Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.7, No.21, 2016

Monetary Policy and Industry Performance: Empirical Evidences from Karachi Stock Exchange (KSE) of Pakistan

AJAB KHAN BURKI
Department of Management Sciences, Bahria University Islamabad, Pakistan

Abstract
The purpose of this study is to deliberate the impact of monetary policy based on interest rates on the industry performance of Karachi Stock Exchange (KSE) listed corporations of Pakistan. This study caters to estimate the effect of interest rate on industry performance using Return on Asset (ROA) from 2001-12 using three different sectors: Industrial Engineering, Oil and Gas Producers and Industrial Metals and Mining. The empirical results show that changing interest rate by the government has implications on the ROA. The expansionary monetary policy, where interest rates are relatively lower are showing relatively higher ROA as compared to that of contractionary monetary policy. The data has been taken from the secondary sources like Karachi Stock Exchange, State Bank of Pakistan, and annual reports of corporations of the given sectors.
Keywords: Interest rate, Return on Asset, Karachi Stock Exchange, State Bank of Pakistan

1. Introduction

1.1. Background of the Research

The topic of this research is monetary policy based on discount rate/ interest rate and industry performance with empirical evidence from Karachi Stock Exchange (KSE) of Pakistan. This topic relates the results of the interest rate and KSE market performance to the industry represented by the companies listed on the KSE stock market. This is a unique topic and no such effort has been previously done in the past on Pakistani market. Researchers have always tried to find the correlation between stock market performance and micro and macroeconomic variables of Pakistani economy (Blake and Wohar, 2006), but no such effort has been made in order to relate the results of the studies to the performance of the companies listed on the KSE stock market.

Pakistan has three stock exchanges; Lahore Stock Exchange (LSE), Islamabad Stock Exchange (ISE), and Karachi Stock Exchange (KSE). ISE operates on ISE-10 index; this means the major representation that ISE provides is the 10 biggest companies listed in it. LSE operates on LSE-25 index; hence the major representation is of the 25 largest firms. KSE operates in KSE-100 index, and it is one of the most recognized indices all around the world as well, therefore this index has been chosen for the purpose of this study, as it represents the major portion of the total Pakistani business industry.

Further background check reveals that Pakistani stock market is sensitive to micro and macro-economic variables of the Pakistani economy. Hence, we can establish that some degree of variation in the stock market performance directly and in the business industry performance indirectly is defined by the variations in interest rate which is one of the major macroeconomic variables of Pakistani economy.

1.2. Stock Exchange

Stocks or shares of the companies are traded in stock exchanges. Stock exchanges are units of an organization or mutual organization that is dedicated in the business of making a connection between the buyers and the sellers of the organization to a listing where stocks and securities are all traded together.

This is a list of world's biggest stock exchanges. These are the stock exchanges that generate largest amount of activity in the whole world:

- Deutsche Borse (Frankfurt, Germany)
- Paris Bourse (Paris, France)
- Amsterdam Stock Exchange (Amsterdam, Netherlands)
- New York Stock Exchange (New York, USA)
- London Stock Exchange (London, UK)
- Bursa Malaysia (Kuala Lumpur, Malaysia)

This study is on Pakistani Stock Market, so here are the major stock exchanges that have been operating in Pakistan for a long time now:

- Karachi Stock Exchange (Karachi, Pakistan)
- Lahore Stock Exchange (Lahore, Pakistan)
- Islamabad Stock Exchange (Islamabad, Pakistan)

ISE is the latest creation among these stock exchanges and is the smallest subsidiary in all three stock exchanges of Pakistan. There are two types of investors that operate in the stock exchanges: individual investors as well as institutional investors. Individual investors are, as their name suggests, individual people who invest in

the stocks of the companies either directly or through stock brokers. Individual investors most of times don't deal with the company directly; they buy the stock from institutional investors. Institutional investors include banks, insurance companies, hedge funds, and mutual funds. There are few institutions as well which are solely made for the purpose of buying and selling stocks. Such companies are also included in the institutional investors as well.

Stock business works on the principle of risk and return. In this business, people say; if you don't take risk, you don't get returns. Measured and calculated risks are also part of the risk taking and so are the random hunches and random investments made on mere good luck bad luck policy, which can sometimes turn into a harsh reality check or real life lesson. Investors bear the risk of loss in order to invest in probable stocks with good returns which they can get healthy returns from for a long period of time or small period of time depending upon the mindset of the investor. The basic principle of risk and return in stock market is high risk high return. Investors invest in order for their savings to be fruitful. Savings can get returns from financial institutions like banks and other such service providers. High return seekers usually come to the floor of a stock exchange. These people are referred to as risk takers and the people contrary to them are known to be risk evaders or avoiders. If you keep your savings in bank account, there is a certain percentage of return that you can make with very little risk. But, investments in stocks lead you to greater risks along with greater returns. By investing in shares, you buy in on a part of equity and capital of the firm. You actually become an integral part of the firm in which you have invested your money along with your confidence and trust. Through investing in stocks not only the worth of your savings goes up but you get supplementary reimbursement in form of bonus payments called dividends. If the firm, in which you invested through shares, performs well, its share price goes up which increases your investment's value. Better performance of the firm also leads to declaring of dividends by the firm, which gives you additional benefits. Investments in shares are therefore sometime referred to as investment in "Risk Capital". Keeping the money in a bank account will always sound a better bet than investing in stock market due to the risk attached with investment in stock market. But we have to say that the shareholders in a company are well rewarded for their risk taking.

The risks attached with an investment in stock market can't be completely wiped off. But risk minimization is possible. This goal can be achieved through proper planning of your investment. The money invested in a single stock bears high risk then the money invested in a combination of stocks, or as it is said to invest in a portfolio. What a portfolio does to your investment is that it minimizes the risks attached to your investments through diversification. A diversified investment results in an investment that keeps your investment afloat even in the case of a loss in any of your stocks, because your overall portfolio covers up for one or two losses. A portfolio investment is an illustration of the statement "Don't put all your eggs in one basket".

1.3. Pakistani Equity Market

Most multifaceted problem a new born country faces is getting together and understanding it potential in terms of its resources. These resources could be of any kind; physical resources, capital resources, human resources, and economic resources. Pakistan after its independence, straight off fell into a chain reaction of problems including problems related to the economic world along with bureaucracy and political problems on hand. Pakistan faced economic problems straight away in many aspects, such as custom duties that didn't attract any foreign investments, counter-productive tax rates and strategically dull approach towards economic matters. This approach kept the doors of economy and stock exchange and potential foreign investments closed for a long period of time.

Pakistani economy started its reforms in 1990's, when marvelous pace was seen in the economic front via reforms introduced in the year 1991. In these reforms, our economy was opened to foreigners on very reasonable conditions. Also in these reforms, there was a very key decision related to Pakistani Stock Market. The decision was to allow individual and institutional investors from foreign countries to take part and fully participate in the Pakistani Stock Markets. Pakistani stock markets and overall equity markets saw reforms since that time towards early 2000's. Pakistani stock markets saw their top indices in the year 2003 and 2004. These uphill trends were carried forward to year 2007-2008. Due to major happenings in Pakistan in the year 2008 and 2009, Pakistani stock market hit some dead ends which resulted in very weak performance of Pakistani Stock Market in these years. Since the year 2009, Pakistani stock market again started reforms and reached its very high performance at the end of the year 2012. Detailed analysis of these crisis and reforms is given in the Karachi Stock Exchange history, background, and introduction section discussed ahead. Pakistani economy and equity market has taken many hits but the economists say that as of year 2014 Pakistani economy is on its way to better reforms.

1.4. Karachi Stock Exchange:

This study primarily focuses on the effects of the macroeconomic variables chosen on the stock market performance of Karachi Stock Exchange. Here is a brief history, background and introduction of Karachi Stock

Exchange.

Karachi Stock Exchange is the largest and the oldest stock exchange in Pakistan. It is located at stock exchange building in Karachi. It is located right in the middle of Karachi's business hub, I.I. Chundrigar Road, Karachi. It is not only Pakistan's oldest stock exchange it is also one of the oldest stock exchanges in south Asia. KSE was founded on 18th September, 1947. It is the biggest stock exchange in Pakistan in terms of market capitalization and also on the basis of liquidity. The number of listed companies on Karachi Stock Exchange is 750 approx. in the year 2014. KSE was declared as the "Best performing stock market of the World for the year 2002". The market capitalization of Karachi Stock Exchange is Rs.6.277 Trillion as of 28th March, 2014. The latest figure for volume of business in Karachi Stock Exchange is US$ 12 billion. KSE operates on 4 different kinds of indexes.

- KSE 100 Index
- KSE 30 Index
- KSE All Shares Index
- KMI 30 Index

Karachi Stock Exchange's floor was closed for foreign investors; both individual and institutional. It was the part of 1991 reforms; when the floor of Pakistani stock market was opened for foreign individual and institutional investors. These reforms brought about great results in Pakistani stock market. These reforms continued to dazzle the Pakistani Stock Market performance until the year 2008. On April 20th, 2008, KSE saw its 100 index break the psychological barrier of 15000 points. On that historical day, KSE-100 closed on 15737.32 points. Over all, in the year 2008, the business volume in KSE increased by 7.4%, which made it the best performer among the major emerging stock markets.

But it was the same year when stock market of Pakistan hit crisis, and resulted in great loss to KSE. These crisis were all due to economic shocks, when on May 23rd, 2008, Pakistani inflation rate reached its record high, and that in turn resulted in increase if Interest rates from the State Bank of Pakistan. This resulted in sharp fall in the business volume in KSE. In the July of 2008, KSE-100 index took a sharp fall, and decreased by one third from all-time high in April, 2008.Pervez Musharraf's resignation increased the index by 4%, but its effect was short lived due to rising fiscal deficit and all time high rates of Inflation. During this time period the stock prices of all stocks listed on KSE were plunged to avoid a very sharp fall, this made all the individual and institutional investors very angry, as they had to bear great losses in those conditions. In the year 2009, after the arrival of new government, the KSE-100 index again started to stay stable. It again went through all the stages of reforms to reach third straight record high in its history on December 6th, 2012.

1.5. Defining Capital markets

A market in which shares of public limited companies are traded among the participants of that market is known as stock market. The participant of the stock markets who are identified to be individual investors, institutional investors and companies which issues their shares for the financing purposes (Eatzaz and Zaman, 1999). This definition sketches the boundaries of a stock market. The activities performed in a stock market, purpose of the stock market and the participants of the stock market are roughly outlined in this definition. The purpose of including this definition is that we need to develop a basic understanding of all the elements of the study. World's biggest stock markets are in US and these are the stock markets that have been generating the highest amount of activity.

Dividends by region have the following data:

- North America – 37%
- Europe Excluding UK – 22%
- Emerging Markets – 14%
- UK – 11%
- Asia Pacific – 11%
- Japan – 5%

Fastest Growing Dividends 2009-2013:

- Emerging Markets – 107%
- Asia Pacific – 79%
- North America – 50.5%
- UK – 39%
- Japan – 29%

Europe ex UK – 8%

The basic elements of this study are as follows:

- Karachi Stock Exchange (KSE)
- Industries listed on KSE

- Interest Rate

In this starting chapter, we try to develop a basic understanding of these three points which are the heart and soul of the topic of this study. All of the keywords are defined in an elaborate way so that basic understanding is developed.

1.6. Karachi Stock Exchange (KSE)

The basic definition of a Stock Market has been defined above. There are three players identified in that definition, which are:

- Companies
- Institutional Investors
- Individual Investors

Companies issue the stock for the purpose of financing. Attractive dividends and returns are attached to the shares which attracts the investors towards that specific stock. Institutional investors are those institutions whose business is to buy the stock directly from the company and sell it to the individual investors through stock brokers (Kiani, 2006). Sometimes, stock brokers also act as institutional investors when they buy the stock directly from the company and sell it to individual investors. This refers to the fact that individual investors actually don't usually deal with the company directly; they are either dealing through stock brokers or institutional investors.

Now we turn our attention towards Karachi Stock Exchange (KSE). KSE is the largest and the oldest stock market of Pakistan. It is also the biggest stock market of Pakistan in terms of Capital involved, volume traded and companies listed. KSE is the basic and the most prominent representation of the Pakistani stock market. I.I. Chundrigar Road is considered to be the business and finance hub of Pakistan, and right in the middle of the business and finance hub of Pakistan is the largest stock market of Pakistan, Karachi Stock Exchange (KSE). Its importance in the equity markets of Pakistan can't be less emphasized, but at the same time, it is also one of the largest and oldest stock markets in the South Asian region as well. The patterns, shocks and happenings related to KSE also affect the stock market patterns of South Asian region. KSE holds the honour of "Best Performing Stock Market of the World for the year 2002" (McQueen and Roley, 1993). KSE has approximately 750 companies listed in its directories. The market capitalization is the best measurement of the amount and extent of operations on the floor of a stock market. The market capitalization of KSE is 6.277 Trillion Rupees as of 28th March, 2014. According to a latest estimate, the total amount of operations on the KSE is US 12 Billion Dollars.

KSE operates on 4 different indexes. These indexes are as follows:

- KSE-100 Index
- KSE-30 Index
- KSE All Shares Index
- KMI 30 Index

1.7. The Evolution of KSE-100 Index

The evolution of KSE-100 index can be described through the major milestones it passed. Here are the significant milestones that KSE-100 index encountered after its formation:

- KSE-100 index is composed by the help of evaluating the performance of top 100 companies on the KSE.
- KSE reforms started in 1991, and during those reforms some major steps were taken in order to improve the performance of KSE. Major reforms done during that period were; allowing the foreign investors to participate in KSE, and the establishment of KSE-100 index in November, 1991.
- KSE's base points at the start were 1000 points, and saw gradual increase in it during the time to a major 12,285 points in February, 2007.
- Global Crisis of 2008 saw major crisis in the financial and business in the whole world and KSE also got affected. The KSE index nosedived 1/3rd of its all-time high.
- The recovery from the global crisis was late, slow and gradual. In 2012, KSE-100 index reached its all-time high once again.

1.8. Industry Representation on KSE

This part of the study gives us an idea that which industries of Pakistan have a representation on the KSE companies list. As this research studies the impact of interest rate on Pakistani industries through gathering empirical data from KSE, therefore it is important to know that what industries have a representation on KSE in terms of the companies listed on KSE. Here is a list of industries that have a representation on KSE Company's list (Nishat et al. 2004):

This long list shows us that every industry and every sector has some representation on the Karachi Stock Exchange. If we study the figures of interest rates related to the data of few of the sectors listed on the stock market then we can yield some really useful results related to the effects of Interest Rate on Pakistani Industry performance which these sectors represent.

1.9. Interest Rate

It is the rate at which the credit is paid back by the borrower to the creditor. Creditor determines the rate at which the loan is to be issued and paid back. In case of businesses and organizations the creditors in most cases are banks, and the interest rate is set by banks regulation body. In Pakistan, the interest rate is set by State Bank of Pakistan (SBP).

1.10. Problem Statement

The problem being addressed here is the relationship of monetary policy and industry performance Pakistan. The study tries to investigate the effects that increase and decrease of the interest rate can lay on Pakistani business industry in terms of their stock market performance. The stock market performance of a company is representation of its financial performance overall, so we can say if we study the effect of interest rate on company's KSE performance. This study is actually finding the relation between interest rate and Pakistani industry performance indirectly. The problem statement of this study is as follows:

"Researching the monetary policy based on Interest Rate and its implication on Pakistani Industry by collecting and using data from Karachi Stock Exchange"

1.11. Theme of Research

The research aim is to find out the impact of interest rate on Pakistani Industry. Study aims to use the data collected from Karachi Stock Exchange of KSE-100 index, and then find the relation between KSE-100 index and interest rate. The study's aim is to provide sufficient results so that the performance of not only Karachi Stock Exchange but also Pakistani major industries can be predicted from the floating patterns of interest rate. So, the results just don't focus on interest rate and its effects on the Pakistani business industry, but its results can also be used to predict the Karachi Stock Exchange performance patterns as well.

1.12. Objectives of the Research

The objectives of this research are set by keeping in mind all the modalities that its results are going to serve in the short term and in the long term. Our research has a wide array of purpose and a wide array that its results cover. The broad objective of our research is going to address the following research questions:

- To determine whether interest rate has effect on stock market performance in Pakistan or not.
- To determine whether the results of this study be applied to the business industry performance in Pakistan or not.
- To determine whether the interest rates fluctuations have implications on the stakeholders' decision in terms of their limitations to foresee the stock market and business performance behaviour or not.
- To determine whether the results of this study be generalized and to what degree can they be applied to the whole Pakistani market or not.
- The prime objective of this research is to find a correlation between interest rates in Pakistan and the Pakistani business industry performance.
- This research also uses KSE stock market index which creates a major involvement of KSE as well, hence the relation between KSE stock market performance and interest rate is studied. The KSE stock market performance is used as a gauge to measure Pakistani business industry performance. So, another objective of this research becomes establishing a correlation between KSE index and interest rate.

1.13. Research Questions:

Here are few basic research questions that have been brought into consideration while doing this research:

- What is the direct effect of interest rate on stock market performance in Pakistan?
- How can the results of this study be applied to the business industry performance in Pakistan?
- What are the potential barriers faced by the stakeholders of businesses and stock market due to the inability to foresee the stock market and business performance behaviour due to changes in interest rate?
- How can the results of this study be generalized, and to what degree can they be applied to the whole Pakistani market?

1.14. Rationale of the Study

Stock market is a sensitive place; it gets affected by littlest of little matters and also gets affected by the huge

variations as well. One thing that majorly affects the stock market performance is the economy of the country in which that stock market is operating. All the major and minor economic matters affect the on goings and operations of the stock market, these major and minor matters are specifically referred to as micro and macroeconomic variables (Pastor and Veronesi, 2006). There are companies listed on the stock market. When companies are performing well and are profitable, then in turn it results in the better returns on shares for the shareholders of that particular company. In such cases, the prices of the stock of that company go upwards because of the high desirability of that company. This in turn leads to better stock market performance and a better daily index of the stock market if most of the companies perform well, and this situation can be traced other way around in case of vis-à-vis situations.

If we look at the above perspective in the light of the topic of this research, then we can say that studying the effects of a certain variable on stock market is actually applicable to the companies, industries and overall business situation of that country. Studies have been conducted in order to find out the effects of micro and macro-economic variables on stock market performance (Kraft and Kraft, 2001), but no such effort has ever been made in order to study the effect of a single economic variable and then apply it onto Pakistani business industry. Therefore, it is intended in this research that finding out the effect of interest rate on stock market performance in KSE, and then apply it onto the business industry. This plan of study reveals that the results are more valuable and more explainable in this model because of the wide array of purposes that it serves not only in KSE, but also in the Pakistani business industry.

1.15. Significance of this study

- Research provides implications that can be used in order to predict the company performance in response to a change in monetary policy, or specifically interest rate which is also triggered by changes in monetary policy and related factors.
- Investors in the stock market can also take benefits from this study's results as they can use the results of this study to predict the movements in stock prices and stock returns of companies in response to the alterations in the interest rate.
- This research also provides standing grounds for further research in this area for the Pakistani market. As gaps related to the same market but different micro and macroeconomic variables still exist.

2. Literature Review

Stock market works on many principles. The movement in the price of a stock of a particular company is not dependent on the will of that company's management. Supply and demand factor usually drive the price of the stocks in a particular stock market. Supply and demand also affect the overall stock market performance as well. Supply and demand are not only the vital factors in general market of commodities, supply and demand are also vital players in the stock market as well. Supply and demand not only determines the prices of things, but it also determines the future of that specific product. In stock market, the importance of supply and demand forces is even more, because when people invest in general products, then there are many components deciding the value and worth of that specific product. In stock market, supply and demand are the most important factors that are deciding the value and worth of a particular stock. Studies have revealed that macroeconomic shocks related to the supply and demand forces in a stock market affect the performance of the stock market. Gallagher and Taylor (2002) argue that demand shocks affect the stock performance in the short run, whereas the effects of supply shocks on a particular stock are in the long run.

There are other factors as well that affect the performance of a stock market in a particular country. Stock market performance is also dependent on the condition of the economy of the country that stock market is performing in. Economy is further divided and categorized into microeconomic and macroeconomic variables. Macroeconomic variables trigger the performance of a stock market as well. The examples of macroeconomic variables are interest rates, inflation rate, and value of the currency of a country, consumer price index, Gross Domestic Product (GDP), Gross National Product (GNP), and unemployment rate. All these variables affect the working and functioning of a stock market in a particular economy. The focus of this research is to study the effect of Interest rate on Pakistani Equity market, particularly, Karachi Stock Exchange (KSE). This chapter of the study focuses on reviewing the literature related to this topic. This study reviews the previous studies that have been held on effect of interest rate on equity market in any country, or studies that have been held in order to investigate the effects of macroeconomic variables on Pakistani or any other equity market. This chapter will help us understand the structures of previous studies; also this chapter will help us to find out the interesting results of previous studies held on the same or related topics.

Macroeconomic variables leave long term and short term effects on the stock market and its overall performance. Sohail and Hussain (2009) investigated the relationship between macroeconomic variables and stock market performance. Their focus was to yield important and meaningful results about the effects of macroeconomic variable on Pakistani Equity Market in long term and in short term. For the purpose of limiting

the study, they chose Lahore Stock Exchange as a sample for their study. They tested the effects of many macroeconomic variables on Lahore Stock Exchange (LSE). The only problem with this study was that the scope of this study was too small. This study was conducted on Lahore Stock Exchange (LSE) and LSE represents very small portion of Pakistani Equity Market as compared to Karachi Stock Exchange (KSE). Their study yielded some very useful results about the long term and short term effects of macroeconomic variables on the performance of LSE. Here are the key points and results to be taken from their study:

- Consumer Price Index and Stock Prices in the Lahore Stock Exchange have a negative relationship with each other. As the CPI increases the stock process fall, whereas, when the CPI decreases the stock prices go up. The effects of CPI on stock prices are usually in the short term and CPI doesn't affect the stock prices in long run.
- Contrary to the CPI, Industrial Production Index (IPI) affects the stock prices in the long run. IPI and stock prices have a positive correlation among them, i.e. when the IPI goes up, the stock prices increase as well, and when IPI drops, stock prices decrease as well.
- Exchange rates also affect the stock prices positively. As the exchange rate relative to the Pakistani Currency goes up, the stock prices go up as well. This means the exchange rate complements the stock prices in Pakistani Equity Market. Exchange rates affect the stock prices in the long run too.
- Money supply is the last variable studied in this research. It also has positive effect on the stock prices. Its effects on the stock prices and stock market are also in the long run.

Hussain and Mehmood (2001) tried to find out the cause and effect relationship between few of the macroeconomic variables. They didn't select the conventional macroeconomic variables. The variables chosen for their study were: Consumption Expenditure, Investment Spending, and Economic Activity. All these three variables somehow represent the same thing that is how is the economy of a country working? If we talk about a developing country, then the consumption expenditures will be always increasing. Investment spending of a developing country also shows increasing patterns. This study found out that all three independent variable affected the change in prices of the stock market in a positive way. This research studied unidirectional cause and effect between the independent and dependent variables, and it yielded the results that more economic activity, consumption expenditure and investment spending leads to an increasing pattern in the prices of the stock market. The prime reason for this relation is that all the three independent variables result in demand for the stock, because more economic activity and investment spending leads to greater demand for stock and it is a simple pattern that when demand increases the prices increases as well. This was a pure research, which seems to be for academic purpose purely, it has very less practical implications for any of the key stakeholders of the stock market i.e. Investors, Stock Brokers or Companies. There is one key practical implication for the companies from this study, and that is, companies should more and more stock at more and more attractive prices for their financing purposes when the economy of their relative country is either developing or well developed, because in such economies usually the demand for the stock is very strong due to consumption expenditure, investment spending and large economic activity.

Macroeconomic variables don't affect the stock market individually. It is a joint effect of the macroeconomic variables on the stock market. This is one of the major gaps in the field of research to find out the joint effect of variables on the stock market. The example of factors having joint affect on the stock market can be given from the study of Irfan and Nishat (2002). They studied the joint affect of the variables related to the companies that are listed on a particular stock market. Their study was conducted on the effects of dividend yield, size of the firm, earning volatility, asset growth, payout ratio and leverage on stock market performance. The purpose of reviewing this study is that just like all these variables used in this study, macroeconomic variables also have joint affect on the stock market performance and its components. Macroeconomic variables have individual affect on the stock market, but the purpose of emphasizing the importance of joint affects is that, joint affect explains the highest amount of variability in the stock prices and stock returns. Joint affect formulates a formula that explains complete variation in stock market performance and it is of greater importance then the individual cause and effect and unidirectional effects. Also the study of joint affect has more practical implications and can be better used in the real life stock market and its components for better investment decisions and spending.

Now we review a study that is related to our topic, but is in a different market. This study was conducted on the Vietnamese stock market. Hussianey (2000) argues that macroeconomic variables of the Vietnamese economy had significant effect on the share prices and overall stock market performance in Vietnamese stock market. Three distinct variables were used in this study; Money Markets and Domestic Production Sector were the independent variables, and stock prices were the dependent variable. According to the researcher, these two factors affected the stock prices very much, and these factors were vital in determining the share prices in the Vietnamese stock market. Another aspect of this study was the study of relationship between the US macroeconomic variables and Vietnamese stock market. US macroeconomic variables affect the stock markets all around the world. This is an indirect relationship, as the US dollar is the standard currency for

all countries of the world to compare their currency with. Therefore, the economic factors of the economy of US affect the economies all around the world. Unsurprisingly, a positive correlation was found between the US macroeconomic variable and the Vietnamese stock market.

Money supply is one of the most important variables in the economy of a country. Money supply determines many key points of an economy. For example, too much money supply usually leads to inflation in that particular economy. Interest rates and many other key factors are also determined by the money supply. Many studies have been conducted in order to find a connection between the money supply and stock market and its components. Studies going beyond the 20 years past usually found no considerable cause and effect relationship between the money supply and stock market performance (Kraft and Kraft, 1977). This study could be counted as an exception due to two reasons. Firstly, the scope of this study was too narrow to find out any considerable cause and effect relationship between money supply and stock market. Secondly, all the studies that followed in time, presented contrasting results as compared to this study. Examples of such studies are Clendenin (1991) and Heins and Allison (1996).

Rumors and news about the changes in the macroeconomic variables also affect the happenings in a stock market. The rumours are sometimes true, and sometimes these rumours are intentionally leaked solely for the purpose of creating some trends or for altering the demand and supply patterns of some particular stocks. Pearce and Roley (1985) argue in their study that the news and rumours about the monetary policy also affect the on goings in a stock market. The announcements, news and rumours taken into account in this study as a sample were the announcements, news and rumours related to Consumer Price Index (CPI), unemployment rate, Industrial Production Index (IPI), Producer Price Index (PPI) and the Federal Reserve's discount rate. Their study yields results that announcements and news related to the monetary policy directly affect the stock prices. News and rumours related to the discount rate and its variability can also be counted as determinants of the stock price variability. Money supply announcements which is the main theme of the monetary policy, also affects the stock market. Its correlation with the prices of the stock is negative. PPI is a factor that affects the stock prices in a very small quantity and time. Its effects on the stock prices are very short living. If we keep all other variables constant, then the variability in the stock prices due to the announcements related to the variability of Producers Price Index (PPI) can be minimized within a matter of days. This means, we can say that PPI cannot be counted as one of the major determinants of stock price variability. Overall summary of the results of this study say that announcements related to the dimensions and factors that are purely and majorly related to the monetary policy of a country do affect the stock market. Whether this news is factitious or truth, stock market and its working is affected by such announcements. Some of the variables and the news related to these variables have a short run affect on the stock prices and other stock market components. Contrary to that some variables and announcements related to these variables have s long term affect on the stock prices, and such affects can't be recovered for a long period of time. Business conditions and the state of economy of a particular country also affect the stock market performance. McQueen and Roley (1993) explain that business conditions also affect the stock market in several ways. It depends that whether the economy of a country is strong, weak or moderate. Stronger economy leads to lesser effects of business conditions on the stock market. This study also brought in economic news as a variable, and the researchers argue that economic news also affects the stock market according to the state of economy in which that stock market is operating. Same news and announcements related to economy or business can lead to different stock market variations in different countries. This is due to the state of their economy, if the economy is weak it can't bear shocking news related to the business and economy, but if the economy is strong then it can bear shocks like this to a certain extent.

Macroeconomic variables including interest rate affects the stock market one way or the other, this is an understood fact that we have to take with ourselves throughout the conduct of this study. This fact has been made understood after deep and thorough review of the studies related to the macroeconomic variables and the effects that these variables lay on the stock market performance. Mustafa and Nishat (2008) conducted one such study on Pakistani Financial and Equity markets. They also confirmed this fact that stock market performance is affected by the macroeconomic variables. The main focus of this study is on finding a relationship between exchange rate and stock market. There are some other variables used as well for the purpose of this study. The other variables used are: Money Supply, Prices of Gold in Pakistan, and interest rate. This study is of great interest to us, because it also contains the variable that is the main variable in our study i.e. Interest Rates. The correlation of all the above mentioned variables exists in the results. The correlation between the stock prices and exchange rate is of negative nature. The effect of exchange rate on stock market performance in Pakistani Stock markets is in short run. The relationship found between these variables is unidirectional cause and effect relationship. Second variable under observation are the gold prices. Results indicate that there is no significant correlation between gold prices and stock prices. We have to keep in mind that this study has delimitations, and one of these delimitations is that it is only focused and conducted on Pakistani Equity Market. The correlation between gold prices and Pakistani stock market is as inefficient that it is shown to be almost zero; its value is as low. Money supply and interest rates have a significant correlation with the Pakistani equity market. The

correlation between interest rate and stock market is of positive nature. The unidirectional cause and effect between interest rate and stock prices and returns suggest that interest rates compliment the stock prices and stock returns in Pakistani stock market. Monetary policy is also used as a predictor in predicting stock price and stock return patterns. This study provides solid grounds for predicting such patterns in Pakistani stock market. If stock brokers and investors know that the variations in a specific variable will lead to following reactions in stock market, then they can anticipate the stock market activity in a better manner then other people, which mean that they can make better and wise decisions in investments. The information acquired from these studies and stock market indices can be used in order to foresee the future patterns and behaviour of Pakistani stock market and all other stock markets in general (Keung et al. 2004).

An international study held on this subject yielded some very meaningful results. The study was conducted on Czech Republic, Hungary, Poland, Russia and Turkey. This study was conducted on a huge scale, which means that its results are more near to reality and it had more practical implications then the other studies reviewed because those studies had relatively narrow scopes. The volume of the stock issued and the price of the stock were investigated in this study. Volume of the stock is also considered a mega variable in the price variability analysis. Negative correlation has been found between volume of the stock and the prices of the stock (Gunduz and Hatemi-J, 2005). When we come to the results about the macroeconomic variables, their effect on stock market performance has been significant in the stock markets of all countries. Macroeconomic variables such as Interest Rate, Exchange Rate, and Money Supply all affect the stock market in the above mentioned countries. The unidirectional cause and effect relationship between these variables and stock market is significant and a positive correlation.

It is important to mention here that there is a significant gap lacking in these studies about the effect of interest rate on the overall stock market performance. Previous studies have only targeted the effect of macroeconomic variables on stock prices, which leaves a significant gap for the study on overall stock market performance of Pakistani Equity market. There are several determinants of overall stock market performance such as; Stock Index, Stock Prices, the Volume of the Stock, and the stock returns. So, there is a gap in that field of study in the Pakistani stock markets.

2.1. Theoretical Framework

The basic objective of this part of the research is to develop a research model that includes all the variables of the research. It determines the dependent and independent variables of the study, and also establishes a model that explains the basic working of this research. Here is a model that explains the research model of this research: Independent Variable: Interest Rate; Dependent Variable: ROA, ROE, Tobin's Q

As this model shows, the independent variable of the study is interest rate, and KSE-100 index is the dependent variable. The model shows industry performance in Pakistan at the end, which means that actually the results gained from the correlation between interest rate and KSE-100 index will be used in order to practically impose the affect of these results on industry performance in Pakistan. Hence, the overall industry performance in Pakistan is the actual dependent variable whose results are gained from the representation of data from Karachi Stock Exchange's most prominent index; KSE-100 index.

3. Methodology

This chapter deals with the defining and explanation of all the components of the methodology of this study. The research methodology revolves around few basic components of the methodology. These basic components are as follows:

There are some key decisions that are to be made related to the methodology of the research. Research methodology defines the ways through which data is collected, and the tools through which the data is analyzed in order to yield the results.

3.1. Research Design:

This part of the study defines the overall research design that has been adopted in order to form this study bring it into its final stages. The research methodology is defined through defining three main and vital components of the research. These components are as follows:

- Research Type and Nature
- Data Collection and Analysing
- Sampling

This sums up the complete research design of this research. All these components are aggregated in order to form the research methodology of this research. All of these components are now explained in detail one by one in order to gain a more detailed view of these components in order to develop a better understanding of these components individually and as a whole.

3.2. Research Type and Nature:

This part of the study establishes that what type of research this study is going to be. The nature of the research is also established in this part of the study.

3.3. Nature of the Research:

The pure research is the one which is done purely for the academic purposes and has no practical implications in the real life. Pure research is usually done using the primary data and therefore it has less or no practical implications due to the use of first hand data and its less reliability and accuracy. Applied research is vis-à-vis to the pure research. As its name implies, the applied research has practical implications related to the topic of the relative research. Applied research is usually done using the secondary data, and its results have more accuracy and reliability due to the use of secondary data. Its reliability increases because the secondary data is already empirically tested at some level and it is not firsthand data. The results of the applied research can be applied to the real life industry on which the study was conducted.

As of this study, the research is going to be an applied research. So that the results related to the study can be applied to the interest rate alterations, the performance and price and return trends of the Karachi Stock Exchange, and the industry performance in Pakistan. The results of this study can be used in order to predict all the above listed trends and behaviours. These points make this study not only an academic research, but also a research which has practical implications and its results can be used in order to find out the trends and behaviours of Karachi Stock Exchange (KSE) and Pakistani business industry in response to changes in Pakistani monetary policy, and particularly the changes in interest rate.

3.4. Research Type:

As mentioned by Goertz and Mahoney (2012), the research types are also categorized into two types. These two types of researches are as follows:

According to Newman (1998), quantitative study is the one in which the analysis of the data collected is done on numeric bases. Quantitative study can use both primary and secondary data for the purpose of yielding results. As mentioned by Wayne (2010), on the other hand, qualitative study is the one which uses non-numeric data in order to yield the results of the research. In quantitative study, the data is analysed using analytical tools like correlation, regression and other quantitative data tests. In qualitative study, the qualitative data is analysed using techniques like case study development, article review, review of previous literature on the related topics and case study analysis etc. In both type of researches, primary and secondary data can be used based on the nature of the research; whether it is pure research or applied research.

In case of this research, the nature of the research demands it to be a quantitative study. The variables of this study; interest rate and return on assets (ROA) of companies from different sectors, have quantitative values and data. Hence, the quantitative study is used for the purpose of this research. Moreover, quantitative data of secondary nature can yield more accurate and reliable results related to this research which can be used in real life, and their practical implications can be used to predict very important trends and behaviours related to the Pakistani business industry and Karachi Stock Exchange (KSE).

3.5. Data:

After determining the nature of the research and the type of research, now we move on towards one of the most important part of this chapter and that is the discussion related to the data. There are two main topics covered in this part of the study. These two parts are:

Data collection deals with the nature of the data collected, and the data collected ways. Whereas, the data analysing discusses the ways in which the data is analytically tested in order to yield results.

3.6. Data Collection:

While discussing the data collection part as mentioned by Gordon (1995), that there are two types of data that can be collected in order to analyze to yield meaningful results related to this study. These types of data are different due to their ways of collection, reliability and accuracy. The first type of data is primary data, which is also known as the first hand data. The researcher makes certain efforts in order to collect the primary data. The researcher uses the primary data collection techniques such as surveys and questionnaires in order to collect the primary data. Primary data is known to be less reliable and accurate because it is collected first hand and no proof of its analytical testing exists. Primary data is usually used for pure researches, the one which is purely for academic purposes. Such studies have no practical implications and their results can't be applied to the real life industry to which the study is related.

As mentioned by Thomas (2010) and Smith (2008), the second type of data and also the data being used in this study is secondary data. Secondary data is usually second hand data, but it could be other subsequent hands as well. Secondary data is already available beforehand before the conduct of the research. This is an

applied research, and applied researches use secondary data due to its reliability and accuracy. The nature of this research is an applied research as it has been established before in this study and the nature of the study demands it to use the secondary data for its analysis.

There are two main variables in this study; Interest Rate and Return on Asset (ROA) of few sectors to be determined in this study. Both these variables have historic values, and those values are used in order to collect the data for the purpose of this study. The data related to the interest rate is a macroeconomic data of the economy of Pakistan. This historic data is available related to the Pakistani economy and the data of interest rate is collected from that historic data. The second variable is the Return on Asset (ROA) of different companies selected for the purpose of this research. The data related to the historic values of Return on Asset (ROA) is also available on the company platforms and company reports and hence that secondary data is also collected from the source to include in this research.

In the end, we can say that secondary data related to interest rates and return on assets is the data which is in discussion related to this research. Secondary data related to these variables is quantitative in nature, and is reliable and accurate. The exact quantitative values of both these variables are readily available, and these historic values are used in order to yield the results related to this research.

3.7. Data Analysis:

After discussing the nature and type of the data to be collected, now we move towards the topic that what to do with the collected data. The data analysis part discusses the ways in which the data is analysed in order to get results. In this research, statistical tools and techniques will be used in order to yield meaningful results related to the effects on change in interest rates on the industry performance in Pakistan. Statistical tests that are going to be applied on the collected secondary data in this study are:

- Regression
- Correlation

Both these tests yield some very interesting, meaningful and detailed results. Correlation tells us the direct relation between the two variables. It tells whether the two variables are directly or indirectly related, whether their correlation is positive or negative. To get more detailed results we apply the regression test on the quantitative data. Regression is one of the most comprehensive tests that can be used in order to yield the correlation and co variance results of variables with statistical values. The values or R and R-Square are one of the most useful values in order to explain certain variations in one variable's values due to the alterations in another variable. This test is perfect for this research because there is one independent and dependent variable and their comprehensive relation could be found out through regression. ANOVA also yields some useful results which are a part of a regression analysis results. All these analytical tests yield a resulting comprehensive study, which is useful in many ways to interpret results of interest rate alterations on Karachi Stock Exchange (KSE) and industry performance in Pakistan.

3.8. Sampling:

After establishing the nature of the study and type of study and also determining the type of data to be collected and its analysing tools, now it is time to declare the scope of our study in terms of data collected and that is defined through sampling. In sampling, we actually define the scope of the data to be collected. There are two aspects in case of which we need to define the scope of our variables. These two aspects are:

- Time Scope
- Industry Specification

First we need to determine the time bracket of the data to be collected in case of both interest rate and return on assets. Secondly, in case of Return on Assets (ROA) we need to specify few industries that are going to be used as a sample from the total population of all the industries represented on the Karachi Stock Exchange (KSE). The industries will be selected from all the industries which were mentioned earlier in this study.

In case of time scope, the data related to the interest rate and return on asset (ROA) will be collected within the bracket of 12 years. This bracket is from year 2001 to 2012. The data related to the interest rate which is our independent variable, and the Return on Asset (ROA) which is our dependent variable is collected within this time bracket. The reason for choosing this bracket is that this bracket gives us elaborate data as well as the data chosen from this bracket is the latest data related to the KSE listed companies sectors, interest rate and return on asset (ROA) of chosen listed companies. The data of the return on Asset of all the chosen companies is taken on yearly basis. The reason for getting the yearly data is that because all the companies reveal such data in their yearly financial performance analysis also known as their annual reports. The annual reports of the companies include both the values needed for the calculation of the Return on Asset (ROA) of these companies. The formula used for calculating Return on Assets is:

$$\textbf{Return on Asset} = \frac{\textit{Net Income}}{\textit{Total Assets}}$$

The net income is a value which is usually calculated for each and every company quarterly, semi-annually or annually. We can't take the data quarterly or semi-annually, because all the companies we have chosen for our analysis from KSE don't release their quarterly or semi-annually reports of their finances. Hence, in order to keep the uniformity of the data, the data is collected yearly. The statistical analysis can only be performed if the data related to all variables is from same years and is taken in same quantity. So, the data related to our independent variable, Interest Rate, is also chosen from the same corresponding years as the data chosen for our dependent variable, Return on Assets (ROA). So, this establishes the time scope of our research that the data chosen for our dependent and independent variables will be chosen from the year 2001-2012.

Now, it is time to move on to the second portion of our sampling after establishing the time scope. The second portion here is named industry specification for the purpose of this research. We have decided to review three industries in our research, and find out the impact of the interest rate changes on the industry performance on these three industries. The three industry chosen for analysis in this research are as follows:

- Oil and Gas Producers
- Industrial Metals and Mining
- Industrial Engineering

All these industries are chosen on basis of random sampling. Financial companies, services companies, insurance companies, and banks can't be chosen for this analysis because these companies have almost nil physical assets as their prime business; their total assets data is nonexistent or negligible. Hence, manufacturing companies and companies with physical mega assets as their prime business or a part of their prime business are selected for the purpose of this analysis.

This is a complete and comprehensive list of all the companies which are represented through the selection of above mentioned three industries from the floor of Karachi Stock Exchange (KSE). The ROA's of all these companies will be statistically evaluated with the corresponding values of interest rate in order to find out the impact of interest rate on the industry performance in Pakistan. This impact is found out through collecting the empirical data from KSE, which is the data of industry specification and industry representation. KSE has helped us find out the companies in each of the above mentioned industries which represent the major portion of public limited companies in these specific industries.

3.9. Hypothesis Statements:

H_0: Changes in Interest Rate in Pakistani economy are directly proportional to the Industry Performance in Pakistan

H_1: Changes in Interest Rate in Pakistani economy are inversely proportional to the Industry Performance in Pakistan

The null hypothesis states that the changes in interest rate have a directly proportionate relationship with the industry performance in Pakistan. Oppositely, the alternative hypothesis states that the changes and alterations in interest rate in Pakistani economy have inverse relationship with the industry performance in Pakistan. It has been already established in the previous studies that interest rate has a relationship with the industry performance, but now we try to establish that whether this relationship with interest rate is inverse or directly proportionate. As a result of the statistical analysis conducted in this study, at the end we will accept one of these hypotheses and reject one of the hypotheses.

4. Findings and Analysis

This chapter deals with the findings and analysis of this research. The findings are presented in the form of statistical data and the interpretation of that statistical data in an orderly manner. The findings are presented in three portions as the data was divided into three categories as well. The findings are divided in the same way as the data; the division is done sector wise like the division of the sectors on the floor of Karachi Stock Exchange. The findings are presented in three divisions and these three divisions are as follows:

- Oil & Gas
- Industrial Mining and Metals
- Industrial Engineering

The findings are sub-divided into two categories; Regression Analysis and Correlation Analysis. The regression and correlation are conducted on each and every sector separately and hence the findings are presented likewise as well.

4.1. Oil & Gas:

The first sector analysed in this study is the Oil & Gas producers sector. This sector contains many major companies listed on Karachi Stock Exchange (KSE). The correlation analysis of this sector was conducted in two different phases with 5 companies in one analysis and the next 6 companies in the next analysis. This was done in order to simplify the presentation of results with the help of two tables. The companies are divided in

alphabetical order. The interpretation of both the correlation analysis table follows the main table's content. Here are the two tables that represent the correlation analysis of this sector:

4.2. Correlation Analysis

		IR	APL	ARL	BLL	BPPL	MGCL
IR	Pearson Correlation	1	.699(*)	-.088	.097	-.032	.643(*)
	Sig. (2-tailed)		.011	.787	.765	.922	.024
	N	12	12	12	12	12	12
APL	Pearson Correlation	.699(*)	1	-.400	-.090	-.093	.354
	Sig. (2-tailed)	.011		.198	.781	.774	.259
	N	12	12	12	12	12	12
ARL	Pearson Correlation	-.088	-.400	1	.501	.282	.014
	Sig. (2-tailed)	.787	.198		.097	.374	.965
	N	12	12	12	12	12	12
BLL	Pearson Correlation	.097	-.090	.501	1	-.095	.360
	Sig. (2-tailed)	.765	.781	.097		.769	.251
	N	12	12	12	12	12	12
BPPL	Pearson Correlation	-.032	-.093	.282	-.095	1	.246
	Sig. (2-tailed)	.922	.774	.374	.769		.440
	N	12	12	12	12	12	12
MGCL	Pearson Correlation	.643(*)	.354	.014	.360	.246	1
	Sig. (2-tailed)	.024	.259	.965	.251	.440	
	N	12	12	12	12	12	12

		IR	NRL	OGDC	POL	PPL	PRL	PSO
IR	Pearson Correlation	1	.721(**)	.405	.496	-.010	-.543	-.002
	Sig. (2-tailed)		.008	.191	.101	.975	.068	.994
	N	12	12	12	12	12	12	12
NRL	Pearson Correlation	.721(**)	1	.480	.640(*)	.158	-.326	-.161
	Sig. (2-tailed)	.008		.114	.025	.623	.302	.618
	N	12	12	12	12	12	12	12
OGDC	Pearson Correlation	.405	.480	1	.529	.375	-.650(*)	-.243
	Sig. (2-tailed)	.191	.114		.077	.229	.022	.447
	N	12	12	12	12	12	12	12
POL	Pearson Correlation	.496	.640(*)	.529	1	.400	-.464	-.664(*)
	Sig. (2-tailed)	.101	.025	.077		.198	.129	.019
	N	12	12	12	12	12	12	12
PPL	Pearson Correlation	.010	.158	.375	.400	1	-.222	-.561
	Sig. (2-tailed)	.975	.623	.229	.198		.488	.058
	N	12	12	12	12	12	12	12
PRL	Pearson Correlation	.543	-.326	-.650(*)	-.464	-.222	1	.274
	Sig. (2-tailed)	.068	.302	.022	.129	.488		.388
	N	12	12	12	12	12	12	12
PSO	Pearson Correlation	.002	-.161	-.243	-.664(*)	-.561	.274	1
	Sig. (2-tailed)	.994	.618	.447	.019	.058	.388	
	N	12	12	12	12	12	12	12

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

These tables show the correlation analysis of the companies of Oil and Gas producers sector and the interest rate of Pakistani economy. As we can see, the correlation between the most of the companies from Oil & Gas sector and Interest rate is a positive Correlation. This relationship indicates that the changes in interest rate

would eventually lead to changes and alterations in the performance of companies from the Oil & Gas sector. The positive correlation indicates to one more things i.e. the change in the interest rate and the change in the ROA of the companies from this performance will be in the same direction. If the interest rate increases, the ROA increases as well. If Interest Rate decreases, the ROA decreases as well.

If we apply these results on the performance of this sector relative to the interest rate while linking it with KSE, then we can say that this specific sector of the KSE performs well in response to the changes in the monetary policy and economic factors of Pakistan, specifically in response to the alterations in the interest rate. The increase in the interest rate and the changes in the interest rate favor the performance of this sector of KSE.

Now we move on towards the regression analysis of this sector. The regression analysis of this sector has presented us with the following results:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899(a)	.847	.842	.05107

A: Predictors: (Constant), IR

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.025	1	.025	9.539	.011(a)
	Residual	.026	10	.003		
	Total	.051	11			

A: Predictors: (Constant), IR
B: Dependent Variable: O&G

Coefficients (a)

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	-.105	.064		-1.642	.132
	IR	.019	.006	.699	3.089	.011

A: Dependent Variable: O&G

The model summary section states the values of R-Square and adjusted R-Square. The standard error values are also included in this table. The most important and the most significant value of the table of model summary is the value of R-Square. This value interprets the accuracy of the model and the reliability and accuracy of the data. The value of R-Square in this particular case is 84.7%. In case of the reliability of the model and the data, this study falls well on the standards. This value explains the variability in the dependent variable that is explained by the variations in the independent variable. The values of R-Square and Adjusted R-Square suggest that this model is a perfect fit for this research and fits in well in the aspects of this study related to the variables of the study.

The second table is the ANOVA table. As we can see in the ANOVA table that the significance level of the data used in this study is 0.011. This means that the data is highly significant. This value needs to be below the 0.05, which is a standard level. This indicates that the data used in this study related to the ROA's of the companies listed on KSE and the data related to the interest rate is reliable. This also indicates that the model is a perfect fit for this research. This shows that predictability power of this model to predict the performance of dependent variable through the values of independent variable and this model of research.

At number three is the coefficients table. This table at first has the value of beta. This shows the percentage with which the ROA's of Oil & Gas companies will change due to 1% percentage change in interest rate. In this case, the value of the beta is 0.019 or 1.9%. This means that the ROA's of the companies in Oil & Gas sector change by 1.9% in response to every 1% change in the interest rate. The value of beta is the most significant value there in the coefficients table and hence that value has been interpreted in detail here.

4.3. Industrial Metals and Mining:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.546(a)	.488	.439	.05118

A: Predictors: (Constant), IR

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.011	1	.011	4.238	.017(a)
	Residual	.026	10	.003		
	Total	.037	11			

A: Predictors: (Constant), IR
B: Dependent Variable: IMM

Coefficients (a)

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	-.049	.064		-.767	.461
	IR	.012	.006	.546	2.059	.067

A Dependent Variable: IMM

In this part of the analysis, industrial metals and mining sector of the Karachi Stock Exchange (KSE) is tested with the same model as earlier. The regression results of this sector are presented in the three tables shown above. The R-Square value of this model and its effects on this variable is 48.8%. This is a respected figure too. The accuracy is still good and reliable too. The significance level of the data is 0.017. In this case, similar to the above results the significance level shows the model is fit for the predictability of the results related to the Industrial Metals and Mining (IMM). The value of the beta in coefficients table shows again the same level of variability in the ROA's of the companies listed on Karachi Stock Exchange in the industrial metals and mining sector. This shows that the 1.2% variability is shown in the results of the regression analysis in the ROA's of the companies listed on KSE in industrial metals and mining sector. This variability is caused due to every 1% change in the interest rate which is the independent variable in this research.

Correlations

		IR	ASML	CSAP	HSPI	IIL	ISL	MSC	STPL
IR	Pearson Correlation	1	.546	.107	.514	-.022	-.678(*)	-.604(*)	-.107
	Sig. (2-tailed)		.067	.741	.088	.945	.015	.038	.741
	N	12	12	12	12	12	12	12	12
ASML	Pearson Correlation	.546	1	.278	.637(*)	-.329	-.043	-.299	-.019
	Sig. (2-tailed)	.067		.382	.026	.296	.894	.345	.952
	N	12	12	12	12	12	12	12	12
CSAP	Pearson Correlation	.107	.278	1	.655(*)	-.195	.113	.244	.237
	Sig. (2-tailed)	.741	.382		.021	.543	.727	.444	.459
	N	12	12	12	12	12	12	12	12
HSPI	Pearson Correlation	.514	.637(*)	.655(*)	1	-.223	-.246	-.432	-.043
	Sig. (2-tailed)	.088	.026	.021		.487	.441	.161	.893
	N	12	12	12	12	12	12	12	12
IIL	Pearson Correlation	-.022	-.329	-.195	-.223	1	-.259	-.425	.486
	Sig. (2-tailed)	.945	.296	.543	.487		.416	.169	.109
	N	12	12	12	12	12	12	12	12
ISL	Pearson Correlation	.678(*)	-.043	.113	-.246	-.259	1	.581(*)	.074
	Sig. (2-tailed)	.015	.894	.727	.441	.416		.047	.819
	N	12	12	12	12	12	12	12	12
MSC	Pearson Correlation	.604(*)	-.299	.244	-.432	-.425	.581(*)	1	-.058
	Sig. (2-tailed)	.038	.345	.444	.161	.169	.047		.857
	N	12	12	12	12	12	12	12	12
STPL	Pearson Correlation	-.107	-.019	.237	-.043	.486	.074	-.058	1
	Sig. (2-tailed)	.741	.952	.459	.893	.109	.819	.857	
	N	12	12	12	12	12	12	12	12

* Correlation is significant at the 0.05 level (2-tailed).

If we see at the significance levels in the correlation analysis conducted on this particular and specific sector, all the results are significant and hence show the accuracy of these results. In this analysis, we see a little deviation from the trend and two of the results of the correlation show negative correlation among the Interest rate and ROA's of the companies. The negative correlations are almost insignificant. Their values are too small and can be neglected in front of the majority positive correlation results shown in this study. Among the 7 companies, the majority (5) of the companies show high positive correlation and that can be generalized in order to imply the results from this analysis for this sector's correlation purposes.

4.4. Industrial Engineering:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.749(a)	.561	.517	.04118

A: Predictors: (Constant), IR

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.022	1	.022	12.796	.005(a)
	Residual	.017	10	.002		
	Total	.039	11			

A: Predictors: (Constant), IR
B: Dependent Variable: IE

Coefficients (a)

Model		Un-standardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	-.122	.051		-2.377	.039
	IR	.017	.005	.749	3.577	.005

A Dependent Variable: IE

In the analysis related to this industry, the R-Square is again high and sufficient to be called a reliable model with reliable variable and their data. The accuracy is well described with this model and its data. This is shown through high values of R-Square i.e. 56.1%. The significance level shown in the ANOVA table is 0.005 which is less than 0.05, and hence shows that this model is perfect for the predictability of the data related to the companies of Industrial Engineering (IE). This means that the variability in the industrial metals and mining companies is described to some extent by the alterations in the interest rate in the Pakistani economy.

The value of beta shows almost identical result as shown in the regression analysis above in the Oil & Gas sector and Industrial metals and mining sector. The variability in the performance of the companies of Industrial Engineering is 1.7% due to every 1% change in the interest rate.

Correlations

		IR	AAPL	AKGL	AGT	BCL	DAE
IR	Pearson Correlation	1	.749(**)	-.109	.624(*)	.358	.334
	Sig. (2-tailed)		.005	.736	.030	.253	.289
	N	12	12	12	12	12	12
AAPL	Pearson Correlation	.749(**)	1	-.411	.416	.181	.364
	Sig. (2-tailed)	.005		.184	.179	.573	.244
	N	12	12	12	12	12	12
AKG	Pearson Correlation	-.109	-.411	1	.101	-.088	-.487
L	Sig. (2-tailed)	.176	.184		.754	.785	.109
	N	12	12	12	12	12	12
AGT	Pearson Correlation	.624(*)	.416	.101	1	.678(*)	.492
	Sig. (2-tailed)	.030	.179	.754		.015	.104
	N	12	12	12	12	12	12
BCL	Pearson Correlation	.358	.181	-.088	.678(*)	1	.583(*)
	Sig. (2-tailed)	.253	.573	.785	.015		.046
	N	12	12	12	12	12	12
DAE	Pearson Correlation	.334	.364	-.487	.492	.583(*)	1
	Sig. (2-tailed)	.289	.244	.109	.104	.046	
	N	12	12	12	12	12	12

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

		IR	GIL	HML	KPCL	MTL	PECL
IR	Pearson Correlation	1	-.423	.428	.827(**)	.367	.207
	Sig. (2-tailed)		.171	.165	.001	.241	.519
	N	12	12	12	12	12	12
GIL	Pearson Correlation	-.423	1	-.461	-.132	.074	.242
	Sig. (2-tailed)	.171		.131	.682	.820	.448
	N	12	12	12	12	12	12
HML	Pearson Correlation	.428	-.461	1	.346	.035	-.372
	Sig. (2-tailed)	.165	.131		.271	.913	.234
	N	12	12	12	12	12	12
KPCL	Pearson Correlation	.827(**)	-.132	.346	1	.272	.168
	Sig. (2-tailed)	.001	.682	.271		.393	.602
	N	12	12	12	12	12	12
MTL	Pearson Correlation	.367	.074	.035	.272	1	.346
	Sig. (2-tailed)	.241	.820	.913	.393		.270
	N	12	12	12	12	12	12
PECL	Pearson Correlation	.207	.242	-.372	.168	.346	1
	Sig. (2-tailed)	.519	.448	.234	.602	.270	
	N	12	12	12	12	12	12

** Correlation is significant at the 0.01 level (2-tailed).

In this study some of the results are significant and some are not. This could happen due to several different reasons. The results however show that the correlation among the ROA's of these companies and interest rate is highly positive, and hence can be inferred and generalized to those companies as well which don't have significant results. In short, we can say that the results of majority of the companies from this sector are relatively more significant and can be generalized to the whole industry.

This sums up the statistical results of this study. In the end, it is important to mention that the results of this study are implied to be the results for the performance of the industries on which these studies are conducted. Overall sense that we get from the results of this study are that the industry performance in general is affected by the changes that happen in the interest rate world. The alterations in the interest rate generally go along well with the industry performance and it acts as a source of appreciation in the performance of general companies listed on the KSE.

5. Conclusions and Recommendations

5.1. Conclusion:

The objective of this paper determines the effect of Monetary policy catering Interest rate on industrial performance-measured through Return on Asset (ROA) for the following three asset intensive industries: Oil and Gas Producers, Industrial Metals and Mining, and Industrial Engineering from 2001-12. The statistical tools used for the purpose of this analysis are regression and Pearson Correlation.

This study yielded some very useful, interesting and futuristic results. Some of these results are as follows: a) the increase in the interest rate results in increasing ROA for the said companies in general which leads to an eventual result that interest rate, has acted as an appreciating agent for the companies listed on KSE, and b) the results show that asset intensive corporations are showing positive trend in ROA with increasing interest rates.

5.2. Recommendations:

On the basis of the findings and results of this study, we would like to recommend the following points to the all stakeholders and general public in understanding this research:

- This study should be used as a key factor by the companies to predict their financial performance as a result of monetary policy changes and interest rate changes in particular which is also a monetary policy factor and component.
- Furthermore, the study reveals the interesting facts reacted to the stock exchange trends. Once a company performs well, it has a good ROA, and hence can result in the better dividends for shareholders. So, this is a recommendation made to general public and shareholders of companies and stock brokers that this study can be used in order to recognize useful trends relating to potential investments in better dividend and better returns paying companies.

- Another recommendation is to the government to make such alterations in the monetary policy that it impacts the industry performance in a positive way. This study has already proved that the interest rate and other monetary policy factors do directly affect the industry performance in Pakistan.

5.3. Delimitations:

This part provides some future research implications to the future researchers. Here are some vital points made related to this point:

- The future researchers can exploit this topic by adding more industries to the research and making it more comprehensive.
- The effects of other macroeconomic variables, microeconomic variables and monetary policy variables other than interest rates needs to be studied in order to make this topic of research practically more useful and more reliable in practical world implications.
- Future researchers can use the models used in this study to further enhance the width and breadth of this study in the industry performance aspect in order to understand the direct impact of variables on industry performance instead of the impact on stock exchanges on which these companies and industries are listed on.

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