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Editorial Perspective

“I have learned that people will forget what you said, people will forget what you did but people will never forget how you made them feel”

Maya Angelou

“I am enough of an artist to draw freely upon my imagination. Imagination is more important than knowledge. Knowledge is limited, and Imagination enriches the world”

Albert Einstein

Re-Imagining the Corporate World: Some Rambling Thoughts

In life, as in research, nothing is more exciting than the willingness of a seeker of truth to embrace new challenges to create new values and goals, new ideas and the reason to be in the world. The eagerness with which he pursues such a goal stems from the belief that life does not, because it cannot, take new meanings, unless it is given new meanings and the world remains empty and devoid of values and the goals it does not possess and the meanings it does not have. It comes to have such profiles only when man engages creatively to add meanings, values and purposes to its worldliness.

The task equally exciting for the creative thinker, teacher, corporate manager and a research scholar is his ability to use other's passion, vision and imagination to accomplish his desired goal. Ironically, however, not too many executives in the corporate world and not too many teachers in the schools of business education seem to have captured the transcending imagination and the humanistic vision of a liberal thinker and few indeed have written about it. In the corporate world, it is hard to find a man who is a humanistic visionary to imagine the “world to be” – a man of enough liberal bias to think our life in his thoughts, a metaphysical poet to sing our life in his songs, someone with ironic intelligence to ask the questions we do not ask for fear of painful answers. In the corporate world, managerial inspiration, motivation and administrative experience can play a positive role in the self-education and the cultural development of a corporate thinker. This is indeed an audacious attitude and, at IBA, we are in the company of learned men who are equally inspired and motivated by similar goals and ideals. As seekers of truth and knowledge, ethical and moral values, we are well within the IBA's tradition of academic excellence and ethico-moral distinction.

Moreover, we owe our audacity to the Qur'anic admonition that “over each learned man there is one more learned.” For us it is a pedagogical conviction, sanctified into a religious belief. But, it is

not confined to religious bias alone. Education has both a moral and a social purpose. It is therefore important to emphasize the role education can play in the corporate management. To desire such a desirable goal and a system of business education, our research orientation must stress the importance of critical thinking, quantitative reasoning, cross-cultural and interdisciplinary research. Inter-cultural competency, qualitative evaluation, incremental and differential learning must play a decisive role in the construction and reconstruction of the corporate world. After all, in relation to the corporate world, we need to remember that the quintessential of management is to make knowledge productive. Management, in other words, is a social function, and in its practice, it is truly a liberal art.

To fulfill the task education has to play in the corporate management, a research scholar must therefore embody inter-disciplinary and inter-departmental approach. To be a research scholar, he must be a man of broad vision and a large perspective. As a seeker of truth, a research scholar needs to embrace the axiomatic assumption that stewardship is of the total management and therefore as a research scholar, he must search for the truth everywhere or nowhere at all. Moreover, re-imagining the corporate world demands a radically questioning research in which value is not glossed over and over shadowed by the fact ridden knowledge.

Good management is good not because we think it is good but because a certain value orientation is attached to it as an *essential* attribute of its basic assumptions, presuppositions and attitudinal disposition. The word *essential* used here is descriptive of what is intended and meant over and above a tacit or implied definition. An essential attribute is that without which something, anything, will not be what it ought to be. For instance, sugar will not be sugar if it is not sweet. Sweetness is an essential attribute of sugar and only he who has tasted sugar knows the truth about it. Education in its pedagogical intensity creates the *taste* of knowledge in the mind and the heart of the seeker of truth. It helps him to understand what it means to be in relation to what he knows. Thus, without adjectival qualification, management remains a vacuous concept. Veracity and sustainability are the essential attributes of good management and good administration.

Socrates disturbed the conscience of man when he asked: “is something good because you like it or should you like it because it is good?” Such questions are devastating to subjectivism and relativism, the two seemingly invincible foes of the corporate management.

Aristotle was a philosopher who has left behind a legacy which will never let a seeker of truth and a lover of wisdom – a teacher and a research scholar – live in bad faith, if he has committed himself to the fidelity to truth over and above anything, however dear and however near to his sentimental attachment. It embodies a thought, hard to endure and harder still to live with. Pedagogically, one could not possibly think a thought, more radical and revolutionary, predicated on his love of truth, exceeding his love for anything he loves.

Very few of our institutions of higher education, including the business education, and not too many of those who teach there can endure, gracefully and without resentment, the few words spoken with such a disarming honesty and devastating pedagogical intensity. Defending himself against those who were dismayed by his criticism of his teacher, Aristotle, without fear or trembling, observed: “Dear indeed is Plato but dearer still is the truth.”

Ironically, corporate world has suffered gravely at the hands of pragmatism, its closet ideological ally. Originally, pragmatism derived its *élan vital* from the veracity, fidelity and the workability of truth. The pragmatist loves the truth because truth does not lie or deceive. Truth is always truth because what else could it be? Truth has never forsaken and betrayed the man in whose loving heart it has found a place to abide. The pragmatist stresses the role played by the truth in the practical affairs of man and for its being instrumental in solving the problems of management in human affairs. According to pragmatism, a belief, an idea or an assumption is intrinsically true if and only if it works. Truth works, falsehood does not. Honesty works; dishonesty and deceit are antithetical to a belief in the essential nature of honesty. That is the reason why men of worldly wisdom and managers of corporate affairs find in pragmatism something so inviting. It has become incumbent upon a corporate thinker and a teacher in the school of business education to translate this wisdom into his teaching practice and the working assumptions of corporate management. Another reason why pragmatism, as a source of the philosophy of thought and action, has such a deep impact upon the theory and practice of business ethics is the place it assigned to “value” and “decision” in the corporate world view. During the days of its youthful and creative enthusiasm, the value orientation of pragmatism prevailed and vigorously sustained its business proclivities under the stewardship of corporate management. Its corporate ethicism predicated fact on value, knowledge on virtue and power and authority on the will to truth.

But then it fell victim to its last temptation. In disregard to the purity of truth, pragmatism let itself be lured into the snare of *expediency*, making it the sole criteria of truth. Consequently, vulgar pragmatism opened wide the flood gates of skepticism, relativism and subjectivism. It defiled the purity of human heart, which, according to Kierkegaard, lies in *willing one thing*. Mysteriously, the Sophists smiled over the lost glory that was Greece and good old Socrates must have felt very sad over the demise of transcendence in the human world.

Nothing is more inimical to our transcendental perspective and creative vision than the notion of the world which has the “thus it is and it cannot be better” tag attached to it. Nothing indeed is more anti-thetical to the progressive and dynamic view of the corporate world than our acquiescence to the “given” world bereft of creative will, evaluative judgments and transcendental vision. Our subservience to the world as it is based upon our disregard for the dialectic between ‘fact’ and ‘value’, between the “thus it is” and “thus it ought to be.” We live in a “given” world which we must accept the way it is. The “given” world in which we live is an acceptance phenomena. But this world is also the world we can alter and change to conform to our moral evaluations and transcendental vision. We can change the “given” world, the world as it is, into the world as it ought to be. The dialectic between *is* and *ought*, between *fact* and *value* is indeed an expression of man’s creative discontent. It is the power behind a creative man’s passion to think and re-think, to imagine and re-imagine, to construct and re-construct the “given” world into a world based upon a paradigm in which his evaluations and idealizations become a passion for other’s creative endeavors and a pedagogical focus in a new and compelling way. This world, the world of his creative and co-creative acts, is the world the corporate man can call “my world”. This world is his world; it is his “portion of the world.” For this portion of the world Qur’an holds him responsible.

We must therefore understand that only the worlds exist: yours and mine, his and hers, ours and theirs, materialistic, idealistic just or cruel, ethical or immoral etc. Corporate world is one of these worlds and man, as its creator is responsible for its worldliness. “The world” is a vacuous concept, barren and empty totally devoid of any adjectival qualification and *it does not exist*.

The dialectical interplay of thus it is and thus it ought to be, of acceptance and alteration, fact and value is discernable in all stages of historical development of the socio-cultural phenomena. Social reality and the reality of the corporate world is no exception to this dialectical movement. We must, however, remember that corporate reality, like the social reality, is a very stubborn fact and it does not yield easily to the pressure of our creative will and evaluative judgments. It offers tremendous resistance to our idealizations. But, ultimately, under the persistence of our will to truth, it gives way to our creative rage against the ugliness of injustice, falsehood, deceit and deception, disorder and disharmony. In this awful struggle between the antithetical forces, corporate man lives a life of trial by existence, seeking a resolution of the antagonistic compulsions in a synthesis which transcends both the *given* and the *imagined* modes of reality. It is a onerous task and it imposes upon the corporate man the burden of making and remaking the corporate world into a world as it ought to be. His success in this project glorifies his will to truth and beauty, virtue and honesty. It ennobles his character and beautifies his mind. It deepens his vision and enlarges his perspective on the world he can call *his world*.

This process of onward movement towards the higher and a still higher stage of socio-cultural reality is an empirical fact about history. It is called “historicism”. But, in re-imagining the corporate world we should not let the lure of historicism detract our attention from the paradigm in which “historical man” and his “world-making and world-shaking” acts play a decisive role. Historicism has unwisely neglected this aspect of man’s being-in-the-world. It has assigned the role played by man to an ‘impersonal’, “abstract” and “vacuous” concept called *history* which, like *the world*, does not exist.

History does not exist, only historical events exist. Historical events are an extension of human actions, choices, decisions, judgments and evaluations. Sometimes human wisdom and folly have created historical circumstances; sometimes human ignorance, prejudice and venomous hatred have created havoc in the world. There have also been the glorious times when man’s creative will and the will to truth have provided a glimpse of the “best of all possible worlds”. History is an autobiography of man. Apart from human actions, history does nothing and it means nothing. Historical events do not make much sense without the causal efficacy of *human factor* and, without *human metaphor*, historical circumstances leave much to be explained. Modern man has lived and suffered so much history so intensely that no amount of mystification about it can make him forget his feeling of pain and joy, disillusionment and betrayal at the hands of those who have acted as causal factor in the making of historical circumstances. We will not be stretching our imagination too much to say that “time past and time present are both contained in time future”. But today, where is the glory that was Greece? Yesterday, who was responsible for *The Rise and Fall of Roman Empire*? Who, if not man, made ENRON fall apart? It was not history because history does not kill, man does. History does not fight wars, man does. History did not build TajMahal, man did.

In history and in the *lived-world* of man, the dialectical interplay of “thus it is” and “thus it ought to be”, of acceptance and alteration, vice and virtue, hope and despair is discernable in all stages of the socio-cultural development. Social reality and the reality of the corporate world is not an exception to this dialectical movement. However, social reality, like the reality of the corporate world, is a very stubborn fact. It does not yield easily to the pressure of our creative will and it does not submit to our ideas and ideals easily. It offers tremendous resistance to our idealizations but, ultimately under the pressure of our will to truth it gives way to our creative rage against the ugliness of injustice, falsehood, deceit and deception, disorder and discord. It is a situation laden with tremendous struggle and it imposes upon the corporate functionary the onerous task of making and remaking his world into a world to be. His success in this regard glorifies his will to veracity and beauty, virtue and honesty, truth and justice. It ennobles his character and beautifies his mind. It deepens his vision and enlarges his perspective on the world he can call *his world*.

The one single factor which has played a decisive role in the formation of historical events and the construction and reconstruction of the corporate world is human character. More and more, year after year, institutions of higher education, including business education, are redefining the role of normative sciences, particularly the role of ethics and morality, in the corporate world-view. It is being felt that, as a professional desideratum, we must be willing to incorporate into our system of business education and the theory and practice of corporate management the emerging trends of character ethics and the contemporary moral issues. Professionalism demands a radical change of our attitude towards the existing corporate paradigm. It teaches us that we shall not grow professionally, if we do not outgrow our tendency to acquiesce and our fascination for the *status quo*.

Corporate world suffers from fatal flaws. Our redemption from the flaws of our situation lies in making our calling the passion of our life. If and when we live passionately, devoted to what we do, and feeling the way we feel about the beauty we love and the truth we speak, only then shall we know how to celebrate the markings we ought to uphold to celebrate the glory of our profession.

The corporate man, like an educated man, is not a complete man but he is essentially a good man. A corporate manager cannot be called a good professional unless he enjoys the distinguishing attribute of ethical and moral character.

In dismay and in despair, we have painfully learned, and circumstances have repeatedly confirmed our feeling that in the corporate world we shall solve very few of our problems if we do not find the place for ethics in the management of economic affairs. We shall not know the purpose of the world if we persist in our flippant attitude towards the liberal and humanistic ideals we can be proud of. Pedagogically we need to integrate into our system of education the belief that our image of perfection and our quest for excellence transcend the petrifying *status quo* and the taken for granted attitude resulting in the acquiescence to the unquestioned and the unexamined beliefs and ideas. It is an educational concern and to achieve the goal we are seeking, we must think of education not only as a formal or specialized training but, equally importantly, education in its intellectual, ethical and moral intensity.

To reimagine the corporate world, we need to make a case for the corporate man, remembering that “being a virtuous man” is the defining characteristic of professional excellence. As a professional proclivity, a good corporate manager should make his passion for excellence his *raison d’être* and the reason to be who he is. His character is his moral strength. He is inspired by the creative will. The creative will is the will to power and the will to power is the will to truth. Like an educated man, let the corporate man take his mandate from his passion to become what he is capable of becoming.

Such inspiration sounds superfluous and, given the society in which the corporate man lives, it is indeed superfluous in many ways. The ethical and the moral climate of the corporate culture has repeatedly impressed upon us the need to re-imagine the corporate world, to create and re-create a new vision of its worldliness. Once again, the audacity that challenges the corporate man, inviting him to “dare to be wise” (*SapereAude*), is grounded in the strength and the tenacity of his ethical and moral disposition.

What makes a man invincible is his character. Human life is inviolable because of the beauty and the sanctity of man’s character. That is what makes him rich; in nothing else is he poor. When character is lost, everything is lost and nothing remains but the sad remembrance of what used to be. In its pristine beauty, human character cannot be other than what it is. That is its essential attribute. Let us praise the glory of man’s character; let us celebrate the story of the corporate man. 

(To be continued)

Tufail A. Qureshi

ARTICLE**Determinants of Financial Distress
Evidence from KSE 100 Index**

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Abstract

Financial distress and its determinants are very important for investors as well as financial institutions; no one can deny its significance. This paper assesses the determinants of financial distress of non financial companies of Karachi Stock exchange from 2003 to 2010. Financial distress in companies was calculated from Z score model. Determinants like current ratio, profitability, efficiency, solvency and leverage were identified. Result shows current ratio, profitability, solvency and leverage are negatively correlated while efficiency is positively correlated.

Key words: Financial distress, Z score, Current ratio, Profitability, Efficiency, Solvability, Leverage

Introduction

Financial distress is becoming a very interesting topic in the area of finance. It shows its impact on companies and moves towards different stakeholders and ends at society. Corporate financial distress became more and more important and relevant when we came across global financial crises. Financial distress is a situation when one party (that may be any individual person or a company) borrows loan and is not in a position to pay back the same along with interest. There are numerous factors that may cause financial distress like cost of capital, leverage, cost of equity, volatility of earning, cost of debt and economic condition. Another reason of financial distress is the increasing number of non performing loans (NPL) of commercial banks. The amount of these non performing loans has reached up to 560 billion rupees in Pakistan. Currently we are looking at whether these forms of companies are successful or not.

Successful companies are growing rapidly and unsuccessful firms are filing for bankruptcy and disappearing from stock exchange. At the time of corporate failure, shareholders are the last one to receive the share of their investment and most of the time companies are in such position that they are unable to fully pay to their creditors as well and as a result shareholders do not receive a thing, so it is the right of a share holder to get correct information i.e. accurate and timely information should be provided (Holder-Webb & Cohen, 2007). According to Andrade and Kaplan (1998) financial distress is a period when borrower does not have the capacity or capability to pay debt. Normally the structure of companies is divided in to two types: financially distressed and non distressed companies. These distressed companies are further categorized as solvent and insolvent. Solvent are those firms that have the capacity to pay back its obligations

while insolvent are those not in the position of paying back. Baldwin and Scott (1983) discussed in their article that a firm reaching the point where it fails to meet its obligations is known to be in state of financial distress. A firm enters into a state of financial distress when its cash flows are less than current long term debts and if its current cash flows exceed its long term debts it will be in safe zone (Whitaker, 1999). One of the reasons for a firm entering into financial distress is economic condition of the country as well as poor management of the companies (Wruck, 1990). The main factor that identifies financial distress is an organization's ability to default.

Objectives of the Study

The objective of this study is to find out different determinants which cause financial distress in companies. This distress adversely affects not just the economy of the country but also results in financial global crises eventually.

Significance of the Study

Health of the firms is very important for investors as well as management. Investors invest in companies that are financially healthy as risk of default is minimized for them. It is important for management as they will be able to identify causes of distress and these causes can be controlled by taking different measures. There are still different dimensions available of financial distress that should be explored and due to limited work being done in developing countries; it has provided an opportunity to conduct research in Pakistani economy. In last few years our economy has been badly affected by financial crises. This paper will help us explore these factors.

Literature Review

Altman and Beaver (1968) were the pioneers to conduct study for the prediction of bankruptcy. Altman (1968) applied multi discriminate analysis and finally selected five ratios out of twenty ratios to develop a model to predict the default of companies. This model was able to predict bankruptcy prior to two years of default very accurately and successfully. In the same year Beaver (1968) used univariant analysis to predict the default of companies. He was of the view that financial ratios can be very useful in prediction of default very accurately at least five years or before default. Beaver then elaborated that among these financial ratios non liquid assets have more convincing results than that of liquid assets. Many other researchers moved on their steps and used multi-variant analyses in their research, these researchers included (Beaver, 1968a; 1968b; Blum, 1974; Altman, 1973; Libby, 1975; Moyer, 1977; Sharma and Mahajan, 1980; Taffler and Tisshaw, 1977). This multi variant analysis was very successful to predict default till 1980. It was then replaced by logistic analysis which remained in use till 1990s (Ugurlu and Aksoy, 2006) and again replaced by artificial neural networks. Altman (2000) developed new model for predicting financial distress of companies by revising the Z-score model (Altman, 1968) and Zeta (Altman, Haldeman and Narayanan, 1977) credit risk model. He used five financial ratios to predict distress and the result showed that this model is very accurate in predicting failure of distressed and non distressed companies. Fitzpatrick (2004) studied financial distress of non financial companies of USA listed in stock exchange. He used parsimonious model to check the financial condition of these companies by creating financial conditional score (FCS). The value of this score card was based on standard deviation, their size and financial leverage. The results

showed that financially distressed companies' used equity more frequently than that of debt and those companies which covered operational loss from external sources failed against those companies which invested in funds. Outecheva (2007) also conducted research on financially distressed of non financial companies in USA. The study was divided into before 1990 and after 1990. The risk assessment before 1990s was controlled by static single period model and after 1990s was dominated by dynamic models and the results showed companies' equity was enough to borrow additional loan. Almeida dan Philippon (2000) also analyzed public listed companies of US, the results indicated that financial distress cost was too small to overcome tax shield benefit and tax shield benefits were constant at certain level and started decreasing with increased in leverage. Chiang Hu and Ansell (2005) conducted research on financial distress prediction by using credit scoring of five different models on 491 non distressed and 68 distressed firms. The result showed that all the five models were best suited with Sequential Minimal Optimization model showing top performance and Logistic regression model showing lowest performance among these models. Janes (2003) tested relation between financial distress and accruals, and the results implied that creditor did not consider any relation while lending debt at initial stage. Theodossiou et al (1996) also conducted research on different factors like company's profitability, its size, financial leverage, growth and managerial effectiveness and results shows these factors are highly involved in financial distress. Recently Anderson and Chang (2011) studied the impact of disclosure of financial distress in term of profit warning announcement on share prices of public listed companies. The result showed the complexity of prediction of financial distress. Zulkarnan (2009) also conducted the similar study to assess corporate financial distress on Malaysian economy using Altman's Z-score model. The results showed that only 5 companies out of 64 fell in distress area and model was very significant in discriminating distress and non distress companies. Similarly Brahmana (2004) also studied corporate financial distress on Malaysian economy. The data sample was taken as delisted companies of Jakarta stock exchange and results showed only 1% of the companies were financially distressed. Corporate governance characteristics can also lead the firm to financial distress because composition of dependent and independent directors affects company's decisions. Elloumi and Gueyle (2001) on their working paper tested directors' composition and results revealed that the composition of board of directors explains financial distress.

Data And Methodology

Sample

Karachi stock exchange is the national market of Pakistan that is why companies were selected from KSE 100 index. For this purpose, data was taken from 'State Bank of Pakistan's Balance Sheet Analysis' a State Bank of Pakistan's publication. This analysis contains all the useful and necessary information of all the listed companies in Karachi Stock Exchange. The time period for the data was from 2003 to 2010. As Karachi Stock Exchange is a mixture of financial and non financial companies that are listed on it but our study focused on non financial companies. The reason being selecting non financial companies was their nature of their capital structure i.e. the capital structure of non financial companies and financial companies is not same and as a result it cannot be compared with each other. This study is restricted to only 2 sectors which include cement and sugar. I used convenient sampling because there were certain companies whose data for more than six years was not available.

Dependent and Independent variables

After reading and discussing the different researchers in literature, I was able to identify my dependent and independent variables. My dependent variable is financial distress and independent variables are liquidity, profitability, leverage and solvency.

Dependent Variables Measurement

Financial Distress

Financial distress means situation where companies are unable to pay their obligations. Its liabilities exceed its assets and as a result companies default. Altman was considered as the pioneer who started work on financial distress. He developed a model to predict financial distress of companies. This model was known as Z score model and was based on five financial ratios. These ratios were selected after a careful analysis out of many financial ratios and this model is used for measurement of financial distress. Ratios are calculated from total assets, total liabilities, sales and retained earnings, EBIT (earnings before interest and taxes), market value of firm. These ratios are given below

R1 = Working capital/Total assets

R2 = Retained earnings/Total assets

R3 = EBIT/Total assets

R4 = Market value of equity/Total liabilities

R5 = Sales/Total assets

R1 = Working capital/Total assets

Working capital over total assets is used to measure the liquidity of the companies. It has been used very commonly in standard finance. Working capital has always been acting as a blood for the companies. It is used to meet day to day business needs. Working capital or net working capital is the difference of total current assets and total current liabilities. It is also known as net liquid assets. It tells how much ratio of total assets is used for maintaining daily needs or how much part of total assets belongs to working capital.

R2 = Retained earnings/Total assets

It is one of the important ratios in standard finance. Its measurement helps us analyze profitability of the companies. Age of the companies is a very important factor of retained earnings, usually newly formed companies have low retained earning while old and matured giants have high retained earnings. Most of the times, companies having retained earnings use it as a source of financing. In other words companies with high retained earnings have low use of debt while companies with low retained earnings are highly leveraged. This ratio tells us how much of retained earnings are being represented by total assets needed or how much part of total assets belongs to retained earnings which can be used as source of finance.

R3 = EBIT/Total assets

This ratio shows the earning capacity of the company with respect to its assets. The ultimate goal of the company is profit earning or rather profit maximization so their failure and success depends on their earning capacity. This ratio tells how much of EBIT is being represented by total assets or how much part of total assets belongs to EBIT.

R4 = Market value of equity/Total liabilities

Market value of equity over total liabilities is very important ratio for evaluating net worth of the company in the market. It explains value of the company over its total obligations. This ratio can be elaborated from the example that if a company's capital structure consist of Rs 400 as equity and Rs 100 as debt out of Rs 500, then it would have to lose 4/5th its assets before it defaults on the other hand if its equity is Rs 100 and debt is Rs 400 out of Rs 500, then the company would default even it loses 1/5th of its assets.

R5 = Sales/Total assets

Sales over total assets help us in evaluating the growth of the company as to how well the company is growing. Companies have to utilize their assets smartly to grow their sales and only stable and efficient companies are able to achieve this. Ingredients for this ratio i.e. sales and total assets are taken from the 'State Bank of Pakistan's Balance sheet Analysis'.

Independent Variables Measurement**Liquidity**

Liquidity is measured by current ratio as it is one of the commonly used ratios for the calculation of liquidity. By liquidity we mean whether the company is in position to meet its short term obligations or not. This ratio can be calculated by total current assets over total current liabilities. It indicates how much of current assets are excess or deficient over current liabilities.

Profitability

Profitability is measured by profit margin. It is calculated by net profit over total sales. It indicates how much of net income is raised by total sales or it can also be said as to how much portion of a company's sales represents profit. If a company generates sale of Rs 100 and its profit is Rs 20 then ratio indicates that 20% of sales represent its profit.

Efficiency

Efficiency is measured by EBIT (earnings before interest and taxes) over total assets. It helps us in determining how efficient the firm is in utilizing its total assets to generate operating income. Efficiency ratio explains how much of operating income is being generated by the use of total assets or it can also be said as to what percent of total assets represent operating income.

Solvency

Solvency is measured by total assets over total debt. The purpose of solvency ratio is to identify whether the company is in a position to pay back its long term obligations or not. How much company has in hand to borrow a loan. For example a company has assets of Rs 100 and total debt to be paid is Rs 50. This shows company has Rs 2 available to pay debt of Rs 1.

Leverage

The leverage ratio is calculated by dividing total debt by total assets. It is related to loan management and determines how debt is managed by the company.

Hypothesis

After discussing arguments of different researchers on financial distress, it is clear that when a company is in distress it not only affects the company but also its shareholders, stakeholders and ultimately country's economy; it does not just stop there but gradually may lead to a global financial crisis. To check the impact of distress empirically, we construct following hypothesis:

Ho=There is no correlation between profit margin and financial distress.

H1=There is correlation between profit margin and financial distress.

Ho=There is no correlation between current ratio and financial distress.

H2=There is correlation between current ratio and financial distress.

Ho=There is no correlation between efficiency and financial distress.

H3=There is correlation between efficiency and financial distress.

Ho=There is no correlation between leverage and financial distress.

H4=There is correlation between leverage and financial distress.

Ho=There is no correlation between solvency and financial distress.

H5=There is correlation between solvency and financial distress.

Data

Panel data of 50 manufacturing firms from two sectors is taken namely sugar and cement to test hypothesis. Out of these 50 companies, there were 40 companies that were financially distressed while 10 companies were not. The reason for taking panel data for analysis is that this data has the characteristics of both time series data in a way that it has values of single variable of different periods of time and cross sectional data in a way that it covers different variables at a particular period of time. Time series data deals with the data of single company at different periods of time while cross sectional data deals data of different companies at a particular period of time. Using panel data had increased the size of data. Larger data has its own benefits one of which is larger degree of freedom which results in decrease in co linearity among variables and the result of the estimates are improved.

Methodology

This research study is based on panel data to identify different determinants of financial distress. First of all, correlation matrix is used to check the correlation between financial distress and these variables. Then regression model is used to check the dependency of one variable over others. Slope and intercept are kept constant in regression analyses which makes it constant coefficient model.

Regression Equation

This regression equation is according to according to this study and now given below

$$Z_{it} = \alpha + \beta_1 (\text{Liq}) + \beta_2 (\text{Prof}) + \beta_3 (\text{Lev}) + \beta_4 (\text{Solv}) + \varepsilon \dots \dots \dots (2)$$

Z= Financial Distress

Liq=Liquidity

Prof=Profitability

Eff=Efficiency

Lev=Leverage

Solv=Solvency

ε = the error term.

First of all financial distress, profitability, liquidity, leverage and solvency ratios are calculated separately one by one. Distress is calculated by Altman's Z score model. It is based on five financial ratios. These ratios were selected after careful analysis out of many financial ratios and are used for measurement of financial distress. Ratios were calculated from total assets, total liabilities, market value of firm, sales retained earnings and EBIT (earnings before interest and taxes). First ratio is working capital over total assets are use to measure the liquidity of the companies. It is used to meet day to day business needs. Working capital or net working capital is the difference of total current assets and total current liabilities. It is also known as net liquid assets. It tells as to how much ratio of total assets is used for maintaining daily needs or how much part of total assets belongs to working capital. Second ratio is retained earnings over total assets. Its measurement helps us in determining profitability of the companies. Most of the times companies having retained earnings use it as a cheap source of finance but the fact is it is an expensive source of finance. In other words companies with high retained earnings have low use of debt while companies with low retained earnings are highly leveraged. This ratio tells as to how much of retained earnings are being represented by total assets needs or how much part of total assets belongs to retained earnings which can be used as source of finance. Third ratio shows the earning capacity of the company with respect to its assets. The ultimate goal of the company is profit earning or rather profit maximization so their failure and success depends on their earning capacity. This ratio tells as to how much of EBIT are being represented by total assets or how much part of total assets belongs to EBIT. Fourth ratio is market value of equity over total liabilities is very important ratio for evaluation net worth of the company in the market. It explains value of the company over its total obligations. Finally fifth ratio is sales over total assets help us in evaluating the growth of the company that how well company is growing. Companies have to utilize their assets smartly to grow their sales and only stable and efficient companies are able to achieve this. Ingredients for these ratios are taken from the 'State Bank of Pakistan's Balance sheet analyses'.

Now in the calculation of independent variables we first of all calculate liquidity. It is measured by current ratio. By liquidity we mean whether company is in position to meet its short term obligations or not. This ratio can be calculated by total current assets over total current liabilities. Profitability is measured by profit margin. It is calculated by net profit over total sales. It indicates how much of net income is raised by total sales or it can also be said how much portion of a company's sales represent profit. Efficiency is measured by EBIT (earnings before interest and taxes) over total assets. It helps us determine how efficient firm is in utilizing its total assets to generate operating income. Solvability is measured by total assets over total debt. The purpose of solvability ratio is to identify whether the company is in position to pay back its long term obligations or not. How much company has in hand to borrow a loan. For example company has assets of Rs 100 and total debt to be paid is Rs 50. This shows company has Rs 2 available to pay debt of Rs 1. Leverage is measured by leverage ratio. It is calculated by Total debt over total assets. It is related to loan management. How debt is managed by company and what is its borrowing problem.

Results And Discussions

Descriptive statistics

Descriptive statistics is a technique used to check the characteristics of data. A descriptive analysis is based on measure of central tendency and measure of dispersion. Central tendency is measured through averages like mean, median and mode.

Mean value of distress, current ratio, profitability, solvency, efficiency is 1.09, 65.349, 0.697, 1.8763, 0.069 and 1.013 respectively.

Dispersion is measured by standard deviation, variance and range.

Deviation of distress, current ratio, profitability, solvency, efficiency is 0.7847, 66.634, 21.975, 2.219, 0.133 and 1.399 respectively.

This deviation shows as to how much of these values deviate from its mean, higher deviation shows inconsistency in values. Skewness shows the shapes of the data. The data is normally skewed if skewness is 0, but in this case all the variables are positively skewed except for profitability which is negatively skewed. Kurtosis shows the peak of the curve. Distress, profitability, solvency, efficiency is leptokurtic while current ratio and leverage is platykurtic. The minimum value shows the minimum value of data and maximum value shows maximum value of data. Range is obtained by taking difference of maximum and minimum values. Therefore range shows the difference between extreme values.

Table - I Descriptive Analyses

<i>Z</i>		<i>CR</i>		<i>Profitability</i>	
Mean	1.09822	Mean	65.349	Mean	0.697351
Standard Error	0.04281	Standard Error	3.6352	Standard Error	1.198813
Median	0.94212	Median	55.9	Median	1.8
Mode	0	Mode	0	Mode	0
Standard Deviation	0.78477	Standard Deviation	66.634	Standard Deviation	21.9746
Sample Variance	0.61587	Sample Variance	40.1	Sample Variance	48.8831
Kurtosis	4.9273	Kurtosis	2.7133	Kurtosis	5.406163
Skewness	1.84119	Skewness	1.4673	Skewness	-2.78369
Range	6.59049	Range	353.1	Range	414.32
Minimum	-0.2536	Minimum	0	Minimum	-238.76
Maximum	6.33684	Maximum	353.1	Maximum	175.56
Sum	369.003	Sum	21957	Sum	234.31
Count	336	Count	336	Count	336

Table - II Descriptive Analyses

<i>Solvency</i>		<i>Efficiency</i>		<i>Leverage</i>	
Mean	1.876339	Mean	0.069992	Mean	1.01366
Standard Error	0.12109	Standard Error	0.007269	Standard Error	0.076353
Median	1.430992	Median	0.056503	Median	0.698577
Mode	0.997274	Mode	-0.05607	Mode	1.002733
Standard Deviation	2.219623	Standard Deviation	0.13325	Standard Deviation	1.399577
Sample Variance	4.926727	Sample Variance	0.017756	Sample Variance	1.958815
Kurtosis	7.687381	Kurtosis	4.642527	Kurtosis	2.145295
Skewness	2.787335	Skewness	1.034062	Skewness	1.416708
Range	27.5702	Range	1.25732	Range	9.130454
Minimum	0	Minimum	-0.4377	Minimum	0
Maximum	27.5702	Maximum	0.819616	Maximum	9.130454

Sum	630.45	Sum	23.51729	Sum	340.5898
Count	336	Count	336	Count	336

Correlation analysis

Correlation shows the association among the variables, higher correlation values shows higher degree of association while lower correlation value shows lower degree of association, and value of correlation lies between -1 to 1. Perfect negative correlation is indicated by -1 and perfect positive correlation is shown by 1 while 0 shows no correlation at all. As we move away from 0 correlations of variable increases whether it is positive or negative depends upon the sign of value. Current ratio and Efficiency is 0.39 and 0.45 which is slightly strong correlation while leverage - 0.26 is weak negatively correlated.

Table - III Correlation

	Z	CR	PM	Solvency	Efficiency	Leverage
Z	1					
CR	0.39106	1				
Profitability	0.29834	0.2011	1			
Solvency	0.17006	0.2196	0.0795	1		
Efficiency	0.45189	0.2163	0.5461	0.097256313	1	
Leverage	-0.2684	-0.2701	-0.041	-0.29217402	-0.07489	1

Regression analysis

Correlation analysis shows degree of association but when we want to know its magnitude as well which correlation lacks. For this purpose, regression analysis is used. Coefficient of current ratio is -0.0005 which shows 1% increase will cause 0.0005% decrease in distress and vice versa. Similarly profitability and solvency coefficient is -0.0023 and leverage coefficient is - 0.0825 and only efficiency coefficient is positive and shows if 1% efficiency increases it will cause 2.87% increase in distress. The value of R is 0.377 which shows the fitness of model.

Table - IV Regression Summary Output

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.47667
R Square	0.37721

Adjusted R Square	0.34551
Standard Error	0.29509
Observations	336

Table - V Regression table

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	1.01803	0.0774	13.145	4.99534E-32	0.865678	1.170384	0.865678	1.170384
CR	-0.0005	0.0006	-0.754	0.045129535	-0.00167	0.000745	-0.00167	0.000745
Profitability	-0.0023	0.0021	-1.105	0.00269917	-0.00637	0.001789	-0.00637	0.001789
Solvency	-0.0023	0.0181	-0.125	0.009009404	-0.03792	0.033403	-0.03792	0.033403
Efficiency	2.85668	0.3434	8.3179	2.38436E-15	2.18108	3.532279	2.18108	3.532279
Leverage	-0.0825	0.0291	-2.836	0.004850347	-0.13979	-0.02529	-0.13979	-0.02529

Conclusion

Financial distress is a hot topic these days in finance and the health of the firm is very important for investors as well as management. Investors invest in those companies which are financially healthy as risk of default is minimized for them. It is important for management as they will be able to identify causes of distress and these causes can be controlled by taking different measures. Financially distressed companies leave economy towards crisis which is the reason everybody wants to determine causes of distress and prevent it from happening. The objective of this paper was to find determinants of financial distress of non financial companies of Karachi Stock Exchange. Data from 50 companies was collected and a result shows current ratio, profitability, solvency and leverage are negatively correlated while efficiency is positively correlated. There are still different factors which are not identified and yet to be explored. These factors give chance to new researchers to move towards this burning issue. It will also help everyone understand the phenomena behind financial distress. 

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ARTICLE**Interest Rate Sensitivity and Stock Returns**

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*Bahria University, Islamabad, Pakistan***Abstract**

This paper investigates the sensitivity of interest rate to stock return of financial institutions traded at Karachi Stock Exchange. Two Index Model of Stone and Bernell(1974) have been used to test the proposition of the present study. Three different portfolios of financial institutions have been examined against sensitivity of actual and unanticipated interest rates. Repo rate/Policy rate instead of t-bill rate is used for the proxy of interest rate. The data is collected from twenty nine financial institutions covering the time period from 2004 to 2011. Unit root test, co integration and error correction mechanism have been checked before proceeding to Two Index Model. For unanticipated interest rate risk ARIMA is proposed using Box Jenkins methodology. The findings of present study shows that stock returns of financial institution demonstrates positive sensitivity to market index and are statistically significant. However, sensitivity to interest rate is negative and statistically insignificant.

JEL Code: E44 Financial markets and macro economy

Key words: *Karachi Stock Exchange, Stock return at KSE*

Introduction

Interest rates have a direct impact when it comes to bond market. However, interest rate sensitivity to stock return is not consistent or direct (Reilly and Brown, 2005). It is argued the actual sensitivity between stock prices and interest rate is negative i.e. increase in interest rates cause stock price to decrease, suppressing the rate of returns. However, this sensitivity is not always consistent (Titman & Warga, 1989). Interest rates impact on stock return can be time varying and also subject to the nature of business (Joseph & Vezos 2006; Park & Choi 2011). Similarly, some industries may react more to interest rates because of their financial structure than others. As Khawaja (1995) argues interest rate is a tool in the hands of the government to regulate financial markets. The Neoclassical theory of interest states that in case of increase in interest rates loan demanded by an entrepreneur becomes expensive causes a shrink in investment activity and stock return. When a rate of interest is high investor will obtain fewer loans and subsequently invest less and vice versa (Khawaja 1995).

The key purpose of this paper is to investigate how stock return of financial institution in Pakistan responds to interest rates sensitivity as well to stock market itself. In the context of Pakistan Stock Market, it is worth exploring this phenomenon because interest rates in Pakistan are quite high among Asian financial markets (Allen, 2012). The interest rates sensitivity and stock return at KSE is important because it will give a hint as to how an investor at Karachi Stock Exchange (KSE) responds to change in the rate of interest. The issue of interest rate sensitivity and stock return is important with reference to Pakistan because Pakistan economy is facing double digit inflation since the last five years. Government recently reduces the interest rates aiming to spur growth in financial markets (Khan, 2011).

This proposition was tested using relevant econometric techniques i.e. unit root test has been applied to check that the time series was stationary, multi-co-linearity between variables and co- integration has been checked to avoid spurious regression. For unanticipated interest rates ARIMA Model has been used in two index model in the context of Pakistan stock exchange market. Stone Two index model previously have been applied on bank stock return (Brewer & Lee 1990; Flannery & James 1984), and on insurance stock return Park and (Choi, 2011).

However, the scope of the present study has been extended by using two-index model for financial institutions including banks, insurance companies, and financial institutions (Annex A). Furthermore, repo rate¹ for proxy of interest rate sensitivity is used instead of t-Bills rates used by previous studies (Brewer & Lee 1990; Schrand 1997; Karam & Mittal 2011).

The remainder of this paper is organized as follows. The first part provides the review of relevant literature. The second and third part provides the procedure followed by data description collection and analysis. The fourth part provides discussion and fifth and final section provides conclusion of present study.

1.0 Literature Review

Two index model shows that return of underlying security is sensitive to interest rate change and stock market index (Stone & Bernell, 1974). Its variations have been used widely by researchers in evaluating interest rate sensitive securities. Stone and Bernell (1974) set the trend by postulating that the return of security is highly affected by interest rate as well as market forces itself. This conviction opens a new debate and most of the empirical studies on two index models are consistent with the finding of original research of Stone and Bernell(1974) and found spastically significant sensitivity between stock return and interest rate (Flannery & James 1984; Brewer & Lee 1990; Schrand 1997; Park & Choi 2011).

While checking the sensitivity of stock return to interest rates, Stone and Bernell (1974) have recommended two variables that can predict any change in stock return i.e. interest rate and stock market index. However, further studies have checked this sensitivity by adding more variables to the original model. Joseph and Vezos (2006) used exchange rate besides interest rates

¹ State Bank of Pakistan reverse repo rate (also known as policy rate or discount rate) is the rate at which banks can borrow from SBP on an overnight basis.

to capture sensitivity and found that return of stocks shows mix trend to interest rate change. Sensitivity is also checked by Lee (1992) including inflation and real activity. Using Vector Auto regression (VAR), he found little evidence stock return sensitivity to interest rates. Consistent with Lee (1992) study Titman and Warga (1989) also used inflation and interest rates to measure sensitivity of stock return. However, they conclude that unanticipated interest rates are positively related to stock return. By using GARCH model sensitivity of insurance company's stock return to interest rate risk is check by (Elijah et al. 2007), they found that sensitivity of stock return to long term interest rates is statistically significant, rather than short term. Chancharoenchai et al.(2005) also support the significant impact of interest rate sensitivity to stock return for different countries.

While using two-index model, different interest rates have been used by researchers. Flannery and James (1984) have used three different interest rates to measure the sensitivity of bank stock returns; they found that all proxies for interest rates are statistically significant for explaining stock return sensitivity to interest rates. Brewer and Lee (1990) have used t-bills for the unanticipated interest rate risk to the sensitivity of bank stock return; they also found statistically significant relationship between stock return and interest rates.

Six different interest rates have been used by Park and Choi (2011) including three month t-bills to 30 year t-security rate, they believed that stock return of insurance companies and interest rate sensitivity were negativity related to portfolio return, and positively related to different time periods.

The actual sensitivity between interest rate and stock market is negative i.e. increase in interest rate because a decrease in stock prices (Reilly and Brown 2005). Plethoras of studies have empirically tested this sensitivity but the evidence is mixed. It was found that there is negative sensitivity between stock return and interest rate (Liu & Shrestha 2008; Chancharoenchai et al. 2005; Elijah et al. 2007) while at the same time Titman and Warga (1989) found a positive sensitivity between interest rates and stock prices. However, Titman and Warga (1989) conclude that the generalization of study is limited as the context of study was different. In one instance Akella and Greenbaum (1992) found that stock return are extremely sensitive to unanticipated change in interest rate and a unit change in t-Bills triggers eight fold change in stock return.

The interest rate sensitivity to stock return can also be subject to causality. Causal relationship appears when dependant variable is affected by independent variable but at the same time also affects them. When this sort of relationship exists between variables, VAR is applicable (Gujarati 1978). Thorbecke (2004) estimated VAR to check how stock market sensitivity to change in monetary policy and concluded that exposure to monetary policy can reduce stock return. Another study by Laopodis (2009) found that stock market does not necessary follow the fundamentals and respond to interest rates.

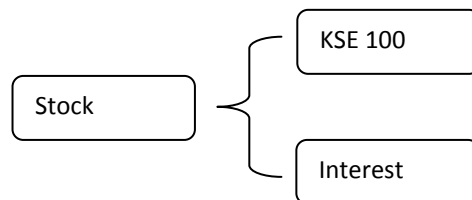
Generally most time series are non stationary and sometime tilted towards volatility clustering that means periods of large swings. The stock prices, interest rates, exchange rates and inflation particularly shows high volatility (Asteriou & Hall 2007). If time series shows such trends (Engle, 1982), ARCH family of models comes to rescue the scenario. Most of the studies which have checked the sensitivity between interest rate and stock return using ARCH and GARCH family of models found a negative sensitivity between interest rates and stock prices

(Joseph & Vezos 2006; Elijah et al. 2007; Liu & Shrestha 2008; Chancharoenchai et al. 2005; Lunde & Timmermann 2004).

Research was also conducted to check the sensitivity on bank stock returns to interest rates (Brewer & Lee 1990; Joseph & Vezos 2006). Whereas Elijah et al. (2007) worked on insurance companies and overall market reaction was tested in response to interest rates. Liu & Shrestha (2008) have found statistically significant results. Park & Choi (2011) and Ehrmann & Fratzscher (2004) have found that interest rate sensitivity on stock returns can also be time varying. They found that industrial sectors that are cyclical and capital intensive are more receptive to interest rate change.

Based on the above discussion, it can be concluded that causal relationship is evident from all the theories incorporating interest rates sensitivity to stock return. Theoretical framework in this study remains same as proposed by two index model i.e. deduction base causal relationship have been observed. However conceptual framework has been altered from the original study and repo rate instead of t-bill rate has been incorporated for this study to broaden the scope of analysis. Figure (1) explains the theoretical framework of the subject under investigation.

Figure 1



The following hypothesis has been postulated as follows:

H_1 Stock returns of financial institutions are not interest rate sensitive at KSE.

H_0 Stock returns of financial institutions are interest rate sensitive at KSE.

2.0 Procedure

The procedure adopted to achieve the set objective of the present study is divided into two folds. The first part discusses the sources of data and the models applied to check the proposition of current study. The second part deals with the econometric procedures necessary before proceeding to estimating the Regression models.

2.1 Data source:

The data source of present study comprises of stock market return of financial institutions, KSE 100 index return and interest rates. This data collection approach is consistent with two factor model (Stone & Bernell 1974). Monthly data for KSE 100 index from January 2004 to November 2011 is used to calculate market return comprising 94 data points. Monthly market

return from KSE is calculated using $(CP - CP_{t-1})/CP_{t-1}$, where CP is closing price of index at time t. The proxy for interest rate change is used for SBP Repo rate which is also called discount rate. Monthly weighted average return of stock has been taken from KSE. Total 29 companies divided in to 3 portfolios of return have been estimated.

The model below (1) is based on Stone and Bernell(1974) two index model. This model incorporates the sensitivity of both stock market and interest rate on the underlying security. Three portfolios of financial institution have been used to capture the sensitivity of interest rates on stock return. Portfolio-A comprise of banks, portfolio-B comprise of Insurance companies and Portfolio-C consist of financial service providing companies. The sensitivity of stock return was captured by equation as follows.

$$R_{jt} = \alpha_j + \beta_{Mj} R_{Mt} + \beta_{Ij} R_{It} + \varepsilon_{jt} \quad (1)$$

Where R_{jt} is portfolio return at time t. R_{Mt} is market return i.e. return on KSE 100 index at time t. R_{It} measures change in interest rates over the time t. β_{Mj} and β_{Ij} are beta coefficients which measures effect of change in market and interest rates respectively on the specified portfolio.

For unanticipated interest rate generally family of ARCH and GARCH models are applied Elijah et al.(2007). However a more appropriate is to go for testing ARCH effect and then proceed to next step. This step has been performed consistent with Breusch-Pagon test. From equation (1) OLS regression on portfolio A, B and C have been run and residuals $\hat{u}_t$ obtain. Then auxiliary regression of square residuals ($\hat{u}_t^2$) was run by using following equation.

$$\hat{u}_t^2 = \gamma_0 \hat{u}_{t-1}^2 + \dots + \gamma_q \hat{u}_{t-q}^2 + w_t$$

Under the null hypothesis of heteroskedasticity $\gamma_0 = \gamma_1 = \dots = \gamma_q$ and rejection of null hypothesis means ARCH effects are found. For our all three models results shows acceptance of null hypothesis of homoskedasticity and found no ARCH effect Asteriou and Hall (2007).

After checking for ARCH effect and accepting H_0 , for unanticipated interest rate ARIMA models were proposed. An ARIMA model has been selected by Box-Jenkins approach of parsimony i.e. model has been selected with minimum number of parameters to be estimated Asteriou and Hall (2007). ARIMA (0, 0, 1) was used for unanticipated interest rate which is purely MA (q) models. For checking the effect of unanticipated interest rate on stock return following equation was used:

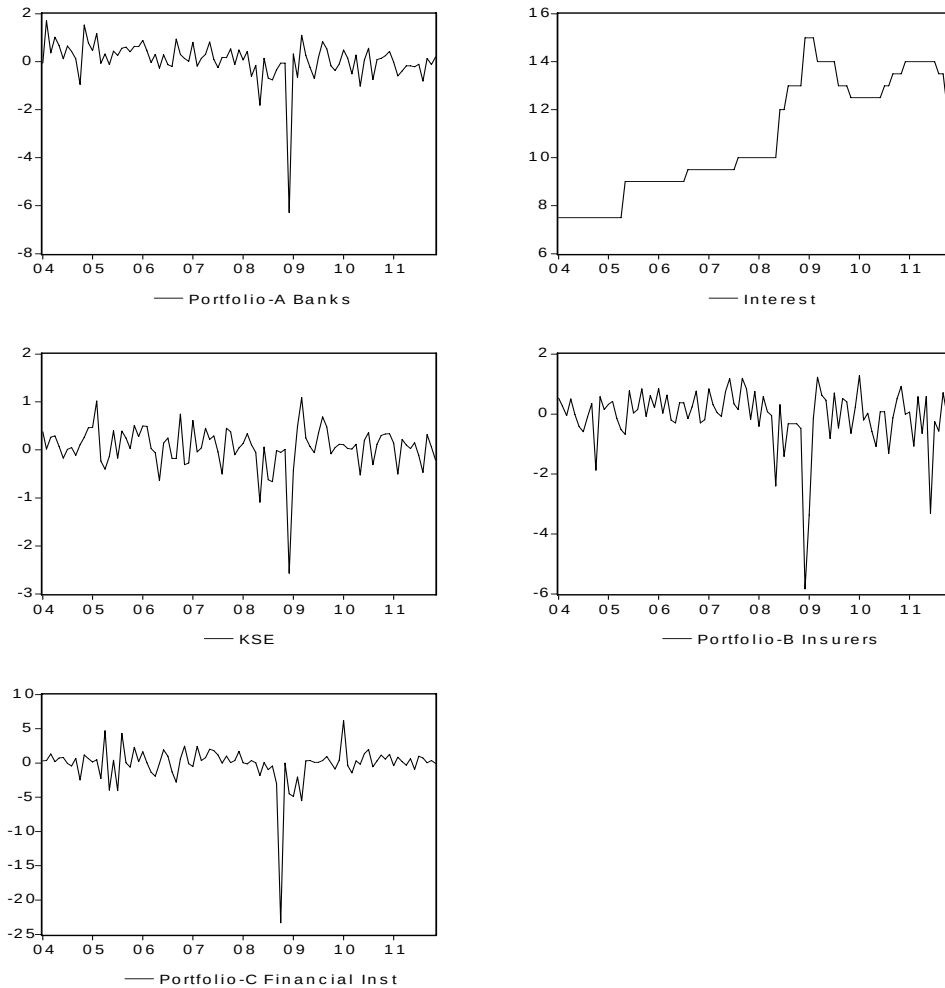
$$R_{jt} = \alpha_j + \beta_{Mj} R_{Mt} + \beta_{Ij} UR_{It} + \varepsilon_{jt} \quad (2)$$

Where UR_{It} is used for unanticipated interest rate risk.

3.0 Data description and analysis

Before proceeding to estimate regression analysis for equation (1) and (2), first step is generally to check the stationary of time series (Gujarati 1978). Graphical representation is usually the first step. Figure (2) depict the trend around all the time series.

Fig. 2



It is evident that except for inflation all series seems to be stationary. The time series demonstrate that mean and variants are not constant over time. However more formal way is to use statically test to check for stationary in data. One of the most widely used test to check stationary or non stationary of data is unit root test.

Dickey and Fuller (1981) methodology has been used to check if the series for regression was stationary. They propose a test which includes extra lag terms of dependant variables in order to determine the serial correlation. The lagged values were chosen for AIC for ADF test the specification are as follows.

$$\Delta y_t = a_0 + \beta y_{t-1} + \sum_{i=1}^p \gamma_i y_{t-1} + u_t$$

Where y_t the series to check for unit is root and p is the number of lagged differences. The results are given in table (1). If ADF test rejects Null hypothesis means time series is stationary. For variable under consideration it is clear that only interest rates are non stationary.

Table - I

ADF Test (Unit root test)			
Variables	ADF test	Comments	Order of integration
Inflation	-1.5056	Failed to reject H_0	I(1)
D(Inflation)	-4.9275	* Reject H_0	I(0)
KSE	-5.6443	* Reject H_0	I(0)
Banks	-4.8563	* Reject H_0	I(0)
Insurers	-5.4632	* Reject H_0	I(0)
Fin inst	-3.9483	* Reject H_0	I(0)

Notes: *, ** and *** indicate rejection of null hypothesis of

Non-stationary at 1, 5, and 10 percent. Significant level.

Critical value obtain from Fuller (1976) are -3.5022, -2.8928 and -2.8928.

4.0 Discussion

Three proposed actions have been suggested after findings the stationary time series (Asteriou & Hall 2007; Gujarati 1978). If dependent and independent variables under study are stationary we may proceed towards applying normal regression. Second if both variables are integrated of same orders then it is likely that they are co integrated and have a long term relationship. This will lead to check co integration of residuals and error correction mechanism. Third option is that if dependent and independent variables are integrated of different orders it may be assumed that there will be no co integration between them. In case of present study interest rates and portfolio returns were integrated in different order see Table (1) therefore this study can assume that there is no co integration. However doing a formal test confirms no co integration.

Residuals have been taken from applying equation (1) on three portfolios. The form of DF test is the following.

$$\Delta \hat{e}_t = a_1 \hat{e}_{t-1} + \sum_{i=1}^n \delta_i \Delta \hat{e}_{t-1} + v_t$$

DF test was applied on residuals taken from equation (1) to check if they are integrated. Results are explained in table (2), (3) and (4) (Annex B). Table (2), (3) and (4) results shows acceptance of H_0 of no-co integration. By examining the co integration the variables seems to be weak co integrated and hence problem of multi-co-linearity can be ignored (Gujarati 1978). OLS regression was finally run for equation (1) and (2) on all portfolios.

As the results of unanticipated interest rates and actual are quite similar there for we limit our discussion to equation (1) only. For banks, there is a bleak difference between the unanticipated interest rate and actual one. Moreover the KSE coefficient is also very significant. Defining the returns of bank Table (5) the model specification shows that there is a positive relationship between market risk and bank return. The results are statistically significant it implies that 1% increase in KSE 100 index will lead to 1.4% return in bank stock. This result shows that bank stocks are very receptive to overall market. It also concludes that investor can maximize their return while keeping a pace with the market i.e. if KSE index is rising; it will also boost the returns of banks stock. As far as the interest rate is concerned, results show a negative relationship between interest rate and stock returns. In case of banks, a 1% increase in interest rate will decrease bank stock by .18% and the results are statistically insignificant. The R^2 shows that 61% of variation in banks stocks are due to these two variables.

Table – II Regression results equation (1) on Portfolio-A Banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0059	0.057171	-0.103156	0.918100
KSE	1.43041	0.139746	10.23578	0.000000
Inflation	-0.1838	0.145443	-1.263678	0.209600
R-squared	0.61476	Mean dependent var		0.068085
Adjusted R-squared	0.60629	S.D. dependent var		0.861084
S.E. of regression	0.5403	Akaike info criterion		1.638008
Sum squared resid	26.565	Schwarz criterion		1.719177
Log likelihood	-73.986	F-statistic		72.60676
Durbin-Watson stat	2.11963	Prob(F-statistic)		0.000000
Dependent Variable Banks				

For insurance companies results are similar to banks Table (6) where the beta coefficient is statistically significant for market proxy and insignificant for interest rates. It implies that insurance companies respond to interest rate and market in the same fashion as bank. However, results of R^2 are less robust than that of bank. Only 50% of variation in insurance stock returns is explained by models.

Table - III
Regression results equation (1) on Portfolio-B Insurance companies

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.1816	0.074505	-2.437088	0.016800
KSE	1.64081	0.182115	9.009747	0.000000
Inflation	0.03599	0.18954	0.18986	0.849800
R-squared	0.51955	Mean dependent var		-0.08489
Adjusted R-squared	0.50899	S.D. dependent var		1.004839
S.E. of regression	0.70411	Akaike info criterion		2.167632
Sum squared resid	45.1152	Schwarz criterion		2.248801
Log likelihood	-98.879	F-statistic		49.20298
Durbin-Watson stat	1.94939	Prob(F-statistic)		0.000000

Dependent Variable Insurance companies

Surprising results are found for financial institutions Table (7) model variables are statistically insignificant for explaining returns of financial institution. A 1% change in KSE index triggers 1.18% change in returns of financial institution and only 02% change can be witness in return due to 1% change in interest rate. Model specification to fit the data i.e. R^2 is also very low and only 03% which is negligible change in financial institution is due to variables of the model.

Table - IV
Regression results equation (1) on Portfolio-C Financial services

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.2356	0.315434	-0.747044	0.457000
KSE	1.1862	0.771032	1.538462	0.127400
Inflation	0.02611	0.802465	0.032538	0.974100
R-squared	0.03057	Mean dependent var		-0.16575
Adjusted R-squared	0.00926	S.D. dependent var		2.994928
S.E. of regression	2.98103	Akaike info criterion		5.053811

Sum squared resid	808.676	Schwarz criterion	5.134980
Log likelihood	-234.53	F-statistic	1.434537
Durbin-Watson stat	1.85373	Prob(F-statistic)	0.243561

Dependent Variable Financial services

Over all these results show that interest rate sensitivity to return of financial institution are statistically insignificant. Therefore it may reject H_0 i.e. significant impact of interest rates on stock return. This means fluctuation in interest rates will not affect the return of financial institution of KSE. Several others variables must be incorporated to check the return of stocks.

5.0 Conclusion

The present study investigates the interest rate sensitivity of stock return traded at KSE. Actual and unanticipated interest rates have been taken to check this sensitivity. The present study attempts to employ the two-index model developed by Stone and Bernell(1974) to measure the stock return at KSE. Secondly, repo rate instead of traditional t-bill rate (Akella & Greenbaum 1992; Flannery & James 1984) is used as a proxy of interest rate.

This approach is consistent with previous studies on two index model of Park and Choi (2011). This study found a negative relationship between stock return and interest rate. For return of financial institution and insurance companies, a positive sensitivity to interest rates has been observed. However for financial institution and insurance companies the results are statistically insignificant. The finding may not be generalized as the time period covered is eight years only and the sample was small and constitutes only 29 companies out of 100 companies.

Two major inferences can be drawn from the study on the face of it. It seems that any change in interest rate by government to regulate financial market and to bring bullish activity in stock market may fall short. Therefore investors who seem to take advantage from interest rate reduction might not get benefit. Secondly reducing interest rate may have some other objective to be achieved by government that is a government mired in debt may reduce interest rate for debt servicing.

It also shows that that there is a need for further studies and our models could be used which includes other economic variables and explained variation in stock returns. 

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"If you have made mistakes, even serious ones, there is always another chance for you. What we call failure is not the falling down but the staying down."

- Mary Pickford

Annex A		
Portfolio-A Banks	Portfolio-B Insurance	Portfolio-C Financial services
Muslim commercial bank	Habib Insurance	F. Nat.Equities
National Bank	New Jublee. Life	Orix Leasing
NIB Bank Limited	Metro Life Ass	Saudi Pak Leasing
Bank Al-Falah	Universal Insurance	AMZ Ventures
Askari Bank	Pak ReInsurance	Ist.Dawood Bank
Asset Inv.Bank	I.G.I.Insurance	Ist.Capital Sec.
B.O.Punjab	Adamjee Ins.	Sec. Inv. Bank
Faysal Bank	EFU life insurance	Dawood Cap.Managemen
PICIC Bank	Grays Leasing	JOVC
United Bank Ltd		PAKRIJSIDDIQ

Annex B

Table - II

Unit root test on residuals Portfolio-A

Variables	ADF test	Comments	order of integration
Residuals of co-integration equation	-4.126735	Accept H_0	I(0)

Note: Banks as dependent variable; accept at 1* level

Critical value obtain from Fuller (1976) are -3.5031, -2.8932 and - and -2.5834.

Table - III

Unit root test on residuals Portfolio-B

Variables	ADF test	Comments	order of integration
Residuals of co-integration equation	-4.55499	Accept H_0	I(0)

Note: Insurance companies as dependent variable; accept at 1* level

Critical value obtain from Fuller (1976) are -3.5031, -2.8932 and - and -2.5834.

Table - IV

Unit root test on residuals Portfolio-C

Variables	ADF test	Comments	order of integration
Residuals of co-integration equation	-4.641426	Accept H_0	I(0)

Note: Financial services as dependent variable; accept at 1* level

Critical value obtain from Fuller (1976) are -3.5031, -2.8932 and - and -2.5834.

"Age does not protect you from love. But love, to same extent, protects you from age."

- Jeanne Moreau

ARTICLE**An Evidence of Profitability in stocks through the test of Logic**

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Introduction

In this world, people do one of two things with dollar, when they earn it. They either save it or consume it. Involuntarily, some of the money people consume is because they must pay tax or spending the dollar on something like food, clothing, or a car. For consumption at a later time, a person saves the dollar by putting it aside.

There can be a difference between investment and savings. Savings involves putting little money away in passbook accounts or bank deposit certificates, where you know about the return of your future, and probably Federal deposit Insurance Corporation (FDIC) provides the insurance of accounts, because a government agency protects depositors against bank failure. Savings involves few worries in short time. Same can be said for Pakistan; people either save the Pakistan Rupee or spend it on necessities or luxuries.

Investing money may take up various forms. Buying shares in stock exchanges in Pakistan such as Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE), and Islamabad Stock Exchange (ISE) listed company is investing and the same applies to any other stock exchange of the world.

The main stock exchanges in the world are New York Stock Exchange (US), Shanghai Stock Exchange (China), Tokyo Stock Exchange (Japan), London Stock Exchange (UK), Hong Kong Stock Exchange (Hong Kong), Toronto Stock Exchange (Canada), Shenzhen Stock Exchange (China), National Stock Exchange (India), Australian Securities Exchange (Australia), Moscow Exchange (Russia), Johannesburg Stock Exchange Limited (South Africa), and Korea Exchange (Korea).

Investor can put the money in stocks through broker or agent and this person works on behalf of the investor and charges a commission on every transaction. Broker holds the shares by investing the investment in diversified portfolios and then buys or sells in order to make a profit for the investor. The second option of direct stock market investment is to take online direct terminal from any investment management company which offers this facility.

Stock markets are generally considered as a high risk investment options. “Never go near ‘Stock Exchange’, is the general advise given by most well-wishers; “instead of making millions, people are known to have lost billions in the process”. Moreover, “Pakistani Stock Exchange” is

believed to be nothing less than a Category 5 Hurricane Disaster. One would like to take advise of such well-wishers, but when one looks at the performance of the our stock exchange from, say since 2000 (Table-I), then a shadow of doubt is cast on the authenticity of these advices. Imagine, if a person had invested in the stock exchange in June 2000, then his investments (despite the crash of 2008) would have increased by 8 times (Table-I). This increase does not include yearly dividends/ profits that a good share generally gives. So why should we not put the above advice through the test of logic?

Performance of Karachi Stock Exchange

Statistical evidence shows that long-term investments in equity based funds offer greater returns than bank deposits, fixed income and money market schemes. Normally an investment in shares for over five years provides an attractive return under any market conditions. Below is a historical analysis showing actual returns from investment in Karachi stock exchange (KSE-100 index).

Table - I
Performance of Karachi Stock Exchange
June 2000 - June 2012

FY Ending June	KSE-100 Index*	Annual increase %age	Increase Since 2000 %age	Inflation in %age**
2000	1521	-		3.60
2001	1366	-10	-10	4.40
2002	1770	30	16	3.50
2003	3402	92	124	3.10
2004	5279	55	247	4.60
2005	7450	41	390	9.30
2006	9989	34	557	7.90
2007	13772	38	805	7.80
2008	12289	-11	708	12
2009	7206	-41	374	20.80
2010	9722	35	539	11.70
2011	12496	28	722	13.50
2012	13801	10	807	9.80

Source: *Yahoo Finance; **Pakistan, Government of (various issues)

With an investment in the stock market with long-term investment horizon (three or more years), investors can earn a potentially higher return compared to inflation. Investor should get professionals to manage their portfolio who understand the market and identify growth opportunities based on fundamental and technical research. The portfolio should be diversified by the portfolio manager. The investment should be a diversified portfolio of shares listed on the

Karachi Stock Exchange that offer high capital gains and dividend potential. The portfolio manager may further add diversity by gaining exposure in international markets to get the benefit from dollar-denominated returns and obviously this will depend upon the size of that particular portfolio.

KSE-100 and Risk-free rate in long-run

Figure – I

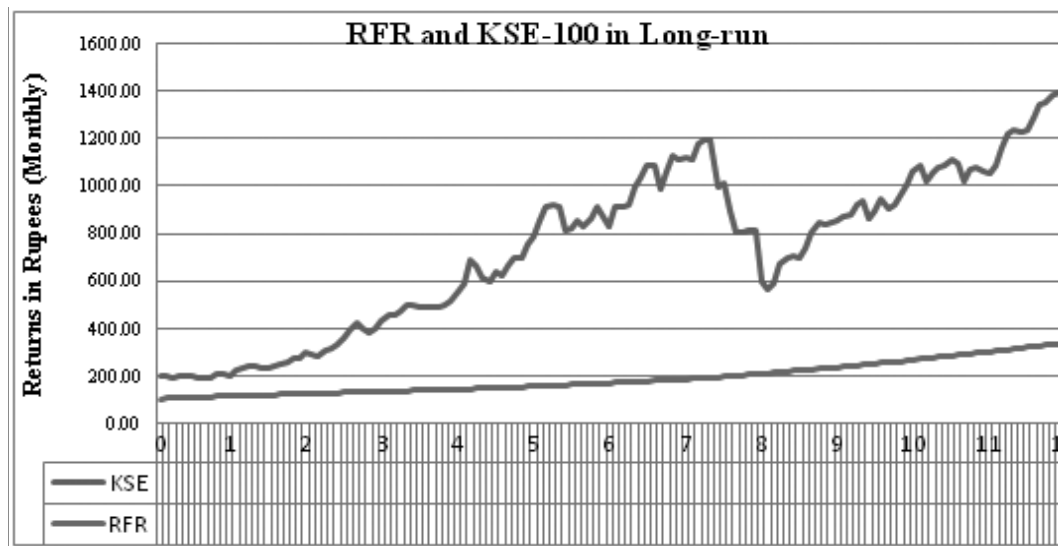


Figure – I explains the investment change in the value of Rs. 100,000/- in Karachi stock exchange and risk-free rate investment from January 2001 to December 2012 on a monthly basis. The monthly data of discount rate (RFR's) from State Bank of Pakistan (SBP) for risk-free investment and KSE-100 index from Yahoo Finance for risky investment. The calculation is made on the basis of the last day of each month figure for both indicators.

This also shows a comparative performance between investment in RFR and KSE. It looks clearly for long-term trends given for KSE have far better returns than RFR. There are some fluctuations shown in KSE trend but overall it gives more investment value. On the other hand RFR shows stable returns over the given time duration and comparatively it gives low investment value in whole period. After 12 years the investment value of Rs. 100,000/- would be Rs. 334,120/- for investment in RFR, and Rs. 1,061,300/- for investment in Karachi Stock Exchange. The return is much higher for investment in KSE. The risk of investment in KSE is also much higher. So this leads to high risk and high return, but return can be positive as well as negative. RFR shows low risk with low return.

Compare the above increase with the Defense Saving Certificates (DSC), which gives about four times profit in 12 years (fiscal years), or real estate which (after a one-time exorbitant rise after 9/11), has laid dormant for past couple of years. Surprisingly, people who had invested in

real estate at its peak in Pakistan or recently in Middle East, despite finding their investments reduced to half; still feel that real estate is the safest form of investment! It is obvious enough that people have been losing extensively in the stock market. Therefore, the million dollar question could be that how or why people lose in a rising and profitable market. Mr. Munir Lada, a former Director Karachi Stock Exchange, on a TV show unfolded the mystery as, “People enter stock market as investors but later turn into gamblers” due to its attractiveness, and thus start losing money in the process.

Investment Options

Almost all investors desire that their investment should be safe (capital protection guaranteed), that their capital growth should (at least) beat the inflation, and that their capital growth should give them reasonable profit/ income.

Investments in banks and DSCs etc, do offer capital protection but they neither beat inflation, nor offer capital protection in the true sense due to the continuous depreciation of rupee value.

Investment in real estate is always a good option but at times that investment gets blocked or the value of real estate does not rise as per expectations. Moreover, partial encashment of real estate (e.g. plots) is not possible; and unless someone has given his house on rent, there is no regular income to meet daily expenses. There is also the risk of fraud.

Investing in a business is yet another good option, but it also has its own shortcomings and vulnerabilities. People who have invested in CNG stations may find difficult times ahead in retrieving their capital as gas reserves are fast depleting and the government seems inclined to cut gas supplies to CNG stations.

The aim of the discussion above is not to suggest that it is all dark outside, but instead to point out that while other investments have their potentials, they also have their share of vulnerabilities.

Stock market investment

When a person desires to initiate a business but is low on funds, he can either get a loan from the bank or ask others to join in with their share of money. Once the business generates returns, the profit is shared among the partners in the proportion they had invested. This at a larger scale is the concept of share/equity/stock market. In order to collect sufficient funds to start or expand a business, big companies get listed on the stock exchange and ‘float’ shares in the open market generally at Rs 10/- per share. Depending upon one’s capacity, an individual or an institution may buy 100, 1000 or even a very large number of shares of that company. An individual having even a single share is entitled to its profit, called dividend, and can attend the company’s annual general meeting to participate as a voter.

There are more than 640 companies listed on the Karachi Stock Exchange of which the shares of 320 to 410 companies are traded on a daily basis. The above shares are further

subdivided into 32 different sectors like Commercial/ Investment Banking Sectors, Oil Exploration/ Marketing Sectors and Cement Sectors etc.

Listed companies on the stock exchange hold meetings on quarterly basis to assess and announce dividends in shape of ‘Cash’ dividends, ‘Bonus’ shares, ‘Right’ shares or ‘Preference’ shares. Some companies announce dividends on quarterly basis, some on a six monthly basis and some on an annual basis; yet, there are others that do not announce dividends at all. Shares generally give advantage to investors in shape of dividends (income shares) or in shape of rise in their basic price (growth shares). E.g. the basic price of PSO is Rs 10/-, but before the crises of 2008, it was trading at Rs 539/- per share.

Success in the stock market is dependent upon “Buying or Selling the Right Share at the Right Time”. There are numerous techniques/ theories for investment in the stock market; however, for ease of understanding, some simple techniques are discussed in the succeeding paragraphs.

Fundamental Analysis (The Right Share)

Selection of right share is initial first step of good investors towards the stock investments.

I Volume leaders

It is always advantageous to select shares that are traded in large volumes as they are easy to buy and sell at desired prices. Other shares which may sound very attractive but are traded in low volumes are at times difficult to sell, especially when the market takes a sudden dip.

II Fundamentally Strong

Invest on fundamentals is the advise generally rendered by the experts. In this technique, one tries to access the actual worth of a company whose shares are to be bought. It includes assessing the financial soundness of the company, the worth of its managers, its payouts/ dividends, its investment/ marketing strategies and the overall expected performance of that sector (say Oil & Gas Sector). This type of analysis is laborious and time consuming, but then it is considered as the most reliable. A simple fundamental analysis for OGDC below may help in better comprehension.

Table – II Financial Results of OGDC For FY 2008-2009

Financial Results For	Profit After Tax (Rs. In Million)	Earning Per Share (EPS)	Dividend
First Quarter Ending 30/09/2008	18,975.529	4.41	20% (i)
Half Year Ending 31/12/2008	32,069.307	7.46	17.50% (ii)
Third Quarter Ending 31/03/2009	44,408.171	10.33	20% (iii)
The Year Ending 30/06/2009	55,539.641	12.91	25% (F)

Table - II above shows that despite the global crisis and excessive drop of oil prices in the international market, OGDC has not only posted good profits in all quarters but also shared it with its shareholders. May be that is why OGDC, which was trading at Rs 140/- per share before the crash of 2008 and hit Rs 40.75/- per share after the crash, has regained its value considerably and was trading at Rs 115 (plus Rs 8.25 as dividend) in September 2009. Similar is the case with Hub Power Company (HUBCO) which was trading at Rs 35 before the crash, touched Rs 14.38 after the crash and has regained its value to Rs 34.26 (plus Rs 3.35 as dividend) on 9 September 2009 (Source: KSE Stocks). From these examples, the reader can see that if they had invested in fundamentally strong shares as the above, then they would not have suffered huge losses as a result of recent crash (2008) of the stock market.

In selection of share volume leaders and fundamentally strong companies are considered for investment. Furthermore it is helpful to make decision about the share price that on which price investor should buy this share to get minimum income profit plus capital appreciation. Investor decides minimum income range (i.e., 5%-6%, 6% to 7%, or 8%-10% etc.) and this will be only do when company announces dividend regularly because it is not included capital gain.

In case of any company's fundamental analysis; unsystematic risk, earning per share (EPS), expected market price per share (EMPS), expected upside gain (EG), dividend per share (DPS), expected DPS, P/E ratio, dividend yield, expected dividend yield, required rate of return through capital asset pricing model (CAPM), returns of assets (ROA) and returns on equity (ROE) are considered very important for selection of the right share on right price. Furthermore, total assets, total liabilities, current ratio, quick ratio, total sales, cost of sales, gross profit, profit before tax, and profit after tax should be considered for at least the past five years and compared for analysis. We are also required to study director reports in detail and at least the last three years annual reports of company that includes detailed information about corporate strategy, business review, core values, board of directors, major events, corporate governance, financial analysis (vertical, horizontal, and index), audit reports, balance sheets, P/L accounts, cash flows, equity statement, short-term investments, long-term investments, and doubtful debts.

Table – III APL-Fundamental Analysis For FY 2008-2012

Fiscal Year	2008	2009	2010	2011	2012
PBT (millions Rs.)	3529.552	4280.42	4846.31	6017.51	5646.74
PAT (millions Rs.)	2641.55	3082.42	3594.31	4256.51	4120.32
High Price	629	428	401	393	474
Low Price	415	137	280	283	321
Average Price	522	282.5	340.5	338	397.5
Earnings per share	55.03	53.51	62.4	61.58	59.61
Dividend (Rs.)	20	25	30	41.5	50

Bonus %	20	-	20	-	-
P/E ratio*	9.49x	5.28x	5.46x	5.49x	6.67x
Dividend Yield*	3.83%	8.85%	8.81%	12.28%	12.58%
ROE	78.52	67.85	59.40	53.70	N/A
Current Ratio	1.46	1.50	1.63	1.76	N/A
Debt-to-Equity	1.80	1.58	1.32	1.12	N/A
ROA	28.82	25.34	24.41	24.30	N/A

The closing market price per share (MPS) of APL was Rs 507/- on January 12, 2013. We expect that it can be low as Rs 450/- and high as 550/- then on average basis at Rs 500/- MPS; the expected dividend is PKR 50/- DPS then $(500/50 \times 100) = 10\%$ expected dividend yield (expected income profit) taken without any capital gain. If price increases then we can earn upside gain. We can forecast the future (total expected return) on the basis of past available data and we can estimate the required rate of return. For this purpose, we will compare the expected return with required rate of return to check whether this stock is over, under, or fair-valued. The investment strategy should be considered as buy 'under-valued' stock, sell 'over-valued' stock, and hold properly 'fair-valued' stock. Analysis can also be done on the basis of closing fiscal year market prices (CFY).

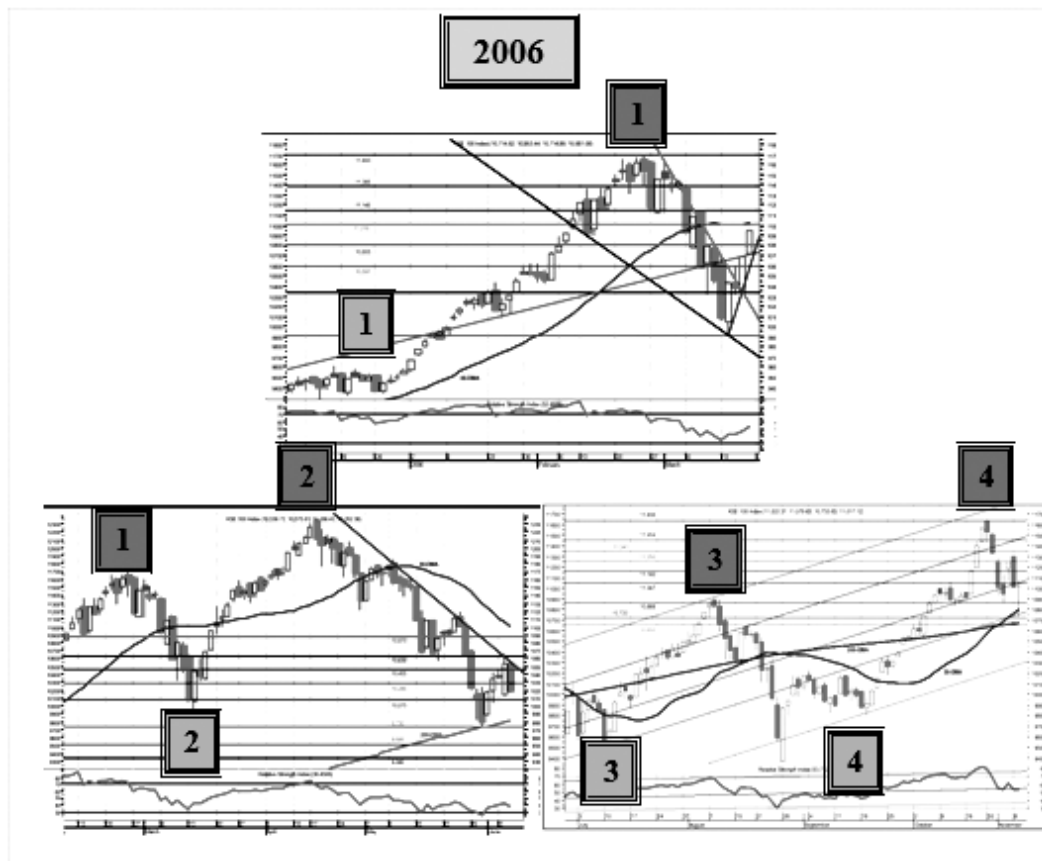
Technical Analysis (The Right Timing)

Simply speaking, it is predicting the future performance of an individual shares or the stock market based on their historical records. Experts in this field employ numerous techniques such as Charts, Moving Averages, and Relative Strength Indexes etc. Out of the available techniques, we find the following most simple and most effective:

I The Result Season

As discussed earlier, listed companies on the stock exchange announce their yearly, half yearly or quarterly results. Result season spans from the time a result is announced till the time the dividends are given. Investors generally buy during result season, causing the market to rise, and sell off towards the end of it, which is instrumental in its fall. Below (Figure – 1) is the actual performance of KSE-100 during the year 2006. Green numbers denote start of result season and red numbers the end of it. From the illustration below, it is quite evident that one should enter the market on the green signal (start of the season) and exit on the given red signal (end of the season).

Figure –1
Volatility of Stock Market v/s Result Season of 2006



Relative Strength Index (RSI)

It is a ratio between the averages of upwards and downwards price changes for 9, 14 or 21 days. This ratio ranges between 0 and 100 and is calculated as under:-

$$RSI = 100 - \{100 / [1 + (U/D)]\}$$

U = an average of the upward price change

D = an average of the downward price change

When the RSI drops below or is near 30, the shares/stock market is considered to be 'under bought' (i.e., trading below expectations) and is likely to rise. When RSI touches or crosses over 70, then the shares or market has entered an 'overbought' region and is likely to experience a fall.

Below (figure – 2) is the actual performance of KSE-100 during 2006. See how superimposing Result Season over RSI can help in predicting the future performance of stock

market. Around 7 August 2006, the RSI had touched 70, followed by the end of result season (3 Red). This synergetic information confirmed a possible fall of the stock market. Similar was the case with RSI 30 and 4 Green which suggested an impending “Rise”. Again result season near ending near close of October 4 Red and an RSI greater than 70 suggested an impending fall.

Figure -2
RSI Visa Vis Result Season of 2006



II Moving Average Convergence Divergence (MACD)

It is calculated by subtracting a 26-period exponential moving average from a 12-period exponential moving average. A 9-period dotted exponential moving average (the “Signal Line”) is automatically displayed on top of the MACD indicator line. We use MACD to support or discard the findings of RSI.

Figure -3
Superimposing Result Season, RSI and MACD (KSE-2009)



When MACD is superimposed on Result Season and RSI, a much better picture emerges for the investor. Below is technical analysis chart for MCB during 2009. The illustration below shows that at the start of the Result Season, the RSI of MCB had dipped below 30 and gave a green (buy) signal. Later, when the RSI was dropping, it was supported by MACD-1 and thus giving the investor a “Hold On” signal.

When RSI reached 70 on 3 Sep 2009, the market could have dropped, but as the Result Season was not over and MACD-2 also supported the RSI, it gave investor the confidence to once again “hold on” to his investments. Following this technique, an investor could have bought MCB at Rs 139.61 on 9 June 2009 and sold it at Rs 238.27 on 24 September 2009 and thus gaining 71% rise in 2.5 months.

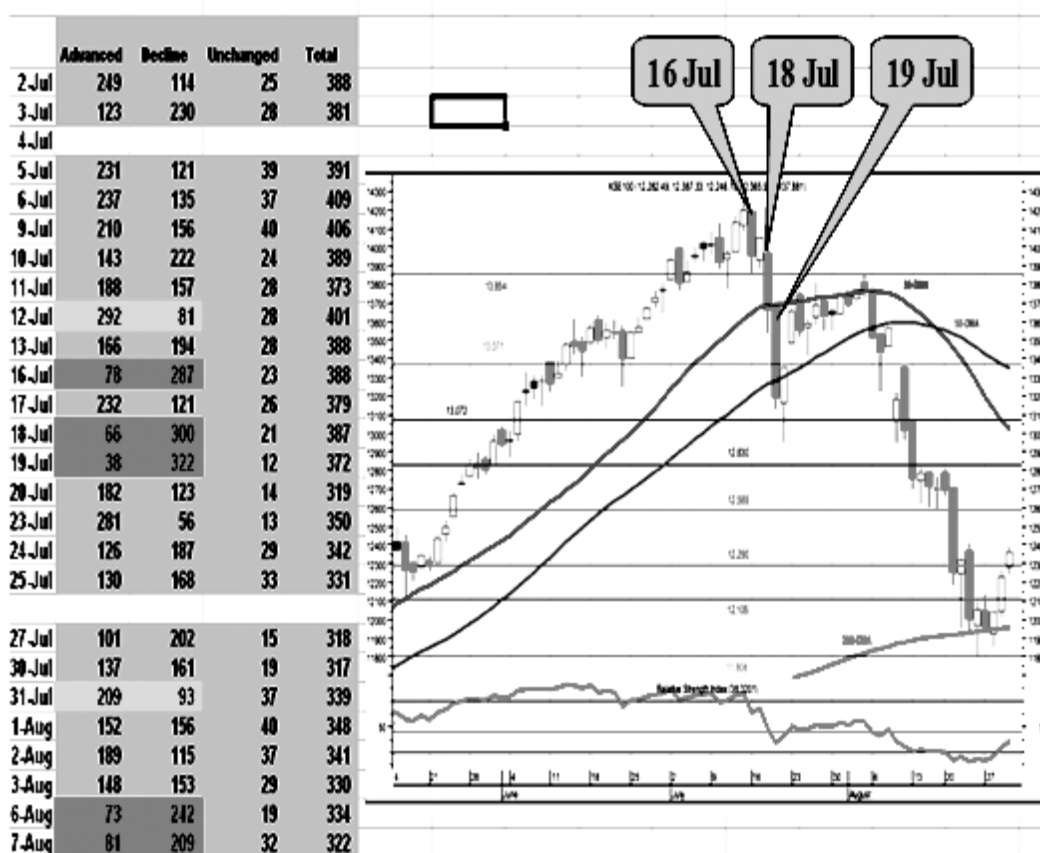
III Advance – Decline Ratio

Advance decline ratio shows the general trend of the market. On a particular day, stocks closing in positive are called “Advancers” and the ones closing in negative are termed as

“Decliners”. On 16 July 2007 (Figure – 4) out of 388 shares traded that day, 78 shares closed in positive and 287 shares closed in negative, i.e., the ratio was $78/288 = 0.27$. Any ratio less than 0.5 after above three indicators (i.e. end of result season, RSI 30 and MACDs) indicate a probable drop. This adverse ratio was further confirmed on 18 and 19 Jul hence indicating that the market is likely to take a correction.

Furthermore, any ratio above 2.5 can be considered as a positive sign provided the result season is starting and RSI is near or below 30. On 29 August 2007, when the result season was starting, the RSI had dipped below 30, and there were 222 advancers and only 62 decliners i.e. a ratio of $222/62 = 3.58$. This high positive ratio was reconfirmed on 4 and 5 September 2007, as a result, the market rose thereafter.

Figure - 4
Advance Decline Ratio (KSE-2007)



IV Candle Stick Behavior

Another important indicator is the Candle Stick behavior. It has been observed that whenever the market is in the overbought region and the Candle Stick Graph takes two or more consecutive dips, then the probability of a correction or drop is very likely. This term is known as 'Double Dip' behavior. The illustration below shows that between October and November 2007, the result season was over, the RSI was above 70 from quite some time and then the stock market took three dips along with adverse advance and decline ratio. The synergetic effect of all these indicators pointed towards an impending correction/ drop.

Figure - 5
Double Dip after RSI - 70 (KSE-2007)



I.

Crash of 2008

Below (Figure – 6) is the picture of the recent crash (2008). It can be seen that on 21 April 2008, the Result Season was over and along other technical indicators like RSI, MACD and candle stick behavior, all combined pointed towards a possible downtrend for the market.

The end of result season was also followed by news of the world's worst ever recession. See figure – 7 below where indicators started appearing from 8 February 2007 onwards, also see how Dow Jones Industrial average started taking a dip near 17 March 2008. Now after all such glaring indicators, one wonders why investors did not leave in time to avoid losses of millions and billions in the process.

Did anybody exit; yes, by the grace of Allah, some people were lucky enough to timely read these indicators and as such exited in time. They are not only saved their investments but also made reasonable gains by transferring their funds into the money market open-ended mutual funds (risk-free investment). Brigadier Agha Ali Hassan (retired) was one of them.

Figure – 6



Indicators before Crash of 2008

Figure - 7

Effects of Global Recession on Dow Jones Industrial Average

Figure - 7
Effects of Global Recession on Dow Jones Industrial Average



Speculative Trading

Fundamental and Technical Analysis (explained above), though effective, require expert handling, are highly time consuming and need continuous updating. For a normal investor, putting in so much effort may not be possible. However, since the returns at times are exorbitantly high, (e.g. MCB trading at 77.76 on 1st January 2009 was trading at 238.27 on 24 September 2009, i.e. a rise of over 300% in 8 months), therefore, it attracts individuals to enter on speculations (or hearsay). These speculations may or may not work. e.g., Etisalat was to buy PTC for Rs 118/- per share when its market price was around Rs 70/- per share. A lot of people speculated the market price of PTC to rise considerably and thus invested heavily. However, as could happen to any speculation, PTC's market price started going down till it touched around Rs 30/- before the crash of 2008.

Investment Techniques

There are numerous ways people invest in stock market given below.

I Investment

Investments could be for short term i.e. for few days; medium term, i.e., for few months (or a result season); or for long term which could span from months to years. Of the above, the best way to benefit from the stock market is to invest in it for a considerable length of time.

II Trading

People also enter the market for very short durations; it may be for a few hours or a few days. Such technique is commonly known as trading and people using this technique are known as Traders, Jobbers or Punters. Experience shows that traders are generally not the winners in stock market. Major reasons could be that generally, they are either speculators or trade on margins.

III Trading on Margins

It is said that the Stock Market is driven by “Greed and Fear.” Since the market seems very attractive, therefore, apart from speculations, people invest by taking loans from different sources. In stock market this technique is known as to trade on Margins. Traders deposits small amount (say) Rs 100,000/- with their brokers who allows them to buy shares worth Rs 500,000/-, i.e. 5 times their deposits. KSE allows a share to go up or down by 5 % in a single day. So if the share goes up or down by 5 % in a day, then the trader can gain or lose 25 % (i.e. 5 % x 5 times = 25 %) of his investment. However, if the share goes up or down continuously by 5 % for 4 consecutive days (which at times has happened), then the trader could either double his money (i.e. 5 % x 5 times x 4 days = 100 %) or lose all of it in only 4 days.

IV Trading in Futures

This is buying and selling in the future. For example a farmer wanting security for his crops may make a contract with local dealer to sell his crop at say Rs 1000/- per ton before even he has planted it. The dealer predicting that the crop to sell for more than Rs 1100/- per ton goes in for the deal. So at the time of harvest farmer gets his contacted amount and dealer makes a profit of Rs 100/- (1100 – 1000) per ton. This in general is the concept of future selling. In KSE, futures are available only for a month in advance. They are denoted by suffix of the month e.g. NBP-OCT (National Bank – October). People generally buy them in cash (say NBP for Rs 100/-) and sell them at a premium (say NBP-OCT at Rs 103/-) the same moment/day or whenever they find a better deal, but before the end of October. Now NBP for Rs 100/- and NBP-OCT for Rs 103/- are locked in a contract till end October. At end October the trader would get his NBP released for RS 103/-, giving him a 3 % profit irrespective of the fact whether the price of NBP appreciated or dropped to any extent. Trading in futures is a safe method till we trade in above method. However, people use futures for other ways of trading, of which ‘Short Selling’ of futures is a common practice.

V Short Selling

Selling first and purchasing later is known as short selling. A short sell is the sale of stock that is not currently owned by the seller with the intent of purchasing it later at a lower price. This is done by borrowing the stock from another investor through a broker. The example of short sell is given below.

Person B borrows the number of shares form person A, and sells it to person C at 45 Rupees per share, and thinks that in future there will be decrease in price of share. Price is decreased and now become 40. Person B buy back that number of shares at Rupees 40 per share, and give back to person A. so due to this person B earns the profit of 5 Rupees ($P = 45 - 40 = 5$ Rupees). So this transaction would be called short sell. The question arises that why person A lends shares to person B, the answer will be risk free rate (RFR). During short selling if company announces the dividend then company gives dividend to person C because he is the owner of the

shares, then person B will do satisfy to person A at his own risk, and person B must pay Rs.2 dividend to person A, because he borrowed the shares from person A.

Normally we buy shares when we expect the market to rise, but if we expect it to fall; then can we sell in advance and buy back when the market drops? Sounds crazy, but such transactions are possible in stock market and are termed as “Short Selling”. Here we are practically buying at low rates and selling at profits. Future trading helps in this type of transitions where we first SELL (without actually being in possession) 1000 shares of NBP-OCT at Rs 100/- and BUY them back when NBP-OCT drops and starts trading at say Rs 90/-. The risk is that if NBP does not drop by end of October and instead rises to Rs 110/-, then the trader would lose Rs 10/- per share. Thus, Short Selling is considered as a risky option.

Risk management

In order to maximize gains in stock market, balanced and calculated risks have to be taken. Some guidelines in this regard are:-

- I Avoid trading and go for investments.
- II Never put all the eggs in the same basket i.e. diversify and never invest in a single share, no matter how attractive it might look like. As a rule, not more than 25% should be invested in any one sector (e.g. banking or cement), and not more than 10% should be invested in a single share.
- III Take risks with your profits and not with your original capital. For example if one person has invested Rs 100,000/- and earned 10% profit, then one must exit the market if it falls by a maximum of 10%. This way original capital will remain protected and a fresh start would be possible even after an unexpected crash.
- IV Never trade on Margins. Margin trading just increases your blood pressure and can actually wipe off your complete investments in no time.
- V Never speculate; always do your homework (i.e. fundamental and/or technical analysis).
- VI Buy on dips and sell on strengths, i.e. wait for the right moment to buy and never let greed tempt you not to sell at reasonable profits.
- VII Never fall in love with a stock. Learn to “Cut Your Losses,” i.e. sell even at a loss if the situation so dictates. Some analyst advocates selling at 2% loss, while others advocate waiting till the price drops by 10 %.
- VIII If the selected stocks are two or more than two then portfolio should be diversified. Diversification includes number of assets and how much coefficient correlation (r) is near about to -1.
- IX Make an investment strategy for buy, hold, and sell. Buy undervalued stocks, hold fair valued stocks, and sell overvalued stocks.
- X Recommended Buying Selling Technique for Starters. Below (Table-V) is a recommended buying/selling guideline for starters. For buying: When the result season starts, one can invest 25% in selected stocks; then as RSI gets near or below 30, then one can invest an additional 25%. Likewise one can go on progressively investing along with indicators. According to the Table-V, one can hold on to his investments till the end of the result season or till RSI remains between 30 and 70. However, as the chances of a wrong assessment can never be ruled out, therefore, during the hold period, if the market drops 10% below the investor’s buy value, then one must cut his losses. To sell, wait for result season to end. Start selling progressively as indicated in table below.

Table – V Progressive Buying/Selling

Indicators	Buy		Hold	Sell	
Result Season	Starts	25 %	Continues	Ends	20 %
RSI	Near/ Below 30	25 %	Between 30 & 70	Near/ Above 70	20 %
MACD	Generating Buy Signal	10 %	Supporting RSI	Generating Sell Signal	10 %
Candle Stick	-	-	-	Double Dip	20 %
Advance Decline Ratio	Greater than 2	25 %	-	Less than 0.5	20 %
General Environment	Supportive	15 %	Supportive	Not Supportive	10 %

General environment is also important for buying and selling the shares in stock market. Political good and bad news have influenced markets in a positive and negative manner respectively. So keep watching the general environment regularly. Environment can directly influence the investor's entire strategy and analysis. There are many market indicators that could be watched regularly. For example, the researchers have found negative relationship between interest rates and stock prices of Pakistan. State Bank of Pakistan (SBP) announces interest rates, money supply, inflation etc. in monetary policy and these factors can affect the market prices. Furthermore, corporate and consumer debt and foreign exchange reserves held by the SBP are also considered important elements. Muhammad Ikhlas Khan (2012) has found the positive association between foreign exchange reserves and KSE market capitalization in Pakistan from July-2003 to June-2008 it has expected positive effect on Karachi stock market.

Conclusion

People who have limited or no knowledge about how the stock market works either they do not enter in it for the fear of it, or enter on speculations and suffer losses in the process. Sometimes people enter into the stock market as investors but due to its false glitter soon turn into gamblers. No doubt stock market has its share of risks but these risks can always be identified and managed. For seasoned investors, stock market is always predictable, gives good returns and even guarantees capital protection. If one can curb his greed and control his panic, then the stock market can be compared with any good business that gives 50% (or more) annual returns to investors. No doubt, returns do not come without putting in a dedicated effort. For those who are new to the stock market, or for those who cannot devote sufficient time and effort, "expert" help in the shape of institutionalized fund managers (representing reputed investment management companies and others) are always available.

For most starters, the analysis might seem too complicated or cumbersome. If that be the case, our advice would be to leave it to the experts in the field. By experts we do not mean the brokers, but properly trained and qualified "fund managers" or "financial analysts". 

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"Happiness comes from spiritual wealth, not material wealth....
Happiness comes from giving, not getting. If we try hard to
bring happiness to others, we cannot stop it from coming to us
also."

- Rumi

ARTICLE**Relationship of Single Stock Futures with the Spot Price:
Evidence from Karachi Stock Exchange**

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*Muhammad Ali Jinnah University, Islamabad***Abstract**

The study is conducted to investigate the relationship of single stock futures with the spot price in Karachi Stock Exchange. Monthly data of twelve companies which are trading single stock futures have been examined for the period 1 January, 2005 to 31 December, 2010 with total of 72 observations for each company. Descriptive statistics, Unit Root test, Co-integration test, Granger Causality test, Vector Error Correction Model based on ARDL approach, Impulse Response and Variance Decomposition tests are used. The existence of long run relationship was found between the futures and spot prices of all the companies. The Granger Causality test reported that the spot prices of FFBL and LUCK assist in forecasting their respective futures prices. The futures prices of HUBC and POL forecast their respective spot prices and play its important role of price discovery. The impulse response analysis revealed that most of the shocks in the futures markets of all the selected companies are explained by their own innovations and their respective spot markets have less influence on them. Variance decomposition test reported that futures market is an exogenous market as majority of its stocks are explained by its own innovation. The results of VECM shows that in case of disequilibrium the adjustment process is quite fast for all the companies.

Key words: KSE, VECM, ARDL.**1.0 Introduction**

The impact of derivatives trading on the underlying assets has long been studied but still debatable. Derivatives play an important role in risk management and also facilitating capital flow into the market. As a hedging tool, financial futures provide financial institution the ability to eliminate certain risk of holding the underlying commodity (Stoll and Whaley, 1988). They can also cause excessive leverage on the part of market participant. The derivative markets has grown rapidly in the emerging economies especially in those countries which introduces liberalization in their markets removing capital control and have well developed underlying securities market. The derivatives trading also have some negative aspects and their contribution in financial crises, capital outflow, and volatility spill over in the market, manipulating accounting rules decreases

their credentials in the financial markets. Almost since futures trading began at the Chicago Board of Trade in 1865 there has been concern about the impact of futures on the underlying spot market (Antoniou and Holmes, 1995). However, weak prudential regulations and immature local derivatives markets have also been held responsible for the negative impacts of derivatives trading.

The transaction cost of trading derivative is considerably lower than trading the underlying asset. The lower transaction cost attracts more investors to hold the underlying asset in a derivative contract. The derivatives price discovery role is of great importance to investors. There is uncertainty about the expected futures cash market prices. The derivatives prices reflect the perception of the market participant and converge to the perceived prices of the underlying asset on the expiration day. Thus the derivatives provide information about futures prices of the underlying asset. The study conducted by Jiang et al (2011) reported that there is a stable and unique unidirectional lead-lag effect which confirms that futures prices tend to discover new information rather than spot prices.

Single stock futures were introduced by “London International Financial Futures Exchange” (LIFFE) on January 29, 2001 and subsequently in the US in late 2002. Futures contracts were introduced in Karachi Stock Exchange on July 1, 2001. The maturity period for a future contract is thirty days and the last Friday of the month is considered to be the last trading day for a futures contract that has reached maturity.

This study focuses on to find out the relationship between single stock futures and the underlying stock on which future is traded and will provide insight into the Futures market in Pakistan. The investors will get information about possible risk diversification benefit by using single stock futures.

2.0 Theoretical background

Single stock futures contract is a binding agreement between the buyer and seller to buy or sell the share of a particular listed company with exchange acting as a third party or intermediary to enforce the contract.

The cost-of-carry model explains the link between the spot market and futures market. Strong (2005) define the cost of carry as the net cost of carrying the asset i.e. the carry charges (interest) and carry returns (dividends). The fair value for a future contract is therefore the price of the underlying asset and the carrying charges.

The rationale for existence of futures markets has been demonstrated by many researchers. The theory of Keynes (1923) and Hicks (1946) demonstrate that the producers are uncertain about the expected futures spot prices and are willing to offer premium. The speculators share the risk in the market and take the premium. Thus the price variability is considered the main reason behind the existence of futures trading. Telser (1981) emphasized that low transaction cost and standardized commodity are the important factors behind the existence of futures market.

Garbade and Silber (1983) are considered the first investigators who analyses whether the spot or futures prices first reflects the new information for storable products. The lead lag relationship between spot and futures is based on Granger (1969) and Sims (1972) causality methodology. The Stoll and Whaly (1990) methodology for lead lag relationship is different from Engle and Granger (1987) causality as the former uses price data while the later uses the stock index and stock index futures returns data. Although most of the studies reported that futures lead the spot market, yet some others studies like Stoll and Whaly (1990) and Flemming et al (1996) reported the greater integration between the spot and futures market and has weakened the lead of the futures.

The theoretical investigation into the effects of futures trading on the underlying spot market volatility reports inconclusive results. Subrahmanyam (1991) propose theoretical model to investigate the effect of index futures on the underlying spot market volatility and comes with ambiguous results. Chari and Jagannathan (1990) concluded that it is not possible to solve the issue of futures trading effect on underlying spot market volatility with theoretical models.

Samuelson (1965) argued that futures prices follow no time trend and the change in future prices will be zero on the expiration date. As the time to expiration date come closer, the volatility of the futures prices should increase called Samuelson hypothesis. He argued that the competitive forces keep the futures prices equal to the expected futures spot prices. As the contract reaches near maturity, the rate of information transmission increases which increases the volatility of the futures prices. Hemler and Longstaff (1991) by using a general equilibrium model reported that the futures returns varies with the underlying market volatility which means the required returns changes with the increase in the level of risk.

3.0 Literature review

3.1 Futures and price discovery

Futures role in providing information about expected spot prices in the future have great importance for the investors. The price discovery process has been shown to be dominated by the futures market in that at least ninety-five percent of the price discovery is achieved in the futures market (Alphonse, 2000). Yang et al (2001) examined the price discovery role of the futures market for storable and non storable commodities. Commodities futures prices were collected from Chicago Board of Trade for the period January 1, 1992 to June 30 1998. It is concluded that futures prices provide useful information about storable commodities which are needed by the traders but cannot perform the price discovery function for non storable commodities. Similar results were reported by Covey and Bessler (1995). Coverig, Ding and Low (2004) investigated the price discovery of the Nikkei 225 spot market, the foreign futures market and domestic futures market. These studies concluded that the spot market contributed 21% to price discovery while for domestic and foreign futures market the figure was 46% and 33% respectively. Several other studies such as Khan (2006), Ahmad, Shah and Shah (2010) and Chatrath et al., (1998) have investigated the role of future in price discovery.

The empirical results in the literature are varied with most of the studies with the consensus that futures play important role in price discovery.

3.2 Lead lag relationship

Pizzi et al (1998) investigating S&P 500 for one minute returns reported bidirectional causality between the futures and the spot market. The futures lead the spot by 20 minutes and the spot leading the futures by 3 to 4 minutes. Kuo et al (2008) explored Taiwan futures market and observed that futures lead the spot market. Schwarz and Laatsch (1991) used minute to minute data to explore the spot and futures market of MMI. They reported that the relationship between the spot and futures are changing over time. The spot was dominated initially but at the end the futures market lead the spot market.

The literature about the lead lag relationship is also providing mix result with most of the studies converging to the lead of futures market over spot market.

3.3 Futures and financial crisis

Almost since futures trading began at the Chicago Board of Trade in 1865, there has been concern about the impact of futures on the underlying spot market (Antoniou and Holmes, 1995). The stock market crash of 1987, the mini crash of 1989, and some more recent highly publicized financial debacles have created the impression that derivatives threaten the stability of the international financial system (Antoniou, Koutmos and Pericli, 2005). Investigating FTSE 100 stock index futures contract on the 19th and 20th October 1987, the evidence seems to suggest that whilst the futures market exacerbated the decline, the cause of the breakdown lies with the stock market (Antoniou and Garrett, 1993).

The literature about futures role in financial crisis are not conclusive and despite its probable role in financial crisis, its benefits seems to outweigh the cost and it is still traded on most of world stock exchanges.

3.4 Do futures need regulation?

Beckett and Roberts (1990) found no relationship between stock market volatility and stock index future activity and assume that increasing regulation to decrease futures activity will not solve the problem. Illueca and Lafuente (2003) suggests that regulatory initiatives to limit futures trading premised on the assumption that futures trading tends to destabilize spot market prices are not justified, at least in the Spanish stock index futures market.

We can conclude from the above literature that increasing regulation to decrease futures trading cannot be a viable option. Morris (1990) argued that increasing regulation such is circuit breakers may shift investors from Futures trading to stock market trading and will make it more volatile.

4.0 Data description and methodology

The study includes monthly end futures and spot prices of twelve companies namely BOP (Bank of Punjab limited), DGKC (D.G. Khan Cement Co), ENGRO (ENGRO Corporation

Limited), FFBL(Fauji Fertilizer Bin Qasim), FFC(Fauji Fertilizer Co. limited), HUBC(Hub Power Company Limited), LUCK(Lucky Cement Limited), NML(Nishat Mills Limited), OGDC(Oil and Gas Development Corporation), POL(Pakistan Oil Fields Limited), PSO (Pakistan State Oil Co. Limited) and PTC(Pakistan Telecommunication). Futures trading on the underlying stock of these companies and their spot prices have been recorded from January 1, 2005 to December 31, 2010. Total of 72 observations have been recorded for each company. Log returns were calculated for both futures and spot prices by taking first difference of log of two consecutive months by the following formula.

$$R_t = \ln (P_t/P_{t-1}) \dots \dots \dots (1.1)$$

Where ‘ R_t ’ is return for the given period t , $\ln$ is natural log, P_t is price at the month end, and P_{t-1} is price at the end of last month. The data is analyzed by using the following statistical techniques.

- I Descriptive Statistics
- II Unit Root Test
- III Vector Auto Regression (VAR Technique)
- IV Johansen and Juselius Co-integration Test
- V Granger Causality Test
- VI Impulse Response Test
- VII Variance Decomposition Test
- VIII Vector Error Correction Model

4.1 Descriptive statistics

Descriptive statistics are applied to explain the behavior of data. The techniques used are mean, median, maximum, minimum, standard deviation, skewness, kurtosis, variance and Jarque-Bera values. It summarizes the characteristics of time series data under study.

4.2 Unit root test

Co-integration requires that times series should be stationary and should be integrated of same order. Stationary series in the data can be confirmed by using different unit root test. For this purpose ADF test (Augmented Dickey Fuller Test) along with PP test (Phillip-Perron Test) will be used. Augmented Dickey Fuller Test assumes that all the error terms are independently distributed and have a constant variance. Augmented Dickey Fuller Test is assumed a strict parameter due to its strict assumptions. A simple ADF test can be written as

$$\text{An AR(1) Model} = U_t = \pi U_{t-1} + e_t \dots (1.2)$$

In equation (3.2), U_t = Variable under study for the time period ‘ t ’,

π = Coefficient

e_t = Error term

The regression model is explained by the following equation:

$$\Delta U_t = (\pi - 1)U_{t-1} + e_t = \gamma U_{t-1} + e_t \dots (1.3)$$

ΔU_t = First difference operator for the underlying variable

π = Coefficient

e_t = Error term

The first Deference of the time series has been taken to make it stationery. Augmented Dickey Fuller test is considered a strict parameter therefore another test can also be applied called Phillip Peron test which is relatively less strict parameter to check for the unit root. Phillip Peron test is explained by using the following equation:

$$U_t = d_0 + d_1 + U_{t-1} + d_t[t - T/2] + e_t \dots \dots \dots (1.4)$$

Johnson and Julius's Approach is applied further to check for the existence of any long term relationship between the time series data.

4.3 Vector auto regression (var technique)

Akaike information criterion (AIC) and Schwarz information criterion (SIC) are applied to select proper lag length for Vector Auto regressive process. Selection of lag length is pre-requisite before exploring long term relationship through Co-integration test.

4.4 Johansen and Juselius co-integration test

The time series data should be integrated of same order to test for the Co-integration. The assumption of Co-integration is that if two time series are individually non-stationary, their linear combination might be stationery. Co-integration is applied to explore any long term relationship between two or more variables. Although Co-integration does not explain the cause and effect relationship between two variables, it does explore the co-movement between two time series. The test is based on empirical evidence. The relationship between time series might have an economic reasoning behind them and it might not be explained through an economic reason. Two different approaches exist to apply the Co-integration which are:

- J.J Approach (Johnson and Juselius Approach)
- ARDL (Auto Regressive Distribution Lag Approach)

The J.J approach of Co-integration is applied on time series which are integrated of the same order, otherwise the ARDL (Auto Regressive Distribution Lag Approach) is used to the test for the Co-integration.

$$U_{t=b_0} + \sum_{i=1}^m b_i U_{t-i} + \sum_{i=1}^m \beta_i M_{t-i} + e_t \dots (1.5)$$

$$Y_{t=d_0} + \sum_{i=1}^m d_i U_{t-i} + \sum_{i=1}^m \alpha_i Y_{t-i} + \epsilon_t \dots \dots \dots (1.6)$$

U_t = Stationery series (for which co-integration to be tested)

Y_t = Stationery series (for which co-integration to be tested)

In the above equations, b_0 and d_0 represents the constants, b_i , d_i , β_i and α_i are coefficients whereas m and i represents positive integers and number of values respectively. The error term is represented by e_t .

4.4 Granger causality test

Granger Theorem is based on the principal that if two variables are co-integrated, there must be a causal relationship between them at least in one direction. Co-integration investigates the existence of long run relationship but does not explain the lead lag relationship which is important in price discovery. Granger Causality is used to determine the lead lag relationship. If the leading series is determined, the other lag series can be predicted. Causality in one direction is known as unidirectional causality which means the flow of information from one market to another market.

If the existence of lead lag relationship is reported in both directions, it means the flow of information occurs from both sides and both the markets are exerting pressure on each other. This is called bi-directional causality.

4.5 Impulse response function

The change in Standard Deviation of one series due to one Standard Deviation change in another series is explained by the impulse response function. The impulse response function is also a good parameter which closely observes the random shocks on the market. It further explains the market response to its own shocks and the shocks due to other market innovations. It also explains the speed of adjustment.

4.6 Variance decomposition test

The variance decomposition test explains the proportion of the movements in one variable (dependent variable) that are due to its own shocks versus shocks due to the other variables (independent variable). The variance decomposition is considered a better tool for the cumulative effect of shocks.

4.7 Vector error correction model

After analyzing the variables for any long term relationship, Error Correction Model is applied to investigate the short term relationship. The equations (1.5) and (1.6) are rearranged for Error Correction Model in the following way:

$$\Delta U_{t=b_0} + \sum_{i=1}^m b_i U_{t-i} + \sum_{i=1}^m \beta_i M_{t-i} + \theta ECT_{t-1} + e_t \dots \dots \dots (1.7)$$

$$\Delta Y_{t=d_0} + \sum_{i=1}^m d_i U_{t-i} + \sum_{i=1}^m \alpha_i Y_{t-i} + \delta ECT_{t-1} + \varepsilon_t \dots \dots \dots (1.8)$$

$\Delta U_{t=}$ Stationery series with deference operator

$\Delta Y_{t=}$ Stationery series with deference operator

Further in the equations (1,7) and (1.8) the new terms θ and δ represents coefficients of error correction term and ECT represents error correction term.

5.0 Results and Discussion

The study uses Descriptive Statistics, Unit Root Test, Vector Auto Regression (VAR Technique), Johansen and Juselius Co-integration Test, Granger Causality Test, Impulse Response Test, Variance Decomposition Test and Vector Error Correction Model to explore the relationship between the futures and spot market. Table 1 give details of the companies which are trading futures and are selected for the study.

Table 1 Selected Compnies Trading Futures on KSE

Company name	Symbol	Sector
Bank of Punjab limited	BOP	Banks
D.G. Khan Cement Co	DGKC	Construction and Materials
ENGRO Corporation Limited	ENGRO	Chemical
Fauji Fertilizer Bin Qasim	FFBL	Chemical
Fauji Fertilizer Co. limited	FFC	Chemical
Hub Power Company Limited	HUBC	Electricity
Lucky Cement Limited	LUCK	Construction and Materials
Nishat Mills Limited	NML	Personal Goods
Oil and Gas Development Company limited	OGDC	Oil and Gas
Pakistan Oil Fields Limited	POL	Oil and Gas
Pakistan State Oil Co. Limited	PSO	Oil and Gas
Pakistan Telecommunication Company limited	PTC	Fixed line Telecommunication

Table 2 Results of Descriptive Statistics										
Companies	Mean	Median	Maximum	Minimum	S.D	Skewness	Kurtosis	Jarque Bera	Prob	Observation
BOP FR	-0.0264	0.0000	0.4564	-0.8682	0.1822	-1.4696	8.8278	127.8040	0.0000	72
BOP SR	-0.0265	0.0000	0.4562	-0.8739	0.1934	-1.2481	7.3131	74.5002	0.0000	72
DGKC FR	-0.0083	-0.0036	0.5028	-0.6054	0.1676	-0.5505	5.1891	18.0136	0.0001	72
DGKC SR	-0.0083	0.0000	0.5108	-0.6134	0.1702	-0.5881	5.1595	18.1411	0.0001	72
ENGRO FR	0.0077	0.0089	0.2888	-0.6169	0.1203	-1.8756	12.0217	286.3854	0.0000	72
ENGRO SR	0.0089	0.0092	0.2885	-0.6263	0.1230	-1.8255	11.6664	265.3113	0.0000	72
FFBL FR	0.0022	0.0131	0.1892	-0.3533	0.1043	-0.9477	4.1711	14.8918	0.0006	72
FFBL SR	0.0022	0.0111	0.1973	-0.3577	0.1024	-0.9627	4.4845	17.7316	0.0001	72
FFC FR	-0.0015	0.0074	0.1728	-0.2304	0.0778	-0.7751	3.7856	9.0607	0.0108	72
FFC SR	-0.0014	0.0026	0.1723	-0.2001	0.0723	-0.5627	3.5573	4.7311	0.0939	72
HUBC FR	0.0028	0.0041	0.2478	-0.2480	0.0859	-0.3779	4.3318	7.0353	0.0297	72
HUBC SR	0.0027	0.0030	0.2471	-0.2920	0.0909	-0.5260	4.5356	10.3941	0.0055	72
LUCK FR	0.0086	0.0060	0.9679	-0.6896	0.2061	0.4444	10.3181	163.0350	0.0000	72
LUCK SR	0.0087	0.0226	0.3008	-0.6138	0.1500	-1.0616	5.9840	40.2355	0.0000	72
NML FR	-0.0027	0.0172	0.4058	-0.7265	0.1751	-1.1933	6.1104	46.1132	0.0000	72
NML SR	-0.0039	0.0138	1.0295	-0.8662	0.2332	0.0203	10.0740	150.1292	0.0000	72
OGDC FR	0.0113	0.0197	0.3812	-0.6360	0.1264	-1.5919	11.7847	261.9235	0.0000	72
OGDC SR	0.0119	0.0137	0.3724	-0.6360	0.1229	-1.6711	12.9821	332.4352	0.0000	72
POL FR	0.0025	0.0140	0.3028	-0.8554	0.1548	-2.3969	14.9447	496.9707	0.0000	72
POL SR	0.0025	0.0170	0.3498	-0.8654	0.1659	-2.5267	14.2937	459.2562	0.0000	72
PSO FR	0.0003	0.0099	0.3268	-0.6601	0.1310	-1.6732	10.9242	221.9750	0.0000	72
PSO SR	0.0004	0.0083	0.3264	-0.6609	0.1284	-1.7135	11.8584	270.6432	0.0000	72
PTC FR	-0.0119	0.0000	0.3265	-0.6166	0.1232	-1.4233	10.2439	181.7316	0.0000	72
PTC SR	-0.0129	0.0000	0.3189	-0.6233	0.1198	-1.4416	11.4251	237.8870	0.0000	72

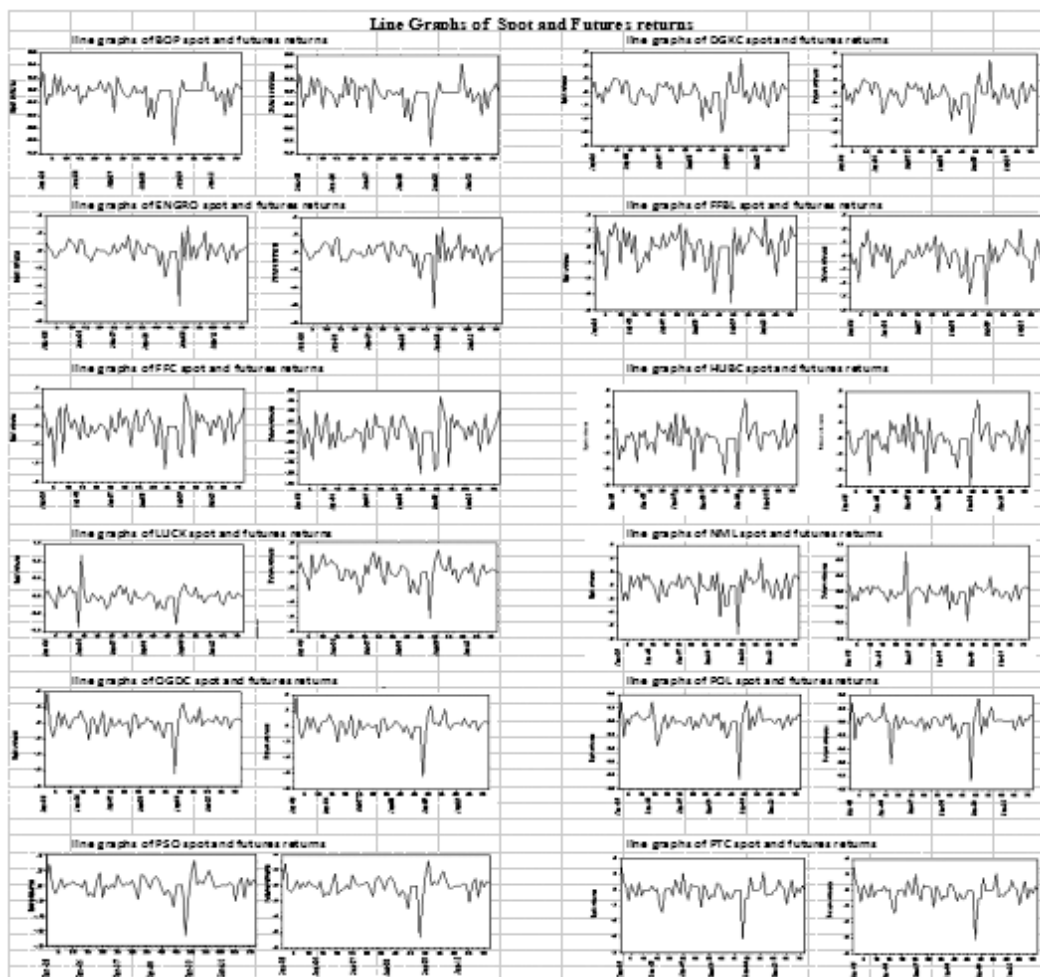
Note: FR denote (*Futures Returns*) and SR denotes (*Spot Returns*)

Descriptive statistics is applied on both the spot and futures returns of twelve companies for the period 2005 to 2010. The results in the table 2 reveal that OGDC spot producing the highest average monthly returns of 1.19% at 12.29% risk level. The OGDC futures average monthly returns is 1.13% and risk level of 12.64% which shows the futures are more risky and less productive than its spot returns. ENGRO's spot average monthly returns hold the second position in the list with 0.89% and risk surface of 12.30%. The futures returns of ENGRO is 0.77% with risk level of 12.03% which shows the single stock futures of ENGRO is less productive than its underlying spot returns with almost the same level of risk. LUCK hold the third position with spot providing average monthly returns of 0.87% comparative to future return 0.86% . The risk level of spot is 15% and futures 20% showing that the futures trading on the stocks of LUCK is more risky than its underlying stock. The average monthly returns for spot and futures of four companies FFBL, HUBC, POL and PSO remain lower but positive with lower values of risk comparative to

top three companies. Five companies namely BOP, DKCG, FFC, NML and PTC provide negative average monthly returns of both spot and futures with varying risk surface.

The statistics in the table 2 shows that the returns for all the companies are negatively skewed (except futures returns of LUCK and spot returns of NML which is positively skewed) which mean that the distribution has a long left tail with a higher probability of negative returns. When the Kurtosis is 3, the returns are Mesokurtic, when Kurtosis is >3 called Leptokurtic and lastly when Kurtosis is <3 called Platykurtic. The Kurtosis of the future and spot returns for all the returns are greater than 3 showing that the distribution is peaked (Leptokurtic). It reflects that compared to normal distribution, the distribution of returns have a fat tails and consequently the Jorque-Bera test rejects the null hypothesis of normal distribution for all the companies.

1.1 Line graphs of spot and futures returns



5.2 Results of adf and phillip peron test

The statistics provided by the ADF and PP test reported in the table 3 rejects the null hypothesis of unit root. The statistics of both the tests complement each other revealing that the spot and futures monthly data series remains non-stationery at level, but become stationery at difference of 1. The t values of futures and spot prices of all the companies are smaller than the critical values (-3.527045, -2.903566 and -2.589227 at 1%, 5% and 10% significant level, respectively) show the rejection of null hypothesis of unit root at 1%, 5% and 10% significant level. The spot and futures series are integrated of I(1).

Table 3 Result of Unit root Test				
Companies	ADF Test at Level	ADF Test at 1st Difference	Phillip-Perron Test at Level	Phillip-Perron Test at 1st Difference
BOP (Future Prices)	-0.206	-8.0003	-0.2447	-8.0003
BOP (Spot Prices)	-0.2836	-8.1185	-0.3115	-8.1185
DGKC(Future Prices)	-1.3018	-6.665	-0.9294	-6.6427
DGKC(Spot Prices)	-1.3018	-6.6181	-1.0878	-6.5745
ENGRO(Future Prices)	-2.1127	-9.5114	-2.0449	-9.4983
ENGRO(Spot Prices)	-2.1306	-9.5148	-2.1457	-9.5011
FFBL(Future Prices)	-1.5972	-8.3235	-1.7941	-8.3568
FFBL(Spot Prices)	-1.5552	-7.8266	-1.8554	-7.861
FFC(Future Prices)	-2.7614	-7.6324	-2.0364	-9.1328
FFC(Spot Prices)	-2.5344	-7.5982	-2.4489	-8.5016
HUBC(Future Prices)	-1.736	-7.6778	-1.736	-7.6635
HUBC(Spot Prices)	-1.8938	-8.0457	-1.9802	-8.0401
LUCK(Future Prices)	-2.5842	-9.2222	-2.5842	-9.2883
LUCK(Spot Prices)	-2.349	-6.4749	-2.2687	-6.4692
NML(Future Prices)	-1.647	-9.2132	-1.6728	-9.1643
NML(Spot Prices)	-2.1058	-10.827	-2.1058	-10.8103
OGDC(Future Prices)	-2.0961	-7.171	-2.1717	-8.3509
OGDC(Spot Prices)	-2.0843	-7.2465	-2.135	-8.0775
POL(Future Prices)	-1.8793	-7.8628	-2.0181	-8.0393
POL(Spot Prices)	-1.9725	-8.3984	-2.0114	-8.5349
PSO(Future Prices)	-2.0056	-7.2614	-2.1402	-7.2744
PSO(Spot Prices)	-2.4939	-7.1494	-2.1091	-7.1751
PTC(Future Prices)	-0.9107	-8.225	-0.8599	-8.2507
PTC(Spot Prices)	-0.8758	-8.1487	-0.8702	-8.159

5.3 Vector auto regression (VAR technique)

The estimation of Johansen and Juselius Co-integration technique required appropriate lag selection. To find out the number of lags, Akaike Information Criterion and Schwarz Bayesian Criterion are the most commonly used methods in financial econometrics. The Values of AIC and SC were found minimum at lag 1 for the eleven companies namely BOP, DGKC, ENGRO, FFBL, HUBC, LUCK, NML, OGDC, POL, PSO and PTC. For FFC lag 3 have been selected for which the values of AIC and SC were at minimum. The statistics are provided in the table 4.

Table 4 Statistics for selecting lag lenght												
Companies	LAG1		LAG2		LAG3		LAG4		LAG5		LAG6	
	AIC	SBC	AIC	SBC	AIC	SBC	AIC	SBC	AIC	SBC	AIC	SBC
BOP	-2.9080	-2.7089	-2.8138	-2.4821	-2.7172	-2.2527	-2.6553	-2.0581	-2.6020	-1.8722	-2.6868	-1.8242
DKCG	-5.2957	-5.0966	-5.2877	-4.9559	-5.2210	-4.7565	-5.1233	-4.5261	-5.0660	-4.3361	-5.1268	-4.2642
ENGRO	-6.5882	-6.3892	-6.5150	-6.1832	-6.4431	-5.9786	-6.3697	-5.7725	-6.3941	-5.6642	-6.4143	-5.5517
FFBL	-5.7087	-5.5096	-5.6484	-5.3166	-5.6058	-5.1413	-5.6360	-5.0388	-5.6524	-4.9225	-5.5687	-4.7061
FFC	-6.9318	-6.7327	-6.8789	-6.5471	-7.6641	-7.1996	-7.6338	-7.0366	-7.5411	-6.8112	-7.7789	-6.9163
HUBC	-6.8585	-6.6595	-6.7577	-6.4259	-6.6754	-6.2109	-6.6233	-6.0261	-6.5856	-5.8557	-6.6361	-5.7735
LUCK	-2.5753	-2.3762	-2.5802	-2.2485	-2.4714	-2.0069	-2.4012	-1.8041	-2.3232	-1.5933	-2.2114	-1.3488
NML	-1.8351	-1.6361	-1.7178	-1.3860	-1.6351	-1.1706	-1.5312	-0.9341	-1.4641	-0.7342	-1.3617	-0.4991
OGDC	-5.6811	-5.4821	-5.6110	-5.2793	-5.5396	-5.0752	-5.4853	-4.8882	-5.4201	-4.6902	-5.3737	-4.5111
POL	-4.1316	-3.9326	-4.0370	-3.7052	-3.9590	-3.4945	-3.9008	-3.3036	-3.8467	-3.1168	-3.7772	-2.9146
PSO	-7.2471	-7.0480	-7.2580	-6.9262	-7.3385	-6.8741	-7.2249	-6.6277	-7.2499	-6.5200	-7.1695	-6.3069
PTC	-6.7169	-6.5178	-6.6118	-6.2800	-6.5120	-6.0476	-6.4614	-5.8642	-6.3573	-5.6274	-6.2737	-5.4111

5.4 Results of Johansen's co-integration test

For the next step, the study applied Johansen and Juselius bivariate co-integration technique. Table 5 provides results for bivariate co-integration with maximum Eigen value statistics and table 6 provide results of bivariate co-integration with trace statistics for the spot and futures prices of mentioned twelve companies respectively.

Table 5 Results of Eigenvalue Statistics					
Companies	Hypothesis	Eigenvalue	Max-Eigen	Critical Value at 0.05 level	Remarks
BOP	None *	0.2632	21.3814	14.2646	Existence of 1
	At most 1	0.2632	21.3814	3.8415	Cointegration equation
DGKC	None *	0.2632	21.3814	-6.5817	Existence of 1
	At most 1	0.2632	21.3814	-17.0048	Cointegration equation
ENGRO	None *	0.2632	21.3814	-27.4279	Existence of 2
	At most 1 *	0.2632	21.3814	-37.8511	Co-integration equations
FFBL	None *	0.2632	21.3814	-48.2742	Existence of 1
	At most 1	0.2632	21.3814	-58.6973	Cointegration equation
FFC	None *	0.2632	21.3814	-69.1205	Existence of 1
	At most 1	0.2632	21.3814	-79.5436	Cointegration equation
HUBC	None *	0.2632	21.3814	-89.9667	Existence of 2
	At most 1 *	0.2632	21.3814	-100.3899	Co-integration equations
LUCK	None *	0.2632	21.3814	-110.8130	Existence of 2
	At most 1 *	0.2632	21.3814	-121.2361	Co-integration equations
NML	None *	0.2632	21.3814	-131.6593	Existence of 1
	At most 1	0.2632	21.3814	-142.0824	Cointegration equation
OGDC	None *	0.2632	21.3814	-152.5055	Existence of 2
	At most 1 *	0.2632	21.3814	-162.9287	Co-integration equations
POL	None *	0.2632	21.3814	-173.3518	Existence of 2
	At most 1 *	0.2632	21.3814	-183.7749	Co-integration equations
PSO	None *	0.2632	21.3814	-194.1981	Existence of 2
	At most 1 *	0.2632	21.3814	-204.6212	Co-integration equations
PTC	None *	0.2632	21.3814	-215.0443	Existence of 1
	At most 1	0.2632	21.3814	-225.4675	Cointegration equation

The maximum eigenvalue statistics in table 5 reports one co-integration equation between the spot and futures prices of BOP, DGKC, FFBL, FFC, NML and PTC while two co-integration equation has been found between the spot and futures prices of ENGRO, HUBC, LUCK, OGDC, POL and PSO at 5% critical value.

Table 6 Results of Trace Statistics					
Companies	Hypothesied	Eigenvalue	Trace Statistic	Critical Value 0.05	Remarks
BOP	None *	0.2632	21.5807	15.4947	Existence of 1
	At most 1	0.0028	0.1993	3.8414	Cointegration equation
DGKC	None *	0.3876	36.0980	15.4947	Existence of 1
	At most 1	0.0248	1.7638	3.8414	Cointegration equation
ENGRO	None *	0.3945	38.9962	15.4947	Existence of 2
	At most 1 *	0.0537	3.8673	3.8414	Co-integration equations
FFBL	None *	0.3410	32.0883	15.4947	Existence of 1
	At most 1	0.0405	2.8949	3.8414	Cointegration equation
FFC	None *	0.2646	24.13800	15.4947	Existence of 1
	At most 1	0.0463	3.2299	3.8414	Cointegration equation
HUBC	None *	0.3725	36.8698	15.4947	Existence of 2
	At most 1 *	0.0588	4.2429	3.8414	Co-integration equations
LUCK	None *	0.3859	39.8716	15.4947	Existence of 2
	At most 1 *	0.0786	5.7326	3.8414	Co-integration equations
NML	None *	0.3485	32.5726	15.4947	Existence of 1
	At most 1	0.0360	2.5726	3.8414	Cointegration equation
OGDC	None *	0.3549	34.6599	15.4947	Existence of 2
	At most 1 *	0.0551	3.9695	3.8414	Co-integration equations
POL	None *	0.3911	38.7769	15.4947	Existence of 2
	At most 1 *	0.0561	4.0419	3.8414	Co-integration equations
PSO	None *	0.3457	35.7356	15.4947	Existence of 2
	At most 1 *	0.0826	6.03497	3.8414	Co-integration equations
PTC	None *	0.3565	31.9606	15.4947	Existence of 1
	At most 1	0.01561	1.1019	3.8414	Cointegration equation

Table 6 provides bivariate co-integration results for the spot and futures prices of the companies by using trace statistics. The results of eigenvalue statistics have been confirmed by the trace statistics and one co-integration equation between the spot and futures prices of BOP, DGKC, FFBL, FFC, NML and PTC while, two co-integration equations have been found between the spot and futures prices of ENGRO, HUBC, LUCK, OGDC, POL and PSO at 5% critical value.

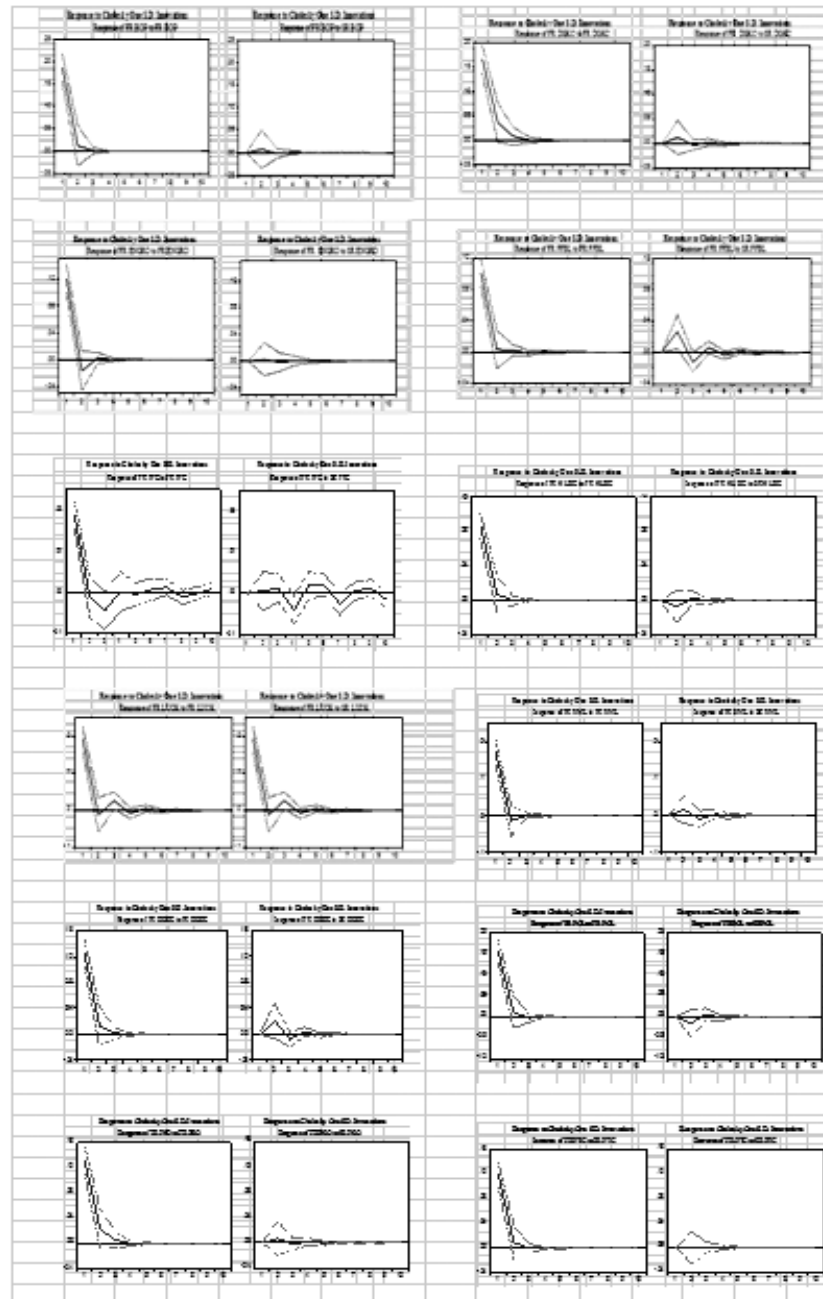
The above results suggest the existence of long run relationship between the spot and futures prices of these companies.

5.5 Results of Granger Causality

Granger Causality test shows that the spot returns of FFBL granger causes FFBL's futures returns (P-value of 0.0133), Futures returns of HUBC granger causes HUBC's spot returns (P-value of 0.0281), spot returns of LUCK granger causes futures returns of LUCK (P-value 0.0010) and futures returns of POL granger causes POL's spot returns (P-value of 0.0052). The Granger Causality test for the remaining eight companies (BOP, DGKC, ENGRO, FFC, NML, OGDC, PSO, and PTC) does not predict any causal relationship between their spot and futures returns. The futures can help to forecast the spot in case of HUBC and POL and play its important role of price discovery. The spot can forecast the futures in case of FFBL and LUCK and the result is line with Khan (2006) paper for the Futures trading and Price Discovery in Pakistan. The Granger Causality has a mix results and both the spot and futures play important role in forecasting their respective futures and spot prices. The results of Granger Causality Test are provided in the table 7.

Table 7 Result of Granger Causality Test			
Companies	Null hypothesis	F statistics	Probability
BOP	BSR does not Granger Cause BFR	0.1244	0.7254
	BFR does not Granger Cause BSR	0.9153	0.3421
DGKC	DGSR does not Granger Cause DGFR	0.4882	0.4871
	DGFR does not Granger Cause DGSR	0.2456	0.6217
ENGRO	ENGR_SR does not Granger Cause ENGR_FR	0.0522	0.8199
	ENGR_FR does not Granger Cause ENGR_SR	0.0785	0.7801
FFBL	FFBL_SR does not Granger Cause FFBL_FR	6.4650	0.0133
	FFBL_FR does not Granger Cause FFBL_SR	0.3498	0.5562
FFC	FFC_SR does not Granger Cause FFC_FR	2.1138	0.1075
	FFC_FR does not Granger Cause FFC_SR	2.3010	0.0859
HUBC	HUBC_SR does not Granger Cause HUBC_FR	0.6114	0.4370
	HUBC_FR does not Granger Cause HUBC_SR	5.0377	0.0281
LUCK	LUCK_SR does not Granger Cause LUCK_FR	11.8867	0.0010
	LUCK_FR does not Granger Cause LUCK_SR	0.0015	0.9686
NML	NML_SR does not Granger Cause NML_FR	0.7142	0.4010
	NML_FR does not Granger Cause NML_SR	2.0271	0.1591
OGDC	OGDC_SR does not Granger Cause OGDC_FR	2.3520	0.1298
	OGDC_FR does not Granger Cause OGDC_SR	0.0001	0.9892
POL	POL_SR does not Granger Cause POL_FR	0.9315	0.3379
	POL_FR does not Granger Cause POL_SR	8.3461	0.0052
PSO	PSO_SR does not Granger Cause PSO_FR	0.2529	0.6166
	PSO_FR does not Granger Cause PSO_SR	0.0575	0.8112
PTC	PTC_SR does not Granger Cause PTC_FR	0.0010	0.9747
	PTC_FR does not Granger Cause PTC_SR	0.7951	0.3757

5.6 Results of impulse response



The above Figure provides results of impulse response test for the twelve companies. The impulse response analysis represents that the shocks in the futures markets of all the selected companies are explained by their own innovations and their respective spot markets have less influence on them.

5.7 Results of variance decomposition test

Table 8 provides results for Variance Decomposition test. The results shows that any variation in futures returns is explained more by its own lag returns (100%) than by the lag returns of spot. From the results of variance decomposition test, we can conclude that futures market of all the companies is an exogenous market as majority of its stocks are explained by its own innovations.

Table 8 Result of Variance Decomposition Test											
	Period	1	2	3	4	5	6	7	8	9	10
BOP	S.E	0.1854	0.1859	0.1859	0.1859	0.1859	0.1859	0.1859	0.1859	0.1859	0.1859
	FRBOP	100.0000	99.8346	99.8261	99.8252	99.8251	99.8251	99.8251	99.8251	99.8251	99.8251
	SRBOP	0.0000	0.1654	0.1739	0.1748	0.1749	0.1749	0.1749	0.1749	0.1749	0.1749
DGKC	S.E	0.1664	0.1709	0.1711	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712
	FRBOP	100.0000	99.4940	99.4567	99.4378	99.4341	99.4330	99.4328	99.4327	99.4327	99.4327
	SRBOP	0.0000	0.5060	0.5433	0.5622	0.5659	0.5670	0.5672	0.5673	0.5673	0.5673
ENGRO	S.E	0.1211	0.1223	0.1223	0.1223	0.1223	0.1223	0.1223	0.1223	0.1223	0.1223
	FRBOP	100.0000	99.9470	99.9303	99.9268	99.9261	99.9260	99.9260	99.9260	99.9260	99.9260
	SRBOP	0.0000	0.0530	0.0697	0.0732	0.0739	0.0740	0.0740	0.0740	0.0740	0.0740
FFBL	S.E	0.1015	0.1050	0.1057	0.1059	0.1060	0.1060	0.1060	0.1060	0.1060	0.1060
	FRBOP	100.0000	93.5587	92.3168	91.9509	91.8477	91.8182	91.8098	91.8074	91.8067	91.8065
	SRBOP	0.0000	6.4413	7.6832	8.0491	8.1523	8.1818	8.1902	8.1926	8.1933	8.1935
FFC	S.E	0.0755	0.0757	0.0778	0.0795	0.0799	0.0803	0.0812	0.0814	0.0815	0.0819
	FRBOP	100.0000	99.9144	99.5282	95.4079	94.4645	93.6017	92.0257	91.9774	91.5846	91.1090
	SRBOP	0.0000	0.0856	0.4718	4.5921	5.5355	6.3983	7.9743	8.0226	8.4155	8.8910
HUBC	S.E	0.0869	0.0875	0.0876	0.0876	0.0876	0.0876	0.0876	0.0876	0.0876	0.0876
	FRBOP	100.0000	99.3139	99.2182	99.1994	99.1959	99.1953	99.1951	99.1951	99.1951	99.1951
	SRBOP	0.0000	0.6861	0.7818	0.8006	0.8041	0.8047	0.8049	0.8049	0.8049	0.8049
LUCK	S.E	0.1932	0.2073	0.2098	0.2104	0.2106	0.2106	0.2106	0.2106	0.2106	0.2106
	FRBOP	100.0000	87.1794	86.7057	86.3666	86.3140	86.2978	86.2943	86.2934	86.2932	86.2931
	SRBOP	0.0000	12.8206	13.2943	13.6334	13.6860	13.7022	13.7057	13.7066	13.7068	13.7069
NML	S.E	0.1756	0.1768	0.1771	0.1771	0.1771	0.1771	0.1771	0.1771	0.1771	0.1771
	FRBOP	100.0000	99.2136	98.9602	98.8965	98.8811	98.8774	98.8765	98.8762	98.8762	98.8762
	SRBOP	0.0000	0.7864	1.0398	1.1035	1.1189	1.1227	1.1235	1.1238	1.1238	1.1238
OGDC	S.E	0.1261	0.1284	0.1287	0.1288	0.1288	0.1288	0.1288	0.1288	0.1288	0.1288
	FRBOP	100.0000	97.4195	97.0688	96.9731	96.9511	96.9458	96.9445	96.9442	96.9441	96.9441
	SRBOP	0.0000	2.5805	2.9312	3.0269	3.0489	3.0542	3.0555	3.0558	3.0559	3.0559
POL	S.E	0.1567	0.1579	0.1581	0.1581	0.1581	0.1581	0.1581	0.1581	0.1581	0.1581
	FRBOP	100.0000	99.0183	98.8496	98.8153	98.8084	98.8070	98.8067	98.8066	98.8066	98.8066
	SRBOP	0.0000	0.9817	1.1504	1.1847	1.1916	1.1930	1.1933	1.1934	1.1934	1.1934
PSO	S.E	0.1310	0.1333	0.1334	0.1334	0.1334	0.1334	0.1334	0.1334	0.1334	0.1334
	FRBOP	100.0000	99.7422	99.7169	99.7066	99.7043	99.7036	99.7035	99.7034	99.7034	99.7034
	SRBOP	0.0000	0.2578	0.2831	0.2934	0.2957	0.2964	0.2965	0.2966	0.2966	0.2966
PTC	S.E	0.1186	0.1189	0.1189	0.1189	0.1189	0.1189	0.1189	0.1189	0.1189	0.1189
	FRBOP	100.0000	99.9988	99.9987	99.9987	99.9987	99.9987	99.9987	99.9987	99.9987	99.9987
	SRBOP	0.0000	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013

5.8 Results of Vector Error Correction Model

Lein (1996) argued that when two series are found to be co-integrated, a VAR technique along with error correction term should be estimated. The error correction model based on ARDL

approach has been applied to test for the short term relationship between the spot and futures returns of the mentioned companies. The coefficient ECM (-1) shows how much of the short run disequilibrium will be eliminated in the long run. The error correction variable ECM for all the companies has been reported negative and also statistically significant. Futures returns have been considered as dependent variable while spot return as independent variable.

Table 9 Results of Variance Decomposition Test					
Company	Regressor	Coefficient	Standard Error	T-Ratio	Probability
BOP	SRBOP	0.8563	0.0473	18.0929	[.000]
	ecm(-1)	-1.0000	0.0000	*NONE*	[.000]
DGKC	SRDGKC	0.9703	0.0202	48.0280	[.000]
	ecm(-1)	-1.5044	0.1047	-14.3736	[.000]
ENGRO	SRENGRO	0.97089	0.020987	46.2611	[.000]
	ecm(-1)	-1.4302	0.10268	-13.9284	[.000]
FFBL	SRFFBL	0.8395	0.0600	13.9916	[.000]
	ecm(-1)	-1.5120	0.0993	-15.2311	[.000]
FFC	SRIFFC	0.71645	0.085866	8.3438	[.000]
	SRFFC	1.0108	0.050306	20.0938	[.000]
HUBC	SRIFFC	-0.76821	0.0877	-8.7595	[.000]
	ecm(-1)	-2.5244	0.14622	-17.2648	[.000]
LUCK	SRHUBC	0.9264	0.0353	26.2105	[.000]
	ecm(-1)	-1.4319	0.1135	-12.6127	[.000]
NML	SRLUCK	0.1045	0.0353	9.3162	[.000]
	ecm(-1)	-1.4931	0.1054	-14.1607	[.000]
OGDC	SRNML	0.56497	0.064821	8.7158	[.000]
	ecm(-1)	-1.3368	0.11115	-12.0272	[.000]
POL	SROGDC	0.9765	0.0325	30.0375	[.000]
	ecm(-1)	-1.4883	0.1052	-14.1539	[.000]
PTC	SRPOL	0.9120	0.0433	21.0436	[.000]
	ecm(-1)	-1.4681	0.1151	-12.7514	[.000]
PSO	SRPSO	1.0163	0.0135	75.1676	[.000]
	ecm(-1)	-1.5174	0.1030	-14.7385	[.000]
PTC	SRPTC	1.0177	0.0230	44.2509	[.000]
	ecm(-1)	-1.4227	0.1101	-12.9275	[.000]

From the result of Vector Error Correction Model in table 9, it is clear that 100% of the previous month's disequilibrium in the futures returns will be corrected in the current month for the BOP, while this figure for DGKC, ENGRO, FFBL, FFC, HUBC, LUCK, NML, OGDC, POL, PSO and PTC is quite high with value of 150%, 143%, 151%, 252%, 143%, 149%, 133%, 148%, 146%, 151% and 142%. We can conclude that the adjustment process in case of disequilibrium is quite fast for all the companies.

6.0 Conclusion

The study was conducted to analyze the relationship of single stock futures with the underlying stock on which future is traded. Twelve companies from different sectors which are

trading single stock futures on their stocks were considered for a period of six years from 1 January, 2005 to 31 December, 2010 for this study. The result of unit root indicates that the series of futures and spot are non-stationary at level, but become stationary at first difference. To check for any long run relationship, Johansen's co-integration technique was used. The maximum eigenvalue statistics and trace statistics reports one co-integration equation between the spot and futures prices of BOP, DGKC, FFBL, FFC, NML and PTC while two co-integration equations has been found between the spot and futures prices of ENGRO, HUBC, LUCK, OGDC, POL and PSO at 5% critical value. The results confirm the existence of long run relationship between the futures and spot prices of all the companies. To explore the causal effect, Granger Causality test has been applied. The result of Granger Causality test predicts that the spot prices of FFBL and LUCK assist in forecasting their respective futures prices which is in line with the results reported by Khan (2006). The futures prices of HUBC and POL forecast their respective spot prices. Thus the lead lags relationship between spot and futures are mix. The Futures for HUBC and POL can predict the expected spot prices in the future and play its important role of price discovery. No causal relationship has been found between the spot and futures returns of the remaining eight companies.

Vector error correction model based on ARDL approach captures the short-run dynamics of relationship between the spot and futures returns. The results of VECM establish that the error correction variable ECM (-1) for all the companies has been found negative and also statically significant. The results of VECM reported that 100% of the previous month's disequilibrium in the futures returns will be corrected in the current month for the BOP, while this figure for DGKC, ENGRO, FFBL, FFC, HUBC, LUCK, NML, OGDC, POL, PSO and PTC is quite high with value of 150%, 143%, 151%, 252%, 143%, 149%, 133%, 148%, 146%, 151% and 142%. The results of VECM shows that in case of disequilibrium the adjustment process is quite fast for all the companies.

To investigate the dynamic response between spot market and futures market, impulse response and variance decomposition tests are applied. The impulse response analysis represents most of the shocks in the futures markets of all the selected companies are explained by their own innovations and their respective spot markets have less influence on them. From the results of variance decomposition test we can conclude that futures market is an exogenous market as majority of its stocks are explained by its own innovations.

The empirical results of the study suggest the existence of long run relationship between the spot and futures market. The existence of long run relationship can provide benefits to investors by using futures and spot market in their hedging strategy. Ederington (1979) presumes that strong co movement between two markets is necessary for efficient hedging. The result of impulse response shows that the futures of all companies have a small response to the shock in the underlying spot market and the impulse response gradually dies out predicting co-integration between the spot and futures market which confirm Johansen's co-integration results.

The probability of negative returns is high than positive returns in both the spot and futures returns of the companies which mean downside risk is more compare to upside risk. The returns are more volatile between 2008 and 2009 which can be attributed to both financial crisis and political instability in the country.

6.1 Practical implication

The study provides important information for investors about the futures market in Pakistan. The existence of long run relationship and the role of futures market in price discovery show that investors can use the futures market for risk management and efficient hedging.

6.2 Futures research direction

Futures research can explore the sources of instability in the spot and futures market and further considering the volatility effect in the spot and futures market. 

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ARTICLE**An Empirical Study on Weak Market Efficiency of
Karachi Stock Exchange**

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Abstract

A lot of research has been conducted to check whether the Frontier and emerging markets show weak form of efficiency or follow a random walk. Karachi Stock Exchange, being a frontier market, was tested on the basis of daily closing values from 2006 to 2011. The study showed KSE to be a weak form inefficient market following non randomness. Three tests were applied on the data. KSE proved to have a unit root, the values in the series showed a strong correlation. Moreover, a Z-statistic value was far greater than 1.96 which proved KSE to be an inefficient market. Inefficient markets have several implications for international as well as local investors.

Introduction

Stock market plays a vital role in any financial system. While it contributes to the economics and trade of the country, a strong and an efficient running of the stock markets also play a vital role in benefitting a country's economy. An efficient market is the one that carries unpredictability of future stock prices. In other words, strong form efficiency exists when the stock prices follow a Random Walk and cannot be predicted by any available information in the market, be it in the form of historical data, public news or insider's information.

Weak form efficiency is the one where the prices of the stock fully contain the historical data of the prices. One cannot find out if a stock at a current point in time is undervalued or overvalued hence cannot earn excess returns. If this is absent and the data instead of following a "random walk" exhibits clustering, the market is said to be inefficient.

Generally it has been stated and proved through researches that the developed markets exhibits a random walk and that the efficient market hypothesis holds true for them. Many researchers have found the US and European Markets to be efficient except for a few exceptions. On the other hand, emerging markets are believed to be either weak form efficient or inefficient, if they do not fulfill any of the criteria for market efficiency.

Karachi Stock Exchange is the main representative of the Pakistani Stock Market since it is the oldest, the largest and the most liquid of all the existing ones. A lot of research has been done

to check the efficiency of KSE, and many have found it to be weak form efficient market while some have found it to be inefficient according to the time periods they have tested. Our study is based on similar studies. We in this research will check the efficiency of the KSE-100 from 2006 to 2011 data and will see if random walk hypothesis holds true for KSE.

Literature Review

By definition, a market is considered to be efficient when the prices of securities existing in the market are reflecting the available information of the market. In other words, “efficient market” postulates that all the information is assimilated in the prices on which the traders trade the securities. The information in the market might be present in the form of historical data, public news or insider’s information.

The efficient market hypothesis, also known as The Random Walk Theory was presented by Fama in the 1960’s. It proposed that the market prices fully reflect all the available information and follow a random walk; that one cannot earn excess returns or profits using this information. It suggests that it is very difficult to earn profits by predicting the prices of the securities being traded. (Clarke, Jandik, & Mandelker, 2001) Moreover, the market is said to be efficient when the prices of the securities regulate quickly to the newly arrived information such that there remains no bias.

Market efficiency is of three types. The market where the investor cannot outperform the market information and cannot earn abnormal or excess returns over the securities with the help of the all the three types of market information is said to be the strong or the most efficient market. Such a type of market is said to follow a random walk. Semi-strong market efficiency is the type where the prices of the securities reflect changes to any public information or news that is floated in the market. The weak form market efficiency is the type where the prices of the traded securities or traded assets reflect and fully contain the historical information of prices. This means that no one can detect the securities that are mispriced; neither can they beat the market by analyzing those prices. (Clarke, Jandik, & Mandelker, 2001) Such markets are said to follow non randomness and usually reject the Random Walk Hypothesis.

The developed economies have been proved to exhibit the random walk hypothesis. Fama did a very detailed study on New York Stock Exchange in 1965 and proved the validity of the hypothesis especially where it states that the prices changes are random and predictions cannot be made based on the historical price trend. But still many others have rejected it in developed economies. (Mustafa, 2008). A study was done on twenty European markets out of which sixteen were regarded as developed and four were considered to be emerging markets. The authors employed Runs test, ADF as well as multiple variance tests to come to the conclusion that only some countries out of the developed ones (Sweden, Portugal, Ireland, UK and Germany) satisfy the basic criteria of the hypothesis whereas some (Netherlands, Finland, France, Norway and Spain) met only a few requirements of the hypothesis. Hungary was the only country from the emerging markets that satisfied the “strictest requirements for a random walk in daily stock returns.” (Worthington & Higgs, 2003) Worthington and Higgs studies (2003) also concluded that the emerging markets seem to reject the random walk hypothesis.

The prices of the securities are something that is well known by almost everybody. Hence, it is really difficult to compete and earn profits on the basis of historical price data only. Developing/ emerging and the underdeveloped countries are considered to have a weak-form market efficiency which is usually convenient to test. It is said that emerging markets are characterized by growth potential and rapid business activity (Mobarek & Keasey, 2000). Samuels (1981) defined the nature of an emerging market as *“Prices cannot be assumed to fully reflect all available information. It cannot be assumed that investors will correctly interpret the information that is released. The corporation has greater potential to influence its own stock market price and there is a greater possibility that its price will move about in a manner not justified by the information available.”* (Samuels, 1981). Hence lower the market efficiency, the ability to predict the changes in stock prices would be greater (Mobarek & Keasey, 2000).

Roux and Gilbertson (1978), while studying the stock market of Johannesburg found no evidence of a random walk. Instead they found market inefficiency in that emerging market (Roux & Gilbertson, 1978). Moreover Malaikah (1992) found out that Saudi stock market was inefficient whereas that of Kuwait was efficient (Malaikah, 1990). Ghana Stock Exchange was found to be weakly inefficient, hence rejecting the random walk hypothesis. Clustering was found in the data series which according to the author was an attraction for the investors. Investors seem to invest more when they have the knowledge of the profitable areas and GSE serves the purpose of increasing investors' returns. (Magnus, 2008)

Khababa proposed that Saudi market did not possess weak form efficiency but was inefficient due to the probable reasons like high transaction costs, less market liquidity etc (Khababa, 1998). Dhaka stock Exchange was also found to have weak form efficiency by Alam, Hasan and Kadapakkam in 1999. Kuala Lumpur market was found to be inefficient by Barnes in 1986 (Mustafa, 2008) whereas another research concluded that the KLSE possess weak form efficiency and that there are some pockets that display inefficiencies. (Nassir, Ariff, & Mohamad, 1993). The studies done by Darat and Zhong in 2000 on two Chinese Stock Exchanges also rejected the market efficiency hypothesis (Darrat & Zhong, 2000).

Hence the returns are somewhat predictable in the emerging markets and there often exists market inefficiency. The validity of Random Walk theory therefore becomes questionable for the emerging markets.

Several studies have been undertaken to check the Random walk hypothesis and market efficiency of the Pakistani Stock Exchange. Since Karachi Stock Exchange is the oldest and the largest, it has been taken into account by most of the researchers. By using serial correlation test and variance ratios, random walk hypothesis was rejected on the KSE by Chakraborty in 2006. The author took daily closing prices from 1996 to 2000. KSE was found to be weak form efficient (Chakraborty, 2006). Hameed and Ashraf conducted a research of the similar cause by taking closing prices data from 1998 to 2006. They rejected the weak form efficiency in KSE and found clusters in the data; hence the data could help in predicting the future values (inefficiency) (Hameed & Ashraf, 2006). The same results were also given by Haroon in 2006. Khilji in 1994, with his research concluded that Random Walk Hypothesis doesn't define the Pakistani market. (Mustafa, 2008)

We are going to check the presence of a random walk in the Karachi Stock Exchange from the daily closing values of KSE-100 from 1 July, 2006 to 30 June, 2011.

Hypothesis

H1: There exists random walk in Karachi Stock Exchange.

Purpose and Methodology

The main purpose of this study is to check whether Karachi Stock Exchange is a weak efficient market as put down by several researches. For this purpose, we have taken data of KSE-100 index's closing values from 1 July, 2006 to 30 June, 2011. The tests that we are applied are the Runs test, the Correlation Tests and the Unit root test with the help of E-views and SPSS.

Results and Analysis

Augmented Dickey-Fuller's Unit Root Test

According to the Unit root test, greater values of the ADF t-statistic indicate the series to be stationary and the data not having a unit root. Since our study indicates that the ADF t-statistic is lower than the t-statistic of the critical values, our data series is not stationary and has a unit root.

Table - I

Augmented Dickey-Fuller Test

	t-Statistic	Prob.
Augmented Dickey-Fuller test statistic	-1.222000	0.6669
Test critical values: 1% level	-3.435758	
5% level	-2.863816	
10% level	-2.568032	

The ADF test result of our data indicated that the value lies in the critical region and not in the accepted region. The markets that possess a unit root are the inefficient weak form ones that exhibit non randomness, hence rejecting our hypotheses. Karachi Stock Exchange has no random walk and it is weak form inefficient.

Auto Correlation

Table 2 shows the auto correlation of the entire sample size. The results show that KSE doesn't follow a random walk. In the Auto Correlation Test all the test values for the KSE-100 touched 0.8 or 0.9. This proves that each day's price/ value are highly correlated with the previous day's price. Hence, the previous trends can predict the future values. Karachi Stock Exchange is thus, a weak form inefficient market and doesn't follow a random walk (Mustafa, 2008)(Harvey,

1995, b)(Poshakwale, 1996). These findings are consistent with the studies done by many researchers mentioned. KSE is information ally inefficient market.

Table - II
Auto Correlation

Sample: 1 1165						
Included observations: 1165						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob.	
*****	*****	1	0.997			
*****	*	2	0.994	0.997	1161.5	0.000
*****	.	3	0.990	-0.113	2316.0	0.000
*****	.	4	0.987	-0.035	3463.1	0.000
*****	.	5	0.983	0.019	4602.8	0.000
*****	.	6	0.979	-0.047	5734.7	0.000
*****	.	7	0.975	-0.017	6858.4	0.000
*****	.	8	0.971	0.019	7974.2	0.000
*****	.	9	0.967	-0.012	9081.9	0.000
*****	.	10	0.963	0.001	10182.	0.000
*****	.	11	0.959	0.000	11274.	0.000
*****	.	12	0.955	-0.031	12357.	0.000
*****	.	13	0.951	0.029	13433.	0.000
*****	.	14	0.947	-0.032	14500.	0.000
*****	.	15	0.942	-0.039	15559.	0.000
*****	.	16	0.938	0.009	16609.	0.000
*****	.	17	0.933	-0.039	17650.	0.000
*****	.	18	0.928	-0.035	18681.	0.000
*****	.	19	0.923	-0.034	19702.	0.000
*****	.	20	0.918	-0.014	20713.	0.000
*****	.	21	0.913	0.003	21714.	0.000
*****	.	22	0.908	0.003	22705.	0.000
*****	.	23	0.903	0.010	23685.	0.000
*****	.	24	0.898	0.017	24656.	0.000
*****	.	25	0.894	0.026	25617.	0.000
*****	.	26	0.890	0.030	26570.	0.000
*****	.	27	0.885	0.031	27515.	0.000
*****	.	28	0.881	-0.021	28451.	0.000
*****	.	29	0.877	0.010	29379.	0.000
*****	.	30	0.872	-0.012	30298.	0.000
*****	.	31	0.868	-0.001	31210.	0.000
*****	.	32	0.863	-0.021	32113.	0.000
*****	.	33	0.859	0.009	33007.	0.000
*****	.	34	0.855	0.011	33894.	0.000
*****	.	35	0.850	-0.007	34772.	0.000
*****	.	36	0.846	-0.010	35642.	0.000
				-0.021	36504.	0.000

Runs Test

Runs Test is used to check the randomness in the series of data. This is to check whether the data series follow a random walk or not (Mustafa, 2008). When the expected number of runs varies largely from the observed number of runs, the test will reject the hypothesis that the series follow a random walk hypothesis.

From the Runs Test, Karachi Stock Exchange is proved to be a weak form inefficient market. Since a Z value greater than 1.96 represents non randomness, the value as indicated by the SPSS test shows weak form efficiency.

Table - III

Runs Test

	KSE
Test Value ^a	10619.00
Cases < Test Value	582
Cases ≥ Test Value	583
Total Cases	1165
Number of Runs	28
Z	-32.564
Asymp. Sig. (2-tailed)	.000

a. Median

Conclusion & Discussion

This study was conducted to check the market efficiency of Karachi Stock Exchange. Data on daily basis was taken for five years. The data was put to test using Unit root test, Auto correlation as well as Runs test using E-views and SPSS software. The results of all three tests proved Karachi Stock Exchange to be following non randomness and rejecting the random walk hypothesis. The Auto Correlation results showed that there is more than 80% correlation between the prices. This leads to inefficiency as the future prices can be predicted using the previous days' prices. Similarly the null hypothesis for the Dickey Fuller test was accepted. KSE has a unit root hence it is inefficient. Moreover, a greater Z value in the Runs test proved KSE to be nonrandom hence weak form inefficient.

Karachi Stock Exchange being a frontier market is a weak form inefficient market and rejects the random walk hypothesis i.e. the prices cannot be predicted by the past prices in this market. The prices do not fully reflect the available information hence there are chances that the investor might attain access to abnormal returns. Efficient markets are a necessary prerequisite if a country wants its money to be invested on the important high- value projects (Hameed & Ashraf, 2006).

There can be various implications for such results. Investors can work on the over or undervaluation of the stock prices to earn the abnormal returns. Hence, such markets are usually considered attractive for investors. According to Samuels and Yacout (1981):

“...there are priori reasons to believe that stock markets in developing countries are neither efficient nor perfect. If a stock market is not efficient, this does not necessarily mean that per se it is a bad thing. The crucial question is whether an inefficient stock market is better than no market at all.” Further researches can be done by taking a larger data series to cater a wider time span.

This might lead to different results. 

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"The emergence of management, as an essential, a distinct and a leading institution is a pivotal event in social history, Rarely if ever, has a new basic institution, a new leading group emerged as fast as has management since the turn of this century. Rarely in human history has a new institution proven in dispensable so quickly and even less often has a new institution with so little opposition, so little disturbance, and so little controversy."

- Petter F. Drucker Rumi

ARTICLE**Interdependence of South Asian & Developed Stock Markets
and their impact on KSE (Pakistan)**

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Abstract

The objective of this study was to investigate the interdependence among the South Asian and developed markets and their impact on Karachi Stock Exchange. The data was collected from eight worldly stock exchanges, four from each South Asia and developed countries for the period starting from July 1999 to June 2011. For analytical purposes, techniques like Correlation Matrix, Unit root, Co integration test and Granger Causality were applied. The correlation results indicated that there was no significant relationship between the South Asian and developed equity markets. However the equity market of US and India found to be correlated. A bidirectional casual relationship was found between CSE and KSE through Granger Casual test. The Equity Markets of South Asia and Developed countries are not co integrated with each other. The international portfolio managers are advised to include Karachi Stock Markets in the developed market portfolios, because the Karachi Stock Market is not linked with the Developed world.

Keywords: Stock Exchange, South Asian, Developed markets, Interdependence.

Introduction

The stock market is a place where the stocks of listed companies are traded. It is also called equity market. The listed companies are those companies whose shares are available on a stock exchange for public trading. It is an important source for companies to raise money. The stock exchanges operate as clearing house, similar to financial institutions that reduce the risk of default on the transaction. The stock market is one of the important sources that perform important role in nation economy.

According to the theory the world markets are integrated with each other. The information flowing from one market may affect the other markets because of integration. Stock Markets are said to be integrated if they move together in same direction. There are many factors that are contributing in financial markets integration. These include the following:

- (1) Free flow of capital
- (2) Increase in flow of information

(3) Reduction in transaction cost.

Topic has gained great importance since after the stock market crash of October 1987 the integration of global equity markets has been studied by different researchers. Mostly the studies are related to the developed countries. The international fund managers invest in those markets which are not independent.

Globalization also plays a vital role in equity markets. Globalization depicts a process through which the national economies have become integrated. After globalization, financial markets have started changing. Globalization is the main factor behind the diversification of stock markets. It means reducing the risk by investing in multiple of assets.

According to the Markowitz (1952, 1959), the investor should hold a well-diversified portfolio of several securities which should be negatively correlated with one another. Moreover, the negatively correlated securities, assume the benefit of diversification. These benefits achieved by investing in international markets. There are two types of diversification (Random and Non Random). Markowitz prefers Non-random diversification. The theory states that, the investors should invest on the basis of variance, covariance and correlation, rather than blindly investing in an asset.

Kedarnath Mukherjee and R. K. Mishra, Suchismita Bose found the stock market interlinkages in Indian markets. Recently Arshad et al (2008) examined the long run relationship between an Emerging Equity Market and Equity Markets of the Developed World.

Some studies state that the some Asian markets are co integrated with markets of developed world but some suggest otherwise. In this study we re-examine this issue. The South Asian countries experienced political and economic circumstances in past years i.e. Asian Financial crises and the terrorist attack in September 2001.

I. Overview of South Asian Stock Markets

South Asia consists of eight countries like Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and Afghanistan. These countries have many regional stock exchanges. Pakistan has three stock exchanges; the Islamabad Stock Exchange (ISE), Lahore Stock Exchange (LSE) and Karachi Stock Exchange (KSE). Among these the KSE covers the biggest share of Pakistan. The Karachi Stock Exchange was established in 1948. It is the largest and oldest exchange. Second to the Karachi Stock exchange is the Lahore Stock Exchange which was launched in 1970. The LSE has 519 listed companies. The third important national exchange is the Islamabad Stock Exchange was established in 1989. It started trading in July 1992.

India is among the top emerging markets in South Asia with almost more than 20 regional stock exchanges. The Bombay Stock Exchange and the National Stock Exchange of India Ltd. are the two primary exchanges in India. The BSE and NSE are two leading exchanges and account for about 80 per cent of the equity volume traded in India. Mumbai Stock Exchange (BSE), Delhi Stock Exchange and Calcutta Stock Exchanges account for more than fifty percent of listed companies in India.

There are 34 developed countries in the World. The Australian Securities Exchange (ASX) is the main stock in Australia. The ASX was established in 1861. The major market index is the S&P / ASX 200. The Tokyo Stock Exchange was established in 1878, The Tokyo Stock Exchange (TSE) is the second largest stock exchange in the world by aggregate market capitalization of its listed companies. The Tokyo Stock Exchange has 2,412 listed companies in 2010. The main indices tracking the TSE are the TOPIX and Nikkei 225.

II. Problem statement

Investors always try to lessen their risks in investment by diversifying their portfolios. In order to identify the different portfolios where they could invest, no visible signs exist which may direct them for investment. This is a problem of prime importance to be identified. In the existing scenarios of national economy, no empirical work has been done yet which may lead the national investors. Therefore, the current study is endeavoring to quantify and identify the impact of various Worldly Stock markets upon one another. The mutual interdependence of these markets will also be detected. It will work like a guiding star for the investors to diversify their national and international portfolios for investment.

III. Research objective

Following are the perceived objectives of this research

To find out whether the stock markets in South Asia (Pakistan, India, Sri Lanka and Bangladesh) are interlinked.

To explore the long run and short run relationship among South Asian and developed countries.

To assess the Interdependence of worldly Stock Markets and their impact on Karachi Stock Exchange.

To examine the linkages among the South Asian and developed equity markets and to see the scope of portfolio diversification within the region.

Literature Review

Owen Bleeders (2002) explained the interdependence between South Africa and both the UK and US. He used the variable approach. According to the results, little interdependence was found before 1995 when dual exchange rates existed. The interdependence between South Asia and US increased after the unification and removal of exchange rates. And also increased after March 1995 when the US purchases increased.

Paresh Narayn et al. (2003) examined the linkages among four South Asian Stock Markets Pakistan, India, Bangladesh and Sri Lanka using temporal granger causality approach. And found the relationship among the stock price indices within a multivariate co integration framework. He also proved the impulse response functions. Results showed unidirectional granger causality from stock prices in Pakistan to Stock Prices in India, Daily Stock Prices indices were used in this study over the period 1995 to 2001. Bangladesh was found most exogenous among these four due to small size and market capitalization.

Lambda (2005) analyzed the short and long run relationship between South Asian equity markets and developed equity markets during July 1997 to December 2003. He used the multivariate co integration framework. According to his results, the Indian market is influenced by the equity market of developed countries (US, UK and Japan). The Pakistani and Sri Lankan markets are independent and having no co integration with the developed equity markets.

Abbas Valadkhani (2007) investigated the co integration and causality between the stock market price indices of Thailand and international stock markets (Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, the UK and the USA), using monthly data from December 1987 to December 2005. According to Granger causality test, the stock returns of Thailand and three of its neighboring countries (Malaysia, Singapore and Taiwan) are unified.

Arshad et al (2008) examined the long term relationship between Karachi stock exchange and equity markets of developed world for the period of 2000 to 2006 using multivariate co integration analysis. According to their findings pair wise Co integration analysis showed that Karachi stock market was not co integrated with equity market of developed world, but Karachi stock exchange was found to be integrated with France and Japan. Co integration analysis indicates that markets are integrated and there exists a long term relationship between these markets.

B.J. Queensly Jeyanthi (2009) investigated the one word ages and volatility spillovers under market reforms, and examined to what extent Indian stock markets are integrated with stock markets of the US, UK and Japan and also found the relationship between the stock prices of India. According to findings, long run relationships were found between the stock prices of India and its major trading partners before and after the structural changes. In short run, Granger causality exists between the stock returns of India and US, UK and Japan after the structural changes but unidirectional relationship exists between India and the UK before the structural changes. According to our view, these differences are due to structural change. Causality model states that volatility spill-over from Japan and UK did not exist before the structural changes. UK and Japan were not well-defined before the structural changes and U.S and Japan were well-defined after the structural changes. So, the US and Japan markets are generating the spillover in New York Stock Exchange (NYSE).

Methodology

I. Population

The stock markets in South Asia and other developed countries of the world constitute the population for this study. South Asia consists of eight countries, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and Afghanistan while according to IMF there are 34 developed countries. These countries have many regional stock exchanges.

II. Sample

A sample of eight equity markets was taken which included four South Asian and four Developed Stock markets. It was both a convenient and purposive sample. The research to be conducted was a quantitative research. Secondary data was used. The data was collected from secondary sources like internet and other bulletins etc. Supportive data was collected from previous research papers related to this topic. The data employed in this study included monthly closing stock market indices. The stock markets include the KSE-100 index (Pakistan), BSE (India), CSE All shares (Sri Lanka), General index (Dhaka), Standard & Poor 500 index (US), FTSE 100(UK), AORD Index (Australia), Nikkei 225(Japan). The data collection period extended over a twelve years period from Jul 30, 1999 - Jun 30, 2011.

III. Hypothesis

The purpose of this research was to investigate the interdependence among the South Asian and Developed world stock markets and their impact on KSE. The hypothesis in this regards were;

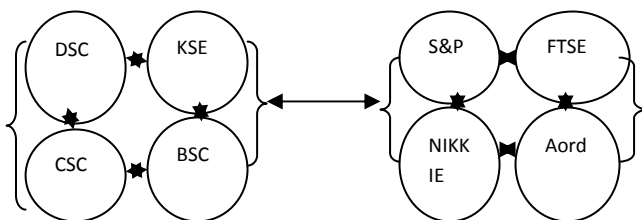
Ho₁: No causal relationship exists among the South Asian and developed stock markets.

Ho₂: There is no association among the south Asian stock markets and KSE.

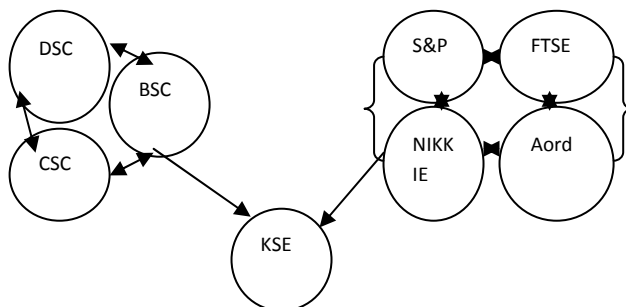
Ho₃: The developed stock markets have no impact on KSE.

IV. Theoretical Model of Research

Model-1



Model-2



V. Major Variable of Study:

The major variable of interest was the rate of return in different stock markets of the world.. The continuous compounded rate of return was calculated by using the following formula:

$$\text{Rat} = \text{Ln} (P_t / P_{t-1})$$

Where:

Rat = Return on day's';

P_t = Index closing value on week's'

P_{t-1}=Index closing value on week't-1'

Ln= Natural Log

In this study the basic purpose was to analyze the interdependence among the equity markets of south Asia and developed world and their impact on Karachi stock exchange, so the different techniques applied are (i) Correlation Analysis (ii) Unit Root Test (iii) Co integration tests (vi) Granger causality test.

VI. Correlation Statistics

It is an econometric technique which is used to describe the degree of relationship between the two variables. In this study the relationship between rate of return of south Asian and developed stock markets were estimated by using the following formula:

$$r = \frac{SS(xy)}{\sqrt{SS(x) SS(y)}}$$

There are three types of relationships. Such as

- (i) +1 perfect positive relationship
- (ii) -1 perfect negative
- (iii) 0 no correlation

VII. Unit Root Test

As the data evolved were of time series in nature. It is necessary to check its stationarity before the application of any economic technique. For this purpose the most frequently used ADF test was applied. For unit root analysis, the model applied was

$$\Delta Y_t = (\rho - 1) Y_{t-1} + U_t = \delta Y_{t-1} + U_t$$

Where

Y_t is the variable of interest,

t is the time index,

ρ is a coefficient,

U_t is the disturbance term.

Where Δ is the first difference operator

$\delta < 0$ then it indicates that data series stationary and vice versa

VIII. Co integration test

Co integration analysis was, firstly used by Johansen & Josuilius. It can be applied to test the existence of r co integrating vectors. (1) Maximal Eigen value, the maximal Eigen value test the null hypothesis that the no of Co-integrating relationships was less than or equal to or against the alternative $r+1$. (2) The Trace statistics. The trace statistic is the null hypothesis of r Co-integrating against the alternative of r or more Co-integrating vectors.

IX. Granger causality test

In next step Granger Causality test was applied. It is the test which helps researchers to determine the direction of cause i.e. whether

$Y \leftrightarrow X$

In order to test this hypothesis the F test in the form given below was applied

$$F = \{(RSS_r - RSS_{ur}) / M\} \div (RSS_{ur} / n - k)$$

Where

RSS_r is the restricted residual sum of squares

RSS_{ur} is the unrestricted residual sum of squares

M is the lag term and $n-k$ is the degree of freedom.

If the computed value exceeds critical value of F at some chosen level of significance, then null hypothesis rejected and it is concluded that Y is the cause of X . Such test could be repeated for identification of cause for other variables as well.

Results

The data given table-1 indicated that there was no significant relationship between the South Asian equity markets. On the other side strong evidences of correlation were found among the developed equity market. The South Asian countries had minimum correlation coefficients with Karachi stock exchange indicating that there was no strong influence on it except CSE. On the other hand the impact of developed countries stock markets on Karachi stock exchange was greater than South Asian. The major influence on KSE was from AORD (Australia).

I. Correlation Matrix

Table-1

	KSE	DSE	BSE	CSE	FTS E	AORD	S&P	Nikkei-Rtn
KSE	1							
DSE	0.06	1						

CSE	0.67	0.02	1					
BSE	-0.05	0.08	0.04	1				
FTSE	0.12	0.07	0.10	0.01	1			
AORD	0.23	0.06	0.29	0.04	0.73	1		
S&P	0.15	0.11	0.14	0.06	0.83	0.71		
Nikkei-Rtn	0.17	0.04	0.24	0.01	0.59	0.70	0.59	1

II. Unit root test

Table-2

	ADF -Level	ADF-Ist diff	PP- Level	PP-Ist diff
KSE	-1.176	-9.47	-1.21	-9.46
DSE	-0.387	-10.79	-0.55	-10.92
CSE	-0.89	-8.98	-0.94	-9.00
BSE	-0.53	-8.56	-0.79	-8.66
FTSE	-1.38	-10.6	-1.46	-10.60
AORD	-1.26	-8.22	-1.33	-8.37
S&P	-1.24	-10.16	-1.36	-10.15
Nikkei	-1.48	-9.255	-1.700	-9.33

The Table-2 presents the results of the unit root test for the South Asian markets. According to the test description if the value of ADF (δ) is below zero, then it is concluded that data series are stationary. The data given in the table 4.2 depict that the ADF test value at level as well as at first difference was less than zero for both South Asian and developed equity markets. Thus, it was concluded that the data series were stationary.

III. Co Integration Analysis

Table-3

Hypothesized	Eigen value	Trace Statistic	C Value at 0.05	Prob.
KSE *	0.369	212.414	159.529	0
DSE *	0.344	159.433	125.615	0.0001
CSE *	0.266	110.813	95.753	0.0031
BSE *	0.242	75.1855	69.818	0.0175
FTSE	0.137	43.279	47.856	0.1259
AORD	0.114	26.253	29.797	0.1213
S&P	0.076	12.299	15.494	0.1431
Nikkei	0.027	3.169	3.841	0.075

The data given in table Table-3 demonstrate the co integration results. It includes the Trace Statistics and Eigen value. Trace statistics confirmed the long run co integration among Equity markets of South Asian. Max Eigen value indicates also verified the long run Co-integration existed among KSE and DSE.

IV. Granger causality test

Granger Causality test was used to determine the co integration among the variables. It showed the causality among the variables. In table-4 the results indicated that CSE (Colombo Stock Exchange) influence KSE and KSE also influenced CSE, their values were .03 and .02 respectively. BSE (Bangladesh Stock Exchange) also Granger cause the KSE, and KSE also Granger cause BSE, their values were .01 and .03 respectively. This showed there existed bidirectional granger causality between some south Asian markets and Karachi equity market.

Table-4

Null Hypothesis:	F-Statistic	Prob.
CSE does not influence KSE	3.06368	0.0311
KSE does not influence CSE	3.14056	0.0282
BSE does not influence KSE	3.87242	0.0112
KSE does not influence BSE	3.05541	0.0314
KSE does not influence FTSE	3.04977	0.0317
AORD does not influence KSE	3.40456	0.0202
KSE does not influence S&P	3.28813	0.0234
KSE does not influence NIKKIE	4.52498	0.005
CSE does not influence BSE	3.53129	0.0173
FTSE does not influence CSE	3.37204	0.0211
AORD does not influence CSE	3.25798	0.0244
S&p does not influence CSE	2.52083	0.0616
NIKKIE does not influence CSE	5.23868	0.002
FTSE does not influence Granger Cause BSE	19.3985	4.00E-10
AORDdoes not influence Granger Cause BSE	28.4276	1.00E-13
S&P does not influence Granger Cause BSE	18.7466	7.00E-10
S&P does not influence Granger Cause BSE	28.8121	8.00E-14
FTSE does not influence Granger Cause NIKKIE	3.46795	0.0187

The results indicated that the developed equity markets were also Granger Cause equity markets of south Asia. In developed countries KSE Granger cause the FTSE but FTSE did not Granger cause the KSE, their values were .03 and .166 respectively. It was unidirectional phenomenon. AORD Granger causes the KSE and P-values were .020. KSE also Granger causes the Nikkei at .005. FTSE & Nikkei Granger caused on CSE respectively at .002 and 4.00e-10. AORD Granger causes the BSE because the P-values are 1.00e-13. This is less than 0.05. S&P Granger causes the BSE and P-values are 8.00e-14. There no Granger Causality Existed between Developed countries except FTSE. FTSE Granger caused Nikkei respectively at 0.018.

V. Conclusions

The main purpose of this study was to investigate the interdependence of South Asian and Developed stock markets and their impact on Karachi stock exchange. The different techniques were applied to test the interdependence.

1. There was lack of intra relationship among South Asian stock markets.
2. Weak correlation among developed stock markets was observed.
3. No significant impact of both Asian and developed market was found on KSE.
4. On the other side European, Australian, American & Japanese equity markets are strongly co related with each other, which may be due to the financial integration of markets and also the free flow of funds among the countries. So, there is an opportunity for international fund managers to invest in South Asian countries.
5. According to Granger Causality test the Karachi Stock Market is integrated with the BSE & CSE. investors of these two countries cannot get benefit by investing in KSE. The other South Asian markets not granger cause each other. However unidirectional causality exists among AORD & KSE and among KSE and S&P. Pair wise Granger Causality test also indicates that the Karachi Stock Market is not integrated with the Developed Equity Markets.

Recommendations

According to the results of this study, we are able to give the following recommendations.

1. The international portfolio managers are advised to include Karachi Stock Markets in the developed market portfolios, because the Karachi Stock Market is not linked with the Developed world.
2. The international investors should not invest in US and India at same time. Because equity markets of US and India are positively correlated with each other. They should choose one of them for investment.
3. The Karachi Stock Market is integrated with Bombay and Colombo Stock Market. So the investors of these two countries cannot acquire benefit by investing in KSE.
4. European, American, Australian, & Japan equity markets are strongly co related with each other so investing in these countries are not beneficial for investors.
5. The Equity Markets of South Asia and Developed countries are not co integrated with each other. The international fund managers should take the benefits of diversification by investing in these stock exchanges.

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"We are never deceived, we deceive ourselves."
- Joka Wolfgang von

ARTICLE**The Volatility effect of Single Stock Futures
Trading on Pakistani Stock Market**

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Abstract

The impact of single stock futures on the spot market volatility is still a issue debated in finance literature. The aim of this study is to analyze the effect of introduction of single stock futures on the volatility of Karachi Stock Exchange. This study mainly addresses the changes in level of volatility and structure after the introduction of single stock futures. Twenty four companies listed on KSE were evaluated in terms of possible volatility effect due to stock futures trading. This study applied F-test for differences in variances as a traditional measure for volatility and GARCH(1,1) as a econometric technique for detecting time-varying volatility. The results showed that there was no effect on volatility level and changes were experienced with structure of volatility after stock futures trading.

Key words: Single stock futures, Derivatives, volatility.

Introduction

Stock market volatility is the most vital area of research from the last three decades. Volatility is a risk measure and widely used in finance studies. Major interest of researchers on volatility studies is due to risk assessment of any security or market. There has been extensive debate on derivatives trading (index futures and index options) and its impact on the underlying spot market. The general perception about derivatives is that they have increased stock prices but there is no common agreement among researchers due to mixed empirical evidence. Impact of introduction of derivatives security (futures and options) on the underlying spot market is a less researched area and there is a little consensus among researchers and practitioners on this issue. Therefore, due to differences in theoretical framework and varied empirical findings, there is no unanimous conclusion that futures trading has stabilized or destabilized the spot market.

Future contracts are introduced in the stock market for managing and minimizing risk in the underlying spot market. Single stock futures are contracts which are traded on stock exchanges. These contracts are future commitments to buy or sell shares at a fixed rate of any specific listed company. Single stock futures are part of derivatives and their price is dependent on

ordinary shares. As these contracts expires, the holder of the contact buys at predetermined price from the seller. This type of physical delivery contracts is called deliverable futures contracts. Determination of gain or loss is done on expiration of contracts. The difference between the spot and futures price is the actual gain or loss of the contract. Nowadays, cash settles futures contracts are available in which daily settlement of contracts is done by the stock exchange.

The link between the spot and futures market can be explained by cost of carry concept. Strong (2005) defined this concept as, " net cost incurred for carrying an asset forward in time". There are two types of net costs, one is carrying returns (dividends) and other is carrying charges (interest).The fair value of future contract is determined by the spot price of underlying asset and cost of carry. This concept has established the link between two markets. Futures contract price is function and dependent on the underlying spot price. It is plausible that a reciprocal relation exists between two markets.

Introduction of single stock futures has given the opportunity to researchers for re-investigating futures trading comprehensively. Stock futures offer direct assessment of probable impact on underlying shares. Market-wide impacts of futures trading can be assessed by index futures whereas companywide impacts can be assessed by single stock futures.

Contextual Analysis

Pakistani stock market comprises of three stock exchanges. Karachi Stock Exchange (KSE) is the largest and oldest exchange. KSE is the most liquid and active exchange in Pakistan. KSE was established in 1947. and provides products like ready market, index futures and stock futures. Trading in stock futures started in July 1, 2001 and Index futures started in April 1, 2008. Pakistani stock market has faced many problems in its development like other developing countries. From the last few years, KSE has witnessed extra-ordinary volatility, and it is considered one of the most volatile markets in the world. Stock futures trading in Pakistan started with ten companies in 2001, and they have increased to forty six companies in 2008 (Khan, Shah and Abbas, 2011).

Significance of the study

Traditionally, futures markets are considered more volatile than the spot market. The close linkage between the two markets creates the risk transfer possibility from one market to another. Previous researches reported different findings about futures trading. Some documented increase in volatility, some stated decrease in volatility and other supported mixed results. As there is no consensus among researchers on this issue, so a study is needed on this important issue in finance. The research on single stock futures in Pakistan has got less attention of researchers. This study fills this gap by adding to existing body of knowledge. Past studies on volatility effect of SSF's contracts on the underlying spot market were investigated in developed countries, but few studies conducted in the developing country like Pakistan. This study will be good addition from developing country perspective to this new area of research. This study will analyze companywide impacts rather market-wide impacts, so direct evaluation of possible effect can be reported. This study will be helpful to various stake-holders such as practitioners, academics, investors and regulators.

Problem statement

Futures markets are considered more volatile than the spot market, so they can be a source of volatility for spot market. As futures trading can increase volatility in the underlying spot market, a study is needed to investigate whether stock futures increase or decrease spot market volatility. The impact of stock futures trading on the underlying spot market has not been investigated comprehensively by researchers. Research on this area in Pakistan is very little and by no means exhaustive.

Aim of this research

The aim of this research is to determine the impact of introducing single stock futures on the volatility of the security.

Research objectives

This study intends to achieve following objectives:

1. To study the changes in the volatility level after the introduction of single stock futures trading in Pakistan.
2. To investigate changes in volatility structure after single stock futures trading in Pakistan.

Research Question

To what extent single stock futures impact underlying spot market volatility?

Delimitations of study

- This study investigated only Pakistani context.
- Sample firms included on the basis of data availability.
- This study will be delimited from July 1, 2001 to December, 2010.

Literature Review

Over the years, two views about derivative markets have been developed to clarify why derivative trading may affect the spot market volatility. This discussion focuses on the arbitrage activities which links the derivatives market with spot market. These contrasting views depend on the assumptions regarding arbitrageurs. A key assumption made about derivative trading is whether they bring informed or uninformed traders to stock market. One view is pro-derivative, stating that derivatives trading bring informed traders to market and these informed traders will bring efficiency and lowers volatility in underlying market. Second view is anti-derivative, stating that derivative trading has brought speculators which are involved in massive and irrational speculative activities (Robbani and Bhuyan, 2005).

Derivative markets have several advantages as compared to trading in spot market. Main benefits are low transaction cost, high leverage and greatest liquidity. Futures trading allow

investors to take market-wide exposure with low transaction exposure. Investors take large positions in futures trading as compared to spot market. The advantage of high degree of leverage provided by futures trading can attract uninformed traders or speculators to both markets. These uninformed and irrational traders for their short-term profits can increase the volatility of underlying market. Futures markets are affected by this speculation due to low transaction costs. These uninformed traders or irrational speculators trading in futures market can destabilize underlying spot market. This view is known as anti-derivative or destabilizing effect of futures market.

Robbani and Bhuyan (2005) differentiate between informed and uninformed trader. Informed traders carry out arbitrage activities and uninformed trader involves in speculative activities. Increase in informed traders attracted to the markets will increase trading volumes and lead to lower volatility in underlying spot market. This is Pro-derivative view or stabilizing effect of futures trading. This view remains intact if no trading volumes are transferred to futures markets. If the trading volumes diverts, it can lead to low trading volumes and increased volatility in spot market. Faff and Hillier (2003) stated that if there are new financial innovations like derivative products, the informed traders can be attracted to futures market due to low transaction cost and high leverage. Trading volumes would be diverted to futures market and lead to destabilization of spot market.

Peat and McCorry (1997) were pioneer researchers on single stock futures. They have opposite view to this discussion of future trading leading to market stabilization or destabilization. After the advent of stock futures if market moves towards stabilization or completion; there would be increase in share prices resulting in low required rate of returns, increase in trading volumes and decrease in spot market volatility. If market is destabilized after the advent of stock futures; there would be decrease in share prices resulting in higher required returns, decrease in trading volumes due to migration towards futures markets and leading to increase in spot market volatility.

Decreased volatility due to futures trading

Elfakhani and Chaudhury (1995) studied the effect of introduction of options on Canadian spot market. They claim that there was a reduction of risk in both total risk and systematic risk in early 1970s due to options trading. They observe that in late 1980s, near the market crash of 1987 the systematic risk of underlying individual equity shares was increased due to listing of options contracts. It was concluded that options listing has been stabilizing effect on the underlying spot market except for the market crash of 1987. Chatrath, Ramchander, and Song (1995) test the hypothesis that "does option trading increase the spot market volatility or not" in US market. Their result exhibited that options trading has reduced volatility in spot market but increased volatility of spot market has increased volatility in options trading. Overall, the options trading have reduced risk in the underlying market. A paper by McKenzie, Brailsford and Faff (2000) find significant and prominent reduction in unconditional volatility and decline in systematic risk. There was slower incorporation of information in prices, shorter impact of old news and lower effect of persistence of shocks. Bologna and Cavallo (2002) attempted to study whether Stock Index Futures Contract (SIFC) reduced volatility of stock market or not? The study observed reduction in volatility and increased efficiency of spot market due to SIFC. This evidence was

supported by decrease in unconditional volatility. Results revealed that new information was being incorporated more rapidly in prices (more clustering), but this impact was not long-lasting (less persistence). The persistence of shocks (ARCH + GARCH term) was also declined from pre to post period, which strengthens stabilizing hypothesis of futures trading. Ang and Cheng (2005) attempt to investigate whether financial innovation's introduction can improve market efficiency or not. They tested market efficiency by applying a "specific announcement of news". If there were few excess unexplained post listing price changes of SSF firms, then market is efficient. Their results supported that market become efficient after SSF trading. They attributed market efficiency to increase trading in futures market, high leverage and low transaction cost, which benefited arbitrageurs rather than speculators. Mazouz and Bowe (2006) investigated volatility effect of SSF's contract on London's stock exchange. There was the reduction in unconditional volatility and systematic risk. Due to futures trading, the current news is incorporated in prices more rapidly, shorter impact of old news and lower shocks effect. Drimbetas, Sariannidis and Porfiris (2007) reported effect of the index futures contract on the underlying equity market in Greece. They used FTSE/ASE twenty as the underlying index. The period of study was 1997-2005. Exponential GARCH model was adopted for volatility analysis. There was the reduction in volatility post futures trading and no change was seen in the structure of volatility. However, unconditional volatility decreased after introduction of futures. De Beer (2008) investigated single stock futures effect on South African stock market. The volatility of underlying equity market was reduced and there was no change in systematic risk. There was faster incorporation of new news, shorter impact of old news and lower shocks effect. Khan (2006) studied futures trading impact on spot volatility in Pakistan. Results support that for incorporating new information, spot market leads the futures market. Futures market is not responsible for the volatility in the spot market. The findings concluded that volatility in the futures market is due to the outgrowth of spot market. Khan and Hijazi (2009) examined single stock futures trading and share price volatility in Pakistan. Results showed that there was a reduction in stock price volatility after introduction of futures trading. However, there was positive relation between spot volumes and spot volatility. This study supports stabilizing effect of futures trading.

Increased volatility due to futures trading

Peat and McCorry (1997) carried out one of the first empirical study on the role of Single Stock Futures (SSF) on Australian spot market. They based their study on existing literature of introduction of options and stock index futures contract on underlying equity market. They tested complete markets theory, diminishing short sales theory and improved information environment hypothesis. Their results contradicted earlier findings of introduction of derivatives trading. Previous studies supported the argument that market becomes complete after introduction of derivative trading. Introduction of options has reported increase in price and volumes but volatility has decreased. However, their study claims that there is no effect on price but increase in volumes and volatility. According to the study by Smit and Nienaber (1997) on "futures trading activity and stock price volatility in South Africa, "Futures trading activity refers to volume and open interest on the stocks." They applied regression for analysis. Results depicts that more activity in futures leads to more volatility in the underlying spot market. Swart (1998) conducted a research on impact of index futures on the volatility and liquidity on underlying Johannesburg Stock Exchange (JSE) in South Africa. Increase in volume and volatility in the underlying market was due to increase in index futures trading. Butterworth (2000) supported the argument that futures trading

have changed the structure and level of volatility of spot market. There was less volatility clustering but more volatility persistence in returns after introduction of futures trading. There was a considerable increase in constant term but huge rise in unconditional variance in variance equation. They concluded futures have beneficial effect on spot market. Faff and Hillier (2003) analyzed "complete markets, improved information environment and diminishing short sales theory on options introduction" in United Kingdom. They constructed a sample of eighty six companies involved in options trading. The sample period of study was 1978-1999. The price effect was tested by event study methodology. The abnormal returns were calculated through market model. Positive abnormal returns were seen after introduction of options trading but there was not visible pattern over the period of time. Volume effect was estimated through dummy variable regression. This analysis suggests that there was rise in level of trading volumes following introduction of options trading. Volatility effect was measured through dummy variable regression. Results show that there is rise in the level of volatility post options trading. Bae, Kwon and Park (2004) studied the effect of futures trading on stock market efficiency and volatility in Korean context. They used a sample consisting of KOSPI 200 and control sample. The period of study was 1990-1998. Dummy variable regression was used for volatility analysis. Results showed that destabilizing effect and increase in volatility of underlying spot market. Aitken and Segara (2005) studied initiation impact of Australian warrants on underlying individual equity shares. Returns of shares showed a decline after introduction of warrants. Both volume and volatility of spot market rose after initiation of warrants. Ahmad, Shah and Shah (2010) conducted a research on impact of futures trading on spot price volatility in Pakistan. The returns showed both clustering and persistence. Kse-100 was found to predict both spot and futures market. However, Spot and futures market do not Granger cause each other but also the market index. All markets were found highly volatile in nature and that was the cause of increased volatility for one another. Consequently, this study supported destabilizing hypothesis of futures trading in contrast to previous studies in Pakistan.

Mixed evidence of futures trading

Oehley (1995) investigated the impact of introduction Stock index futures contract (SIFC) on the underlying market index in South Africa. Results did not provide any evidence that introduction of futures trading increased volatility. The general increase in share market volatility was due to 1987 market crash. However, SIFC was not attributed for increasing volatility of index. Darrat and Rahman (1995) substantiated evidence from U.S market about "futures trading and its impact on share price volatility. They reported that futures trading had not increased volatility of underlying equity market. There was evidence of spike volatility in the sample period, but it was not attributed to futures trading. Hence, volatility of Over the Counter (OTC) index and term structure was responsible for volatility in stock prices. Parsons (1996) studied futures trading and its impact on the cash (spot) market in the context of South Africa. The results depicted that there was no increase in volatility of underlying indexes, which supported stabilizing effect of futures trading. Vanden Baviere and De Villiers (1997) studied "stock price volatility after the introduction of Index futures". The findings did not provide any evidence for increased to the level of volatility of firms that were constituent of the market index. Lee and Tong (1998) analyzed emergence of Individual Stock Futures (ISF) contracts in the Australian equity market. They reported that increase in the level of volumes and no effect on volatility due to introduction of stock futures. Their studied suggested increase in volumes due to more participation of firms

because future trading expanded investment opportunities and resulted into risk reduction. Dennis and Sim (1999) computed volatility of introduction of ISF contracts on Sydney future exchange. Their findings exhibited that trading in the spot market has the huge effect on the volatility of spot market rather than trading in the futures market. Consequently, they substantiated that there is minor effect of beginning of ISF contracts on the volatility of cash market. A paper by Kruger (2000) on index futures and stock price volatility in South Africa suggested that futures trading did not increase volatility in equity indices. As the date of expiration of a futures contract is near, there is an increase in futures trading. Hung, Lee and So (2003) conducted a research on impact of SSF contracts listed in foreign stock exchanges on the underlying domestic equity market. They find evidence that SSF contracts listed in foreign countries are increasing volatility on an underlying domestic equity market. Moreover, the daily shock in foreign listed SSF firm is increasing conditional volatility in their respective home underlying equity market. Besides, reduction in conditional volatility was seen as a result of high variable and predictable activity across the days. There were no differences in unconditional volatility from pre to post futures period. There was slower incorporation of information in prices, shorter impact of old news and lower shocks effect. Mazouz (2004) in his study on the effect of equity options introduction on NYSE (United States). The study adopted GARCH model. Findings show no effect of equity options on both unconditional and conditional volatility. Kumar and Mukhopadhyay (2004) examined futures trading and its impact on the underlying Indian equity market. There were no-effect index futures trading on both average and additional level of volatility. The new information was being incorporated in prices but old information, and shock's effect was less persistent. A study by Robbani and Bhuyan (2005) on the volume and volatility effect of futures and options trading on stock market index of United States investigated thirty companies that are part of DJIA index. The sample period was 1989 to 1994. For analysis they applied t-test, f-test, Wilcoxon signed rank test, Parkinson's estimator and GARCH for time varying volatility. Returns of all underlying firms showed no effect as result of derivative trading. However, trading volume of twenty three companies tend to increase after derivative trading. There was increase in conditional volatility post futures and options trading but there was no increase in unconditional volatility. There was faster incorporation of new news and longer impact of old news which results in higher shocks effect. Chau, Holmes and Paudyal (2005) studied cross border and domestic listing of SSF contracts on underlying market volatility and feedback trading in UK. The findings reported improvement in market efficiency; reduce volatility in the underlying and little decrease in level of feedback trading. They were obvious differences among industries in terms of market dynamics. Positive impact on the underlying market from pre to post period is not related to futures trading. A constant component was used to model serial auto-correlation presented in the possible market in-efficiency. The improvement in efficiency was due to reduction in that component. Clarke, Gannon and Vinning (2007) analyzed introduction warrants in Australian stock market. It was seen that there was no difference in volatility after warrant's introduction. Recently, a paper by Khan, Shah and Abbas (2011) explored single stock futures trading and its impact on stock prices. Both traditional and econometric analysis depicts mixed results. GJR-GARCH analysis showed limited and fractional decrease in volatility for both SSF firms and control sample. Thus, this partial reduction can be attributed to other markets wide factors but not to futures trading. Consequently, majority of past studies suggest that derivative trading no effect on volatility of underlying spot market. Majority of past studies on single stock futures are conducted in United States, United Kingdom, Australia and South- Africa. Majority studies find that there is mixed evidence on volatility. Previous researches on derivatives trading like warrants, options and stock

index futures contract provided varied and indecisive results. In Pakistan, most of the studies focused on futures trading and some of them investigated single stock futures. Generally, there is no conclusive study on futures trading.

Theoretical framework

Complete Markets hypothesis, the Diminishing Short-Sales Restrictions hypothesis and the Improved Information Environment hypothesis by Ross (1976), Miller (1977), DeTemple & Seldon (1991) and Figlewski & Webb (1993). These all theories provided a conceptual framework about impact of option introduction on the underlying spot market.

Theory of complete markets by Ross (1976) and Arditti & John (1980) states that options introduction has increased the opportunities for investors in terms of risk/return patterns. Options have provided more favorable and attractive positions for investors as they were not available prior to their introduction. Expansion and improvement in opportunity set will increase the demand of shares and as a result there is an increase in equilibrium prices.

The diminishing short sales theory states that the options introductions can make markets complete by allowing the short positions. These synthetic short positions allow investors who have the negative view on shares, so they can trade on their information which they were not allowed previously without options. Informational efficiency is restricted by short sales constraints and negative information cannot be incorporated in prices (Miller, 1977). In this situation only optimistic investors will buy shares, there would be an imbalance in supply-demand and as a result there would be increased in equilibrium prices. As there is availability of short positions in the derivative market which resulted in supply-demand imbalances. These imbalances are corrected by arbitrage and there is a decrease in prices.

Improved information environment hypothesis has many dimensions and there is no sole statement by theorists on it. It favors the removal of the short sales-hypothesis, by which informed traders having negative information can trade and get profit from better information than others. Another dimension of this theory states that introduction of derivative trading will bring the increase in analyst and coverage of media and this change the investment mix (insider traders/speculators/uninformed traders) in underlying stock.

The vast amount of past studies on the area of impacts of derivative trading on the underlying equity market is based on futures introduction, with limited studies available on introduction of single stock futures trading. Besides, most of the past studies on derivative trading and their impact on the underlying spot market are based on options introduction. Both single stock futures and options are from same category of derivatives, so they share similar characteristics with different patterns of returns and leverage, but we assume theories to hold for them.

Research Methodology

Data and sample

Firstly, the sample of the study was filtered by particular criteria. The selection criterion of SSFs is following: (i) Any SSFs delisted during the sample period was excluded from analysis. (ii) A stock must have 500 days of spot price data for both pre and post event. Secondly, sample time period of analysis was determined from past studies. In previous studies, time period selected was varying from three months to three years. So, to avoid any bias in study researcher has selected two year pre and post data for SSFs. Trading in individual stock futures on the Karachi Stock Exchange commenced in July 2001. The sample period of this study begins July 1, 2000 and ends December, 2010. Till June (2008) forty six single stock firms were identified by Khan, Shah and Abbas (2011). Twenty four firms. Daily closing share prices were obtained from the online database of Karachi Stock Exchange for a period of one year prior, to one year after the listing of each stock, yielding more than 500 daily observations per stock for each of the sub-periods.

Hypothesis

H0: Introduction of Single stock futures has no impact on the underlying volatility.

H1_A: Introduction of Single stock futures causes either a positive or negative impact on the underlying volatility.

Data analysis techniques

Calculation of Returns

This study uses the following formula for calculating returns for each stock:

$$R_{it} = \ln\left(\frac{P_t}{P_{t-1}}\right) \text{----- (1)}$$

R_{it} = Return of security i in period t

P_t = Closing price of security i on day t

P_{t-1} = Closing price of security i on the day $t-1$

Volatility effect

Volatility is statistical measure used to capture the tendency of any security or market to sharply rise or fall over period of time. It is widely used in finance studies. It is used as a proxy for assessing risk in any security or market. Volatility can be measured by standard deviation, variance and beta.

According to the framework provided by major theories, the probable effect of stock futures trading on the underlying spot market is provided as follows:

Expected change in underlying spot market			
Characteristic	Complete market's theory	Diminishing short sales restriction theory	Improved Information Environment hypothesis
Volatility	Lower	Lower	Lower

Source: Clarke, Gannon and Vinning (2007)

Firstly, F-test for differences in variance was used for preliminary investigation of volatility. Secondly, Generalized Autoregressive Conditional Heteroskedasticity (GARCH) was employed as major methodology for capturing changes in conditional volatility.

F-test of difference in Variance

Variance is a measure of volatility. Larger the variance among the returns represents higher volatility and more riskiness of the security or market. It is calculated as a mean sum of squares of difference between values and means of security sample. F-test is a traditional measure to examine changes in volatility (unconditional variances). It is applied to the ratio of pre-SSFs versus post-SSFs.

$$F - test = \frac{S_1^2}{S_2^2} \text{-----} (2)$$

S_1^2 = Pre-event variance

S_2^2 = Post-event variance

Auto-regressive conditional heteroskedasticity

The assumptions of OLS regression are expected value of residuals should be zero, constant variance of residual terms and no auto-correlation in the data series. The constant variance assumption of error terms is also known as homoskedasticity. The basis of ARCH or GARCH modeling is the violation of homoskedasticity assumption. The ARCH effect is present in time series that has not been constant variance (heteroskedastic).

Autoregressive conditional heteroskedasticity (ARCH) is a condition when variance of error terms in one period is dependent on variance of error terms in the previous period. In this situation, hypothesis test of regression coefficients and their standard errors will be invalid. ARCH or GARCH modeling considers heteroskedasticity not a problem which is to be corrected but rather variance included in modeling (Engle, 2001). ARCH/GARCH models have corrected OLS deficiencies with meeting required assumptions. The features of GARCH models, they have constant unconditional variance, conditionally heteroskedastic and mean reverting.

Engle (1982) introduced ARCH modeling. These models are particularly designed for modeling and forecasting conditional volatility. Bollershev (1986) introduced GARCH (Generalized ARCH) modeling. In ARCH model, dependent variable variance is included in the model as a function of independent variables and its past values. In GARCH (p,q) model, conditional volatility (variance) is a function of lagged terms of conditional variance and past squared error terms.

Engle (2001) stated standard GARCH (p, q) has two standard terms. The first term (p) shows the number of ARCH terms (autoregressive lags included in the model), and second term (q) shows GARCH terms(number of moving average lags).GARCH(1,1) refers to existence of ARCH and GARCH term of first order. Volatility clustering is captured by GARCH models. According to Engle (1993), volatility clustering is referred as high volatility followed by more tranquil periods of low volatility.

GARCH (1,1) Model

Basic GARCH (1,1) specification:

Mean equation

$$y_t = \alpha + \beta y_{t-1} + \varepsilon_t \dots \varepsilon_t(o, h_t)$$

y_t = return on security

α = constant

βy_{t-1} = Autoregressive coefficient and explanatory (lagged) variable

ε_t = residual term

Variance equation

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1} \dots \omega > 0, \alpha > 0, \beta \geq 0$$

Unconditional constant variance of error term

$$\text{var}(\varepsilon_t) = \frac{\omega}{1 - \alpha - \beta}$$

h_t = Conditional variance in period t

ω = Constant (long-term average)

$\alpha \varepsilon_{t-1}^2$ = News coefficient and ARCH(1) term

βh_{t-1} = Persistence coefficient (old news and GARCH(1) term)

Source: Brooks (2008)

The variance equation consists of three terms:

- constant: ω
- information regarding previous period volatility (ARCH term)
- forecasted variance of last period (GARCH term)

Source: Eviews (2007)

Current asset price is explained by auto-regressive component in the mean equation. In variance equation, error terms are modeled to be time-varying rather than constant. The parameters of GARCH(1,1) show that current volatility is a function of past squared error terms and an auto-regressive component of the conditional variance. Engle (2001) states that for a mean reverting variance process the parameters estimated from GARCH model should be positive and their value should not be greater than one.

De Beer (2008) states GARCH equation has two main effects. Firstly, impact of recent information to market (ARCH effect) and the effect of old information to market (GARCH effect). It is important statistically to know that whether recent news is important than old news to the market. The detection of current and lasting impact is measured by the changes in the size of ARCH and GARCH effect. The volatility persistence can be measured by adding two effects.

De Beer (2008) states that a sample will follow volatility clustering and persistence if both ARCH and GARCH terms are significant. This volatility clustering and persistency process shows that if there is a shock in stock prices, it will persist for many successive periods. A shock or jolt in share prices will last for a short period if the ARCH and GARCH terms are insignificant.

In the same way, if there is an increase (decrease) in ARCH (1) term from the pre-event sub sample to post-event sample, then there is faster (slower) dissemination of information (news) on the stock prices. If there is an increase (decrease) in GARCH (1) term from the pre-event sub sample to post-event sample, then there is the long-lasting effect of old news on share prices. The auto-regressive root which is the sum of ARCH plus GARCH term values, it shows the tendency of specific stock to show the impact and after effect of jolt or shock on the price. AR root show the persistence of shocks.

ARCH (1) and GARCH (1) effects are tested separately for pre-event sub sample and a post-event sub sample. Change in unconditional variance can be measured by introducing a dummy variable in conditional variance equation. Dummy variable for the pre-event it is zero and post-event is one. Futures trading will increase (decrease) volatility if there is a significant positive (negative) dummy variable coefficient.

Variance equation, including Dummy variable

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1} + \delta D_F$$

$$\text{var}(\varepsilon_t) = \frac{\omega + \delta}{1 - \alpha - \beta}$$

δ = coefficient

D_F = dummy variable

Results and Discussion

1.1 Descriptive statistics of Pre and Post event period of individual shares

		Mean	Median	Std. Dev.	Skewness	Kurtosis	J.B.(P- value)
ENGRO	PRE	-0.001	-0.002	0.029976	-0.128	11.56474	0.000
	POST	0.000997	0.000614	0.024221	-0.004	6.013720	0.000
FABL	PRE	0.002103	0.001458	0.027585	-0.471	7.949325	0.000
	POST	0.001521	0.001356	0.029189	-1.262	10.15042	0.000
FFBL	PRE	0.003289	0.000000	0.041945	0.345826	7.808736	0.000
	POST	0.001407	0.000000	0.025513	0.339097	4.134581	0.000

FFC	PRE	0.000	0.000000	0.027886	-1.666	43.28937	0.000
	POST	0.002134	0.001447	0.020634	-0.270	5.836772	0.000
HUB	PRE	0.000635	0.000000	0.030108	0.139531	6.856852	0.000
	POST	0.001552	0.001992	0.027161	-0.744	9.792955	0.000
KESC	PRE	0.001173	0.000000	0.034128	1.215301	8.635981	0.000
	POST	-0.002	0.000000	0.029418	0.819180	8.233262	0.000
LUCKY	PRE	0.002804	0.000000	0.028679	0.347713	3.876507	0.000002
	POST	0.002092	0.002304	0.027287	-0.051	3.494917	0.069852
MPLF	PRE	0.003163	0.000000	0.032238	0.377267	3.523883	0.000152
	POST	-0.001	0.000000	0.027643	-0.069	3.532435	0.042739
NML	PRE	0.001104	0.000000	0.037895	-0.988	12.99042	0.000
	POST	0.001639	0.000000	0.033319	0.335330	4.906277	0.000
PIA	PRE	-0.002	0.000000	0.030568	-0.061	4.965522	0.000
	POST	0.002502	0.000000	0.042873	0.974915	7.807721	0.000
PIOC	PRE	0.003450	0.000000	0.032683	0.104470	5.874602	0.000
	POST	-0.002	-0.002	0.029352	-0.086	3.034602	0.723754
PSO	PRE	0.000637	0.000275	0.027285	-0.123	10.57158	0.000
	POST	0.001362	0.000623	0.026797	-0.095	5.823495	0.000
PTCL	PRE	0.000	0.000000	0.022892	0.125436	8.996783	0.000
	POST	0.001181	0.000000	0.024341	-0.142	7.297403	0.000
SNGP	PRE	0.000303	0.000000	0.035134	0.280865	10.54835	0.000
	POST	0.002487	0.000000	0.029891	-0.185	7.444145	0.000
SSGP	PRE	0.001921	0.000000	0.025665	0.237348	4.508559	0.000
	POST	0.000	-0.002	0.025778	0.055356	3.496147	0.067755
TELE	PRE	0.000688	0.000000	0.030216	0.259989	4.657943	0.000
	POST	-0.001	-0.004	0.035922	-0.886	14.22332	0.000
ABL	PRE	-0.002	-0.001	0.030599	-0.280	4.571490	0.000
	POST	0.001883	0.000000	0.026991	-0.066	4.254456	0.000
NETSOL	PRE	-0.001	-0.002	0.052528	-13.231	250.2266	0.000
	POST	-0.003	-0.005	0.047136	0.745493	9.684422	0.000
FCCL	PRE	-0.001	0.000000	0.026065	-0.124	3.794509	0.000738
	POST	-0.002	-0.003	0.041262	0.012739	8.917209	0.000
CSAP	PRE	0.000109	-0.001	0.028581	-0.817	7.022855	0.000
	POST	-0.002	-0.003	0.034682	-2.018	23.96737	0.000
ATRL	PRE	0.000624	0.000000	0.030562	-0.820	7.005381	0.000
	POST	-0.002	0.000	0.037650	-1.764	14.90924	0.000
PRL	PRE	-0.003	-0.002	0.026916	-0.224	4.243145	0.000
	POST	0.001151	-0.001	0.028255	0.032965	2.669006	0.305289
PICT	PRE	-0.002	-0.001	0.030599	-0.280	4.571490	0.000
	POST	0.001883	0.000000	0.026991	-0.066	4.254456	0.000
WTL	PRE	0.000779	-0.003	0.027665	0.308685	4.098218	0.000
	POST	-0.002	0.000000	0.053642	0.112598	7.240552	0.000

Descriptive Analysis

The descriptive analysis tells us the behavior of data with respect to normality. In majority of cases, Jarque-Berra statistics show that returns are not normal. In post-event period, PIOC and PRL exhibited normal distribution. All the shares show excess kurtosis. Positive excess kurtosis shows leptokurtic behavior of returns. Negative skewness is prevailed in the majority of the shares. Financial data usually exhibit non normal behavior which is also evident in this return series. ADF test is applied for checking unit root in series. If there is unit root, series will be non-stationary, which can lead to spurious results. All the returns are stationary at the level.

To check the conditional volatility, ARCH LM test is applied to detect ARCH effect. It is necessary for return's series to have ARCH effect, so that GARCH (1,1) is applied. The study collected data of 41 shares two years pre and post data of Single stock futures firms from July 1, 2001 until December 30, 2010. Out of 41 shares, 27 shares exhibited ARCH effect but three companies were excluded for analysis because of violations of GARCH assumptions. A final sample of 24 shares is included for analysis.

Table 1.2. Stationary of returns

	Full period		PRE		POST	
	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
ENGRO	29.4449	0.0000	20.6093	0.0000	20.9949	0.0000
FABL	27.6713	0.0000	20.5057	0.0000	18.6759	0.0000
FFBL	33.0237	0.0000	24.2463	0.0000	21.5013	0.0000
FFC	33.7869	0.0000	25.3862	0.0000	21.4462	0.0000
HUB	30.2433	0.0000	21.2833	0.0000	21.3392	0.0000
KESC	25.0637	0.0000	17.3946	0.0000	18.3587	0.0000
LUCKY	29.1649	0.0000	21.1245	0.0000	19.9003	0.0000
MPLF	-29.709	0.0000	21.2602	0.0000	20.7242	0.0000
NML	-29.981	0.0000	22.0648	0.0000	19.9915	0.0000
PIA	33.8942	0.0000	25.7774	0.0000	23.2023	0.0000
PIOC	26.6361	0.0000	19.2042	0.0000	18.5536	0.0000

			-		-	
PSO	-31.438	0.0000	21.7735	0.0000	22.6163	0.0000
	-		-		-	
PTCL	32.0945	0.0000	23.7087	0.0000	-21.765	0.0000
	-		-		-	
SNGP	31.9307	0.0000	22.0872	0.0000	23.2462	0.0000
	-		-		-	
SSGP	-26.737	0.0000	18.8382	0.0000	18.9401	0.0000
	-		-		-	
TELE	28.2739	0.0000	20.6682	0.0000	19.4902	0.0000
	-		-		-	
ABL	26.8719	0.0000	18.0994	0.0000	20.2883	0.0000
	-		-		-	
NETSOL	25.5238	0.0000	18.6514	0.0000	17.5892	0.0000
	-		-		-	
FCCL	25.0909	0.0000	20.1877	0.0000	18.7955	0.0000
	-		-		-	
CSAP	25.9801	0.0000	20.1524	0.0000	17.1362	0.0000
	-		-		-	
ATRL	23.5107	0.0000	18.7351	0.0000	15.2765	0.0000
	-		-		-	
PRL	23.4802	0.0000	17.4566	0.0000	15.8312	0.0000
	-		-		-	
PICT	26.8719	0.0000	18.0994	0.0000	20.2883	0.0000
	-		-		-	
WTL	32.3585	0.0000	22.1253	0.0000	23.0351	0.0000

Table 1.3. Pre diagnostic ARCH LM test

S.no	Name	F-statistic	Prob
1	ENGRO	28.76	0.00
2	FABL	4.11	0.04
3	FFBL	14.12	0.00
4	FFC	145.90	0.00
5	HUB	88.88	0.00
6	KESC	100.90	0.00
7	LUCKY	35.06	0.00
8	MPLF	27.01	0.00
9	NML	40.61	0.00
10	PIA	25.43	0.00
11	PIOC	9.74	0.00

12	PSO	17.90	0.00
13	PTCL	27.24	0.00
14	SNGP	4.24	0.04
15	SSGP	91.37	0.00
16	TELE	3.33	0.07
17	ABL	5.31	0.02
18	NETSOL	7.17	0.01
19	FCCL	122.85	0.00
20	CSAP	6.20	0.01
21	ATRL	150.87	0.00
22	PRL	66.36	0.00
23	PICT	20.25	0.00
24	WTL	174.51	0.00

Table 1.4. F-test for difference in variances

Change in standard deviation				
Name	Pre-SSF	Post-SSF	Change	P-value
ENGRO	0.00090	0.00059	-0.00031	0.0000
FABL	0.00076	0.00085	0.00009	0.1035
FFBL	0.00176	0.00065	-0.00111	0.0000
FFC	0.00078	0.00043	-0.00035	0.0000
HUB	0.00091	0.00074	-0.00017	0.0108
KESC	0.00116	0.00087	-0.00030	0.0005
LUCKY	0.00082	0.00074	-0.00008	0.1333
MPLF	0.00104	0.00076	-0.00028	0.0003
NML	0.00144	0.00111	-0.00033	0.0021
PIA	0.00093	0.00184	0.00090	0.0000
PIOC	0.00107	0.00086	-0.00021	0.0083
PSO	0.00074	0.00072	-0.00003	0.3437
PTCL	0.00052	0.00059	0.00007	0.0853

SNGP	0.00123	0.00089	-0.00034	0.0002
SSGP	0.00066	0.00066	0.00001	0.4610
TELE	0.00091	0.00129	0.00038	0.0001
ABL	0.00094	0.00073	-0.00021	0.0026
NETSOL	0.00096	0.00120	0.00024	0.0059
FCCL	0.00068	0.00170	0.00102	0.0000
CSAP	0.00082	0.00120	0.00039	0.0000
ATRL	0.00093	0.00142	0.00048	0.0000
PRL	0.00072	0.00080	0.00007	0.1394
PICT	0.00094	0.00073	-0.00021	0.0026
WTL	0.00077	0.00288	0.00211	0.0000

Decrease in S.D

Increase in S.D.

13

11

s

ns

s

ns

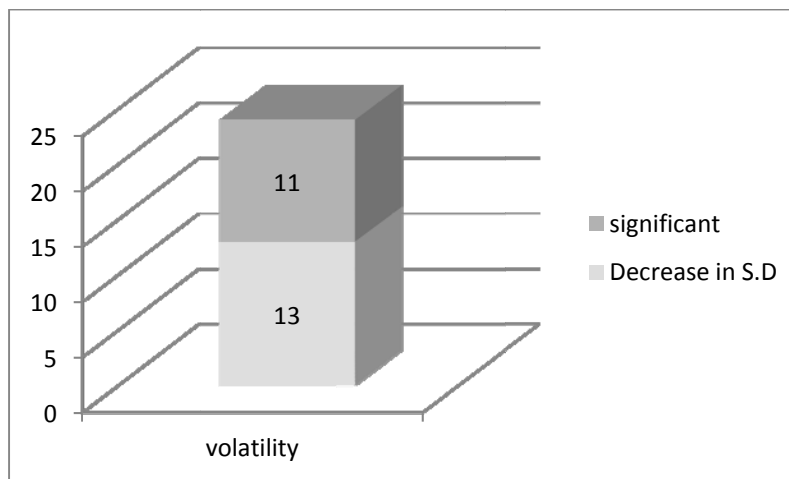
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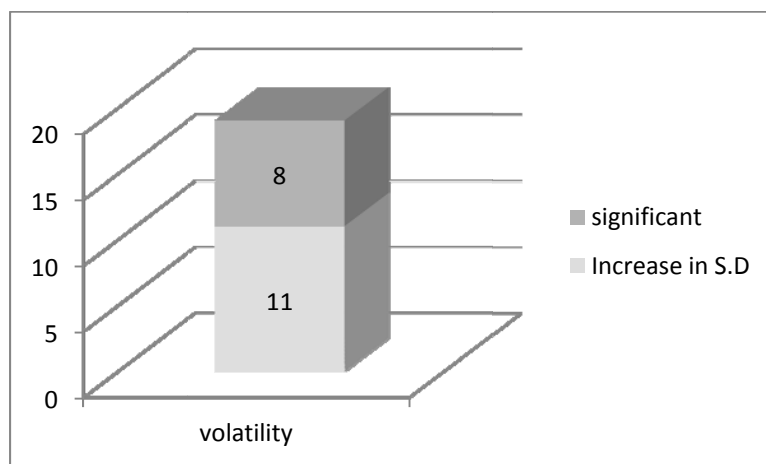
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*s= significant , ns= not significant





F-test analysis

As the results show more decrease in volatility after single stock futures trading, this is in conformance with stabilizing effect of futures trading.

Table 1.5. Individual company's response to stock futures trading

ARCH-GARCH effects		Companies
-	Decrease in ARCH	ENGRO,FFC,SNBP,CSAP,FCCL,NETSOL,ABL.
+	Increase in GARCH	
+	Increase in AR root	
Interpretation		Slower incorporation of news Large impact of old news on volatility Long period of volatility
+	Increase in ARCH	FABL,HUB,LUCKY,MPLF,PIOC,PSO,PTCL,TELE
-	Decrease in GARCH	
-	Decrease in AR root	
Interpretation		Faster incorporation of news

		Small impact of old news on volatility
		Short period of volatility
-	Decrease in ARCH	FFBL,KESC,SSGP.
+	Increase in GARCH	
-	Decrease in AR root	
	Interpretation	
		Slower incorporation of news
		Large impact of old news on volatility
		Short period of volatility
+	Increase in ARCH	NML
-	Decrease in GARCH	
+	Increase in AR root	
	Interpretation	
		Faster incorporation of news
		Small impact of old news on volatility
		Long period of volatility
+	Increase in ARCH	PIA,WTL,PICT,PRL,ATRL.
+	Increase in GARCH	
+	Increase in AR root	
	Interpretation	
		Faster incorporation of news
		Large impact of old news on volatility
		Long period of volatility

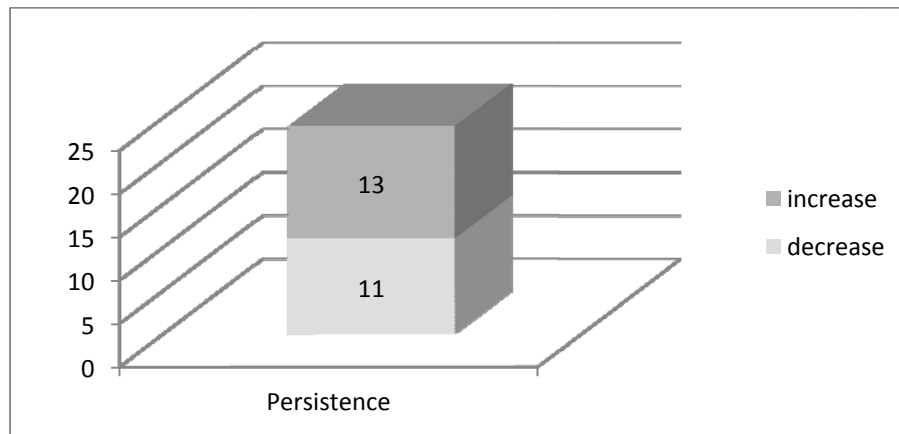
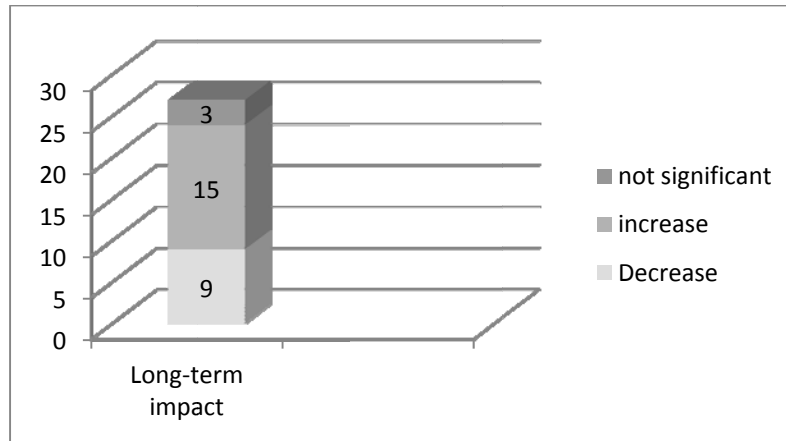
Above table shows the individual company response towards futures trading. These responses are categorized in five different patterns and their interpretation.

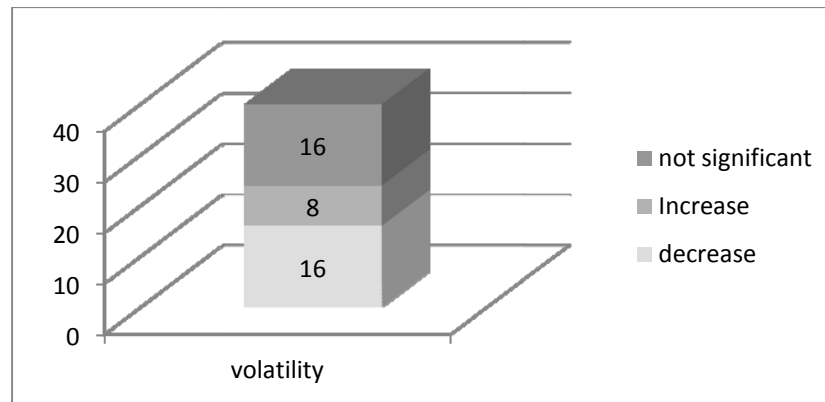
Table 1.6. Summary of GARCH(1,1) analysis

No.	SSF	DF	ARCH	GARCH	AR root
1	ENGRO	-	-	+	+
2	FABL	-	+	-	-
3	FFBL	-	-	+	-
4	FFC	-	-	+	+
5	HUB	-	+	-	-
6	KESC	-	-	+	-
7	LUCKY	-	+	-	-
8	MPLF	-	+	-	-
9	NML	-	+	-	+
10	PIA	+	+	+	+
11	PIOC	-	+	-	-
12	PSO	+	+	-	-
13	PTCL	+	+	-	-
14	SNGP	-	-	+	+
15	SSGP	-	-	+	-
16	TELE	+	+	-	-
17	WTL	+	+	+	+
18	PICT	-	+	+	+
19	PRL	-	+	+	+
20	ATRL	-	+	+	+
21	CSAP	+	-	+	+
22	FCCL	+	-	+	+
23	NETSOL	+	-	+	+
24	ABL	-	-	+	+

Spot volatility		Dissemination rate		Long-term impact		Persistence of shocks	
Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase
16	8	10	14	9	15	11	13
s	ns	s	ns	s	ns	s	ns
3	13	5	3	9	1	14	-
8	1	13	2				

*s=significant , ns= not significant





GARCH (1,1) analysis

A statistically significant decrease was experienced by the majority of companies with only five shares showed a statistically significant increase in volatility. Fourteen shares showed a significant increase in the rate of news incorporation as compared to nine shares showing significant decrease in dissemination rate. Similarly, there was a significant increase in long-term impact of thirteen shares with eight showing decrease in old news impact. Increase in news incorporation in prices and long-term impact of old news lead to increase in persistence of shock effect in thirteen shares. ARCH LM test is applied again to check remaining ARCH effect. In all the shares, there was no ARCH effect left over.

Table 1.7. Post diagnostic ARCH LM test

	FULL		PRE		POST	
Name	F-statistic	Prob.*	F-statistic	Prob.*	F-statistic	Prob.*
ENGRO	0.28363	0.5945	0.101817	0.7498	0.270438	0.6033
FABL	8.12E-05	0.9928	0.056489	0.8122	0.270438	0.6033
FFBL	0.500265	0.4795	0.714687	0.3983	0.043029	0.8358
FFC	0.011526	0.9145	0.002426	0.9607	0.145052	0.7035
HUB	0.092346	0.7613	0.110351	0.7399	0.132487	0.716
KESC	0.297581	0.5855	0.387924	0.5337	0.005348	0.9417
LUCKY	0.018597	0.8916	0.12658	0.7222	0.069259	0.7925
MPLF	0.038806	0.8439	0.006397	0.9363	0.059263	0.8078
NML	2.27312	0.132	1.121221	0.2902	1.030216	0.3106
PIA	0.825346	0.3638	0.377225	0.5394	0.365154	0.5459
PIOC	0.020692	0.8856	0.011685	0.914	0.16592	0.6839

PSO	0.009179	0.9237	0.068158	0.7941	0.460655	0.4976
PTCL	0.001008	0.9747	0.001533	0.9688	0.002449	0.9605
SNGP	0.60092	0.4384	0.720607	0.3964	0.012194	0.9121
SSGP	0.054115	0.8161	0.073785	0.786	0.029758	0.8631
TELE	0.112181	0.7377	1.17E-05	0.9973	0.051665	0.8203
WTL	0.862318	0.3533	0.116504	0.733	0.742151	0.3894
PICT	0.521795	0.4702	0.498874	0.4803	0.00585	0.9391
PRL	0.006386	0.9363	0.047317	0.8279	1.114346	0.2917
ATRL	0.000899	0.9761	0.088883	0.7657	0.000747	0.9782
CSAP	0.05644	0.8123	0.292578	0.5888	0.025685	0.8727
FCCL	2.606255	0.1068	0.140523	0.7079	10.10767	0.1600
NETSOL	0.008391	0.927	0.076264	0.7825	0.005595	0.9404
ABL	1.904208	0.1679	0.128298	0.7204	1.465631	0.2266

Discussion

This study applied traditional measures of volatility (F-test) as well as econometric techniques (GARCH modeling). Both analyses showed that in the majority of cases, there were mixed effect on volatility after futures trading. It is reasonable to conclude that SSF's trading lead to lower spot market volatility. The results are against complete market's theory, diminishing short sale restriction theory and improved information environment hypothesis, which states that decrease in volatility after derivative trading. This study is aligned with Chau et al.(2005) and Hung et al. (2003). With respect to changes in structure of volatility, the increased rate of news into share prices has been followed by long periods of excessive price movements, which lead to the extended period of volatility. It is therefore concluded that futures trading has attracted both informed as well as uninformed traders. Faster incorporation of news in share price attracted informed traders. Larger contribution of old news to volatility show that uninformed traders are attracted towards futures markets. The increase in ARCH and GARCH term resulted in the extended period of volatility (persistence of shocks effect).

Conclusion

Single stock futures lead mixed effect with respect to level of volatility. SSF's contracts altered the structure of volatility with an increase in ARCH term, GARCH term and also Autoregressive term. Increase in ARCH and GARCH term suggests that SSFs has attracted both informed as well uninformed investors who have led to increase persistence of shock's effect. Consequently, this study is aligned with majority of past studies which showed no effect. As this study shows persistency of shocks effect, so strict regulations should be uphold with respect to futures trading.

Recommendations

This study can be extended by analyzing good news and bad news impact on volatility after stock futures trading. Asymmetric models like T-GARCH and E-GARCH can be applied. Sector wise analysis can be conducted to analyze the effect of stock futures on underlying spot prices of the specific sector. 

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ANNEXURE

Sample companies included for analysis

S.No	Code	Company Name	Listing date
1	DSFL	Dewan Salman Fibers Ltd.	1-Jul-01
2	ENGRO	Engro Chemicals Ltd.	1-Jul-01
3	FFC	Fauji Fertilizer Co. Ltd.	1-Jul-01
4	HUBC	Hub Power Co Ltd.	1-Jul-01
5	MCB	MCB Bank Limited.	1-Jul-01
6	NML	Nishat Mills Ltd.	1-Jul-01
7	PIAA	Pakistan International Airline (A)	1-Jul-01
8	PSO	Pakistan State Oil Co Ltd.	1-Jul-01
9	PTCL	Pakistan Telecommunication Ltd.	1-Jul-01
10	SNGP	Sui Northern Gas Pipe Line Ltd.	1-Jul-01
11	IBFL	Ibrahim Fibers Ltd	1-Jan-02
12	FFBL	Fauji Fertilizer Bin Qasim Ltd.	25-Nov-03
13	DGKC	D. G. Khan Cement Co. Ltd.	21-Jun-04
14	SSGC	Sui Southern Gas Co Ltd.	21-Jun-04
15	LUCK	Lucky Cement Limited.	21-Jun-04
16	MLCF	Maple Leaf Cement Factory Ltd.	21-Jun-04
17	NBP	National Bank Of Pakistan	21-Jun-04
18	POL	Pakistan Oilfields Limited.	21-Jun-04
19	AKBL	Askari Commercial Bank Limited.	20-Sep-2004
20	BOP	Bank Of Punjab	20-Sep-2004
21	FABL	Faysal Bank Limited.	20-Sep-2004
22	TELE	Telecard Ltd.	20-Sep-2004
23	KESC	Karachi Electric Supply Corporation	20-Feb-06
24	PIOC	Pioneer Cement Ltd.	20-Feb-06
25	WTL	World call telecom	24-Mar-08
26	AICL	Adamjee Insurance	24-Mar-08
27	ABL	Allied Bank Limited	24-Mar-08
28	AHSL	Arif Habib Sec.	24-Mar-08
29	PKGS	Packages Ltd.	24-Mar-08
30	NRL	National Refinery	24-Mar-08
31	NIB	NIB Bank Limited	24-Mar-08
32	NETSOL	Netsol Technologies	24-Mar-08
33	JSCL	Jah.Siddiq.Co.	24-Mar-08
34	FCCL	Fauji Cement	24-Mar-08
35	CSAP	Crescent Steel SPOT	24-Mar-08
36	ANL	Azgard Nine	24-Mar-08
37	ATRL	Attock Refinery Limited	24-Mar-08
38	SNBL	Soneri Bank	24-Mar-08
39	PRL	Pak Refinery	24-Mar-08
40	PICT	Pak.Int.Con.Ter.	24-Mar-08
41	BAHL	Bank Al-Habib Ltd	24-Mar-08

ARTICLE**Investor Sentiments and Exchange Rate Volatility**

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Abstract

In this paper, we have investigated the role of investor sentiments on the exchange rate volatility in our emerging market. In the past there were many studies that tried to capture the impact of investor sentiments on the stock market returns but the exchange rates are also one of the important economic indicators and is frequently used as the stock market returns and interest rates etc, so we have tried to see the impact of investor sentiments on the exchange rate volatility. The data has been collected from International Monetary Fund website, Karachi Stock Exchange for stock returns and for the purpose to collect various sentimental proxies to measure sentimental index. Also we have not collected exchange rate data in relation to a single base currency rather we have selected a basket of currency i.e., SDR composing mainly of currencies like US dollar, Japanese Yen, Swiss Franc, Pound and Mexican Lira. For empirical testing we have used the sentiment equation mainly composing of six sentimental proxies that are dividend premium, number of initial public issues in a single year, closed end mutual fund discount, first day return on initial public offering, share turnover in Karachi Stock Exchange and equity share in total equity and long term debt issuance. We have run regression on the exchange rate volatility and independent variable was investor sentiment that we have used described above. Before that we also had applied Augmented Dickey Fuller test to check the stationarity and we have applied first differencing to make the time series stationary as in the first level place the series was unit root. Final results confirmed that the investor sentiments did explain the volatility in the exchange rates although the impact is low suggesting that there may be many other factors that explains the variation in the exchange rates.

Introduction

The foreign exchange market is among one of the most active financial markets having sheer volume of trading all over the world. As a result many of the past researchers have paid due attention on the foreign exchange market to examine the questions regarding speculative efficiency. The volatility in the stock exchanges is attributed to the two major yet somewhat contradictory reasons. According to some researchers the major swings in the exchange rates is attributable to the changes in fundamentals where as others argue that sentiments or anomalies of the investors also play major role in these swings in the exchange rates (Froot and Thaler 1990).

The uncovered interest parity i.e. the difference between expected currency depreciation and interest differential implies that the interest differential is an estimate of the future exchange rate change.

The impact of investor sentiments on the stock market and exchange rate volatility has been given importance with the advent of behavioral finance as much of the variance in stock markets and exchange rates is explained by these investor sentiments. In this paper we will try to find whether these sentiments of the investors affect the exchange rate volatility or not. We will use the investor sentiment index that uses six sentimental proxies on which the data has been collected mainly from the Karachi Stock Exchange. Exchange rate volatility will be calculated and regressed with the sentimental equation discussed above as the independent variable. This study will help us to find out the extent to which these sentiments influence the changes in the exchange rates.

Problem Statement

With the increase in international trading, the volatility in the exchange rates has increased to a large extent due to the fundamental as well as behavioral aspect thus raising the importance of sentiments that causes volatilities in the exchange rates.

Research Questions

- To what extent volatility in exchange rate is explained by the investor sentiments
- To highlight the most explanatory sentimental proxies that play crucial role in exchange rate volatility.

Literature Review

With the development of real time information system and reduction in the transaction costs, daily foreign exchange turnover and the volatility in the foreign exchange rates has increased sharply. The increasing level of this foreign exchange turnover shows the large number of small transaction indicating the speculative behavior (Westerhoff 2001).

Economics has a very different perspective especially from the social sciences in a sense that most of the behavior of the agents can be assumed as they make rational decisions and well defined preferences that are very much consistent with the preferences prevailing in the market whereas on the contrary, much of the empirical studies suggest that it is difficult to rationalize (Froot and Thaler 1990).

The debate that either exchange rates are correctly priced or not is very much important as it effects the prices of all the foreign assets, goods and factors of production and also if the argument of Nurske is considered valid that the speculation in the foreign exchange market drives the prices from the fundamental values then the argument for intervention might be considered quite strong in the foreign exchange market (Froot and Thaler 1990). According to Yu (2011), investor sentiments have significant powers in explaining the returns on the foreign exchange. Talking about the irrational approach, an associated term is noise trader approach which says that that not all investors are rational so thus on the whole limiting the arbitrage possibilities, therefore

suggesting that the shifts in the resulting sentiments cause high exchange rate volatility (Westerhoff 2001).

Besides taking the role of investor sentiments, many of the past researches have taken into account factors like macro economic variables, heterogeneous expectations and central bank interventions to model exchange rate dynamics but much little research has been conducted in measuring the impact of market sentiment indicator on the exchange rate volatility (Brauchler 2005). Many of the researches have also focused on the central bank's interventions on the volatility of the exchange rates and as a result of which, many studies have tried to find out the channels through which such intervention might be possible as much of the literature admits that central bank often intervene covertly in the foreign exchange market (Hung 1995).

In the case where the dynamics are dominated by the strategies that are trend followed, leaning against the wind which in case would be the central bank will reduce the volatility of the exchange rates, otherwise when the fundamentalists do not know by themselves the fundamental values of the exchange rates, the leaning against the wind approach will increase the exchange rate volatility (Westerhoff 2001). There have also been opposing views regarding the sterilized intervention on the exchange rate volatility as according to some policy makers such intervention helps to lower volatility whereas on the contrary some analysts suggests that such interventions only create uncertainty and thus volatility (hung 1995). Country specific risks are sometimes thought to play an important role in shaping the behavior of the country's macro economic variables particularly the exchange rates (Huang and Suchada 2003).

In normal setting if the intervention strategies are used to reduce the volatility, then in certain circumstances the shrewdness of such strategies may determine the effectiveness of such strategies and in such a setting where noise trading is efficient in foreign exchange market, the authorities may use the strategies that enhances the volatility to manage the exchange rate level (hung 1995). According to Baker and Wurgler (2006), investor sentiments do represent significant power in predicting the foreign exchange rates and also returns on the foreign exchanges. Noise traders have a major role in the disruption in regularity of the rational investors as their non fundamental knowledge makes it more risky for the arbitrageur, thus having noise impact on the stock market returns and vice versa. These noise traders have no sophisticated or specialized knowledge and their emotions play a major role in their investment decisions in stock markets (Glaser et al 2009).

Many studies in the behavioral finance area tried to bring to surface proxies for investor's sentiments that were thought to play a significant role in investor's decision making regarding the stock returns but in making a comparative analysis of the techniques able to predict stock returns and behaviors, majority of them did not succeed (Lahmiri 2011). Both the associated variables i.e., the true expected growth rate and the sentiments (misperceived growth rate) have sufficient explanatory powers in predicting the changes in the exchange rates. High true expected growth rates predicts lower spot rate in the future whereas high sentiments predicts higher future spot rates

Regression analysis in which both the investor sentiments and forward premium are included to explain the variation in the foreign exchange returns showed greater fitness of model

than does the model in which only forward premium was included as the explanatory variable suggesting that investor sentiments contain information that is not explained by the forward premium (Yu 2011). According to Friedman (1953), as speculators buy low and sell high, This activity ensures that the exchange rates reflect the long term determinants or fundamental currency values, whereas Nurske (1944) suggests that foreign exchange speculation is destabilizing, therefore excess volatility imposes more costs on producers and eventually on consumers as well resulting in decisions that are less efficient allocative (Froot and Thaler 1990).

Hypothesis

H₀: There is no significant relationship between investor sentiments and exchange rate volatility

Research Methodology

As identified in the literature, there can be many proxies that can be included in the sentimental index and many of the previous researchers used different proxies according to their understanding having major impact on stock market returns. In this study six sentimental proxies have been included with permission in the investor sentimental index that has been developed by Shah in unpublished work and these are number of initial public offerings in a year, first day returns on these initial public offerings, closed end fund discount, dividend premium, equity/debt ratio and average daily turnover in Karachi Stock Exchange.

The above mentioned proxies have been included by different researchers in measuring the impact of these proxies. According to Baker et al (2009), low long term returns are suggestive of perfect market timings relative to the market index. Initial public offerings are the number of initial public offerings made during a year. Returns on initial public offerings are the average first day returns on these IPO's during the year. According to Baker and Wurgler (2006), initial public offerings earn sometimes remarkable returns that it becomes very much difficult to define the role of investor's enthusiasm behind it. According to Finter et al (2010), the return on the initial public offering is defined as the difference between the IPO's offer price and the initial price of the stock at the first trading day. Closed end fund discount is defined as the difference between the net asset value of the closed end mutual funds and their market price. The closed end fund discount proxy has been defined by many of the past researchers including Baker and Wurgler (2006), Neal and Wheatley (1998) and Lee, Shleifer and Thaler (1991). According to these researchers, disproportionally holding the closed end mutual funds, the average value of closed end funds may be a sentimental index if the behavior of retail investors is bearish.

Average daily turnover is defined as total volume over the year divided by the total capitalization at the end of the prior year. Baker and Wurgler (2006) defined market turnover as the trading volume divided by the number of shares listed on the stock exchange. We have calculated the turnover of the shares listed on the Karachi Stock Exchange following this definition of Baker and Wurgler (2006).

Dividend premium is defined as the difference between the average market to book values of dividend paying and non paying dividend stocks (Baker and Wurgler 2006). An analogy to the dividend premium is volatility premium is also used by Baker et al (2009) which simply defines

the time when the valuations of the high volatile stocks are high or low as compared to the valuations of the low volatility stocks. Equity to debt ratio has also been used by Baker and Wurgler (2006), and is defined as the proportion of equity issuance to the total equity and long term debt issuance.

The investor sentiment equation resulting from the above mentioned discussion and including all the highlighted proxies is given below.

$$\text{Sentiment Index} = 0.1873\text{DP} + 0.5109\text{NOIPO} - 0.3960\text{CEMFD} + 0.3956\text{FDRIPO} + 0.4672\text{KSET} + 0.4151\text{EQSHARE}$$

Where,

DP=Dividend Premium

NOIPO= Number of initial public issues in a single year

CEMFD= Closed end mutual fund discount

FDRIPO= First day return on initial public offering

KSET= Share turnover in Karachi Stock Exchange

EQSHARE= Equity share in total equity and long term debt issuance

We have applied Factor analysis to formulate this index through Principal Component Analysis and after that we have applied univariate regression to see the impact of this developed Investor sentiment index on the Exchange rate volatility. Also we have used the Augmented Dickey Fuller test to make the time series data of exchange rate stationary and the expression for the ADF is given below.

$$y_t = \theta_1 y_{t-1} + \theta_2 y_{t-2}.$$

The above equation represents the DF test of order 2. Our time series became stationary at first level by taking first difference of it. We have applied co integration test to check the short and long term relationship between the investor sentiments and exchange rate volatility. The expression for the co integration test applied on the two time series is given below.

$$\begin{aligned} & T^{-1} \sum_{t=1}^T X_t^2 - O_p(T) \\ & T(\hat{\alpha} - \alpha) - O_p(1) \\ & T^{-1} \sum_{t=1}^T X_t e_t - O_p(1) \\ & (\hat{\alpha} - \alpha) - O_p(T^{-1}) \end{aligned}$$

Also note that the above expression is for the co integration for the two series that are integrated at order one i.e. AR (1). The co integration test has been applied on these two time series to check the long term relationship between the two time series and also Error correction model has been applied to check the short term relationship as well. Finally we have checked the impulses response of the tow series and it can clearly be seen that the two time series do not

converge considering the short term span but do have a slight convergence over the longer term although the convergence is at its minimum level.

Data Analysis and Interpretation

<i>Descriptive Statistics</i>	<i>Number of IPO's</i>	<i>Descriptive statistics</i>				
		<i>Avg. 1st Day Returns on IPO's</i>	<i>Avg. Daily Turnover</i>	<i>Equity/Debt Ratio</i>	<i>Closed End Fund Discount</i>	<i>Dividend Premium</i>
Mean	3.948	14.966	326.166	28.482	3.537	0.905
Standard Error	0.224	0.601	38.976	0.233	0.235	0.011
Median	3.065	15.314	2.137	29.478	2.201	0.935
Mode	2.044	15.314	0.753	28.874	2.201	0.749
Standard Dev	2.570	6.907	447.798	2.674	2.706	0.126
Sample Var.	6.604	47.709	200,523.477	7.148	7.320	0.016
Kurtosis	-0.021	0.109	0.390	-0.669	0.975	-1.099
Skewness	1.119	-0.949	1.210	-0.919	1.343	-0.537
Count	132.000	132.000	132.000	132.000	132.000	132.000

Table I

The above table shows the descriptive statistics of the data that has been analyzed. The data seems quite normal with the average first day returns on IPO's and Equity /Debt ratio along with the dividend premium negatively skewed. Sample variance of average daily turnover seems quite abnormal due to the tremendous increase in its value from 2007 onwards. The resulting regression equation after making the exchange rate stationery is given below.

Regression Equation

$$Y = \alpha + \beta x + \epsilon$$

Where,

Y=Exchange Rate Volatility

$$x \text{ (Investor's sentiments)} = 0.1873DP + 0.5109NOIPO - 0.3960CEMFD + 0.3956FDRIPO + 0.4672KSET + 0.4151EQSHARE$$

<i>ADF Test Statistics (Levels)</i>				
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	1.84714	0.9676	2	261
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.04457	0.8519	2	261
ADF - Fisher Chi-square	4.80842	0.3075	2	261
PP - Fisher Chi-square	4.31607	0.3649	2	261

Table II

<i>ADF Test Statistics (First Differences)</i>				
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-14.8916	0	2	256
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-12.6812	0	2	256
ADF - Fisher Chi-square	108.119	0	2	256
PP - Fisher Chi-square	150.741	0	2	259

Table III

Before applying regression, we checked the time series for stationarity through the application of Augmented Dickey Fuller test to detect and to remove it. The above table shows that both the time series were non stationery at the first place and had unit root. We have taken first difference of it and then made it stationary and after that we have applied regression to test the model. The above results show that the series after taking first difference is stationary at a high significance level.

Regression Table

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	90.81808	2.173221	41.78963	0.0000
SER01	0.017226	0.003628	4.74733	0.0001
R-squared	0.154855	Mean dependent var		97.53672
Adjusted R-squared	0.147984	S.D. dependent var		19.97621
S.E. of regression	18.43899	Akaike info criterion		8.682682
Sum squared resid	41819.54	Schwarz criterion		8.727935

Log likelihood	-540.6676	Hannan-Quinn criter.	8.701066
F-statistic	22.53715	Durbin-Watson stat	0.045476
Prob(F-statistic)	0.000006		

Table IV

The above table shows the results of regression that has been applied to show the variance of investor sentiments on the exchange rates. The value of R square is 15.48 percent which shows that almost 16 percent of the variance in the exchange rate is explained by the investor sentiments. F value is 22.53 with more 99.9 percent confidence interval which is highly significant showing that the overall model is fit. The value of regression estimator is 0.017 showing that one percent change in investor sentiment can bring a change of 1.107 times in the exchange rate, keeping the value of constant, i.e., 90.82 in the present case, t value in the above model is 4.75 which is greater than 1.96 and having a significance level of 0.0001. Durbin Watson stats show that there is a problem of negative autocorrelation in the above model.

So, our null hypothesis that there is no relationship between investor sentiments and exchange rate volatility has been rejected under the results and analysis discussed above, in fact there can be many other sentimental proxies that we have not included and can produce much greater variance in the volatility of the exchange rates. The above conclusions are made on the portfolio theory which states that the movements in the stock market returns produce much variance in the exchange rate volatility and the results confirm the role of sentiments that play an important role in the changes on the exchange rates.

Hypothesized		Trace			0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value		Prob.**	
None	0.058949	8.055265	15.49471		0.4595	
At most 1	0.003168	0.399786	3.841466		0.5272	

Trace test indicates no co integration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Table V

Hypothesized		Max- Eigen			0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value		Prob.**	
None	0.058949	7.655479	14.2646		0.4148	
At most 1	0.003168	0.399786	3.841466		0.5272	

Max-eigenvalue test indicates no co integration at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level

Table VI

Both of the above tables show that the application of co integration to show the long term relationship between the two series. Both of the above series were non stationary in the first level and the above test has been applied to find out if the resultant series is stationery or not. The statistics of the above table shows that the series are not co integrating as the level of t stats is less than the critical values in both of the above tables showing that there does not exists any long term relationship between the two time series. The results are also not significant at 95 percent confidence interval.

Co integrating Eq:	CointEq1
GARCH01(-1)	1
SENT(-1)	-0.00133
	-0.00048
	[-2.74963]
C	0.428662

Table VII

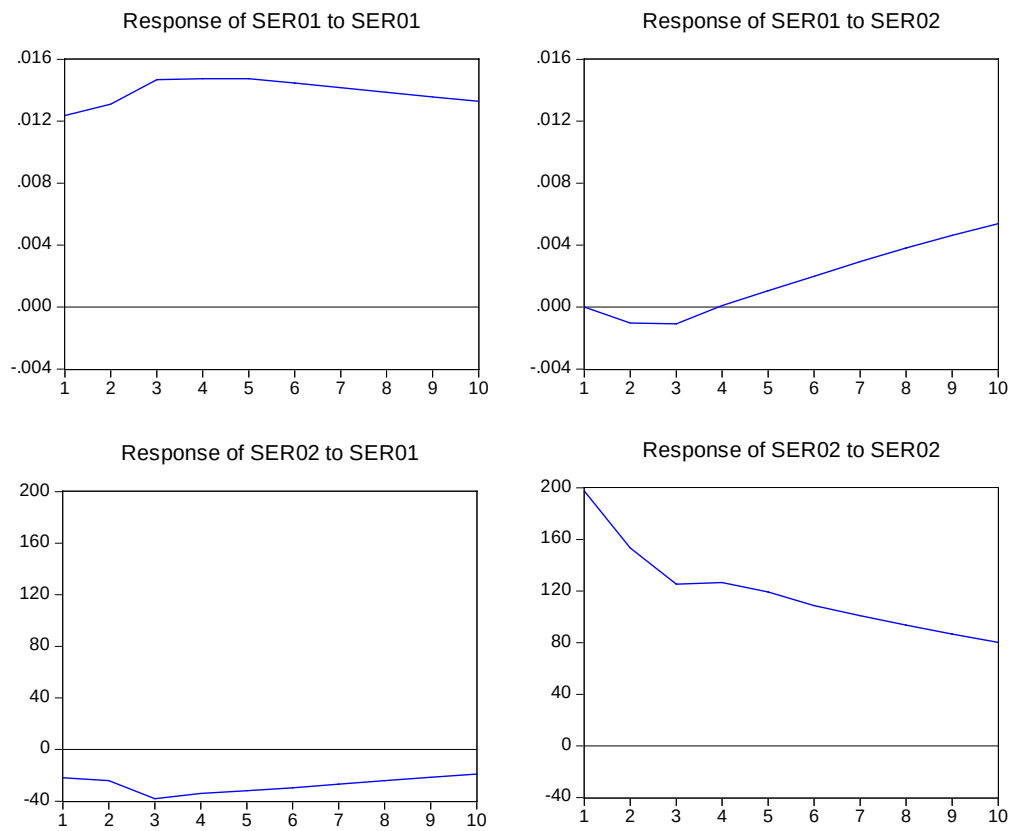
In table VII, we have applied vector auto regression model to find that either any short term relationship between the two time series exists or not. Although the results are not much different than the previous results, in one case the result is significant i.e. the relationship of exchange rate volatility seems to converge with sentimental index over a period of time but at very minimal level.

Error Correction	D(GARCH01)	D(SENT)
CointEq1	-0.00426	57.68489
	0.00199	-32.0298
	[-2.13758]	[1.80098]
D(GARCH01(-1))	0.053955	-637.27
	-0.08951	-1437.15
	[0.60278]	[-0.4434]
D(GARCH01(-2))	0.125794	-1532.67
	-0.08862	-1422.87
	[1.41944]	[-1.0777]
D(SENT(-1))	0.00018	-0.14644
	-0.000580	-0.09306
	[-1.87060]	[-1.573]

C	D(SENT(-2))	-0.000068	-0.11832
		-0.0000570	-0.09229
		[-1.18635]	[-1.2820]
		0.001781	7.534585
		-0.00112	-18.0528
		[1.58431]	[0.41736]

Table VIII

Response to Cholesky One S.D. Innovations

**Figure I**

Research Contribution

As far as academic contribution is concerned, there has been many studies that have tried to explain the variations in exchange rate due to the investor sentiments but different sentiments have different roles to play in different forms of market. In this paper we have tried to explain the variations in our emerging market due to the sentiments that have been included in our sentimental index and therefore adding to the general body of knowledge.

Practical contribution is that by taking into consideration the included proxies, investors as well as business that operate globally diversified portfolio or have a global impact on locally operating operations can benefit from the study.

Conclusion

In this paper we have tried to capture the impact of Investor sentiments on the exchange rates. There can be many factors that contribute to the volatility of the exchange rates but in this paper we have only included investor sentiments as an independent variable. The above results show that the investor sentiments do explain the variation in the exchange rates but the extent of variation is not up to greater extent. This means that the other factors do exist that explain further variation in the exchange rate volatility. In testing the long and short term relationship between the two time series, the results were insignificant showing that there does not exist significant relationship in the short as well as in the long term. It means that the proxies that we have taken to measure investor sentiments have an impact directly on the stock market returns but not on exchange rate volatility, although an indirect impact following the portfolio balance theory can be observed with significant statistical results. As we have tried to see the impact of investor sentiments so we can conclude that in the lights of behavioral finance, the investor sentiments have some explanatory power in explaining the results of the exchange rates. No doubt the extent of variations is not to a greater one suggesting that behavioral aspect is not the only factor and many of the other factors like macro economic factors, central bank intervention, imports and exports and long term government strategies also play an important role in the volatility of the exchange rates. One point worth mentioning here is that the exchange rate system in practice also causes volatility in it for example fixed exchange system constitutes less volatility as compared to the floating exchange rate system. In our market we have managed float system that is also attributable to the less volatility in exchange rates, whereas in pegged exchange rate system the volatility is not subjected to the changes in the economy of the individual country as the country to which the exchange rate is pegged, its economic indicators dictate the volatility in the country's exchange rates. 

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ARTICLE**Lead-Lag Relationship in Spot and Future Market:
Evidence from Pakistani Stock Market KSE-100 index**

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*Institute of Management Sciences, Peshawar***Abstract**

This paper has investigated the Efficient Market Hypothesis (EMH) through the concept of lead-lag relationship of the future market prices and spot market prices in the context of Pakistani stock market. The study has used data of randomly selected one hundred and forty firms listed on the Karachi stock exchange from January 1995 to March 2012. Spot and future indexes have been developed from the closing prices through the Price-Weighted index method. First stationarity of the data has been checked through Augmented-Dickey Fuller test then GARCH (1,1) model has estimated for both the spot and future index returns in order to investigate the volatility in either of the index. The results of GARCH (1, 1) suggested that the impact of the previous day volatility in both the spot and future index has impact on the current day volatility. The future market price volatility has more prominent value to explain the spot market prices as compared to that of the explanatory power of the future market prices based on the spot market prices. Therefore it has concluded based on the GARCH (1,1) there exists lead-lag relationship between the future and spot index and future market leads the spot market. Granger causality test has used to triangulate the results of GARCH (1,1) model. The results showed that future market Granger causes the spot market while the spot market does not Granger causes the future market. Thus it can be concluded that it is the future market prices that lead the spot market prices and thus there exist a Lead-Lag relationship between the future and spot market prices in Karachi stock exchange and one can predict changes spot market price based on the changes in the future market price. Moreover, these empirical results support the view that it's the future market where information has created about the security prices and then it disseminate to the spot market. This study shall help the investors in the establishment of the investments strategies for Pakistani stock markets.

JEL Classification code: C22, G10, G13, G15

Key words: Spot index, Future Index, Lead-Lag relationship, Granger Casualty, GARCH, Volatility.

1.0 Introduction

The weak form of the efficient market hypothesis in the spot and future markets have gotten sufficient attention from the research students, academics and practitioners due to the market volatility and arbitrage opportunity available with the investors to outperform the market. The term efficiency of the market means that all information about the securities has been reflected in the prevailing market prices (Fama 1960). Therefore, any good or bad news information disseminated to the market would incorporate in the spot as well as the future prices instantaneously. But what if the news has not reflected in both the spot and future markets simultaneously. Then the question arises that which market has the capability of discovering the prices and then which market shall follow it. Thus if market is not efficient, then there can be lead-lag relationship between the two markets.

The concept of the price lead- lag relationship of the future index with the underlying spot index is that how quickly one market incorporates the newly arrived information as compared to other, and how much the two markets are associated with each other. In efficient market the price movements in the two markets are not auto-correlated and there has no lead-lag relationship. However, if the reaction to news of the two market is not simultaneous than there would be a possibility of lead-lag relationship between the two markets.

A good number of researches investigated the significant lead-lag relationship of the futures index and underlying spot market (Finnerty and Park (1987); Kawaller, Koch, and Koch (1987); Harris (1989); Stoll and Whaley (1990)). Their empirical findings support the inefficiency of the future and spot markets and suggested that the future market significantly leads the spot market. However, there has been weak evidence for the spot market to predict the future market.

The price discovery feature of the derivatives market has a vital role in the relationship between the future and spot markets. Booth et al.(1999), suggested that price discovery has the process through which the new information incorporated in the securities prices that would lead the share prices to attain equilibrium. Analytically, it has been verified in different studies that derivatives market enclosed good or bad news information and later on the same information reflected in the stock price. Thus there exists a lead-lag relationship between the future and the spot markets (Frino et al.2000; Thenmozhi 2002; Mukherjee and Mishra 2006; Floros and Vougas 2008; Tse and Chan 2010).

The market dynamics and institutional set up of the financial markets have differences in the microstructure and transaction cost that lead the returns of the one market while the second market follow it. Therefore, there exist plausible views about arbitrage profit. (Chan and Chung 1993; Sofianos 1993).

This paper has contributed in the sense that it is the first study that has used the future contract data while testing for the lead-lag relationship between the future and spot markets in Pakistani

context. Secondly a good number of statistical techniques have been used for investigation that has not been used before simultaneously.

The paper has been organized in different sections such as introduction provides an overview of the concept with the contribution of the study. The second section is literature review that showed the different theoretical and empirical work up to the date. Third section composes of research designed and methodology that explain the data set and different techniques used in the study. Fourth section is based on the analysis that showed the empirical results with interpretation. The fifth section represents the conclusion and future scope of the study.

2.0 Literature Review

Literature on the derivative and spot market has mainly been divided in to three main broad sections. Firstly the derivative markets' impact on the spot market and behavior of the derivative exchange markets. Secondly the behavioral aspects of the spot market position near to the expiration dates of the future contracts. Thirdly investigation of leader and follower relationship between the spot and derivative market across the emerged economies but very little is known about the emerging markets due to non-availability of derivative market data.

Zeckhauser and Niederhoffer (1983) conducted the first survey on the relationship between the spot and the future markets. The survey concluded that future market prices have the capability of forecasting the changes in the spot market prices in short terms.

Kawaller, Koch and Koch (1987) investigated a bidirectional intra-day price lead-lag relationship between the spot and the future market while using trading data of S&P 500 future with one minute gap. Their empirical results suggested that there exists a significant lead-lag relationship between the future and spot market. Furthermore they showed that future market lead the spot market by twenty to forty five minutes. While the spot market leads the future by just two minutes.

Herbst et al. (1987) investigated the stock and future market relationship through cross correlation for the period of February 1982 and September 1982. Their findings suggested that the future market leads the spot market from zero to sixteen minutes. Kawaller, Stoll and Whaley (1990) tested empirically causal relationship between the future and spot market while using intra-day data of S&P 500 with that of the Major Market Index. The empirical results supported a causal relationship between the spot and future markets. Moreover, future markets lead more stronger than the spot market.

Stoll and Whaley (1990) suggested that there exists a lead lag relationship in five minutes intervals prices of S&P 500 futures market with that of the spot market. They showed that future market strongly lead spot market while week lead-lag relationship evidenced in reverse direction. (Pizzi et al. 1998).

Chan (1992) suggested the existence of the leader and follower relationship between the future market returns and spot market returns while using the inter-day stock returns of the S&P500 and Major Market Index (MMI). The author has investigated lead-lag relationship of the future and spot market based on the good and bad news differential effect, trading and size of the two markets with their movements.

Chan et al. (1991) investigated relationship between the stock returns and returns volatility of the future and stock index of S&P500 market data for time period of 1984 to 1989. Generalized Auto-Regressive Conditional Heteroskedasticity (bi-variate GARCH) has used to test for the lead lag relationship between the spot and future markets and concluded that none of the market price can be forecast with changes in the other market. Furthermore they suggested prominent bi-directional dependence relationship between the returns and also returns volatility of the both spot and future market. There has been no lead-lag relationship between the changes in the price and volatility between the future and spot market. So both the future and spot markets can act as significant discovery place in the prices and the news disseminates quickly in both of the markets.

Wahab and Lashgari (1993) provide contrary results to the above studies while using daily data of FTSE 100 and S&P 500 index from 1988 to 1992 while investigating causal relationship between spot and future market through co-integration. They evidenced strong lead-lag effect from spot market to future while weak in strength from future to spot market.

Abhyankar (1995) conducted his study on lead-lag relationship in the London's stock and future market while using hourly data form 1986 to 1990. The empirical results of E-GARCH model suggested a contemporaneous association between the spot and future market. Future market leads the spot market in mean. The author argued that more traders with information enter the future market as compared to the spot market due to the existence of lower cost in the entry and transaction in the future market. So any good or bad news information assimilated much faster in the future markets and thus provide an opportunity for traders to speculate. He further added that at the time of high volatility and moderate good and bad news, the spot market lead the future market.

Kutmos and Trucker (1996) investigated the relationship between the S&P 500 index and S&P 500 Future index while using daily closing prices for the time period of 1984 to 1993 through the bivariate E-GARCH procedure. The empirical results suggested that in short run the future market and spot market dynamics are the same. Any news impact in the future would lead to increase in the volatility of the spot market through asymmetric ways. However any innovation initiating in the stock market has no effect on the volatility of the future market.

Cheung and Fung (1997) investigated daily data of three months Eurodollar stock rate and future rate for the period of 1983 to 1997. They used co-integration, Ganger causality test and AR-GARCH model for the testing of relationship between the two rates. The empirical results of these models supported the bi-directional casualty between the two markets. Silvapulle and Moosa (1999) suggested that futures market prices of the crude oil lead the stock prices. Their conclusion has been based on the daily prices from 1985 to 1996 while using the linear causality test. Moreover, they also used nonlinear causality tests which suggest that both of the market react to the good and bad news information simultaneously without time differentiation.

Booth et al. (1999) investigated the German market of future index, option index and stock index while using intraday transactions. The empirical results showed that future market and spot market are helpful in providing information about each other while the option market has weak informative relationship between the shares and option index.

Frino et al. (2000) investigated the news impact on the future and spot market while using correlation technique of analysis. The findings suggested that economic news have impact on the spot market and then that effect has shown in the future market later on. So there exists a lead lag relationship between the spot and future markets.

Roope et al. (2002) investigated the Taiwan Index future that is listed in both the Singapore as well as Taiwan stock market. Their empirical results suggested that information effects on the prices are originated in Singapore and then it has been carried forward to the Taiwan future markets. Therefore, there exists lead-lag relationship between the two market future contracts and spot prices.

Thenmozhi (2002) and Anand-babu (2003) investigated lead lag relationship between the Nifty future and spot index for the daily prices. Their findings suggested that the future market has led by one and two days the spot market. They further added that it's the future market that has good power of information disseminating and thus play a vital role in the change in prices. So therefore due to more information origination in the future market that can leads to the spot markets.

Mukherjee and Mishra (2006) suggested a contemporaneous and bidirectional relationship between the Nifty future and index and spot index in India while using a daily data for the period of six months ranging from April 2004 to September 2004.

Hoque, Kim and Pyun, (2006) investigated the mean reverting behavior of the eight financial markets based on weekly data from April 1990 to February 2004. Their findings suggested that out of those eight markets Singapore, Indonesia, Thailand, Philippines and Malaysia showed predictable behavior and mean revision exists while in Korea and Taiwan, the results failed to support the mean reversion.

Floros and Vougas (2008) investigated the Greek market efficiency while using data set of 1999 to 2001. Their findings suggested that the futures market of the Greek is more efficient than the stock market. Zhang et al. (2010) investigated the Future market efficiency by applying random walk hypothesis and unit root test. The empirical results suggested that the market prices of 51 out of 54 futures contracts fulfill the sufficient condition of the market efficiency. The future prices follow a random walk hypothesis implies that the market is efficient.

3.0 Research Design and Methodology

This section includes the sample framework, the data sources from where the data has been collected and used for the analysis and the models that have been used for the estimation and testing of lead lag relationship between the future and spot prices.

3.1 Sample framework and Data sources

This study has been conducted considering a random sample of forty such firm that are traded in Karachi Stock Exchange(KSE) in both the future and spot market for the period of January 2005 to March 2012. Daily stock and futures closing prices have been collected for those trading days where the trading of both the spot and future has been done simultaneously, accounted for 248000

observation from the KSE official website². Spot and future indexes have been developed from the closing prices of the one hundred forty firms through the Price-Weighted series like Dow Jones Industrial Average (DJI), Nikkei–Dow Jones Average (NDJA). Returns from both of the indexes has calculated by the below equation.

$$R_t = \ln(P_t / P_{t-1})$$

3.2 Descriptive statistics

The descriptive statistics will show the distributional characteristics of the spot Index and future Index. It usually contains the minimum, maximum, mean, deviation, Skewness and Kurtosis. Table 3.1 shows the descriptive statistic of the study.

3.3 Unit Root Test of Stationarity

Unit root test has been conducted to check for the stationarity of data. If the data has stationarity and no trends exist, then that data can be used for the further estimation. The unit root test was based on the concept that stock prices have random walk patterns and there has no trends in their behavior. Therefore it can be suggested that a random walk series is that series in which today stock prices equal to the previous day stock prices plus the random shift or shock as shown in the below equation. The Unit Root test results are given in table 3.2.

$$P_t = \rho P_{t-1} + \mu_t$$

3.4 Modeling Volatility of Spot Index and Future Index.

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model has used for modeling the spot index and future Index volatility and its impact on each other. Bolerslev (1986) modified the ARCH model that has presented by Engle (1982) model to the GARCH that allowed the researchers to use more lag in equation. Engle and Patton (2001) supported that GARCH has effectively modeled the volatility of the financial assets. GARCH model equation has been given below.

$$R_{st} = \gamma R_{ft} + \varepsilon_t$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^q \beta_i \sigma_{t-i}^2$$

Where

σ^2 = Conditional variance of the time series.

ε_{t-i}^2 = Autoregressive Conditional Heteroskedasticity (ARCH)

² <http://www.kse.com.pk/>

$$\sigma_{\epsilon_i}^2$$

= Generalized Autoregressive Conditional Heteroskedasticity (GARCH)

A and $\beta \geq 0$ to assured that the GARCH model is stable and the Conditional variance has some positive value. In this paper GARCH (1,1) has estimated based on the Schwarz Criteria and Akaike Information Criteria. In the GARCH equation the term (1,1) showed the first lag has used while estimating the equation for the ARCH and GARCH.

3.5 Granger Casualty

In order to find out the casual relationship between the spot index and future index returns, Granger casualty test has used. This test will help us to investigate the lead-lag relationship between the future and spot indexes. This test has used for the lead-lag for the reason that it is based on the concept that all information in one variable that we want to forecast has solely present in the other time series variables.

4. Empirical Analysis

This section consist of the empirical results of the study that includes descriptive statistics, Stationarity test, GARCH(1,1) and Granger Casualty test for the lead lag relationship between the spot and spot Index has been reported.

a. Descriptive statistics

The descriptive table shows that the number of observation used for the analysis are 1695. The minimum value of the future -0.745 while that of the spot has -0.724, maximum value of the future index has 0.346 while spot has 0.337, standard deviation of the future index has 0.139 and the spot index has 0.144. The ADF test results show that the both of the future and spot index are stationary. The ADF value of the spot is 39.54 and the future index has 35.57 both of these values are higher than the critical value that is -3.434 at 1% significance level.

Table 4.1 Descriptive statistics, Augmented Dicky-Fuller Test for Future and Spot Index.

Items	Future Index	Spot Index
No of Observation	1695	1695
Minimum	-0.745	-0.724
Maximum	0.346	0.337
Median	0.012	0.019
Standard Deviation	0.139	0.144
Skewness	-1.845	-1.954

Kurtosis	11.665	11.322
Jarque-Bera Test	299.754*	313.056*
ADF Test	-35.57***	-39.54***
Table 4.1 represents the number of observation, mean minimum, maximum, standard deviation, median, skewness, Kurtosis and ADF (Augmented Dicky-Fuller test). *** shows the level of significance for the future and spot market index.		

b. Correlation of Future Index Returns and Spot Index Returns

Correlation shows the linear association between the two variables. In our case the correlation between the spot and the future is about 0.936 which shows that spot and future index returns are positively correlated while the magnitude shows the intensity of the relationship is very high. Thus the spot and future index can have the capability of leading each other but the direction of the relationship as to which price leads is unknown.

Table 4.2 Correlation analysis of Future and spot Index.

Item	Future Index	Spot Index
Future Index	1.000	0.936
Spot Index	0.936	1.000

Table 4.2 showed the correlation between the future index and spot index.

4.3 Discussion and Estimated Results of GARCH (1, 1) Future Index as dependent and Spot Index Returns as independent variable.

GARCH (1,1) model has been used to estimates the volatility of the future index based on the spot index returns as shown in Table 4.3. The empirical results of the ARCH and GARCH suggested that current volatility has been directly and positively affected by the last period volatility as well as the square of the residuals of the last period. The mean equation coefficient has positive value of 0.4809 and it is statistically significant lead to the conclusion that there has a direct relationship between the future index volatility with that of the spot index volatility. The variance equation shows that both α and β have coefficients of 1.4572 and 0.2277 are positive and highly statistical significant at 1% significant level. The results suggested that volatility in the future prices has been due to the ARCH term more than the GARCH term of the estimated equation. Based on the above results, we can conclude that the volatility in the future market is due to the volatility in the spot market and the sum of $\alpha + \beta > 1$ which further suggested the volatility response of the spot prices on the future is going to increase over time (Chou,1988).

Table 4.3 GARCH (1,1) Model: Future Index Returns as dependent variable and Spot Index

Returns as Independent variable.

Items	Coefficient	Std. Error	Z-Statistics	Probability
		Mean Equation		
S.I.R	0.4809	0.00469	102.51	0.000***
		Variance Equation		
ARCH(1)	1.4572	0.0376	38.712	0.000***
GARCH(1)	0.2277	0.0080	28.32	0.000***
Schwarz Criterion			-5.113	
Akaike information Criterion			-5.126	
Log likelihood			430.90	

Table 4.3 shows the GARCH(1,1) results where S.I.R is spot Index returns while in the parenthesis of ARCH and GARCH (1,1) shows the lag terms. *** shows the significance level.

4.4 Discussion and Estimated Results of GARCH (1, 1) Spot Index as dependent and Future Index Returns as independent variable.

In order to investigate the impact of the future price volatility on the spot prices GARCH (1,1) has been estimated as shown in the table 4.4. the empirical results suggested that spot market volatility can be explained by the volatility in the future market but the explanatory power of the spot market volatility to explain the future market volatility has greater than the former one. The mean equation has a coefficient of 0.3351 and has statistically significant at 1% level of significance. So there has a direct positive influence of the future market volatility on the stock market volatility. The spot market volatility can be forecasted based on the volatility in the future market prices. The variance equation showed that ARCH (1) and GARCH (1) has coefficients of 0.0568 and 0.8672 and has statistically significant at the 1% level of significance. The sum of α and β is less than one ($\alpha + \beta < 1$) which further suggested that volatility shocks in the spot prices decay at lower rate. The impact of the volatility in the spot market prices due to the future market prices will decrease over time.

Table 4.4 GARCH (1,1) Model: Spot Index Returns as dependent variable and Future Index Returns as Independent variable.

Items	Coefficient	Std. Error	Z-Statistics	Probability
		Mean Equation		
F.I.R	0.3351	0.0052	64.49	0.000***
		Variance Equation		
ARCH(1)	0.0568	0.00558	10.18	0.000***
GARCH(1)	0.8672	0.00695	124.61	0.000***
Schwarz Criterion			-5.204	
Akaike information Criterion			-5.217	
Log likelihood			442.06	

Table 4.3 shows the GARCH(1,1) results where F.I.R is Future Index returns while in the parenthesis of ARCH and GARCH (1,1) shows the lag terms. *** shows the significance level.

4.5 Engle Granger Casualty Test

Granger Casualty test has been used to test for the causes and effect relationship between the Future market prices and the spot market prices. This test would help us know about the Lead-lag relationship between the future and spot market i.e. future market prices lead the spot market prices or the spot market prices lead the future market prices.

The empirical results of table 4.5 showed the Engle-Granger Casualty test results.

The results suggested that future market prices Granger causes the spot market prices based on the F-value 7.071 and its P-value 0.0003 which is greater than the critical value and thus Null hypothesis is rejected while the alternate hypothesis is accepted and thus future prices Granger Causes the spot prices. However for the spot prices causes the future hypothesis has not been supported for the reason of having less f-value 1.885 than the critical value while higher probability value 0.152. Therefore it can be concluded that spot Index does not Granger Cause Future index. Now based on the above results, it can be concluded that the future market leads to the spot market.

Table 3.5 Pairwise Granger Causality Tests

Null Hypothesis	F-statistics	Probability
Spot Index does not Granger Cause Future index	1.885	0.152
Future Index does not Granger Cause Spot index	7.971	0.0003***

Table 3.5 shows the results of Engle Granger Casualty Test. *** shows level of significance at 1% confidence intervals.

Conclusion and Future Research Directions

This study was conducted to investigate the lead-lag relationship between the future market prices and spot market prices. For the empirical analysis, daily stock prices and future prices have been collected from the Karachi stock exchange website for the period of January 2005 to March 2012 for randomly selected forty firms. GARCH (1,1) model has used to investigated the volatility in the spot and future prices. The empirical analysis concluded that historical volatility in the market prices has an impact on the current market price volatility in both of the spot as well as the future prices. Moreover the results further suggested that the future market price volatility has more prominent and persistent value to explain the spot market prices as compared to the explanatory power of the future market prices based on the spot market prices. So based on the GARCH (1,1) model, the future market leads the spot market. The news shock arrives at the future market and then it transfers to the spot market prices. That is why the volatility of the future market prices can better explain the spot prices.

In order to triangulate the results of the GARCH (1,1) model another test has used called Engle Granger Casualty test to investigated the Lead-Lag relationship between the future market prices and spot market prices. The results of the casualty test supported the GARCH(1,1) results and the future market prices Granger causes the spot market while the spot market does not Granger causes the future market. It can be concluded based on these analyses that it's the future market

prices that lead the spot market prices and thus there exists a Lead-Lag relationship between the future and spot prices of the Karachi stock exchange and one can predict changes spot market prices based on the changes in the future market prices.

This research was done to investigate the Lead-lag relationship based on the prices of spot and future market. In order to make more insight in this relationship one can include the trading volume as well as while explaining volatility in either of spot and future market prices. Other factors such as value added tax, capital gain tax, law and order situation and sentiments of the investors play important role in the lead-lag relationship between the spot and future market prices. 

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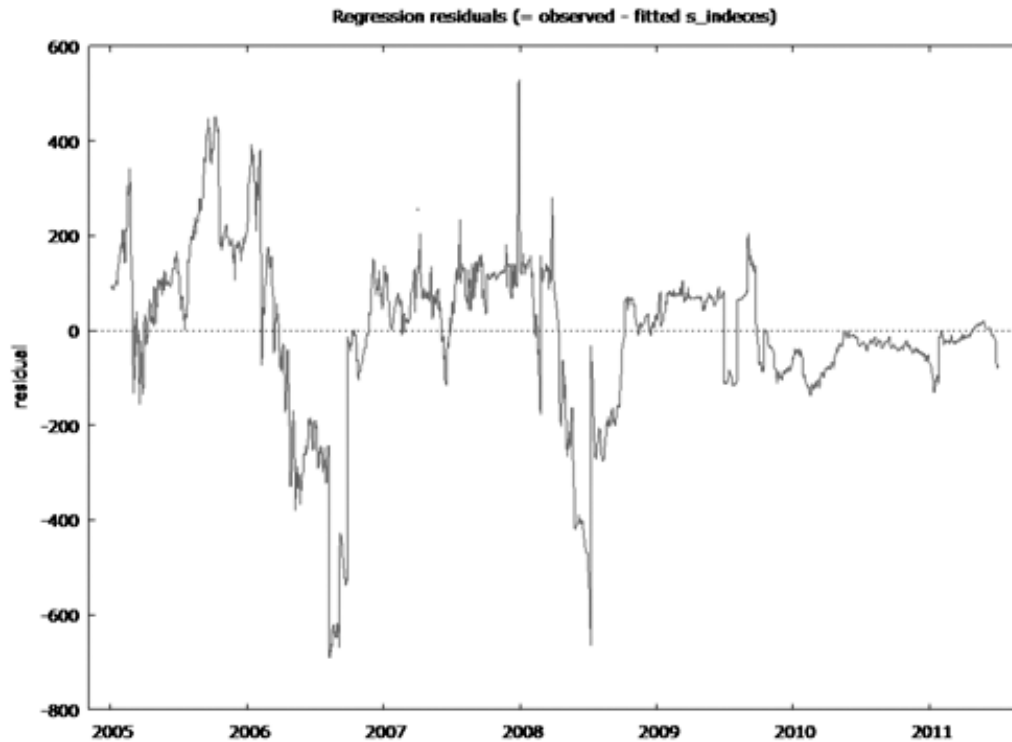
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Annexure

A1. Graph showing Residuals plot



The above annexure shows the residual plot of the regression of spot prices over the future prices.

"There is no prescription for leadership. By definition, it is individual. It is about morality, character and values. That's why it is really an incredibly difficult task to take on."

- M. S. 'Vindi' Banga

CASE STUDY

Lucky Cement
A Price Leader in the Karachi Stock Exchange due to their
Marketing Break through in to the South Asian Markets

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Abstract

Cement is one of the most significant commodities in the area of physical development of infrastructure. As the South Asian economies develop and more and more demands are made on the infrastructure, cement will emerge as the key marketable commodity in this part of the world.

In the past 10 years the cement industry in Pakistan added capacity at a rapid pace. They made large profits on the back of high demand. Lately, they have experienced decline in sales and profits. To avoid the volatility of the domestic markets, some cement manufacturers have looked overseas. Lucky Cement Limited, as one of the leading manufactures, therefore decided to build a facility in the south to:

- *Meet the growing needs of the southern part of the country, and*
- *To export the surplus to the Middle East, Africa and South Asia.*

Currently, the maritime trade towards Europe and the US is experiencing a slow down. This has created a huge buildup of containers in Asia. Lucky is using this buildup of containers to their advantage. They lease the containers at a reduced rate to ship cement to India and Sri Lanka. They also used a unique approach to meet the time-consuming quality approval process by using a UK based quality appraisal agency to save the approval time. By using the shipping cost advantage and shortening the approval time in, Lucky Cement has created a strong presence in both India and Sri Lanka.

Introduction

On May 3rd, 2013 Lucky Cements shares closed at Rs. 173.89. This is a great turnaround for a company whose shares were being traded at Rs. 62.14 on June 30th, 2010. Their earnings per share have gone up from Rs. 7.35 in 2006 to Rs. 12.28 in 2011. This positive change was a result of the company's sustained effort to expand their sales and lower the cost of production. Another major aspect of this change was a marketing breakthrough for Lucky. They opened the export market swelling cement to the South Asian countries. Although Lucky has been selling cement to Afghanistan for a long time, they entered the Indian and Sri Lankan market after they opened their production facility in Nooriabad and selling bulk cement through Port Qasim to India and Sri

Lanka. Their continued profitability and high dividend payment have made them a darling of investors of Karachi Stock Exchange. Cement is one of the most significant commodities in the area of physical development of infrastructure. As the South Asian economies develop and more and more demands are made on the infrastructure, cement will emerge as the key marketable commodity in this part of the world.

The story of cement industry is as old as the story of industrial development in this part of the subcontinent. The first cement plant was established at Wah in 1921. On the eve of independence, there were four cement plants operating in Pakistan with a total manufacturing capacity of 470,000 tons per year. Pakistan Industrial Development Corporation established two new cement plants in 1956. As the newly independent country started development of physical infrastructure more cement plants were established to meet the increasing demand.

The expansion of cement industry took a big hit when it was nationalized in 1972. A new government organization, State Cement Corporation was created and ten plants with the annual capacity of 2.8 million tons plants were transferred to it. For the next 12 years, the industry worked under strict government regulation and price controls. State Commission of Pakistan added five new cement plants with the annual capacity of 1.8 million tons. In 1985, the government started to deregulate the controls and pricing structure. The government also started encouraging the private sector to build cement plants to meet the growing needs of the country. In 1991 a process of denationalization started. This encouraged the private sector to become active and built seven new plants¹.

In the past 10 years the industry has added capacity at a rapid pace. New plants have come on stream and the old plants have added more manufacturing capacity. As on November 2011, the two zones had an installed capacity of 42 million tons of clinker and 44 million tons of cement. The break down by zones is as follows²:

Table-1

	Annual Installed Capacity (Millions of tons)	
	Clinker	Cement
North Zone	35,382,857	37,152,000
South Zones	6,728,571	7,065,000
Total	42,111,428	44,217,000

One of the significant aspects of cement industry is that not all the manufacturers are making money. It is a high investment business where fixed costs are extremely high. The cement business therefore, relies heavily on working at full capacity. The industry as a whole was not very profitable in the 90s. The decade of 2000 saw rapid development of infrastructure in Pakistan. Some of the major projects undertaken during this period are the building of Gwadar port, and the Makran coastal highway in Baluchistan, building of motorway in Punjab and Khyber Pakhtunkhwa, lining of water courses in Punjab and Sindh and construction of new houses and commercial building all over the country.

There has been a marked change in the profitability of business from 1990s to 2000s. The early months of 2000 saw the industry as a whole making with 2003-4 being a banner year for them. Their fortunes turned in 2007-8 when the industry cumulatively made a loss of 6.22 billion rupees. An idea of how the fortunes of the industry fluctuate between stout years and lean years can be had by looking at the following table³:

Table – 2

	Profit	Loss	Net profit (loss)
Financial Year	(Billions of Rupees)		
2010-2011	5.98	(5.27)	0.71
2009-2010	4.84	(13.60)	(8.76)
2008-2009	10.32	(4.95)	5.37
2007-2008	3.30	(9.52)	(6.22)
2006-2007	5.57	(3.71)	1.86
2005-2006	17.74	(0.41)	17.33
2004-2005	10.18	(0.39)	9.79
2003-2004	6.17	(0.94)	5.23
2002-2003	0.80	(1.93)	(1.13)
2001-2002	1.55	(1.52)	0.03
2000-2001	0.66	(3.14)	(2.48)
1999-2000	1.12	(1.43)	(0.31)
1998-1999	0.19	(3.96)	(3.77)

To avoid this fluctuation between profit and loss and to diversify their markets, Pakistani cement makers began to look at the export markets. After post 9/11 development work taking off in Afghanistan and high oil process leading to more construction work in the Middle East, Pakistani cement makers found good export markets at both places. The industry heavily exported to these two markets in the early part of 2000. As a matter of fact, bulk of Pakistani cement was exported to Afghanistan with the North Zone doing most of the exporting.

Afghanistan has been a traditional export market for Pakistani cement makers. The export procedures a resample, transportation is invariably by land and the exporters have long term contacts with Afghani importers. Manufacturers from the North Zone therefore, have always exported their surplus to Afghanistan. It is after the business activity slackened in Pakistan and the cement manufacturers started building a surplus that they started eyeing other destinations for their product. The table below shows the changing emphasis of Pakistani cement exporters⁴:

Table -3

Financial Year	Export to Afghanistan Cement	Export to India Cement	Export to Others Cement	Export to Others Clinker	Total Exports	North Zone	South Zone
	Metric Tons						
2001-2	106,620	0	0	0	106,620	106,060	560
2002-3	430,332	0	0	41,500	471,822	428,602	1,720
2003-4	1,118,293	0	0	0	1,118,293	1,088,218	30,075
2004-5	1,407,900	0	157,270	0	1,565,170	1,516,370	48,800
2005-6	1,413,994	0	91,165	0	1,505,159	1,409,492	95,667
2006-7	1,725,526	0	1,096,995	390,973	3,213,494	1,929,938	1,283,556
2007-8	2,777,826	786,672	3,045,995	1,106,127	7,716,620	5,111,607	2,605,013
2008-9	3,148,306	634,455	6,061,035	908,690	10,752,486	6,989,136	3,763,351
2009-10	4,013,671	722,967	5,637,163	283,436	10,657,235	6,960,854	3,696,382
2010-11	4,725,165	590,104	3,910,675	200,169	9,426,112	6,686,824	2,739,284
2011-12	1,804,581	253,118	1,134,698	0	3,192,397	2,377,013	815,384

Three patterns can be discerned by looking at the table above.

- From 2001-2 with a minor exception, all the cement exported went to Afghanistan
- 2007-8 was the first year that exports commenced with India
- Although North Zone still has a lead in exports, South Zone is also emerging as exporter of cement and clinker

Lucky Cement Limited

Lucky Cement has emerged as a favorite of investors at Karachi Stock Exchange. While most of the cement companies have gone through the proverbial cyclical ups and downs of peculiar to the cement industry, Lucky has continued to outperform its peers. It is poised to become a performer on the international theatre. It has started building a facility in the Democratic Republic of Congo to serve the fast growing African market. Our study however, concentrates on their performance in the South Asian market.

Lucky Cement Limited as one of the leading manufacturer therefore decided to build a facility in the south to:

Meet the growing needs of the southern part of the country, and
To export the surplus to the Middle East, Africa and South Asia.

Lucky Cement's Karachi Plant

The management at Lucky believed that the south zone of the country demands more cement and clinker than was currently made in 2005. At that time, the projected installed capacity of the country was expected to be at 45 million tons by the year 2012. One third of it i.e. 15 million tons was estimated to be in the south. This meant that from that level of 6.8 million tons, another 8.2 million were to be added. That implied that even if the Dewan's Dhabeji and Al-Abbas group

projects under construction at that time) were able to add 2- 3 million tons, the gap of about 4-5 million tons was still to be there to be filled by new projects. That was the basis of their plan of setting up a one million ton capacity plant in the south.

The management of Lucky Cement saw a clear advantage in building a cement plant in the South Zone. The advantages of a South Zone plant were:

- Proximity to a large expanding market that was adding major infrastructure such as the Lyari Expressway, the Gwadar Port, the Makran Coastal Highway, and major residential and commercial building in Karachi and Hyderabad.
- Proximity of the two ports in Karachi to bring cheaper (lower freight) coal as fuel
Availability of the port near to the production facility to export the surplus

Search for a Cheaper Fuel.

Initially, the cement manufacturers in Pakistan used furnace oil as fuel in the burning process and as supplier of energy to run the plant. Gradually, the price of furnace oil became extremely high leading the manufacturers to look for a cheaper alternative. The table below shows a comparison of cost for furnace oil and coal as a source of fuel in cement manufacturing ⁵:

Table – 4

	Furnace Oil	Imported Coal	Exchange Rate	Imported Coal
Financial Year	Rs. Per Ton	US\$ Per Ton	1 US\$ =	Rs. Per Ton
2010-2011	47,317	108.2	86.0	9,307.36
2009-2010	39,137	75.9	85.5	6,489.45
2008-2009	33,910	94.9	81.4	7,724.86
2007-2008	31,444	94.5	68.3	6,454.35
2006-2007	20,107	51.7	60.4	3,122.68
2005-2006	20,300	48.0	60.2	2,889.60
2004-2005	13,331	53.7	59.6	3,200.52
2003-2004	11,282	42.2	57.9	2,443.38

Coal therefore has a clear advantage over furnace oil. Lucky Management after deciding to use coal as their choice of fuel embarked upon receiving a steady and reliable supply of coal.

Their first choice was Lakhra coal. It has the advantage of abundance in supply and very close to the production facility. It was also much cheaper than the furnace oil. Lakhra coal, however, had a serious flaw:

Furnace Oil:

Approximate furnace oil required per ton
Sulfur content - furnace oil

85 Kg
3.5% (Avg.)

Sulfur induced per ton of clinker (85 x 3.5 %)	2.97 Kg
Lakhra Coal:	
Requirement of Lakhra coal per ton of clinker	223 Kg
Sulfur content - Lakhra coal	5.49% (Avg.)
Sulfur induced per ton of clinker	12.24 Kg

From the above data we see that by using Lakhra coal instead of furnace oil the sulfur content in clinker rises by almost 300 percent. This is a major hurdle for industries to shift to coal from furnace oil. The cost of production is higher and the quality of clinker is worse, which deteriorates the quality of cement. Additionally, Lakhra coal also has high volatile matter which gives rise to spontaneous combustion problems.

The Management therefore decided to use coal imported from Indonesia to use as fuel for production. In 2005 the FOB price of Indonesian coal was US\$42 per ton. Freight from Indonesia to Karachi was US\$20 per ton. Even with an unfavorable exchange rate of US\$1 to Rs. 60, the Indonesian coal gave the company a clear advantage over furnace oil.

Profitability

Lucky Cement has delivered a consistent profitable performance over a long period of time. Table 2 above shows that with the exception of financial years between 2003-2006, the cement industry has not been a very profitable business. Comparably Lucky Cement has delivered profits consistently over a long period of time. The table below shows their revenue, expenses and profit from 2006 to 2011⁶:

Table -5

	2006	2007	2008	2009	2010	2011
Sales	8,054,101	12,521,861	16,957,879	26,330,404	24,508,793	26,017,519
Cost of sales	<u>5,073,797</u>	<u>8,846,708</u>	<u>12,600,706</u>	<u>16,519,138</u>	<u>16,529,932</u>	<u>17,306,400</u>
Gross profit	<u>2,980,304</u>	<u>3,675,153</u>	<u>4,357,173</u>	<u>9,811,267</u>	<u>7,978,861</u>	<u>8,711,119</u>
Net profit	1,935,950	2,547,292	2,677,670	4,596,549	3,137,457	3,970,400
Profit as % of sales	24%	20%	18%	17%	13%	15%

Export to South Asian Countries

Armed with a cost advantage and enviable profitability, Lucky Cement management embarked upon looking for export markets in South Asia. They believed that due to their high growth potential and proximity to Pakistan, they can be a dependable and profitable market. India with above normal growth ranging from 8% to 10% during the years 2006 to 2010⁷ holds a high potential for cement exports. Sri Lanka, coming out of a long and disastrous civil war offers

opportunities to contribute towards the repair and development of their physical infrastructure. It is estimated that cement demand will grow in India at an average rate of 9.8% for fiscal years 2011-2014⁸. Not all this demand can be met with the Indian cement industry that is already facing high fuel and distribution costs. Indian cement industry came under pressure due to an 8.3% increase in freight and 12.6% increase in fuel and power costs in FY11-12⁹.

Going Global

Although, Lucky Management has a long experience selling their products (clinker and cement) in Afghanistan and the Middle East, entering the South Asian market is a different ball game. The countries in the Indian subcontinent have trade policies that clearly favor their local industries. Cement being a base commodity is a highly controlled item. South Asian countries (including Pakistan) jealously guard their cement markets to prevent foreign incursion. Lucky Management foresaw the following advantages in entering the South Asian markets:

- Their large customer base and huge development potential
- Diversification of their export market from two countries namely, Afghanistan and UAE, to many countries.
- Reduce their dependence on a very volatile local market.
- Proximity of the South Asian markets to their production base in the South Zone.

Lucky Management used the classical textbook approach to enter South Asian markets. They are using a step by step process to enter the market and sell their product. The steps are ¹⁰:

- No regular export activities
- Export via independent representatives
- Establishment of one or more subsidiaries
- Establishment of production facilities abroad

Opening Doors in India and Sri Lanka

Lucky Cement was fortunate to have exporting doors opened for them by the importing countries themselves. In case of India, one of the largest trading houses asked Lucky to dispatch their product to them. This trading house was influential enough to process all the import requirements itself on the Indian side for Lucky to ship their consignment. For Sri Lanka, it was one of their ministers who personally requested Lucky to export cement to his country. Lucky management used this opportunity to introduce their product and their name to other importers in the country. Starting with small consignments of a few thousand tons, Lucky is now shipping cement and clinker to these countries in hundred of thousands of tons every year.

Impediments to Exports both India and Sri Lanka have strong organizations to verify the quality of cement and clinker imported in their country. In India the task of verification of quality and issuance of a clearance certificate is performed by the Bureau of Indian Standards (BIS) while in Sri Lanka, Sri Lanka Standard Institute (SLSI) performs this job. In India a certificate issued to an exporting entity is valid for one to two years for all their shipments while in Sri Lanka, SLSI

constantly test samples picked from shipments arriving at Colombo Port. Although primary role of these National Standards Bodies (NSBs) is to ensure that the cement being imported complies with relevant local Cement Standards but these often NSBs become a Non-Tariff Barriers for free trade.

On the face of it, it seems that it is easier to export to India than to Sri Lanka due to the duration of the validity of the certificate. However, Lucky found it from their experience that it was harder to get a certificate from BIS than to SLSI. The officials at BIS asked to come to Pakistan to inspect all the cement making plants who have requested to have quality assurance certificate issued to them instead of confining themselves to each shipment. Towards the end of 2010 BIS Certificates of Lucky Cement Karachi Plant and certificates of most of other cement exporters to India expired. Despite Pakistani cement industry's persistent follow-up with BIS directly as well as through government, the auditors of BIS finally came to Pakistan after 5-6 months i.e. March 2011. Additional time was required for getting clearance from Indian Interior Ministry. The team of auditors entered Pakistan through Wagah and then fanned out to entire Pakistan and inspected all factories to renew their permits. Once the certificate was given to Lucky they could export both cement and clinker to India for a whole year.

The SLSI also becomes NTB as it tests every single shipment. In Sri Lanka, even with the blessing of a minister, the bureaucracy played its hand by slowing down shipments from Pakistan. This was done on the behest of the local manufacturers who did not want competition for their products from Pakistan. The delay in issuing quality certificate pushed the delivery schedule forward causing the shipper to pay demurrage to the shipping company. It also happens that the test results obtained by SLSI in their Lab do not comply with SLSI Standard requirement. This issue is being addressed by picking parallel sample of all shipments reaching Sri Lanka sent to an accredited Laboratory in UK in addition to sample tested by SLSI. None of the sample ever tested in UK or any other accredited and independent Laboratory has been found unsatisfactory or non-complying with standards. However this adds to the expenses.

Fuel costs happen to contribute about 60% of the total cost of production. Cement being a high investment items also has a high fixed cost. With a high variable cost and high fixed cost, the profitability in cement business depends upon lowering fuel costs and working at a high capacity. Lucky needs to substitute the high priced coal for a low priced substitute and work at close to 100% capacity to stay competitive within the country and outside.

Logistic Advantage in Shipment to South Asia

Currently, the maritime trade is experiencing a slow down. With Europe facing recession, Asia has a huge build up of empty containers. The seaborne shipping business itself is feeling the pinch. Maritime freights are down and availability of both container and bulk ships is high. This is helping Lucky to ship their products to both India and Sri Lanka at competitive rates. Even within India, due to high business activity, both surface and maritime freights have increased. India also has a rundown infrastructure (it has no motorways to speak of) causing transport costs to go up. Cement sent from surplus states such as Gujrat may not be price competitive when it reaches the southwestern state such as Kerala after factoring in the transportation costs. Lucky Management is exploiting this costs difference to their advantage. Karachi Plant's proximity to Port really helps in

keeping inland freight low. All other major players in Pakistani cement industry are located in North Zone and they incur substantial inland freight to bring their cement to Karachi port. Lucky Cement is the only company in Pakistan having its own set-up of bulker fleet as well as loose cement silos at Karachi ports. In cement distance of market from production unit really makes difference. With Lucky's Nooriabad Plant working at near full capacity, they are able to dispatch both cement and clinker at competitive prices to both India and Sri Lanka. They should therefore look for long-term cost advantages such as increased productivity and substitution of high priced coal to a cheaper fuel.

Traditional commodities traded between Sri Lanka and Pakistan is tea and rice. Pakistan exports rice to Sri Lanka and Sri Lanka exports tea to Pakistan. Rice is also exported in containers so when export of Rice is at peak, the availability of containers for cement exports becomes a problem. This also results in increase in ocean freight by shipping lines.

Even with logistical and bureaucratic impediments, Lucky managed to increase its shipment to South Asia. Below is a record of quarterly shipment of cement to both India and Sri Lanka* for the last two fiscal years: (fiscal 2011-2012, three quarters only)

2010-11	1 st Quarter	2 nd Quarter	3 rd Quarter	4th Quarter	Total
India	308	5,570	38,472	26,600	70,950
Sri Lanka	291,261	69,487	65,545	107,363	533,655
Total	291,569	75,057	104,017	133,963	604,605
2011-12	1 st Quarter	2 nd Quarter	3 rd Quarter	4th Quarter	Total
India	23,716	10,416	9,100	NA	43,232
Sri Lanka	56,178	78,458	180,682	NA	315,318
Total	79,894	88,874	189,782	NA	358,550

*Internal company reports

Future Opportunities and Challenges

Lucky has embarked upon an ambitious plan to export to South Asia and Africa. They already have a strong presence in Afghanistan and UAE. However, doing business in South Asia carries its own risks and rewards. Both India and Sri Lanka are expected to grow with a rapid pace in the coming years. India is expected to maintain its double digit GDP growth. It did not spend enough to build and, maintain its physical infrastructure. Government of India (GOI)'s Eleventh Five-Year Plan recognizes this deficiency and has allocated USD 160 billion to be spent on developing logistic infrastructure. This amount is a full 2.3% of GDP¹¹. According to McKinsey, this amount though large enough is insufficient to redress the situation. They estimate the proposed expenditure to be over USD 500 billion. Anything less will result in India suffering economic losses of about USD 120 billion annually by year 2020.

McKinsey is proposing that GoI should redirect the USD200 billion investments on roads. This money should be used in developing and expanding the high density corridors, lengthening the existing national highways. They also propose to build 15 expressways by the year 2020 to address the rapidly increasing freight traffic ¹².

Sri Lanka is coming out of a very long and destructive civil war. Its North stands in ruin and needs to be rebuilt, some part actually from scratch. It requires a tremendous amount of capital to develop its infrastructure. Sri Lanka being a tourist heaven cannot afford to have a slow rate of infrastructure development. Both these countries offer Lucky tremendous opportunities for export of cement and clinker.

Sri Lanka had an extensive roadway system to meet its need at the times of its independence. However, during the civil war, due to changing priorities and redirection of resources, the road infrastructure fell into disrepair. According to a World Bank report the country is facing logistic infrastructure problems that are affecting the growth of its tourism and commerce ¹³:

- National highways, which are mostly two-lane, are unable to carry the current volume of mixed traffic (pedestrians, bikes, bullock-pulled-vehicles and motor vehicles). This, together with the lack of side lanes and paved shoulders, leads to uncontrolled development of roadsides and causes low travel speeds, poor level of service, and less long-distance traffic.
- Neglected maintenance, as well as the lack of official capacity and resources, has led to the severe deterioration of roads. This adversely affects farmers taking produce to markets and villagers travelling to cities to reach social services.
- Urban streets are in poor condition due to flooding, blocked drains, heavy traffic, and low quality construction. The lack of drainage poses a serious threat to traffic in congested areas, affects people's health, and hampers the development of commerce and tourism.

The Government of Sri Lanka has planned to spend USD 6 billion to repair old road and build new highways and expressways to solve the transportation problems highlighted in the above World Bank report. This expenditure is on top of what the Government intends to spend in developing repairing and developing the areas devastated by the civil war.

Both India and Sri Lanka therefore offer great opportunities for Lucky Cement to carve a market for them. In both the countries, the bureaucracy is extremely strong and it finds ways to help their favorite sons. Lucky will have to stay one step ahead of the game in both India and Sri Lanka to achieve its goal of becoming a major exporter of their product to South Asian countries.



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"Few people attain great lives in large part because it is just so easy to settle for good life. The vast majority of companies never become great, precisely because the vast majority becomes quite good. And that is their main problem."

- Jim Collins in Good to Great

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