

A study on relationship between stock market development and economic growth in Pakistan

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Those who eat Riba (usury) will not stand (on the Day of Resurrection) except like the standing of a person beaten by Shaitan (Satan) leading him to insanity. That is because they say: "Trading is only like Riba (usury)," whereas **Allah has permitted trading and forbidden Riba (usury)**. So whosoever receives an admonition from his Lord and stops eating Riba (usury) shall not be punished for the past; his case is for Allah (to judge); but whoever returns (to Riba (usury)), such are the dwellers of the Fire - they will abide therein.

Quran (2:275)

Dedicated to my Parents and Teachers
For their consistent support and encouragement

Acknowledgement

All praises are only for **Almighty Allah**; the most benevolent and the most merciful. Countless salutations and blessings upon the **Holy Prophet Muhammad (P.B.U.H)**; the last messenger of Allah and the greatest benefactor of humanity.

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Abstract

The capital market plays an essential role in the growth of the economy of the country. This is the rationale that the industrial bodies, government advisors and even the central bank of the country keep a close eye on the activities of the stock market. This thesis explores the relationship between the stock market development and economic growth in Pakistan for the period of 1988 to 2012. We investigated the stock market development and economic growth relationship by using the measure of stock market development (market capitalization of listed domestic companies) and the measures of economic growth (Real GDP, Money Supply M2, Consumer Price Index). The results revealed that development in stock market can be attained by increase in economic growth of a country.

Keywords: Stock market development, Economic Growth, Market capitalization of listed domestic companies, Measures of economic growth, Real GDP, Money Supply, and Consumer Price Index

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Chapter 1: Introduction

1.1 Background of the Study

Whenever financial condition of any country is analyzed, the stability of its stock market is always taken into consideration. A stock exchange gives access to institutional and private investors enabling domestic companies to raise capital.

Stock exchange's role in financial markets is crucial for the development of the financial industry of any country because it helps to raise capital for the companies as well as brings companies and investors together. The stock listed companies also have to follow the rules and standards set by the government. This ensures that stock listed domestic companies grow and prosper following proper code of conduct.

Even a country like Rwanda that is not acknowledged for having a developed economy depends on its stock market to enable businesses raise capital and give investors prospects and opportunities to support new and traditional companies. Rwandans are also expected to participate for building wealth by investing in their stock market as done by people in other nations. This proves that the role of the stock market in any economy is vital and global. (Cohen, 2011)

Activities in the stock market can intensely impact the economy and everyday buying behavior of general public. A downfall in share prices can cause widespread economic disruption. For example, the key factor that caused 1930's Great Depression was the stock market crash of 1929.

On the contrary, there can be less impact on the economy due to the daily movements in the stock market than anticipated. The stock market performed quite remarkably during the recession of 2009-13. Therefore, the stability of stock market during the recession was rather deceptive to the state of the economy. Hence, here it is pertinent to notice that an economic recession is not essentially caused by a drop in share prices. (Pettinger, 2015)

Hence, the connection of stock exchange's performance to economic growth of a country is very fundamental. The relationship between both has to be determined to discover the true correlation between measures of stock exchange and determinants of economic growth.

1.2 Problem Statement

The relationship between stock market development and economic growth can be seen, in general, in two ways.

- i. The possible impact the economic activity may have on stock market development.
- ii. The possible impact the stock market development may have on the economic activity.

Numerous researches have been carried out over the past couple of decades proving positive relation of economic growth with stock market development. Mostly the researchers have explored the effect of stock market development on economic growth of any country. However, this research carried out is different as it focuses on the effect that

economic growth has on stock market development leading to the following research question:

“How is stock market development related to economic growth in the Islamic Republic of Pakistan?”

1.3 Stock Markets in Pakistan

Karachi Stock Exchange was the first Stock Exchange to be established in Pakistan on 18th September 1947. It started with paid-up capital of 37 million rupees and five companies. Later independent stock exchanges in Lahore and Islamabad were opened up in 1970 and 1989, respectively.

Securities Exchange Commission of Pakistan (SECP) sets strict rules and regulations on which the listing on stock exchange is done. Table 1 shows the profile of all three Stock Exchanges in Pakistan.

All three stock exchanges i.e. Karachi Stock Exchange, Lahore Stock Exchange and Islamabad Stock Exchange had separate management, indexes, trading interfaces and listing criteria. Thus, they had no mutual link with each other. All three stock exchanges previously operated as non-profit organizations. The respective members of these exchanges had ownership as well as trading rights. This structure intrinsically created conflict of interest and apparently jeopardized the concern of the investors. Hence, Pakistan Stock Exchange Limited (PSX) was formed by merging these three stock exchanges. In January 2016, Pakistan Stock Exchange Limited came into being.

By market capitalization, Karachi Stock Exchange is one of the oldest stock exchange in South Asia, consisting of many Pakistani associations and overseas companies. Since 2009, Pakistani benchmark stock market index has been specified as third best performer in the world by Bloomberg. (Anon., 2015) Karachi Stock Exchange is also considered as best performing stock exchange in the world by Khaleej Times. (Khalid, 2015)

Table 1: Profile of Stock Exchanges in Pakistan - End-March 2015 (Source: Economic Survey of Pakistan 2014-15)

	KSE	LSE	ISE
Total Listed Companies	560	433	218
Total Listed Capital (Rs. In Billion)	1,177.8	1,096.1	894.4
Aggregate Market Capitalization (Rs. Billion)		6,395.0	5,020.7
Total Market Capitalization (Rs. In Billion)	6,760.8		

1.4 Economic Situation in Pakistan

In 1947, when Pakistan got its independence, it was a very poor country. Its economy mainly depended on agriculture. Since independence, the average economic growth rate of Pakistan has been greater than the world economy's average growth rate. In 1960s, the average annual real GDP growth rates were 6.8% (also known as the decade of development), 4.8% in the 1970s, and 6.5% in the 1980s.

In 1990s, the average annual growth rate fell to 4.6%, with significant decline in growth rate after 1995. The growth rate was also above average in Industrial-sector including manufacturing.

The 1960's era was known as decade of development. This is because in the late 1960s, Pakistan was appreciated as an example of economic development for other developing nations around the world. It received commendations for its economic development.

Later in 1990s, due to fiscal mismanagement and monetarily irresponsible economic policies caused a massive rise in the country's public debt. Hence, in 1990s there was a slower growth rate. However, after 2000, condition improved gradually.

Pakistan's economy mainly based on agriculture. Over the years industrialization has transformed Pakistan into a semi-industrialized country. According to World Bank Databank, the GDP per capita (constant 2005 US\$) has increased from 222.4 in 1960 to 813.7 in 2014.

According to World Bank Databank, in 2014 Pakistan had a Labor Force of 65,361,409.0 with 5.2 percent unemployed. The inflation in Pakistan in 2014 was 7.2 percent. The gross national income per capita in the year 2014 was Rs.143,192.7.

Pakistan's economy is basically based on three industries:

- i. Agriculture
- ii. Industry – Manufacturing goods
- iii. Services

Agriculture is the most dominating industry that forms Pakistan's economy. Figure 1 shows the composition of GDP. As seen from figure 1, Pakistan's GDP is basically agriculture based.

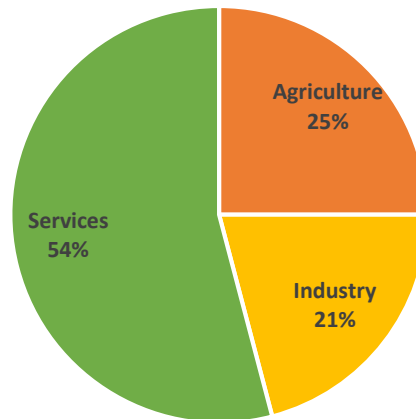


Figure 1: GDP composition in Pakistan (Source: CIA The World Factbook)

The percentage of labor force by occupation is shown in Figure 2. 33% of Pakistan's labor force is in services, 22% is in industry while the major chunk i.e. about 45% is in agriculture.

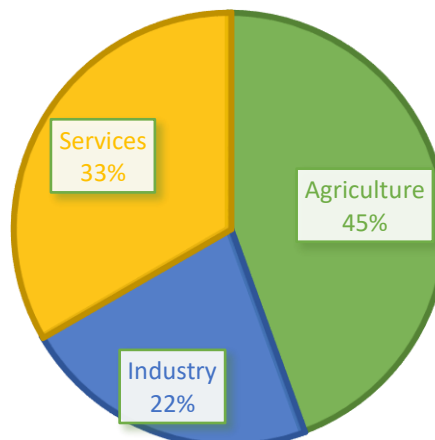


Figure 2: Labor Force - by Occupation (Source: CIA The World Factbook)

A summary of Pakistan’s economy in terms of GDP growth and inflation is represented in Figure 3. As seen from the graph in the figure, inflation has gradually decreased over the years while there is no substantial change in GDP growth rate over past four decades. Hence, the economy of Pakistan is suffering and there is no significant improvement in its economy.

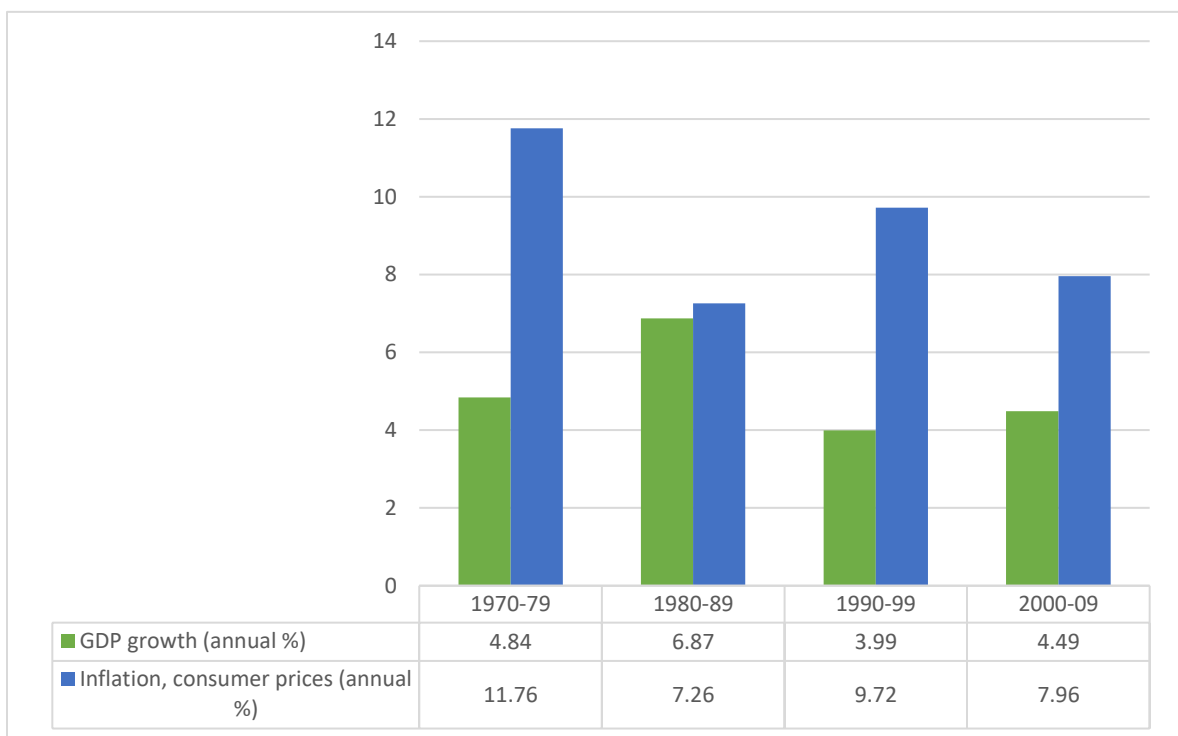


Figure 3: GDP growth and Inflation in Pakistan over the years (Source: World Bank Databank)

1.5 Objective of the Study

The relationship between stock market development and economic growth can be seen generally in two ways which are as follows:

1. Firstly, the stock market is the main sign of economic activity in the country.
2. Secondly, the stock market possibly may have an impact on aggregate demand

In other words, either ups and downs in stock market cause variations in macroeconomic variables like GDP, Money supply or CPI etc. or these variations are due to these macroeconomic variables. In the first case, it means that the stock market leads to economic activity, while the latter shows that it lags economic activity. Hence, it is an interesting issue to examine the cause and effects of macroeconomic variables on performance of stock exchange.

Therefore, it is also pertinent to understand and have knowledge of the relationship between stock price and macro variables in the light of many economic reforms occurring in developing countries. Beginning in the early 1990s, there was the amount of liberalization measures to reduce economy, privatization, and foreign exchange management, particularly for international investors. These actions have led to an important developments in the size and depth of the stock market in emerging countries where they began to play an appropriate role. (Husain & Mahmood, 2001) (Nazir, et al., 2010)

1.6 Significance and Rationale of the Study

Several studies have been done over the past couple of decades to show a positive relationship between stock market development and economic growth. In many cases, researchers are considering the impact of the development of the stock market on national economic growth. The research in this paper is that it is investigating the effect of economic

growth on the development of the stock market. As this area has been ignored by many researchers so this study will contribute to the reduction of gap in the literature.

1.7 Structure of the Study

Chapter 1 introduces to the topic explaining the significance of the topic selected for study. It also describes the objective of research and what research problem statement is being addressed in the thesis.

Chapter 2 is the theoretical framework. Theoretical framework guides the research, defining what things need to be measured and what statistical relationships will be analyzed in the study. It serves as the summary of past studies that have been carried out on the topic by various researchers and professionals.

Chapter 3 explains the methodology of the study i.e. what methods are used to carry out the research and study.

Chapter 4 is about the empirical results of the research. It has the details of the results deduced and observations made.

The study ends with Chapter 5 which is on the discussion and conclusion of the study. The topics covered under this topic are discussion, recommendations, limitation and conclusion of the whole study.

Chapter 2: Theoretical Framework

2.1 Stock Market Development

The world stock markets are booming in previous few decades and the developing markets have become an integral part of this boom. The development of the stock market, especially in developing nations have been extraordinary. This caused significant changes in capital flows from developed countries and financial structure of the under developed countries. The capitalization ratio is the main indicator for the development of the stock market i.e. market capitalization as a proportion of GDP. (Yartey, 2008)

It was found by Demirguc-Kunt and Levine (1996) that maximum indicators of the stock market are greatly associated with the growth in the banking sector. States with a strong stock market are most likely to have strong banking sector. Market capitalization as a percentage of GDP is a good measure of the development of the stock market because it is considered to be more subjective than other distinct indicators of stock market development.

Market Capitalization is the sum of product of market value of the shares and the total shares outstanding of all local companies listed on the stock exchange. Listed companies in the stock market do not include investment companies, mutual funds or other collective investment vehicles.

Companies and mutual funds are also categorized into three categories according to their capitalization: small cap, mid cap and large cap. This sorting of companies into different

caps allows for the assessment of risk versus potential growth for the investors. Historically, large cap companies have experienced slower growth with lesser risk. Similarly, small cap companies have endured high growth potential but with greater risk.

It is often misunderstood that larger the company, higher will be its share price although this is not true in reality. Therefore, two companies cannot be compared by just comparing their stock prices.

Yartey (2008) in his paper found that in emerging market countries, macroeconomic factors, such as gross domestic investment, private capital flows and income level of liquidity, and the development of banking services in the stock market are significant aspects in the growth of the stock market.

Political risks, the quality of bureaucracy and the law and order improve the feasibility of external financing and hence they are important factors of the growth and development of the stock market. This means that the political risk may be a significant feature in the development of developing stock markets.

Market capitalization of each country is shown in Figure 4. This shows that the size of the country does not influence capitalization of the stock market. China has the biggest economy among these countries although its market capitalization is smaller than Hong Kong. Population and GDP of South Africa and Taiwan is small while the stock market capitalization is similar to China. (Yartey, 2008)

A comparative study was carried out in 2011 on economic growth and stock market development by Z.Ahmad, A.A.Khan and A.Tariq between Pakistan and Bangladesh. The

dependent variable was taken to be GDP per capita growth in US\$ (in millions). Four independent variables were taken i.e. market capitalization in US\$ (in millions) as a measure of stock market size, volume of the stock market defined through the entire amount of listed companies, stock turnover ratio (in percentage) as a measure of liquidity of the stock market and the total value of stock traded (in percentage of GDP). It was noticed that only market capitalization is an important factor and greatly related to the real economic growth of Pakistan. (Ahmad, et al., 2012)

Stock market can increase domestic savings and can enhance the quantity as well as the quality of investment which accelerates economic growth. Stock markets also support economic growth by facilitating corporations to raise capital at lower cost. This reduces the risk of credit crunch by making corporations less dependent on banks for financing. The stock market also enables the individuals to finance long term investments by providing funds. (Baumol, 1960)

Yartey (2008) has mentioned that the growth of superior organizations can influence the appeal of equity investments and hence it can also lead to stock market development. Results of Yartey's paper revealed that institutional quality and political risk are intensely related with development in stock market capitalization. Another significant aspect in the development of stock markets in developing markets is the development of good quality institutions.

The return on stocks is highly sensitive to both fundamentals and anticipations. Studies in "Economic Forces and Stock Market Returns" have shown that the stock market is effected by both internal and external conditions. Exchange rate, stock prices in the world economy and interest rate are the external factors affecting the stock return. (Unknown, n.d.)

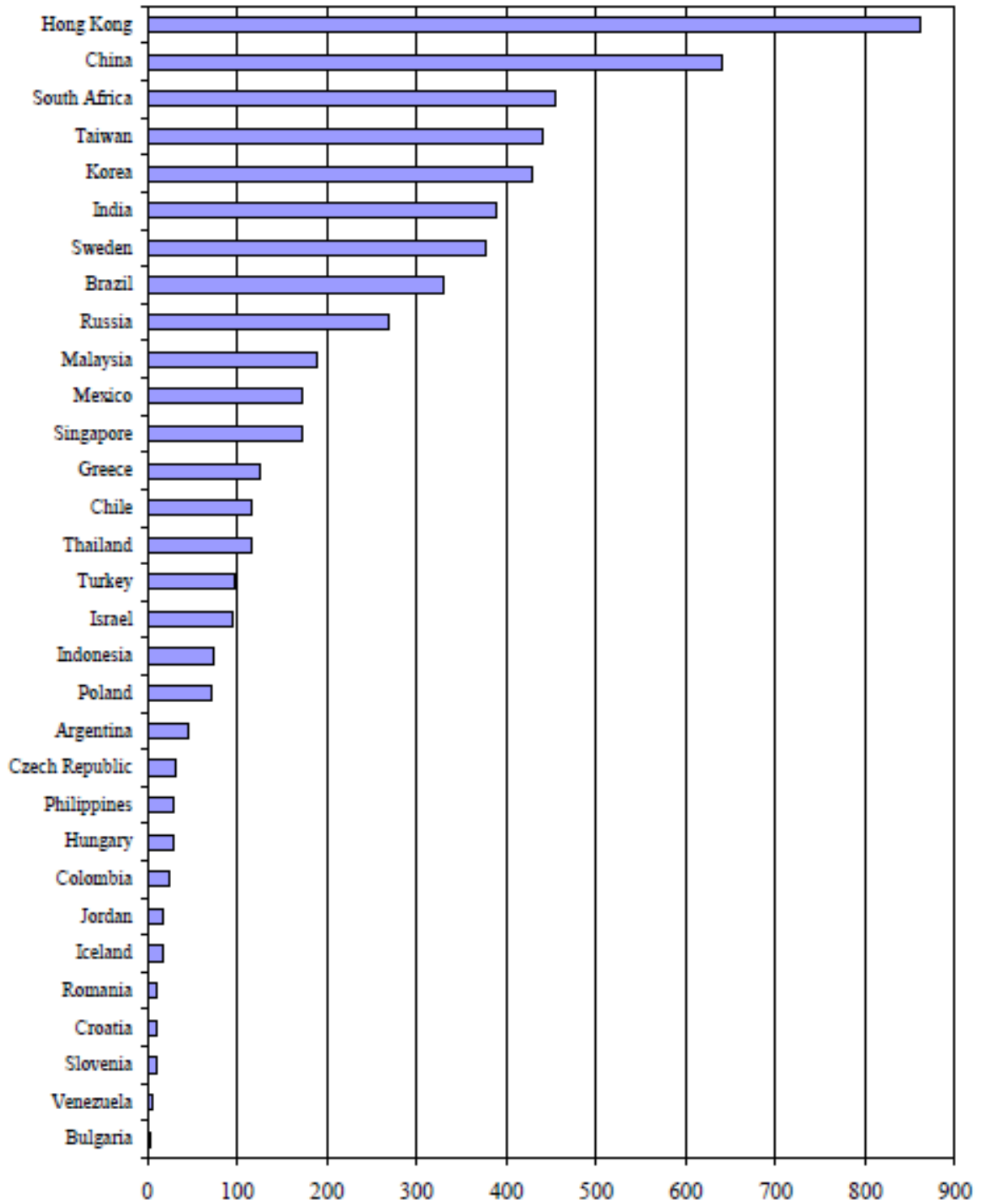


Figure 4: Stock Market Capitalization (in Billions of USD) - December 2004

2.2 Economic Indicators

Sen in his book has differentiated economic development from economic growth. Economic development is considered as a wider concept than economic growth. Economic growth is vital for development while development reflects both economic and social development. (Sen, 2001)

Experts of American Association of Individual Investors have declared ten indicators that are common and very vital in determining economic growth of United States of America. (Anon., 2015). These indicators were:

- i. Real GDP,
- ii. Money Supply (M2),
- iii. Consumer Price Index (CPI),
- iv. Producer Price Index (PPI),
- v. Consumer Confidence Survey,
- vi. Current Employment Statistics (CES),
- vii. Retail Trade Sales and Food Services Sales,
- viii. Housing Starts,
- ix. Manufacturing and Trade Inventories and Sales, and
- x. S&P 500 Stock Index.

Most economist have defined the following indicators to be effecting economic growth:

a) Real GDP

The real Gross Domestic Product is market worth of entire goods and services produced by economy in a definite period of time. This period is usually taken to be a year. The changes in inflation are minimized so it is called 'real'.

b) Money Supply – M2

Money supply M2 stand for the total money a country has in circulation. It includes all physical currency, assets in retail money market accounts and small money market mutual funds, individual time deposits and savings deposits.

c) Consumer Price Index (CPI)

The CPI is measure of individuals' cost of living changes i.e. it captures prices paid for goods and services for the specified period of time.

d) Producer Price Index (PPI)

Producer Price Index belongs to the family of indexes that measure the change in average selling prices of goods and services. This is measured for a specified time period.

e) Balance of Payment

It is the difference of value between country's visible and invisible exports and imports within a precise time period. It comprises of export and import of physical items as well as services. Balance of trade is a part of balance of payment.

2.2.1. Real GDP

The gross domestic product is considered as the main indicator of economy. Nobel Laureate Paul Samuelson defined GDP as “truly among the great inventions of the 20th century, a beacon that helps policymakers steer the economy toward key economic objectives”. GDP is the biggest sign of economic output and growth because it aggregates measure of the total economic output of the country.

Real GDP is GDP adjusted for price changes and hence inflation. This makes comparison easy against other historical time periods. The Central Banks use real GDP data to adjust the country’s monetary policy. Many experts use only real GDP to express economic growth of any country. Graph in Figure 5 shows the Economic Growth of Pakistan from 1961 to 2012. The Economic Growth is expressed as percentage change in Real GDP.

2.2.2. Money Supply (M2)

Usman & Adejare (2014) pointed out that experts have recently started giving more attention towards the relationship between money supply and economic growth. Some economists emphasize that discrepancy in the amount of money is the most significant factor of economic growth, while others state that money supply seldom cause much difference in economic activities of a country.

As per Dedola & Lippi (2000), there may not be a chance of economic growth devoid of a suitable money supply, credit and proper financial conditions.

In Pakistan, for measuring stocks and policy formation, three different types of monetary aggregates are used. M0 and M1 are narrow measures and M2 is a broader aggregate. The

M2 money supply consists of currency in circulation, demand deposits, and other deposits with SBP, time deposits and Resident Foreign Currency Deposits (RFCDs) of scheduled banks.

An assessment of financial assets show that an extensive range of financial instruments like liabilities of non-bank financial institutions, NSS tools etc. with same characteristics like time deposits are possible nominees to be considered for insertion in monetary aggregates. Also, the financial arena of the country has seen significant changes over the past one and a half decade. A number of new financial products have emerged, seeking both to reconsider the composition of existing groups and to determine the top ranking of monetary aggregates. (Khan & Hussain, 2005)

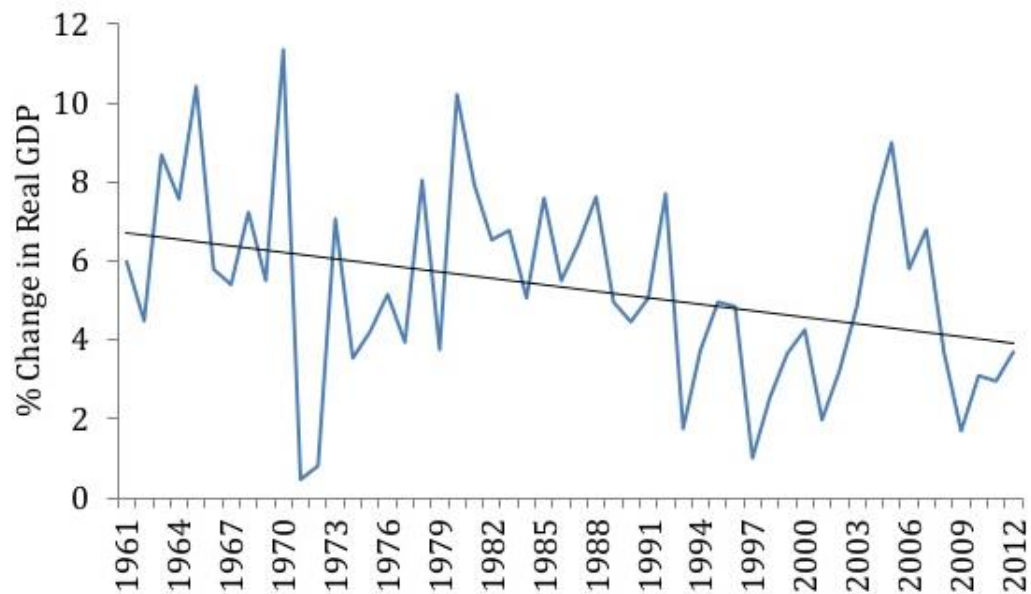


Figure 5: Pakistan Economic Growth as percentage of Real GDP (1961 to 2012)

Money supply is the aggregate sum of financial assets in the economy at a particular point in time. Consequently, M2 comprises of demand deposits of fiscal establishments and total currency that is in circulation. In Pakistan, money supply M2 is analyzed, disseminated, reported and issued by State Bank of Pakistan. Figure 6 shows that Money Supply M2 of Pakistan has gradually increased from 2008 to 2015.

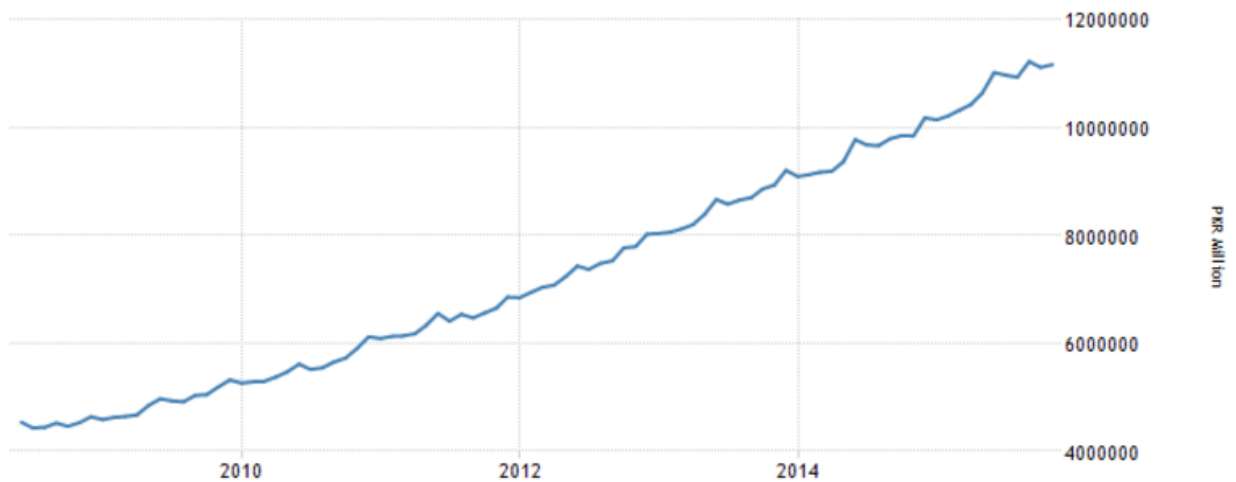


Figure 6: Pakistan Money Supply M2

Money is used in all economic transactions and hence, it has a strong influence on the economic activities of the country. The increase in money supply leads to lower interest rates and increased investment. More is the money offered to the consumers, more they spend.

Thus, demand of products increases which causes an increase in production. This causes businesses in the country to flourish. This could also lead to higher stock market prices as

companies issue more stocks and bonds. In this view, the money supply continues to increase. (Ihsan & Anjum, 2013)

2.2.3. Consumer Price Index (CPI)

Consumer Price Index (CPI) is the highly monitored economic statistics of most nations embodying the indicators of inflation. The consumer price index is calculated by taking the price fluctuation of each item within a given basket of goods. It is taking weighted average of the price while the goods are weighted according to their importance.

CPI is also one of the indicators on which monetary policy is based. Generally CPI of Pakistan has increased in the last decade mainly because inflation has increased. Figure 7 shows the Consumer Price Index of Pakistan over the last decade.

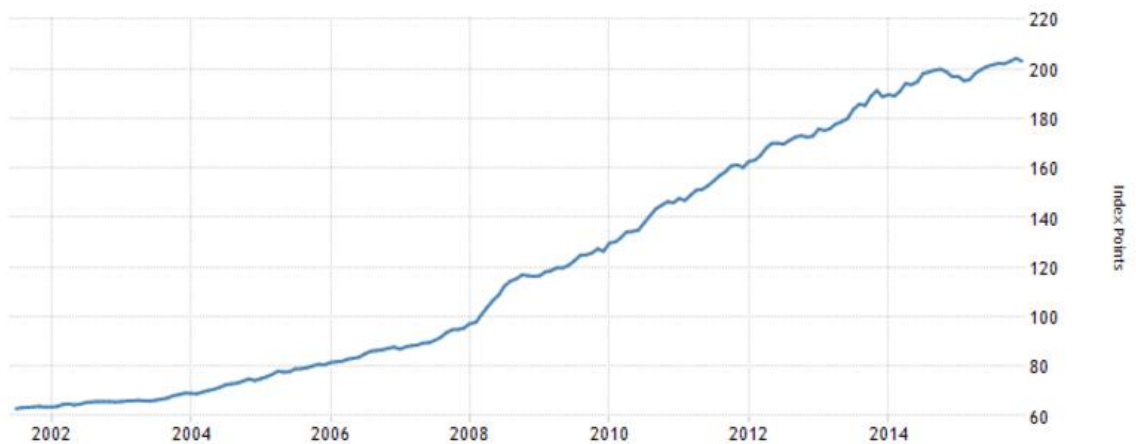


Figure 7: Consumer Price Index of Pakistan

2.3 Relationship between Stock Market Development and Economic Growth

A well-established stock market is always providing the prospects for funding and savings. The key purpose of a stock market is to help the borrowers and the savers by bringing together the savings from different pools and providing the platform to convert them into profitable investments.

A stock market is also useful for reallocation of resources in different sectors of the economy. The macroeconomic variables have significant concerns in selecting the stocks available in stock market. (Attari & Safdar, 2013)

Although some analysts view that stock markets does not have much role in economic growth while some studies has shown that economic growth and development is boosted up by stock markets. This evidence opens up a new door in literature in stock markets in economic growth (Levine, et al., 1998)

In principle, well developed stock markets allocate capital to useful investments and increase savings leading to an increase in economic growth. This in return provides a relatively lower cost for the source of investment.

A strong positive relationship has been observed in empirical evidence amid stock market development and economic growth (Atje & Jovanovic, 1993); (Levine and Zervos 1998) but there are few studies in which the authors have shown no relationship between stock

market growth and development e.g. Bencivenga, et al. (1991) who has studies the developing countries has clearly depicted results of no linkage between the two.

Further, (Atje and Jovanovic, 1993, Levine and Zervos, 1998) have studied developing countries rigorously and its results show that there is no evident association between stock markets development and progression in single framework.

There is mix of studies about the relationship between the two. It's uncertain to say that it is positive or negative. In study, Levine and Zervos (1998) has discovered a constructive link between stock markets and economic growth across different countries and this lead to the understanding of presence of strong association of both variables in developing countries.

Studies also reveal that present and future rates of economic development and production enhancement is correlated with stock market and bank by keeping few factors like economic and political factors constant (Yartey, 2008).

El-Wassal & Kamal (2005) researched about the association between stock market growth and economic growth. In its study, it focused on 40 developing markets for the time period of 1980 to 2000. This study showed that the economic growth is actually the leading factor for stock markets growth. Other factors than economic growth like financial liberalization policies and foreign portfolio investment also have an impact on development of stock markets.

Levine and Zervos (1998) study highlighted the liquidity measure of stocks worth more value for trade in market in comparison to size of the market and economy, at the same time it is certainly related to rate of economic growth. It also suggests that the banking

development level measured in ratio of bank loans to a private sector to GDP is also directly associated to economic growth.

This significant factor in stock market development in relation to economic growth is established by Beck and Levine (2001); and they have shown in its study that bank and stock market expansion significantly affects growth.

Rahman & Salahuddin escripted in their paper that short term as well as long term economic growth has an influence on stock market development. Similarly, public and private investments also have a significant impact on economic growth, therefore government must improve its financial sector and keep it efficient to keep the economy growing.

2.4 Cross-Country Relation Evidence of Stock Market Development and Economic Growth

Ahmad and other co-authors (2012) studied two countries i.e. Pakistan and Bangladesh for the relationship of stock market and economic growth. After carrying out the research it was found that Pakistan stock market has an impact on economic growth because its stock market is larger in size while Bangladesh's stock market plays a role in economic growth thorough liquidity of its stock market.

Ahmad's paper also revealed that the economic growth of Bangladesh was well than economic growth of Pakistan. Moreover, this study also says that in both countries the

stock market doesn't play a vital role in growth of its economy but the financial institutes play a driving role in growth and development.

Research carried out by Nagaishi (1999) saw the association of stock market expansion with economic escalation in India from the 1980s onwards. His findings indicated that significant linkages between stock market development and economic growth does not exist in the Indian context. The reasons specified were basically the deregulation of the stock market, volatile movements of domestic stock prices and unstable Balance of Payment positions.

Chapter 3: Methodology

There are basically two types of research methodologies: qualitative and quantitative. In this paper, quantitative research methodology is used. Following method has been carried out in this paper:

- i. Data was collected of all variables for which model was specified.
- ii. The model is specified based on dependent and independent variables.
- iii. The hypothesis is identified.
- iv. Statistical test was carried out to test the model.
- v. Empirical results were gathered.
- vi. The results were analyzed to examine the hypothesis.

3.1 Model Specification

In this research, following model is used:

$$SMC_t = \alpha + \beta_1 CPI_t + \beta_2 GDP_t + \beta_3 M2_t + \varepsilon \dots\dots Eq 1$$

SMC_t is Stock Market Capitalization at time t

CPI_t is Consumer Price Index at time t

β_1 is beta coefficient for CPI_t

GDP_t is Real Gross Domestic Product at time t

β_2 is beta coefficient for GDP_t

$M2_t$ is Money Supply M2 at time t

β_3 is beta coefficient for $M2_t$

α is the y-intercept

ε is the error term.

3.2 Dependent Variable

In our model, the dependent variable is the Stock Market Capitalization. Stock Market Capitalization is believed to be directly related to development of Stock Market. Therefore, greater the Stock Market Capitalization, greater is the country's Stock Market Development.

The relation of Stock Market Capitalization is seen with multiple independent variables.

3.3 Independent Variables

In our model, three independent variables are taken which are Real Gross Domestic Product (GDP). Money Supply M2 and Consumer Price Index (CPI). The effect of these variables is seen on stock market capitalization and hence on development of stock market.

3.4 Hypothesis

There are two hypothesis that are considered: Research Hypothesis and Null Hypothesis. The study is carried out for Pakistan to decide whether which hypothesis should be accepted and which one should be rejected.

3.4.1 Research Hypothesis

The Research Hypothesis states that Stock Market Capitalization in Pakistan depends upon the country's Real Gross Domestic Product (GDP), Money Supply M2 and Consumer Price Index (CPI).

3.4.2 Null Hypothesis

The Null Hypothesis states that Stock Market Capitalization in Pakistan does not depend upon the country's Real Gross Domestic Product (GDP), Money Supply M2 and Consumer Price Index (CPI).

3.5 Types and Source of the Data

The primary panel data's source is the World Bank. The definition and basis of various indicators taken from the World Bank's website is presented in tabular form in the Appendix. The reason to use data from World Bank is that it is one of the most credible sources of data.

The yearly data of the indicators from 1988 to 2012 is used. The country for which the historical data is collected is the country where the study is being carried out i.e. Pakistan.

The data of following indicators is collected:

- i. Market capitalization of listed domestic companies – It is in US Dollars
- ii. Consumer price index – The base year used is 2010 whose index is taken to be 100.
- iii. GDP at market price – It is in US Dollars as per prices of 2005.
- iv. Money and quasi money (M2) – It's unit is Local Currency Rate i.e. in PKR

The graph of Market Capitalization of Pakistan from 1988 to 2012 is shown in Figure 8.

The graph of Consumer Price Index of Pakistan from 1988 to 2012 is shown in Figure 9.

The graph of GDP at market price of Pakistan from 1988 to 2012 is shown in Figure 10.

The graph of Money Supply (M2) of Pakistan from 1988 to 2012 is shown in Figure 11.

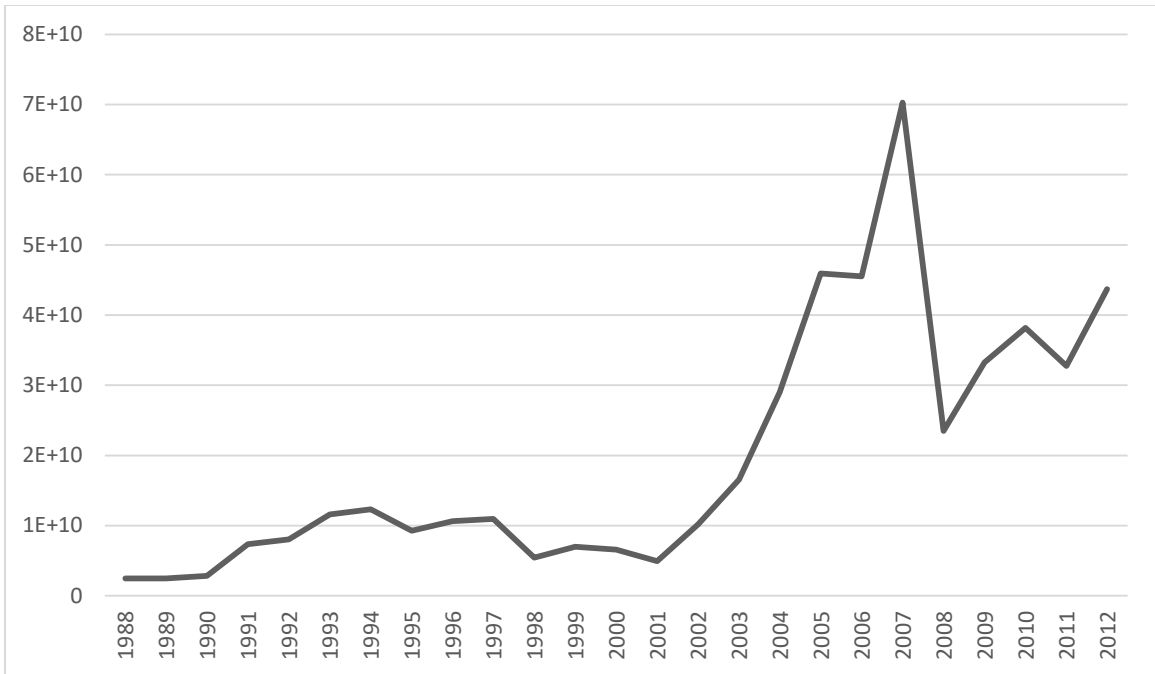


Figure 8: Market Capitalization of Pakistan (US Dollars)

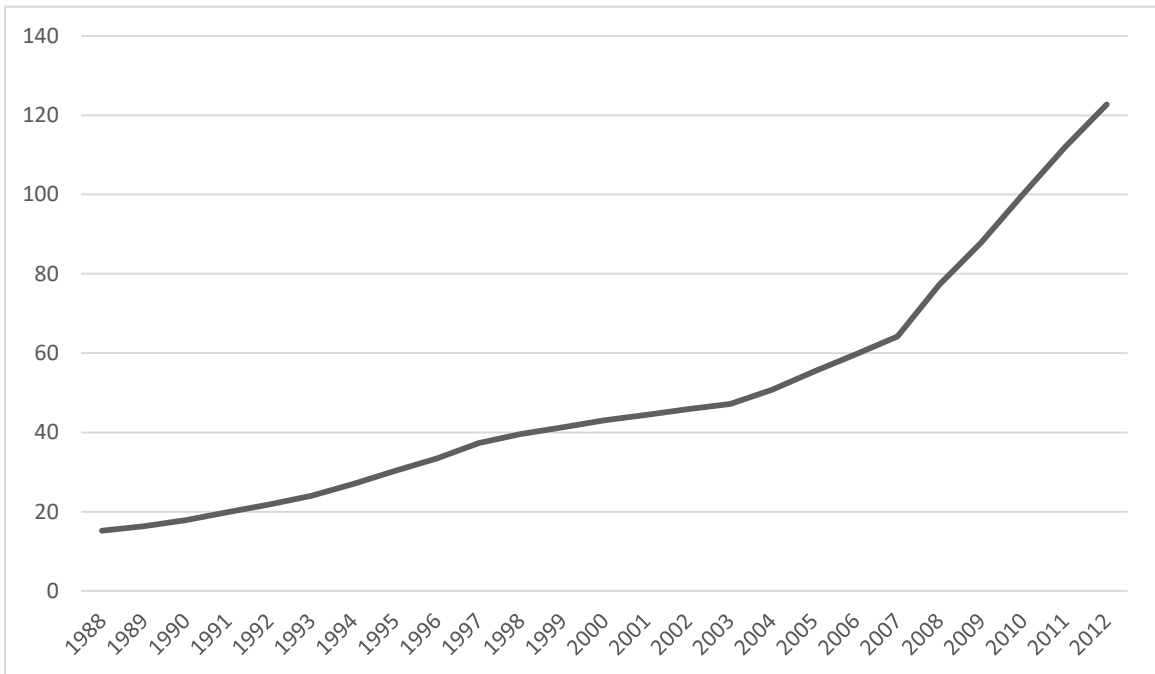


Figure 9: Consumer Price Index of Pakistan (2010=100)

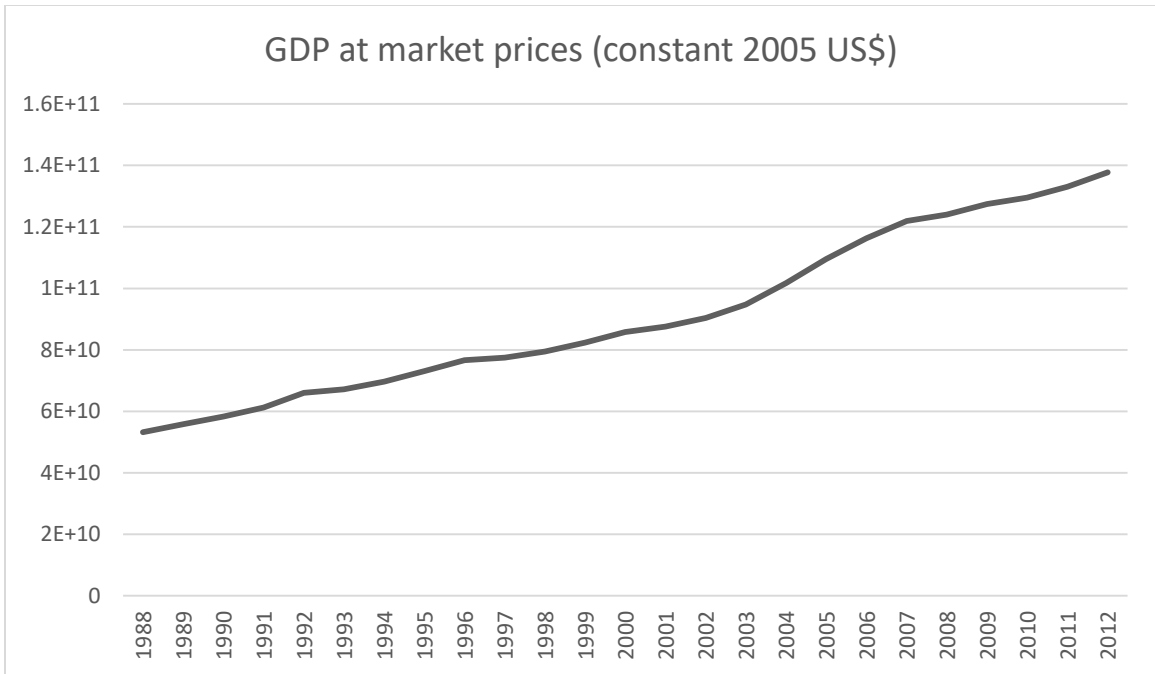


Figure 10: GDP of Pakistan at market prices (constant 2005 USD)

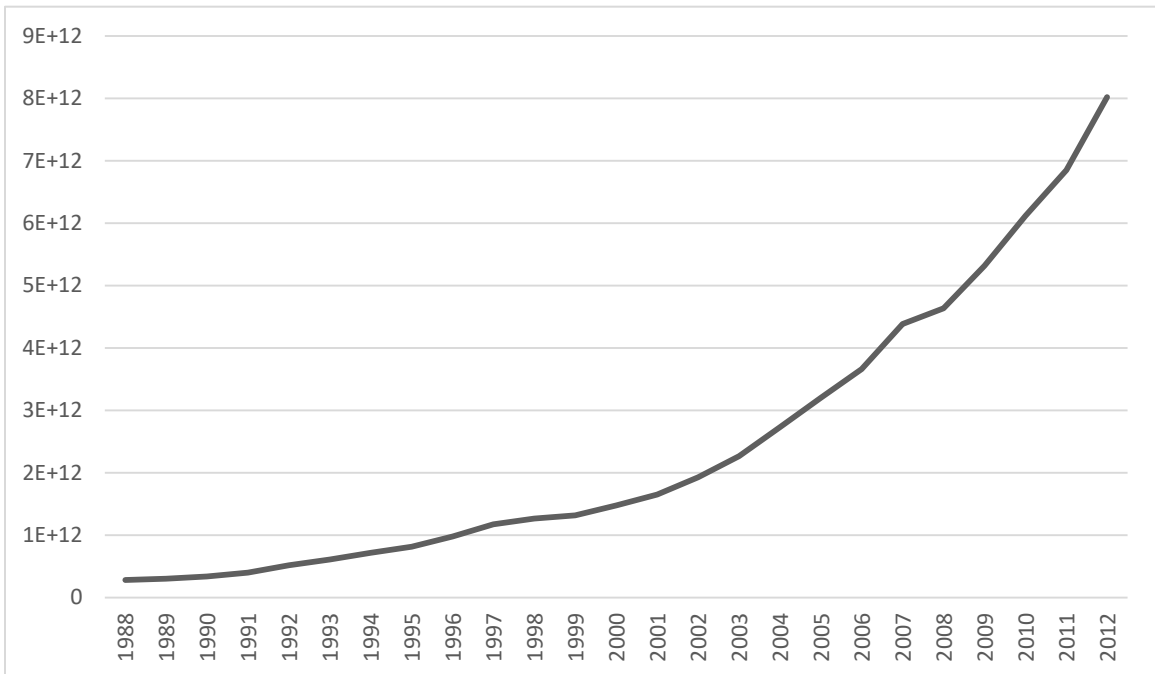


Figure 11: Money Supply of Pakistan in PKR

3.6 Statistical Test

The statistical test provides a tool for quantitative decision-making process or processes. This is required to determine whether there is enough evidence to "reject" a hypothesis about the process and this is called the 'null hypotheses.

The statistical tests allow us to reach conclusions because they can tell us whether the pattern we monitor is real or just due to chance. There are various kinds of statistical tests.

The decision of which statistical test to use depends on following factors:

- Research design,
- Data distribution and,
- The type of variable.

Generally, we use statistical test from set of parametric tests if the data were normally distributed and from a range of non-parametric tests, if the data is not normally distributed. If the data does not meet assumptions essential for parametric tests, then non-parametric statistical tests are used.

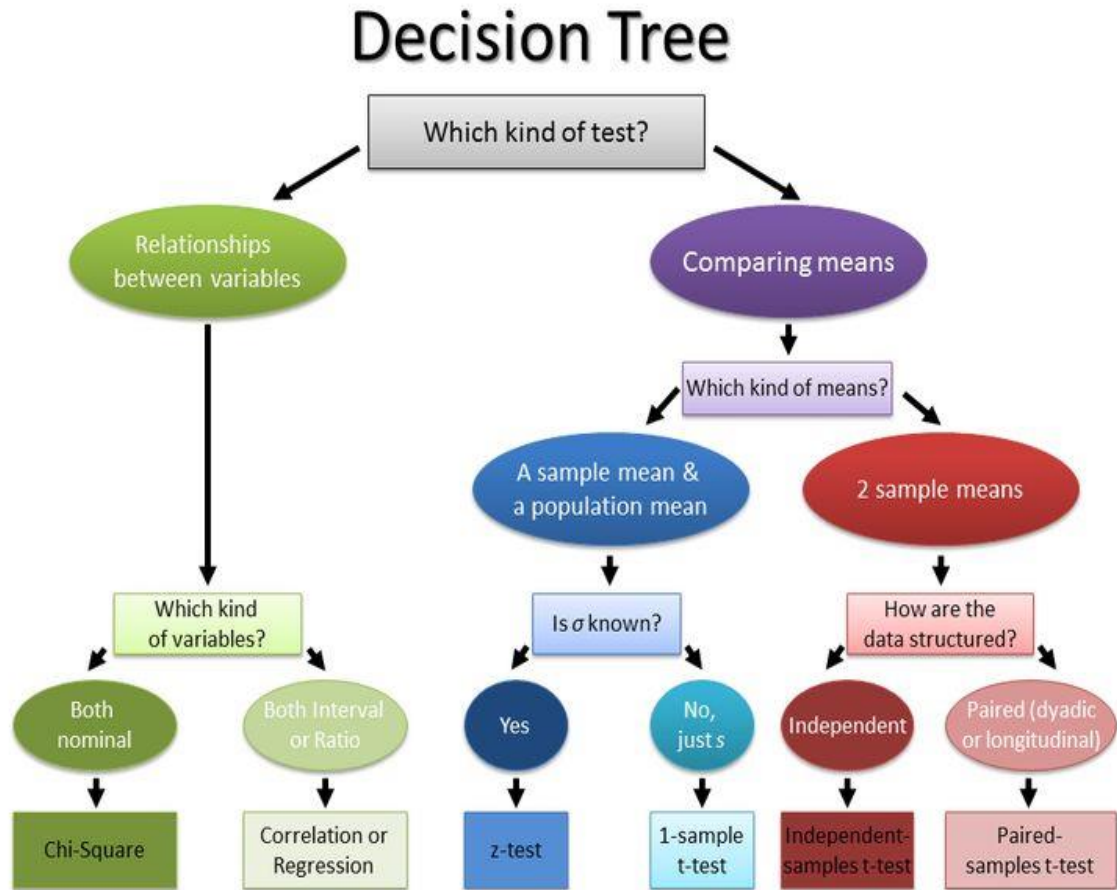


Figure 12: Decision Tree to select statistical test

The statistical test used in this study to comprehend the relationship between the dependent and independent variables as decided from decision tree in Figure 12 is Multiple Regression. Multiple Regression is used because of following reasons:

- It has one dependent variable
- It has several independent variables
- It can be used for prediction
- It recognizes the finest set of predictor variables

- As many independent variables can be entered, by viewing at all of them simultaneously, it also states which are best predictors
- It accesses causal linkages

Multicollinearity is when an approximate linear relationship holds among some or all the independent variables. To remove multicollinearity between independent variables, Partial Least Squares (PLS) test is used.

Chapter 4: Empirical Results

4.1 Overview

First of all, it is ensured that there is no patterns between independent variables and residuals. The residual plot is a graph showing the independent variable on the horizontal axis and the residuals on the vertical axis. If the points were distributed randomly around the horizontal axis in the residual plot, then linear regression model is suitable for the data or else non-linear model is more suitable.

Three typical patterns of random plots are shown in Figure 13, 14 and 15. Figure 13 shows a random pattern, which indicates a better fit for linear model. Figure 14 (U-shaped) and Figure 15 (inverted U) have non-random patterns and thus suggest best fit for a non-linear model.

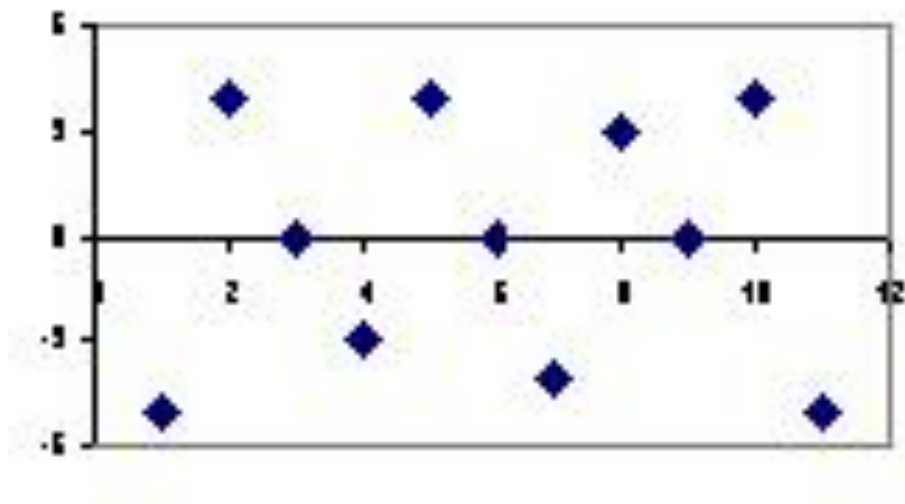


Figure 13: Random Pattern

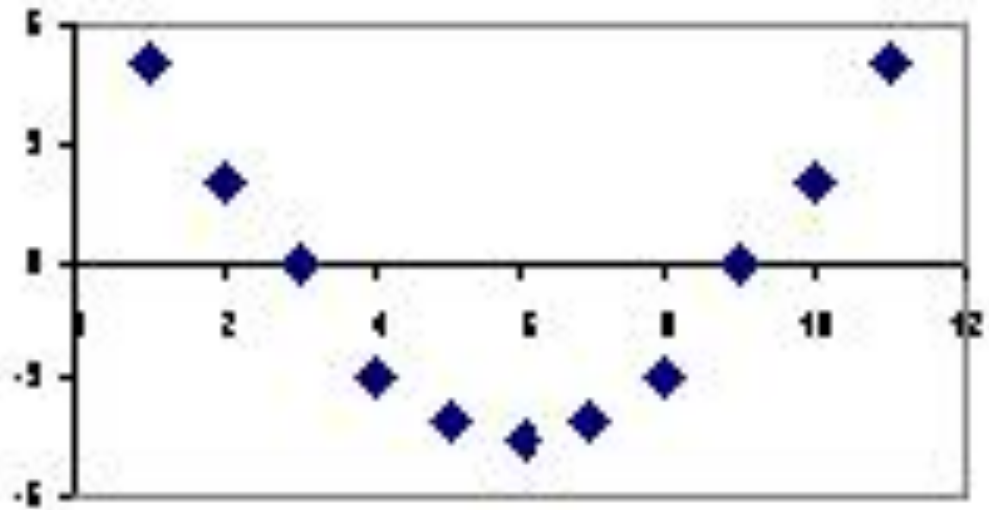


Figure 14: Non-random: U-shaped

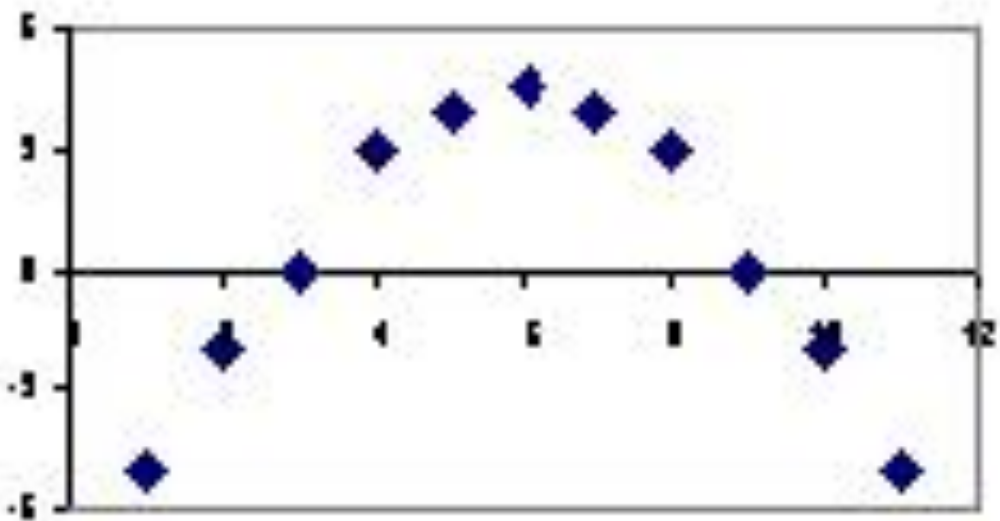


Figure 15: Non-random: Inverted U

To check whether linear regression model or non-linear model is more suitable for data, residual plots are plotted between independent variables and their residuals. The graphs obtained are shown in Figure 16, 17 and 18.

As seen from the Residual Plots, no pattern exists between each independent variable and residuals.

4.1.1 Real GDP

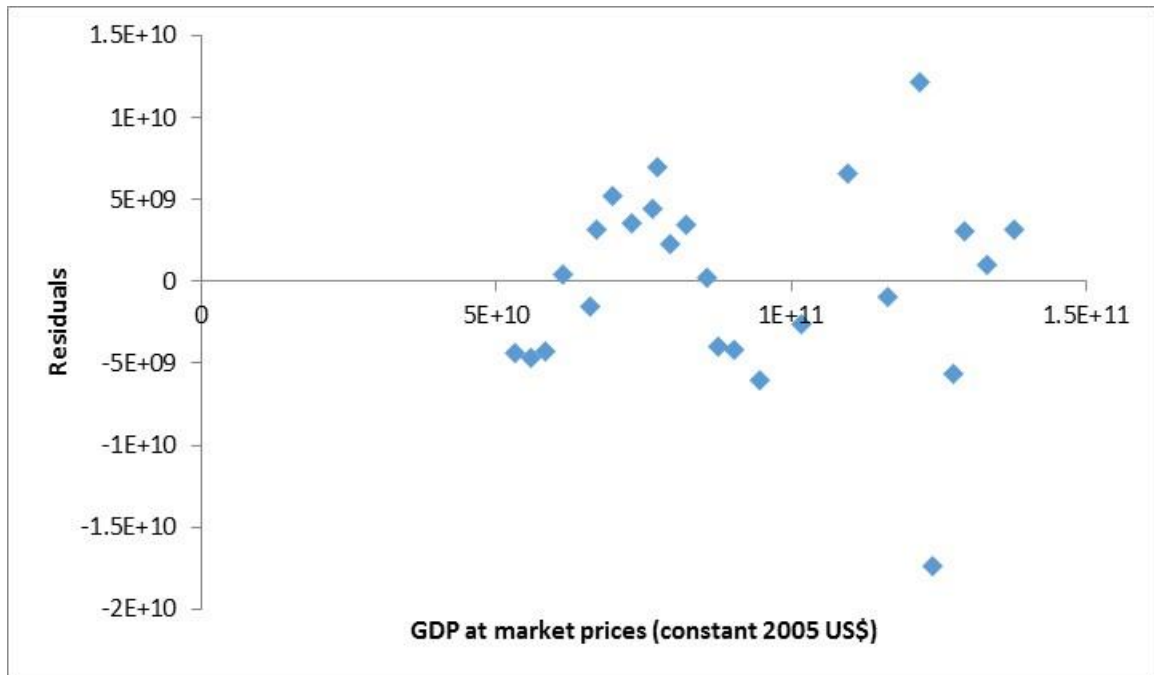


Figure 16: GDP at market prices (constant 2005 US\$) Residual Plot

4.1.2 Money Supply M2

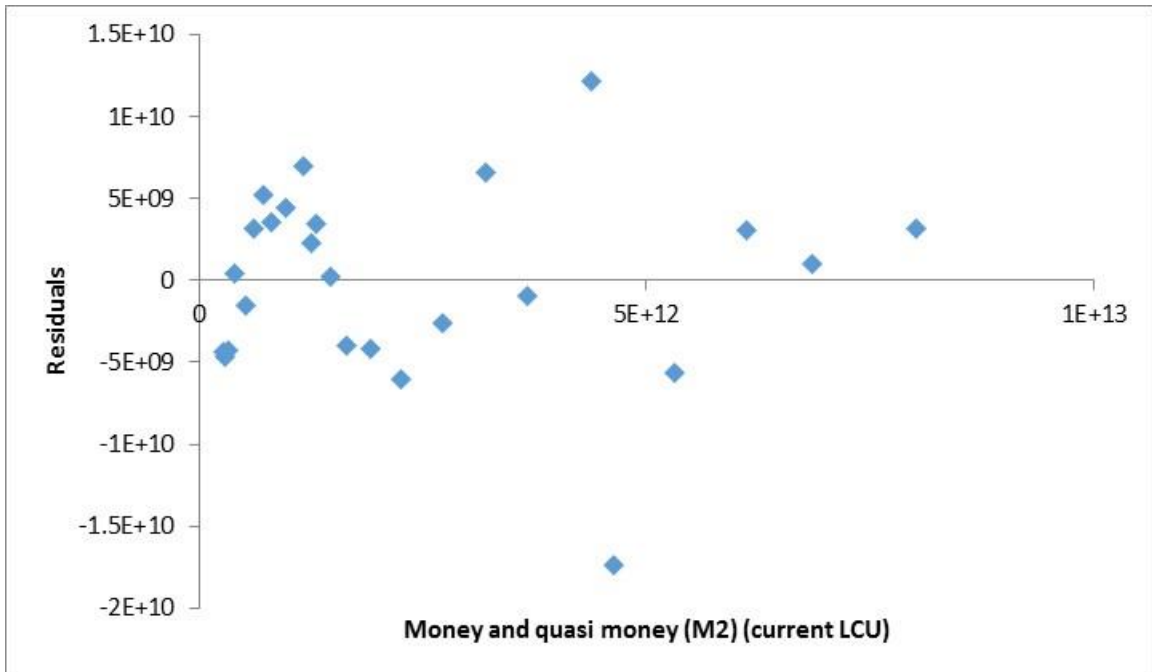


Figure 17: Money and quasi money (M2) (current LCU) Residual Plot

4.1.3 Consumer Price Index

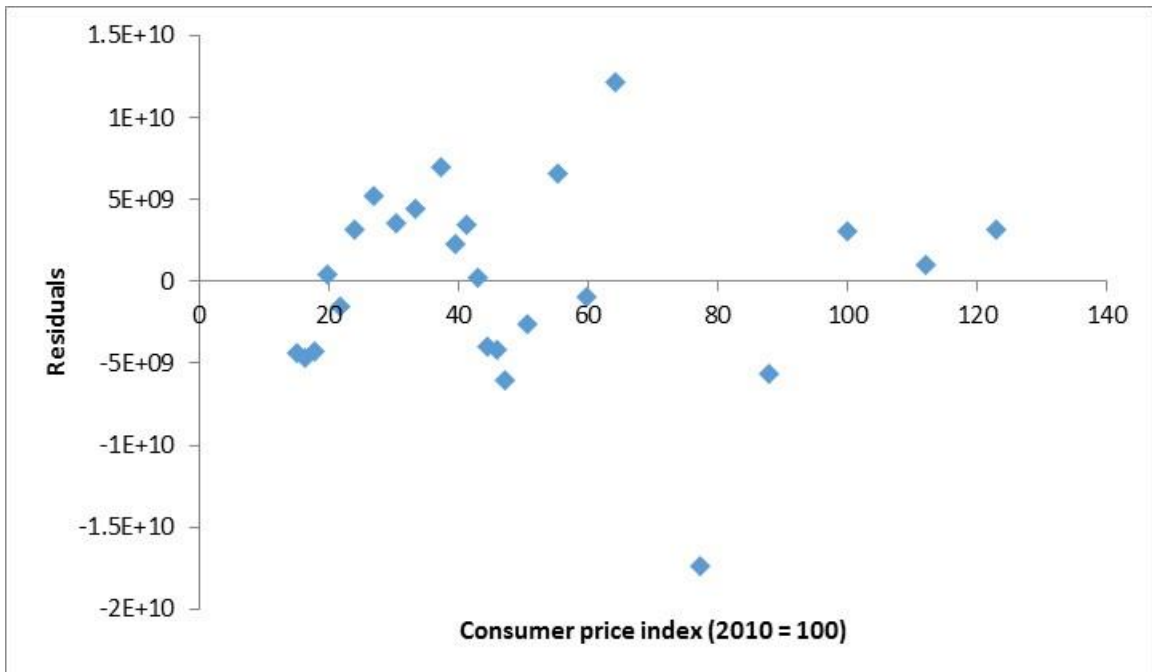


Figure 18: Consumer price index (2010 = 100) Residual Plot

4.2 Multiple Regression using MS Excel

Multiple regression is an extension of simple linear regression. It is used to predict the value of a variable based on the values of two or more of the other variables.

The Model Summary table is given in Table 2.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.945 ^a	.893	.878	6255946593.65063	.893	58.521	3	21	.000	1.876

a. Predictors: (Constant), M2, GDP, CPI

b. Dependent Variable: SMC

The R is Multiple Correlation Coefficient. R can be considered as a predictor of the quality criteria of the dependent variable.

As seen from Table 2, the value of R is 0.945 which suggests a good level of prediction.

The value of R-square indicates that how well the model fits the data. The value of R^2 is also called the determination coefficient. It is the amount of discrepancy in the dependent variable that can be described by the independent variables.

The value of R^2 is 0.893 which indicates that our independent variables explain 89.3% of the inconsistency of our dependent variable i.e. Market Capitalization. Therefore, the model specified in equation 1 accounts for about 89.3% of all the variability. Hence, this model is able to predict 89% correct values of Market Capitalization.

Adjusted R-squared is an altered form of R-squared that has been attuned for the amount of predictors in the model. The adjusted R-squared gives a percentage of variation by only those independent variables which actually has an impact on the dependent variable.

The adjusted R-squared relates the expressive power of regression models that comprises of varied amounts of predictors. Hence, in our model 87.8% of the independent variables effect the dependent variables.

Durbin Watson test used to measure autocorrelation in the residuals from statistical regression analysis. Durbin-Watson value is always between 0 and 4. There is no autocorrelation in the sample when the value is 2. A value close to 0 indicates a positive autocorrelation while a value near to 4 indicates negative autocorrelation.

In our sample, the value of Durbin Watson is near 2 and this shows that autocorrelation does not exist.

Table 3: Collinearity Statistics

Models	Tolerance	VIF
CPI	.022	45.348
GDP	.080	12.522
M2	.019	53.585

In the described model, multicollinearity exists as seen from Table 3. The VIF are well above 5 which shows that multicollinearity between independent variables exists.

Therefore, to fix the issue of multicollinearity, Partial Least Squares (PLS) Regression is used.

4.3 Partial Least Squares test using Minitab

Partial Least Squares (PLS) is used when the amount of predictors go above the amount of cases or when predictor variables are highly correlated. Partial Least Squares pools features of multiple regression and principal components analysis.

It firstly extracts a set of hidden factors that clarify maximum covariance between the dependent and independent variables. And then a regression step predicts values of the dependent variables using the breakdown of the independent variables.

Partial Least Squares is used using the software Minitab.

Results from Minitab are shown in Table 4, 5 and 6.

Table 4: Method Table

Cross-validation	Leave-one-out
Components to evaluate	Set
Number of components evaluated	6
Number of components selected	3

Table 5: Analysis of Variance for Market Capitalization

Source	DF	SS	MS	F	P
Regression	3	6.90499E+21	2.30166E+21	61.35	0.000
Residual Error	21	7.87910E+20	3.75195E+19		
Total	24	7.69290E+21			

Table 6: Model Selection and Validation for Market Capitalization

Components	X Variance	Error	R-Sq	PRESS	R-Sq pred)
1	0.971683	3.38839E+21	0.559543	4.00289E+21	0.479664
2	0.996049	2.05269E+21	0.733171	3.03688E+21	0.605236
3	0.999690	7.87910E+20	0.897580	1.26173E+21	0.835988
4		6.10767E+20	0.920606	1.68586E+21	0.780855
5		5.26536E+20	0.931556	2.09002E+21	0.728318
6		4.43232E+20	0.942384	2.22735E+21	0.710467

Method table specifies the quantity of components Minitab evaluated and the amount of components selected as the optimal model. The optimal model is the model with the maximum predicted R-Sq.

Minitab nominated the optimal model to be three-component model with a predicted R-Sq. of 0.84.

The p-value for Market Capitalization is 0.000, which is lesser than an alpha of 0.05, giving enough evidence that the three-component model is significant.

To select the optimal components of our model, the Model Selection and Validation table is used. The model with three components, which was chosen by cross-validation, has R-Sq. of 89.8% and a predicted R-Sq. of 83.6%.

The variance in the predictors as clarified by the model is specified by the X-variance. In our model, the three-component model explains 99.9% of the variance in the predictors.

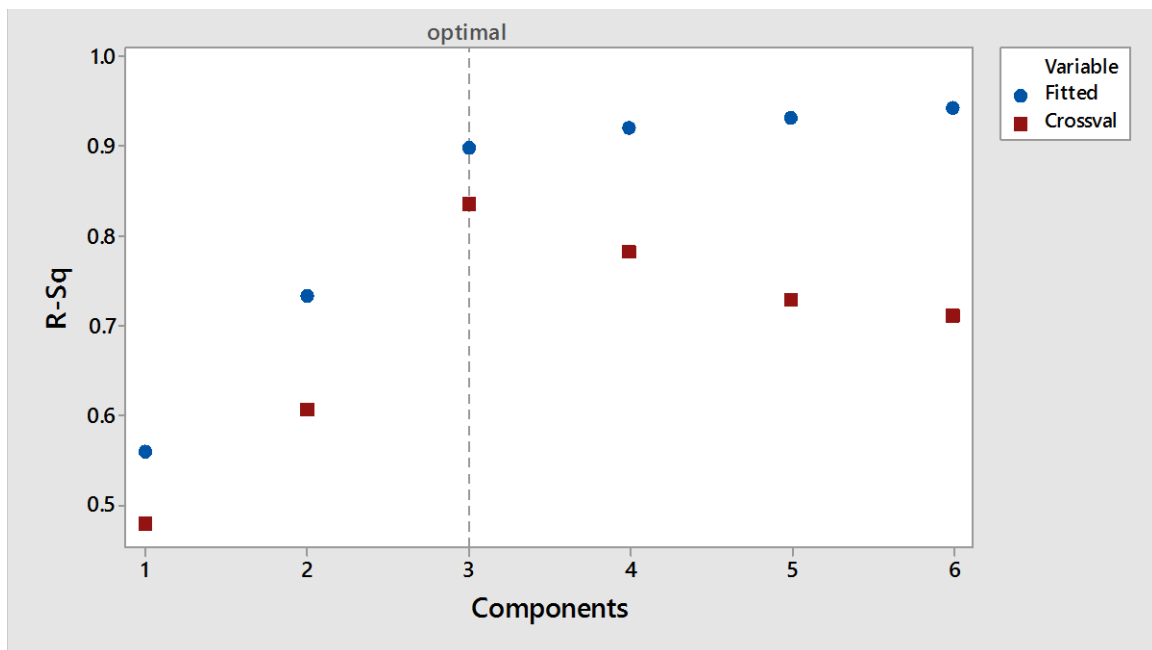


Figure 19: Model Selection Plot

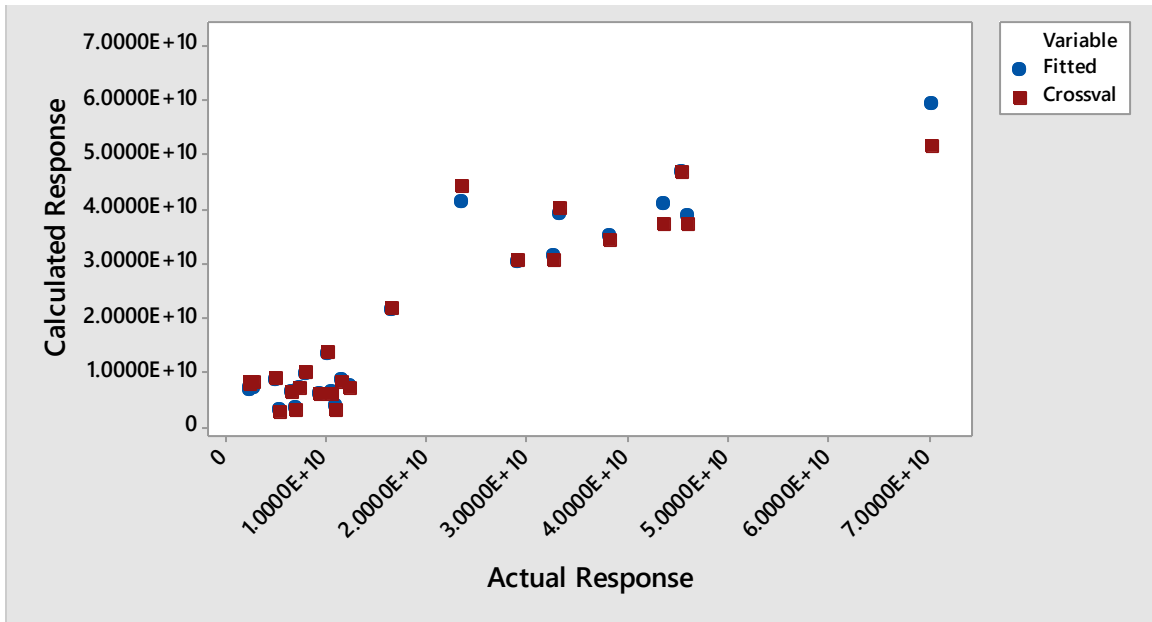


Figure 20: Response Plot

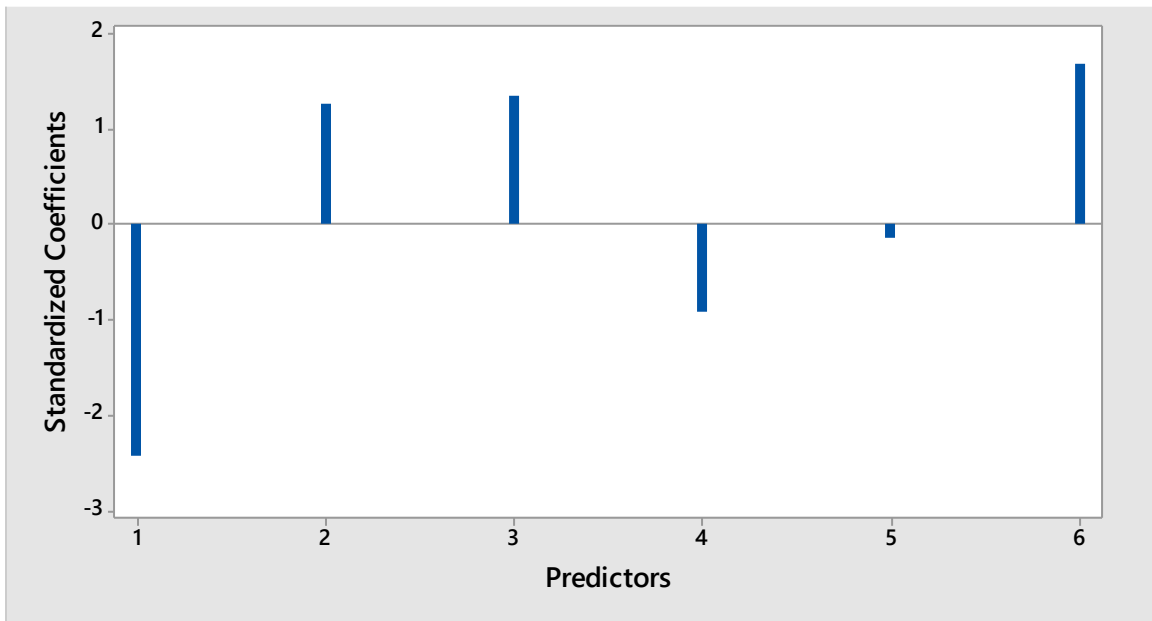


Figure 21: Standardized Coefficient Plot

The graphical display of the Model Selection and Validation table is shown in the model selection plot Figure 19. The vertical line indicates that the optimal model has three components. It can be also observed that the models having more than three components, their predictive ability decreases significantly.

The response plot shown in Figure 20 specifies that the model fits the data sufficiently as the points are in a linear pattern. Even though there are dissimilarities between the fitted and cross-validated fitted responses, not any are that enough to specify a dangerous leverage point.

The coefficient plot in Figure 21 shows the standardized coefficients for the predictors.

β_1 is beta coefficient for CPI_t (Predictor 1) which is negative and has the most effect on the response.

β_2 is beta coefficient for GDP_t (Predictor 2) which is positive and has least effect on the response.

β_3 is beta coefficient for $M2_t$ (Predictor 3) is positively related to the response.

Chapter 5: Discussion and Conclusion

5.1 Discussion

The research hypothesis initially suggested has proved to be correct. The market capitalization and hence the stock market development is linked to the economic growth of the country.

The economic indicators taken in our study that are Consumer Price Index, Real GDP and Money Supply do effect the development of stock market but their extend of affect is not similar. The Consumer Price Index has the strongest impact on the Market Capitalization i.e. greater is the Consumer Price Index, lower will be the Market Capitalization.

a. Effect of Consumer Price Index on Stock Market Capitalization

The Consumer Price Index and market capitalization have a negative relationship. As Consumer Price Index increases, the inflation in the country also increases. Hence, the domestic companies have to accommodate for the rise in costs and the rise in prices/wages.

With increase in inflation, the total cost for a company increases due to rise in costs of raw material and other overhead costs. Inflation causes opportunity cost of holding money to rise and increases uncertainty that in future inflation may further increase. This uncertainty discourages investments and savings resulting in decrease in market capitalization for domestic companies.

b. Effect of Real GDP on Stock Market Capitalization

Real GDP has a positive relation with market capitalization i.e. as Real GDP increases, market capitalization also increases and as Real GDP decreases, market capitalization also decreases. Real GDP has a direct strong relationship with the country's economy. Hence, when the economy of the country gets stronger, the stock prices increase and market capitalization also rises.

c. Effect of Money Supply M2 on Stock Market Capitalization

Like GDP, Money Supply M2 is also directly proportional to market capitalization. As compared to GDP, Money Supply is strongly linked to market capitalization.

As money is used in all the economic dealings and transactions so it has a dominant effect on the economic activity of a country. An increase in money supply will result in rise in investment and decline in interest rates. When more money is supplied to the consumers, they spend more. Thus, demand of products increases which causes an increase in production.

Due to increase in demand of products and hence production, the businesses in the country flourish. This may also cause stock market prices to rise as firms issue more equity and debt which then effects the domestic companies. Therefore, the market capitalization increases with an increase in Money Supply.

Beside some statistical tools, there are behavioral factors as well in accessing the relationship between economic growth and stock market development. This is because investors' perceptions also play a role in development of stock markets. Consumer's perception and investor's sentiments play a significant role in deciding the effect of inflation and money supply on performance of stock market.

For example, large-cap companies are generally perceived as more stable and well established companies with recognized growth so they are more prone to investor's sentiments and consumer's perception. Investors have more confidence on these companies as compared to small and mid-cap companies. Hence, investors prefer in investing in such organizations. Likewise, investors prefer investing in developed countries due to the opinion of it being safer.

5.2 Recommendation

In future, more comprehensive results can be achieved by comparing Pakistan with other developing and developed countries. This will give a more conclusive relationship between stock market and economic growth. Through this comparison, the effect on developed and emerging economies can also be judged.

Yearly data was used for this thesis. A more frequent data e.g. quarterly or monthly data can be used to improve the findings of the model.

Regression analysis was used to estimate the relationship between performance of stock market and country's economy. Other quantitative as well as qualitative analysis can be used to take a full view of relationship between the dependent and independent variables.

The behavioral aspects of relationship between stock market and country's economy can also be analyzed. This is the qualitative side of the study of relationship between the variables.

The qualitative analysis is important because investors' perceptions also play a role in development of stock markets. Consumer's perception play a vital role in deciding the effect of inflation and money supply on performance of stock market. Hence perception of investors and consumers can be measured to analyze the effect on performance of stock market.

Investors and consumers' react differently in each country. Therefore, it would be interesting to know the effect of perception of investors and consumers in different countries, and hence the consequence of their perceptions on performance of stock market.

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5.3 Limitations

The limitations of our study are as follows:

- Most authors commend that there should be at least ten to twenty times as many observations as variables. Otherwise, the regression line estimates may be very unreliable and is likely not to repeat. In our study, the observations are way less than the variables. The reason for these less observations is unavailability of data.

The data used is yearly data from 1988 to 2012 monthly data. Data for other years is not available from credible sources.

- Regression analysis was used to determine the relationship between dependent variable and independent variables. The biggest limitation of regression analysis is that in real world, the variables do not follow the assumptions of linear regression as presumed.
- The regression techniques only determine relationships but cannot estimate the underlying causal mechanisms.

In our study, only three economic indicators i.e. Consumer Price Index, Real GDP and Money Supply M2 are used to find relationship with Stock Market Capitalization. Other indicators like Producer Price Index (PPI), Consumer Confidence Survey, and Current Employment Statistics (CES) also effect the Stock Market Capitalization. The effect of these variables is not studied in this paper.

This paper is based on the concept of traditional finance theories. Behavioral finance also plays a vital role in determining the stock market capitalization and hence the economic growth of a country.

Behavioral finance recommends psychology based theories to explain the anomalous stock market conditions, such as very high or reductions in the share price. In behavioral finance, it is anticipated that the info and the features of the participants in the market structure affect the systematic investment decisions to individuals, as well as the consequences of the market. This part has not been explored in this paper. For deducing best results, it would be important to use both traditional and behavioral finance theories in the study.

5.4 Conclusion

This study examines the effect of economic growth on development of stock market in Pakistan. The empirical evidences reported that Pakistan economic growth leads to stock market development. The results show that both stock market development and economic growth in Pakistan have significant positive relationship.

The capital market plays a significant part in the growth of the economy of the country. This is the reasoning that the industrial bodies, government advisors and even the central bank of the country keep a close eye on the activities of the stock market.

Stock market capitalization is found to have stronger influence in Pakistan by the economic growth indicators. Therefore, the research hypothesis is accepted while the null hypothesis is rejected.

Appendix

Code	Indicator Name	Long definition	Source
CM.MKT.L CAP.CD	Market capitalization of listed domestic companies (current US\$)	Market capitalization (also known as market value) is the share price times the number of shares outstanding (including their several classes) for listed domestic companies. Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies are excluded. Data are end of year values converted to U.S. dollars using corresponding year-end foreign exchange rates.	World Federation of Exchanges database.
FP.CPI.TO TL	Consumer price index (2010 = 100)	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are period averages.	International Monetary Fund, International Financial Statistics and data files.
NY.GDP.M KTP.KD	GDP (constant 2005 US\$)	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2005 official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.	World Bank national accounts data, and OECD National Accounts data files.

Code	Indicator Name	Long definition	Source
FM.LBL.M QMY.CN	Money and quasi money (M2) (current LCU)	Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS). Data are in current local currency.	International Monetary Fund, International Financial Statistics and data files.

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