultat de ce coefficient est significatif, de 0.080082 avec un écart type de 0.059518. Ce coefficient indique que la formation de capital physique a un impact positif très important pour les déterminants de la croissance économique dans les pays BRICS. Une augmentation dans le niveau de capital physique était susceptible d'augmenter le taux de croissance.

L'investissement intérieur brut en % du PIB: Ce coefficient est de -0.074692 avec un écart type de 0.049113, il signifie que le taux d'investissement est significatif et joue un rôle fondamental comme un moteur de croissance dans les pays des BRICS. Cette relation estimée indique que les effets de plus investissements intérieurs entraînent une augmentation du taux de croissance, plutôt que l'inverse.

La croissance de la population active, moyenne annuelle: Le coefficient de la croissance de la population active est de 3.02E-07 avec un écart type de 9.23E-07 est plus élevé et significatif. Ce résultat désigne un effet de l'augmentation du taux de croissance, si le taux de la population active est largement plus élevé. En revanche, il pourrait y avoir un effet négatif sur la croissance, si le taux d'emploi est rémunéré des travailleurs supplémentaires ou un taux de chômage plus élevé.

La liberté économique: on note un coefficient significatif de 0.001865 avec un écart type de 0.025194, l'effet de la liberté économique est positif, ainsi peut être mesuré par le degré d'ouverture au commerce c'est-à-dire le ratio des exportations et des importations au PIB d'un pays. En outre, le score global de la liberté économique se compose par d'autres indices supplémentaires de degré d'ouverture économique et politique.

La dépense de consommation finale des administrations publiques en % du PIB: Le coefficient de la consommation publique sur la croissance est positif de 0.043030 avec un écart type de 0.053851, ce qui signifie qu'une augmentation de volume de dépenses publiques non productives diminue le taux de croissance associée à une valeur de départ donnée du PIB. En ce sens, le ratio de la consommation publique dans le PIB est destiné à mesurer les dépenses publiques qui n'améliorent pas directement la productivité.

L'ouverture de l'économie des pays BRICS: C'est la mesure de l'ouverture internationale et le ratio des exportations et des importations au PIB. Le coefficient de cette variable d'ouverture estimée est négatif de -0.009417 avec un écart type de 0.007047. Ce résultat a un effet significatif sur le taux de croissance, si plus les taux d'ouverture internationale des pays BRICS sont élevés, plus le taux de croissance est élevé.

L'indice du respect de la loi: Il présente un coefficient positif et significatif de 0.236092 avec un écart type de 0.428864. L'attractivité du climat d'investissement d'un pays aux yeux des investisseurs potentiels en tenant compte de l'efficacité de l'application de la loi, la qualité de l'administration, la corruption politique, la probabilité de voir les contrats publics annulés, le risque de renversement du gouvernement, et l'état des autres influences sur la sécurité des droits de propriété surtout au niveau d'innovation économique et commerciale. Le résultat est que plus le respect de la règle de droit est favorable à la croissance économique.

L'indice de la démocratie: Le coefficient de la démocratie est égal à 0.040764 avec un écart type de 0.045619, il s'agit d'un coefficient significatif. L'interprétation est que l'augmentation des droits politiques a tendance à favoriser la croissance économique et l'investissement. La relation étroite entre la croissance globale et la démocratie est loin d'être

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parfait. En outre, les pays ayant des niveaux intermédiaires de la démocratie semblent éviter des niveaux de taux de croissance plus faibles.

L'observation de l'ensemble des (cf. Graphiques scatters 1) représente la relation partielle de la variable dépendante, le taux de croissance réel par habitant par rapport à toutes les autres variables indépendantes. Chaque observation correspond au taux moyen de la significativité de la relation du taux de croissance réel par habitant par rapport aux variables explicatives. L'axe vertical représente les séries des variables indépendantes et l'axe horizontal représente la variable dépendante du taux de croissance réel par habitant. L'ensemble de ces graphiques mesures le signe positif ou négatif, faible ou fort entre deux variables qui permet d'illustrer le niveau général du taux de croissance réel par habitant par rapport aux autres variables explicatives déterminantes de la croissance économique dans les pays BRICS.

IV. Conclusion

L'objectif de cet article était de présenter une bréve littérature théorique des déterminants de la croissance économique, d'étudier profondément l'origine de la croissance exogène et endogène et de vérifier les relations de convergence entre ces deux formes de croissance. Cette littérature ayant pour base des estimations pour valider la convergence de croissance exogène et endogène dans les pays BRICS. Les déterminants de la croissance économique ont attiré une attention croissante par plusieurs théoriciens, on note en particulier les travaux de (Solow, 1956, 1957) et (Solow, Tobin, Von Weizsacher, et Yaari, 1966) sur l'origine de la croissance exogène, les études fondamentales de (Romer, 1986) et (Lucas, 1988) sur l'origine de la croissance endogène et les théories de la convergence par (Barro, 1990, 1991, 1996, 2001) et (Barro, et Sala-i Martin, 1992, 2004). Les facteurs de croissance économique sont présentés sous forme des déterminants de croissance exogène dans lequel la croissance de la population active et la production par tête due au progrès technique ou sous forme des déterminants de croissance endogène dans lequel le capital humain joue un rôle fondamental dans le maintien de la croissance économique et la prévention des rendements décroissants de l'accumulation du capital physique. La convergence entre la croissance exogène et endogène comprend des facteurs culturels, technologiques, démographiques, géographiques, politiques, sociales, institutionnelles et macroéconomiques. Dans ce cadre, un large éventail de variables explicatives a été trouvé en corrélation avec le taux de croissance économique dans les pays BRICS. L'application de la méthode empirique à un échantillon de cinq pays BRICS permet de complémenter un certain nombre des variables significatif sur ce phénomène de croissance. La régression de l'équation de convergence conditionnelle effectuée sur un panel dynamique des pays BRICS est alors venue appuyer mes résultats obtenus. Le modéle économétrique dans cet article a tenté de tenir compte d'étudier la validité du taux de croissance réel par habitant comme une variable dépendante par la méthode d'estimation de moindres carrés ordinaires (MCO). Les résultats empiriques ont révélé que le PIB par habitant en %, la durée de la scolarité obligatoire, le taux de natalité, le taux d'inflation, la formation brute de capital en % du PIB, l'investissement brut en % du PIB, la croissance de la population active, moyenne annuelle, la liberté économique, le dépense de consommation finale des administrations publiques en % du PIB, l'ouverture de l'économie des pays BRICS, l'indice du respect de la loi et l'indice de la démocratie sont des déterminants importants de la croissance économique dans les pays BRICS. Cela signifie que la relation du taux de croissance réel par habitant est significative avec l'ensemble des variables explicatives estimées.

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Annexes

Annexe 1: Liste des pays inclus dans l'échantillon d'estimation

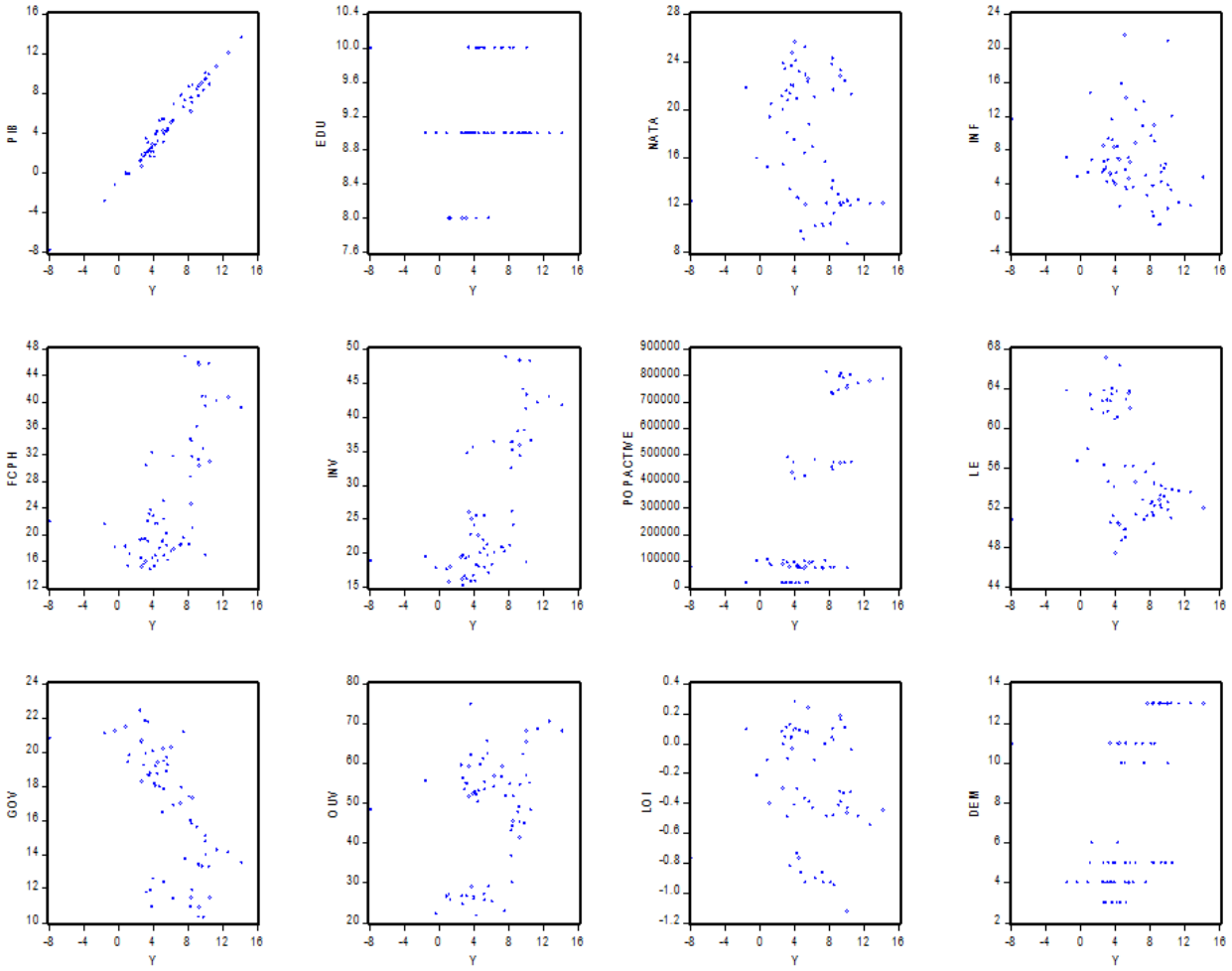
Pays	Abréviation
Brésil	BRE
Russie	RUS
Inde	IND
Chine	CHI
Afrique du Sud	AFS

Annexe 2: Les définitions des variables et les sources des données

Variables	Définitions	Sources
Y	Le taux de croissance du PIB réel par habitant	Nations Unies (CNUCED), la CNUCED STAT conférence des Nations Unies sur le commerce et le Développement
PIB	PIB annuel par habitant en %	Indicateurs du Développement Mondial
EDU	La durée de la scolarité obligatoire	Statistique de l'éducation de données de la Banque Mondiale
NATA	Taux de natalité, brut (pour 1000 personnes)	Indicateurs du Développement Mondial
INF	Taux de l'inflation	Indicateurs du Développement Mondial
FCPH	La formation brute de capital fixe en % du PIB	Indicateurs du Développement Mondial
INV	La formation brute de capital en % du PIB, désigne, l'investissement intérieur brut en % PIB	Indicateurs du Développement Mondial
POPACTIVE	La croissance de la population active, moyenne actuelle	Laborsta Internet EAPEP V 6, Octobre 2011, Population économiquement active, estimations et projections
LE	La liberté économique dans un pays en %	Données sur le patrimoine (Heritage)
GOV	Dépense de consommation finale des administrations publiques (en % du PIB), désigne, la part moyenne des dépenses publiques en % PIB	Indicateurs du Développement Mondial
OUV	Rapport de la transparence (Somme Importations et Exportations (% du PIB), désigne, la part moyenne de la somme des importations et des exportations en % PIB	Indicateurs du Développement Mondial
LOI	Indice du respect de la loi	Indicateurs de Gouvernance dans le Monde
DEM	Indice de démocratie (Liberté dans les évaluations des pays du Monde)	Freedom House

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Graphiques 1: Graphiques Scatter de la relation de variable dépendente par rapport à toutes les autres variables indépendentes



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Road Sector Development and Socio-Economic Growth in Wonbera Woreda, Benshangul Gumuz, Ethiopia

By Hika Nigatu Ayele
Wolaita Sodo University

Abstract- Road is the backbone of a countries infrastructure and the frame of a countries socioeconomic development. Thus, the study was aimed at examining the road sector development and socioeconomic growth of Wonbera woreda in Benishangul Gumuz Region. To accomplish the objective, the researcher employed descriptive research design. Both primary and secondary data sources were used. In line with this both qualitative and quantitative data type was employed.190 sample size was selected from 2700 total population by using simple random sampling technique. The researcher used questionnaire, interview and secondary data as a method of data collection. Both quantitative and qualitative data analysis method was used. The study shows that the contribution of road on the quantity of agricultural production was high. It also indicated that there is variation in the prices of agricultural products and inputs between places accessible to road and not.

Keywords: road sector development, socio-economic growth, agricultural production, social service, market access.

GJMBR-B Classification: JEL Code: A19



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Keywords: road sector development, socio-economic growth, agricultural production, social service, market access.

I. Introduction

a) Background of the study

Road infrastructure has always played a key role in the progress and economic growth of a nation, both through the direct effects of higher mobility for citizens and goods and also via the indirect benefits derived from the process of building infrastructure (Vatanen, 2007). In addition, the road transport sector is essential for developing countries for the reason that provision of other advanced means of transportation is expensive. For instance, Fan and Rao (2003), Baum and Korte (2001), Pollack and Heertjee (2000) indicated that public expenditure in rural infrastructure is one of the most powerful instruments that governments can use to promote economic growth and poverty reduction and among these services, road transport sector is considered as the crucial one.

In sub-Saharan African countries roads are the most useful way of transport which accounts for over 75% of passenger and freight traffic, and the road network in the region plays a significant roles in their socio-economic development. The development and maintenance of appropriate road infrastructure is, therefore, fundamental to economic growth and poverty reduction in sub- Saharan Africa (Abedi, 2008).

Recognizing the importance of the road transport, the government of Ethiopia has launched a road sector development program (RSDP) since 1997 which focused on upgrading and rehabilitating the existing road network, and providing regular maintenance. Since then, the condition of roads has improved and the road network which was about 26,550km at the beginning of RSDP in 1997(UNECA, 2009), had grown to 33,297km by 2002, of which 4,053km (12%) were paved and the remaining 29,244km (88%) were gravel, and it has increased to 44,359km by the year 2008.

b) Statement of the problem

In Ethiopia road transport is the dominant mode and accounts for 90 to 95 percent of motorized inter-urban freight and passenger movements. However, because of its limited road network, provision of infrastructure has remained one of the formidable challenges for Ethiopia in its endeavor towards socio-economic development and poverty reduction (ERA, 2008).

The total length of road in Benishanigul Gumuz Region was only 1473.2 km which is 746.8 km, 523.6 km, 202.8 km in Metekel zone, Assosa zone and Kamashi zone respectively (CSA, 2008) and the road density is 28.4 km/1000 sq km (EDH, 2004). The low road density and seasonal state of road raises constraints to rural producers. Many people's live and

Author: Lecturer, College of Business and Economics, Wolaita Sodo University, Wolaita Sodo, Ethiopia, P.o.Box.138.
e-mail: Nigatuh.2020@gmail.com

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produce far away from major roads, markets and to other socio-economic service center. Consequently small holder agricultural producers face high transportation costs that raises prices of inputs, and impair further access to market, which leads to low productivity, health, education which in turn hinder economic growth in the area.

It is generally believed that the improvements of transportation services in the study area have major implications for efforts to increase agricultural production, educational expansion, social provision and market access. However, the region as well the woreda was characterized by very low infrastructure. Most roads are dry-weather roads and hence access is difficult during rainy seasons. Moreover, the road network connecting the region with zones and Woreda's was very poor. Kebeles are in most cases not connected with Woreda and Market network is almost negligible (BGFSS, 2004) as well the roads are not in good condition because of lack of proper maintenance. This condition makes delivery of services such as health, education, extension services very challenging and impede mass mobilization, marketing and general development interventions. **Thus,** this study attempts to examine the contribution of road transportation to socio economic growth of Wonbera woreda.

c) Objective of the study

i. *General objective*

The general objective of the study is to assess the role of road transport development to the socio-economic growth of Wonbera Woreda, Benishangul Gumuz, Ethiopia.

ii. *Specific objectives*

1. To examine the role of road development for the improvement of social services in the area
2. To analyze the contribution of roads for economic growth of the study area
3. To investigate the market access in relation to road development of the study area

d) Research Questions

1. What is the contribution of road development on the provision of social services?
2. What is the contribution of Road sector development to socio economic growth in the area?
3. What is the role of road in the economic growth of the study area?

II. Literature Review

Road is Line of communication (a travelled way) using a stabilized base other than rails or air strips which is open to public traffic or a line which serve primarily to provide services (IRF). It is one of the major factors determining the socioeconomic variables such as education, health, economic activities, and social services.

Road Communication plays a crucial role in promoting economic, social and cultural development of a region. Their importance has always been recognized and found from the history that once road communication is given the development of civilization, their quality and quantity have improved significantly. Thus, the road is one of the great fundamental institutions of mankind. It develops with man's advance. In the modem world, roads have proved to yield profound economic and social significance (Kantharajappa, 1998).

Manohar Lal (1989) studied the roads and their socio-economic impact on the rural community. He found that the road development has bestowed a package of benefits on the village people in agriculture sector. Lal found that the development of road network has resulted in faster and more equitable distribution of marketing of products. Allied agricultural and non-agricultural activities have also started growing with expanding road communication. Small trade and business establishments have come up in some of the villages linked with roads. Lal also observed that the rural road network generated a better access to facilities for schooling, health, banking and postal services to the rural people. Thus, there was a clear indication that the developments of rural roads have become a necessity to accelerate socio-economic transformation of rural society (Kantharajappa, 1998).

Improved accessibility is even more crucial to landlocked countries that suffer from limited access to regional and global markets. Such countries bear the costs of inefficiencies at land border crossings and transits through neighboring countries. Improved transport accessibility allows landlocked developing countries to participate in and benefit from the globalization process (UNESC, 2008).

a) Road and Socio-economic Development

Transport plays a pivotal role for social and economic development of a society. On the one hand, the achievement of economic growth and poverty reduction requires good physical access to resources and markets, whilst on the other; quality of life is generally dependent on the quality of physical access to employment, health services, homes, education and other amenities. Fromm (1965) identifies that transport performs the following four broad functions in assisting economic development:

i. as an input into the production process permitting goods and people to be transferred between and within production and consumption centers;
ii. transport improvements can shift production possibility functions by altering factor costs and reducing levels of inventory tied-up in the production process;

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iii. increasing factor mobility and permitting factors of production, specially labor, to be transferred to places where they may be most productively employed; and
iv. Increasing the welfare of individuals by extending accessibility to a range of facilities and providing superior public goods, such as improved social cohesion and security.

b) Road Development and Agricultural Production

Road transport plays an important role in agricultural development. This is because it is the major means of transporting agricultural produce from the farms to the markets as well as to various urban communities (Tunde and Adeniyi, 2012). In rural areas, the development of roads affects agriculture directly by enlarging the areas under cultivation. There is a two-fold relation between road development and increased agricultural production: these are: Firstly, intensive cultivation, to exploit the resources of land fully is made possible due to easy transport of manures, good seeds and better agricultural equipment: Secondly, scope for extensive cultivation has increased.

c) Road Transport and Impact on Domestic Market Development

Various researches in developing countries have concluded that rural (farm to market) roads have a major effect in improving marketing opportunities and reducing transaction costs. The marketing of agricultural commodities, excluding the stages of processing, can account for 2560 percent of final prices for foodstuffs in developing countries, with about half of the marketing costs attributable to transport (Beenhakker, 1987).

Analyses of the impacts of transport systems on agricultural marketing argue that the benefits of investments in improved transport depend greatly on the policy regimes governing crop pricing, regulation of marketing, and conditions of competition in transport (Beenhakker, 1987 and Gersovitz, 1991). This implies that investment in road sector brings market transparency and widespread access to market information which creates a competitive marketing system and also it helps the market integration among the regions (Kessides, 1993).

d) Road Transportation and Social Development

It was only towards the end of the 1970s that the impact of investment in roads in developing countries on a broad range of social aspects – including access to education, health and other welfare facilities – started to be considered (Howe and Richards, 1984). The late 1990's were a period of considerable innovation with, and discussion about, almost all aspects of the rural road project cycle as governments, lending, and aid institutions struggled with the renewed emphasis on poverty reduction. Attention was varyingly given to the poor themselves, different aspects of social benefits, and more holistic approaches to rural transport especially the philosophical approach underlying the design of infrastructure and provision of services (Lebo and Schelling, 2001; Starkey et al, 2002). Inadequacy or absence of transport facilities may undermine the productive process. Ahmed et al (1976), cited in Button (1993) aptly remarked that inadequacy of transport facilities is one of the bottlenecks to socio-economic development and national integration in many developing countries.

e) Transport and development in Ethiopia

In Ethiopia majority of the rural communities are isolated for significant portions of the year because of lack of access to reliable all-weather roads. With about 77% of rural families needing to travel more than 20km in order to access health and other basic facilities, efficient transport system will not only improve the living conditions of the people but also improve social interaction and help diversify rural economic activities. Walking and non-motorized transport are the major forms of transport in the rural areas with most journeys on foot involving an average distance of 5-6km and a time consumption of about 2 to 3 hours. Women tend to bear a disproportionate share of this burden of travelling. The gap between the urban and rural centre in relation to access to public transport is very wide with about 97% of the urban compared to 28% of the rural households having access to transport services within 5km (ERA, 2011).

In response to this, the transport development in Ethiopia is much focused on road development as evidenced in the Road Sector Development Programme (RSDP) and the PASPED. Road infrastructure development has been given the highest priority because of its critical role in enhancing rural growth through improved delivery of agricultural inputs and connection of farmers to markets. The commitment of the state is evidenced in the expenditure pattern of the state; in 2005, government's expenditure in the road sector was 11.2% compared to 4.8% in the health and 4.5% in water and sanitation.

This is part of government's effort at strengthening the infrastructure backbone of the economy as well as accelerating market-based agricultural development. Preparations have also been made to step up the Ethiopian Rural Transport Program through the construction of substantial amount of low level rural roads, and the provision and expansion of conventional and intermediate means of transport. There are measures to facilitate the participation of local contractors in road construction as a way of ensuring the sustainability of transport development (ERA, 2011).

Major Challenges of the Rural Road service

According to Akiliu (2007) Construction of adequate road system greatly hampered by rugged terrain of highlands and normally heavy seasonal rainfall

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and some of the main structural and operational problems of the road transport sub sector in Ethiopia are a close look at the characteristics of the road transport mode such as backward management system, old vehicles, lack of skilled man power on the sector, disintegrated transport sector institutions relationship and communication, Problems of maintenance; Procurement problem; Access/availability of rural roads linking Kebeles and Woredas; Quality/standard of rural road; Availability of contractors; Rural road budget distribution and utilization; Lack of clarity to road ownership and responsibility of the community and so on.

III. Methodology

a) Research Design

The researcher employed descriptive research design to examine the role road sector development on socio-economic growth of the study area. since such design helps the researcher to describe the contribution of road sector development on economic growth.

b) Data Source and type

The researcher used both secondary and primary sources of data. The primary data were collected through interview, questionnaire, and focus group discussion from the concerned bodies while the secondary data were collected from books, journals, unpublished documents, internet, and reports.

c) Sample size and Technique

The researcher used stratified sampling techniques in order to select Kebeles based on their distance from the road. According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all weather roads are considered to have road access and those far from five kilometer as poor road access. Thus the researcher categorized the Kebeles based on their distance from road, Kebeles within 5km from the road, Kebeles 6-10km from the road and Kebeles more than 10km from the road. The study area, Wonbera woreda, has 33 Kebeles and based of distance categories 9 Kebeles were selected proportionally.

To determine the sample size of the households (HH) from the selected kebeles the researcher applied a standard statistical approach for sample determination. Accordingly the following formula was used (Yamane, 1967).

$$n= N/1+N (e2)$$

Where,
n=the desired sample size
N=the total population
e=the desired level of precision which is 0.07

According to this method the researcher took sample size of 190households out of 2700 households of the selected Kebeles by using simple random sampling technique in order to avoid the research bias. The proportional allocation of the sample was made on the basis of the size of households in the selected Kebeles of Wonbera Woreda.

Table 3.1: Number of sample households by Kebeles

Distance from Road	Kebeles selected	Total number of HH	Sample HH
<5km	02 kebele	535	38
	Etashumo	451	32
5-10km	Sanki	361	25
	Minjo	293	21
	Tesoboka	340	23
>10km	Kitar	215	15
	Melkan	205	14
	kisia	150	11
	Bania	150	11
Total	9	2700	190

d) Method of data Collection

In order to obtain relevant information for the study, the researchers employed questionnaire (for this study the researcher designed and administered both closed ended and open ended question to selected households of Wonbera woreda), interviews (the respondents for the interview were selected from woreda level Offices. Hence, the researcher selected the respondents from office of woreda Rural Road Authority, Wonbera Woreda trade and Transport office, Agricultural office, educational office, and health office through semi-structured interview questions) and finally, secondary data were collected from magazines, reports, manuals, internet, published and published documents.

e) Method of Data Analysis

The researcher analysis the data by using both qualitative and quantitative data analysis method. Thus,

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simple descriptive statistics (like frequencies and percentages) and inferential statistics was used to analyze quantitative data. The qualitative method of analysis particularly narration was employed for the data that was collected through structured interview and open ended questionnaires.

IV. Results and Discussion

This part deals with the analysis and discussion of the data gathered from the study area. It primarily discusses the road sector development and socioeconomic growth in Wonbera Woreda of Benishangul Gumuz Regional State. Then, it discusses Agricultural production, educational and health services, income level, investment, and market accessibility.

a) Road network in Wonbera woreda

Road network is at a very low level in the wonbera woreda since there is lack of all weather roads connecting most of the kebeles. However, several road projects are underway since then, including Chagni-Wonbera, Guba-Wonbera. Chagni-wonbera road is 169km gravel road which is constructed after 1992 or in 1996 EC and Guba-Wonbera road is also a gravel road which is still under way. Additionally wonbera is connected with Dibatie and Bullen on the same line and the Woreda were connected with Asossa through zonal city Gilgel belles and with capital city of Ethiopia, Addis Ababa, through Amhara and Oromia region. The government of Benishangul Gumuz and as well local government have a program to connect every kebele with each other through road network. Accordingly, in wonbera woreda most of the kebeles are interconnected with each other through voluntary vigilization program. So the government constructed 628km of weather road (both dry and all weather roads) and under way to construct 225km which connect the Kebeles with the woreda city and with each other. That means the total road network of Wonbera were 738km of which 120km gravel road and 618 km weather road (WWRRA, 2011).

b) Road Density

The road density of the region shows an improvement from time to time. The EPRDF developed Road Sector Development Program (RSDP) with a plan of increasing the road density of a country from 0.43 to 1.5 km per 1000 persons and from 21 to 116 km per 1000 km2 starting from 1997 through 2009 (ERA, 2008). Accordingly, the road density of Benishangul Gumuz has increased in each year plan period. In 2004 the road density of the region has reached 3.2 km per 1000 persons and 28.9 km per 1000 km2.

Even though the road density of the region has increased to some extent it does not achieved the target set by the government in its Road Sector Development Program (RSDP). In 2011, the road density of the region including the dry weather road reached 6.5 per 1000 persons and 85.51 per kilometer square which is higher than the national road density values of 0.57 km per 1000 persons and 42.6 km per 1000km2 for the same period (ERA, 2008). Although the regional as well as the federal road authorities are work to bring accessibility of the weather road for those who are inaccessible to road they were unable to meet the target.

c) Road Accessibility

Access refers to the opportunity to use or the right to or the ability to reach some destiny. Accessibility is measured as the percentage of population having access to all weather roads. The benefits of having access to a road network is measured in terms of reductions in monetary costs or time needed by beneficiaries to access output markets or key public social services like health and education.

According to the interview administered with Benishangul regional bureaus of rural road authority only 15 percent and 25percent of the rural population of the region lives within 5km and 6-10 km of the main roads (asphalt and gravel) respectively. Thus the remaining 60 percent of rural people of Benishangul Gumuz live at a distance of more than 10 km from the main roads. Moreover, out of 423 kebeles only 166 kebeles has access to road both all-weather and dry weather roads and has improved after 1997 as a result of the RSDP program. This under development of road network has its implication for the development of the agricultural sector, education, health, investment and market access of the region. The effort made so far towards the improvement of main roads and rural roads in the region is an indication to bring development but not good enough to enhance rural accessibility and thereof economic development.

Table 4.1: Road Accessibility

		No of respondents	percent
Road accessibility	<5km	70	36.8
	6-10km	69	35.8
	>10km	51	28.4
	Total	190	100

Source: survey, 2013

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According to the Ethiopian Road Authority (ERA, 2008) peoples within five kilometer distance of all weather roads are considered to have road access and those far from five kilometer as poor road access. Of course, those within 6-10 km distance from all weather roads are not equally deprived of opportunity as those of far more than ten kilometer. Thus, the study has grouped the respondents in there accessibility categories. Accordingly, out of the total respondents 36.8% are within 5km from the main road, 35.8% between 6-10km distance from the main road and the remaining 27.4% with a distance of more than 10km from the road (table 4.1). From this it can be inferred that the majority of the respondents are settled closer to road transport which may enable them get access to market, education, health, etc.

Table 4.2: Type of road

		No of respondents	percent
Type of road	Asphalt	-	-
	Gravel	64	33.7
	Dry weather	126	66.3
	total	190	100

Source: survey, 2013

Table 4.2 indicates that out of the total respondents 66.3% replied that the type of road is dry-weather road and the remaining 33.7% responded that the type of road in their area is gravel road (all weather roads). From this it can be inferred that the major have access to dry- weather road and one-third access gravel road. The data also shows that there is no asphalt road in the study area.

d) Contribution of Road to Agriculture production

i. *Agricultural production*

Agriculture is the major sector for Wonbera population. Farmers produce different types of crops both for consumption and sell. However, marketing of agricultural products is affected by lack of road infrastructure. Thus, farmers carry saleable agricultural products to distant markets using human portage and pack animal.

As indicated in table 4.3 out of the total respondent 57.4% responded that roads has high contribution on the quantity of agricultural production, 24.7% moderate contribution, and 14.7% responded very high contribution. From this it is clear that road has great contribution on agricultural production.

According to the interview made with head of agriculture bureau of Wonbera woreda, road has plenty of contribution on the quantity of agriculture production. Before the construction of gravel road, the woreda have no chance to export agricultural products rather they use and produce only for consumption purpose. Small amount is sold to cover loans of agriculture inputs (fertilizer, pesticides, herbicides, and the like). But after the construction of road the farmers began to produce agricultural products in large quantity including for export purpose.

Table 4.3: Contribution of road on agricultural production

		No of respondents	percent
Contribution of road on quantity of agriculture production	Very low low moderate high Very high	4 2 47 109 28	2.1 1.1 24.7 57.4 14.7
	Total	190	100
prices of agricultural products for areas with road access are higher than inaccessible areas	yes	186	97.9
	No	4	2.1
	Total	190	100
Use of agricultural inputs was significantly different for areas accessible to road and poor access to road.	SA	80	42.1
	Agree	108	56.8
	disagree	2	1.1
	SD	-	-
	Total	190	100

Since then the woreda exported agriculture products to other place, especially after the construction of Asosa-Gilgel and Gilgel-Wonbera road export of products like coffee and sesame was started in the woreda. For example, in 2003, about 75,000 quintal and in 2004, about 88,000 quintal of coffee was exported to Oromia region of Genbi town. On the other hand in 2004, 48,305.82 quintal and in 2005(half year) 1369.34 quintal of sesame was export to Asosa and to other region (Wonbera woreda Agricultural Office, 2013).

As table 4.3 shows from the total respondents 97.9% of them responded that there are variations in

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prices of agricultural products between places accessible to road and those with less access. According to the focus group discussion (FGD) made with farmers, farmer's households with poor transportation facilities get double punishments. They said inaccessible farmers sell agriculture produce at lower prices and buy agriculture inputs at high prices.

The farm gate prices of manufactured goods are significantly higher while farm gate prices of agricultural products are significantly lower in localities with poor transportation facilities. This means a huge price bands between the buying and selling prices for the peasant households with poor transportation access (Sadoulet and de Janvry, 1995). Therefore, it can be concluded that road transportation has an effect on prices of agricultural products i.e. transport improvements reduce the cost of moving agricultural products to market and, therefore, extend the market, thereby encouraging cultivation and also investment in rural areas.

e) Road and Social services

i. *Accessibility of schools*

As Ethiopia's SDPRP states, the education sector is expected to help reduce poverty by universalizing primary education and by producing a workforce capable of filling jobs requiring skilled labor. To realize this schools are being opened in all corners of the country. In the study area, there is also an attempt made to the realization of the intended plan by the MOE.

Table 4.4: Accessibility of schools

		No of respondents	percent
School distance from home	<5km	75	39.5
	6-10km	66	34.7
	>10km	49	25.8
	Total	190	100
Road construction on improvement of education quality.	Very low	2	1.1
	low	9	4.7
	moderate	32	16.8
	high	126	66.3
	Very high	21	11.1
	Total	190	100

Source: own survey, 2013

As indicated in table 4.4. Item 1, out of the total number of respondents 39.5% replied that the distance of school from their home is within 5 km, 34.7% replied the school distance from their home is6-10 km and the remaining 25.8% responded that they walk more than 10 km to reach school. From the data it is clear that majority of the respondents walk more than five kilometer distance (approximately more than one hour) to reach school.

According to the Head of Wonbera Woreda Educational bureau schools are sparsely located and thus majority of the students walk more than five kilometer to reach the nearest school. Thus, the dropout rate at the secondary level is very high because of distance of the school. There are more schools closer to the road than away from the road. This implies that students closer to road had to walk significantly less time to get to both primary and secondary schools in comparison to those far away from the road. Additionally, Road accessibility and closeness of household from woreda headquarters may have positive effect on school enrollment of children. Because of distance to school, lack of better information flow, and knowledge of the importance of education households couldn't enroll their child. Road accessibility and distance of households from woreda headquarters may also influence children school enrollment indirectly through income (Bhata, 2004). Therefore, distance to school from home has effect on school enrollment because it is difficult for the children to walk to school if the school is too far.

ii. *Contribution of road on improvement of education*

It is obvious that availability of infrastructural facilities encourages the establishment of services such as schools, health centers, market centers, etc. In this regard transportation play significant role. Therefore, road has high contribution on the improvement of education through the attraction of other services (cafeterias, shops, etc) for teachers and students, provision of educational materials to schools, transport services to students and teachers and from schools as required.

Table 4.4. Item 2, Shows that out of the total number of respondents 66.3% responded that road has high contribution to educational development, 16.8% moderate contribution, and 11.1% very high contribution. From this it is clear that road has high contribution on improvement of education as majority of respondents replied. According to the interview made with Head of the Education Bureau of Wonbera woreda, the bureau is committed to the provision of better education aiming to improve the access, quality, equity and efficiency of education to address the needs of the community. To bring this in to action road is one of the major components in addition to government policy.

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Table 4.5: Relationship between home distance from the road and school

		school distance from home				
		<5km	6-10km	>10km	Total	%
Home distance from the road	<5km	65	5	0	70	36.8
	6-10km	10	57	2	69	36.3
	>10km	0	5	46	51	26.8
	Total	75	67	48	190	100
	39.5	35.2	25.3	100		

Source: survey, 2013

Thus, the households with good road access had less walking distance to school than the households with poor road access and they have also the opportunity to get better education services than those less accessible to road. This indicates that the construction of road nearby home brings education services better and easier for parents to enroll their children to school. The cross tabulation in table 4.5 shows that there is relationship between home distance from the road and school distance from the home. Hence, in order to examine the association between home distance from the road and school distance from the home Pearson Chi-Square test was used (Table 4.6 presents the result).

Table 4.6: Relationship between home distance from the road and school

	Value	df.	asym.sig. (2-sided).
Home distance from the road and school distance from home	266.755	4	.000

Examination of the results on the association between home distance from road and school distance from home revealed to be strongly significant, x2(4df.)= 28.504, sig.000. This shows that there was a significant association between home distance from road and school distance from home. Therefore, it is clear that road accessibility contributes to school accessibility.

f) Health Facilities

It is obvious that infrastructure facilities may influence the social services given in a certain area among which health service is not exceptional. Under this topic the influence of road network on health services is examined.

Table 4.7: Health services

		No of respondents	percent
Do you think that road improve health situation.	Yes	184	96.8
	No	6	3.2
	Total	190	100
Contribution of road development on health services	Low	4	2.1
	Medium	40	21.1
	High	119	62.6
	Very high	27	14.2
	Total	190	100

Source: survey, 2013

In Wonbera woreda there are only two clinics and 20 health posts. Almost half of the kebeles (13 kebeles) of the woreda don't have any health services and thus patients go to the neighboring Kebeles in search of health posts. This is against the government's policy that focuses a four-tier health service system which comprises of a primary health care unit (a network of a health center and five health posts), the hospital, regional hospital and specialized referral hospital (MoH, 1993).

Table 4.7. Item1 Revealed that out of the total sample population 96.8% of the respondents responded that construction of road near by their home bring improvement on their health situation and only 3.2 % of the respondents replied that road construction nearest by their home doesn't bring improvement on their health situation. From the data it is clear that road bring improvement in the health situation as the majority of the respondents replied. The respondents also explained that before the construction of the road they travel long distance to get health service and they pay high tariff for transportation. Mothers also give birth at home without the help of health workers.

Following the construction of road health posts were constructed in most of the rural Kebeles and as a result farmers get primary health care such as vaccination, delivery, and other health services from the nearby health posts. Moreover, mothers give birth at health posts. Therefore, road development helped in the reduction of maternal mortality, infant and child mortality

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and it bring improvement to the health of the people in general.

Table 4.7. Item 2 shows that out of the total number of respondents 62.6% of the respondents indicated that the contribution of road on improvement of health is high, 21.1% replied moderate and 14.2 % replied very high. Thus, road has high contribution on improvement of health as majority of respondents' replied. According to the interview made with Head of Health Bureau of Wonbera woreda, road has vital contribution on improvement of health situation of the people especially to the rural people because the presence of road make things suitable i.e. it is possible to give ambulance service during emergency case, to provide medicines at right time at desired place and people with good road access are motivated to go to health institution while poor road access people fear a long distance walk without transport services and they prefer to be at their home when they are sick.

Table 4.8: Respondents' home distance from road and health institution

		Home distance from health institution				
		<5km	6-10km	>10km	Total	%
Distance of home from road	<5km	61	9	0	70	36.8
	6-10km	8	58	3	69	35.8
	>10km	2	4	45	51	27.4
	Total	71	71	48	190	100
	%	37.4	37.4	25.2	100	

Source: survey, 2013

In order to examine the relationship between distance to the nearest health center and road transport cross tabulation were used. Table 4.9 illustrates that 37.4 % of the respondents are found within 5km from health centers, 37.4% within 6-10 km and 25.3 % more than 10 km. This implies that majority of the patients' travel more than 5 km looking for health facilities. As cross tabulation in table 4.8. Shows that there is relationship between home distance from the road and health institution. Hence, in order to examine the association Pearson Chi-Square test analysis was used.

Table 4.9: Relationship between home distance from road and health institution

	value	df.	Asymp,sig. (2-sided)
Home distance from road and health institution	247.421	4	.000

Examination of results on the association between home distances from road and health institution distance from home, x2(4df) = 247.421, sig.000 (table 4.9). This shows there was a significant association between home distance from road and health institution distance from home. Therefore, it is clear that road accessibility brings adequacy of health institution for the society.

g) Market Access

Monahar Lal (1989) found that the development of road network has resulted in faster and more equitable distribution of inputs as well as marketing of products. Investment in road sector brings market transparency and widespread access to market information which creates a competitive marketing system and also it helps the market integration among the regions (Kessides, 1993).

Table 4.10: Respondents home distance from market and means of transport used

		No of households	Percent
Home distance from market	<5km	60	31.6
	6-10km	73	38.4
	>10km	57	30
	Total	190	100
Means of transportation	Pack animal	115	60.5
	Human portage	35	18.4
	Vehicle	40	21.1
	Total	190	100

Source: survey, 2013

As indicated in table 4.10. Item 1 out of the total number of respondents 38.4% of the respondents replied that the distance of their home and the nearest market center, is between 6-10 km 31.6% within 5km, and the remaining 30% more than 10 km. From this it is clear that majority of the respondents walk more than

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five kilometers (more than one hour) to reach market centers.

Therefore, Better road accessibility could help to get market information because of lower transaction costs and perfect information. It could also encourage people to take more advantage to produce and sell it in the market and the people nearest to the road have advantage to get the market access that they are willing to produce more systematically for the market, while those with poor market access are forced to produce for domestic consumption.

Even though there is improvement in road sector investment in the study area, majority of the households come across long distance (6-10km and above) still using pack animals and carrying loads on their head and backs to take their products to market places especially those far away from roads. Table 4.10. Item 2 revealed that out of the total sample population 60.5% of the respondents respond that they use pack of animals to sell agricultural products to the nearest market center, 21.1% use vehicle and the remaining 18.4% use human portage. The result shows that the majority of respondents use pack of animals to transport saleable agricultural products to the nearest market center.

Table 4.11: Respondents home from the road and market

		<5km	6-10km	>10km	Total	%
distance of home from the road	<5km	55	15	0	70	36.8
	6-5km	4	58	7	69	36.3
	>10km	1	1	49	51	26.8
	Total	60	74	56	190	100
	%	36.1	38.9	29.5	100	

Source: survey, 2013

Table 4.11 illustrates that out of the respondents 38.9 % are located 6-10 km distance from market centers, 31.6 % within 5km and the remaining 29.5% more than 10 km. This implies that majority of the respondents travel more than 5 km for marketing. The cross tabulation in table 4.11 shows the relationship between home distance from the road and market distance. In order to examine the association between home distance from road and market centers Pearson Chi-Square test analysis was used.

Table 4.12: Relationship between home distance from road and market

	Value	df.	asymp.sig. (2-sided)
Home distance from road and market distance from home	243.083	4	.000

Examination of results on the association between home distances from road and market distance from home, x2(4df) = 243.083, sig.000 (table 4.13). This shows there was strong significant association between home distance from road and market distance from home. This implies that households with good road access has good market access and they have the opportunity to buy inputs and to sell their out puts at reasonable price with low transportation price and households with poor road access get double punishment. I.e. high price for input they buy and low price for the output they sell in addition to transportation cost and time cost.

V. Conclusion and Recommendation

a) *Conclusions*

Based up on the findings, points were concluded as follows:

- The study indicates that in the recent decade the government is making a relentless effort towards expanding the road network in the region and woreda as well. However, an important key indicator is the issue of accessibility of the existing road. The overall accessibility of road does not meet the need of the study area.
- The study shows that the contribution of road on the quantity of agricultural production was high. It also indicated that there is variation in the prices of agricultural products and inputs between places accessible to road and not. Farmers' with poor road accessibility experienced double punishments, i.e. they pay higher price for the commodities they buy while they get lower price for the commodities they sell. Thus, road accessibility brings improvement in the quantity of agricultural production.
- The study indicates that schools were sparsely located in Wonbera woreda, as a result majority of the households are found more than five kilometer away from the nearest schools. There were more schools closer to the road than away from the road. Thus, students closer to road had more opportunity to get schools in comparison to those far away from the road.

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– Road development helped in reducing maternal mortality, infant and child mortality as well as health costs. However, in the study area health institutions are few and people had to walk more than five to ten kilometer to reach the nearest health posts. For referral to zonal or regional level health services, the distance traveled could be in days. The survey area was, therefore, underdeveloped in terms of health services though improvements are under way in terms of road accessibility and health services.
– The study revealed that household with good road access has good market access and vice versa. That means better road accessibility could help to get market information, low transportation price and better means of transportation, which help to produce more saleable agricultural products.

b) Recommendations

Up on the conclusions made, the following recommendations were forwarded:

– The area is far from the center of the country and it is big challenge to promote developmental programs in the area. Thus, in order to connect the area with the interior part of the country and also properly utilize the natural resources road network needs to be expanded in accordance with road transport policy of the country. Therefore, the Regional Road Authority should work to connect the study woreda with big market centers within and outside the region.
– The study area is rich in natural resources particularly in agricultural and industrial raw materials. However, the area is poorly linked with road transport and farmers mostly produce for consumption. Thus rural Kebeles needs to be connected with market centers in order to collect the products during harvesting seasons.
– Road in the area is not only poorly networked but also poorly maintained. Road construction alone does not bring the intended level of economic development and provision of social services unless continuously maintained. Therefore, the existing roads have to be repaired on time to give the required services so that communication remains continue.

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Financial Crises and Banking Governance in the Emerging Countries of South East Asian

By Foued Sabbagh
University of Sousse

Abstract- This article aims to analyze the effectiveness of bank governance mechanisms or through prudential regulation as an external dimension or either the mode of administration as an internal dimension is a source of birth of crises. In addition, the risk in terms of financial instability, institutional weaknesses and the weakness of regulatory and supervisory system leads to a lack of governance in banks. This empirical study was conducted on a sample of four emerging countries of South East Asia and to an annual period from 1980 to 2010, using the Probit model on panel data. The results also suggest that there is a strong and significant causal relationship between financial crises and bank governance in the South East Asian countries during periods of financial liberalization.

Keywords: financial crises, bank governance, financial liberalization, south east asian countries, probit panel data.

GJMBR-B Classification: JEL Code: G01; G18 ; G28 ; G32 ; G38

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Financial Crises and Banking Governance in the Emerging Countries of South East Asian

Crises Financières Et Gouvernance Bancaire Dans Les Pays Émergents Du Sud Est Asiatique

Foued Sabbagh

Résumé- Cet article se propose d'analyser que l'inefficacité des mécanismes de gouvernance bancaire soit par la réglementation prudentielle comme une dimension externe ou soit par le mode d'administration comme une dimension interne est une source de naissance des crises. De plus, les risques en termes de l'instabilité financière, les fragilités institutionnelles et la faiblesse du système de réglementation et de surveillance entrainent un manque de gouvernance au sein des banques. Cette étude empirique a été réalisée sur un échantillon de quatre pays émergents du Sud Est Asiatique et pour une période annuelle allant de 1980 à 2010, en utilisant le modèle Probit sur données de panel. Les résultats semblent également indiquer qu'il existe une relation de causalité étroite et significative entre les crises financières et la gouvernance bancaire dans les pays Sud Est Asiatique durant les périodes de la libéralisation financière.

Mots Clés: crises financières, gouvernance bancaire, libéralisation financière, pays sud est asiatique, probit sur données de panel.

Abstract- This article aims to analyze the effectiveness of bank governance mechanisms or through prudential regulation as an external dimension or either the mode of administration as an internal dimension is a source of birth of crises. In addition, the risk in terms of financial instability, institutional weaknesses and the weakness of regulatory and supervisory system leads to a lack of governance in banks. This empirical study was conducted on a sample of four emerging countries of South East Asia and to an annual period from 1980 to 2010, using the Probit model on panel data. The results also suggest that there is a strong and significant causal relationship between financial crises and bank governance in the South East Asian countries during periods of financial liberalization.

Keywords: financial crises, bank governance, financial liberalization, south east asian countries, probit panel data.

I. Introduction

La libéralisation et l'intégration financière des économies émergentes des pays Sud Est Asiatique ont fortement impulsé la croissance économique et l'ouverture des marchés financiers sur l'extérieur. Ces événements ont été rapidement tourné instable puisqu'ils ont été secouée par une série des crises financières remarquable surtout en 1997-1998. Durant ces périodes, ces crises montrent que les risques en termes de l'instabilité financière et les fragilités institutionnelles ont été impulsé par le rôle primordial des institutions bancaires et financières et par les stratégies des pouvoirs publics pour instaurer des mécanismes de gouvernance bancaire. En effet, la multiplication de ces crises financières a remis en cause les objectifs de la globalisation et de la libéralisation financière, ainsi l'instauration des mécanismes de gouvernance bancaire. Ce qui laisse à remarquer que la bonne gouvernance bancaire durant les périodes d'intégration et de la libéralisation financière constitue une condition favorable pour avoir un système bancaire et financière stable à long terme. Mais malheureusement la plupart des économies émergentes des pays Sud Est Asiatique ont connue des graves perturbations financières au cours des deux dernières décennies. Dans ce contexte, plusieurs travaux montrent l'existence d'une relation entre les crises financières et la gouvernance bancaire on note principalement (Mathieu C et Sterdyniak H (2009), Bertrand R et Masmoudi I (2010), Williams J et Nguyen N (2005), Sinapi C (2010), Abouab E, Rachdi H et Elgaied M (2008), Adams R.B (2012)). La plupart de ces analyses, mettent en avant deux parties d'explication, d'une part le rôle des mécanismes de gouvernance bancaire pour assurer la stabilité financière, et d'autre part l'impact de ces mécanismes sur les crises financières et inversement. L'objectif de cet article expose le cadre théorique et empirique, qui fonde le lien de causalité entre les crises financières et la gouvernance bancaire dans les pays Sud Est Asiatique. Cet article est structuré autour de trois parties. La première s'articule en particulier sur les fondements théoriques des mécanismes internes et externes et l'interaction entre ces deux dimensions de la gouvernance bancaire. Que ce soit, par l'importance des mécanismes externes par la réglementation prudentielle, ou aussi par les mécanismes internes à savoir le mode d'administration au sein d'une banque. Ainsi, l'interaction des mécanismes internes et externes de la gouvernance bancaire dans le but d'assurer une meilleure coordination entre le conseil d'administration, les intérêts des dirigeants, les intérêts des actionnaires et les autres parties prenantes telles que les pouvoirs

Author: Titulaire d'un Master Recherche, Spécialité Finance et Développement de la Faculté de Droit et des Sciences Economiques et Politiques de Sousse et Chercheur en Sciences Economiques.
e-mail: fouedsabbagh_2010@yahoo.fr

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publics et de régulation. La deuxième partie explique le constat de l'impact de la gouvernance bancaire sur les crises financières et aussi l'impact de ces crises sur la gouvernance bancaire dans les pays Sud Est Asiatique surtout après la période de l'intégration et de la libéralisation financière. La troisième partie sera détaillée sur une présentation empirique de la notion des crises financières et de la gouvernance bancaire par une méthodologie économétrique choisie. Cette partie se fonde essentiellement sur une démarche suivie par un diagnostic de la relation entre la libéralisation financière, la propagation des crises financières et le rôle important des mécanismes de gouvernance bancaire pour limiter les risques des perturbations financières dans les pays du Sud Est Asiatique.

II. Les Mécanismes De La Gouvernance Bancaire

Après la libéralisation financière et l'ouverture économique, les crises financières dans les économies des pays Sud Est Asiatique prenaient fréquemment une dimension structurelle des systèmes bancaires et financiers. Les pouvoirs publics et de régulation ont constaté le rôle primordial pour assurer la stabilité financière. D'où la gouvernance bancaire trouve là, au cœur des débats liés à la propagation des crises dans cette région. Dans ce cadre, une vaste littérature traite les considérations théoriques et empiriques de la relation entre les crises financières et la gouvernance bancaire. Certaines de ces études spécificités comme la distinction entre la dimension externe par la réglementation prudentielle, la dimension interne par le mode d'administration et l'interaction entre ces deux dimensions. En outre, la bonne gouvernance bancaire permet de remédier les risques de déclenchement des crises financières.

a) *La dimension externe : La réglementation prudentielle*

La réglementation prudentielle qui est l'ensemble des mesures qui visent à obliger les banques de réduire ou de mieux assurer les risques gérés par les diverses activités financières et bancaires. Ces règles ont pour objectif d'assurer une meilleure gestion des risques, la crédibilité et la transparence, la protection des créanciers, les relations avec les clients, les collaborateurs et la stabilité du système. L'ensemble de ces règles se compose de trois grandes mesures :

- *Justification théorique de la réglementation prudentielle:* Il s'agit de justifier la présence d'information asymétrique, l'existence d'externalités surtout aux niveaux macro et micro-économique pour réduire les risques symétriques.
- *Les objectifs de la réglementation prudentielle:* La réglementation prudentielle est intervenue en vue d'harmoniser les conditions d'exercice de la concurrence bancaire, qui permet de développer et de préserver la stabilité et la solidité du système bancaire. Ainsi, le renforcement de la sécurité bancaire en instaurant des normes de fonds propres et de contrôle, afin de préserver la confiance du système et d'éviter les crises systémiques. La réglementation doit donc adapter le fonctionnement des banques face à la vague évolution des marchés.
- *Les normes de surveillance prudentielle internationales:* Face à la perturbation dans les secteurs bancaires et la montée des risques d'instabilité, les autorités internationales, comme le comité de Bâle I et II, a mis en place des normes de supervision bancaire. Les banques sont tenues de respecter ces normes pour garantir leur liquidité et leur solvabilité et pour atteindre les meilleures pratiques telles que la qualité de l'information, les normes de comptabilité et audit, les règles du travail et les normes de l'environnement au regard de leur client. Parmi ces normes on note principalement le ratio « *Cooke* » qui va être remplacé ensuite par le ratio « *McDonough* ».

L'accord de Bâle I: (Le ratio Cooke), adapté en 1988, définit le montant des fonds propres minimum que doit respecter une banque face à la montée des risques.

L'accord de Bâle II: (Le ratio McDonough), c'est la réforme qui permet à réconcilier le capital réglementaire et le capital économique. Cet accord repose sur trois piliers de réglementation. Le pilier I, c'est l'exigence en fonds propres pour diminuer le risque de crédit, le risque de marché et le risque opérationnel. Le pilier II est le processus de surveillance pour la régulation des établissements bancaires. Le pilier III, c'est la discipline de marché dans le but de compléter les informations nécessaires sur les marchés financiers face à la montée des risques.

L'objectif fondamental de la réglementation prudentielle est assuré un mécanisme de gouvernance efficace pour réduire le risque systémique et pour améliorer le degré de la sécurité financière individuelle et la stabilité financière et monétaire. Malgré, cette réglementation le ratio McDonough reste faible pour limiter les risques pro-cycliques et systémiques dans les marchés financiers et les secteurs bancaires. C'est pourquoi aujourd'hui se mettent en place des nouvelles règles par le comité de Bâle III face à ces virus des perturbations financières et bancaires.

b) *La dimension interne : Le mode d'administration*

La dimension interne de la gouvernance bancaire concerne les modalités d'administration c'est-à-dire le conseil d'administration (CA) et le président directeur général comme toutes les sociétés. Selon Charreaux G (2000), les théories contractuelles (financière et partenariale) du conseil d'administration pour lesquelles l'objectif du conseil d'administration est

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de discipliner les dirigeants aux théories stratégiques pour lesquelles le conseil constitue un instrument cognitif aidant à la création de compétences.

i. *Définition du conseil d'administration selon les théories de gouvernance*

On distingue trois théories explicatives de la gouvernance bancaire selon la dimension interne telle que la théorie contractuelle financière, la théorie partenariale et la théorie stratégique.

- *La théorie contractuelle financière de la gouvernance:* Le conseil d'administration intervient comme un instrument de discipline des dirigeants au service des actionnaires, soit par les systèmes de rémunération, soit en menaçant de les évincer.
- *La théorie partenariale de la gouvernance:* Le conseil d'administration est un instrument dans l'objectif de faciliter la création de valeur pour l'ensemble des parties prenantes.
- *La théorie stratégique de la gouvernance:* Le conseil d'administration est considéré comme instrument cognitif aidant à la création de compétences dans le but de faciliter et d'aider pour trouver des nouvelles options stratégiques.

ii. *Le rôle du conseil d'administration dans la saine gouvernance des banques*

L'étude Caprio G, Laeven L, et Levine R (2007), évalue l'impact de la structure de propriété des banques et des lois sur la protection des actionnaires sur les valorisations des banques tout en contrôlant les différences entre les réglementations bancaires. Sauf dans quelques pays avec des lois très strictes sur la protection des actionnaires les banques ne sont pas largement répandues. En effet, la structure de propriété des banques joue un rôle important pour assurer une bonne gouvernance. Dans ce cadre, Alexandre H et Bouaiss K (2008), démontrent que le conseil d'administration entant qu'organe de représentation des actionnaires, vise à maximiser la valeur pour les actionnaires, même si une plus grande prise de risque sera impliquée. D'où, le gestionnaire a pour un objectif de maintenir un niveau de capitalisation nécessaire, prendre des décisions face à la montée des risques et de réaliser de bonne performances. En outre, Laeven L et Levine R (2009), montrent que la relation entre risque bancaire et réglementation des fonds propres, les politiques d'assurance-dépôts, et les restrictions sur les activités de banque dépend essentiellement de la structure du capital de chaque banque. Dans ce contexte, les membres du conseil d'administration et la direction générale de la banque doivent être responsables de la qualité de gouvernance, de surveillance et de réglementation. Ces membres sont comptables de la protection finale des actionnaires et des autres parties prenantes. La compétence et la transparence au sein d'une banque sont alors une pratique efficace pour exercer une bonne mission de contrôle et de liquidité.

iii. *Le conseil d'administration, mécanisme interne de contrôle du dirigeant*

L'apport principal de ce mécanisme interne est expliqué par la relation entre les caractéristiques de conseil d'administration, les performances et les incitations à prendre des risques dans le secteur bancaire (Rachdi H et Ghazouani Ben Ameur I (2011)). Lorsque les commissions bancaires puissants, c'est-à-dire un conseil plus représentant les intérêts des actionnaires de la banque et le pouvoir PDG, c'est-à-dire la capacité de PDG d'influencer la décision du conseil d'administration a trait au risque bancaire prenant d'une manière comptable avec l'environnement de contrat bancaire (Pathan S (2009)). Le principal mécanisme interne de contrôle du dirigeant se compose donc de l'indépendance des administrateurs, la taille du conseil d'administration, la séparation des fonctions de direction et de contrôle et la composition du conseil d'administration et la détention de titres de la banque par le dirigeant. Ces mécanismes sont généralement des déterminants pour avoir une discipline de contrôle du dirigeant efficace et rentable, ainsi de faciliter la coopération entre les membres du conseil d'administration et de direction général.

c) *L'interaction entre les mécanismes internes et externes*

Il existe une relation d'interaction complémentaire et évidente entre les mécanismes internes et externes. Les dirigeants adoptent des mécanismes internes en réponse aux contraintes externes (Semmae M (2011)). Ces mécanismes de la gouvernance bancaire ayant pour objectifs principales suivantes :

- L'instauration des meilleures pratiques et des procédures de travail à travers la surveillance des dirigeants.
- La meilleure coordination possible entre les différents membres des dirigeants, des actionnaires et des pouvoirs publics et de régulation.
- L'asymétrie de l'information, la crédibilité et la transparence pour protéger les actionnaires contre certains risques symétriques et les excès du pouvoir des dirigeants.
- La confrontation et la meilleure combinaison entre les mécanismes internes et externes déterminent l'espace discrétionnaire du dirigeant c'est-à-dire la restriction du pouvoir managérial, réduire les coûts d'agence et pour faire face à les engagements des actionnaires et les pouvoirs de régulation.
- Les mécanismes externes ont un rôle fondamental dans l'orientation et la régulation de l'étendue et de la présence des mécanismes internes pour assurer l'instauration d'un système de gouvernance bancaire efficace et rentable.

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- L'instauration d'un système de management et de contrôle interne permet de réduire les risques et les contraintes imposées par l'accord Bâle II. En effet, les banques adoptent des nouvelles procédures pour améliorer le capital réglementaire et le capital économique.

Les pouvoirs publics et réglementaires ont instauré des mécanismes de gouvernance bancaire à la fois externes et internes, d'une part pour limiter le déclenchement des crises financières et de l'autre part pour assurer la meilleure pratique de contrôle, de direction et de coordination possible entre actionnaires, dirigeants et autres parties prenantes. La vulnérabilité d'une économie à une crise financière résultant de l'interaction entre le degré de spécialisation économique et le financement de la dette bancaire (Gande A, John K, et Senbet L.W (2008)). En effet, l'interaction entre la réglementation prudentielle et le mode d'administration améliore l'efficacité des structures institutionnelles des systèmes bancaires et financières. De plus, la bonne gouvernance bancaire peut jouer un rôle primordial pour réduire l'instabilité financière dans les économies des pays Sud Est Asiatique.

III. La Relation De Causalité Entre les Crises Financières Et La Gouvernance Bancaire

Les économies émergentes des pays Sud Est Asiatique ont été secouées par une forte perturbation financière en 1997-1998. Cette crise montre, une fois encore les risques en termes de l'instabilité financière, la fragilité institutionnelle et les faiblesses des mécanismes de la gouvernance bancaire. Elle a mis une nouvelle fois en évidence le manque de contrôle et de régulation des structures institutionnelles des systèmes financières et bancaires. Ce débat pose la question de la relation de causalité entre les crises financières et la gouvernance bancaire surtout après la libéralisation et la globalisation financière. En effet, la fragilité institutionnelle et en particulier la gouvernance bancaire, joue un rôle fondamental dans le déclenchement des crises actuelles. Delà naît l'analyse de l'impact de la gouvernance bancaire sur la crise financière. En outre, la libéralisation financière et la faiblesse de régulation dans le secteur bancaire facilite l'éclate rapide d'une crise et le passage d'une perturbation à une autre dans les économies émergentes des pays Sud Est Asiatique. D'où, se pose ici l'analyse de l'impact des crises financières sur la gouvernance bancaire.

a) *L'impact de la gouvernance bancaire sur les crises financières*

La propagation des crises financières dans les pays Sud Est Asiatique ne sont pas seulement le résultat de la dimension externe selon la réglementation prudentielle mais aussi par la dimension interne selon le conseil d'administration, la structure de propriété, et l'endettement. La fragilité institutionnelle et la mauvaise gouvernance bancaire ont été alors la cause principale de la naissance des crises financières dans ces pays. Dans ce cadre, il y a un impact direct de la gouvernance bancaire sur la sécurité du système bancaire et la protection contre les risques d'instabilité. La faiblesse des mécanismes de la gouvernance bancaire peut être aussi une cause qui peut aggraver plus rapidement le déclenchement des crises financières dans les pays Sud Est Asiatique. Les hypothèses de la relation de causalité entre le conseil d'administration et les risques interne dans les firmes bancaires sont basées sur le constat de Jensen M.C (1993) et les études empiriques de Mamoghli C et Dhouibi R (2009) et Dannon P.H (2010). Ces hypothèses sont composées d'une explication de la relation de causalité entre la défaillance de la gouvernance bancaire et les différentes situations de risque d'insolvabilité respectivement de risque de crédit. Cependant, Jensen M.C (1993) discute les forces qui rendent les mécanismes de contrôle interne inefficaces et offrent des suggestions pour leur réforme. De plus, la composition du conseil d'administration dans l'objectif pour assurer un contrôle interne efficace des gestionnaires.

H 1: La taille du conseil d'administration a un impact négatif sur le risque de la banque : Selon Mamoghli C et Dhouibi R (2009), la taille du conseil d'administration aura un effet positif sur le risque d'insolvabilité et de la dualité et associée à un risque plus élevée. En effet, il y a un impact négatif de la dualité entre la taille du conseil d'administration sur le risque de crédit bancaire et par conséquent un impact positif sur le risque d'insolvabilité.

H 2: La dualité a un impact positif sur le risque d'insolvabilité respectivement le risque de crédit de la banque : l'impact de la dualité de la structure de leadership du conseil d'administration sur le risque bancaire. D'après la théorie de la myopie au désastre, Mamoghli C et Dhouibi R (2009) ont empiriquement montré que dans le cas de la dualité de la fonction de chef de la direction et le président y aurait évidemment une détérioration du degré de contrôle et de supervision. La dualité a un impact positif sur le risque d'insolvabilité des banques. Par conséquent, cet article se concentre en particulier sur la relation entre les mécanismes de la gouvernance bancaire et le risque d'insolvabilité dans le cas des banques des pays Sud Est Asiatique.

H 3: Le risque d'insolvabilité de la banque est négativement lié à la diversité démographique du conseil d'administration: il y a donc une relation de causalité entre le risque d'insolvabilité et le pourcentage des administrateurs et des capitaux étrangers siégeant au conseil d'administration.

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H 4: Le risque d'insolvabilité de la banque est négativement lié à la diversité cognitive du conseil d'administration: Il existe une dualité entre le pourcentage des administrateurs représentant l'Etat et les établissements publics et le risque d'insolvabilité.

H 5: L'impact des administrateurs institutionnels sur le risque de la banque : cet effet démontre que lorsque plus le pourcentage des administrateurs institutionnels augmentent, plus le risque d'insolvabilité de la banque est diminue.

L'évaluation d'une variété de professionnels de la finance en rassemblant les caractérisations des facteurs qui ont causé des crises à travers les épisodes de l'insolvabilité des banques (Caprio G et Klingebiel D (1996)). De plus, l'étude empirique de (Caprio G, Laeven L, et Levine R (2007)) évalue l'impact de la structure de propriété des banques et des lois sur la protection des actionnaires sur les valorisations des banques tout en contrôlant les différences entre les réglementations bancaires. Ces résultats suggèrent le rôle important des mécanismes de la gouvernance bancaire soit par la réglementation prudentielle ou soit par le mode d'administration. C'est pour cela, ces mécanismes ont pour rôle de diminuer les risques d'insolvabilité respectivement des risques de crédit et par conséquent de limiter la naissance des crises bancaires surtout dans les économies émergentes des pays Sud Est Asiatique.

b) L'impact des crises financières sur la gouvernance bancaire

L'impact des crises financières sur les mécanismes de la gouvernance bancaire dans les pays Sud Est Asiatique était plus échelonné à travers les risques d'instabilité dans le secteur bancaire et financier. Ces risques ont été plus excessifs à cause d'une manque d'expertise, la faiblesse du système de réglementation et de surveillance, la détérioration des bilans de banques et la fragilité institutionnelle. Ces causes ont entrainés la déroute de certains établissements financiers et bancaires devant faire face à deux types des crises :

- Une crise de liquidité à caractère systémique incluant l'instabilité des flux de capitaux et les sorties massives de liquidité. Ce type de crise a un impact direct sur les banques d'investissements suite à la chute de certaines banques.
- Une crise de solvabilité de certaines banques et établissements dont les débiteurs ont fait défaut et dont les actifs en garantie ont vu leur valeur fondre.

La plupart des pays émergents surtout les pays Sud Est Asiatique ont adopté un processus de libéralisation financière. Ce résultat facilite l'ouverture des systèmes bancaires nationaux sur l'investissement et l'installation des capitaux étrangers. Dans ce cadre, l'étude de Chroqui R (2008) consiste à analyser l'effet de la privatisation bancaire, via l'entrée des banques étrangères, sur la performance de banques privatisées. La gouvernance bancaire se trouve là dans une situation limite aux différentes structures de propriété, locales, étrangères et publiques. Par conséquent, la libéralisation financière augmente le risque des naissances des crises à cause d'un manque de performance, de réglementation et de surveillance dans le secteur bancaire. Selon, les travaux empiriques de Komulainen T et Lukkarila J (2003) et Feridun M (2005), la libéralisation des flux de capitaux et financiers changent l'environnement économique, mais aussi a été une cause de la propagation des crises suite à la sortie soudaine de capitaux. L'hypothèse centrale est que les défaillances bancaires à l'origine des crises peuvent être expliquées, en grande partie par les comportements spéculatifs des banques favorisés par la libéralisation financière (Miotti L et Plihon D (2001)). Le déclenchement de ces crises a pour origine d'une part des ressources bancaires par une défaillance brutale des déposants et de l'autre part provient de difficultés sur les actifs bancaires par la solvabilité des banques concernées. L'étude empirique de Kaminsky G.L et Reinhart C.M (1999), montre qu'il existe des liens entre les crises bancaires et monétaires, est plutôt que le caractère gémellaire de ces crises provient de l'existence de causes communes, dont le principal est la libéralisation financière. Les crises dans les économies émergentes sont alors à l'origine des relations entre les crises bancaires, les crises de change et les crises de balances de paiement, par la cause des sorties massives des capitaux étrangers, de l'attaque spéculative et des risques de liquidité et de solvabilité. La libéralisation financière et l'évolution macroéconomique stimulent les entrées de capitaux et l'ouverture financière sur le marché financier mondiale, mais ils ont des résultats défavorables puisqu'ils sont des causes des défaillances et des fragilités bancaires et financières. D'où, avec un certain décalage, elle amène à une perte de confiance des non-résidents, puis une sortie massive des capitaux étrangers créant ainsi les conditions d'une crise de change et d'une crise de liquidité. Les économies émergentes des pays Sud Est Asiatique ont connues durant ces dernières décennies une forte accélération de l'intégration financière internationale surtout après la période de la libéralisation financière. Ces événements deviennent catastrophiques à cause de l'instabilité financière, le retournement brutal des flux de capitaux et la notion de fragilité institutionnelle. La montée des risques de perturbation et de défaillance facilite l'impact de ces crises sur la gouvernance bancaire dans les pays Sud Est Asiatique.

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IV. Méthodologie Et Base Des Données

a) La base des données

La base des données utilisée dans cet article pour analyser le lien entre les crises financières et la gouvernance bancaire a été fournie par la base des statistiques de la Banque Mondiale. Pour, l'indice des crises sera relevé d'après les articles de ((Glick R et Rose A.K (1999), Kaminsky G.L et Reinhart C.M (1999), Caprio G et Klingebiel D (1996) et Laeven L et Valencia F (2008, 2012). Et pour, l'indice de la libéralisation financière a été relevé de l'article (Kaminsky G.L et Schmukler S.L (2008)) (*cf.* Annexe 1). L'échantillon choisi est un panel de pays Sud Est Asiatique suivants, Indonésie, Malaisie, Thaïlande et Philippines sur une période annuelle allant de 1980 à 2010.

b) Le modèle économétrique

Le modèle économétrique choisi dans cet article est un modèle de régression en panel. Il s'agit de valider un ensemble des variables explicatives par la méthode Probit sur données de panel annuel. Ce modèle est inspiré des travaux empiriques de (Abouab E, Rachdi H, et Elgaied M (2008), Komulainen T et Lukkarila J (2008), Feridun M (2005), Glick R et Rose A.K (1999) et Cartapanis A, Dropsy V, et Mometz S (1999)). Il estime la probabilité de crise et prend la forme suivante :

$$Prob(y_{it}=1/x_t,\beta_t)=F(x_t,\beta_t) \quad (1)$$

Où x_t correspond à l'ensemble d'indicateurs et β_t est un vecteur de paramètres inconnus. Y_{it} la variable observée reçoit une valeur de 0 ou 1 selon que la crise a eu lieu ou non. Avec le modèle Probit, le côté droit ici du modèle est limitée entre 0 et 1, et elle est comparée à la valeur observée Y_{it}. Ce modèle suppose que la fonction de distribution de probabilité (Y_{it} conditionnelle à X_{it}) correspond à la distribution normale. Etant donné que dans le modèle Probit de la probabilité conditionnelle approche de un ou zéro avec un taux plus élevé, il pourrait donner de meilleurs résultats de l'estimation lors de l'étude des crises financières.

La variable dépendante Y_{it} est une variable dichotomique prenant la valeur 1 ou 0 selon que la crise se produit ou non (Feridun M (2005) et Glick R et Rose A.K (1999)). Si la crise a eu lieu, la variable dépendante Y_{it} prend la valeur 1. Si non, elle reste à 0.

$$Y_{it} \begin{cases} 1 \text{ si la crise a eu lieu} \\ 0 \text{ sinon} \end{cases} \quad (2)$$

Avec i = {1,……..,N} et t = {1,……,T}

La variable dépendante Y_{it} est ensuite régressée sur l'ensemble des variables explicatives selon la base de la forme suivante :

$$Y_{it} = \alpha_i + \beta_1 (BCOM)_{it} + \beta_2 (EXPORT)_{it} + \beta_3 (INV)_{it} + \beta_4 (CRED/PIB)_{it} + \beta_5 (INF)_{it} + \beta_6 (DCT/RES)_{it} + \beta_7 (SBE)_{it} + \beta_8 (CROPIB)_{it} + \beta_9 (DEPGOUV)_{it} + \beta_{10} (LIBFIN)_{it} + \varepsilon_{it} \quad (3)$$

C'est l'équation du modèle de régression en panel Probit sur la période annuelle allant de 1980 à 2010 dans les pays Sud Est Asiatique.

c) La discussion des résultats obtenus

Les variables explicatives qui sont très corrélées avec les autres variables sont les investissements directs étrangers (en % du PIB), crédits domestiques/PIB, l'inflation et la libéralisation financière comme il peut être vu dans le tableau de la matrice de corrélation (*cf.* Annexe 2). Les dettes à court terme sur réserves présentent une forte corrélation positive avec la variable dépendante Y, les dépenses de consommation finale du gouvernement général (en % du PIB) présentent une forte corrélation positive avec les investissements directs étrangers (en % du PIB) et le solde de la balance extérieure des biens et services (en % du PIB) présente une forte corrélation positive avec les crédits domestiques/PIB. Ces plus fortes corrélations positives sont affichées dans tous les pays Sud Est Asiatique. En revanche, les plus fortes corrélations négatives sont notées en relation entre la variable dépendante et la libéralisation financière, l'inflation, prix à la consommation (en % annuel) et la croissance du PIB (en % annuel), les investissements directs étrangers (en % du PIB) et les dettes à court terme/réserves totale, l'inflation, prix à la consommation (en % annuel) et les dépenses de consommation finale du gouvernement général (en % du PIB). Avant la régression Probit la matrice de corrélation permet d'évaluer les signes attendus des coefficients des variables. Pour un coefficient positif signifie qu'une augmentation de la variable explicative entraînera une augmentation de la variable dépendante, si cette variable se rapproche à 1, cela indique une crise. Pour un coefficient négatif signifie qu'une augmentation de cette variable entraînera une diminution de la variable dépendante.

Les résultats de l'estimation du modèle Probit sur l'échantillon des pays Sud Est Asiatique allant de 1980 à 2010 sont présentés dans (*cf.* Annexe 3). On constate 123 observations selon les données de panel estimé. Par ailleurs, la plupart de ces variables explicatives sont significatives selon les taux de 1%, 5% et 10%. Pour identifier la relation de causalité entre les crises financières et la gouvernance bancaire à travers l'estimation Probit, on mesure le degré de la significativité des variables explicatives suivantes les banques commerciales et les autres prêts, les crédits domestiques/PIB et les dettes à court terme/Réserves

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totale. Ces variables sont significatives cela veut dire qu'il existe une relation étroite entre le déclenchement des crises financières et les mécanismes de la bonne gouvernance dans le système bancaire et financière des pays Sud Est Asiatique. Par conséquent, ces indicateurs ont causés des crises à travers les risques d'insolvabilité et d'illiquidité, d'où la montée de ces risques entraîne la perturbation financière et la ruée bancaire surtout dans les banques commerciales. De plus, on note que la significativité des crédits domestiques/PIB montre l'importance rôle qui peut jouer ces crédits pour assurer une bonne réglementation prudentielle dans la conduite et la gestion des établissements de crédit contre les risques d'instabilité. Ainsi, la significativité des variables explicatives suivantes les exportations de biens et services (croissances annuelle en %), les investissements directs étrangers (en % du PIB), Inflation, prix à la consommation (en % annuel), Solde de la balance extérieure des biens et services (% du PIB), la croissance du PIB (en % annuel) et les dépenses de consommation finale du gouvernement général (en % du PIB) selon les taux 1%, 5% et 10% explique l'impact des flux des capitaux étrangers sur le secteur financier et réel des économies émergentes des pays Sud Est Asiatique.

Les résultats d'estimation montrent qu'il existe une relation entre la libéralisation financière et l'émergence des crises, cela explique l'impact de la libéralisation financière sur la fragilité financière et les faiblesses spécifiques dans certains segments comme démontre l'étude de (Demirguç-Kunt A et Detragiache E (1998, 1999)). Cependant, comme l'a souligné Bustelo P, Garcia C, et Olivié I (1999), les pays du Sud Est Asiatique ont eu un certain nombre de faiblesses communes. La principale conclusion est que les fondamentaux intermédiaires non conventionnels, les changements dans les anticipations des agents privés et la mondialisation financière sans doute ont été les principaux facteurs de la crise Asiatique. Pour commencer, la libéralisation financière aveugle et un cadre de surveillance faible contribué à l'entrée massive de capitaux qui à son tour, conduit à trois types des carences économiques, l'équilibre des contraintes de paiement de plus en plus, l'apparition de fragilités financières, et des problèmes de production reflète dans un atout bulle et une diminution de l'efficacité des investissements. Ces résultats ont augmentés la fragilité financière, réduit la qualité de l'évaluation des risques et l'augmentation des prêts bancaire. Par conséquent, ces causes ont montées les risques excessifs d'instabilité lorsque la santé économique et financière des pays est dans une situation de fragilité institutionnelle et de faiblesse dans le système de réglementation et de surveillance bancaire. La relation de causalité entre les crises financières et la gouvernance bancaire dans les pays Sud Est Asiatique à travers l'estimation de ces variables explicatives est globalement significative.

V. Conclusion

Le débat de la libéralisation et la globalisation financière ouvre la porte de l'accélération de l'intégration financière internationale des économies émergentes des pays Sud Est Asiatique. Dans ce contexte, la bonne gouvernance bancaire selon les mécanismes externes par la réglementation prudentielle et les mécanismes internes par le mode d'administration peut freiner certains risques d'instabilité dans le secteur bancaire. L'interaction entre ces deux mécanismes est évidente. Les dirigeants adoptent donc des mécanismes internes en réponse aux contraintes externes. L'utilisation efficace des mécanismes de gouvernance a pour but de discipliner les gestionnaires non performants et les directeurs des banques commerciales à but non lucratif (Crespi R, Garcia Cestona M.A, et Salas V (2004). En revanche, la période qui a été caractérisée par la déréglementation et la libéralisation financière améliore l'impact des changements dans la gouvernance des banques sur les performances de la banque (Williams J et Nguyen N (2005). L'étude de la relation variable dans le temps entre la libéralisation financière, les institutions gouvernementales et les marchés financiers de (Kaminsky G.L et Schmukler S.L (2008)), démontre que la libéralisation financière a été une cause principale de déclenchement des bulles financières et des crises. De plus, l'hypothèse centrale de (Miotti L et Phihon D (2001)) est que les défaillances bancaires à l'origine des crises peuvent être expliquées, en grande partie, par les comportements spéculatifs des banques favorisés par la libéralisation financière. En effet, les pays Sud Est Asiatique adoptent des processus de libéralisations financières aveugles. Ces événements favorisent l'éclatement rapide des perturbations financières surtout dans des économies ont connues généralement une notion de fragilité institutionnelle des systèmes financières et bancaires. Par ailleurs, les mécanismes de la gouvernance bancaire joue un rôle primordial pour atténuer la propagation des crises financières et pour renforcer l'environnement institutionnel des banques contre certains risques d'instabilités financières. D'une part, l'impact de ces crises sur la gouvernance bancaire a souligné la faiblesse de régulation et de la gouvernance de certaines banques, ainsi a entrainé la déroute de certains établissements financiers et bancaires face à la montée d'une crise de liquidité et de solvabilité. De l'autre part, l'environnement de la fragilité institutionnelle des systèmes financiers et bancaires, et plus précisément les mécanismes de la gouvernance bancaire, joue un rôle remarquable dans la naissance et le déclenchement des crises. Cependant, pour comprendre le rôle des jeux de la gouvernance dans la crise financière, il est important d'obtenir une

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perspective plus large des problèmes de la gouvernance potentielle dans le secteur financier (Adams R.B (2012)). Par conséquent, la réglementation prudentielle et le mode d'administration pour superviser la gestion bancaire partagent clairement une responsabilité dans la crise. La faillite des banques entraine l'effondrement du taux de change et la diffusion de ces crises dans d'autres pays par le phénomène de la contagion. Cette propagation de ces crises reflète une forte corrélation entre la concurrence pour les fonds des prêts bancaires et le commerce (Van Rijckeghem C et Weder B (2001), ainsi la relation commerciale est un important canal de contagion, au-delà des influences macroéconomiques (Glick R et Rose A.K (1999)). De plus, le degré d'efficacité dans les marchés financiers et les marchés émergents en devises joue un rôle important avant la crise et pendant les périodes de crise surtout contre les accidents de devises (Frankel J.A et Rose A.K (1996) ; Lazâr D, Todea A, et Filip D (2012)). La volatilité élevée dans les marchés financiers et les marchés monétaires augmente le risque de la contagion entre les pays (Pappas V, Ingham H, et Izzeldin M (2013)). Il est intéressant de faire ressortir quelques prolongements possibles par l'estimation du modèle Probit pertinence de la relation entre les mécanismes de la gouvernance bancaire et la naissance des crises récentes. La significativité des variables explicatives montre qu'il existe une relation de causalité étroite entre les crises financières et la gouvernance bancaire durant la période de libéralisation financière dans les pays Sud Est Asiatique.

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Annexes

Annexe 1: La base des données (Indicateurs, Symboles et Sources)

Indicateurs	Symboles	Sources
Les banques commerciales et les autres prêts (PPG + PNG) (NFL, $ US Courant)	BCOM	Indicateurs du Développement Mondiale (WDI)
Les exportations de biens et services (croissance annuelle en %)	EXPORT	Indicateurs du Développement Mondiale (WDI)
Investissements Directs Etrangers (en % du PIB)	INV	Indicateurs du Développement Mondiale (WDI)
Crédits Domestiques/PIB	CRED/PIB	Indicateurs du Développement Mondiale (WDI)
Inflation, Prix à la consommation (en % annuel)	INF	Indicateurs du Développement Mondiale (WDI)
Dettes à court terme/Réserves Totale	DCT/RES	Indicateurs du Développement Mondiale (WDI)
Solde de la Balance Extérieure des biens et services (en % du PIB)	SBE	Indicateurs du Développement Mondiale (WDI)
La croissance du PIB (en % annuel)	CROPIB	Indicateurs du Développement Mondiale (WDI)
Les dépenses de consommation finale du gouvernement général (en % du PIB)	DEPGOUV	Indicateurs du Développement Mondiale (WDI)
La libéralisation financière	LIBFIN	Selon Kaminsky G.L et Schmukler S.L (2008), la variable libéralisation financière admet 3 dimensions (Libéralisation domestique réelle, Libéralisation des marchés financiers et Libéralisation du compte capital). La libéralisation financière mesurée par l'indice composite du secteur financier domestique, des marchés financiers et du compte capital varie entre 1 et 3. L'indice prend la valeur de l'unité en cas de répression financière, deux en cas de libéralisation partielle et trois en cas de libéralisation totale.
Crise	Y	Variable dépendante, varie entre 0 et 1, il prend la valeur de l'unité s'il y a une crise et zéro sinon, les sources de l'indice de crise sont les articles de (Glick R et Rose A.K (1999), Kaminsky G.L et Reinhart C.M (1999), Caprio G et Klingebiel D (1996), Laeven L et Valencia F (2008,2012)).

Source: Auteur

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Annexe 2: La matrice de corrélation

	Y	BCOM	EXPORT	INV	CRED_PIB	INF	DCT_RES	SBE	CROPIB	DEPGOUV	LIBFIN
Y	1.000000	0.125716	-0.048835	-0.129670	-0.049927	0.135805	0.517245	-0.186400	-0.113606	-0.113955	-0.294001
BCOM	0.125716	1.000000	0.053708	0.070661	0.092533	-0.064438	0.193871	-0.274539	0.225512	0.089370	-0.210396
EXPORT	-0.048835	0.053708	1.000000	0.215333	0.141153	-0.130840	-0.024384	-0.090162	0.424667	0.029231	-0.028421
INV	-0.129670	0.070661	0.215333	1.000000	0.412920	-0.330436	-0.400398	0.167996	0.251849	0.534695	0.268087
CRED_PIB	-0.049927	0.092533	0.141153	0.412920	1.000000	-0.292975	-0.205858	0.672367	0.250953	0.173526	0.082685
INF	0.135805	-0.064438	-0.130840	-0.330436	-0.292975	1.000000	0.308988	-0.150350	-0.509293	-0.460366	-0.209443
DCT_RES	0.517245	0.193871	-0.024384	-0.400398	-0.205858	0.308988	1.000000	-0.382748	-0.106463	-0.356878	-0.397398
SBE	-0.186400	-0.274539	-0.090162	0.167996	0.672367	-0.150350	-0.382748	1.000000	-0.171913	0.064551	0.186763
CROPIB	-0.113606	0.225512	0.424667	0.251849	0.250953	-0.509293	-0.106463	-0.171913	1.000000	0.113723	0.051787
DEPGOUV	-0.113955	0.089370	0.029231	0.534695	0.173526	-0.460366	-0.356878	0.064551	0.113723	1.000000	0.044223
LIBFIN	-0.294001	-0.210396	-0.028421	0.268087	0.082685	-0.209443	-0.397398	0.186763	0.051787	0.044223	1.000000

Source : Estimation Logiciel Eviews. 5

Annexe 3: Estimation modèle Probit : 1980-2010

Dependent Variable: Y
Method: ML - Binary Probit (Quadratic hill climbing)
Date: 03/23/16 Time: 23:12
Sample (adjusted): 2 124
Included observations: 123 after adjustments
Convergence achieved after 2 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.096778	1.281905	-0.855585	0.3922
BCOM	5.34E-12	7.85E-11	0.067960	0.9458
EXPORT	-0.001232	0.014315	-0.086097	0.9314
INV	0.063686	0.098795	0.644625	0.5192
CRED_PIB	0.012327	0.027891	0.441965	0.6585
INF	-0.013579	0.023696	-0.573037	0.5666
DCT_RES	0.010786	0.004057	2.658845	0.0078
SBE	-0.012249	0.031504	-0.388792	0.6974
CROPIB	-0.043109	0.047097	-0.915317	0.3600
DEPGOUV	-0.016883	0.073106	-0.230939	0.8174
LIBFIN	-0.115045	0.135365	-0.849886	0.3954
Mean dependent var	0.195122	S.D. dependent var		0.397915
S.E. of regression	0.355425	Akaike info criterion		0.952503
Sum squared resid	14.14859	Schwarz criterion		1.204000
Log likelihood	-47.57896	Hannan-Quinn criter.		1.054661
Restr. log likelihood	-60.70852	Avg. log likelihood		-0.386821
LR statistic (10 df)	26.25911	McFadden R-squared		0.216272
Probability(LR stat)	0.003407			
Obs with Dep=0	99	Total obs		123
Obs with Dep=1	24			

Source : Estimation Logiciel Eviews. 5.

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The Practices and Challenges of Employee's Performance Management and Evaluation in Gamo Gofa Zone Finance and Economic Development Department

By Hika Nigatu, Feleke Solomon & Alemtshay Gedion
Wolaita Sodo University

Abstract- There is little research exists that examine the practice and problems of performance management and evaluation of employees in developing countries, especially in Ethiopia public sector. Therefore, this research was aimed to assess the practice and challenges of performance management and evaluation -in public sector in the case of finance and economic development department of Gamo Gofa zone. The study was conducted by using descriptive survey type in which all data relevant to the case was gathered and analyzed. In this study, both qualitative and quantitative data type were used. For that matter, the researchers used both primary and secondary data as a source of information. The study used systematic sampling technique in order select sample employees and purposive sampling technique to select representative officials and experts. In line with this, 40 sample size was selected from 68 total population.

Keywords: performance, performance appraisal/ evaluation, rater bias, performance management.

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The Practices and Challenges of Employee's Performance Management and Evaluation in Gamo Gofa Zone Finance and Economic Development Department

Hika Nigatu [α], Feleke Solomon [σ] & Alemtshay Gedion [ρ]

Abstract- There is little research exists that examine the practice and problems of performance management and evaluation of employees in developing countries, especially in Ethiopia public sector. Therefore, this research was aimed to assess the practice and challenges of performance management and evaluation -in public sector in the case of finance and economic development department of Gamo Gofa zone. The study was conducted by using descriptive survey type in which all data relevant to the case was gathered and analyzed. In this study, both qualitative and quantitative data type were used. For that matter, the researchers used both primary and secondary data as a source of information. The study used systematic sampling technique in order select sample employees and purposive sampling technique to select representative officials and experts. In line with this, 40 sample size was selected from 68 total population. For the purpose of this study the researchers employed questionnaire, interview and secondary data as a method of data collection. Both quantitative and qualitative data analysis method were used. The findings of the study revealed the practices of performance evaluation in their organization were high. They respond as performance evaluation was conducted by top management where self evaluation and subordinate evaluation was not commonly practiced in the study area. The study shows check list and goal settings are the commonly used methods of performance evaluation. Skills and quality were the most commonly used criteria of evaluation in the study area. Finally, the study shows as rater bias, similarity error, and low evaluator motivation were the factors that affect performance management and evaluation in Gamo Gofa zone, finance and economic development department. Therefore, the researchers recommend the organization to initiate BSC (self-evaluation, peer evaluation) which encourages the participation of employees in the evaluation process. Additionally, the organization and government should set a common standard for performance appraisal in order to reduce biasness as much as possible.

Keywords: performance, performance appraisal/ evaluation, rater bias, performance management.

I. Introduction

a) Background of the study

Performance is a topic that is a popular catch-cry and performance management has become a new organizational ideology. Under the global economic crisis, almost every public and private organization is struggling with a performance challenge, one way or another. Many researchers and experts assert that sets of guidelines for design of performance management systems would lead to high performance (Kaplan and Norton, 1996, 2006). In fact, the term "performance management" was not utilized until the 1970s (Armstrong and Baron, 2005).Since then, the language of performance has become an almost every-day feature of work in many public sector organizations and has been associated with the establishment of standards or indicators to be achieved, and the audit of organizational systems to ensure conformance (Boland and Fowler, 2000).

Performance management is the strategic and integrated approach to delivering sustained success to organizations by improving the performance of the individual contributors (Armstrong and Barron, 2002). Employee's performance evaluation is a subject of great interest in any organization. In line with that, an employee is perceived as an important or valuable asset to an organization and is the key or prerequisite factor to make sure the operation of the organization runs as planned (Muhd Rais and Abdul Karim, 1999). This is aligned with the purpose of performance evaluation in the contemporary approach which emphasizes on employee who has full potentials that can be explored and expanded.

Employee's performance appraisal is one of the most important activities of every organization. Because the success & failure of any organization is exceedingly depend up on various resources, among which human resource is the most vital one. The usefulness of performance evaluation as a managerial decision tool depends partly on whether or not the performance appraisal system is able to provide accurate data on employee performance and hence rating accuracy is a

Author α σ: Wolaita Sodo University. e-mails: Nigatuh.2020@gmail.com, feleke.solomon@gmail.com

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critical aspect of the appraisal process (Adeba Hundera, 2014).

b) Statement of the problem

Performance evaluation system is one of the relevant and considerable reform programs that are effective and efficient in responding and satisfying the public needs. In designing a performance appraisal system attention must be given to a number of aspects that impact on how effectively the system actually measures employee contributions in a work setting (Buford and Lindner, 2002). However, from the existing condition in the ground the researchers also believe that the efficiency of the public sector organization in giving citizen centered quality service is highly affected by weak administrative system which is mainly characterized by the problems of performance management system and evaluation of employee such as using faults in rating format , deficiencies in appraisal content, rater resistance to judge others, and the implications of the specific purpose of appraisal for the rater and the rate (Decotiis & Petit, 1978). Therefore, the study is designed to assess the practice and problem of performance management and evaluation system of employees in Gamo Gofa Zone, Finance and Economic Development Department.

c) Objective of the Study

i. *General objective*

The main purpose of the study is to assess practices and challenges of Employee's performance Evaluation in Gamo Gofa Zone Finance and Economic Development Department.

ii. *Specific Objectives*

- To assess the techniques used to evaluate the performance of employees in Gamo Gofa Zone Finance and Economic Development Department.
- To assess the criteria used to evaluate employee's performance in Gamo Gofa Zone Finance and Economic Development Department.
- To find out the factors that affect performance management and evaluation of employees in Gamo Gofa Zone Finance and Economic Development

d) Research Questions

1. What techniques are used to evaluate employee's performance in Gamo Gofa Zone Finance and Economic Development Department?
2. What are the criteria used to conduct performance evaluation of the employees in Gamo Gofa Zone Finance and Economic Development Department?
3. What are the factors affect employee's performance evaluation in Gamo Gofa Zone Finance and Economic Development Department?

II. Literature Review

Performance evaluation is the human resource management activity that is used to determine the extent to which an employee is performing the job effectively (John Ivancivich, 1998:261). Performance evaluation is the process of determining how he/she is performing on the job and ideally establishing a plan of improvement (Byars Rue, 1997:284).

Many researchers and experts assert that sets of guidelines for design of performance management systems would lead to high performance (Kaplan and Norton, 1996, 2006). A long time ago, the traditional performance measurement was developed from cost and management accounting and such purely financial perspective of performance measures was perceived to be inappropriate so that multi-dimensional performance management was developed in the 1970s (Radnor and McGuire, 2004).

In many countries, the performance evaluation system is also known as a performance management system. The reason for this is that it aims to improve the performance of all individuals and, as a result, improve the overall personal and organizational performance. While approaches to evaluation may vary, there are common features of performance management systems. Generally, these are a clear link between the goals of the organization and the work of the individuals; and work plans or objectives that are decided, with deadlines, at the start or during the year and that link directly to organizational need. This includes a clear understanding by the individual of what they have to achieve and how it will be measured clear directions about the kinds of behaviors people must have to perform their duties to the levels that are acceptable by the organization and which can be measured.

As cited by Pan Suk Kim, 2011 in an increasingly competitive world, performance improvement is not optional; it is essential for enhancing government's effectiveness and competitiveness. In the era of globalization and the borderless economy, competency and performance of government employees need substantial improvement. In that regard, having performance management and performance appraisal including PRP programs seems to be a good idea. However, the well-articulated system design based on in-depth understanding of complex human nature and effective management of such programs is a key to success. Having a good idea is not enough. So the good idea must be followed up by system improvements and sound practices. If performance measurement is simply viewed as a data collection and reporting exercise, it will serve little purpose to a policy community (Hernandez, 2002). Accordingly, performance appraisal and performance measures must be improved or adjusted to be successful in aligning with overall organizational and

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social environments. There needs to be understanding of the relationship between strategy, people, organizational design and performance systems in order for performance management to be achieved in the public sector (Radnor and McGuire, 2004).

Although there are substantial variations among the countries, it might be fair to say that the performance evaluation system has been widely introduced and government employees' awareness on performance has been gradually improved since the 1980s. However, a number of limitations are also salient for the time being. Recently, performance appraisal and performance measures faced criticism from government employees for various reasons. First, people dislike to evaluate as well as to be evaluated in general. Second, the seniority-based system might be still prevalent in many organizations so that it is hard to change perception and behavior in the short term. Third, it is difficult to develop performance objectives and measurable performance indicators because the nature of public affairs is often hard to quantify. Fourth, these systems appear to require more paperwork and increase both performance pressure and stress. Fifth, many officials may lack in-depth understanding about the nature of these systems and the difficulties setting performance objectives to fulfill for the year (Pan Suk Kim, 2011).

Despite of its controversy on performance management and performance appraisal, it will be growing but varies in form and force among different countries and different tasks (Pollitt, 2005). Accordingly, the performance appraisal scheme should be well designed and practiced in a way that places its legitimacy beyond any doubt. This has many meanings. Among others, it signifies that the performance appraisal scheme should imply a fair and balanced system of allocation of individual responsibilities within the organization, a transparent mechanism for setting organizational objectives and to make them known by the incumbents, an individual evaluation procedure pre-established in legal instruments or in clear internal guidelines, a possibility of internal and external review and oversight over the procedure and results of the appraisal, and finally individuals need to be reassured that the results of their evaluation will be used correctly.

As cited by Aggarwal and Thakur, 2013 in performance appraisal two types of measures are used: Objective measures which are directly quantifiable and Subjective measures which are not directly quantifiable. Performance Appraisal can be broadly classified into two categories: Traditional Methods and Modern Methods. Traditional Methods are relatively older methods of performance appraisals. This method is based on studying the personal qualities of the employees. It may include knowledge, initiative, loyalty, leadership and judgment. Traditional method involves ranking methods, graphic rating scales, critical incident method, and narrative essays. Modern Methods were devised to improve the traditional methods. It attempted to improve the shortcomings of the old methods such as biasness, subjectivity, etc. modern methods includes management by objectives, behaviorally anchored rating scale, human resource accounting, assessment centers, 360 degrees, and so on.

One of the most difficult requirements of an effective performance appraisal system is that it is as free as possible from bias. Raters as a human being cannot deny the involvement of bias in their decision making on performance of the ratees. The only thing that the raters can do is to minimize the level of unfairness as possible. Work professionalism plays an important role for the reliability of the assessment process. There are many types of bias that creep into appraisal system and the most reported are subjectivity, recency effect, halo effect, central tendency and prejudice (Ahmad and Bujang, 2013). Accordingly, biasness, subjectivity, prejudice and the like challenges the proper implementation of performance evaluation and appraisal in public sectors.

III. Methodology

a) Research Design

The study was conducted by using descriptive survey type in which all data relevant to the case was gathered and analyzed. This research design is more appropriate and relevant for this study as it enables the researcher to make an in-depth analysis of the case in question provide the opportunities to investigate many specific details.

b) Source and type of data

In this study, both qualitative and quantitative data were gathered and used. For that matter, the researchers used both primary and secondary data as a source of information. The reason of using both qualitative and quantitative data is to increase validity and reliability of the findings of the study.

c) Target Population

The target population of this study was all permanent employees of Gamo Gofa Zone Finance and Economic Development Department. According to the information from the zonal department the total number of permanent employees is 68.

d) Sample and sampling method

To conduct the study thoroughly both probabilistic and non-probabilistic sampling techniques has been used. Probability sampling technique was used for the selection of employee and non-probability sampling technique was used to choose key informants. The researchers has first selected sample employees from the list of all employees using systematic random sampling technique and selected representative officials and experts using purposive sampling technique. In systematic random sampling, the researchers have

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been first established the ratio of sample size to population, then established the sampling interval and finally picked up at random a starting number on employee list and by starting from that number picked every n^{th} element for inclusion in sample until reaching the end of the list. The researchers also have purposely chosen representative officials who have closeness to the issue under study in order to obtain detailed information for the study. The sample size for the study was determined hereunder by using Yamane (1967) statistical calculation formula.

$$n = \frac{N}{1 + N(e)^2}$$

Where,
n = Sample size
N = Total population
e = error
Therefore, $n = \frac{68}{1+68(0.1)^2} = 40$

$$\underline{n = 40}$$

e) Method of Data Collection

For the purpose of conducting the study, the researchers developed a questionnaire and interview questions from assessed literatures on the related area. The reason why the researchers used questionnaire because it is more appropriate and provide adequate time for the respondents to think and answer questions. The questionnaire that developed and distributed to the respondents was closed- ended questionnaire. The interview was conducted the management of Gamo Gofa Zone Finance and Economic Development Bureau for the purpose of getting full range and depth of information which is more relevant to the subject matter.

f) Methods of Data Analysis

After a gathering data with the help of questionnaire and direct interview, the data obtained were analyzed by using both qualitative and quantitative method of analysis. After checking the data collected from the sampled employees and key informants, data matrix was prepared, coded and filled in to Excel sheet. And then the coded data were analyzed and interpreted by using graphs, tables and narrative discussions.

IV. Results and Discussion

a) The general features and practices of performance appraisal in Gamo Gofa Finance and Economic Development Department

Performance appraisal is currently implemented and practiced in public sectors in order to measure, judge and adjust performance of each employee within a certain predetermined period. The application of performance appraisal involves the procedure like planning, communicating, data gathering; observing and coaching. Performance appraisal is mainly carried with two major purposes: evaluation and development. The evaluative purpose is intended to inform people their performance rating so as reward high performance and to punish poor performance whereas, the developmental purpose is intended to identify problems in terms of employees performing assigned tasks. The collected performance data are used to provide the necessary skills training or professional development (Chen, 2011). However, the emphasis is on development, although performance management is an important part of the reward system through the provision of feedback and recognition and the identification of opportunities for growth. It may be associated with performance or contribution related pay but its developmental aspects are much more important for the success of organization and its employees. Regarding the current practice of performance appraisal in Gamo Gofa Zone, data collected, is presented, analyzed and discussed in the table below.

Table 1: The Practices of Performance evaluation

Practices of Performance appraisal	Low		High		Total	
	N	%	N	%	N	%
	11	27.5	29	72.5	40	100

Source: Own survey, 2017

The respondents were asked to rate the current practices of performance evaluation in Gamo Gofa Zone Finance and Economic department. Accordingly, the majority, 29(72.5%) of respondents reported that there is high implementation of performance evaluation of employees whereas, the remaining 11(27.5%) of respondents reported that there is low implementation of employees performance evaluation in Gamo Gofa Zone Finance and Economic Development department. This implies that currently performance appraisal is found to be high in the institution because they are frequently communicated about the importance of implementing performance management and evaluation. The interview result from management is consistent with this result. There is a remarkable implementation and practices of performance evaluation in Gamo Gofa zone Finance and Economic development bureau.

b) Period/Time to Conduct Performance Appraisal

In any administration activity of an organization, performance appraisal also has its own time to be conducted. Everyone in the organization has its own time to conduct performance appraisal depending on their own philosophy of time period (Mullins 1996) with the majority of schemes, staff receives an annual appraisal and for many organizations this may be

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sufficient. Also more frequent appraisals may be appropriate for new members of staff, those recently promoted or appointed to a new position or for those whose past performance has not been up to the required standard. Thus, the period/time to conduct performance appraisal is discussed as follows.

Table 2: Period/Time when performance appraisal is conducted

Item:- How often performance evaluation taken place in your institution		
Response	**Frequency**	**Percentage** (%)
Monthly	3	10.30
Quarterly	12	41.40
Semi-annually	6	20.70
Annually	7	27.60
Total	40	100

Source: own Survey, 2017

The above table deals with the period in which performance evaluation of employees will be conducted in order to strengthen human capacity in terms of managing employee work performance. Thus, the largest share, 41.40% of respondents said that performance evaluation is carried out quarterly whereas, the remaining, 27.6%, 20%, 12%, 10% and 3% of respondents reported that performance evaluation is undertaken in Gamo Gofa Finance and Economic Development department annually, semi-annually, quarterly, and monthly respectively. This means that employees were not apprised periodically but conducted when it was deemed necessary to do so. This is consistent with the findings of Chen, 2011 which conducted in South Africa and China. He showed that there is no regular, time-specified appraisal in South African Local governments; managers initiate appraisals of employees whenever they feel like it.

c) Personnel/parties who conduct Performance Appraisal

Casio (1995: 38) states that the fundamental requirements for any rater are that an adequate opportunity be made available for performance to be observed over a reasonable period of time. Once the performance appraisal method has been developed, the next step is to determine who will perform the assessment function, and where to get the feedback from. Concerning this, the respondents were asked to identify the personnel/parties who evaluate the performance of employees and their response rate is presented, analyzed and discussed as hereunder.

Table 3: Personnel/parties who conduct performance appraisal

Item :- who is responsible to carry out performance evaluation in your institution		
Response	**Frequency**	**Percentage (%)**
Top Management	30	75
Supervisor/coordinator	9	22.5
Officer	3	7.5
Total	40	100

Source: own Survey, 2017

As shown in table 3the performance evaluation of employees are carried out by different personnel. The majority 30 respondents representing 75% indicated that employees' performance evaluation and management is a centralized activity. This means that it is carried out by top management members. While, the remaining 9 (22.5%) and 3 (7.5%) of respondents stated that immediate supervisor/coordinator and officer are respectively responsible to evaluate performance of employees in Gamo Gofa Finance and Economic Development department. This means that only limited source of performance appraisal are used to evaluate the performance of employees/workers. In other word, parties like self-appraisal, supervisor's appraisal, Subordinate's appraisal, Peer appraisal and Persons outside the immediate work environment were not properly participate in performance appraisal of the employees. Especially employee, subordinate and outside appraiser involvement in performance evaluation is low and still not gain grounds in Gamo Gofa Zone Finance and Economic department.

d) Appraisal Methods and Instruments

The most common methods of performance appraisal currently practiced in Gamo Gofa Zone Finance and Economic development department were presented and discussed as hereunder:

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Table 4: Performance Appraisal Methods

Alternative	Frequency	Percentage
Check list	17	42.5
Goal setting	23	57.5
Essay appraisal	-	-
Graphic scale	-	-
Ranking method	-	-
Critical	-	-
Total	40	100

Source: Own survey, 2017

The above table clearly reveals the dominance of goal setting in evaluation of employees' performance in Gamo Gofa Zone Finance Economic Development Bureau consisting 57.5% followed by check list which accounts 42.5%. This shows that goal setting method is highly practiced in evaluating employees' performance as it involves formal program of setting numerical or quantitative performance goals for individuals. Thus, it serves as common objectives of increasing employee motivation and performance in Gamo Gofa Zone Finance and Economic Development office.

e) Performance Appraisal Criteria

According to Armstrong (2009), the criteria for reviewing performance should be balanced between: achievements in relation to objectives; the level of knowledge and skills possessed and applied (competences or technical competencies); behavior in the job as it affects performance (competencies); the degree to which behavior upholds the core values of the organization; day-today effectiveness. The criteria/ standards that exercised by organization should relevant and commonly recognized in measuring the performance of employees on different aspects. In this context, the respondents were asked to identify the standards/criteria that should be used to assess the performance of employees and their response rate is presented, analyzed, discussed and interpreted hereunder.

Table 5: Standards of Performance evaluation

Item: Types of standards/criteria used to conduct employees performance appraisal		
Response	Frequency	Percentage (%)
Knowledge	-	-
Skills	17	42.5
Quality	20	50
Experience	3	7.5
Accuracy	-	-
Completeness	-	-
Total	40	100

Source: Own survey, 2017

Table 5 above indicated that majority 20 (50%) of the sampled respondents said that quality of workers or employees is mainly used as standard/criteria to conduct performance evaluation followed by the skill of employees which accounts 42.5%. The remaining insignificant 7.5% of the sampled respondents were replied experience of employees is used as the standard of performance evaluation next to quality and skill of employees. This implies that employee's quality and skills are mainly used as the standards or criteria to evaluate performance of employees. This is consistent with the interview results that conducted with top management of Gamo Gofa Zone Finance and Economic Development department. It stated that managerial standards, quality of employees, knowledge, experience, job duties, and skills are incorporated in

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performance appraisal criteria and used to evaluate the employee's performance from different dimensions.

f) Factors that distort Performance Appraisal

Every organization encounters problems when they deal with employees' performance evaluation. Each method of performance appraisal has its own drawbacks or limitations in measuring the true performance of employees. Some of those problems that frequently appear and affect the employee performance evaluation were identified and discussed as hereunder.

Table 6: Factors that distort Performance Appraisal

Response	Frequency	Percentage (%)
Rater bias	16	40
Similarity error	14	35
Problem interpretation	-	-
Low evaluator motivation	10	25
Total	40	100

Source: own survey, 2017

The above table 6shows the errors that occur and distort performance appraisal. Thus, the majority 40% of respondents identified that rater bias is the main problem/error that occur in conducting employees' performance evaluation followed by similarity error and low evaluator motivation which accounts 35% and 25% respectively. This implies that rater bias, similarity errors and errors that arise from evaluators mainly affect employees' performance appraisal in Gamo Gofa Zone Finance and Economic development department. Therefore, rater bias and similarity error are found to be very serious and pose great problem in measuring performance of employees in Gamo Gofa Finance and Economic Development Department. This is similar with the findings of Mathis and Jackson (1997) which revealed that rater bias, similarity error, problems emanating from ratees and poor performance appraisal system distort the rating or evaluation of employees' performance. Chen, in 2011 also identified unclear standards; hallo effect; recency; bias on sex, age and race or nationality; generalization; leniency and strictness error, central tendency; and personal prejudice affect the proper evaluation of performance appraisal.

V. Conclusion and Recommendation

a) Conclusions

Based on results and discussion the following conclusions were drawn:

- As the study revealed most of the respondents replied that mostly evaluation was made by top management, where there is little employee participation in the performance appraisal system.
- The main challenges of performance management and evaluation in economic and finance department of Gamo Gofa Zone are subjectivity, biasness, lack of coordination between managers and employees, problem of result interpretation and so on.
- As the result shows, the organization used goal setting and check-list as the techniques of performance evaluation. Because, it involves formal program of setting numerical or quantitative performance goals for individuals.
- The major draw backs in performance management and evaluation is rater-bias or prejudice which may be unconsciousness or quite intentional.
- As the study indicates the objectives of performance management and evaluation was not clear to employees before performance takes place.

b) Recommendations

Based up on the findings of the study the researcher forwarded the following recommendations;

- Since Self-evaluation increase the effectiveness of the appraisal system and result in a positive impact on an employee's satisfaction with the evaluation and his/her perception of justice and fairness. Therefore, it is recommendable if the organization initiate BSC system which encourages the participation of employee in the evaluation process.
- The objective of appraisal should be made clear to all employees before appraisal takes place and it should be inclusive of promotion, transfer, payment and the like.
- Since employees' evaluation was based on personal judgment, personal likes or dislikes, it is better if the government sets a common standard of performance evaluation for the employees of every organization in order to reduce biasness as much as possible.

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Effects of Macroeconomic Variables on the Stock Market Volatility: The Pakistan Experience

By Waqar Khalid & Saifullah Khan
Quaid-I-Azam University

Abstract- This research paper empirically investigates the effects of interest rates, exchange rates and inflation rates on stock market performance of Pakistan by using annual time series data covering the 1991-2017 periods. The prime intention of this research was to inspect the long-run and short-run relationships between the KSE-100 index and macroeconomic variables by employing the econometric techniques of autoregressive distributed lag (ARDL) bounds testing procedure to cointegration and the Error Correction Model (ECM), respectively. By applying the ARDL model, the empirical results revealed the fact that there was a negative and significant impact of interest rate on the market index, whereas; the exchange rate and inflation rate have a positive impact on stock market volatility in the long-run.

Keywords: stock exchange, ardl, macroeconomic variables, time series data, kse-100 index, Pakistan.

GJMBR-B Classification: JEL Code: B22



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Effects of Macroeconomic Variables on the Stock Market Volatility: The Pakistan Experience

Waqar Khalid [α] & Saifullah Khan [σ]

Abstract- This research paper empirically investigates the effects of interest rates, exchange rates and inflation rates on stock market performance of Pakistan by using annual time series data covering the 1991-2017 periods. The prime intention of this research was to inspect the long-run and short-run relationships between the KSE-100 index and macroeconomic variables by employing the econometric techniques of autoregressive distributed lag (ARDL) bounds testing procedure to cointegration and the Error Correction Model (ECM), respectively. By applying the ARDL model, the empirical results revealed the fact that there was a negative and significant impact of interest rate on the market index, whereas; the exchange rate and inflation rate have a positive impact on stock market volatility in the long-run. Furthermore, the ECM analysis points out that an estimated coefficient of the error correction term was significant with expected negative sign and shows that 46.53% deviation of the stock market index are corrected in the short-run per year. The study recommended that the monetary authorities should further reduce the bank rate up to the lowest rate in order to stimulate the stock market performance, which in turn, will boost the existing investment level and will encourage the new investment into the stock market. In addition, this policy will also ensure in the reduction of higher inflation rates. And the study finds that the reduction in bank rate and stabilization in exchange rate is essential to local and foreign investors in the short run.

Keywords: stock exchange, ardl, macroeconomic variables, time series data, kse-100 index, Pakistan.

I. Introduction

a) Background of the Study

A well-functioning and a well-developed financial sector play a leading role in the economic growth and development of a country. The efficient and effective utilization of capital resources in the financial market is the imperative job of a well-organized financial system. Through the financial system, the economy's scarce resources move from savers to borrowers. Savers provide their surplus income to the financial system with the expectations to achieve the highest rate of return in future. Conversely, borrowers demand funds from the same system with the understanding that they will be mandatory to repay the amount with the interest rate in future.

Author α: School of Economics, Quaid-I-Azam University, Islamabad, Pakistan. e-mail: waqarkhalidicp@yahoo.com
Author σ: Department of Management Sciences, University of Swabi, Khyber PakhtunKhwa, Pakistan. e-mail: saifullahk014@gmail.com

The financial system of a country has two main classes, (1) Financial Markets, and (2) Financial Intermediary. Financial markets are the institutions and arrangements which brings together buyers and sellers of financial instrument. The elementary function of a financial market is the proper allocation of savings of individuals eventually in the economy. That is, to collect funds from a saving surplus unit and invest that into a saving deficit unit. In Pakistan, the bond or security market and the stock market are the principal financial markets. In contrast, financial intermediaries consist on those financial arrangements and institutions through which lenders can indirectly offer finances to debtors. Financial intermediaries include the overall banking sector of Pakistan. These are the banks through which the money flows from the hands of savers to borrowers.

Financial markets have two main categories, (i) Money market, and (ii) Capital market. Money markets are those institutions which are concerned with transactions of short-term credit instruments (the maturity time of such instruments is less than a year), for example, bonds and treasury bills, etc. This market has no physical existence found anywhere like the stock market, but it refers the network of all demanders, suppliers and brokers of short-term bonds or treasury bills extend to the whole country. On the contrary, capital markets refer those institutions where longer-term financial securities (the maturity time is more than a year) are traded (Horne and Wachowicz, 2008), for instance, stocks, bonds, shares, etc. This market structure includes those financial institutions through which surplus money (savings) in the economy is transmitted to investors. The major components of capital market comprise of insurance companies, investment banks, savings banks, stock exchanges, etcetera.

A vibrant, developed and dynamic capital market can present appreciably in the rapid economic growth of a country. Due to the well-functioning of a capital market, the funds raised from people can easily mobilize for further investments to others in the productive channels, therefore activates the unused monetary resources. It also assists in capital formation, which refers the net accumulation to the existing quantity of stock of capital in the country. Through the mobilization of such funds, it generates savings, which in turn, available in different sectors of the economy such as agriculture and industry. In Pakistan, the capital

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market consists of the stock market or equity market and debt market.

Based on the latest economic facts, Pakistan is considered an emerging global economy. The economic outcome depends on two most important factors; (i) the consistent political and macroeconomic stability on national levels, which provokes investor's confidence and create a center of attention for home and abroad capital, plus (ii) the current financial sector development and revolution. From the observation of emerging Asia, one of the changes such as the structural changes in the equity market has been noteworthy (Akhtar, 2006).

The equity market is chief in establishing the speed with which policy steps changes are spread out into the whole country. This market is really sensitive to the changes in monetary policy tools through their handlings of the levels of macroeconomic variables in the country. The stock market performance is one of the leading dynamics which affects the economic progress of a nation and may have practical implications for macroeconomic variables to accomplish the preferred outcomes. This market performance is highly influenced by many macro variables, for instance, interest rate, exchange rate and inflation rate (Tripathi and Seth, 2014). The stock market development level, domestic currency value and the interest rate level give details of the dynamics in the development level of an economy (Mbulawa, 2015).

The finance theory suggests that there is a relationship among these variables both in the short and long run. For instance, if the central bank increases the interest rate from its previous level, this policy step would clue investors to find the money market for their investments, if other variables do not change. Conversely, if the interest rate decreases by the central bank from its prior level, this change would be a signal for investors to mobilize their funds into the stock markets giving a better reward. But this move in investments is possible only if both the prescribed markets are perfectly close substitutes to each other in the long-run. A negative and significant relation between interest rate and stock return has been found in the study conducted by Ahmad et al. (2010). Similarly, the interest rate shows a negative and significant relationship with the stock prices in the long-run (Mukit, 2012).

There are a wide range of economic factors which can influence the behavior of stock market volatility, but the most important among all the factors is the exchange rates which have attracted the attention of not only economists and policymakers, but the investment community as well for a long time (Kutty, 2010). The exchange rates develop the underlying stock market performance (Abraham, 2011). The disorder in equity markets can be prohibited from maintaining a proper check on the existing exchange rates. Then again, if stock prices influence the exchange rates of a country, in that case steps may be implemented to regularize the normal workings of stock markets. Depreciation of currency in a country increases those firms competitiveness that are involved in export business because the price of such stocks will pursue a rising trend and the anticipation is that overseas investors are attracted to the domestic stock market. The exchange rate has a constructive influence on the stock return in the long term (Mukit, 2012) and significant relation has been concluded for the same variables in the study conducted by (Ahmad et al., 2010). Though, Aslam (2014) put forward that the correlation between stock market performance and the domestic currency is negative. Whereas, the empirical study taken by Ihsan et al. (2015) revealed no evidence for association between Fx rate and the market index for Pakistan.

Since the independence of Pakistan, the Pakistan's currency (PKR) remained related to the Pound Sterling up to the month of September, 1971 and afterwards to the United States dollar (USD) till January, 1982 under the fixed exchange rate system (Janjua, 2007). But this arrangement was changed to the managed floating exchange rate system with effect from January 8, 1982 by the government of General Zia-ul-Haq with the aim of sustaining a favourable balance of payment and to ensure export competitiveness (Janjua, 2007). Under this system, the PKR value was settled on a daily basis relating to a basket of currencies of Pakistan's key trading competitors and partners. Afterwards, when Pakistan becomes the 7th atomic power of the globe and successfully conduct nuclear detonation on May 8, 1998, then several economic sanctions were imposed on our homeland by its foremost donors. Due to such reasons, the foreign exchange reserves of Pakistan fall sharply. After such nuclear explosions, a two-tier or dual exchange rate regime (i-e. official exchange rate and floating interbank exchange rate) were launched with effect from July 22, 1998. Nevertheless, effective from May 19, 1999, the exchange regime has been integrated, and the market-based floating exchange rate system was introduced. Under this system, the currency rate is determined by the Dd-Ss forces in the Fx market. At present, Pakistan is prevailing floating rate, where each commercial bank sets its personal exchange rates based on its time spanning positions. The State Bank of Pakistan started making purchases in unofficial markets to divert the flow of foreign exchange from unofficial markets to interbank markets (Hyder and Mahboob, 2006). While effective from July 20, 2000 to now, Pakistan has adopted the free floating regime of exchange rate. Under this regime, the currency rate is decided by the interactions of free market forces of demand and supply in an open market, and hence there is no role of the SPB (Janjua, 2007).

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The theoretical relationship between inflation rate and stock market performance has been empirically investigated by many financial economists across the globe. When the overall price level rises in the economy, each currency unit buys fewer commodities, so reducing the purchasing power of money income. The social effects of an inflationary trend of an economy are frequent and may be negative or positive, but largely negative (Uwubanmwen and Eghosa, 2015). An unfavorable social cost of an anticipated inflation contains a fall in the real money value and other monetary articles over a long time span. The unanticipated inflation may dampen savings and investments, and also hurts citizens on fixed pensions. Likewise, if the inflation rate is very fast, scarcity of products occurs in the market as households start hoarding due to which prices will begin to rise even more in the future times. More specifically, the stock prices determine how efficient and effective the equity market distributes shares and equities on the ground of inclination as well as the availability of market information. Rise or fall in the price of stock builds ambiguity and uncertainty for those people who plan to invest and, in a result, affect the demand and supply forces of stocks. Consequently, rises in the general prices may influence the investment decision of a potential investor which has an adverse impact on the overall returns of stocks in the stock market at large.

The economy of Pakistan is one of the essential regional economies. Though, uncertainty in the shape of wars, earthquakes, floods, shocks, etc. and frequent political instability has badly affected the economic performance of the economy in question over the last two to three decades. But no one can deny the fact that the Pakistan economy has tremendous capacity to achieve high levels of economic efficiency by way of equivalent development in major sectors. The verdicts may too be noticed on the currency, which has largely depreciated against the foreign currencies by a large margin in recent times with immediate effects on macroeconomic indicators used to assess the economic position and the market index is certainly one of them.

The present democratic government, which was elected in 2013 with the majority public mandate has dedicated serious efforts to reform and in this respect, certain measures have been in action to stop the continuous declining rate of PKR/US$ and encourage steps helpful to equity market development. Despite the pluses and minuses of the current government interest, to a degree the currency value has appreciated against the USD for a shorter time, but the major confront is whether a targeted point of currency parity will be sustained in the presence of the immense challenges facing the economy of Pakistan today. And more essentially, the interlinked macroeconomic effects may be checked on the stock market index, which is an eminent indicator and the investors use it as a yardstick to invest their past and current savings in the stock market. This research study is also an endeavor to empirically consider the effects of macroeconomic variables on the stock market volatility as measured by the Karachi Stock Exchange (KSE-100) index. The empirical relations of these variables may present an idea to stock market investors living anywhere and acts as a knowledge base for financial experts and concerned government bodies to make profitable decisions which develop the significance of the current empirical work.

b) Karachi Stock Exchange (KSE-100) Index

In this research work, we are going to examine the short and long term connection of macro variables on the equity market performance by applying yearly dataset covering the 1991-2017 periods. On September 18, 1947, the Karachi Stock Exchange (KSE) was introduced which was initially considered the biggest stock exchange in the region on the basis of market capitalization indicator. At the start, a total number of five companies were registered and the KSE-50 index was set up to capture its performance, which was based on 50 financial companies, and with times more companies were appearing in the list of the KSE due to the enhancement of trading activities in volume. Hence, to better capture the stock market performance, the KSE-50 index was changed into the PSX index in November 1991 with a reference value of 1000. The KSE-100 indicator consists of top hundred listed firms selected from different sectors in terms of highest market capitalization. There are many indices that are used in Pakistan for measuring the stock market volatility such as the KSE-30, KSE-50, LSE 25, ISE 10, BR Index 30, BR Index 100, KMI 30 etc., but the most frequently quoted index is the KSE-100; as it offers an excellent indication of how the Pakistan stock market is performing. It is the biggest market index, which represents the sector-wise (34) performance of the biggest companies of Pakistan listed on the exchange market and works as a yardstick to evaluate stock prices. The KSE-100 index captures about 90% of the market capitalization of listed companies (Ihsan et al., 2015). It is a value weighted index and is constituted after every six months. The same index was renewed as a free float index on October 15, 2012 and in the same year, the KSE was acknowledged as the best performing stock market globally. On March 6, 2015, there were 580 companies on the KSE with entire market capitalization of 7, 625.837 billion rupees (Pakistan Economic Survey, 2016-17).

With effect from 11 January, 2016, all the three equity markets[1] were integrated into one equity market, commonly known as the Pakistan Stock Exchange

[1] Karachi, Lahore and Islamabad

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(PSX) which provides a sole platform to foreign investors mostly. Latest statistics show that the PSX-100 index (or the KSE-100 index) was a top ranked market in South Asia and stood in 5th position as a finest performing stock market across the boundaries in 2016 by Bloomberg, providing a total return of 46% for the same year. And this return was also stood best in MSCI[2] frontier markets. Over the last 10 years, the average gain of the PSX was 20% and over the last 20 years, this return was 24%. The same index gained a huge momentum in the fiscal year 2016. During the first quarter of the financial year 2016, the PSX index showed a sluggish and sliding trend because of low oil prices in the market. But during the 2016Q2, the stock market gained an upward trend and business investors remained confident and bullish even with tensions in political plus international boarder fronts. Some of the sectors which have contributed to the PSX index include banking, refinery, pharmaceutical, cement, E & P, and so on. Starting from July 1, 2016 up to May 8, 2017, the covered time span witnessed an upward trend for the market index. The KSE-100 index showed marvelous performance of the PSX market over the stated period largely because of reforms undertaken by SECP[3], better macroeconomic indicators, improved security conditions, and the rest. On June 30, 2016, level of the PSX-100 index was at 37,783.54 achieved 13,152 points and on May 8, 2017, level of the same index remained at 50,935.91 which show a growth of 34.8%. During the budget year 2017[4], the PSX index gained its peak point at 50, 935.91 on May 8, 2017 while, the lowest point of the same index was at 37, 966.76 on July 4, 2016. Furthermore, the average daily volume of 379.1 million shares was witnessed during July 2016 to March 2017 which shows a three times increase as compare to previous periods (Pakistan Economic Survey, 2016-17). The following table 1 presents the summary of the latest statistics on the PSX market over the last few years.

Table 1: Profile of Pakistan Stock Exchange (PSX)

Description	2012/13	2013/14	2014/15	2015/16	2016/17*
Total Listed Companies	569	557	560	560	560
New Companies Listed	4	5	9	6	4
Funds Mobilized (Rs. in billion)	29.5	47.6	79.6	111.2	21.9
Total Listed Capital (Rs. million)	1,116,005.0	1,100,304.9	1,189,518.9	1,289,081.0	1,297,159.0
Market Capitalization (Rs. million)	5,154,738.0	6,655,294.8	7,421,031.6	7,588,472.2	9,594,805.0
Total Shares Volume (million)	54,319.0	56,580.6	64,617.2	55,430.3	70,518.6
Average daily shares volume (m)	221.0	229.1	261.0	220.8	379.1
*end March, 2017					

Source: Pakistan Stock Exchange

c) Problem Statement

The stock market volatility and its impact on the macro economy is the core interest area of research for economists, policymakers, financial analysts and business community experts due to its crucial role in the economic development of a country. The finance theory suggests that variation of the stock market is extensively correlated with different macroeconomic variables. Among the class of those macroeconomic variables, the fluctuations in both interest rate and exchange rate are considered to be major variables which can exert a momentous influence on the stock market volatility. A change in interest rate is an essential economic and financial factor influencing the value of stocks and stock market return (Joseph and Vezos, 2006). The converse relationship of interest rate with exchange rate can force the value of stock in either direction. Alternatively, the level of inflation appears to affect the price of common stocks, but the relation between the two variables is unclear. Some research studies like Schwert (1981) and Fama (1981) established a converse and significant association between inflation and the equity market. Though, some empirical works such as Pearce and Roley (1985) and Hardouvelis (1987) established no such type of relations between the said variables. And the same kind of contradiction has also been found in the relationship between exchange rate and the stock market index.

Irrespective of the theoretical knowledge and the significance of the relationship between stock market volatility and macroeconomic factors, the empirical evidence suggests that there exists a clear dichotomy about the relationships between stock market

[2] MSCI stands for Morgan Stanley Capital International
[3] SECP stands for Securities and Exchange Commission of Pakistan
[4] Up to May 8, 2017

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return and macroeconomic variables. Minuscule idea about the actual relationship of interest rate and exchange rate with stock market volatility is one of the main issues of investors, which can adversely affect their future profitability. Since the association between stock market return and macroeconomic factors is not obvious, it is obligatory for researchers to explore the existing behaviour of the variables. But surprisingly, a dearth of empirical studies exists in Pakistan to explore the interactions between stock market volatility and macroeconomic variables. Though some research studies are available on the same concern, but mostly they have investigated the interactions between exchange rate and the KSE-100 index. Therefore, this research study is an endeavour to fill the empirical research gap and to investigate the short-run and long-run relationship of the stock market volatility with macroeconomic variables. To my knowledge, this study is the opening of its nature at the countrywide level of Pakistan since the Asian crisis of 1997/98.

d) Research Questions

Following are the few major research questions that we are going to address in this research study.

1) Is interest rate and exchange rate having a relationship with stock market performance of Pakistan?
2) Does inflation rate affect stock market performance in Pakistan?
3) Is there any long term correlation exist between equity market volatility and macroeconomic variables in Pakistan?

e) Research Objectives

Below are the main objectives of this research paper:

1) To empirically investigate the effects of interest rate and exchange rate changes on the equity market volatility of Pakistan Stock Exchange both in the short-run and long-run periods.
2) To find out whether the KSE-100 index in Pakistan is significantly influenced by inflation rate or not, both in the short-run and long-run in a time series arrangement.
3) To explore whether there exist a long term relationships between the KSE-100 index and macroeconomic variables or not.
4) To detect the difference in short-run and long-run relationship of these macroeconomic variables on the KSE-100 index of the Pakistan Stock Exchange.

After this introduction chapter, the remainder of the paper will proceed as follows. Section 2 reviews the existing literature on the study. Section 3 presents a detailed description of the data and data sources. Section 4 deals with the theoretical and empirical framework, including the ARDL estimation strategy. Empirical results of the study are discussed in Section 5. Lastly, Section 6 concludes this study with some policy implications.

II. Literature Review

An extensive number of research articles can be found worldwide examining the relationship between stock market volatility and macroeconomic variables over the last half century. The economic and financial theory conceived that there is a possible and mixed association found between the stock market and macroeconomic variables. In recent times, a large number of empirical works focus on the dynamic relations between the stock market and interest rate and exchange rate.

The earlier studies such as Modigliani (1971) and Mishkin (1977) conclude that smaller interest rate rise stock prices which sequentially lead to improved business investment activity. In general, a small interest rate directs privileged capital flows to the equity market in anticipation for a higher profit where a high rate of interest endorses more saving amounts in banking sector and accordingly lessens the capital flow to the open stock markets. The empirical study conducted by Fama and Schwert (1977) concludes an inverse relationship between stock returns and T-bills rates. Mukit (2012) investigated the effects of interest rate changes on the stock market return by using annual time series data from 1991 to 2012. The Johansen cointegration procedure demonstrates that the interest rate shows a negative and significant relationship with the stock prices in the long-run and also there exist at least one cointegrating relation between the variables. The Granger causality test shows that there exists a unidirectional causality from interest rates to stock prices.

A recent dynamic study analyzed by Muktadir-al-Mukit (2013) examines the economic effects of interest rates on stock market volatility by employing monthly data over the period of 1991 to 2012 for the Bangladesh's economy. A cointegrating test exposes a significant and stable long-run connection between the selected variables. It has also been concluded that a 1% rise in interest rate causes a 13.20% reduction in market index in the long-run. The ECT coefficient value shows that 0.12% variation of stock returns is corrected in the short term. The result of the impulse response function also confirms the converse relationship between the variables included in the model. And, the result of the Granger causality affirms the existence of a unidirectional causal relationship which is from the interest rate to stock market index.

There have been a large number of research studies investigating the dynamic and causal relationship between exchange rates and stock market

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volatility and all these empirical studies provide mixed results about the relationship between the two variables. Kasman (2003) analyzed the linkage between exchange rate and stock prices for the stock market of Turkey by using a high frequency data. The numerical results of Johansen approach provide empirical evidence that a long term connection exist between stock prices and exchange rate. What's more, the findings of the Granger causality analysis signify a unidirectional causal relationship between the two variables and hence, the causality relation exists from the exchange rate to industry sector index. For the stock market of India, Nath and Samanta (2003) have inspected the dynamic and causal relationship of the exchange rate with stock market return by using daily time series data covering the periods of March 1993 to December 2003. The outcomes prove that the casual linkage between the two markets is commonly absent, however, in recent periods, a strong causal relationship has been found from stock market return to foreign exchange market return. Similarly, Kutty (2010) studied the empirical relationship of the exchange rate with stock prices for the Mexican's stock market while using the weekly data for the year of Jan-1989 to Dec-2006. The results of cointegration test presents that there is no long time correlation exists between the examined data. While the Granger causality test recommends for the short-run relationship between the explored data.

A same kind of analysis has been carried out by Ihsan et al. (2015) in Pakistan and checked for the relationship between exchange rate and stock market index. Considering the daily time series data over the period of September 2012 to May 2014, the results of the Johansen technique to cointegration report that there is no long-run involvement exists between currency rate and KSE-100 index. Whereas, the Granger causality test concludes that the currency rate doesn't cause the PSX index. Employing the GARCH model, Mlambo et al. (2013) assessed the economic effects of exchange rate changes on the stock exchange of Johannesburg (JSE) by using monthly South African dataset over the 2000-2010 periods. After estimating the model, they found a very weak linkage between exchange rate changes and the JSE market. Further, the impact of prime overdraft rate plus total mining production on the market capitalization was found negative. But surprisingly, the impact of interest rate of US on the market capitalization was found positive. It was suggested that government should focus exchange rate as a policy instrument to magnetize foreign portfolio investment. Using the ARCH family and Johansen cointegration models, Bhat and Shah (2015) investigated the relationship between stock market volatility and changes in exchange rate for Pakistan using a weekly time series for the 1997-2013 periods. The results of Johansen cointegration model conclude that both the examined variables are cointegrated with each other in the long-run. And the Granger causality verdicts confirm the bi-directional causal relationship between the two variables under examination.

A more recent study on the same concern carried out by Poornima and Ganeshwari (2016) tried to look at the dynamic attachment between NIFTY index and exchange rate by applying the data periods from July 2014 to July 2016 choosing daily closing indices. Analysis of the correlation between the mentioned variables shows a negative coefficient value. As well, findings of the Granger causality test highlight a unidirectional causal relationship between NIFTY returns and exchange rates.

The former empirical studies validated that when inflationary pressure happen in a country due to some socioeconomic reasons, surely it will influence the prevailing stock market performance as the stock exchange market plays a fundamental job in the economic boom and encouraging capital accumulation and supporting economic prosperity (Hamrita et al., 2009), the rationale is that on every occasion the price of consumer products changes it will surely affect the stock market profitability in either direction (that is, negatively, positively, or may not the case due to some responsible factors). Few of the important studies are reported as follows.

The former study carried out by Mukherjee and Naka (1995) examined the connection of stock prices in the Tokyo stock market with a group of macroeconomic variables. Their empirical verdicts of the Error Correction Model (ECM) report a positive relation of the stock price with exchange rate, money supply and industrial production. Over the period starting from January 2000 to March 2010, Limpanithiwat and Rungsombudpornkul (2010) have investigated the long-run association between stock prices and inflation in Thailand while introducing the impacts of Tsunami and global economic recession on the underlying relationship. The results of the VAR (Vector Autoregression) model display that volatility of stock prices is irrelevant to inflation. In addition, to capture the effects of inflation on the equity value, a number of direct interviews have also been conducted to assemble opinion of investors who investing in the stock market of Thailand. The results of interviewees also support the stated conclusion.

While using the ARDL bounds test, Ibrahim and Agbaje (2013) have examined the long-run dynamic linkages between stock market returns and inflation in Nigeria using the monthly time series data from 1997 to 2010. The findings of the ARDL approach suggest that there exists a long-run co-integrating the relationship between stock returns and inflation. The results of the ECM show that the pace of convergence to equilibrium position is moderate which means that there is evidence

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of the short-run interactions between the two macro variables.

Using the quarterly data covering the January 1996 to December 2011 periods, Saleem et al. (2013) had examined the long-run co-integrating relationship between the KSE-100 index and inflation through the use of Johansen techniques for Pakistan's economy. The evidence from Johansen procedure to cointegration yields an inverse linkage between the selected market index return and inflation due to the reason that Pakistan is not a developed country. When the inflation rate becomes high, it badly affects the economic performance, which in turn affects the stock market profitability and the responsible reasons for this backwardness are the prevailing economic conditions, huge budget deficit and the remaining other important economic factors. The empirical outcome of the Granger causality test indicates that there is no such evidence of a causal relationship between the said variables in any direction.

Solnik (1987) investigated the economic impact of macroeconomic factors such as interest rate, exchange rate and inflation on stock prices for nine western economies, including France, UK, Switzerland, Canada, US, Belgium, Netherlands, Germany and Japan by using monthly dataset. After empirical investigation, he concludes depreciation to have a positive but insignificant effect on the United States equity market as compared to change in change in inflationary prospect and interest rates. In the same way, Hasan and Javed (2009) discovered the long-run relationship of the PSX with a set of macroeconomic variables such as exchange rate, T-bill rate, money supply and inflation rate. The analysis of cointegration, Granger causality and impulse response shows that there exists an inverse relationship of the stock market with the interest rate and the exchange rate. Besides, Ahmad et al. (2010) examined the impact of interest rate and exchange rate on the KSE-100 index of Pakistan uses the time series data covering the period 1998-2009 while applying the multiple regression models. The outcomes of the model concluded that there exists a significant relationship of the interest rate and exchange rate with the selected market index. The results also suggest a negative and significant relationship among the included variables.

Geetha et al. (2011) have reinvestigated the interconnection between the equity market and macroeconomic indicators like expected plus unexpected inflation rate, interest rate, exchange rate and GDP for three selected countries, which are China, Malaysia and US. The results of the Johansen procedure confirmed about the long-run relationships among variables under examination for the whole countries. While the findings of the ECM report the absence of the short-run equilibrium relationship between market index and the rest of the variables for Malaysia and United States. Though, China's ECM verdicts reveal that there is a short-term link exists between equity market in China and anticipated inflation. And finally, Muktadir-al-Mukit (2012) evaluated the macroeconomic effects of the interest rates and the exchange rates on stock market return by using monthly data for Bangladesh's economy, covering the 1997-2010 periods. By applying the cointegration technique, it was observed that a 1% rise in interest rate and exchange rate contributes 1.71% and 1.04% decline in stock market index, correspondingly. The estimated ECT coefficient value shows that 7.8% variation of stock returns is corrected in the short term. And lastly, the result of the Granger causality affirms the existence of a unidirectional causal relationship which is from the market index to exchange rate plus from interest rates to a stock market index.

III. Data Description

The macroeconomic variables included in this study consists of annual time series observations on stock market performance, interest rate, exchange rate and inflation rate for Pakistan covering the periods starting from 1991 to 2017. The Karachi Stock Exchange Index or the KSE-100 Index (1991=1,000) has been used as a proxy for measuring the stock market performance variable which captures the daily price movements of equities in the stock exchange market in Pakistan. This index was launched in November 1, 1991 having a base value of 1, 000 points. Data on the KSE-100 index is taken from the Karachi Stock Exchange Indices (KHI Stocks) published by the Pakistan Stock Exchange Limited (2017) and the remaining series of data have been updated from the website (www.opendoors.pk). The interest rate variable has been proxy by the discount rate or the bank rate, commonly known as the SBP's Reverse Repo (Ceiling) rate[5]. The change in interest rate has been calculated by taking log difference to bank rate, and can be written as:

$$Change\ in\ Interest\ rate = ln\left(\frac{IR_t}{IR_{t-1}}\right)$$

Data on the interest rate variable has been collected from the State Bank of Pakistan until 2016 and the rest series have been updated from the Monetary Policy Statements and Pakistan Economic Survey 2016-17. As well, the variable exchange rate or foreign exchange rate is the price or purchasing power of the home currency in term of foreign currency. More

[5] This rate is formally known as the SBP 3-day repo rate which was renamed since Aug 17, 2009. This is the rate at which domestic banks borrow from SBP on an overnight basis. Also, at this rate the banks deposit their end-of-day excess cash with SBP on an overnight basis. It remained as SBP Policy rate till May 24, 2015.

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explicitly, the foreign exchange rate is stated in terms of Pakistani rupee (PKR) against the United States dollar (USD), and can be calculated as:

$$Change\ in\ foreign\ exchange\ rate\ (\Delta FER) = ln\left(\frac{FER_t}{FER_{t-1}}\right)$$

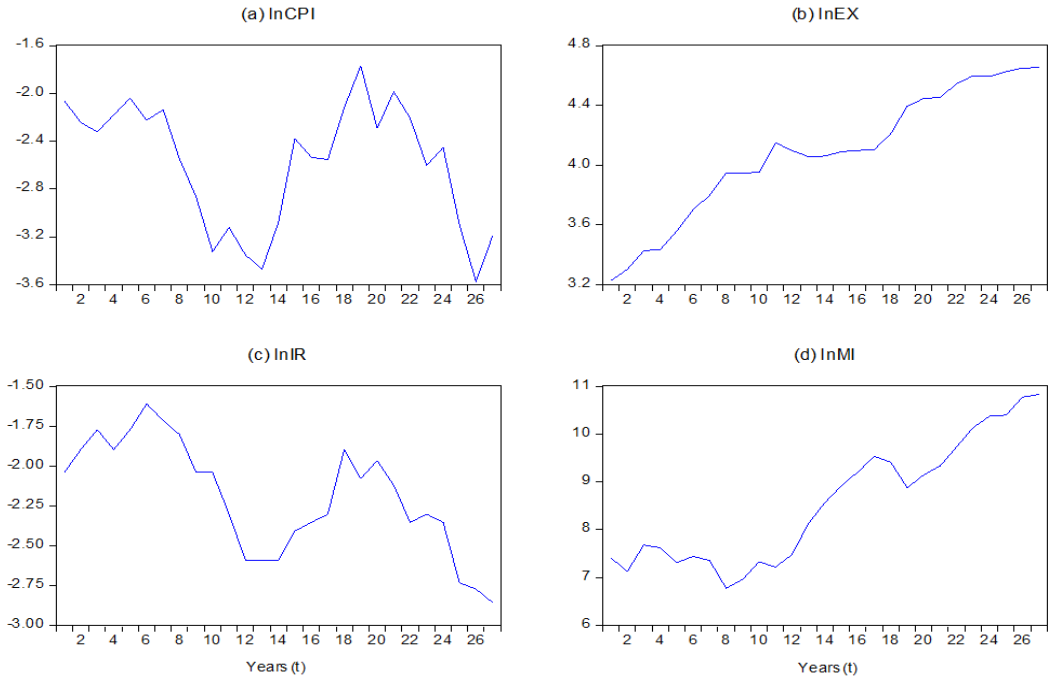
Data on the average foreign exchange rate variable has been taken from the Statistics and Data Warehouse Department, State Bank of Pakistan until 2012 and the remaining sample observations on the same variable have been taken from the Domestic Markets and Monetary Management Department plus the Statistics and Data Warehouse Department, State Bank of Pakistan (2016). Also the last sample observation for the year 2017 on the exchange rate variable has been updated from the External Relations Department, State Bank of Pakistan (2017). The inflation rate variable has been proxy by the Consumer Price Index (CPI) which is the best statistic to measure the cost of living when compared with other measures, for example, the Wholesale Price Index (WPI), the Sensitive Price Indicator (SPI), the GDP deflator, and so forth. Note that the base year for measuring the inflation rate in Pakistan for the fiscal year 2000 and onward is 1999-00=100 (PBS). As we deal with the annual data, therefore; the inflation rate (Y-O-Y) measures the annual percentage change in the CPI series. More to the point, July 2007 inflation rate (CPI value) will be the percentage change in CPI from July 2006. Yearly events have a tendency to be volatile in nature because they are largely affected by some major events, such as, stock market crash, natural calamities, disasters, earth quacks, years with many workers on vacation, etc. To calculate the year-wise change, the following formula has been suggested by the researchers.

$$Percentage\ Growth = \frac{Year\ A - Year\ B}{Year\ A} * 100 \text{ or } Inflation\ Rate = ln\left(\frac{CPI_t}{CPI_{t_1}}\right)$$

Data on the inflation rate variable has been taken from the Pakistan Bureau of Statistics (PBS) and the remaining observations have been updated from different Pakistan Economic Surveys, published by the Ministry of Finance, Pakistan.

A few transformations have been made in the original data to stay away from spurious and ambiguous empirical results in the study and finale to present an effective set of policy suggestions. For instance, those variables that were originally available in the percentage form have been converted to the decimal notation. In the same way, all included variables in the study are changed to the natural logarithmic form to suit the operation of variance as one of the box-cox transformation. One of the advantages of the natural log transformation is that we get a smaller value of the coefficients after estimating them and hence, we can easily interpret the estimates for results.

Figure 1 plot all the variables over the selected time span, depicting more or less upward trend for exchange rate and stock market index, whereas; the more or less downward trend have been found for inflation rate and interest rate.



Source: Results extracted from the EViews 9

Figure 1: Plot of macroeconomic variables over the 1991-2017 sample periods

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The above four figures offer a glance at the historical background of the Pakistan economy. From the figure of inflationary trend (a), we can observe that inflation fluctuates considerably over time. The CPI value edged up to some extent in fiscal year 2001 after noticing a three decade low preceding year. The inflation rate stood at 4.67% in terms of the CPI in January FY01, while, based on the average rate of inflation, this rate rose to 4.4% in fiscal year 2001 from 3.6% in the prior year. The responsible reasons behind the observed inflation during FY01 were the oil price shocks[6] in the international market, the Pakistan's currency depreciation against the US$[7], impermanent shortage of pulses and gram, rise in issue prices of wheat[8], hike in prices of specific fruits and vegetables, etcetera. Recently, the inflation rate has been recorded about 3 or 4% per year on average basis, signifying that prices have been somewhat stable from previous decades. A variety of responsible factors for such a big achievement includes the low oil and product prices, smooth supply of stuff, stable currency, and monitoring of prices at both national and provincial levels (Pakistan Economic Survey, 2016-17).

From the rising exchange rate scatter plot (b), one can clearly perceive the idea that the Pakistan's currency has been quickly depreciated against the USD over the last two decades[9]. There are different reasons of currency depreciation in Pakistan which includes economic, political and corruption. The responsible interconnected economic reasons include the fiscal deficit, price shocks, faulty financial system, speculative pressure, expansionary fiscal plus monetary policy, real exchange rate, capital flight, low foreign direct investment, and so on. Despite the mentioned facts, the Pakistan rupee has remained stable at the rate Rs. 104/$ in the open market roughly for the last two years due to the SBP's prudent management and effective monetary policy.

The figure (c) of interest rate variable illustrates the percentage change in the bank rate for each year since 1991 where the ups and downs can be clearly seen. It shows that initially this policy rate was set high at 13% in October FY91, where further increased at the rate has seen from the SBP's side and this rate reached to 14% in January FY92. Furthermore, the central bank also increased the bank rate from 9% to 9.5% (Economic Survey, 2005-06), and such increase in rate has remained high during the end of FY12[10]. The increase in policy rates was in accord with the foreign rising trends as well as such steps was also taken to shorten the advancing ability of the banks to the private segment. This policy designed to curtail domestic aggregate demand from the private sector that was one of the foremost driving forces for fuelling inflation. The plot of exchange rate shows that the policy rate is continuously falling from its peak over the last few years. To ensure the economic stability on the national level, the central bank kept the bank rate at 5.75% in FY17 and continued the same in the successive periods.[11]

The scatter plot (d) of the stock market performance which is captured by the KSE-100 index signifies the upward trend over the sampling period. During the start of FY01-02, the central bank stimulated toward a proactive monetary policy management system. The central bank attained a degree of market calm and analysis for the future, making a 1% decrease in the policy rate in July and August, 2001. The stock markets have continued floating during the FY02-03. The KSE-100 index has observed an exceptional growth during the FY02, increasing from 1770.1 points in June-FY02 to 2902.4 points in Apr-FY03. Afterwards, the index reached to its magic high score of 3003.4 points during the May FY03, yielding an increase of 69.7% during the time under review. This target was touched due to the friendly macroeconomic policies of government, improvement in economic fundamentals, and assurance of local as well as foreign investors on the KSE market.[12] During the FY17, the index reached at its highest position of 50,935.91 points on 08 May, 2017, while its lowest level was 37,966.76 points on 04 July, 2016 (Pakistan Economic Survey, 2016-17).

IV. Theoretical and Modeling Framework

This research study proposes the framework in Geetha at al. (2011), Muktadir-al-Mukit (2012, 2013), Mbulawa (2015), Ihsan et al. (2015), Rabia and Khakan (2015), Sichoongwe (2016), and Kennedy and Nourizad (2016) in econometrically estimating the relationship between stock market performance with an interest rate, exchange rate and inflation rate in a time series setup. These listed studies estimated the structural model to empirically investigate the interactions between stock market performance with an interest rate and exchange rate in the log transformed form. Additionally, we introduce the Consumer Price Index (CPI) as variable to

[6] The price of POL increased

[7] The Pakistan's rupee was depreciated by 18.6% in terms of the USD

[8] By provincial governments

[9] Pakistan's rupee against the USD depreciated by about 17% both in the open market and inter-bank during the fiscal year 2000-01 (Economic Survey, 2000-01).

[10] It was 12% in July 27, 2012.

[11] It is the lowest policy rate by SBP since early 1970s.

[12] Other main factors include the declining returns on alternative investments, huge foreign exchange reserves, expectations of early privatization (state enterprises and banks), liberalization and deregulation, strong presence of energy stocks in the market, reforms by the SECP, etc.

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proxy for inflation rate, which turns the prices of a fixed basket of commodities[13] into a single value (index) reflecting the general level of prices in the economy plus measures the rise in the cost of living of citizens. This variable has got importance in the analysis especially after the global financial crises of 2007/08.

The background theory suggests that the stock market performance in Pakistan depends on interest rate, exchange rate and inflation rate, which can be written in the functional form in equation 1 as follows:

$$stock\ market\ performance = f(interest\ rate, exchange\ rate, inflation\ rate) \quad (1)$$

The same functional relationship of the model can be symbolically written as given in equation 2:

$$MI = f(IR, EX, CPI) \quad (2)$$

We have converted the basic linear illustration of the model into the log-linear form[14] due to the reason that it gives more efficient results and avoid non-sense regression as compare to the original functional specification (Cameron, 1994) and Ehrlich (1975, 1996). Also, such sort of conversion in variables provides elasticity estimates in the form of coefficients which a researcher can directly and easily interpret for policy purposes. For example, the log form offers direct estimation of the company return elasticity which permits the PSX profits to respond proportionately to changes in exchange rates. Accordingly, the structural model in the log-linear form of all variables under examination can be stated in equation 3 as follows:

$$lnMI_t = \beta_1 + \beta_{IR} lnIR_t + \beta_{EX} lnEX_t + \beta_{CPI} lnCPI_t + \varepsilon_t \quad (3)$$

Where,

$lnMI_t$ = log of the stock market index or log of the KSE-100 index at time *t*

$lnIR_t$ = log of the interest rate or log of the SBP's Reserve Repo rate at time *t*

$lnEX_t$ = log of the exchange rate or the Pakistani rupee per US$ at time *t*

$lnCPI_t$ = log of the inflation rate or log of the Consumer Price Index at time *t*

β_1 = constant term or intercept

β_i = slope coefficients of the independent variables or elasticities

ε_t = error term or residual or stochastic disturbance term

t = time unit, or t_1 = 1991 and t_{27} = 2017

The conventional finance theory implies that if the interest rate falls, the investments with fixed income turn out to be less competitive due to their lower returns, so consequently, stocks turn out to be more attractive. In opposition, when interest rate increases, the investments with fixed income turn out to be more competitive due to their higher returns, and as a consequence, stocks become less striking. This logic, meaning that there is an opposite relationship of the stock valuations with the interest rates. Therefore, we expect $\beta_{IR} < 0$.

Furthermore, there exists a clear dichotomy in the finance literature on the relationship of stock prices/returns with exchange rates. Some of the research studies recommend that there exist a positive correspondence between the stock prices and the foreign exchange rate, for instance, Aggarwal (1981), Smith (1992), Sabri (2004), Ahmad et al. (2010), etc. In contrast, other empirical works have concluded a negative link between stock prices and foreign exchange rates, and such studies include Soenen and Hanniger (1988), Granger et al. (1998), Md-Yusuf and Abd-Rahman (2012), and so on. However, works like Ma and Kao (1990), Beirne et al. (2009), etc. have established mixed results on the relationship between stock returns and exchange rates. Hence, we expect $\beta_{EX} > 0$ or $\beta_{EX} < 0$.

At last, the effect of price hiking on stock returns is totally based on the level (severity) of inflation. Earlier research attempts have suggested that inflation and stock exchange markets are strongly correlated with the inflation rate affecting the stock exchange market risk plus volatility. These financial markets encourage savings as well as investments by ensuring an opportunity for portfolio diversification equally to clients plus corporate investors. The severity of the general prices on the financial market performance significantly persuades the prices of financial assets which are basically determined by the net profits of a company and are therefore straightforwardly proportional to the behavior of a company. So, an extremely inflationary situation, therefore negatively influences the stock prices and ultimate stock returns. And so, we expect $\beta_{CPI} < 0$.

a) Estimation Strategy

The technique for empirical investigation in this paper is the ARDL (Autoregressive Distributed Lag) or bound cointegration approach originally developed by Pesaran and Pesaran (1997), Pesaran and Shin (1999) and Pesaran et al. (2000, 2001) to explore the long run relations between stock market performance (market index), interest rate, exchange rate and inflation rate

[13] The Laspeyres index is the price index, which measures the general price level for a fixed basket of commodities (goods and services).

[14] It is the model type where both the explained and explanatory variables appear in logarithmic form.

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over the sampling period. This cointegration model can be used for analysis, exclusive of finding the order of integration. According to Haug (2002), this technique to cointegration is best in providing the best outcomes for small datasets (and the same is the case here), in contrast to other methodologies of cointegration[15] found in the literature of applied Econometrics. Also, one feature of the ARDL approach is that the unrestricted technique of the ECM has enough flexibility to include lags that captures the data generating process in a general-to-specific structure of the arrangement (Laurenceson and Chai, 2003). As each of the variables included in the model appear as a sole equation, the problem of endogeneity is less crucial in the bound testing approach as it is free of residual correlation (Nkoro and Uko, 2016). Additionally, one of the features of the ARDL technique lies in its pure identification of the cointegration vectors among the multiple cointegrating vectors. As well, this approach has the ability of differentiation between explained and independent variables when we are dealing with the single long run relationship. Specifically, this methodology supposes that only a single reduced-form equation relationship exists between the explained variable and the exogenous variables (Pesaran et al., 2001).

The generic form of an ARDL regression model is given in equation 4 as under:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \ldots\ldots + \beta_k Y_{t-p} + \alpha_0 X_t + \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + \ldots\ldots + \alpha_q X_{t-q} + \varepsilon_t \quad (4)$$

We can observe from the appearance of the general ARDL approach set in equation 4 above, that such specifications are illustrated by having lags of the explained variable, plus lags (and possibly the current value) of the independent variables. The conventional ECM or the unrestricted ARDL approach would be of the type:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta Y_{t-i} + \sum_{j=0}^{q_1} \gamma_j \, \Delta X_{1t-j} + \sum_{k=0}^{q_2} \delta_k \, \Delta X_{2t-k} + \varphi Z_{t-1} + e_t \quad (5)$$

In equation 5 above, 'Z' is the error-correction term in the model which is the OLS disturbance term series from the long run cointegration regression. That is to say,

$$Y_t = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + V_t \quad (6)$$

The unrestricted ARDL model is given in equation (7) as follows:

$$\Delta lnMI_t = \alpha_1 + \alpha_{IR} lnIR_{t-1} + \alpha_{EX} lnEX_{t-1} + \alpha_{CPI} lnCPI_{t-1} + \sum_{i=1}^{p} \alpha_i \, \Delta lnMI_{t-i} + \sum_{j=0}^{q} \alpha_j \, \Delta lnIR_{t-j} + \sum_{k=0}^{n} \alpha_k \, \Delta lnEX_{t-k} + \sum_{l=0}^{n} \alpha_l \, \Delta lnCPI_{t-l} + \mu_t \quad (7)$$

In applied econometrics, cointegration is an influential way of perceiving the existence of the steady-state equilibrium between variables. It has become a principal condition of every economic model analyzing the non-stationary data. If the variables under consideration don't cointegrate with each other, in that case we have the spurious regression problems and the regression results therefore become almost insignificant. Alternatively, if the examined variables do cointegrate with each other, in that case we have a cointegration property (Nkoro and Uko, 2016). In order to find out the cointegration relations among the examined variables under study through the ARDL methodology, the hypothesis can be tested with the tabulated critical values given by Pesaran et al. (2001). As in typical cointegration testing, we set the null hypothesis for the nonexistence of a long term equilibrium association between the examined data, in opposition to the substitute assumption that there exists such kind of relationship between the variables. The null hypothesis of no cointegration among the variables in the stated model can be written as: $H_0: \alpha_{IR} = \alpha_{EX} = \alpha_{CPI} = 0$. The alternative hypothesis of cointegration among the variables under study can be written as: $H_1: \alpha_{IR} \neq \alpha_{EX} \neq \alpha_{CPI} \neq 0$.

The next step in such analysis is to conduct an F-test, where we compare the F-statistic calculated values with the lower and upper critical bound values as given by Pesaran and Pesaran (1997) or Pesaran et al. (2001) in their respective studies. However, there is a convenient complexity that has to be resolved when we perform the F-test. The distribution of this statistic is entirely non-standard even if we have a substantially large sample data. This is rather similar to the condition to the Wald-test when we check for Granger non-causality when we have non-stationary series. Therefore, the issue is set on by using the Toda-Yamamoto method (1995), to make certain that the Wald-test statistic is asymptotically chi-square. As suitable critical values for the F-statistic are not exists for the mixed results of variables (i-e. I_0 and I_1). Though, Pesaran et al. (2001) provide bounds on the critical values for the asymptotic distribution of the F-test. For different cases, they presented lower bounds and upper bounds on the critical values. In each situation, the lower bound stand

[15] The other pioneering techniques include the Engle-Granger methodology (1987), Johansen and Juselius (1990) methodology, Phillips and Hansen (1990) and Phillips and Loretan (1991) works.

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on the postulation that all of the variables are stationary at levels (I_0), and the upper bound stand on the postulation that all of the variables having unit root (I_1). In reality, the fact may be someplace in between these two extreme cases. In case of the small time series sample, Turner (2006) has collected critical bounds for the F-test that is appropriate for the short hand data. If the F-statistic value is more than the upper critical bound, we would establish that there is a cointegration among variables. If the F-statistic computed value falls below the lower critical bound, we would establish that there is no cointegration among the variables, meaning that the variables are stationary at level, i-e. I (0). Conclusively, if the F-statistic calculated value falls between the two polar bound, the result or decision is inconclusive. In order to explore the long-run relations among variables in such cases, we depend on the significance of the lagged error correction term (ECT) for cointegration. After confirming the long run relations among included variables, the short term behavior of examined variables is explored in equation 8 by the vector ECM (VECM) model:

$$\Delta lnMI_t = \delta_1 + \sum_{j=0}^{p} \delta_2 \, \Delta lnIR + \sum_{k=0}^{q} \delta_3 \, \Delta lnEX_{t-k} + \sum_{l=0}^{o} \delta_4 \, \Delta lnCPI_{t-l} + \omega ECM_{t-1} + \varepsilon_t \quad (8)$$

The presence of an ECT suggests the changes in explained variable ($\Delta lnMI_t$) which is a function of the disequilibrium levels in the cointegration relations plus the changes in other independent variables under consideration. This result shows the variations in explained variable from a short period of time to long run equilibrium path (Masih and Masih, 1997). It demonstrates the magnitude to which any variability in the preceding time is being adjusted in dependent variable. Its positive coefficient point out a divergence whereas, a negative value of its coefficient signifies convergence. If its estimated value equal to one, then a hundred percent of the adjustment occurs within the period. If its estimated value equal to 0.5, then fifty percent of the adjustment occurs each period. Lastly, if its value is zero, meaning that there is no adjustment occurs, also to argue that there is a long-run relationship doesn't make any logic any longer.

V. Empirical Results and Discussion

In the views of Pesaran and Shin (1999) and Pesaran et al. (2001), the ARDL approach can be implemented in finding the long run relations among variables having the mixed order of integration. This methodology can be used for the purpose to integrate I (0) and I (1) series in the same estimation process. If variables included in the model are all stationary at level I (0), then the Ordinary Least Squares (OLS) technique is best for estimation. And, if all data series are non-stationary at level I (1), then the Johansen approach to cointegration is advisable due to its simple estimation practice. Therefore, we cannot use the OLS technique on the series if one of them or all of them is non-stationary due to the reason that these series will not act as constants anymore and some of them are time variant. The OLS technique will by mistake give high t-statistic values and significant outcomes, but in a real situation, it would be inflated due to the common time component[16]. However, in different relevant studies such as Muktadir-al-Mukit (2012, 2013), Ihsan et al. (2015) and Poornima and Ganeshwari (2016), this rule has been violated[17].

ARDL approach doesn't need pretest for unit roots. However, it may be desirable to test for unit roots in variables, although not as a required condition. Subsequently, this approach to cointegration is superior to others when involving with series that are integrated of a different order, I (0), I (1) or both types of combination. Though, this approach will collapse in the incidence of the integrated stochastic trend of I (2)[18]. Ouattara (2004) expressed that if any series in the dataset is integrated at I (2), in that case the F-test calculation for cointegration becomes indecisive. The reason is that the critical bounds given by Pesaran et al. (2001) are completely relying on the hypothesis that such a series of variables should be stationary at levels or stationary at their first difference. That is the reason; we check unit root tests to certify that no series is integrated at their second difference I (2).

a) Statistical Analysis

There are some preliminary steps which are needed to be carried out before going to an ARDL procedure to cointegration. The whole dataset consists of twenty seven years of annual observations from 1991 to 2017. Descriptive statistics provide simple summaries about the sample and about the observations that have been made. The summary of descriptive statistics of the whole dataset is presented in table 2.

[16] In econometric theory, such results are known as meaningless regression results where R^2 becomes higher than the D-W statistic of the model and such results are undesirable for devising an effective economic policy.

[17] All these literatures have used the OLS methodology, even after concluding that all of their series of data are non-stationary and having unit roots, denoted by I (1).

[18] The methodology to cointegration will remain invalidate for such kind of data.

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Table 2: Statistical Analysis Summary

Statistic Name	lnMI	lnIR	lnEX	lnCPI
Mean	8.559699	-2.191032	4.077736	-2.583671
Median	8.571526	-2.120264	4.096419	-2.453408
Maximum	10.83154	-1.609438	4.652054	-1.771957
Minimum	6.779490	-2.855970	3.226411	-3.575551
Standard Deviation	1.294407	0.349715	0.430395	0.516289
Skewness	0.299251	-0.236382	-0.391736	-0.488427
Kurtosis	1.710099	2.014896	2.193306	1.969984
Jarque-Bera	2.274806	1.343176	1.422655	2.267076
Probability	0.320651	0.510897	0.490992	0.321892
Observations (n)	27	27	27	27

Source: Output from EViews 9

The table 2 above report's summary of the descriptive statistics, which illustrates that the average of market index points is 8.56 with a standard deviation of 1.29, the average of interest rate is -2.19 with a standard deviation of 0.35, the average of Pakistani rupee against the US$ is 4.08 with a standard deviation of 0.43 and the average of inflation rate is -2.58 with a standard deviation of 0.52. All given variables of the model are negatively skewed except the stock market index which is positively skewed. Furthermore, kurtosis statistic of the dataset showing that the EX and IR variables are leptokurtic (high peak/long tailed) and CPI and MI variables are platykurtic (lower peak/short tailed). As a final point, the Jarque-Bera statistic confirms that the disturbances are normally distributed because the corresponding probability value for each variable is more than 5%, hence we accept the null hypothesis meaning that the residuals are normally distributed[19]. In a compact form, we can write this finding as: $u_i \sim N(0, \sigma^2)$ or $u_i \sim NID\ (0, \sigma^2)$

b) Correlation Analysis

In order to check multicollinearity among variables under examination, a correlation analysis has been suggested in the literature. Originally multicollinearity refers a situation in which two or more than two independent variables in a multiple regression model are highly linearly related. Based on the rule of thumb, if the intercorrelation between two independent variables is greater than 0.8, then we have strong or significant multicollinearity in the data. Such kind of analysis measures the degree to which the two regressors move together. The sign of the Pearson correlation coefficient (PCC) test[20] decides about the nature of the relationship, whereas, its coefficients calculate strength of the relationship between the pairwise correlations. Outcomes of the Pearson correlation test are reported in following table 3.

Table 3: Results of Intercorrelations

Symbol	lnMI	lnIR	lnEX	lnCPI
lnMI	1.0000	- 0.6487	0.8151	- 0.1461
lnIR	- 0.6487	1.0000	- 0.6473	0.7020
lnEX	0.8151	- 0.6473	1.0000	- 0.3277
lnCPI	- 0.1461	0.7020	- 0.3277	1.0000
Note: All the tabulated values have been rounded-off to four decimal places.				

Source: Outcome from EViews 9

[19] H_o: Residuals are normally distributed, and H_1:Residuals are not normally distributed

[20] The sample Pearson correlation coefficient can be calculated using the following formula: $r = r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}$

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The above table 3 illustrates what is call correlation matrix. Analysis of the correlation matrix clearly depicts that both interest rate and inflation rate are negatively correlated with the stock market index and the exchange rate is positively correlated with the same market index. Also, some series of variables are negatively correlated and others are positively correlated with each other. The interest rate variable is negatively correlated with all variables in the model, except for the inflation rate. Furthermore, the EX and CPI are negatively correlated among themselves, whereas, the correlations between exchange rate and interest rate and inflation rate and interest rate were found negative and positive, respectively. And finally, intercorrelations also confirm that inflation rate is positively and highly correlated with interest rate[21]. From the whole analysis of intercorrelations, we can conclude that our data has no issue of exact or perfect multicollinearity as none of the PCC between explanatory variables is more than 0.8.

c) The Unit Root Test

In order to escape from the nonsensical and meaningless results, the variables included in the economic model must be stationary since it is not possible to obtain reliable estimates and making forecasting with a nonstationary dataset. That's why; checking the stationary properties of a series is a natural begin of an empirical investigation in almost every time series study. There are many tests in time series Econometrics for such purpose, but the widely used and the most famous amongst them over the last numerous years are the unit root tests (Gujarati, 2004). For such a purpose, there are many tests in the literature such as the Dickey-Fuller (DF) test, Phillips-Perron (PP) unit root test, Ng-Perron test, Augmented Dickey-Fuller (ADF) test, and so forth. The most frequently demonstrated test amongst all for checking stationarity on a set of data is the ADF test because of its quality of relaxing the postulation of autocorrelation among residuals. If a series under analysis is found stationary at level form, we say that it is integrated of order zero, denoted by I (0). Conversely, if a series of data is found non-stationary at level form, but stationary at their first difference, we can call it integrated of order one and is denoted by I (1). To find the long run relations among variables, the order of integration is significant in deciding the appropriate procedure to cointegration. The ADF test detailed outcomes are given in table 4.

Table 4: The ADF Test Results

Variables		Intercept			Trend and Intercept			Conclusion
		Coefficient	S.E	Prob.*	Coefficient	S.E	Prob.*	
MI_t	Level	0.019514	0.052154	0.9777	-0.472483	0.130747	0.0508	I (1)
	1st Difference	-0.871829	0.199175	0.0022**	-0.913384	0.210081	0.0106	
IR_t	Level	-0.063451	0.108581	0.8575	-1.076173	0.248413	0.0131**	I (0)
	1st Difference	-0.938961	0.204216	0.0013	-0.966608	0.210866	0.0063	
EX_t	Level	-0.058675	0.30440	0.3152	-1.038871	0.236218	0.0115**	I (0)
	1st Difference	-0.912187	0.209929	0.0023	-0.984336	0.213481	0.0059	
CP_t	Level	-1.269603	0.293806	0.0034**	-0.659489	0.189874	0.0674	I (0)
	1st Difference	-1.012695	0.214588	0.0010	-1.018417	0.220503	0.0058	
*Mackinnon (1996) one-sided p-values ** denotes stationary in each variable								

Note: All hypotheses are tested at 5% level of significance.

Source: Outcome from EViews 9

In table 4 above, column first represent variables names. Columns second and third give details of first and second difference estimates of coefficients together with standard error and probability value. The order of stationary for each variable is given in the last column of the table. Additionally, the stock market index variable has got unit root at the level and its plot reveals the same fact. Specifically, based on the intercept form, $t-statistic = \frac{\hat{\beta}}{s_{\hat{\beta}}} = \frac{0.019514}{0.052154} = 0.37 < 1.9$. Also, we then checked the unit root at level based on the trend and intercept criteria and got the same result from the p-value at 5% significance level. Now, at first difference, at intercept form, the estimated coefficient and standard error are, (-0.871829) and (0.199175), correspondingly, giving the ADF test-statistic value of (-4.38). At the present, t-statistic confirms significant results (as$|4.38| > 1.9$), which means that at first difference, we

[21] This argument is based on only for the intercorrelations among independent variables.

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have no unit root in the dependent variable. The similar guideline is followed for the rest of all explanatory variables. At the final note, results of the ADF test indicate that all of the explanatory variables are stationary at their level because their plots have the mean reverting behavior.

d) Optimal Lags Selection

The ARDL bounds test methodology as established by Pesaran at al. (2001) involves an appropriate lags length in dataset to eliminate any serial correlation. Empirical results of long run relations among variables are highly responsive to lag length specified in the econometric model (Bahmani-Oskooee and Bohl, 2000). The optimal order of lag length has been chosen by determining the 1st difference of the conditional ECM of time series ARDL. There are many criteria for selecting the order of adequate lag length, but the most important criteria among them are the Akaike Information Criterion (AIC) and Schwarz Information criterion (SC). In this paper, the optimal lag is selected based on the ground of minimum value of AIC. According to the AIC criterion, lower the value of AIC, better the model. There is confirmation that the F-statistic calculated value of the ARDL model is very much sensitive to the choice of order of lag in the economic model. In the presence of adequate lag order, the researchers can get unbiased, efficient and reliable empirical verdicts. Detailed outcomes are listed in the following table 5.

Table 5: Results of lag length selection

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-43.03034	---	0.000506	3.762427	3.957447	3.816517
1	59.59903	164.2070	5.06e-07	-3.167922	-2.192822*	-2.897471
2	83.65918	30.79699*	2.97e-07*	-3.812735*	-2.057553	-3.325922*
*indicates lag order selected by the criterion						

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final Prediction error AIC: Akaike Information criterion

SC: Schwarz Information criterion HQ: Hannan-Quinn information criterion

Source: Outcome from EViews 9

From the table 5 above, we can see that there are many criteria to choose the number of lags that can be used in the system equation. According to the AIC criterion, 2 lags should be used in the dataset before for going into the long run relationship among variables in the model.

e) Testing for Cointegration

A large number of procedures for testing cointegration among variables have been suggested in the econometrics literature. In order to check for the long-run relations among variables, we have calculated the test statistic of the F-test by the ARDL bounds test, applying the unrestricted OLS technique following equation 7. The following null hypothesis has been tested against the alternative hypothesis using the ARDL bounds test and its thorough results are given in table 6.

H_0: No long-run relationships exist among variables

H_1: Long-run relationships exist among variables

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Table 6: Results from ARDL bounds test

ARDL Bounds Test to Cointegration			
Estimated Equation: $MI_t = f(IR_t, EX_t, CPI_t)$			
Selected Optimal Lags/AIC Lags: 2			
Test Statistic	Value	k***	Conclusion
F-statistic	12.51466*	3	
Critical Value Bounds			Cointegration[22]
Significance	I(0) Bound	I(1) Bound	
10%	2.72	3.77	
5%	3.23**	4.35**	
2.5%	3.69	4.89	
1%	4.29	5.61	
Note: I (0) show lower critical bound value and I (1) represent upper critical bound value.			
*specify significant at the 5% level			
***k is the number of independent variables for explained variable in ARDL model			

Note: **The above, I (0) and I (1) tabulated values (which are, 3.23 and 4.35 at 0.050 or 5% significance level) for an F-statistic is obtained from Table CI (iii) Case III: Unrestricted intercept and no trend introduced by Pesaran et al. (2001).

Source: Outcome from EViews 9

Table 6 indicates the calculated F-statistic and its critical values at 1%, 2.5%, 5% and 10% significance level in both polar extremes, i-e. at level 1(0) and at first difference 1 (1). The empirics show that the F-statistic computed value (which is 12.51) falls above the upper bound I (1) and is more than 4.35 of the F-test critical value at 5% significance level given by Pesaran et al. (2001), and therefore we can reject the null hypothesis. This finding concludes the presence of cointegration among examined variables, i-e. the stock market index is cointegrated with interest rate, exchange rate and inflation rate when the KSE-100 index appears as a dependent variable in the model.

f) Long Run ARDL

Cointegration of two or more than two time series variables implies that there exists an equilibrium or long-run relationship between them. Table 7 reports the empirical verdicts of long-run relations among regressors of the proposed ARDL model (1, 2, 0, 2) via SBC.

Table 7: Long-run ARDL Estimates

Dependent Variable = lnMI				
Selected Model: ARDL (1, 2, 0, 2)				
Variable/Regressor	Coefficient	Standard Error	t-statistic	Probability
Constant (C)	1.213949	1.275963	0.951398	0.3556
$\ln IR_t$	-5.919177	0.763974	-7.747877*	0.000
$\ln EX_t$	0.331953	0.421151	0.788204	0.4421
$\ln CPI_t$	2.597753	0.401570	6.468998*	0.000
Note: *indicate significance level at the 1%				

Source: Outcome from EViews 9

[22] It means that despite being in isolation nonstationary series, but its linear combination between or among time series variables can be stationary.

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The finding shows that an increase in interest rate reduces in stock market index points. The effect of interest rate on the stock market performance of Pakistan is greatly significant at the 1% level of significance. The estimate (-5.9) of lnIR indicates that a 1% increase in bank rate leads to an about 6 percent (5.9%) fall in stock market index points in the long-run. Similarly, the inflation rate is another highly significant time series to the stock market performance. At the 1% significance level, the effect of inflation rate on the stock market index points is positive. The coefficient of lnCPI, which is 2.6 after being rounded-off, shows that a 1% rise in inflation rate leads to an increase in market index points by 2.6% in the long-run. Finally, the coefficient on the exchange rate (lnEX) signifies a positive impact on lnMI. That is, the coefficient of lnEX on lnMI is positive, comparatively smaller and statistically insignificant. It means that if the exchange rate depreciates by 1% results in a 0.33% rise in market index points[23]. The results in this study support the findings of Solnik (1987) who conducted his study on the western market economies. Basically, the cointegrating equation can be written as:

$$Cointegrating\ Equation = lnKSE - (-5.9192 * lnIR + 0.3320 * lnEX + 2.5978 * lnCPI + 1.2139)$$

g) Short Run Dynamics

The ECM proposed by Engle and Granger is a technique of analyzing the short term behavior of a variable with its long term behavior over the time. If the economic variables are found to be cointegrated with each other, the disturbances from the long-run regression can be applied to empirically estimate the error correction model and to examine the long-run plus short-run effects of the economic variables and to notice the adjustment coefficient. The numerical results of the error correction version of the proposed ARDL model by following equation 8 are given below in table 8.

Table 8: Short-run Model Estimates

ECM Demonstration of the ARDL (1, 2, 0, 2) Model				
Explained Variable = $\Delta lnMI_t$				
Variable	Coefficient	Standard Error	t-statistic	Probability
Constant (C)	0.355340	0.068209	4.769783	0.0001
$\Delta lnIR_t$	-0.613661	0.313121	-1.959500	0.0677**
$\Delta lnEX_t$	0.154450	0.212571	0.726581	0.4780
$\Delta lnCPI_t$	0.083637	0.174987	0.477963	0.6391
ECM_{t-1}	-0.465275	0.091125	-5.105890	0.0001*
Note: * and ** shows significance at 1% and 10% level, respectively				

Source: Outcome from EViews 9

From the above table, coefficients of economic variables with delta symbol (Δ) indicate the short-run elasticity estimates or short-run coefficients. The estimated results show that in the short-run IR_t once more is the main significant economic variable responsible for the upward trend in the stock market performance. Evidence shows that a rise in interest rate in the short-run causes a decrease in market index points. For instance, a 1% increase in interest rate decreases stock market index points by 0.61% at 10 percent significance level. On the other side, the impact of exchange rate depreciation is positive but statistically insignificant at 10% significance level. It means that a one percent change in exchange rate will raise market index return of 0.15%. And, the short-run impact of inflation rate on the KSE-100 index is although positive but statistically insignificant.

The last term in the above table (ECM_{t-1}) is the one period lag error of ECM given in equation 8, and is called the equilibrium residual of one period lag. This term is also known as the ECT that directs the macroeconomic variables of the system to reinstate back to original equilibrium position, i-e. Actually, it corrects the disequilibrium of the system. The sign before omega (ω) or the sign of ECT term should be expected negative after estimating equation 8. Its value tells us at what rate or speed it corrects the preceding period deviation of the given system. When 'ω' is significant and having negative sign, it corroborates that there exists a long-run equilibrium relations among all

[23] All of the estimated coefficients values in the table are interpreted in the percent form because all the included variables in the ARDL model are in log from.

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economic variables declared in equation 8. The result confirms the negative sign of ECMt-1 (lagged ECM) and is found high statistically significant at the 1% level of significance which gives validity to the existence of equilibrium linkage among the particular macro variables. Nevertheless, the speed of adjustment from prior year's disequilibrium in stock market return is 46.53% annually.

h) Recursive Residuals Testing

This section explains a figure of the recursive residuals about the straight zero line. In the plot, plus and minus two S.Es (standard errors) are too revealing at each point. Residuals exterior the S.E bands advocate instability in the parameter estimates of the equation. The goodness of fit for the ARDL specification is inspected via stability tests, e.g. CUSUM (cumulative sum of recursive residuals) and CUSUMSQ (cumulative sum of squares of recursive residuals), developed by Brown, Durbin and Evans (1975). These diagnostic statistics were applied to analyze the stability of short run plus long run parameter estimates. The CUSUM statistic is given in equation (9) as under:

$$CUSUM_t = W_t = \sum_{r=k+1}^{t} \frac{w_r}{s_r} \qquad (9)$$

Where, W = the recursive residual, s = S.E of the regression fitted to all T sample size, t = k+1, …, T

If the β vector remains constant, then $CUSUM_t$ has zero mean [i-e. E (W_t) = 0] and variance that is proportional to t – k - 1. But if β vector doesn't remain constant, $CUSUM_t$ will incline to diverge from the mean line. Similarly, the CUSUMSQ statistic is given in equation (10) as under:

$$CUSUMSQ_t = S_t = \frac{\sum_{r=k+1}^{t} {w_r}^2}{\sum_{r=k+1}^{T} {w_r}^2} \qquad (10)$$

If the parameters remain constant, then the expected value of 'S' will be as,

$E(S_t) = {(t-k)}/{(T-k)}$ which goes from 0 at t = k to one at t = T.

Pesaran et al. (2000, 2001) advocated that both statistics are suitable in checking for stability of parameters in such kind of models. The plot of both CUSUM and CUSUMSQ is significant at 5% significance level indicating the parameter or variance stability. These both stability diagnostic tests were used to check for the stability of short run and long run parameter estimates. For this reason, both the stability tests have been conducted and the outcomes are given in figure 2 and figure 3 below. The plot of the CUSUM test shows that the residuals are beyond the red extreme lines, signifying that our model is not stable which means that the dependent variable is not stable. Conversely, the plot of the CUSUMSQ test stays within two polar bounds at the 5% significance level, confirming that the selected time series model is stable structurally.

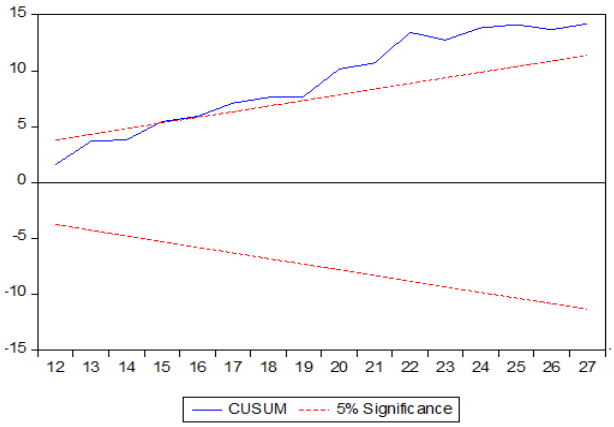


Figure 2: Plot of the CUSUM test

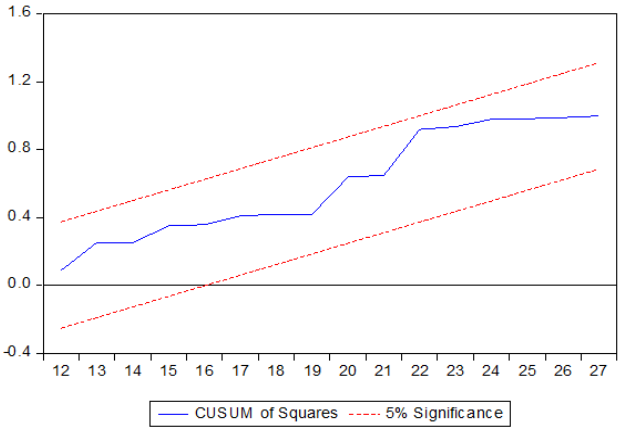


Figure 3: Plot of the CUSUMSQ test

Note: The straight line symbolizes critical bounds at 5% level of significance for each plot

i) Other Diagnostics Tests

Besides the recursive residual statistics, other relevant diagnostic tests have also been applied to the model for checking its strength, suitability and validity.

i. *Testing for Serial Correlation*

Autocorrelation or serial correlation is normally found in the time series dataset and is regarded as the problem of time series data. There are many tests in the literature such as the Durbin-Watson (D-W) test, Durbin's h test, Breusch-Godfrey LM test, etc. which are applied to check for serial correlation. The Breusch-Godfrey LM test is the most recognized tests for checking the presence of serial correlation (for higher order) as other alternative tests carries several drawbacks. For example, (i) the D W test may provide inconclusive outcomes; (ii) this test is not practical when a lagged dependent variable is there; and (iii) this test

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doesn't take into account higher orders (two or more lags) of autocorrelation. Due to such reasons, Breusch and Godfrey (1978) introduced an LM test (the Lagrange Multiplier) which we have applied in this study.

H_0: *Residuals are not serially correlated (no autocorrelation)*

H_1: *Residuals are serially correlated (autocorrelation)*

The LM test verdicts are reported in table 9 which shows that there exist serial correlations up to 2 lags, and hence we reject the null hypothesis of no autocorrelation at the 5% level of significance as the corresponding probability value of the observed R^2 is less than 5% (3.01%).

Table 9: Results of the Breusch-Godfrey test

Breusch-Godfrey Serial Correlation LM Test				
Second-order Serial Correlation (second-order s.c.)/Lags 2				
F-statistic	2.726027	Prob. F (2, 14)	0.1000	Conclusion
Obs* R-squared	7.007042	Prob. Chi-Square (2)	0.0301	Serial Correlation

Source: Outcome from EViews 9

ii. *Testing for Heteroskedasticity*

In the views of Stock and Watson (2003), the presence of heteroscedasticity is more probable to happen within a cross-sectional data. But this conclusion doesn't mean that the problem of heteroscedasticity in time series frameworks is not possible. There are many ways of detecting heteroskedasticity such as the Breusch-Pagan LM test, the Glesjer LM test, the ARCH test, the Harvey-Godfrey LM test, etc., but the most widely accepted one is the White's test (1980). This test has many advantages such as, it doesn't presume any earlier determination of heteroscedasticity and it doesn't depend on the normality assumption. The null hypothesis of heteroskedasticity against its alternative hypothesis is:

H_0: *Errors are homoscedastic (Homoscedasticity)*

H_1: *Errors are not homoscedastic (Heteroskedasticity)*

Table 10: Results of the White's test

Heteroskedasticity Test: White				
F-statistic	1.016188	Prob. F (8, 16)	0.4623	Conclusion
Obs* R-squared	8.422786	Prob. Chi-Square (8)	0.3933	Homoskedasticity
Scaled explained SS	3.626357	Prob. Chi-Square (8)	0.8892	

Source: Outcome from EViews 9

The White's test results as shown in table 10 demonstrates that the corresponding probability value of the observed R^2 is 39.33% > 5%, consequently we can admit our $H_{0,}$ meaning that the proposed model does not have the issue of heteroskedasticity which is a good signal for the model adequacy.

iii. *Testing for Normality*

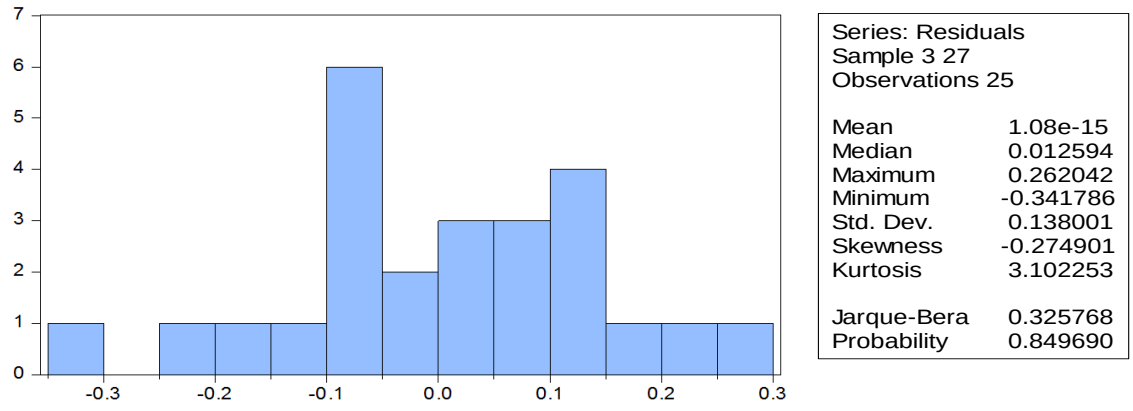
Testing of hypothesis assumes that the selected model for empirical investigation must be good in the sense that it doesn't violate the basic assumptions of the CLRM[24]. Therefore, one such test is the normality test which is used to investigate whether the residuals (or the disturbances) follow normal distribution or not. Since in small sample sizes as the case here, the *t, F* and chi-square tests necessitate the normality assumption, therefore it is required that this basic assumption be checked formally. For this purpose, the Jarque-Bera test (1987) has been applied to check for the following null hypothesis against the alternative hypothesis.

H_0: *Residuals follow normal distribution*

H_1: *Residuals are not normally distributed*

[24] CLRM stands for the Classical Linear Regression Model

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Source: Outcome from EViews 9

Figure 4: Normality of Residuals of a Regression line

In the figure 4, the x-axis plots the residuals and the y-axis plots the number of observations taken for this particular study. Application of the J-B test illustrates that the J-B statistic is 0.325768, and its corresponding p-value is 0.849690 (or 84.97%) which is more than 5%. Hence, we are not in a position to reject the null hypothesis that the residuals are normally distributed which fulfills the required assumption of a best regression model. And lastly, the statistics shows that the model specification is well constructed which is a good sign for the regression model.

VI. Conclusion and Policy Implications

In this research paper, we explored empirically the relationship of stock market return with interest rate, exchange rate and inflation rate in Pakistan uses the time series annual data for the period of 1991 to 2017 employing various econometric frameworks. The test results of unit root, illustrate that the economic variables under consideration are mixed stationary. The ARDL procedure to cointegration has been applied to find out the long-run relationship between all the variables that are included in this empirical study. The findings propose that there exists a long-run correlation between interest rate, exchange rate, inflation rate and the KSE-100 index. The results of the selected ARDL model expose that interest rate has a negative and inflation has a positive influence on the PSX index in the long run, and coefficient estimates of both the regressors were found highly statistically significant. Likewise, the exchange rate has a positive, but insignificant impact on the market index in the long-run.

The estimated error correction coefficient of the ARDL procedure signifies that about 46.53% disequilibrium of the KSE-100 index from its long-run equilibrium path is corrected per annum in the short-run. The results of the CUSUMSQ test suggest that the incorporated model is stable structurally. Similarly, other diagnostics passes the short run model as a best regression model.

Based on the above empirical results, we recommend some policy steps in order to boost the financial sector of Pakistan. The healthy stock market can be encouraged by reducing further the bank rate by the regulatory authority of the monetary policy of the State Bank of Pakistan. The use of bank rate in stimulating PSX market is not receptive to the inflation rate. High bank rates were helpful in discouraging the higher economic growth, whereas the low bank rate would encourage stock market financial activity. Similarly, the reduction in bank rate has a positive impact on the inflation rate of the country. During the periods of higher bank rate, the inflation rate was also higher, and vice versa. Therefore, to curb with the highest inflation rates in the future the monetary authorities need to reduce the bank rate. Besides, the regulatory authorities need to prepare such policies which bring new investors into the stock market for business and will have accordingly favorable effect on the PSX market. If the stock market becomes well-developed, the depreciation of the exchange rate will be automatically stable. The results of this study also help foreign investors to consider the volatility of the PSX market into concern while decision making to invest here since the stock market volatility brings change in exchange rates so foreign investors can also foresee their exchange risk on account of volatility of stock returns.

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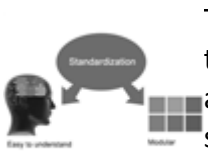
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TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

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28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

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30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

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Key points to remember:

- Submit all work in its final form.
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Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

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· Use paragraphs to split each significant point (excluding for the abstract)

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- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

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- Center on shortening results - bound background information to a verdict or two, if completely necessary
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- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

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- Explain materials individually only if the study is so complex that it saves liberty this way.
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- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

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- Report the method (not particulars of each process that engaged the same methodology)
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- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

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What to keep away from

- Resources and methods are not a set of information.
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The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



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Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
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What to stay away from

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- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

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- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

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- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
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- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

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	A-B	**C-D**	**E-F**
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Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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